

The Green Deal for retrofit¹

It might not be the answer – but it asks good questions

The Green Deal, along with its associated Energy Company Obligations, has been billed as one of the Government's main tools to cut our carbon emissions and energy use. The Green Deal was announced soon after the coalition took office, billed as a consumer-centred revolution in home energy efficiency. But the slow process of proposal, consultation, response and redesign means that even now it has not quite got off the ground. Kate de Selincourt takes a look at its prospects.

The Green Deal is a loan system whereby Green Deal "Providers" source finance for energy efficiency improvements, then the occupants (owners or tenants, residential or otherwise) pay back the cost of the work, plus the cost of the finance (the interest), via their electricity bill.

Green Deal borrowing is tied to the property, not the occupant, and the amount borrowed is set such that the measures plus the interest should be affordable out of average bill savings as predicted by RdSAP – the so-called golden rule.

The assessments and installation have to be carried out by operators accredited within the Green Deal system, to be eligible for Green Deal funding – many, but not all, existing trade schemes count towards this.

The Green Deal is supposedly "market based", using commercial finance, and once established isn't intended to involve any public spending. The Energy Company Obligations (ECO) by contrast are obligations for the big six energy companies to pay for particular extra energy efficiency measures (on particular residential properties only – see box). Although the ECO isn't *government* spending as such, the public has to pay for it, via everyone's energy bills.

The legal framework for the Green Deal came into effect in October 2012 and the first ECO projects are expected to begin around the turn of the year, but, Green Deal finance is not due to be available until early 2013.

Will there be any takers?

Although early Green Deal rhetoric described the Green Deal as primarily a money saving proposition, customers will weigh up a whole range of potential benefits and costs. However, if you start with a purely financial calculation, the customer immediately runs into a problem with hard maths.

The initial rhetoric sold the Green Deal as a bargain ("customers will save money on their bills for no up-front costs", the line went). However, the up-front money has to come from commercial lending institutions. Green Deals won't be secured on the property, as this would impinge on the mortgage lender's "rights". Although the default rate is officially expected to be low, because the rate of default on electricity bills is low, the Green Deal itself is untried, so looks risky, which makes the money more expensive.

¹ This is a slightly amended version (with additional references) of the article that originally appeared in [Green Building](#), Winter 2012. A facsimile of the original, with illustrations, will be available here shortly.

The Energy Company Obligations or ECOs

The Energy Company Obligations are the part of the Green Deal that will probably get going first. These are the successor to the CERT and CESP programmes, and they oblige the big six energy companies to deliver a certain amount of notional carbon saving, by paying towards energy efficiency measures in UK homes.

The government has decided it wants to use the ECO to boost the market for solid wall insulation, so around half of the spending will have to be on energy efficiency improvements to homes with solid walls (or hard-to-treat cavities), and include wall insulation. This is called the Carbon Obligation.

The government has removed the obligations under CERT to offer subsidised cavity wall and loft insulation, except for households in receipt of particular benefits, but NOT living in social housing – the Affordable Warmth Obligation. These households will be eligible for 100% funded energy efficiency improvements to bring their homes up to the (not very ambitious) “Decent Homes” standard.

Following an outcry from the social housing sector, a third category of obligation was introduced, the “Carbon Saving Communities” obligation, which targets low-income areas and covers both public and private housing tenures.

The overall spending on these obligations is expected to be around £1.3 billion per year – less than the CERT and CESP budgets.

In theory, individual households are eligible for an ECO grant to “top up” a Green Deal where they meet the relevant criteria. Because the energy companies will want to get the obligations met at lowest cost to themselves, a lot of the spending is expected to be via large-scale, neighbourhood- or even city-wide programmes, so how easy it is for individual households and their contractors to access the ECO may depend on whether there is a suitable larger scheme that they can be part of. This will be looked at more closely in the second part of the article.

	Who is eligible	What measures	Householder contribution
Carbon ECO	Households in solid walled properties or properties with hard-to-treat cavities. Owner occupiers and private and social tenancies	Package that must include solid wall/cavity wall insulation, some restrictions	Could be zero, or variable amount via green deal or private source – remains to be seen
Carbon Saving Communities	Properties as above in specified low-income areas, plus low income households in small rural communities. Owner occupiers and private and social tenancies	“loft and cavity wall insulation as well as wider insulation measures”	Zero for “affordable warmth” eligible h’holds, as Carbon ECO for better off
Affordable Warmth	Householders on certain benefits, below certain household income. Owner occupiers and private tenancies only	Mainly basic measures such as heating systems, loft and cavity insulation (probably fairly shallow)	zero

Energy Company Obligations - summary²

² Please note, this is compiled from DECC sources, but cannot be guaranteed

As Mark Dowson & Adam Poole from Buro Happold told a recent Good Homes Alliance 'Green Deal for Real' event³, there is a "lack of incentives for investors".

Protecting the investors

DECC takes this issue seriously; strict rules about the loans have been devised, in order, DECC says, to "reassure the markets". As Secretary of State for Energy and Climate Change Ed Davey put it⁴: "We are committed to ensuring the interests of Green Deal providers and financiers remain protected to maintain the security of Green Deal asset and thus secure the lowest possible cost finance for consumers."

Nonetheless Green Deal borrowing is going to look expensive to many customers – the most recent pronouncements from the Department of Energy and Climate Change (DECC), and the Green Deal Finance Company set up to "bundle up" the loans, suggest a rate of 7.5% is expected.⁵

Interest at 7.5% adds a substantial amount to the overall repayments – on a 10 year Green Deal for example, it adds over 40% to the principal repaid – taking a very substantial bite out of any savings. Borrowing at this rate for the full 25 years means that more would be repaid in interest than the original amount spent on the property.⁶

This means that for very many of the measures theoretically available in the Green Deal, the return on investment in fuel bill terms is simply too low to cover the costs of finance in a reasonable time, or even within the predicted lifetime of the measure itself. It has been predicted that mainly tank lagging, draughtproofing and loft and cavity insulation will meet the 'Golden Rule', with new boilers and loft insulation top-ups only eligible in some cases, and other measures seldom covered by a Green Deal alone.⁷

For owner occupiers, a mortgage extension is likely to be significantly cheaper. And Which? points out that "for those with a good credit score, there could well be more cost-effective finance" even without security; for example £10,000 loans may be available at 6%. According to Which?, DECC suggested that the Green Deal was nonetheless still cheap – "for those on the lowest incomes that often have poor credit ratings and can often only access loans at high, punitive rates". It is perhaps unfortunate that according to *Inside Housing*, the Office for Fair Trading has ruled that, actually, people would have to undergo a credit check before being offered a Green Deal – so some of these same customers may be excluded after all.⁸

Theoretical examples have been bandied about showing people spending thousands of pounds on the most extensive 25-year Green Deal the golden rule allows, for perhaps a £30

³ <http://www.goodhomes.org.uk/events/123>.

⁴ Written statement June 11th 2012

http://www.decc.gov.uk/en/content/cms/news/gdeco_wms/gdeco_wms.aspx

⁵ <http://www.decc.gov.uk/assets/decc/11/consultation/green-deal/5533-final-stage-impact-assessment-for-the-green-deal-a.pdf> Despite the evidence from Which? and others, this impact assessment states that 7.5% is "significantly lower than would be expected for other forms of unsecured personal finance". DECC claims to have sourced this information from the Bank of England, quoting an "average rate on personal loans of £5,000" of 15%, but it is not clear what kind of loans this figure covers.

⁶ <http://www.uswitch.com/gas-electricity/news/2012/07/03/government-faces-criticism-over-green-deal-loans/>

⁷ Research from www.Bioregional.com & LoCal-net

⁸ <http://www.insidehousing.co.uk/eco/households-face-green-deal-credit-check/6524458.article>

or £60 a year notional energy saving. This sort of Deal seems highly unlikely in practice. Research, including some for DECC suggests:

- People are more comfortable with five- or possibly ten-year financial arrangements than longer ones
- People are generally unlikely to want to commit to more than £4-5,000.⁹ When they do, it tends to be as part of a major refurbishment, and/or done with close advice and support throughout the design, commissioning and project management stages.¹⁰

Promoting the Green Deal as a way to save money will if anything encourage people to look for smaller green deals covering only the most cost-effective measures. This of course would restrict the potential for major cuts in emissions, as Keith Bothwell explains in his feature in the Winter 2012 issue of *Green Building*.

Can the assessment be relied upon?

If people do buy large Green Deal packages, with putative savings only marginally greater than the repayments, there is an obvious danger. Predicting energy use in buildings is notoriously uncertain. The Daily Mail “Green Deal rip-off left me £1000s out of pocket” headlines are not hard to imagine.

Frustratingly few published studies give results of real-life post-retrofit energy use. In published accounts of retrofit projects, impressive claims for savings are often made, yet close reading shows these “savings” are merely predictions from numerical modelling: no actual monitoring of energy use has taken place, so these “savings” are no more than wishful thinking. This is at last beginning to change, as at least the gaps in knowledge are being acknowledged – though filling them will take longer.

When monitoring has been done, the findings are striking, if unsurprising. The savings predicted by SAP and RdSAP are not, on the whole, realised. For example, Gentoo housing in the North-east retrofitted 139 homes and found that householders only saved an average of half the predicted amount. So what is going on?

SAP sets a fixed living temperature (21°C in the living area and 18°C everywhere else) – it has to, to compare buildings. But of course many people cannot afford - or even manage, if the heating system is inadequate --to keep their homes this warm.¹¹ For such households, potential savings from any upgrade will be proportionally lower than the predictions. If they take advantage of an upgrade to be more warm and comfortable, the savings may well be eaten up altogether.

In the example above, Gentoo found that prior to the upgrades their customers had been using 40% less energy than RdSAP calculations had suggested, suggesting this was indeed a factor.

Green Deal advisors will be required to ask about the energy use patterns of potential customers, and to warn them if they are unlikely to achieve the savings predicted by their

⁹EST, DECC, 2010, *Exploring consumer willingness to pay*; Great British Refurb, 2010, *Government Green Deal must offer financial incentives*, cited in Green Deal or no Deal', Consumer Focus <http://www.consumerfocus.org.uk/files/2011/03/Green-deal-or-no-deal.pdf>

¹⁰ See for example projects managed by Severn Wye Energy Agency (eg Target 2050, http://www.swea.co.uk/downloads/read/HomesReport_read.pdf) and CSE (eg http://www.cse.org.uk/downloads/file/green_deal_conf_presentation3_learning_&_case_studies.pdf)

¹¹ http://www.cse.org.uk/pdf/you_just_have_to_get_by.pdf

Green Deal fabric assessment. But of course because ‘underheaters’ will still have to make the same repayments, this will make a Green Deal a lot less attractive to those who are already cold because they have no spare money – they are caught in a bind.

Thus, the households most in need of the improvements will be the ones for whom the Green Deal will be most likely to leave them out of pocket. Those on certain benefits will be eligible for the Affordable Warmth ECO, and hopefully some others will benefit from the Carbon ECO, and receive subsidised solid wall insulation. But others will be left literally in the cold.

“Energy take-back” and “rebound” are cited rather impatiently at times by designers and strategists – they lead to “underachievement in real-world energy savings” as one DECC document put it.¹²

But is it an “underachievement” to make someone’s house more comfortable? This seems to be missing an important part of the picture. In fact, the ability to keep the house warm and comfortable, far from being an obstacle to “performance”, is probably one of the best motivators for people to undertake – or accept -- energy efficiency work. Other incentives include security from fuel price rises, improving the appearance of their home, making it healthier for themselves and their families, and being ‘green’.¹³

Possible disincentives include hassle and uncertainty; reluctance to improve a landlord’s property at their own expense; need for redecoration/relandscaping; perceived effect on lettable/saleable if there is still a charge outstanding; and whether they trust the assessor, the provider, the installer, the energy company - or the Government. In fact research commissioned by the government made it clear that, simply looked at from a financial point of view, most customers would not go for a Green Deal even if there were net savings, because of the perceived hassle and risk – in other words, only if they are convinced there will be benefits beyond the financial, will they bother with it at all.¹⁴

This is scarcely rocket science – and belatedly, some of the DECC rhetoric has picked up the idea that there may be more to gain from a low-energy retrofit than a £30 per year cash saving – Climate Change Minister Greg Barker even suggested that people might want to insulate their home so they could “hoover in their knickers”.¹⁵

It isn't just behaviour that erodes savings

It may not come as a great surprise to learn that not all energy retrofits perform as advertised. The Joseph Rowntree Housing Trust worked with researchers at Leeds Metropolitan University to test a two-stage energy retrofit of a 1930s house.¹⁶ The tests were by co-heating, which measured fabric performance independent of occupant behaviour. The retrofits underperformed in relation to the predictions. The standard retrofit delivered only 73% of the predicted performance improvement, the deeper, ‘radical’ retrofit, just 71%.

Heat sensors and thermographic imaging (see photos) revealed a number of gaps in loft and wall insulation. They also found that the original fabric performed better than predicted,

¹² DECC June 2012 Green Deal Impact Assessment

¹³ ‘What’s in it for Me’ report by Consumer Focus

¹⁴ Green Deal Household Model Assumptions Document, Element Energy, November 2011

¹⁵ <http://www.independent.co.uk/environment/green-living/minister-turns-the-disco-lights-on-to-sell-eco-home-upgrades-7717618.html>

¹⁶ http://www.leedsmet.ac.uk/as/cebe/projects/tap/tap_part2.pdf,

meaning there was less ‘slack’ to improve upon. Joseph Rowntree warn that “there could be many similar properties nationwide where ... installations fail to deliver anything like the benefits claimed”. In fact the research team felt that it was unlikely that the job could have been run much better, meaning many are probably worse.

DECC has been warned repeatedly of this danger, and responded by issuing what they call ‘in-use factors’ for a number of Green Deal technologies, discounting the energy savings that would be predicted in a Green Deal assessment, to give an added safety margin (see table). Note, these ‘in-use factors’ are explicitly NOT meant to include any comfort taking, which will of course reduce savings further. Given the experience of the “well-managed” Joseph Rowntree Trust scheme, it may well be that these factors don’t go far enough.

Measure	% in-use factor
Cavity wall insulation (including insulation of hard to treat cavities)	35%
Connection to a district heating system	10%
Draught proofing	15%
External solid wall insulation for a mobile home	25%
Flat roof insulation	15%
High performance external doors and passageway walkthrough doors	15%
Loft or rafter insulation (including loft hatch insulation)	35%
Pipework insulation	15%
Room in roof insulation	25%
Secondary or replacement glazing	15%
Solid wall insulation: solid brick wall built before 1967 (England & Wales)/1965(Scotland)	33%
Solid wall insulation: (a) a solid wall not built of brick; (b) a solid brick wall built in or later than 1967 (England & Wales)/1965(Scotland)	25%
Under-floor insulation	15%

In-use factors to be applied to Green Deal energy saving calculations – version published by DECC in October 2012¹⁷

Can this be sorted with more detailed guidance?

The experience of the Joseph Rowntree Trust illustrates a difficult truth - both technical knowledge and installation quality are lacking. And this issue itself relates to culture, training, management structures and the commercial and contractual structures – points explored in more depth in an interesting pair of reports, one from Leeds Met and de Montfort Universities, and one from University College London¹⁸.

Neil May, founder of the Sustainable Traditional Buildings Alliance, has long been a critic – with numerous others - of the limited understanding of the building physics in retrofit – but also – of an over-optimistic idea of what can be known.¹⁹ May, who is currently working with UCL, sees this as a philosophical turning point: “Perhaps what we need is a new style of working where risks are taken - as they have to be if we’re going to do anything - but they are taken knowingly, learning from the outcome, building up the knowledge base.”

¹⁷ https://www.decc.gov.uk/en/content/cms/consultations/eco_inuse/eco_inuse.aspx

¹⁸ http://www.leedsmet.ac.uk/as/cebe/projects/retrofit_challenge.pdf and BRI Vol 40 issue 4 <http://www.tandfonline.com/toc/rbri20/current>

¹⁹ http://www.aecb.net/PDFs/conference12/Neil_May_Embracing_Uncertainty.pdf, www.stbauk.org

The AECB's CEO, Andrew Simmonds, agrees. He suggests that in a sense, no-one would yet be in a position to advise on how to create a working Green Deal, because so much is unknown or untested. "As part of the Green Deal, let us try out some models, test them and report back on what they cost, how easy they are to build, how they perform and what they are like to live in."

The Green Deal and ECO could be said to offer the biggest ever opportunity to transform the knowledge base, and perhaps even the culture and philosophy, of the way retrofit is delivered. However DECC has shown no sign as yet of grasping this opportunity. As the TSB's Paul Ruyssevelt and others have noted with dismay, there appear to be no plans for monitoring, no plans for performance feedback, and as yet only a sketchy indication of how traditional buildings will be treated.

Diminishing expectations

Taking together the high interest rates, the fact that many customers will be worried by warnings that the Green Deal might not save them money, the caveats for technical underperformance, and the lack of public discussion of the 'softer' benefits of retrofit, it is hard to be convinced that the Green Deal will "transform" 14 million homes, as was originally promised. The nation's carbon emissions will not be dented much either. Deeper retrofits that would achieve this, will almost certainly need a different financing model.

Although DECC still keep up the brave talk, there is a certain sense that they are stepping back, saying now that they are 'handing the baton over to the market'.

Charles Phillips, a senior official at DECC, has admitted that there is not a pent-up demand for carrying out self-financed energy efficiency improvement work, even for the most cost-effective measures such as loft and cavity insulation. The current CERT and CESP programmes, despite large subsidies of up to 100%, are struggling to meet their targets, and at the Good Homes Alliance event²⁰ Phillips echoed the very words repeated time and again by those campaigning for more Green Deal customer incentives: "You can't give it away."

Shortly after Phillips made these remarks, DECC published the details of these long-awaited incentives – a range of 'cashback' subsidies for early Green Deal customers.²¹ Announced in October, these offer up to £1000 to customers who undertake a Green Deal Assessment, then have a Green Deal installer fit recommended measures – although they don't have to use Green Deal Finance. (Incidentally the cashbacks can be claimed on jobs that also have an ECO contribution – in which case they might be seen as helping the energy companies as much as the customers.)

Although DECC is at pains to stress what a triumph it is to have secured £200 million from the Treasury in such straitened times, the news has not met with an unqualified welcome

²⁰ Green Deal 4 Real, September 2012

²¹ Sums range from £10 for a hot water cylinder jacket up to £650 for solid-wall insulating at least 50% of external walls. "To avoid over-rewarding people who may be in receipt of support from ECO, the amount of cash back that can be received will be capped at 50 per cent of the applicant's installation costs."

http://www.decc.gov.uk/en/content/cms/tackling/green_deal/gd_customer/gd_cashback/gd_cashback.aspx

from the industry. One blogger was very sceptical, suggesting that it would repeat the “boom and bust” seen with the Solar FiT, with all its destabilising consequences.²²

Nonetheless, the cash-back might persuade some customers to act. It might be cynical to suggest that those most likely to take up the incentives are those who are contemplating the work anyway; the hope, presumably, is that these ‘early adopters’ will be so well pleased with their work that the demand for energy retrofit will strengthen – rather than slump back once the cashback offer expires. This latter scenario seems to be the fear of Paul King, chief executive of the UK Green Building Council: ‘Ultimately, if we are to reach 14 million leaky homes and transform attitudes to energy efficiency in the housing market, we will need structural incentives.’²³

In fact DECC now seems to have accepted that, as many have predicted, the Energy Company Obligations, not the Green Deal, will be the “backbone” of the programme.²⁴ The ECOs certainly overcome the basic economic hurdle, by offering substantial subsidies of up to 100% (see box). How the ECOs might work out in practice, and whether or not there will be a role for small businesses, will be looked at in part two of this article – due to appear in *Green Building* in Spring 2013.

But even the ECOs are only aiming for building regulations levels of efficiency. DECC will sooner or later have to face the reality that if they want to cut emissions, as well as reducing discomfort and fuel poverty, deeper measures will be required.²⁵ This would require a different approach to funding – and in Part Two I will also consider more effective ways the government might harness the wider benefits of energy efficiency.

²²

http://www.solarpowerportal.co.uk/guest_blog/the_125_million_green_deal_kick_start_will_do_more_harm_than_good

²³ <http://www.ukgbc.org/news/long-term-green-deal-needs-more-just-cash-backing>

²⁴ Charles Phillips at Green Deal 4 Real, as above

²⁵ In fact DECC’s own predictions for carbon saving from the Green Deal have dropped 70% since this time last year -- comparing the carbon saving projections DECC released in October 2012 with those of 2011 reveals that a startling 70% has been sliced off the savings predicted from the Green Deal to 2020 – thanks to Darryl Croft for spotting this (<http://www.abelscroft.com/2012/10/despite-rhetoric-decc-cut-green-deal.html>) . For more discussion see <http://www.aecb.net/forum/index.php/topic,3760.0.html>