

Episode 103

Is Building a Passivhaus Expensive?

The show notes: www.houseplanninghelp.com/103

Intro: Geoff and Kate Tunstall were early adopters of Passivhaus in the UK. In this episode they're going to share their build story and explain how they got the best from their budget.

I started by asking Kate for some background on their project.

Kate: We were looking to build a retirement home basically, to downsize the house we were currently living in to get something that was more energy efficient, a bit eco. We didn't know much about it but something that would be easier to run and we walked through the door of the Green Building Store, who we knew about because they did energy-efficient windows, and said: "We'd like to build an eco-house." And I think they nearly threw us out because it was about 5pm on a Friday evening but they said: "No, you want to build a Passivhaus." We said: "Well what's that?" We'd never heard of that. And then we started on this journey. But yes, it took five years was it?

Geoff: I think it probably was five years. Certainly it took time. But the point was when we asked them if we could visit a Passivhaus, because they wanted us to spend our money on it, they said: "Well you can't. There isn't one."

We'd been speaking to a MVHR company in Austria. I rang them and said: "Would it be possible to visit a Passivhaus or two?" and they said: "Yes."

So in January 2008 we flew to Zurich, drove to Bregenz in Austria and we visited two Passivhauses. One was a sort of flat and the other was a full family Passivhaus of a similar size to ours. It was -4 outside. We stood in them, it was quiet, serene, it was 20/21 degrees. It was Passivhaus, like this! So we looked at each other, listened to the noise that we were warned of with the MVHR machine, there was nothing. It was just a very warm, comfortable house. We went into one and said: "That was alright. That was very interesting," and we went in another one, a family house, and we were sold. That was what did it, actually standing in a Passivhaus

in the middle of winter in the middle of Europe. We looked at each other and said: "Yes." If we can afford this, this is what we want.

Ben: In terms of budget and what you were going to do, you mentioned your original plans, so how did you move on from this stage of thinking *oh we want to do this, can we do it within our budget?*

Kate: Well basically we went to the building company and said: "Can it be done for this cost, because this is our budget." I mean I don't think we let on that we had the contingency amount, but when we had to pay a ransom strip at the start of the...

Ben: Maybe you could explain that. First of all, where is your plot? Was it difficult to be able to build a house and then yes, I want to dig into this ransom strip?

Kate: We were very fortunate because we had a large south facing garden, so instead of living in the little terraced house on the main road where we'd been living all our married life, we could move to the bottom of the garden which was a quieter spot for us to start with. So we already had our plot.

Unfortunately the builder had bought the land behind, or what would be our entrance to our plot, and we'd been paying a wayleave up to then to the old guy who used to live at the bottom of our garden, which meant that we didn't have any rights to exit from our land onto this little road.

He then demanded a back ransom strip of about six inches, a six inch strip and based on the amount that the plot was worth he was demanding £30,000 for this six inch strip. It put us back nearly a year because we were fighting this and looking to see how we'd get round it. And short of going to court we decided to just offer him, I think we ended up with £18,000 we had to pay for the ransom strip. So that was our contingency money gone from before we'd started.

Ben: A few more questions on this, so Geoff, when this piece of land was bordering your house, was it just this was always the case that someone else owned this bit at the very bottom of your garden, but because it was a garden it just didn't matter at that stage? Is that how it worked?

Geoff: Well we had the wayleave so we could actually park our cars in the bottom of the garden. So that was access we had always used. And also on our original plans for the house, it actually showed a road, a potential road, at the bottom of our garden. So we argued

with the Land Registry that was going to be a potential road there, therefore should be access to it.

That took twelve months so in some respects yes, we knew that we didn't own that land to get onto the road, but what it was it was the builder that came in who clocked the idea that he could actually save a bit of the land as a ransom strip and the thing he said, it was like winning the lottery. He didn't really want to charge us but if we were him we'd do the same. And we said: "No, we wouldn't do the same." But anyway, he had us over a barrel.

But the good news, the flipside of this twelve months nearly, was that in that twelve months the Green Building Store, Bill and Chris Herring, they were able to do all the house design. So they designed the house in that twelve months. They were able to research and sort this out because they'd never done it before. So they needed the time to work out what to do.

So in one respect it was bad news because, as Kate said, it was our contingency gone. But the other part was that always the budget was going to be £140,000 or thereabouts so they accepted looking at doing the build knowing full well that the discipline of a finite figure they had to work within. So it was always ever going to be a cost effective house.

And what the delay meant was one, we didn't have the contingency because that had gone, but two, they were able to sort out all the bits and nuts and crannies of what they were going to do when they built it, so that when we did shell out for the ransom strip and said we're go, the system was go, the house was go, that it was very straight forward then, because they'd done all the prep.

Ben: Just before we move off the ransom strip, is there any advice that you can give to people who might be buying a piece of land where the same thing could apply, and perhaps they might miss it? Is there a lesson that you've learnt from this?

Kate: Well you just have to look very carefully. I mean I think we were perhaps a little naive and we were unfamiliar with the legal side of it, so it may well be that you get someone legal in to have a look at things before you put your money down.

Geoff: Or alternatively, the other thing to do is obviously you can apply to the Land Registry online to see who owns the land that you're thinking of buying, or the plot that you're thinking of buying, and that will give you the ownership of what is round that plot. And that's

how we found out that this guy had recently put in a ransom strip extra to make sure he got his, what he was after was £30,000. What he got was I think it was £18,000. So it's all negotiable anyway, but it was a bitter pill to swallow.

Ben: Sorry, I have one more question on this. Did you play a bit naive and say well perhaps we won't be building our house then? Was that, was there a strategy to making...?

Geoff: Yes, yes. [Ben laughs.] And that's why he came down. He dropped from £30,000 to £17,000 I think it was we actually settled with him, and another thousand for the solicitor fees. But the reason he came down was that he suddenly realised that this was our contingency. That was all we had. Either he'd get nothing or £17,000. So he went for the £17,000. So you just have to explain that that's it. You have to barter in a way. It's a horrible thing to do, because you want to get on and do it, but that's what we had to do. As I say, the serendipity was we used the time well.

Ben: How big was this house going to be? What were the factors? And then in front of us let me describe, Kate I've no idea how you've done this, we'll show a picture in the show notes, but you have created a model that helped you get to grips with the layout of Denby Dale Passivhaus.

Kate: Well, initially when we were thinking of a house before we went to the Green Building Store, I had in my head that you retire to a dormer bungalow. The house we used to live in had three sets of stairs. Three flights of stairs, so I was very keen to get rid of stairs. When it came to it, you look at the plot of land you've got and it wouldn't have been practical. It would have been a very small bungalow or it would have taken up an awful lot of ground space. So they recommended to us that we have a first floor, two floors, which is why we came up with this design.

I had trouble working with a two dimensional plan and what it meant, and I think I got the idea from the self-build magazines, just basically to cut out a plan, stick it on balsa wood and make it 3D, and you start to get a feel of what that size means. I think I put some little beds inside as well to get an idea of can you get a double bed in this space, can you get a single bed in this space and whatever.

It helped us as well when we were trying to explain things to the building team because we're on site as well, it was very useful because we were able to watch daily what was happening and if

there was anything we wanted to explain to them we would trot down the garden path with our little model in hand and you could see them groaning as we walked towards them. "Oh no, what do they want doing now! What change do they want now!" But yes, it helped certainly to explain.

Ben: Geoff, maybe you can take us through the actual design that you finished up with, because along with being a Passivhaus you actually have a solar element that is not necessary for the design but it was something that you wanted?

Geoff: Yes, the house we used to live in was a 250 year old cottage in Denby Dale. It was a cottage and a shop. It was two houses. And it was dark, it was draughty, it wasn't too bad in terms of, it was our home. And we thought that was okay, but what we wanted was something with light in it. Something that was warm and something that didn't have any draughts. We wanted a modern, contemporary home.

So when the issue of Passivhaus came along we were thinking of a house with a conservatory on the front and that was our first thought. When the Green Building Store tried to model that in PHPP planning it wouldn't have it. And the Passivhaus Institute said: "No, it's got to be part of the fabric."

And so they remodelled it with the solar space that we have. Because what we wanted was light to permeate all the way across the house. In fact in mid-winter the light permeates right through to the back wall and halfway up the back wall in the living room. And it's lovely to have this natural light beaming in. And even on a dull day there's still enough residual light to light the house, and the only rooms that don't have a window are one of the toilets and a shower room.

And so consequently, we were thinking one of energy, we don't have to light something, fair enough, but the more important thing was to get light and warmth through the whole fabric of the house.

And one of the things we pushed for was the solar space, a two-storey solar space. It's one of the things that caused difficulties in the construction but we stuck to our guns because that was what we wanted in the design. But the beauty was with the Passive House Planning Package, they dialled in the different criteria and it worked. On paper it worked. So we knew that when we came to building it, as long as it was built to the same standards as it was described, it would work. It would predict the performance. And it

has done. Very accurately. It's been very salutary that that is the case that Passivhaus, because of its planning process, is able to predict very accurately the performance of the house.

Kate: And again, being able to use the model we found that the window, the bedroom window in our current bedroom, because it was made small on the north facing wall, it actually looked pokey. And you were much more aware of that with the model because you could see how much light there was coming in, and even with the solar space it made it a small, because it was a small aperture, it's a very dark room. I mean you don't need a lot of light in a bedroom anyway, but we'd looked out onto our garden and we wanted to see out, so we said: "No, we would like the window a little bit bigger please." And it was a matter of going back to the PHPP and I believe they put in extra insulation in the floor to compensate.

Geoff: It was actually higher performance insulation. They were able to get some higher performance insulation for the same cost as a less performing one. And what they did when they got that, it meant that it gave them the leeway then to make the windows bigger in the rear of the house. So again it was a very useful design tool to be able to move things about, to get what we wanted.

Ben: One of the interesting aspects of this in terms of what we can link up in the show notes, is that you've been very open about the cost and that you've built this on a tight budget, so we can see where the money's gone. We'll link to the Green Building Store blog on Denby Dale Passivhaus.

Take us through that build process and was it just everything on track? Did you get nervous at all about the budget at any stage?

Kate: Well, probably all the time! [Kaye laughs.] I can get very nervous about money! But we used to have two or three weekly meetings with the guys from Building Store...

Geoff: And the architect, Derrie O'Sullivan, and occasionally a specialist like Andrew Farr came, so if we needed someone to come they'd come. But it was very collaborative and I think it makes a big difference because it helps take away the possibility of nasty shocks, because you have a regular meeting, and you know you've got a meeting coming up. We took minutes at that meeting to make sure that everyone knew what was happening, and that was a good system because you could work to that system. You knew when something was going to happen, how much it was going to cost. Or if you didn't know it was going to cost, well someone would find out.

And so it kept us up to date as a whole team in the design process and in the actual process of build.

Kate: And then the fact that we were living on site meant that daily you could see what was going on. Daily you wanted to see what was going on! And if there were any little things that needed changing it was easy to change them because not much had taken place.

An example I can think of is I came home one day and they'd started on the first floor and putting in the window apertures. And one of the windows was out of line with the window beneath it. Only by about a brick distance but it looked so wrong you could see it. And they went back to their plans and said well this is what we... I said: "Well no, it needs changing!" But it only meant one course of bricks had been laid, so it wasn't a big deal. So I think living on site was an important factor in keeping, well probably in keeping to the budget as well.

Ben: What was the biggest challenge through the build?

Geoff: There were various challenges. One of the biggest challenges was the fact that we built the house right through one of the coldest winters for twenty or thirty years. It was really, really cold and so it meant then that paint, the window frames came through with a colour on the outside and a colour on the inside, and the colour on the inside was a white, a bright and it was wrong. So what we needed to do was change the colour but the trouble is it was so cold that the paint, it was too cold for the paint. And so we had to go off the chemical based paint and onto a water-based paint.

But then there was snow and howling gales. They had to put a shield up, a screen up so they could actually work in the place. And just the temperature was really cold. And then clay plaster was something else we introduced and because it was cold and it was damp the clay plaster was starting to show spores of mould and things. So it was the temperature didn't help. But no it didn't stop us. It was just another challenge.

Kate: Structurally I think they found it a challenge to have the solar space there because the corner's glass on both sides of the two walls, so I think if you asked the guys at the Building Store they'd say that was one of the major challenges. I mean they didn't want to do it and we had to push for that design because we knew that that was something we wanted, even though it made it difficult as a Passivhaus because you've got potentially too much solar gain

coming in. But it worked. They resolved it and we're living in it now, so it's good.

Geoff: If you look at the model, the model's there and the solar space is just an open space but what it doesn't show is the strength that it needed in the corner to hold this corner up. And that was the problem. No one had clocked it. No one had seen that that was an area for strength.

But in fact what they did was they brought in the structural engineer, he drew a design, they had to make sure the support was inside the thermal envelope and it didn't go outside the thermal envelope and it's worked perfectly ever since. So you've got to catch bits and bobs until you actually, you can't really visualise everything, but again that had an impact on the expense, but as Kate said it was something that was dear to us with the project. And the beauty is it's been achieved.

Ben: As I walk around the house I think you've been very clever both with how you've used the space but clearly you've been clever with your money as well. So what tips would you give to someone who wants to build a house but thinks I can't do Passivhaus on a small budget?

Geoff: I think the main thing is that there's certain things that you've got to have with a Passivhaus. Triple glazing is one of them, it's impossible to do to get the sort of performance with double glazing. So the things that you need to have that make it passive, you need to budget for. And there's no short cut round there. That has to happen!

And same with things like the ducting for the MVHR. You can't put cheap ducting into the structure of the house because that wouldn't last. It has to be, where it has to be quality it has to be quality.

Where we saved money was we've used kitchen furniture, kitchen from Howdens. We've used inexpensive lighting from IKEA. If you search around you can find reasonable design answers to what you require. But it takes a bit of looking at, takes a bit of searching if you're bothered to do that. And we were bothered because we had to.

But all the way through the design and build, always was the figure that we had to achieve. Both ourselves and the Green Building Store. And it's to their merit that we're able to do it. But it was a good discipline for the Green Building Store and ourselves to

actually work to a figure, a limited figure, because it proves that Passivhauses can be built to a reasonable budget. And the budget for our house isn't a lot for what we've got.

Ben: You've lived here for five years which is something quite good. We haven't chatted to too many people in the UK who've got that experience, so what have you learnt, how has it been for you?

Kate: It's been very good. It's been excellent! It has done everything we wanted and it's warm when we need the warmth, it's fuel efficient / energy efficient. We wanted a house that we could retire to that didn't have the big bills, it does that. We wanted a house that would keep clean easily, it does that.

What we've actually found, and I hadn't realised before because we were focussing really on how much energy we would save, is how much it's important to have a healthy house. Because it has the mechanical ventilation system all the air coming in is filtered. With the triple glazing it's a very quiet house. It makes it a very calm and tranquil and healthy place to live and that must benefit us in our old age if for nothing else!

Ben: And is there anything that, with all the knowledge that you had, that you would do differently?

Geoff: Not really. We actually did put in underfloor heating in the kitchen and in the bathroom and the reason we did that is because the Passivhaus that we visited in Austria actually had underfloor heating in the bathroom, and we thought there's a point to that. He must have done it for a reason. And we didn't know how efficient the house was going to be.

So there is underfloor heating in those three areas and it's never been used. It's never been used because the 20/21 degrees is throughout the house. Through the floors, through the walls, through the ceiling and £120 a year for a comfortable, warm, healthy, quiet, serene environment is something that I think should be replicated in all new houses for the future.

Ben: And this self-build journey, as you reflect back on it, and perhaps to encourage others who might be doing it, how was it overall?

Kate: Yes, it was very good. We got on very well with our building team but I think you have to make sure that you work at that and keep the communications going. Like we had the fortnightly, three weekly

meetings and I think we all tried to work at a compromise or whatever the situation needed.

Geoff: What I would say is that if a self-builder's thinking of a self-build house you have to address Passivhaus. You have to visit a Passivhaus, because I think once you've done that, one way or another you will build a Passivhaus. It's too good an opportunity to miss. It may cost a little bit more but it will pay it back in three or four years, and thereafter, well from the word go, and thereafter you'll have a very warm, comfortable house that will continue to protect you from price rises from fuel and energy.

And that's one of the big strands about Passivhaus, it future proofs against the vagaries of the economic system. Things are not going to get cheaper before they get dearer and the Passivhaus is well worth the extra you pay at the start, because you get the benefits on and on and on.

Ben: Well, I would like to commend you, because I know that not only have you been through this process but you have shared it in multiple different ways, online and taken your own time to get the message out there, so Geoff and Kate, thank you very much.

Geoff: It's been a pleasure, thank you very much.

Kate: And I hope you get your own house one day.