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The Green Deal: failure is almost guaranteed

Monday 12 December 2011 by [Chris Goodall](#) | [12 comments](#)

The UK's houses are poorly insulated. The proposed Green Deal is the central part of the government's plan to encourage householders to improve the energy efficiency of their homes. Instead of paying for improvements immediately, homeowners will be able stretch their payments over many years, paying less than the savings they accrue through lower energy use. What the government calls the 'Golden Rule' is that people will be able to borrow as much as they want as long as the energy bill savings are more than the repayments. Sounds too good to be true? It is. At the expected implied interest rates, only cavity wall insulation achieves a large enough energy efficiency benefit to meet the requirements of the Golden Rule. Except in exceptional cases, no other energy saving measures will save homeowners more than the cost of the improvements. The much heralded Green Deal will be a spectacular flop.

In late November, the Department of Energy and Climate Change (DECC) launched the open consultation on the new proposals. A dense 200 page document goes into huge detail on the way the new scheme will be regulated and householders shielded from aggressive sales tactics. The concerns about consumer protection are justified – from autumn 2012 energy advisors selling insulation measures will be trying to persuade homeowners to take on thousands of pounds of debt for insulation measures that make no financial sense if the consumer has to pay anything like a commercial interest rate.

The consultation document doesn't make any attempt to show that it makes financial sense for householders to invest in energy efficiency by borrowing money. In the many hundreds of pages of dense official reports on aspects of the Green Deal, I haven't been able to find any analysis that shows how much efficiency improvements will cost or what will be the benefits for the average homeowner. Expectations for the scheme run high at DECC: *'The Green Deal will put consumers back in control. By 2020, we will have seen a revolution in British property'* says the November document. But it contains no numbers and no calculations. So let's look at a few figures here – I'm sorry if the arithmetic is a little dense.

How much do households spend on heating?

The typical UK house uses about 14,000 kilowatt hours (kWh) for space heating each year. (The average gas bill is higher but this includes about 4,000 kilowatt hours for cooking and water heating). Today's prices for kilowatt hours of gas start at around 3.5 pence. (You may pay more – this is the lowest rate I could find for gas from a large supplier). All the space heating needs for the average house can be provided for about £490 per year. We'll call this a round £500.

The gas we use for heating keeps our rooms warmer than the outside world. In a perfectly insulated house, we'd not need any central heating – the heat from our bodies, the warmth from lights and appliances and the energy from the sun getting in through the windows would keep the house heated. The typical UK house isn't well insulated and leaks heat in approximately the following yearly amounts.^[1] (Fans of this type of data can find much, much more in my book [How to Live a Low Carbon Life.](#))

Walls	6,500 kWh
Windows	3,300 kWh

Ventilation ('draughts')	3,300 kWh
Roof (loft)	1,300 kWh
Doors	800 kWh

In addition, the typical central heating boiler loses about 2,500 kWh in hot air expelled to the outside world.

The government has provided a long list of energy efficiency measures that householders could plant to introduce under the Green Deal. These range from air source heat pumps to better central heating controls. But the table above gives a good sense of where the savings might actually be worth achieving. If, for example, the walls of a house could be better insulated then it might be possible to save a large fraction of the average heat loss of 6,500 kWh per annum. Cutting this in half – approximately what can be achieved by adding insulation to cavity walls – would save 3,250 kWh, saving about £115 a year.

Today, cavity wall insulation is subsidised and it will generally only cost about £250 for the average house. After the Green Deal is introduced, the subsidy will go and the full average cost of about £500-£600 will be applied. But even at this higher level of cost, it makes financial sense for the homeowner to pay for insulation of cavity walls. With an interest rate on the loan of 7%, the insulation pays for itself in 7 years.

Although the expected interest rate that will be charged by commercial providers is never specified by the government, the implied figure has risen from 3% mentioned in the early DECC market research to a couple of examples in the footnotes of the November 2011 consultation document that use the 7% figure. Standard personal loans might cost 11% today, meaning that even the 7% figure may turn out to be optimistic.

The crucial fact is that no other piece of house improvement is financially viable. There is either no payback within twenty years at today's energy prices (double glazing is a good example) or even a small interest rate renders the energy efficiency measure financially unattractive (such as improving the thickness of loft insulation).

Here's some numbers to back up these assertions.

Double glazing

Cost of double glazing for a medium sized three bedroom semi-detached house – perhaps £6,000.

Energy saving if this measure cuts heat loss from windows by two thirds – 2,200 kWh per year.

Financial benefit of energy saving – £77 per year.

Payback – about 80 years, by which time the seals on the glazing will have been lost, reducing the efficiency gains.

Loft insulation

Cost of extra loft insulation. (Almost all homes have at least 10 cm of existing covering) – perhaps £320 including the fee of the Green Deal adviser who has to approve the measure.

Energy saving if this measure cuts heat loss from the loft by two thirds – 870 kWh.

Financial benefit of energy saving – £30 a year

Payback with a 7% interest rate – 21 years.

The other major potential cost saving investments are boiler replacements and solar panel installation. Neither come close to achieving a 20 year payback with an interest rate of 7%. A new efficient boiler pays back in two decades (by which time it will probably have had to be replaced again) with a 5% interest rate and a typical solar panel installation only works with interest rates of 4% or below. This figure assumes that the proposed Feed In Tariff reductions are actually applied.

The very unhappy fact is that with the exception of cavity wall insulation there is no energy efficiency improvement that a family can take that makes strict sense financially if the household has to borrow to make the change. The government's hypothesis is that British homes are poorly insulated because people don't have the ready cash to invest in improvements. Sadly, DECC is wrong. British homes remain badly insulated because it is extremely expensive for most people to make real energy saving improvements and few households will want to take on the burden of more debt when the reductions in their energy bills are so small.

The Green Deal as presently configured by DECC will fail. But we must cut household energy bills and reduce the 25% of UK carbon emissions coming from domestic housing. What should we do? First, we need a national well-publicised programme of free cavity wall insulation, with contractors moving street by street to improve every household.

This won't happen under the Green Deal: it is a hugely complex and a bureaucratic nightmare even a year before it starts. Just to give one example of the costs imposed: the doorstep advisers established under the Deal will be highly regulated and will have supervisory bodies checking their work. Amazingly, on top of these institutions will be a further regulator superintending the activities of the supervisors. The chance of significant success, even at getting large numbers of houses to install cavity wall insulation, are close to zero when the overheads are so great. Only a nationwide programme of free insulation stands any chance. Simplicity can succeed where the Green Deal will not.

Second, we need to have national scheme for insulating solid wall homes. Even the supporters of the Green Deal know that solid wall insulation does not make financial sense. But such measures can make the single greatest difference to fuel bills in money terms. Millions of solid wall houses need external or internal insulation and a nationwide campaign to train an army of people to do the work would have major potential employment benefits. As the economic situation worsens, a campaign to insulate – for free – all the eight million solid walled homes in the country makes increasingly good sense.

[11] The total comes to more than 14,000 kWh because our home heating is supplemented by the heat from lights, people, appliances, hot water and solar energy.

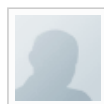
12 comments

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[Piers Sadler](#) on [Tuesday 13 December 2011 at 11.08am](#)

I have done a similar analysis of the Green deal and came to the same conclusions, except that uninsulated lofts also meet the Golden Rule.



Presentation on this can be found at <http://tinyurl.com/cdhwmmg>

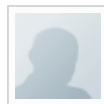
Chris Goodall on [Tuesday 13 December 2011 at 11.42am](#)



Hello Piers,

I agree: wholly uninsulated lofts also meet the Golden Rule. But there are few indeed of these. With fibreglass £1 a roll in B&Q, the homeowner has to be very obdurate indeed not to have already put at least 10cm of insulation in the loft.

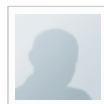
[David Lawrence](#) on [Tuesday 13 December 2011 at 1.14pm](#)



Depressingly, I have to agree with every word. These politicians and civil servants live in a world where "regulation" is far more important than achieving the objectives.

I suspect that as the deadline gets closer, DECC will realise that they simply cannot get started by October, and RHIs (Domestic) and Green Deal will simply get hacked back into the long grass....with a theoretical start date of October 2013, perhaps! That looks like the soonest they will actually have anyone qualified as a Green Deal Assessor! Greenest Government ever.....ho ho ho.

[Mark Brinkley](#) on [Thursday 15 December 2011 at 6.41am](#)



Chris

Excellent analysis. My only quibble is that you cost gas a 3.5p /kWh. This ignores the standing charge element which makes gas bills nearly £100 a year more than you estimate. But it doesn't essentially alter the maths.

But what if fuel bills double? Or you are using oil? Then a condensing boiler might make sense. But SW insulation and decent glazing will remain way over the horizon.

And just why has the interest rate been set at 7%?

Chris Goodall on [Thursday 15 December 2011 at 9.12am](#)



Dear Mark,

Thanks very much indeed for the comments.

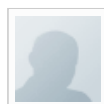
a) I decided to ignore the standing charge because the householder pays this cost however many units the home uses. So if, say, the insulation measures reduced bills by 50%, the standing charge would still apply. The size of the reduction in the bill would be entirely determined by the cost of the marginal units of energy.

b) You are right to say that the Green Deal will be appropriate for homes off the gas grid (about 20% of the UK total). I should have pointed this out. Thank you. These homes are also typically less well insulated than the UK average but they are relatively unlikely to have cavity walls. The only really effective measure will be solid wall insulation but even at today's oil prices, only a small number of homes will meet the Golden Rule. The back-up subsidy (the Energy Company Obligation, or ECO) will help some homeowners but the amount of money available will not cover many homes (perhaps 120,000 a year).

As I suggested in the piece, a sensible government policy that said 'what is the most effective way of reducing emissions and fuel poverty' would focus entirely on cavity wall and solid wall insulation and minimise the cost and bureaucracy of this by going house to house to acquire the

maximum economies of scale. It would also be a very important employment generator in less well-off areas.

[Daniel White](#) on [Thursday 15 December 2011 at 12.33pm](#)



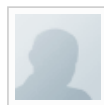
Mark has already made the point that gas is a remarkably economic way to heat a home, removing most economic incentives for a householder to invest to reduce their bills and emissions. The 20% of the housing stock that are not on gas though, must account for a disproportionately large amount of carbon emissions, both from their fuel type and building fabric. Thus the Green Deal does stand some chance of impacting on this sector.

To put a word in for the air source heat pump side of the argument the investment already stacks up if you are off the gas grid. Even properties that need heating system upgrades are seeing paybacks of 10 years against oil.

The area where the Green Deal and the associated ECO funding can make a difference, is where the goal of emissions reductions is coupled with the social welfare benefits of lifting homes out of fuel poverty. When PV and heat pumps are combined a home can be transformed to have net earnings rather than net expenses for energy. This is likely to remain the domain of the housing associations though who may already be able to borrow on better terms.

Let's all wait and see if the RHI comes riding over the hill to save this approach, or indeed to see if it ever makes it over the hill.

[Rick Morgan](#) on [Thursday 15 December 2011 at 5.07pm](#)



Hi Chris,
Very interesting but PLEASE can you send your analysis to DECC in response to their consultation which closes on 18th January (if you have not already done so). Then they can have the opportunity to provide a proper response.

I think I follow your reasoning, but you don't seem to have allowed for energy (gas, electricity, oil) price increases.

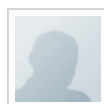
Have you looked at DECC Impact Assessment ? Its a big document and I haven't read it fully, but I think the following are relevant:

14.1.2 shows the measures that their modelling suggests could not be wholly paid for by Green Deal finance and the extent to which they could be.

14.4 shows their energy price rise assumptions to 2025. They seem quite conservative to me.

14.6 shows the Green Deal finance interest rates used : 7% is the central one.

[Andy Hunt](#) on [Thursday 15 December 2011 at 7.03pm](#)

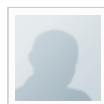


The Green Deal looks to me like another stitch-up by the Big 6. The cheapest Green Deals will be offered by the cash-rich energy utilities who do not themselves have to borrow money to lend out. Thus they will offer the lowest interest rates but be making the highest margins of any Green Deal provider.

And of course, interest rates will be set at what the market will stand. And what the market will stand will be set by the price of energy, which will be set by the Big 6 who are offering the cheapest Green Deals.

Geddit? It's genius.

rural voter on [Thursday 15 December 2011 at 7.18pm](#)



It may be economic to insulated oil- or LPG-heated houses (1.5 to 2x the price of mains gas) occupied by visiting Swedes or Americans (less accepting of cold houses). Most British houses are now kept cold out of inability to afford the bills. The improvements would probably be more significant in health or social policy terms than energy saving.

Technically the program seems totally lacking. For a time, no mention of suspended floor insulation (above cellars or crawl spaces.), then I think an architect got it included.

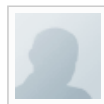
There's still probably nothing on existing timber-frame walls, oak or softwood. Most of them built before the 1990s are probably uninsulated. Somehow the volume developers convinced the authorities that plasterboard, an air gap, a plywood sheet, another air gap and brick between you and the outside world was enough insulation.

Even the cavity wall insulation being fitted is dumb, Haven't they heard of PU foam? Better U-value, and it blocks up the air leaks that are all over the place in modern houses with plasterboard-lined walls not the older wet plaster

If you have space for fuel storage, an air source heat pump is a particularly dumb investment compared to a condensing oil or LPG boiler. More capital cost, more CO2. Spend the cost difference on insulation? As soon as we face domestic demand charges, the running costs will rise further. They're not that good even now and never pay for the higher capital cost .

Yes, my experience leads me to believe that it will fall flat on its face.

Chris Goodall on [Friday 16 December 2011 at 10.38am](#)



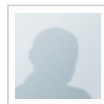
Dear Rural Voter

The number of people living in under-heated homes is indeed probably rising. Certainly the aggregate amount of gas consumed last year (2010) in domestic properties was not enough to keep houses at the average winter temperature of the previous (warmer) year.

One of the main selling points used by the government is that the Green Deal will enable our houses to be warmer. There is a little dishonesty in this. All the analysis in the background paperwork assumes that average home temperatures remain the same. If the main impact of improved insulation is to allow the householder to run the home at a higher temperature, then there won't any financial saving.

We can either have lower usage (and hope we can afford the Green Deal fees on our electricity bills) OR we can have warmer homes, not both.

Chris Goodall on [Friday 16 December 2011 at 10.47am](#)



Dear Rick Morgan,

Thanks for pointing out the analysis in the Impact Assessment. I am slightly embarrassed to say I hadn't studied before, wrongly thinking it was just a bureaucratic formality.

I will post a piece on the assumptions in this 300 page document in the next few days.

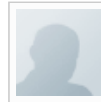
Thanks again. I will look at the energy price assumptions. When people

have written to me to say that I have not taken into account the potential future rise in the price of fossil fuels, I have tended to reply that if energy costs do indeed rise (as I accept they almost certainly will) then householders may be financially rational to take very expensive insulation measures.

But it is not financially rational to say today that energy prices might rise substantially in five or ten years time and therefore make £10,000 worth of investment TODAY. You wait until they do rise.

Chris

Chris Goodall on [Friday 16 December 2011 at 10.54am](#)



Dear Andy Hunter,

As you suggest, the central role of the Big 6 is a troubling feature of the scheme. You mention the nexus of energy price and financing charges.

There is also the unhealthy likely connection between the Assessors and the Green Deal providers. The Assessors are nominally independent but will be utterly financially reliant on the Providers. The cost of an Assessor's work in a big house is going to be several hundred pounds. Few people will pay this upfront – they certainly aren't doing it today with the EPC assessors.

So the Assessors will have to offer their services free and their income must therefore come from the Green Deal Providers. Indeed the consultation acknowledges that this is likely to be the case. So any real independence will disappear. When the Assessor employed by EDF arrives in your house you can be pretty certain that she or he will be recommending services provided by EDF. There is as much a potential for conflict of interest here as there is with Independent Financial Advisors who tend to push products with high commission rates.

Chris

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