HOUSE PLANNING HELP

Episode 150

Where is the balance between renewables and a fabric first approach? – with Alex Baines

The show notes: www.houseplanninghelp.com/150

Intro: In today's episode we're going to be talking to Alex Baines about the balance between renewables and a fabric first approach. Alex is currently building the Long Barrow Passivhaus, which is a project we are featuring in The Hub, and have also explored in previous podcast episodes. Recently Alex posed a question to a panel that I was sitting on, about where we thought the balance lies between renewables and a fabric first approach.

I started by asking Alex a bit about his early work and how he came to be interested in renewable energy.

Alex: I suppose it goes back a fair bit further than that, to university. I actually got involved in, heavily involved in sports and travel and skiing, so I started my own adventure ski company.

About five or six years after university, because at first I got involved in doing skiing events, so after that I went into starting up my own company.

That wasn't going the way I wanted to it to go and I ended up spending too much time in London and we weren't really getting out of it what we wanted to do.

It was also the time of the crash. A lot of our clients were based in London and we had some guidance basically from an older generation saying actually things aren't looking right this year, you've got to decide what's going to happen if the market crashes. And this was early 2008. We were just on the round of looking for going out to a much wider audience, looking for investment for that wider audience. With that warning we decided actually hold on, if things go wrong we will have quite big problems.

So the three of us who were directors decided to close down the company and I suppose my problem at that time was I didn't really

want to go back into the industry having been involved in it for ten years. And so sat down and just had to have a long think about what I was going to do next.

And essentially a very good friend of mine, one day turned round and said Alex why don't you go into renewables. And I absolutely did not understand why he had said that. But he explained it very easily. He said basically you're an outdoors person and you're also a geek at heart. So have a look at it. And I don't think I used some very polite words but within three weeks I realised he was right. And actually it suited me down to the ground.

So I then went off and did a Masters of Renewable Energy at CAT. I think it was their first year or possibly their second year of the course. It was one of the first renewable courses in the UK at the time. And that seemed the right thing. I was fascinated and was completely hooked by it and loved the whole thing of renewables. Spent all my time researching them, working out the calculations, working on some old systems. I went then into an M&E company, so a mechanical and electrical engineering company, to help advise them on renewable installations. But that very quickly took a turn. This was at the stage where renewables were beginning to be quite heavily incentivised in construction.

Ben: So why did that come about? What was the trigger that they were just trying to get new energy sources? Was that how it came about?

Alex: Yeah, it was. It was the government were just following various issues around the world and various agreements like the Copenhagen agreement and the government had started to put right we need to get people doing more on renewables, using more renewables. We need to cut down our carbon emissions, we'd signed up to agreements for 2050 and even for 2020. They'd started putting in the structure for Part L to actually go to theoretically zero carbon by 2016 for residential which obviously got canned earlier this year.

And so there was this incentive to get towards that line. And the first thing that everyone went on was renewables. And the way to do that was they went well the industry's too young, we need to incentivise it, and they started to, this is where you got the feed-in tariffs and the Renewable Heat Incentive, all started to come out of that period.

And so a lot of companies, especially mechanical and electrical engineering companies who had traditionally done all the design for buildings in terms of your heating and electrical usage, suddenly found they were being asked a lot more to do, right, what's our 2% or 5% from planning requirement from renewables or what do we need to contribute towards Part L calculations.

And so there was all this aspect of renewables. But it was all great doing that but it wasn't very long before I realised hold on, we're all treating renewables as the solution, and this isn't just me. A lot of people had come to the same opinion and actually to be fair a lot of people many years earlier.

Renewables is a great part of the solution but to me it's the final part of the solution because technically you can get to zero carbon by building a pretty bad building and whacking in a massive amount of renewables.

Ben: So what did this do then, incentivising it? Because it sounds on the surface quite a sensible idea.

Alex: Yeah, it is. However working on some buildings you can end up in some weird situations. And the one that really got me at some point was, we were trying to make a building very energy efficient and so we made it very energy efficient but there was nowhere to do things like PV, to get a certain renewables requirement. And we had, I think one of them was we had a planning requirement to get 10% renewable on the site and we couldn't do it through PV and PV was too expensive so we went to do it with biomass. The client was trying to cut costs at the time and actually we realised that by making the building worse, biomass had a bigger effect. So biomass was affecting 60% of the total load on a mediocre building, whereas if you made it a very energy efficient building it was only affecting 15% of the load.

And so you ended up in this weird situation of making the building worse to achieve requirements that were there to make everything better. So yeah, it didn't always work! There were times obviously when it did and PV helps and all the rest of it, but actually on most of these buildings at that stage it was the heating load.

Ben: And then how did it move on from there when we got into a stage where a lot of solar panels for example were selling weren't they? The market was just going crazy for them and then overnight all these incentives were just switched off.

Alex: Yeah, I mean the government had always said that they had certain targets and they were going to wind things down, but they did wind things down quicker and sooner than a lot of us had realised, and that they'd agreed to!

So I think there was too many installations going in, it was too much money and obviously we had all the financial issues. And that caused everyone to back pedal a fair bit I think in government. But it's effectively it was just getting the design right and actually to me PV is the right line to do because whatever we do avoiding electrical energy is a lot more tricky than heating.

It was very soon apparent to me that the way I needed to go was Passivhaus, because I cared about reducing the energy full stop and it's very easy to realise that actually if you reduce the energy on a building you put in less renewables to achieve whatever your target happens to be. Whether it's the full length and going zero carbon or whether it's just whatever is beneficial. You make your building 20% more efficient, potentially, whatever the calculations are, you might be using 20% less renewables. That costs a lot less and renewables at that stage and still today are quite expensive for what they are, however beneficial.

Ben: And you still see it. And I've seen it even in the last few weeks, where it's this association of what is green and sometimes I was watching something to do with gaining planning on a site and they were saying oh if it's a green home for example if it has renewables, this that the other, a heat pump, it will tick this box. So it's still about there but this balance, it's shifted towards fabric first and is it still heavily weighted there? Can you explain why?

Alex: It's shifting towards fabric first. I wouldn't say it's shifted fully towards fabric first. People still don't believe they can achieve everything. You've got the issues again also in SAP which don't do the detailed calculations in terms of you don't have to do the detailed calculations in terms of site values, thermal bridging.

You've ended up we're getting to the right stage of getting the building, ie the demand side, absolutely right. So you look at a building, the building is the demand and the renewables is something that meets that demand. So if you can reduce the demand then you reduce the size of your generator, your energy generator. But I think we're still in a slight flux as to where things sit.

If Part L had been cleared up for example and gone to zero carbon this year there'd be a sole focus on getting the energy of the

building absolutely right, but if you go back to Part L 2010, at that stage we're looking at Part L 2016 zero carbon.

Ben: This is the UK Building Regulations in case anyone is confused, because you obviously know this very well.

Alex: So this is the UK Building Regulations and this Part L is to do with the energy in a building and you've got four types of Part L. You've got residential and non-residential, and you've also got new build and effectively refurb, in both categories, which are the four different parts.

But in terms of the new build side, back in 2010 we were looking at an improvement. That improvement from 2010 to 2013 came back as 6%. And so you're sat there just going oh we've just had this improvement, it's 6%. What, we're going to go for a 94% improvement next time to get to zero carbon? How does this work? And that's partly why it didn't seem to come out.

So if you have the Building Regs and they'd locked down on the fabric, then it'd have been very easy for them to do the calculations and go to renewables. The problem is renewables, because the previous feed-in tariffs and everything else, the industry to a certain degree was working, it's got the ability to promote, and because of all of that actually your consumers associated eco with renewables.

And there was a lot of, at the time I would call and a lot of people did call, eco-bling. Or the other side of it is called green-wash, where people are just saying this is green and when you delve into the calculations it's not at all. Or it had very little effect on a building or what they were trying to do.

I would much rather, to me the simplest way to do something is to say right, irrelevant of the energy generated, how much am I using? Because renewables eventually will fail. Admittedly I've worked on some PV panels that were 25 years old, 30 years old and their energy generation was down by 22% I think it was at the time. So they're still working relatively efficiently and they're great for what they were doing.

Ben: And are they better now as well because there's not much to go wrong to begin with but is current technology better?

Alex: The technology is better. We'll see whether the robustness of all products is the same. Obviously there's a large amount of influx of technology from different countries around the world. And frankly

there's so many more manufacturers came on board. They're more efficient shall we say.

Are they better? Well to me something better has to also last its full duration, because it's all very well putting on the renewables but if it's going to collapse in 30 years then you're suddenly back to that state of going oh well, this building is no longer zero carbon, or this building has no longer got that 15% efficiency, or 10% efficiency, or whatever it was that you were looking at for the improvement.

So it developed very quickly for me into fabric first and then let's see what we can do with the renewables on the site, because the renewables is the final part of the benefit. It's the final part to get you to the bit that you can't avoid. You cannot avoid electricity around your house. You need it for lighting. You can avoid the majority of heating, whereas the electrical usage with the dropping of the LED's coming in and everything else, that dropped massively the energy usage in a building.

So there's been quite big savings on that side. There aren't a huge amount percentage wise to where we were a number of years ago, to improve, although there are certain things percentage wise will improve on electricity. But if you count ten years ago at 100%, some of our buildings are now using 20% of that electrically if not less. And these are quite often standard design buildings. They're not trying to do anything in particular special. You go into a Passivhaus and they're obviously significantly better than that because people are watching every single bit of every single bit of usage.

And the biggest one obviously electrically we have is everyone using their phone chargers and all the rest of it and the hidden vampire loads. But I reckon that going forward those things will vanish more and more. But ultimately the distribution network for electricity on a house, that's not going to change much. There's no need for that to change much.

The heating of the structure, alternatively if you go down to Passivhaus, you may not be putting in a significant heating infrastructure anymore. You just don't need it. You don't need it now, you don't need it going forward. So the off-set for me is we need to off-set our electricity which is why PV becomes more crucial on a building.

I have pretty much, over the last four years, that when I first started mooting the thing of building my own house, people are always

asking oh you're doing a green house so what technologies are you using? I'm sat there just going…

Ben: But that is still the default. This is what I was saying earlier.

Alex: Yeah it is. It's absolutely the default. And it's the default is down to I would say lack of knowledge as to what is beneficial. That's why I say the feed-in tariff and all of that promoted PVs and promoted your biomass and all the other heat pumps, and the heat pump industry got on board, because it was a saving. There was a way to generate a saving or an income to the household so everyone went oh I know about that, oh it makes my house green! But when you're building, it doesn't make your house green, but yet everyone asks so what technology are you using.

So my answer is for our house none. So you're not using a ground source heat pump? Well no, it's overkill. And you're not using biomass? That would completely be too much for us. Well we'll use a bit of PV if we've got the budget at the end to off-set that bit of electricity we don't have and I'll also hopefully put in some solar thermal panels to provide the hot water, because hot water you cannot avoid. And that is one you can't avoid so whatever does the hot water, great.

But it's something that I think will come once we get to this fabric first stage as part of the Building Regs, and then people will realise right actually I need to put on 15% of my renewables to where it was ten years ago. And people's understanding will change but it's going to take a lot of time. In the UK I suspect it's got to be driven by government. I don't see any other way.

Ben: The demand from the public which seems pretty unlikely doesn't it, is the other way?

Alex: Yeah, but it's unlikely because it's a lack of knowledge and it's a lack of promotion. You flip round to somewhere like Brussels and it's been put forward, admittedly I don't know how it got through in Brussels to the legislation there I'm not entirely sure. It seems to have snuck in that they suddenly went Passivhaus based on a study they did and they couldn't avoid it.

And the demand there has actually benefited the entire industry, that they now found all the manufacturers have now come into Brussels because that's where the demand is, so they don't have to source stuff from out of the country anymore on a number of things. Now in the UK, we're getting to that stage, but there isn't so much

of a demand because it's not driven from above and there's not enough demand from below because people just don't know yet.

Ben: That Brussels story though is just incredible because you would expect all sorts of issues to come up and I've seen possibly two or three talks on how they did it and each time I think would that work here? In Brussels they just seem to have just gone on with it! But you can just imagine, I don't know, different politics over here and big house builders lobbying.

Alex: Yeah. The big thing there was they had a sort of a project that had been running for five or six years, an incentive project to get people to build to better regulations, which they had one of the worst cities in Europe in terms of the quality of their building. So they wanted to incentivise and get things going, and ended up with if you do this for your building you effectively get this amount of money and you've got to give us the record and tell us how much it cost.

And what happened was suddenly they realised over time that things weren't costing as much to improve as they thought they were going to. And so when someone said we're all going to Passivhaus and these are all Passivhaus details so that's part of the incentives package.

And so it then got, as far as I can understand it, it then gets to the government and well they had a six year case study of it working on a massive scale so it was sort of yes we can, it's not going to cost the amount that all the developers say it's going to cost as an increase to achieve it.

Could we get that in the UK? If we follow the same methodology maybe, but I think it's going to come more from the agreements that we've got in place for going to zero carbon over time. But to my mind I'd much rather we focussed on making new builds zero carbon and actually getting everyone's brains working on what to do with the old buildings. Because you're not going to get a lot of the old buildings fabrically improved and so you're going to be looking at the renewables, you're going to be looking at other items.

And it's got to be different for every building. They all work in different ways. There's benefits and pitfalls to different things you can do but our old building stock still makes up over 90% of the UK's building stock, so talking about new builds is great but actually it's the old buildings we need to focus on.

Ben: But it's also, and I think you've probably said it just then, putting the plug in to stop the rot, because if you keep on building rubbish in your buildings then you're going to keep on retrofitting forever as well. Or maybe knocking down.

Alex: Yeah you are. You're absolutely right. To me what we should be doing probably in terms of Passivhaus is it's great talking about Passivhaus but actually to me Passivhaus is not the energy standard and we've been talking here all about energy because of renewables, it's all about the human comfort element. And actually if our Building Regs spoke about getting the human comfort right, which is traditionally where it started from, then it would work.

You look at the requirements for ventilation, that was from human comfort, but everything in all the different various parts of the Building Regs have become so split they have engineers that focus just on meeting the ventilation requirements with no link necessarily to something like acoustics or very little link to something like the energy side of it. They are purely trying to meet their 7 litres per second per person or 8 litres per second per person in different spaces in the building. And the pipes will be run through to achieve that in certain locations but then they don't put in acoustic attenuators because well frankly that doesn't matter. They don't work on a whole package delivery, to work for what is best for the human body, whether that's the heating element, whether that's the acoustic element or some other form. I would much rather we just said right, let's go for a human element design and actually funnily enough you focus on the human element you end up with Passivhaus because that's where Passivhaus came from.

Ben: And I think that really that is what's worked so well. That's why I'm such an advocate and would like to see myself living in a Passivhaus is because it seems that while not perfect, it's the best way of putting into a system and it's all driven by people who've actually done the work and the physics.

Alex; Yeah it is. I think the downfall of Passivhaus at the moment to my mind is the perception of people is that Passivhaus is purely an energy standard. Why go there. To me it's not an energy standard, it's a human comfort standard. It's about what is comfortable for the human body. I know that being in my mother's house, because it's an old house, it's leaky, it's got single glazed windows that fog up on mornings, her house would have to be at 24 degrees whereas my house once it's built as a Passivhaus will only need to be about 20 degrees internally. I will feel exactly the same in both

environments and I think that's the element that people don't understand.

The benefit of the ventilation in terms of the air quality, all of those aspects brought together, that's the big difference to me. It's the quality of living going forward and the energy is the final part of the bundle. What would you rather live in? Would you rather live in a building that is good for your health, feels good to live in, or not?

Ben: But do you know, we're so used to just living in what we've got that it's not even really a consideration. This is why self builders get to start with a blank canvas of what would I like and start to consider some of these issues.

Alex: Yeah they do, but if we started to talk about it people would use that metric as part of their decision making when they're purchasing a house. When you're in a house you deal with the faults and frailties of that house and you dislike some and you love other aspects of it.

To me it's the same as looking at a car which has certain MPG. Some people will take the hit on the MPG because they might like the acceleration. It's a preference. As long as you know what you're getting into, it's not an issue at all.

But the fact is a lot of people at the moment they buy a house thinking it's great and everything else, without considering those items, because generally actually it comes down to location to be fair. But they won't know what they can do to either improve or change. Self builders are in quite a niche position in that they can make that choice from the outset, so it needs to be comfortable and it needs to fit this aesthetic requirement. Others can go right, this is my location, aesthetically I'll take a bit of a hit and I can improve maybe a certain percentage so you might be talking about a 60s or 70s standard building that you can improve the building, or you might be out in the countryside and in a lovely, like round here in a Cotswold village where it's protected. Well that's aesthetic and that's location and you prioritise that. In which case there's virtually nothing you can do to the building because they're listed, then you'll start to look at renewables or something like that to generate extra heat for the human comfort element. So it's just managing those perceptions which at the moment no one does.

Ben: Well let's round off this conversation because I want to ask a couple of questions about your build, when we're on this line though between renewables and fabric first, do you have a point

that you've finished up with and do you think it will ever move again?

Alex: Yeah, my point actually follows on from the previous part of the discussion. The point that I've ended up with is the human aspect comes first. End of story. For me and my family I want a house that they can be comfortable in, not that relies upon extra heating or whatever to boost the air temperature.

So the house is designed and the only way that I know of to achieve that to guarantee that I will achieve that is Passivhaus. So that's why to me Passivhaus is crucial. And then the renewables, if we've got the budget at the end of the project because of various problems on the project or whatever, then we'll off-set that with renewables to get to a zero carbon target. But it is very much to me it's about human comfort and for me to be certain that's going to work it's Passivhaus.

So I think that if you're focused on that, if you miss it by a percent or two percent, it's still going to hit that ability. But to design and to work to that level, that's the beneficial aspect, then you know you're going to achieve it and then you can do the rest of it. That's why I generally push Passivhaus and that's why I went into Passivhaus for my own build, because I wanted what was right for my family and I discovered actually this is it. This gives me the aspects of comfort.

Out here we still get power cuts regularly and so if I had biomass, any of those, they generally link to a pump for hot water distribution for heating or any form of heating distribution around a building is linked to a pump, your electricity goes down. We don't have heating unless we turn on a fire. We have to light the fire or something like that. That's all we've got when we don't have lighting around the building.

So actually I didn't want to be in that situation with two very young kids. It's about having something that's comfortable and will ride out the situation for a number of hours for example. And actually getting to Passivhaus you don't even ride it out, you just don't need it.

Ben: So where are we at then? We've been featuring your house build in The Hub, we've made lots of five minute videos from when we started. I'm not even sure, was it 2015 or 2014?

Alex: 2015 we started.

Ben: 2015 was the build, obviously a lot of research went in behind there. So we've been featuring episodes as we've gone through, and then your work didn't quite go to plan did it, and so you had to pause things. So where are you at now?

Alex: We've had a little bit of fun! It has been paused and it's about being able to get the cash together to finish it up. So because I then went into doing my own consultancy obviously I can't get a mortgage in the UK because you need a certain number of years of when you're doing your own work as proof of financial income and the mortgage rules have tightened up a lot here over the last three years I think it is now.

I've got a separate income from another property so we are looking at selling that, however that is not in this country and legally has been having a few problems so we're expecting that actually to have sold, must have been about nine months ago and is still ongoing. So that's been on hold but we are about to restart very shortly. We're just waiting on one final sign-off for the finances to come in to get the windows, to get the roof on, and then I can get working on the internals.

Ben: What does that mean then for next steps?

Alex: So where the building is at the moment, we now need to make it waterproof. Thankfully because of the construction methodology that we use, which is ICF, there was nothing really that could degrade over a year through the winter, or through the summer. And all I need to now is we're going to get the insulation waterproofing on the roof and then we can put the waterproofing onto the rest of the building with the windows going in and suddenly we go completely watertight, we'll have the airtight aspect.

So for me the next steps after that is we've got a bit of backfill around the site, we'll do that as soon as we've put in sort of the external services so the water, electrical and the vent pipes for the ventilation supply and extract.

Then it's on to the internals. And the internals is, well for us it's really simple. Because we've got a construction methodology that actually we can build and move rooms as we see fit, I can build certain parts of the house internally.

Ben: I'm intrigued to see how this bit works actually, because you say all that – I'm expecting to hear from one side to the other. If you're moving walls around.

Alex: Yeah, no that's the potential! So say we had another kid and actually we've got an area which is a playroom, or we could turn that into a bedroom and give a bit more space, or take a bit more space out of the other bedrooms for the kids. So it's not something you'll be just walking around it's something you can just take down a partition and put up in a different position effectively.

But because of that structure, the only infrastructure that I need to really get in before I can do all of that is the ventilation system. So I put that in and that's only because I want a hidden ventilation system. Put that in, get that commissioned correctly, so that's then working and then I can start building internally the main living areas.

And from then it's quite easy. The electrical design is quite simple, the water design and the heating infrastructure is relatively straight forward as well so then it can just fit into place and we can build one room to completion. And because we've got a shell and a concrete structure all the other places are still usable. They're just a lot larger and with no decoration, that's all as far as I'm concerned. We've got a fair bit of glazing so we've got a fair bit of light going in so it works quite well in that sense.

Ben: You've had highs and lows on this. Has any of it put you off self build and this whole process and doing it?

Alex: In a word, no. Not at all. I suppose it's not really an issue. It's an endgame, an end goal for my family. Things are tricky but then things in life are tricky and you follow and you do want you want to do and it's been there, it was well planned, we know exactly what we're doing. All it's done is meant we've had a pause.

So it's made certain aspects of life difficult. We've ended up staying in the little cottage that we're renting which has got mould growing in it. It's not the healthy atmosphere that we want for the children but it's unfortunately because of the situation it's had to be delayed by a year. So that's all it is. We're in a house that gets very cold in winter and we have the fire on 24 hours a day. So it's not as nice as it could be but actually it hasn't put me off anything.

Absolutely we'd do it again. I'd just probably this time see if there's a way of getting the mortgage beforehand, but our decision was not

to go for the mortgage beforehand until we got to an airtight / watertight shell, because we got a completely different price on the mortgage. So that was the decision we made at the outset and we were absolutely fine until an extra bit of money went into the foundations and even then it looked okay, and then it went slightly wrong after that. The last bit of the budget didn't work there. So we decided to pause. We've still got budget left but we decided to pause before the windows went in, before the waterproofing went on.

Ben: It's a good tip actually that one isn't it.

Alex: Yeah, know where you can pause. Now there are certain buildings and certain structures, and certain build methodologies where you absolutely cannot have pause points until they are airtight and watertight. Just does not work. But there are others that do.

Ben: And hopefully you won't have to pause but yeah, I know what you're saying.

Alex: Yeah, hopefully you won't but situations may occur, there maybe an illness or something along those lines. So it's just being aware of maybe or where a slow down could occur where something hasn't been able to come in at a certain timeframe that you're wanting to do. Build in, even if it's a pause of just a week. Just be aware things overrun as well.

But from our side obviously we've had a pause now for close on a year. We must be getting close to that stage now I think. But it doesn't have any detrimental effect on the building because of what we're building and how we're building it.

But I think you've just got to be aware as a self builder what can go wrong and when it can go wrong. Don't expect it to go wrong because hopefully your planning means it won't. But with us our planning was on purpose because of the mortgage. After a certain stage we couldn't then get that mortgage at that stage because of my work situation and because of the finances. So we paused before the airtight and watertight stage, which is your normal pause point on buildings I suppose. But for us also because of our design methodology for the building I can build up internally only a certain part of the building if I need to, to live in part of it.

Ben: Always good to chat. Thank you Alex.

Alex: You're welcome. Good to see you.