

Episode 158

Lessons from 40 years at the Centre for Alternative Technology

The show notes: www.houseplanninghelp.com/158

Intro: The Centre for Alternative Technology (CAT) is an eco-centre in Wales, dedicated to demonstrating and teaching sustainable development, alternative technology, and all aspects of sustainable living. In this interview, we hear from Pat Borer who has been involved with the centre since its early days.

I started by asking him to tell us about his background.

Pat: My name's Pat Borer. I'm an architect and for forty-two years, I've lived in mid-Wales, came up from London, escaping, on a small-holding.

I've made a living out here as an architect, quite a lot of the time at the Centre for Alternative Technology in Machynlleth where I went to work in 1976 and then stayed there for fourteen years.

Since then, all I've ever done really is green architecture. And most of that has been self-build, I think. And that continues even though I'm quite ancient now.

Ben: We'd like to talk about the Centre for Alternative Technology and just a quick journey through the ages to see what that might uncover.

When did it first set up or when was it first an idea?

Pat: In about 1973, this very well connected man called Gerard Morgan-Grenville, like many, saw the writing on the wall that industrialised civilisation was on a dead end really, which it still is. He wondered if he could start somewhere that demonstrated there is an alternative to a mainstream way of doing things.

He looked around America and saw the hippy communes and thought 'that's not quite what I mean.' So, he found this site in west Wales which was an old slate quarry that had been abandoned since about 1950 and had been taken over by nature.

It's quite a beautiful place because as soon as a thing has no economic benefit then nature takes over. And it's a wonderful place, full of wildlife and trees. Whereas the land outside of it is standard sheep monoculture with very little wildlife or interest.

So, he managed to rent this for almost nothing and started what was meant to be an experimental place, a village of the future. That was what he had in mind. But then people annoyingly kept coming to look at it. And so, eventually so many people were coming to look at it that they thought they may as well open to the public, charge them and get an income.

And that's what it's been doing ever since. I think it opened to the public in about 1974 or 1975. And it demonstrates what is still really alternative technology and social ways of dealing with things. It's always been a cooperative. At one time, it was almost communist because everybody got paid the same wage. I think there was us and Cuba that was left!

It's changed a bit but it's always been an educational centre. That was the point. The education is of ordinary day visits because it's lucky enough to be on a visitor route up west Wales. The main road from Pembrokeshire to Holyhead goes past it. Schools have always been very strong, the educational side. So, schools come on daytrips. You meet people all the time, particularly here in Wales, who say 'I'd go there when I was in primary school.' So, that's always been very strong.

Then two other forms of education. Day and weekend and week public courses which has always been very successful and still is. That's perhaps where the self-build element comes in, self-build courses. Then recently in the last ten years, CAT has got a small university. We built a purpose-built building for Masters courses in architecture, renewable energy, all that sort of thing.

Ben: The 1970s was the energy crisis and that triggered off a lot of questions about how can we live alternatively. So, I imagine you had lots of ideas.

How has that developed through the years or is it a case of just banging our head against a brick wall for forty years?

Pat: No, it has developed. The technology has changed a bit but basically, it's not that hard.

An awful lot of our energy in the UK is in heating houses and since CAT built a super insulated house in 1976 that's better than a Passivhaus, uses less energy, we've known how to do that. We

know how to build low energy houses that use our fair share of resources.

That's what it's always looked at. What is the equitable amount, our fair share? And we know in energy, we use approximately eight worlds' worth, us in this part of the world. The industrialised people of the world use eight times what is their fair share.

So, that sort of thing has been developed. It was all quite crude to begin with, as you'd expect. There was a lot of emphasis on renewables. But that's really been taken out of CAT's hands, in a way. Renewables are now a much bigger field. Even pathetic Britain generates more in renewables than it does from nuclear. And some industrialised countries that are more sensible like Germany and Denmark have a very high proportion of renewables. So, that has moved on hugely.

The technology hasn't changed really. A photovoltaic cell hasn't increased in efficiency hugely, but what's happened is the Chinese have made a lot of them. And good old capitalism, thanks to the Chinese, means it now costs half of when I put in my PV array.

People call them solar panels. Don't call them solar. PVs. Photovoltaics. Because solar panels can cover hot water and electric. It's a bit of a vague term. Years ago, solar panels meant hot water. Now it means electricity. So, keep the terms separate. That's the pedant in me!

When I put mine in, it was £14,000 to install it. Now, it's about £6,000 for the same thing. So, that's just in three years. Extraordinary.

So, that's the big change. Big business, unfortunately not British but, say, Danish, wind turbines have got cheaper and cheaper and they're now economically very close, certainly with coal. They're getting close to gas in terms of generation cost. The government isn't releasing the figures for PVs because we suspect it's cheaper.

So all of that has developed but not particularly CAT developing it. CAT has done some research, mostly on the theoretical level.

It did this very good thing. It's done it several times but the recent one is called Zero-Carbon Britain. It's a theoretical analysis of Britain's energy needs and can that be run zero-carbon? Good question. Because ultimately, in a hundred years say, that's what we'll have to do. So, let's see how we can get to that point.

So, that's the sort of research they've done. It's a serious bit of academic research that was opened in the Houses of Parliament and that sort of thing. Questions were asked in the House. So, it did very well.

That's the sort of level they work on plus the education side. Because it's all about people's attitudes and opportunities and what they like to do. That's really the difference. The technology is the same. It still works extremely well, it's very efficient, the costs have come down hugely. So, it's merely the attitude of people. And that includes, of course, governments.

Ben: Let's focus on some people that come to CAT for a minute. You mentioned those day visitors. I'm intrigued, obviously, with the day visitor, it's often a light visit, only getting a chance to experience a couple of things.

Is there a message that you like to send people away with? Has anyone thought about that?

Pat: Yes, I've thought about it too much probably.

CAT is an odd place in a way, in that it's got lots and lots of different threads all over it that you could follow. There's not one message, 'you must vote Green or ...' – it's not a simple thing. It's a complex thing and we like to show how complex ecology and our place in the world is and that every little thing affects every other thing. It's the butterfly effect and what have you.

But we also like to show that as David McKay, who was the government's energy advisor – he recently died unfortunately – he wrote this brilliant book which I can't remember the name of, on energy. He said 'if everybody does a little, we'll only achieve a little.'

We normally think if lots of people change one light bulb, that's going to make a huge difference. Alright, it does. But actually, we've gone beyond that stage. What he was saying is we've actually got to do a lot because we are right in the middle of a crisis. For everyone to just do a little is not enough. Which is a very good point.

So, we try to show how you can do a little, change your light bulbs and save water in the toilet, that sort of fairly easy change, doesn't really affect your lifestyle and doesn't challenge you in any way. And things like maybe an electric car would challenge you a bit more. And a bit more insulation in your house when you haven't really got room to do it. Or it looks very pretty. Do you really want to put insulation on the outside? All these sorts of questions.

It's sort of levels, really. From light bulbs to government. The day visitor hopefully ends a little confused but a bit inspired I think. That's the point.

Our thing has always been it's in a beautiful part of Wales. It's stunning. So, people have a good feeling about green things just by being there. So, that's a plus. A jolly good start. And then we do things like show well-insulated houses and we heat them very well so that people associated energy saving not with shivering in the dark, which is what people like to say, but with comfort. Which is what it is. A well-insulated house is far more comfortable. In fact, people live warmer then and don't save as much as they could.

But the truth is, a house like this which is an old 1750s house is so different from a house that hasn't been insulated. Just the feel of it. The walls are warm. They're not freezing cold stone things that suck the heat away from you.

So, we try and kind of go a bit over the top and make it appealing. We talk about green building for instance, which is very relevant to self-builders and so on. A lot of that, yes energy is one side, architecture, light, quality of air, that sort of thing is another. Materials are another. And it's a big side because our building industry uses a tenth of the nation's energy. The construction sector.

Waste from the building industry is three times domestic waste. So, every time you put a black bin outside to be put into landfill, the equivalent is being dumped on your behalf, of three bags. So, it's huge. That's a complex thing and it's to do with contracts and it's cheaper to buy a lorry load of plasterboard and dump half of it than to keep a plaster boarder waiting for a delivery. It's understandable but it's led to this huge waste of brand new stuff. This is not waste when you attack an old building and you end up with bits of rubble. This is new stuff.

So – where was that leading?

Ben: I can pick up on something there. There are so many of these decisions that, let's say – and I've heard this a couple of times – that people that live in very energy efficient homes go on more holidays. And this unravelling, it's so tricky.

Should we be living a life that's more dialled down so that we don't fly or are we hoping that things will catch up, that we all live in a Passivhaus, we all drive the electric car. In fact, we probably don't

even have to own our car because it's automatically driving to us. Is that the future? Or is it one of almost austerity?

Pat: No, I don't think it's austerity. The CAT has survived on very little money but it's never been uncomfortable. It's never been a place you don't want to be. Wages are very low but that's because of all the things you talk about, car sharing, food sharing and stuff that went on and still does go on. It makes it very cheap to live there, if you do live there, or work there.

So, no. Why people with low energy houses fly more, I don't know. Probably going to look at other Passivhauses in other countries. But I guess they've got more money because they don't spend it on heating. And that's what people like to do.

If you look at this zero-carbon Britain, to be able to get to a zero-carbon state, we've got to do some serious things. One of those is to reduce flying. Another is to reduce meat. They're all sensible, well-known things. We know very well that meat is a huge emitter of carbon dioxide. Partly through the animals, partly through growing the food. We're growing loads of food for animals and not for us. We know all that.

But I don't think CAT particularly want to preach. If you want to go flying, then it's our problem but it's your choice.

In fact, I remember one woman who worked there decided not to have children. And she said 'I'm not going to have children but I am going to fly to Greece. The children are a huge energy expenditure. I choose not to do that. I choose to use the same amount of energy to have holidays.' That's very logical. A child takes an enormous amount of energy.

Ben: But you could go down this – and I found myself doing it, just when I've been playing around. For example, a couple of years ago, I decided what would happen if I didn't have any more baths? I can always jump in the bath with my wife once every however often but generally – and that's been a habit that I've changed, that I only have showers now and they're only three minutes long and has my life folded? It hasn't.

But am I just being stupid? Really, this is not how we solve it?

Pat: It's one of the ways we solve it. It certainly is. The best solutions are not technological nor lifestyle. You could go and live in a cave, have a really low impact. Then we've lost the whole of three thousand years of civilisation really.

So, we have to build on what we've done. And there are some great things that have been done in three thousand years. But there was a little slip-up called the Industrial Revolution and we went down this path of enormous fossil fuel use. That will be looked at, in a few hundred years' time, as a wrong turning. We've got to push the oil tanker, the huge boat quite a bit to the side. We've got to do hard steering one way away from this fossil – that is without a doubt.

Unless you're a crazy person – which one can see several crazy people around – you cannot deny climate change. You cannot deny that most of the fossil fuels have got to be left in the ground. Otherwise life will become untenable for not just us – probably us rich people it's not going to affect hugely – but for most of the world, it's going to be disastrous.

Plus, of course, the wildlife. We watched Planet Earth II and think it's wonderful. But how much longer? David Attenborough always makes a little comment which is quite right because we're killing them all. So, that huge gene pool which is so necessary for us, for everybody and everything, is being diminished.

So, these changes have got to happen. And the sooner they change, the better. But I'm not one to say 'you've got to do it.' And that's what CAT tries to show, that it's an attractive way to live.

I was talking about materials when I forgot what I was talking about. Our buildings which place a great emphasis on using natural materials, let's call them – but remember, plutonium is natural so it's not quite the right phrase but materials from benign sources that have little impact on the world when using them – all of our buildings are like that. Which is great. There's a philosophy behind it. It's low energy, low embodied energy in the materials. But they've also got to be great bits of architecture that feel good to live in, to make that point. And also, because they just do.

People come in to our buildings, particularly the most recent one, and say 'hmm. It smells different and feels different. Why is that?' The reason is that probably eighty percent of it is made of these benign materials and they're things that humans have grown up with. Wood, earth and lime. We've spent millions of years getting used to these materials, so it resonates when people go in a building like this. It's tonnes of wood, rammed earth walls and all that. It resonates and people go 'this feels good.'

So, that's the way in which we try and get it over. We're not going to preach. There are, obviously, preachy type posters around the

place. But I hate them. You've got to show people that it's a good thing to do for them, that it's attractive really.

I don't think CAT has been terrific at that but with these latest buildings and the latest works going on, I think it's getting there. That people come and go 'so, this is a place that hardly uses any energy and yet I'm warm. All of these materials come from natural, benign sources and they look great and smell nice.' So, that's what we're trying to do.

All of our courses take place in this new building. So, we've got hundreds of Masters graduates going out there. You meet them all over the place and they're soaked through with this philosophy. And they're just doing normal greenish type jobs. Engineers and so on. But they've got it in the back of their minds where this idea came from, I think.

Ben: You mentioned the courses there. This might be a good point just to focus on self-builders.

That's a slightly longer course. What information are you keen to impart on them over a few days? I know you can't go completely in-depth.

Pat: It's a four or five day course. We've been running it since the eighties, so at least thirty years. Two courses a year, maybe sixteen people on each course. So, not huge.

We give a mixture of theory and practice. Every day we start with a bit of theory.

We only do timber frame courses because we think timber frame in its various forms – and there are loads of different ways to build in it – is the most people-friendly. The most applicable to self-build. All you have to do is learn to measure, to square and saw and screw and you've got most of a house. Those techniques are not like bricklaying, not like plastering. They're easy.

And wherever people in the world have got timber, they've built in timber. Where they haven't, they've built in something else. So, all across the northern hemisphere and the cold bits, it's a predominantly timber architecture. And that's for those reasons. It's kind of easy, timber is strong, it can be reasonably durable, easy to cut – you have to cut it right – and so on and so forth.

So, we only do timber frame. Obviously, people will want to plaster but there are techniques where they don't have to. So, that's up to them.

But you find that people on self-build who do self-build, there's this rather glib term 'self-build, build self.' Because they end up different people half way through. And we've found this. I've been involved in hundreds of self-build schemes of people building their own houses. And they change. They become more confident about what they can do. And they end up plastering their own house because they kind of go 'how hard can it be? If builders can do it, I can do it.' They even, to a certain extent, do plumbing and electrics. You're not allowed to complete it yourself but they do a lot of the base work.

But we don't cover all of that. You're not allowed to anyway. We just talk about timber frame and its three or four main ways of building in timber frame. We do a bit of theory and of course then, every opportunity, we're plugging in 'the other good thing about timber is that particularly if you buy local, home grown timber, it has very low embodied energy, it's supplying work for people in the countryside, for farms and so on. It's providing good habitats for wildlife.'

There's hundreds of tick boxes with timber. Which is why in Wales there's an organisation called Coed Cymru – Welsh Wood – a QUANGO. Woodlands are very big in Wales and wood production. There's lots of new sawmills that have sprung up. Which is great because we've got a reasonable amount of wood.

So, all the time you're only showing things really that, if there is a message, are reinforcing it. We show how you insulate but we don't use plastic foams because they're at the bottom of our list. At the top of our list are equally good insulations made from recycled newsprint, cellulose, sheep's wool, flax, hemp, cork, waterproof – it's nature's expandable polystyrene. Exactly the same but it grows on trees.

So, we just feed in all that, that every decision you make is important. Important for you and for the planet. Just choosing your insulation, there's a lot of temptations. You can get second-hand foam and so on. And I don't blame people for going and getting a lorry load of second-hand foam. It's not very good with timber frame. It doesn't work very well. But I can't blame them for doing that. That's fine.

With a lot of different things, a lot of science – and it's all evidence-based. It's not just our feelings about this. There's evidence. And the evidence for using breathable construction, say, is very, very strong. If you don't, you could have a dangerous situation whereby you get condensation within a timber frame structure and it can rot it. Which is what happened with early timber frames in the 1980s in

Britain. We imported the idea without importing the quality of workmanship unfortunately.

People still build like that and it's stupid. We know all about condensation in construction. It's just science.

So, that sort of thing we teach. It's on many, many levels. But it's all evidence-based. Of course, we have prejudices and we are prejudiced towards using, say, sheep's wool or something because it's just jolly nice to use. It smells great, it doesn't itch, it's easy to fit, that sort of thing.

We have these talks as well on energy, materials, a bit on services, a bit on organising the site, planning, building regs. Designing and building is what you could call an iterative process. It's circular. You don't quite get back where you were, it keeps going. It's feedback, isn't it? You're always feeding things in as a designer until you say 'okay, that's as good as we're going to get.' And we're all designers. Self-builders are designers. So, you're forever putting in inputs.

And we're very good at that, humans. We can choose a site based on all sorts of things. Where the schools are; where the shops are; which way it's facing, if we're sensible, if it's south; how much land there is; what the neighbours are like. We're ever-so good at combining all of those things. So, we're just adding another layer of complexity, saying as well as all that, think about what's the sustainable thing to do. What, if you kept doing it, could go on forever.

Ben: Are there any common questions that you get asked in these training sessions?

Pat: Yes. Money. There is an attitude, partly true, that what I could call green construction costs more. So, there's quite a lot of discussion about that.

And it's true. Many of the materials do cost more. Some of them don't. You can do a cheap green house or an expensive green house. It's up to you. A lot of them, using the philosophy of reusing materials is very good so, that's often the cheaper thing to do.

That comes into it quite a lot, costs, because that's very important. It's one of the big inputs into your iterative design processes, the costs of everything. So, we're able to answer that.

But the trouble is, often you're not comparing like to like. For a similar cost, you can buy a locally grown hardwood floor, say, to a laminated floor with a veneer of real timber on top. And they cost

much the same, oddly. But one's much better than the other. The solid mono wood is environmentally much better than a glued-up thing made in a factory somewhere in Germany. And they cost a similar amount, I think.

You can make these choices and sometimes costs will come into it, yes. Quite a lot of the time. Often, it's your choice.

So, most self-builders are probably looking for a better-quality house. A better place. Not just a place that could've been built by a developer. Who would want that! The point of self-build is that you are the designer, you are the money bags, you're looking after this. So, you can have what you want. And very few people – in Britain I think it's fifteen percent is self-build. It's quite low compared to Germany where it's fifty percent ...

Ben: It could even be under ten percent.

Pat: Anyway, it's not many people, the same people who design the house are the people who live in it. So, we get rubbish, terrible, badly built, terribly badly planned old-fashioned designs because a developer does that and you're forced to buy it.

Which is why we've got an enormous DIY market. It's huge. Because our houses are not that good. So, we have to do something about it. So, we truck along every Saturday and buy something to make it better.

But if you've got the opportunity to design your own house, I've never had a self-builder – and I've had hundreds of self-build clients – who've said 'do you know what? I want to put in the minimum insulation in this house because that makes good financial sense.' No. Nobody's ever said that. They say 'it's not going to cost much more to highly insulate this house. Insulation is cheap. It's the stuff that holds it in place that costs the money. If my walls are a foot instead of four inches, I'm never going to have to heat my house again. So, that's what I'm going to do.' And that's what people do.

That's always been the way in the last thirty years. They've all been low energy houses. When you look at studies that have been done on low energy houses in the UK – there's quite a few things – a high proportion of them are self-build because it's a no-brainer, as they say.

Ben: Let's finish off on any tips for a truly successful self-build.

Pat: Wow. I don't think it's in the technology. There are hundreds of ways to build and they all work. If you're good at brickwork, for

goodness sake do brickwork because it's a very cheap way to build. And you can do a Passivhaus, a very low energy house in brick. It doesn't have to be timber frame. It's just that it's come from Germany where they tend to do that.

Choose the technologies that suit you. For most people's cases, it may well be timber frame because it's easy to do.

Ben: Maybe a round up then of what we've been talking about today?

Pat: It's not hard to think with one bit of your brain about what's the correct thing to do. And we probably all know what the right thing to do is, for the planet. It's not very difficult. People are telling us all the time and have been telling us for thirty years.

So, try and feed that in to your self-build scheme and you'll find that, I think, you'll get a better result at the end. As well as saving the planet, you've kind of saved yourself a bit.

It's a bit like whole foods. Because they're better for the planet but they're also better for you. It's like whole building, I like to call it.

Ben: A good way to finish. Pat, thank you.

Pat: A pleasure.