

Episode 287

A beginner's guide to retrofit – with Russell Smith

The show notes: www.houseplanninghelp.com/285

Russell: Well, I'm actually a chartered civil engineer. I renovated my own house sixteen years ago now.

It was really on the back of a period of secondment into a charity called Forum for the Future and I started to understand the gravity of climate change and the impact of the things that we'd never heard of as a general member of the public. I hadn't really heard about the impact of energy, particularly starting to unpick the amount of energy and carbon emissions attributed to the housing stock. And it's very easy to put the two things together and say, crikey, we've got a hell of a lot of houses that are going nowhere. And the average rate of change or knockdown and rebuild of a Victorian house, it's expected to be here in about a thousand years' time.

So, nobody appeared at that time at least to be looking at the renovation stock where all the sexiness in industry was all about new-build. And I have to say, I don't think much has changed in that respect really.

But I said at that time that I'd try to do the best that I could with that particular Victorian property. I got the heating bills down to fifty quid a year, I had about three-thousand visitors come and look at the house over a period of three years – this was whilst I was renovating. And I was learning as I was going so I could be fairly honest with everybody that came to say, this is what I've discovered, this is how hard it's been, this is how much it costs – not as much as you think provided you do it in the right way – all those sorts of things. I was able to distil it and realise crikey there's a business in this, but actually, it didn't have to be anything too mindboggling technically either provided that you get your head around this in the right way and take the customers on the journey. People were prepared to do that with you.

So, I started my own firm and I've been doing it ever since because it's such a critical thing for us to try and achieve at scale.

Ben: Quite interested that you used the word renovation there because I was going to ask, what's the difference between a renovation and a retrofit?

Russell: Does anybody really know?

I think it's almost a state of mind, if you like. If you're retrofitting, you're retrospectively fitting things. That's where retrofit comes from. Effectively, you're chucking things at a building in the right way but you assume that those things that you're doing are done in isolation.

People talk about whole house retrofit. I think that's complicating issues. What we're talking about is refurbishment, it's deep refurbishment, and ultimately every home in the UK is going to have to have a significant amount of work done to it in order for us to hit our climate change targets.

My view is, if we all take the position that every house has to have that work done and we either have the opportunity to do it all at once, which you could regard as a whole house renovation, or you're going to retrofit, in other words you're going to do bits and pieces at a time, but provided you've got a game plan right at the start knowing how everything should fit together in the long-term then your retrofits should add up to a whole house refurbishment in the long-term.

That's how it works in my simple mind.

Ben: How do we get this game plan then?

Russell: Great question. That's a customer journey that's taken a long time for us to work through, my colleagues and I at Parity Projects.

What some people suggest is that you need to go straight at every building and for the customer, the first thing they see is a design for everything in the building. My answer to that is, that would work for a couple of people who are convinced that this is a thing that they want to do. However, ninety-nine percent of the people who own buildings, do not realise this is a thing. So, if we attack them with an enormous pile of drawings and deep retrofit specifications, they're going to run a mile.

So, a whole house plan is something that I urge people to get straightaway for their building but that doesn't necessarily have to be something that requires deep calculation or something that's really going to take a huge amount of time and therefore cost.

Our approach is to be able to use data that potentially already exists on the building, a set of calculations that are prevalent out there – we do use the RdSAP calculation methodology that's used for the energy performance certificates – we throw away the energy performance certificate because it's hopeless but we do use the data, we do use the calculation because it's widely known and accepted at government level, but what we don't do is then use that necessarily to go and create the deep plan for a whole house renovation.

What we do is, we get somebody at relatively low cost to a point where they understand the size of their problem and the size of the opportunity. So, we show them all the things that are possible with the house. We show them all the things that are a priority which is a subset of those – quite a few of the things that we've analysed we analyse deliberately knowing that they're going to be awful but we show people that we've got to a point for their building that's impartially derived, they can throw some things away because it's been shown that they're pointless and they arrive at a distillation of a package of measures for the property which are very appropriate.

That is a key point of building up the trust with your homeowner. And you do have to make them aware that if we're going to the next stage, we need to really unpick the house, we need to go into proper detail, we need to do some more analysis, we need to use calculations that really try and make sure that we're picking out every single element of this building and what it's all about so that we can go forward with confidence.

I think that's a trick that we've missed in this country. I think there almost seem to be people that want to leap straight to a deep calculation and charge people a lot of money straightaway. If you're somebody that's accepted that part of the journey straightaway, great. But we're trying to build a model here that every householder in the country can understand, know what's next once they've had it, and they're brought on a journey.

Ben: Can you give us an example of the two extremes then of what these measures might look like?

Russell: I think I'd have to come back to you on that. I think ultimately, all of these things need to be done to every house. So, if I start at that point...

The cleverness in the advisors that you would get to help you do your retrofit is how they all fit together. And it's particularly difficult to get all those things to fit together if they're not all done at once. So, if you're phasing your renovation over time, you have to be pretty smart to be able to do that well and/or experienced to know what doesn't work.

So, if I start with what would need to happen, let's take the most common type of house in the UK; a three-bed semi. Let's say a third of the buildings in the UK are solid walls and let's take one of those, for instance, because they tend to be the toughest or so-called hard to treat.

When you take a building like that, you're in a position to be able to say, 'okay, where's my heat loss?' Because ultimately we want to be able to reduce our demand for heat. That typically in a house is your biggest proportion of energy consumption / carbon dioxide emissions. So, you want to be able to reduce your heat loss and secondly your demand for hot water. So, demand is what it's all about. Let's reduce our demand therefore we need to pump less heat and hot water into the building. Makes sense.

From that front, if you've got a solid wall building, the biggest proportion of your heat loss will be the heat loss through your walls. So, of course, your listeners might be thinking, 'how the hell do you do that to a building that doesn't have a cavity, because everyone keeps talking about cavity wall insulation?' Well, there are two options there. You've got to put it on the outside of the house or you've got to put it on the inside of the house. Both have their pros and cons.

If you're putting insulation on the inside of the building, you've got to be extremely careful, very detailed in the way that you analyse the opportunities that go into the building, making sure that you are working in balance with the way that the building was designed to behave. That's all about the moisture in that brickwork because you might have moisture there already that needs to dry before you do the work, you might have rain that's incident on that building. So, if you're a solid wall homeowner in Swansea, your building will have very different levels of risk associated with it compared to someone that lives in the middle of London.

So, you need to be able to choose your measures carefully and you might even argue in a situation in somewhere like Swansea, you wouldn't want to go anywhere near internal wall insulation unless it was dealt with very, very, very carefully.

The external wall insulation option is actually relatively straightforward in some respects provided it's designed properly. So, the heat losses in that instance will actually combine with another benefit of insulating that brickwork and that is in retaining some thermal mass inside the building so that actually your heat demand can actually be controlled much better because the heat inside the building would be absorbed by the brickwork and you can have more like a balance within the building so that your heating system doesn't have to work quite so hard.

You just go around the building looking at all those options that are bespoke to that building in turn. What's next after the walls? Windows and doors. There are two elements to windows and doors. One is obviously the heat loss through the structure itself and then there's the heat loss due to air infiltration around the structures as well which unfortunately, typically in the UK, will be pretty high because – and I'm not going to have any fans here – the installation standards are extremely variable and we need to be making sure that these things, if you're not going to replace them, that the gaps around those structures are dealt with very well.

The other two key areas of the outside external fabric really. Obviously, your roof, and under floor. It might not be well-known but typically under floor heat losses on your ground floor are pretty enormous. I hate generic figures but typically fifteen percent of the heat loss of a building will be through the floor. And how many people do you know that are jumping over themselves to try to insulate underneath their floor?

We get a huge number of phone calls from people saying, 'my feet are quite cold. What do I do about it?' And they've not considered that actually, an enormous part of their bill is lost there. We get the odd call from people that have put down a brand-new engineered wood floor and they're asking me how to insulate it. Well, the first answer is, I really wish you'd called us a month ago, but the second answer is, there are people that can tackle those things now with robotics and what have you. But really, the point with all of this is you need to be thinking about your plan before you've done any of these things, not after.

Moving on to the roof, obviously it's a big part of the surface area of a building. So, being able to tackle those different types of roof there are out there in the marketplace is very, very key. But as you can probably imagine, as I've been talking about all these elements, they're all unique. They might all face a different way to the sun, have different amounts of rain incident on them, we need to care about the amount of ventilation that the wood that each of those

structures might be having so that they don't get moist and start to rot over a period of time. So, there is a level of uniqueness to every individual building that an expert has to consider in a lot of detail before you can start plonking bits of insulation on them.

The next thing we need to think about once we've built a building tight and we've insulated very well, is ventilating. It's one thing that as an industry, if you're not an expert in this space, if you're just focused on the thing that you might have picked up at college, you won't really have been taught about ventilation. And once you get to the point where you're insulating more and you're decreasing the air changes that go through that structure as a result of that work, you need to make sure there's a good level of air infiltration into the building so that the air quality remains high for the occupants.

Once you've got those things dealt with in combination, you've resulted in a much lower energy demand than you would have done in the first place. And that's the point to start considering your heating system and how you would put some heat into the building.

Clearly, standards such as the Passivhaus standard deal with this head on and it's critically important to be able to make sure that you are ventilating and insulating in combination so that you get to very, very low levels of heat demand so that in some instances you can virtually do away with your heating system altogether but not completely. When you get to those levels of heat demand, you can start considering the amount of heat that might be coming off all of the appliances and the people in there etc.

It's a laudable aim for every property but when we start coming up against things like cost and logistics, we have to appreciate that not every building in the country is going to ever reach those levels. That's when it starts becoming a little bit more complicated and actually much more difficult for an expert to advise a householder because you're looking at budgets, you're looking at logistics and priorities and maybe even the underlying health conditions of the occupants and what their priority is for that moment in their life.

And also, the next occupant, the person that's going to buy that property next. How would they wish to live in that building? If you're only going to go halfway through that whole house plan, how do you communicate the next part of that plan to the next occupant? How do you make sure that they don't trip over things that you've left them, so that if you're only installing some of the measures or you're only tackling some of the things that you would want to do upfront, really you want to make sure that those things don't have to be undone to do the next things later on.

Ben: There's a lot in that. You've hinted at some of the phasing. But really, would you be advising to just do the whole thing if you can?

Russell: Yes, definitely. It definitely makes the most sense. It's the least costly way of doing it. If you imagine that if what we're going to be doing over the next thirty years – or hopefully quicker, by the way – is going to be just waiting for the kitchen to be done so that you can insulate underneath and behind it, or waiting for the bathroom to be done, or waiting for the extension to be done and then you do a bit then, that's fine. And I would say a lot of people they've got no other option.

However, if you imagine you're doing the whole house at once, there's nobody living in the house, you don't necessarily have to tidy up completely at the end of every day, you could bulk-buy your materials, you can consider the airtightness layer around the whole building, you can put in a ventilation system that copes with the entire building, not just one room at a time. Even common sense tells you that's the right way to go.

But we have to bear in mind that people on the whole don't have somewhere else to go while this happens. You've got to bear in mind that people haven't got all the money at once. So, there are challenges in that respect and we have to bear those in mind.

Ben: Are you finding that it's a certain group of society then that's doing these retrofits or is that complete nonsense?

Russell: That's a loaded question really. The people who have been trying this for a long, long time, they completely get it. I would say at Parity we've been giving advice to people for fifteen years and as my colleague David would say, we've kind of started to run out of professors called Anne that live in North London, that are quite wealthy and completely understand climate change.

But as people start to realise this is not going away, I think we're definitely seeing a change. I would say even the last four or five months, the Extinction Rebellion narrative now and their presence has had a massive impact. We've started a couple of schemes now with central government support in a couple of parts of the country specifically trying to target people who do have the money to do this straightaway. And it's not a question of getting people to understand what a heat pump is anymore. They know what one is and they want one. In many respects, we have to try to get them to calm down a bit because their house doesn't suit a heat pump. We have to get them to get the house to a point where the heat pump is ready for them.

So, there's definitely a level of awareness. There are young families that have just bought their first home, for instance, and they want to get it right at that stage and they know they're going to live there for the next twenty years so they want to do all the right things straightaway. It's not just Professor Anne. It's a whole range of people.

Obviously, social landlords have had a big role to play in this market as well. They've been doing quite a bit for a while. I would say given their budgets and their power in the marketplace, they haven't been doing enough, but they're distracted because there's a lot of new-build going on; there's a demand for housing and they've had to put all of their efforts into that and they probably can't borrow any more money because they're completely up to the hilt in borrowing simply because of that. Doing more on the retrofit front is hard so, they're having to do things piecemeal as they fulfil their asset management plans.

I realise that's not a straight answer for you.

Ben: No, that's alright. We're used to things like that.

Just thinking about how we're spending money as households, is it possible that we're missing a trick because we just want a new kitchen or the money's going elsewhere into some other fund when actually it could be going into the house?

Russell: Completely. There is one thing I talk to our counterparts at BEIS about and central government very often now, is this need for a national campaign to raise awareness of the multiple opportunities there are with retrofit.

Just one roll of loft insulation into the house of ten different people, they might be motivated in ten completely different ways to have that insulation in the property. It's going to help their building warm up more quickly, there's a level of airtightness there that's improved. Providing you combine that with ventilation, respiratory problems are solved. The value of the property might go up, the landlord might be able to put a bit more money on the rent (as long as it's done ethically) – all of that kind of stuff.

It's just that people aren't aware of it. They're super, super surprised. Even my friends and family when I keep talking to them about this stuff – and I do – even though I do this and I've been talking about it for a long time, it's just not in their psyche.

So, we need central government. It's an absolutely critical thing now. If they're going to do nothing else, just to try and have a

concerted campaign – the door might be open to that on the back of how society’s pulling together on the back of the coronavirus – have a concerted campaign of trying to get people to understand the real potential of their property, where it can get to provided they make very good, strong decisions, and that they have this notion of the whole house plan that I think is central to that. So that they know everything that needs to happen with that building over the next thirty years.

It’s got to happen. We’ve got no choice. That is going to happen so that when they are planning their shiny new kitchen, the new bedroom or they’re just redecorating, they can incorporate those things into their thinking.

It does need to be followed up with, of course, by some low interest finance for people who don’t have that money but we’re seeing a lot of work being done in the finance space now, that’s potentially green mortgages, to be tagged on to this kind of work so that people can pick the right sort of finance at the right sort of time. Even decent equity release options are out there now as well so people can really choose the right thing to go forward with.

Ben: A word on quality then. I understand the whole house plan idea and if you’re doing it, that’s great. But if you’re not in our area, how do we pick someone that’s actually going to get this right? Because there is such a thing as bad retrofit.

Russell: Yes, completely. I am dismayed by the reputation of the industry. Fortunately, I’ve spent most of my time with some really good contractors and designers who want to do the right thing. And in fact, I’ve never met anybody that deliberately wants to do a bad job.

I think on the whole what we’ve got is a fragmented industry of people that know how to do their thing and that’s all they want to do and really, they don’t communicate enough with the people around them to try and get the whole thing done well. I think that’s a key problem for us.

Quality starts at the design. It starts at the point where somebody is putting the right list of things together, explaining that list extremely well to the contractor so that they in the first instance can actually price up the job well. And I think that’s where things tend to fall down. Until things actually start properly and the clients are properly spending money, are people willing to put the effort in to try to provide the clarity so that everyone can move forward with the job?

I think people tend to bash contractors in the first instance for poor quality but the bottom line is, if the contractor's not been told what to do very well then it's never going to work.

One thing we've tried to do over the last seven years with this cooperative we setup called RetrofitWorks, is try to bring all of those disparate parts of the industry together as part of one organisation so that we can all work together to design the customer journey and the schemes within which we all operate, so that communication is good, the tools that everyone has got at their disposal to do the design and to communicate with each other and to implement the work and so that somebody can check everything at every step of the way, is all there. We've been allowed to work in silos for far too long now so that everybody thinks they've done their thing well and sod the person that comes next.

I think Grenfell is a very sad tale for the way that the industry has ended up pushing itself down a particular way trying to cut the corners and costs out of every single step of the process to a point where we've ended up at just finger pointing. Whenever anything goes wrong, all the money gets spent on is lawyers trying to unpick everything and trying to make sure someone is to blame. When actually, a bit of cooperation and collaboration at the earliest stages by everybody involved in the project solves most of those problems. We've managed to do that really successfully with RetrofitWorks over the last seven years and it's going from strength to strength.

Ben: You seem to have a lot on your plate and I know particularly about a couple of your projects that you've talked about. BEIS as well. But the pilot schemes, let's run through one of these because my production company, Regen Media, has made some videos for Cosy Homes. So, what is that scheme and why is it up and running and what is it hoping to prove?

Russell: Cosy Homes Oxfordshire is a manifestation of the key partners that we built up in Oxfordshire. So, whilst RetrofitWorks on the one hand brings this model saying, 'okay, we've got all these members, we've got contractors, we've got designers, we've got retrofit coordinators and these people together can deliver renovations to houses', what it needs is to work well in an area or in a constituency of customers.

By working with Low Carbon Hub in Oxford and the National Energy Foundation in Milton Keynes, what we're able to do is define what we think the customers within Oxfordshire need. We define the marketing, the approach that the customers want is clearly described, we design our processes as a cooperative behind all of that, and we push forward with the advice, the whole house plans,

the detailed design, and putting a tender process in place so the right contractors are selected and we make sure they do their work well.

What central government has done, they bought into this model and they've given us some funding to push that on. Because the challenge for putting these things in place is that you're not sure that someone's going to buy the product. And in many senses there is far too much at stake for government to just let the market make this happen. Because it hasn't happened, it hasn't really come to life since I started this sixteen, fifteen years ago. So, it does need a little bit of a nudge. And fair play to central government for allowing us to have some funding which pays for the working capital of that model. In other words, we invest a lot in the marketing, reaching customers, giving the advice, in the hope that we earn enough money in the long-term to pay that back. And the model does seem to be bearing fruit.

The model itself at the start of all this, the idea was that for a million pounds worth of working capital, we could tackle the renovation of the able to pay type customers of about five-hundred-thousand houses, and that money would be paid back over about five or six years given the amount of demand we think we'd generate.

I would say we're learning a lot. I think it hasn't helped that the funding hasn't necessarily been available for very short-term. Year by year we've been working with that money. If we'd had a guaranteed funding for a longer period, I think we could've moved much more quickly. But having said that, we have more customers that we can handle. The challenge there has been getting the supply chain on board, coming up with a model that they're willing to work with.

I think that the problems we've had are local to Oxfordshire because of the nature of the industry. Other parts of the country – we're working in Sussex; Warmer Sussex is a scheme down there, and we're about to launch in London as well with a scheme called Ecofurb – we have established supply chains in those areas that we've worked with for quite a long time now. They trust us, we trust them, and our processes have really been optimised because of those relationships. Whereas we're starting from scratch in Oxfordshire with new faces and we need to build up that rapport over a few jobs.

So, it's been a little slow to get going in Oxfordshire, I will be honest with you, but we are definitely getting somewhere and the reports at least, people love the idea of these whole house plans. It really

gives them the clarity and the detail that they need to be able to take the next step.

Ben: Are we thinking that we're going to bring new labour into the industry or is this retraining of existing skilled people?

Russell: It's all of that. If I could give you a flavour for the numbers, we did some work at the end of last year to model all of the work that would be needed in the UK to complete the renovation work for the housing stock, to meet what we only have at the moment is an interim target set by government to hit a minimum of an EPC score of C for every house in the UK by 2030. So, ten years.

That is, in effect, trying to renovate twenty-six-million buildings in that time. We're using the Parity Project's modelling tools to identify which measures would be required in each house over that period. When you work that back you can then start to identify how many people would be needed to do that work. Based on about one-hundred-and-sixty-thousand people working in this particular industry at the moment, we need to virtually triple that number in order to hit these targets.

So, it's not just a case of retraining all of those hundred-and-sixty-thousand. Retraining is probably a bit of a harsh word. They all broadly know these things but they've never been asked to do it. They need a refresher and some guidance for the detailed stuff like airtightness, making sure the insulation is installed well, putting windows in properly. They don't need training, they need coaching, I think. We need them to get on with it straightaway and we need people on the ground to show them how to do it properly.

And what about the rest? There's a massive gap there. Where are those people going to come from? We haven't even recovered the numbers in our industry following the 2008 economic collapse. So, we need to get back up to those. In fact, we were at two-hundred-and-forty-thousand people in the industry back at that particular time but we need to get up to about three-hundred-and-eighty-thousand people. Those people need to come from other industries that might be waning, they need to be coming from people that are bored doing other things. We're talking about quite a change in the way our industry has to be considered.

We really need to think of innovative ways of getting people into the industry to do this.

It's more than just putting them on the existing training courses because in my view the existing training courses being run in

colleges are not fit for purpose. They are from day one putting people in the position where they are in their silos, something I described earlier on as a major factor in how our industry fails to function well. I personally think all college students need to be on the same course for about a year at least so they all know the same stuff and from that they start to develop their specialisms. And then they can talk to each other properly on site rather than the plumbers having a row with the electricians about who should sweep up at the end of the day, we'd actually all be on the same plane knowing where we're all headed.

But we've got some big opportunities out there as well. We've got factories closing down and there's quite a long period of time before that will genuinely happen. So, why can't we be training up these people in their lunchbreaks or after work or whatever so that they've actually got the right skills? And this will be managerial skills not just people working on the tools. There's a range of people that could be becoming available in a defined area. We should be working to try and get these guys mobilised. And quickly.

This is something that's really going to change the nation, I think. If that sort of model of retraining combined with this notional government national plan for how we can get the whole country renovated, I think we're on to something. I think it's something that we'll really want to be able to get into. Parents will no longer be telling their kids they should only be a doctor or a lawyer when they leave school. They might be encouraging them to get into something that's actually going to have a practical aspect, will really make a material difference to every household in the country, and we can actually see the outcomes of that which will be minimising our impact on the climate.

Ben: Just finally, if we're going back to look at our house thinking we want to get this done, are there any useful bits of information, resources or anything that you would tell us so we're not going to get scared off at any point? What comes to mind?

Russell: I would say it would be worth just getting in touch with one of your local retrofit coordinators. This is a relatively new qualification, frankly. It's kind of what I've been doing for fifteen years but I've never been able to give it a name before. But effectively there's a small army of these retrofit coordinators out in the market now that are able to give you the advice and they've got the technical knowledge to be able to pull a plan together for your property.

But other resources out there, if you went on to the AECB website, there's a section on there called Knowledge Base and there's a

whole load of stuff on there that you can read for free. Other things are accessible if you're a member, so join.

In general, I think we've let householders down in this country really on a portal for knowledge for how to retrofit homes. There are a different range of organisations out there that do have some things on their websites for free. CSE in Bristol, the Centre for Sustainable Energy, they've got some really lovely things on their website that you could have a look at too.

But on the whole I would say try and get your local professionals and contractors to you to start to wake up to this. Because they know most of this. They just need to work with a retrofit coordinator or similar to be able to pull it together. I think that's the way to do it. Obviously, we need to try to build a legacy from even if it's just one job. If you're going to do your home up, try and accept that some of the people on that job will need to learn something, point them in the right direction.

But I would say if you're a homeowner starting from scratch which is where I was at fifteen years ago, in a home, living on my own, the whole house was pulled apart and I was trying to work it out as I went along, it's dreadful. Just try and team up with some professionals that genuinely want to help. Having a professional out there that's got the right attitude is critically important. Even if they don't necessarily know it, they will learn. They will find out.

Get them to give me a call. I'm happy to help provided I've got the capacity. Okay, admittedly the capacity is very thin at the moment but we're all in this together ultimately. Every building needs to be renovated. The sooner we start, the sooner we'll get there.

Ben: Russell, fantastic to have a chat with you. Keep up the good work and thank you very much.

Russell: Cheers.