

HPH352

Ben Adam-Smith 00:00

This is House Planning Help episode 352. Hello, I'm Ben Adam-Smith and this is the podcast for you if you're interested in self build or retrofit. I'm exploring what houses we should be building in the 21st century, and trying to break down the major roadblocks that may get in our way. Coming up in this session, I'll be chatting to Wookie and also Rob Leedham, both of whom have retrofitted their homes. And I suppose this isn't a classic case study episode, it's more about investigating how they've supported each other, how a local retrofit network has developed over time, meetups, spreading information. And I thought this works nicely, really, with our resource today, the Association for environment conscious building, because for a few reasons, firstly, this is where I met Wookie, it was Alan Budden from Eco Design Consultants who introduced me at the last conference. And then another reason is that the AECB themselves had local meetups, I know I was part of a local group, but they take a lot of energy to keep going and to make good, so I think they morph a little bit over time. And then the AECB is also just on top of retrofit, some great training, lots of great information over the years, so that makes them a very good resource for today, we'll put that into the show notes. So we're in Cambridge for this episode, which is a lovely part of England and I was chatting to Mark Brinkley, author of the Housebuilder's Bible in a recent episode, when he brought up neighbourhood retrofit. And this is when I got a nudge, really a reminder, oh, yeah, I never followed up on Wookie and finding out how he's supporting and encouraging the local retrofit movement in Cambridge. The plan is this, we're gonna get some background on Wookies retrofit, and then pop over to Rob's house. Before we get going. This is a great example of how to save money if you're prepared to invest time, the DIY approach, and Wookie is clearly someone who likes to take things into his own hands. He's a problem solver. He loves getting practical. And maybe you can see yourself in here. You've got these traits, too. I can imagine this is really, really useful for local meetup as well. So I started by asking Wookie how he got into retrofit.

Wookey 02:20

Well, so we arrived having bought our nice new house in Cambridge at enormous expense, which looked quite tidy, much tidier than the old previous one, which had been an old lady's knackered house. But then it was January, and it was jolly cold, actually, and draughty and you go, 'Oh, it looks nice.' It had been rented out for 10 years, you know, somebody's gone to the old people's home sort of thing. So we thought we're gonna have to do some work, aren't we? How annoying so we took our nice, new, relatively tidy looking house apart, and I've ruined it for about a decade, just starting to get some bits actually painted and finished again. You know, we started off insulating the loft and air tightening things and buying a new green building store door that wasn't terrible with a massive gap around the outside and so on and then progressed to wall insulation, internal wall insulation, external wall insulation. The boiler was like an ancient ideal Mexico in the garage, which would obviously do another 30 years quite happily but it was horrible, it was using six kilowatt hours a day just to run its pilot light, it was shocking. The garage was quite warm, and insulated pipes come across a sort of asphalt roof, the roof felt. So we got rid of all that, put a proper boiler in, sadly not a heat pump, which has barely been used, of course

for 15 years and is now about to get replaced with some proper heating. So yeah, it was very much circumstantially, we just went, oh, this really isn't quite as good as it looks, let's do this properly.

Ben Adam-Smith 03:34

Going into this, what skills did you have?

Wookey 03:38

So this was the second house. So the first house, you know, needed plumbing and heating and insulation and everything. But I didn't know much about building physics then. So we stuck insulated plasterboard on the walls and did a standard combi boiler and didn't know much about airtightness, didn't bother doing the bit between the floors, we just did each room. So learned quite a lot from having done it mediocly once, going right this time, we're doing things properly. Now understand how these things are supposed to, so that was pretty much reading, reading the internet. So the green building forum and the Navitron forums were the places where I learned everything. I've got an engineering degree, so I have an engineering mentality even though I'm a software engineer. I'm in Cambridge because I went to the university and failed to leave like a lot of people, were still here it's quite a nice town, long way from the mountains but apart from that, it's excellent. So you know that gives you a certain confidence you know, how hard can it be? And to be fair, my my dealings with trades people over the years have been less than inspiring. You know that a few times you go no, I'll give the car to the garage and let them do it. It comes back wrong. You go no, I'm good. I generally I found do a better job and it was it takes forever. But you get what you want. And it's even though you know what the quality is.

Ben Adam-Smith 04:52

So that's quite interesting, bringing it into your own sphere where you can control things. So I imagine you're really good at researching different areas and getting down to what is important. So are there any issues that came up along the way that you had to sort out? Can you give us an example of how you went about it?

Wookey 05:13

The MVHR, I guess it's quite a good example. Yeah, that's a classic thing where normally you just ask somebody to do you a design, it cost five grand, and they come in and do it for you, right. But actually, the principles aren't very complicated, you know, the airspeed in the pipe needs to be less than whatever it is two metres a second, otherwise, it will make a noise, given a certain amount of volume, you need to shift a certain amount of air. So the pipe needs to be a certain size. That's for the classic, you know, steel spiral pipe, for example, I just sat down and wrote a spreadsheet going it's navier stokes equation, you discover in this process, this horrible bit of physics, where between turbulent flow and non turbulent flow that you just nobody knows it's magic, and you go really amazed, but anyway, so you just avoid that zone, because it's bad. So you know, it's not very complicated. If you can work a spreadsheet, you just did the sums. And then a mate emailed me while I was on holiday somewhere saying, oh, there's there's some MVHR units going on eBay for 500 quid because they fitted them on a building site, realised the wrong thing and take them out again, two days later. So the wife gets a phone call from Austria going, go and get one of these things on eBay. So you get a unit for 500 quid, and it costs about 700 quid in pipe, and you know, 12 days in the cupboard, and the loft fitting pipes, which is

very tedious. I did spend like all of one Christmas in the cupboard, cutting those stupid spiral pipe. So I would recommend to everybody don't do it that way. I mean, people recommend it. But honestly, I think the single pipes manifold, and just like one in every room is just one pipe or two pipes, big rooms need to pipes everywhere else needs one pipe, and it's manifold, it's a lot easier to fit. I don't think it's any less efficient. So for DIY, it's a little bit more expensive. So unless you absolutely trying to save the pennies, you'll find that a lot less aggravating.

Ben Adam-Smith 06:55

But expense is something that you've done really well with here. And perhaps it's sort of mixed with the amount of time that you have put into it. But I'm intrigued with these decisions, for example, the architectural design when you took that into your own hands. So does it just end up that you look at everything and think what will happen if I do this myself? It'd be interesting if you could paint that line between what does go to someone else and what stays with you?

Wookey 07:21

Yeah, so you generally, my assumption is that I can do everything. And it turns out that's true for everything apart from plastering, the hardest thing in the world.

Ben Adam-Smith 07:29

Plastering, people always say that!

Wookey 07:31

Going over the slot where there's some wiring is easy, but doing a whole wall is genuinely a proper skill. So yeah, plastering, and tiling, and rendering are the three things I've paid somebody else for. Actually, it's not true. We started off when we did the extension, we got, so we didn't need an architect, but somebody to do the drawings and all that stuff. So we paid a chap 1500 pounds to draw some drawings, but I didn't really what I wanted, you know, was supposed to be green, and he just built a square brick, the cheapest possible extension you could have. And you go No. So I can do a better job than this. I should just start it that way myself, really. So so what I got out of him basically was was a measured plot. He was quite good at that. So uh yeah, I just did all the drawings myself in the end. And because I'm a free software person, I have to use open source stuff. And open source CAD back in 2012 wasn't very good. So it had to use 2D CAD, which was annoying for a triangular building. But anyway, everything came out alright, even Windows fitted but there was a measure six times job before you ordered the windows because it's all on you. I measured the windows, I'm favouring the windows if they don't fit when they arrive is my fault. I don't get to blame anybody else.

Ben Adam-Smith 08:35

We jumped around a little bit. So let's just backtrack on the actual building. What is the build up? You know, What shape is it? What was the retrofit plan?

Wookey 08:45

It's a fairly straightforward seven by eight metre square 1960s detached house with a separate garage. So the extension was basically filling in the bit between the House and the garage and tarting that up with the room on the sunroom on the front. So we started off with basic installation and then once we'd

done the core stuff, then we did the extension for like three years. So we got builders to do that. To be fair, didn't do all the brick work and things so that was just a time issue. You know, we both had jobs, but we did all the kind of internal work and fitting underfloor heating and quite a lot of the insulating and all the airtightness.

Ben Adam-Smith 09:24

When have you had time to do this, then you've clearly got a job that there's a lot of thinking in that full stop. So when you move on from there, you've got a lot on your plate.

Wookey 09:33

Yeah, it's weekends really. So yeah, there's a lot of weekends when we could have gone cycle touring instead of you know, chipping bits of stuff off the wall. That's definitely true. So we did make a rule fairly early on like at least one weekend a month we're going to do something because yeah, this goes on forever right? So you need to kind of explicitly go stop doing DIY do something else for a bit. But yeah, you know, we haven't got any kids, that helps and I quite like it.

Ben Adam-Smith 09:58

And one really interesting aspect of this is that we're in an area where quite a few retrofits have taken place and are taking place. So, when did this come onto the radar when you were doing your own project?

Wookey 10:14

Yeah so it started off as us the green building forum a lot and you know, some people were in and around Cambridge. And you know, if you're hanging on a forum long enough, you sort of become mates with the people, even though you've never met them. So we thought, let's go to the pub. So a few of us, arranged to meet in a pub near the station, because people coming from nearby. So we did that quarterly, maybe rather irregularly for a few years. And then that kind of faded off, later on it restarted as more more local. So you know, I found people at work, you know, I work at a nice, reasonably well paid office. So the people there can actually afford to do their own houses. But you know, most of them, either haven't thought about it, or if they have thought about it, they don't know where to start. So there's quite a lot of people in Cambridge, who are interested, at least vaguely being able to just talk to somebody on non commercial basis about, you know, what have you done. Now, we already have various institutions in Cambridge, like the open eco homes thing, and I went to those in the early days or 2010, we went around and looked at various other people's, what they'd done, which, again, is very helpful in understanding you can actually ask them, you know, what works? What didn't? So yeah, it's just grown over time. And you know, you meet people at various events and around, and basically, everybody I meet, I go, have you fixed your house yet?

Ben Adam-Smith 11:38

That's really interesting that you're encouraging as well. So what do they respond to that? What's the range of response?

Wookey 11:45

Usually the answer's no, obviously. But yeah, quite a lot of people genuinely go. Yeah, but I should. So they get that.

Ben Adam-Smith 11:54

Do you get by in as well on what you have done here and and the full measure, because it is quite a complicated subject. I don't think there's any doubt about it. Maybe not for you as an engineer, but I have certainly tried to convince a few of my friends, and I'm not sure they quite get it.

Wookey 12:10

A surprisingly large fraction of the people I meet, think, yes, that is a good idea and I should definitely find out about it, a very small fraction of them want to do it as DIY or take ownership, they don't really want to learn about the whole thing. They just want somebody to do it and there's a terrible shortage. There aren't enough people around here at the moment. I know several people who've been quite keen, and have tried to get quotes and struggled or been told that we can come and get to you in two and a half years time.

Ben Adam-Smith 12:36

Can you paint a picture of who this DIY person is? You know, how many skills do you really need to have, we don't want poor retrofit taking place. We know there's a certain amount of information that's important, and a certain amount of practical skill. So who is that DIY retrofiter?

Wookey 12:55

Yeah, I mean, I guess I've got a fair amount of practical skill just acquired, I mean, I've always fixed my own cars, that was kind of where it started. And electronics. And then you know, buildings, buildings are quite simple, really, in comparison to cars and electronics. It's often fairly basic stuff. So it's mostly a matter of understanding building physics. So you actually know what you're trying to do to get to the bottom of something. A problem I found the Internet has an awful lot of advice, but it doesn't really explain why most of the time, you've got to go to better resources. And the green building store did a great job of publishing the details of the Denby Dale Passivhaus study, I basically stole all those details for my extension and went right I'll do it like that to be fine. You know, going, in principle, a timber frame building might have been better, but I already got a brick building and adding totally different construction is a bit of a pain, it's easier to do it if it's kind of the same stuff. So having made that decision, you go right, well, we might as well just copy all their details that look good. Some stuff I've just made up, you know, like a fibreglass I beam between the inner leaf and the outer leaf to try and keep the thermal bridging down and you kind of think, oh, was my building inspector gonna complain about this, but it turns out building inspectors don't know anything about this stuff. So they only care about things they understand like foundations, and you know, wall tide roof structure. So it was pretty good actually, he basically ignored anything he didn't understand. And I had no trouble at all with you know, uncertified LED lights, I made my own lights up, and weird bits of construction and those sorts of details.

Ben Adam-Smith 14:20

Few people in my experience are actually that interested in copying, proven techniques, details and all the rest of it. So I think that's, that's, you know, they always want a bespoke solution in a way and that,

to me, is why we keep going round and round in circles and architects you can end up paying a lot of money when you might have been happy with just build me a box with tried and tested ways of doing it.

Wookey 14:48

Yeah, um, especially detailing. You know, it was interesting because I did all the design for this extension, and it's weird and triangular. It's the same as a whole house right? You still got doors and windows and roofs and walls and floors and corners. Isn't there's a whole load of junctions and you have to think for every one of them, well where's the airtightness layer going to go? And how's this attaching to other things? You know? And, and if I don't think about it, I'm not sure I'm gonna be able to rely on my builder to do it right. To be fair, we had quite a good relatively green minded builder there is, there is one in Cambridge, but still, so yeah, there's always some stuff which is particular to this building. But yeah, I did my best of, again, reading on forums, people suggest stuff, right? And if someone's done it before, and it works, that's usually a good detail.

Ben Adam-Smith 15:28

Did anything come up too late? So I'm sure you would have got there eventually. But you'd perhaps done something already, and then discovered something new.

Wookey 15:37

Yeah, I mean, orderings always difficult. Trying to do things in advance, like, you know, the very first thing we did or second thing we did was fitted a new front door, and we made it 50 mil off the floor on the assumption that this is a concrete slab, we're gonna have to put some insulation down, we probably don't want to dig it all up, really. So we did that. And I think that's going to work out actually 13 years later, the floor installations going in, and the doors already at the right height. So you know, result. But equally, we did the extension and had to put the manifold somewhere. And now we're thinking about the rest of the house and actually I don't think that's put in the right place and that's probably going to have to move. So I do emphasise the whole building plan to people as much as possible, even though it's kind of off putting because they want to start this thing, and now we're turning it into this massive project, you've got to think about everything before you can start, which is a problem because sometimes it means people just don't, you know, ever, or at least not for a decade. So there's a bit of a problem. But it really does matter. You can waste a lot of time and money doing things twice if you're not careful.

Ben Adam-Smith 16:33

Right. I've got a couple of questions on this. First of all, if I had come to you at the beginning and said that to you, would you have got one?

Wookey 16:40

You mean gone to somebody else? Well, I tried to make my own whole building.

Ben Adam-Smith 16:44

No, that wasn't the question!

Wookey 16:47

Yeah. Now that retrofit coordinators exist and all that sort of past 2035 approach. I mean, I think it's a good approach. I'm not sure...

Ben Adam-Smith 16:55

What that had was inbuilt knowledge in that step. Because that's the buy in that we want to get. I'm thinking of friends who have done maybe just replaced some glazing. But without a whole house approach, like you're saying, You're never going to get the glazing..

Wookey 17:10

It sounds like you might have done some major things differently. If you were starting with this knowledge that you've gained over the years now. Yeah, as I say, I would have basically gone for a proper EnerPHit retrofit and I mean we are living in the house so the digging up the floor part is always a bit of a commitment that you probably want to avoid and have to. But yeah... Move the windows into the insulation layer and all that stuff. I guess the one major thing that did get changed during this process was started off doing internal wall insulation, mostly because it was easy to DIY. And I was aiming for like AECB carbon light grade 50 kilowatt hours per metre squared kind of thing. And then over time, I got more enthusiastic basically, until you know what actually do PHPP summit, I put PHPP off for a long time, because it's a pain in the arse it took it took a month from a standing start, even though I kind of understand the principles, but you know, it's just if you've not done it before, it's hard. But let's do something. Actually, we could get to EnerPHit or at least pretty close on this house. So yeah, so we end up doing the second half of the house EWI, mostly because the kitchen, the bathroom and the stairs are all on that wall, and you can't really do on the inside sensibly. So you're gonna have to go outside. So honestly, it would have been better to do a whole damn thing on the outside as one EWI that would have just been technically better. Okay, would it cost more basically, there's the only reason not to. So that changed over time, where I was trying to get to improved over a decade. And that meant that we ended up changing the windows on the south side, which weren't, they were 20 years old, but they weren't terrible. So we're going to keep those. But when it came to buying windows and delivery costs and so on, you work out you know what we might as well do the whole damn house. So annoyingly, the the nice reveals you've already done and torted up, get to be destroyed. So that's the only thing we've ended up damaging previous work and have to do again.

Ben Adam-Smith 18:52

Well how has that been then? Because that is a key part of retrofit, you've chosen not to move out I imagine it's been okay, because of the length of time but there is disruption in the time.

Wookey 19:03

Yeah, so basically, you're doing things a room at a time you know, the IWR, you just do a bit and you do a bit and you do a bit. So you move you're moving furniture around, and over time you collect more stuff and the moving furniture, it's like this room I was going to put on the floor heating in, was the original plan. So I took the radiator off the wall, and then several years later went actually I've put so much crap in this room. That's not going to happen as I've put radiator back. Just kind of irritating. I did at least leave a T piece in the plumbing so it wasn't too difficult. But yeah, working around the things I mean, it's a bit of a pain. Dust I think is actually the biggest but once you put your MVHR in you don't

really want to go crazy with an angle grinder anymore. And we did do, so I cut out the reveals which is excellent from a thermal bridging improvement point of view but does make a hell of a mess. Because indoor angle grinding, it's just not something you really want to do in a house you're actually living in if you can help it. We had to put a little sort of shower curtain round around the lounge window in one place where it was actually nominally a finished room with furniture in it and things. So yeah, you know, I have a very tolerant wife, she would like to point out, I am extremely tolerant after all the aggravation.

Ben Adam-Smith 20:08

Very good. I think we need to underline that. And what about challenges, then what do you think has been the biggest challenge on the project?

Wookey 20:18

I'm gonna guess uses up a lot of time, I think is possibly the most significant thing. You know, after a decade of weekends doing DIY...

Ben Adam-Smith 20:26

But you've enjoyed it?

Wookey 20:27

Generally. Yeah, I do like the process. You know, there are occasions when you think I should possibly have done a bit less of this and a bit more some other things. But yeah, I do enjoy. I do like the problem solving. You've got to design something, you've got to actually do it. And you know, it's nice when you finish and it's come out, well, you do get quality work if you do it yourself. The real problem with tradespeople is that everything's time based. How many hours is this going to take? Right? So they won't necessarily thread the plumbing in the wiring in the right place, they'll do whatever they can get at in half an hour, rather than doing it properly which is literally going to take 10 times as long. I think that's the main advantage of doing things yourself is you get those little details right.

Ben Adam-Smith 21:08

And you really understand the building don't you. You know what has happened to it?

Wookey 21:12

Yes, you get to find out where all your cables go and where the leaks are. It took us a surprisingly long time to find some of the holes from the airtightness point of view, the kitchen was always freezing. We didn't know why and it literally it was embarrassingly nine years before we realised that the pipe from the dishwasher was just shoved into an old sink pipe. So there was no J trap with water in it, so there was just a gale blowing through the hole. And you go out well I will explain why it's bloody freezing in this corner. And in fact, where the water pipe to the metre came in, even though it's coming out of the ground there was a gale blowing through that as well, which we didn't discover until we did some floor insulation. I don't understand where the air is coming in, and it's like coming in through the dirt somehow. Magic.

Ben Adam-Smith 21:50

Have you done any analysis since of the house of how you feel it's performing both thermally air quality and so forth?

Wookey 21:59

Yeah. So I mean, we really once we finished the basic installation shell, which we did just before lockdown, so the EWI was done. Then you really noticed that basically now it's all warm, your kitchen isn't freezing anymore, didn't really need any heating and we were stuck here the whole time. And you've got triple glazing. So it's very quiet. And it's a fairly quiet area anyway, but now it's super quiet in here. When we did the MVHR we also really noticed because, you know the wife used to suffer from dust mite allergy a bit. And that just went away. So you really do know is the quality of the building. And as other people have said this, you know, when you go and rent somewhere to stay, you go cold and draughty in these rented cottages. It's not like my nice house at home. So you get quite picky about buildings once you've tried living in one that's actually good. So yeah, and we did finally do an air tightness test. Like we didn't do one at the beginning. So I don't know how terrible this house was. I couldn't quite bring myself in 300 quid just to find out was really draughty. That was obvious. So it's not quantified. But we've we've now finally done it, we got 1.52 air changes per hour, which is I was hoping to get to one but you know, that's not bad for a 60s cavity wall.

Ben Adam-Smith 23:02

It's surprisingly difficult, isn't it to get under one on the retrofit, which is I guess why that marker is often there.

Wookey 23:09

Exactly. Without totally replastering all the walls and really going for it total total destruction sort of job.

Ben Adam-Smith 23:15

Now, I think it'd be interesting if we widen our interview and head off down the road. So tell me where we're at first.

Wookey 23:24

So backing onto me is my neighbour Rob Leedham. And he's basically been more or less EnerPHitting, not quite, his house at the same time I have been. So as we've gone on, we've exchanged quite a lot of notes about fitting and we've used it I've used wood fibre, he used EPS, and so with various differences, that they're nominally identical houses on the same housing estate half a year apart, but actually, they're different in various ways, because they were they're all slightly different here. The eaves constructions not the same anywhere, and so on. I've got skilings he hasn't, he did his MVHR before I did. So you know, that kind of thing. But we've basically got to follow the fairly similar path.

Ben Adam-Smith 24:00

Yeah, this is one of the real challenges of retrofit, that it's not as if it's one solution, there we go give it to everyone job on. Come on, let's go.

Wookey 24:09

This is two houses down and they're just about to send in the planning permission for a major retrofit to expand because that's one of the few houses that hasn't been expanded yet.

Ben Adam-Smith 24:19

Well, that's always nice, isn't it when it needs some work doing to it's the right time.

Wookey 24:24

And the guy I think he was an architect, so or some something like that, he does know what he's doing. So I think they're planning quite a good retrofit, but they're limited by how much money they've got. So there's a compromise on you know, making it bigger for the kids and basically how much house they can have and they've had to scale down their ideas a bit as building prices have gone up.

Ben Adam-Smith 24:44

You're gonna have to do the knocking and stuff. Good day Rob!

Rob Leedham 24:50

Hello Wookey

Wookey 24:51

I've brought Ben round to talk to you about about repairing, breathing houses.

Rob Leedham 24:55

You've just come to the right place.

Ben Adam-Smith 24:56

Excellent.

Rob Leedham 24:58

Come in please.

Ben Adam-Smith 24:58

Right Rob, can you remember when you first met Wookie?

Rob Leedham 25:06

Oh, I think that was probably about 10 years ago, maybe slightly more even.

Wookey 25:10

We moved in 2007, so but I guess you were just looking for a bit, you saw some bloke on the roof, I think, fitting hot water. So the first thing I did was solar thermal. So we looked to the back garden going whose that bloke on the roof? What is he doing?

Rob Leedham 25:12

Yes, I think Wookey introduced me to solar thermal, and we've followed him down that route. And then Solar Electric after that.

Ben Adam-Smith 25:30

So did you always plan to do a retrofit here?

Rob Leedham 25:35

I think over time, my ideas about what we're possible have increased. And over the 23 years that we've been here, we've installed one green measure after another. I don't think there's been a master plan. People rarely know they're going to stay somewhere for that length of time. But in retrospect, it has worked out that way.

Ben Adam-Smith 25:57

Now, I'm intrigued as well about this working together. Maybe it helped that work. He was ahead of you a little bit. So what have you got from that relationship? How's it worked out?

Rob Leedham 26:10

I think it's very useful and confirming to identify someone that's explored new ideas, and shows that something's possible. We put solar panels on our roof, and we've put external wall insulation on. I've had many conversations with people passing the house about both of those technologies.

Ben Adam-Smith 26:35

And when we've just walked in through the doorway, the first thing I noticed was a fan. So what's the story there.

Rob Leedham 26:42

So we installed mechanical heat recovery ventilation about 10 years ago. And as part of that process, I've been making the house very airtight, in order that we don't lose energy through uncontrolled air leakage. And the fans that you saw in the hallway, one of them is a professional air tightness kit. And the other one is a less expensive version intended to be loaned out to people. And the idea of those is that you instal them in a door or a window. And when they're on, they allow you to depressurize a house, identify leaks, and calculate how leaky the house is. So how much energy is lost through uncontrolled ventilation.

Wookey 27:28

Was that like five or six years ago or something, basically, Rob wanted to test is air tight and find the leaks. So he just made a plank stuck in the window. And I went, Oh, that's handy. Can I borrow it. So I borrowed it, it's a car radiator fan and a plank, really not very fancy. So I borrowed it and it was really useful for finding leaks, once you can depressurize your house, you can just walk around and look for the leaks, and you're not, you haven't got some airtightness chap that you have to pay 300 quid to standing there, looking at his watch, you know, you've got all day or week makes a huge difference. There's another chap, just down the road, who's been doing a massive EnerPHit project, and he was struggling to get his airtightness. So he borrowed the fan. And the builders found it really useful to be

able to try and find leaks. So we've realised that this is actually a very applicable thing. It doesn't cost very much money. So now the Cambridge retrofit hub is getting going in Cambridge. So if you're familiar with cosy homes, Oxford, but they're basically trying to replicate that model in Cambridge, so that there is somebody for most people to go to and just get stuff done, rather than have to become experts themselves. And they're going, yeah, we should have a load of these fans, so we can just give them to people, and they can start finding where all the holes are.

Ben Adam-Smith 28:33

And Robert, slightly off retrofit topic here. But did I hear that you created your own ground source heat pump?

Rob Leedham 28:40

Yes, that's true. That's something that I kind of drifted into about four, maybe three years ago, I wanted to have a heat pump, I started learning about them and wondered about buying one, what different type and wanted to experiment. And before I knew it, I'd actually ended up building one, and then why not start digging trenches in the garden. And, again, I'd like to say there was grand master plan. But it all seemed to work very well and is still installed. It's been going for a past couple of years. So we took out our gas boiler bit over a year ago. And we fully rely on the heat pump now.

Ben Adam-Smith 29:16

I think we need to have a little wander around. So as we go around, can you just show me anything of interests in either your retrofit or how you're powering the house differently?

Rob Leedham 29:24

Okay. We're in the kitchen at the moment. And in the ceiling there we can see one of the many heat exchanger vents and that one's taking air out of the house. So warm, moist air, it takes out of the house and passes the energy on to cold, fresh air that comes in and other into other rooms.

Ben Adam-Smith 29:45

Did you have an air tightness target before you went for whole house ventilation?

Rob Leedham 29:50

I had a target to get under three. That's the point where it's considered to be efficient to have a heat exchange and that's air changes per hour at 50 Pascals. We're around 2.1 now.

Ben Adam-Smith 30:04

But there are just so many benefits. I know what you're saying in terms of electricity usage. But then you've got all of the moist air going out the bathrooms out of the smelly rooms. And yeah, it's just great, isn't it?

Rob Leedham 30:15

Yeah, it's an unsung hero, it really is, my wife really liked the fresh air in the house. And it just works. Yeah, I can, I can hear it here, there are some bits, because it's the heat pump, as I say is DIY. Some parts of it is inside and some part outside. And so the electronics is inside and the header tank. And

there's a little display there that says it's got a coefficient of performance of 4.4 at the moment. So inside, we've got that part that calculates the efficiency. And there's a little electric metre, a standard electric metre off the shelf thing for measuring how much electricity is used. It's been going for about two years and a couple of months, and it's up to four megawatt hours of electricity in to provide all of the heating and hot water for those two and a bit years.

Ben Adam-Smith 31:17

Yep, it's raining. Yes. Ah hah!

Wookey 31:21

And the other thing about ground source heat pumps is that they are actually the very simple you know, there's a compressor or an expander, and a pump the heat into heat exchangers? That's basically it. So which is why in fact, it's not that hard to build your own.

Rob Leedham 31:32

Yes. So it lives inside this insulated box. So you could probably just hear it at the moment. We're right next to it. I can take the door off, and then it will be a bit louder. It is basically as what he says, a fridge. It sounds like a fridge. It's the power of a large American fridge freezer, except the cold side goes under the ground. And there are some pipes that I can show you under this grate.

Wookey 32:04

This is a fine bit of DIY with some EPS insulation and a bit of rock woll on the inside, which basically deadens the noise. It has a remarkably good job of keeping.

Ben Adam-Smith 32:13

I just can't get over how Rob is your neighbour, he seems like the perfect person to be living next door to you.

Rob Leedham 32:19

We do egg each other on.

Wookey 32:21

I was quite impressed when he said I'll build my own heat pump. And there's an idea maybe I could do that, too. And then I thought actually, that sounds like quite alot faffing about. So I bought one on eBay instead, which was basically similar. But then the wife went, do we have to take the garden up? Couldn't we just have an air source heat pump like everybody else? So we're currently on a how much difference is actually going to make? And which am I going to do? Maybe some cooling in the summer will be nice. So I should have an air to air one. So I'm currently surveying the entire possible sphere trying to decide something.

Ben Adam-Smith 32:48

Isn't that her domain as well, you got to be careful going into the garden?

Wookey 32:52

Yeah, I mean, if we didn't write the beginning and we moved in, and it was a bare grass, that would have been fine. But now there's a whole lot of veg beds and plants planted and things that the digging up part is significantly less popular.

Ben Adam-Smith 33:01

Because that's one of the challenges, isn't it that you've got to be really careful about, that you don't want your pipes too close together and all the rest of it, and taking too much heat from the ground.

Rob Leedham 33:09

That's true. That's true. We have a lot of insulation in this house. So actually, we don't need very much heat. That's the key to making heat pumps work and easily, shall we say? So I could make this because there was so much installation that any heat source would work fine. I have to say I would always tell people, though, that the sensible thing is probably isn't to make your own. It's to actually buy an air source heat pump and have someone instal it and and they are the sensible choice these days.

Ben Adam-Smith 33:33

Just depends who you are!

Wookey 33:36

The other thing that is a little interesting about the heat pump approach is that Rob just used trenching tool. So the pipes are only like, point eight metres down or point eight five sort of thing. So it's not, you know, didn't have a massive digging project. And it's still pretty messy. But that was probably a sensible compromise in terms of getting it done without spending a fortune. So you so you reckon you get the whole thing cost a couple of grand basically by the time we finished?

Rob Leedham 33:57

Yeah, probably less than I mean, the most expensive thing by far was hiring the trencher. So that was 700 pounds to hire this machine, which was a brilliant machine, I mean it I felt so powerful. Pulling this machine behind me with a massive chainsaw in front of it that went straight into the ground and threw up the Earth, half bricks popping out of the ground everywhere. So I went around the garden with the machine towing the machine behind me and over the course of a weekend and I was left with a load of trenches, each of which was two thirds of a metre deep roughly the whole family joined in putting the pipes in and joining them up at the manifold. So under the ground, there are no connections It's just plastic pipe and buried in various places. So we can still see that the ground has recovered and we still plan on using it for whatever, home office or a small orchard perhaps. So at the end here, we have another inverter. So we have one in the loft, which has been there for 12 years, I think with the original solar panel system that we got about 12 years ago. This is an additional one. Now that hybrid inverters are available. So this one can connect to a battery, and to more solar panels. And we have the space on the garage roof, some more space in the garden. And so I'd like to have more solar panels.

Ben Adam-Smith 35:30

So everything that we've looked at so far here has been renewables and about the generation side, I mean, when you look at Wookey's project, you know, how in depth have you gone with the house?

Rob Leedham 35:44

For the house itself, it's mostly about saving energy. So insulation in various places. So we have 150 millimetres of external wall insulation completely around the house. As Wookey, we have insulation below ground now, down to the footings to prevent heat escaping from the, from the slab of the house. So when when we first moved in the concrete floor of the house was very cold to the touch. But with the insulation it is much more comfortable. It's a much more pleasant house now.

Ben Adam-Smith 36:18

Did you take a DIY approach to all of that work? Or how did you make it happen?

Rob Leedham 36:22

Yes, it's all DIY, the original solar electric that was professional, but other than that, it's a DIY journey of discovery.

Ben Adam-Smith 36:30

And how long has it taken you? And are you still on this journey?

Rob Leedham 36:36

I think as many people is, depending on the age of my kids as to how much effort has gone in. The kids are a bit older now. So I'm more able to push on with things. We've been here 23 years, I'm still on the journey. Most people would think we've finished by now but I can still think of things.

Ben Adam-Smith 36:55

Two fascinating retrofit stories. We did plan to move on to Stuart Dyers house next, but he was on holiday. However, he's left us the message.

Stuart Dyer 37:06

Hi, Ben, it's Stuart Dyer here. Yeah, just getting back in touch with regards the retrofit and extension that we did on our 1930s detached property. We carried out quite an extensive retrofit, moved out for a year, we did external wall insulation, triple glazed the property, fitted mechanical ventilation with heat recovery, put it in an air source heat pump. Worked quite hard on airtightness as well, I think that was possibly the most difficult thing. And also put in underfloor heating, which works well with the air source heat pump, and insulated quite a lot under the floors. In terms of being in Cambridge, I think there's quite a benefit, because there's quite an active retrofit scheme here in Cambridge. So for example, we have monthly meetups of the Association of environmentally conscious buildings. So that's a great chance to meet with people in the pub, discuss with those who have already done a lot of work, the good things to do and the pitfalls to avoid. Transition Energy Group is quite active in terms of new technologies, new interests, and good advice there. And perhaps one of the key ones is Cambridge carbon footprint. So they run an open eco homes each year where you can actually visit other people's houses, either sort of new builds passive houses, or those who've done quite a lot of retrofit work. And they also have a lot of case studies. So that's, that's great in terms of support for the local community, who are looking to either build or retrofit. So very quick summary of what we did there. But now that I've

done the work myself, it's a chance to give back by talking to people like yourself. So hope that's useful. Thanks, bye.

Ben Adam-Smith 38:34

And reflecting on this topic, and some of the points made in this episode. First of all the resources as ever, if we've mentioned something, it will be in the show notes today. Secondly, groups may exist in your area. So you need to go and investigate or may have morphed a little bit as they tend to over time. And then the other thing that Stuart mentioned just then is that if you've been on this journey, as we like to do on this podcast, we'll always find people who've been on this journey, and see what they've learned, then that's a great opportunity to give back. But it's just been fascinating to see action on the ground. And I remember when I was talking to Mark Brinkley, he was he just had all these different stories of even on his own street, people who had retrofitted and then there was one guy who powers his whole house from his car and all these sorts of things. So I think we better go back to Wookey for the final word for today about the Cambridge meetups that he's involved with.

Wookey 39:29

It's actually now mix of AECB members and random people who want to retrofit their houses. And it's interesting when an architect was running it, architects came to the pub a lot. But now that retrofit is running it, retrofiters come to the pub a lot. So you know, the idea is to have a mix, but that doesn't always work as well as you'd like. And it's almost impossible to get builders to come to the pub, which would be nice, but you know, they're probably busy. But yeah, I think that's been quite useful. And when they're doing that every month, half online half offline since COVID, which is kind of useful for people who aren't in in the middle of Cambridge, it isn't necessarily handy for them to physically come here. So basically everyone you meet who expresses an interest and you say well just come along and ask, you know, tell us what sort of building you've got. And you'll get some slightly random but unbiased advice from whoever happens to be there this week. And I think quite a few people have done that. And, you know, some of them have gone on to do major projects. So I think it's working. But we do definitely need more of the, okay, yeah, I'd like to do this, but I don't really want to learn all about it. I just want somebody, so which is what the retrofit hub people are for. So I hope that's going to grow.

Ben Adam-Smith 40:33

And that is one such link you will find in today's show notes along with everything else we've mentioned, houseplanninghelp.com/352. We've got a summary of what has gone on, some photos as well. So you can check out Rob, and Wookey's projects. And actually Stuart sent me an article about his own home. So you'll get to be able to explore that too. If you've got a comment or you'd like to ask a question, you can tackle that in one of two ways, either on social media, we'll provide links, or at the bottom of the show notes, just scroll down houseplanninghelp.com/352. My call to action is to check out The Hub and this is the membership community that we run alongside House Planning Help, with all sorts of digital resources so you can keep the learning going. Whether you're tackling a new build or a retrofit. As we've been talking retrofit today, a couple of things that might be of interest we've just added in a new ask the expert session. So Es Tresidder is on hand every few months to answer questions around building physics and moisture, and he actually has tackled his own retrofit at Fort William, which is a stunning transformation of a building, all sorts of lessons learned there as well. We've got our in depth video case studies and again, the one that might be most relevant is Guy Hargreaves project. We

filmed the entire way through his retrofit. So we mentioned Alan earlier from Eco Design Consultants while this was one of his projects and just fascinating to see this Victorian building being made more comfortable and energy efficient. We've got a live training sessions courses, the members only forum and you can chat with me during office hour. Want to find out more houseplanninghelp.com/join There we go. We're done for today. Thank you so much for being there. The House Planning Help podcast is produced by Regen Media, content that matters.