HOUSE PLANNING HELP

Episode 67

How a Home Energy Assessment Can Inform Retrofit Measures

The show notes: www.houseplanninghelp.com/67

Intro: Our interview today is a follow-up on session 60 so it may not make a lot of sense unless you've listened to that first part. It was a slightly different podcast because I followed Graham Hunter from Parity Projects as he conducted an energy assessment of my dad's house.

So now we're going to take a look at the data and go through the various improvements that could be made. First though I asked Graham to pick up where we left off - what happened to all the data?

Graham: One of the first things we'll do is we will actually just run the model. So that does all the sums it needs to do and it will give us, in this property for example, we're looking at annual oil consumption and on-peak electricity. We will have figures for those which come out of the software which we can then check against the data that we got from the fuel bills when we were on-site. And so that's where we will tend to do a little bit of calibration, if we need to, just making sure that before we start modelling up any improvements to the building we can be fairly sure that the best case scenario that we're modelling is realistic and so we're not over-estimating or over-selling any savings from any of the measures.

Ben: With all that information it sounds as if it's almost an automatic process, so what software are you using to do this or is it specifically something you've designed to help your needs?

Graham: It is. So it was designed by two of our company directors. It's based on something called BREDEM, which is the methodology which then became something called SAP, which is Standard Assessment Procedure, which is what is used to model the energy use of new build properties. That is used in another format called Reduced Data SAP which is the methodology you'll see being used on an energy performance certificate. So what we've done, rather than try and to simplify it, we've almost consciously tried to make life hard for ourselves [laughs] and we've actually made it a bit

more complicated but what that then allows us to do is to actually add in little bits and pieces. So for example we can put in the use of the central heating down to the nearest 15 minutes. We can put in data on how different appliances and light fittings were being used, which just gives it that added bit of accuracy and it becomes much more of a bespoke tool in that way.

Ben: What have we found then on this particular energy assessment?

Graham: So it's quite an interesting one, as most of our gas properties are. Essentially that's just because it allows us to look at a lot more options for the heating system. We've looked at things as simple as just replacing the current oil boiler with a new one, and then adding in a few extra bits of control mechanisms. But we've also done things like looking at air source heat pumps, for example, ground source. We've looked at different types of biomass systems using different fuel types, so going from logs to chip to pellet, and just what we try and do is throw absolutely everything in there, even things which people might not have been considering to start with, just so that we can be comfortable with the fact that we are giving everyone all of the options and all of the numbers behind them.

I think that's a thing to point out. We try very hard not to make recommendations in the reports. We can offer advice and we can give people the detail that they're looking for in terms of how they might want to go ahead with the next steps for example. But we try and keep away from actually saying that this is what you should do. We are of the opinion that is very much the decision of the homeowner, and so we try not to lead people, but we just try and give them all the facts there to be able to make up their own minds.

Ben: How then does this property compare to others or should we be looking at the figures now?

Graham: So if I just run through some of the . . . You see on the first page here we've got what we describe as the headline figures here. So what this is showing you is from the analysis that we've done we've come up with I think it was between about 60 and 70 possible measures which could be applied to the house. And what we then do is based on the priorities of the homeowner we will sit and rank those in level of importance and look at what the paybacks on them are and what impact they will have. We then will design some packages, again based on what is the homeowner is trying to achieve. The first one we've got: “No-brainers”. So that tends to be measures with fairly quick paybacks. We see there the overall package has a payback of 2.2 years. One of the main reasons that

we build the packages is actually to show people adding up the individual savings of all the measures is quite a different thing to actually applying those measures on top of each other. So what the packages show is the cumulative impact of applying this box of retrofit measures if you like.

I'll just scroll through here . . . What we've done is so we've looked at “No-brainers”. We've then increased the payback period a bit so we're looking at what we call some “Consideration Measures”. So, normally going up to a payback period of about 15 years there.

Once we get past that we are obviously looking at more substantial measures there, so we've called the next one "Green Halo." So it's interesting to note that we've put a maximum payback of the measures in that package at 25 years. But what we're actually saying there is if you did apply all those measures together, the overall payback period of that package would actually only be 5.5 years. Rather than looking at measures in isolation it's saying well what happens if we go ahead and we approach retrofit in a more whole house way?

Going through the packages there you'll see we've actually built one which we've called "CO2 Focussed". Now because when we spoke to your dad during the survey he mentioned there was an environmental motivation there, so we've considered that and we've looked at some measures which, maybe if we look at them from a purely cost perspective they're not things which would be recommended, but if the motivation is solely to reduce environmental impact then these are things you might consider. So the big difference in this one, we've gone instead of replacing the oil boiler with a new one which looks like financially the best option, we've gone with a biomass option so that we can switch fuels from oil to I think it's pellets we've looked at in this one. And so again we can get the saving that the client's looking for there.

Ben: Biomass I think is a tough one though in terms of knowing that you're sustainably sourcing it. Where would your pellets come from or is that all built into this assessment?

Graham: Yes, it's something which divides opinion. We've taken a view on it of we're looking at biomass in terms of making the assumption that that fuel is sustainably sourced.

Ben: That's a big assumption.

Graham: It is, but there are lots of assumptions like that which are probably quite a bit beyond the scope of what we're doing here.

Another common thing which comes up for example is people who go to renewable energy companies to buy their electricity. So again that's sort of going a bit above and beyond.

And it's quite a good example the biomass one actually. I mean I can think of one previous client who was of the opinion that we should make the assumption that that fuel wasn't being sustainably sourced, in which case we can within the software itself just adjust the CO2 content per unit for that fuel source and then show them what impact that has. But we are aware there are people who hold opinions on these things which are obviously affected by things external to what we're doing here. It's another aspect of, you know, trying to make this a bespoke service, and if people have those opinions then we will try and adapt what we do to incorporate that.

Ben: Perhaps we could have a few examples of some of the measures, so this is unusual isn't it, going CO2 focussed? Shall we leave that aside for a moment and go back, as a lot of people will be thinking about the money side? But could we go in-depth on one of the packages that you've suggested? I suppose “No-brainer” makes the most sense to begin with.

Graham: Sure, sure. So, just to run through what we've looked at here. So this is a package with an annual fuel bill saving of £260. Total cost of £585 so doing a quick bit of maths there we can see that has a payback of just over 2 years.

So the measures within this package if we just run through them: first of all we've looked at blocking some of the open chimneys in the house. There are various products on the market for example that can be used to block up those as draft points so we've looked at the effect of that. We've looked at installing low-flow shower heads in the bathrooms. We've looked at replacing a lot of the halogen spotlights with LED replacements and then separately we've looked at some of the incandescent light bulbs as well and replacing them with LEDs. So we split up the lights into the different fittings just so that if there's different levels of availability for those different types of lights.

Ben: That sounds, as you say, a no-brainer that all of those things are not involving deep retrofit or too much thinking. Is there any downside to any of those measures?

Graham: Not really. I mean those are all quite straight forward, non-invasive measures, which is what we try and do with the first package to sort of show people without too much effort what could be achieved and whether it's worth going for those quick wins first of all and then having a bit of a deeper think about what's next. Or you know in some cases, we'll find for example people who are quite motivated by energy issues already may well have addressed all the no-brainers, so in that instance what we can show them with that package is actually there's not much left to do at that level and so then suggest that they might want to go up to the next one.

Ben: So you've got other measures that go a little bit further, maybe you could describe that then? Is that under some consideration?

Graham: Yes, so in this one actually most of it is replacement of appliances and we've obviously got the oil boiler replacement in there as well.

As we go on to the "Green Halo" package you'll see for example we start looking at more fabric measures there. So we've got 2 measures within that package for example looking at different areas of the loft and what can be done to upgrade those. It's interesting to note we don't actually get to anything like solid wall or floor insulation here until we start putting payback to one side and looking at either CO2 focussed retrofit or just going for the whole house idea and just doing everything that could be done.

Ben: That's really interesting. So what you're saying is the whole house retrofit is out of it in terms of payback?

Graham: Depending on the motivations, but if the motivation is purely running cost savings.

Ben: So what about if . . . There's no way we can predict what energy prices will be in 30 years' time, so there must be some fluctuation in this model if energy prices go up?

Graham: So that's obviously another thing to consider, obviously trying to predict how energy prices might rise in the future.

Ben: They could go down? [Laughs]

Graham: That would be nice! [Laughs] It's again something that would be very brave of us to try and predict so what we do there is with the report that you get we'll send you essentially an Excel spreadsheet as well with all of the measures we've looked at listed, and the reason we give you that is because that has some functionality

where people mainly use it for if they go and get quotes for work they can put in the actual quote for the measure and then re-calculate the paybacks based on that. But it also has a function in there where you can add an annual fuel price percentage increase and then it will re-do the sums. So for example if we make an assumption that fuel prices will increase by 5% per year for the next 20 years, then we might see things like the solid wall insulation like the floor insulation then looking much more viable. But these figures here are based on the current costs as they stand.

Ben: Okay, that makes sense. Are there any other key points to take out of this? I know you're not going to give recommendations of what you think personally, but anything else we should note?

Graham: Yes, I think with this one we're hinting at the issue of the walls there. This was quite an unusual property in that it had quite early cavity wall insulation installed in it already, so normally where we'd look at a property of this age it would either be empty cavity walls or all solid walls, so internal or external wall insulation would actually look quite cost effective then. But in this case that measure has already been tackled so it's something where adding further insulation to that obviously then has much less of an effect compared to if there was nothing there to start with.

Ben: And in terms of airtightness, there is mechanical ventilation system in the house, very unusual again I should think, how this has happened organically though. So is there a measure that you've looked into for that for making the house more airtight?

Graham: Yeah, again that's one of the more unusual aspects of this house with it having the heat recovery system there already. I would assume when that was installed there were some works carried out to try and improve the airtightness a bit.

Ben: Probably not, not necessarily.

Graham: Okay, I mean what we've seen in the . . . If you look at the draughts page for example. We have actually noted that the draughts are quite few and far between for a property of this age. It's not saying there are none, it's just saying comparatively it's actually doing quite well. We've only found a couple of things, like for example sealing up the chimneys and looking at sealing those wooden floorboards.

Ben: Well Graham, thank you very much. It's been fantastic to trail you as you've gone about your work and to see it at this end, and I'll give my dad a nudge next!

Graham: [Laughs] Thanks very much.