

Episode 114

The long road to high performance homes – with David Olivier of Energy Advisory Associates

The show notes: www.houseplanninghelp.com/114

Intro: David Olivier has 35 years' experience in supporting UK architects and engineers on leading energy conscious building designs. He was also instrumental in The Autonomous House – a project which we will link to in the show notes.

We're going to be covering a few different topics with David, largely because he was involved in a lot of environmental research earlier in his career. We're also going to be talking to him about his own project, together with getting lots of useful advice.

I started by asking David to tell me a little bit about his background.

David: I was born in Leominster, Herefordshire, 62 years ago and I went to Sheffield University and did a degree in chemistry. Then I went to Cambridge and started a PhD in a related subject, but I realised halfway through that degree that I was going to be slightly bored by some forms of academic research and I wanted to do something of more interest to humanity.

So I had already become very interested in environmental issues during my stay in Cambridge. And this was in the mid '70s, and by the end of my spell at Cambridge I went to work for an environmental research body called Earth Resources Research in London, which is, or rather was, linked to Friends of the Earth. And we started doing a study of the long term energy needs of the UK and the potential for meeting them from renewable energy combined with a large increase in the efficiency with which we use energy.

By the end of that time the report was finished and published in 1983, and after that I slowly set up a freelance business advising people on energy and environmental improvements which they could make to their new and even existing buildings. It's important to realise that in the mid '70s, although Britain wasn't very

advanced, Canada and the USA were doing a vast amount of work on energy efficient and solar buildings. And you've got a few pages on your site from Harold Orr in Canada who I know, and he was one of the pioneers in this field, alongside many other Canadians and Americans.

And I met these people in the '70s and I've admired them since then, because they were doing 40 years ago what people in Britain are now doing when they build a new Passivhaus or something close to it. And passive solar has been used in the USA in new houses for the last 60 or 100 years. It's not just since the oil crisis of 1973. There are several famous houses by architects, including Frank Lloyd Wright, which are profoundly passive solar because in the 1940s the sun rose and set every day in the northeast USA, just as it does today. And it's a much sunnier region than Britain so people have always realised that the sun is important, except of course volume developers which don't seem to recognise where the sun rises and sets in the sky when they set out their new housing estates.

Ben: In this report that you did then, I'm assuming that you came to some conclusions, and I'm wondering whether one of those is to do with the sun! But what did you come up with then, and was it acted upon?

David: What we came up with then was the conclusion after about 4 years work by myself and three colleagues. We came up with the conclusion that within about 50 years, if the political will was there the UK could provide about two thirds of its energy from renewables. That would have been by the year 2025 which we're now approaching, 40 years later.

We also concluded that the UK could improve its energy efficiency by about threefold over 50 years, with the result that it could reduce its energy consumption and increase the standard of living of most people.

And this was a conclusion which was unfamiliar to people in the late '70s and early '80s, but there were other reports being published at the same time, including one by the Centre for Alternative Technology, which came to the same conclusions.

So there was some confidence at the time that energy policy could be moved in the direction of renewables, if the political will was there and if the public were keen enough on these changes. At that

time of course the biggest stress was on the price of oil, rather than the emissions of CO₂.

But if you fast forward 40 years, the concern is still about the cost of energy as well as the environmental impact, and many people are concerned about their heating bills, not just about the amount of CO₂ they emit. So there's a huge parallel between the situation back in the early '80s and the situation in the mid 2010s.

Ben: You came up with these suggestions. I'd certainly like to know more about the renewables, how that would have worked and been implemented. Why hasn't it happened? Why are we back here at square one?

David: We're not quite at square one, because despite government lack of interest and inaction, energy efficiency has improved over time in the UK just because the measures are so cheap and easy to do, they will happen come what may even without any government's encouragement. People have been investing in energy efficient lightbulbs, such as compact fluorescent lamps and LEDs over the last 30 years, and those have had a marked effect on electricity consumption.

To my amazement I recently read a report by Andrew Warren, the ex-head of the Association for the Conservation of Energy, and Andrew's report sets out how the consumption of gas and the consumption of electricity in households has declined sharply over the last 15 years, and this is set to continue in the future, if only government policy is made more positive towards these measures.

At the moment government policy seems to be made more favourable towards new nuclear power stations and fracking of natural gas in England. But there's no reason why there has to be bias towards those two though. The nuclear power policy in particular is extremely expensive and the electricity consumers will pay dearly if we build more nuclear plants. Imagine if the same money was invested in energy conservation in the domestic sector, for example, subsidising the price of a double plus or a triple plus fridge freezer so that people can replace an energy wasting model that's ten years old, by a really energy economical model, from made usually in Germany I'm afraid rather than the UK, but nonetheless, it's possible to buy a fridge made in Germany that uses about £10 worth of electricity a year, compared to £50 for some old models still in British households.

Ben: There's little that we can do about government policy, we obviously want to see it change. What can we do ourselves if we're wanting to become more energy efficient?

David: Are you thinking of living in an existing house or if you're building, planning to build a new one?

Ben: We're thinking new build on this podcast.

David: If you're thinking of building a new house or an extension, then consider very carefully whether you should ignore the UK building regulations and meet a much higher standard, because the building regulations in other countries in Europe are much higher than our building standards, and they have been for as much as 30 or 40 years. The Swedish building standards of 1980 are better than our building standards of 2010 or 2014.

So don't think of just meeting the UK building regulations, think of applying more insulation and if you live in the countryside and your only fuels are oil or LPG, think very carefully about meeting the Passivhaus standard because you'll probably find that that will give you a good return over the next 10 to 20 years, and it will also make you more comfortable. A better insulated house and a more draught proof house is more comfortable, whatever your heating fuel.

Ben: We talk about the Passivhaus standard from time to time, it's always nice to hear it mentioned again. This year, what we're trying to do at House Planning Help, is more on some of the key challenges that we face when we're trying to go through the self build process, and I am stuck on one of those at the moment - finding land. So I wonder through the story of your house that we're sitting in at the moment, and also any advice that you might have for me, if we could start that discussion.

So, land. What can you tell us about trying to find land in the UK to build your house?

David: The first thing I would say is if you have a choice then move to East Anglia, Scotland or Wales, because you will find more building plots in relation to the demand than you will in other parts of England and Wales.

I think in parts of England and Wales the supply is really difficult and you will probably find that you have to do a self build, you will

probably have to buy a building plot on which there is an existing decrepit house and knock it down and start again.

However, I think if you live in one of the regions further from London, or even in East Anglia, my impression is there are plenty of plots for sale and you should be able to find something within the area where you're looking without too much difficulty. Whether you can get it at a reasonable price is another matter.

And if you're in any doubt, take advice from a chartered surveyor and get a valuation of the plot with and without a finished house on it. And then make sure that you incorporate a contingency just in case your costs overrun, otherwise you could end up with a house worth no more than it has cost to build, which would be tricky if anything further goes wrong.

Ben: Tell us about your land hunting experience and how you got on here.

David: My experience was probably easier than most because I'm living in Herefordshire which is on the border of Wales and although it's not as easy as Scotland or perhaps East Anglia to get permission or find a plot with permission at a decent price, it was easier.

When I looked, which was the 1990s, at that time it was a buyer's market, because there had been a recession in the early 90s, however the recession went on for a long time in terms of property values, and so building plots were available at reasonable prices well into the 90s and it was possible to even have a choice of even three or four plots.

When I found my plot I had a choice of three on a shortlist and one which was slightly more expensive. And after I deleted the more expensive one as being a bit too much, and I asked a surveyor I knew to value the other three plots and he replied that two of them were fairly valued and I should just go for whichever I liked best. I doubt that self-builders today would have that luxury, except in the peripheral regions of the UK.

So I think I was very lucky and I'm quite keen that the government should actually take some action to provide more choice of self build plots today, because there's no good reason why self build should only make up 10% in new dwellings in the UK and it should make up 50% in Austria, Belgium and Germany, and nearly as high as that in most of Europe.

Ben: I sometimes wonder whether I should be kicking up a little bit more of a fuss as well, in my particular area, because I'm sure that there is land which could be released by certain councils when land is sold off by farmers as well. It only will tend to go to the big developers because they know how to get the roads in and so forth. It's not impossible is it, particularly if this is something already close to amenities to have a small scale self build project of even 6-10 different plots?

David: Yes, there's lots of scope for what most councils call "windfall sites". These tend to be individual sites up to sites for perhaps 5-10 houses which are not quite foreseen in the local plan, but nevertheless satisfy the conditions for getting planning permission.

So there's scope for a group of self-builders to look for a larger site if they, especially a site next to a road where the services already are in, because I believe it's legally a lot easier if you can individually buy all your plots and do your development yourself, rather than a group self build. I believe there may have been legal problems with the group self build which need to be checked. I'm not an expert on that so it's just something to bear in mind.

One point which I would make is if you live in an area covered by five or six councils then do find out what their planning policies are, because when I was looking for a plot I was looking in an area bounded by six different district councils and they had six different planning policies varying all the way from relaxed, positive and helpful, to negative, unhelpful and completely draconian, saying no building anywhere outside these ten settlements.

So do always consult the councils but on the other hand be very careful at annoying planning officers, because if you do anything to annoy them they may take the opportunity to make life difficult for people who then apply for planning permission.

I had a very strange experience when I built my site. The junior planning officer who was dealing with this area said that he wanted my house to face north which was not ideal for a solar house. So I then had to go and see the chief planning officer and try and explain what I wanted to do, and it took about six months to get the initial unhelpful letter reversed and they did eventually give permission for my detailed planning permission with the house facing south, but it was a surprisingly difficult episode over such a minor point given that the site was in the middle of the open countryside and was not on a building line or right next door to any other house, which could object to a house not facing the highway.

Take extreme care when you, as I said, when you go to meet council officers. If in doubt, especially if you're in the home counties, consult a planning expert before you even go to meet a council because I don't think you'll find that they're as flexible and helpful as some of the ones I met in the 90s were.

But I do think that if you're persistent you should be able to overcome the objections, because if you watch any episode of Grand Designs, some of the self-builders have overcome huge objections to get their scheme fulfilled.

In 2015 I think the self build and custom building act was passed by parliament and this was led by the MP Richard Bacon, a Norfolk MP and MP for an area where there are plenty of plots but also plenty of demand for self build. And his Bill, or rather the government Bill, does require councils to take action to ascertain the demand for self build plots in their area and to provide land or to require volume developers to provide some land as part of a larger development. And this should be very helpful to self-builders because it puts a legal duty on the local authority to make efforts to help self-builders be able to obtain serviced plots. So I think if you look up this act of parliament and then quote its requirements to the councils in the area where you're looking, you should find that at least one or two of them have heard of it and will be interested in doing something to help you. Not just as their legal duty but also because they, who knows, some of the planning officers might also be sympathetic to self build, as I found when I was looking for my plot.

Ben: Clearly you are a man with a lot of experience in energy efficiency, so what does that mean when you want to create your own house?

David: When you want to create your own house always consider the fact that you'll be living in it for, not just the first year, but possibly if you're a self-builder, the first 10 or 20 or more years. And over that time you want it to be affordable to heat, no matter what the future may throw at us. I personally don't think that energy prices will rise precipitately in future, but I may be wrong. I don't think they'll fall precipitately either. And even at the present day energy prices you can justify doing a lot more than the UK building regulations require you to do when you insulate a new house.

So take into account the future, certainly orientate the house to face the sun, even if you're building in a town orientate it to face the sun which is usually quite easy. You may have to face it at a slight

angle to the building line, but there are lots of precedents of old houses which face due south and face at a slightly odd angle to the road because the people in the 17th or 18th century knew that the sun rose in the south in the winter and set in the south and they knew that solar energy is available from south windows in winter whereas it's not available from north or west or north-east windows very much.

Ben: Your particular project though, what I was getting at really, was what you wanted to do? You have this fantastic scope on your project to demonstrate all that you've learned. So, tell us a little bit about your house.

David: Okay, well it's about 105m². It's a two storey detached house with a low roof line on the north which is a feature of many rural houses in Herefordshire. It's got a normal two storey roof line on the south.

The windows are about 70% south facing. The windows are much larger than a normal new house would be, especially on an estate built by a developer. The windows are about 30% of the floor area, that's the total window area. A developer's house may be 10% or 15% only.

By having larger windows you get much more solar gain all the year and that solar gain is extremely useful from late autumn through until late spring. The excess solar gain could be a nuisance in summer, so you have to take into account either solar shading or other methods to reduce the summer solar gains.

This house is a very high mass house - it's built of concrete with concrete floors and concrete block partition walls and that has the effect that the summer temperatures are not as extreme as they would be in a lightweight house. If you were building a lightweight house you would have to be more careful to minimise the window area in areas if it could lead to overheating. And if you were building a lightweight house you would have to be more careful to have external shading. I think if you were building a large windowed timber house in the south east of England you would certainly want to restrict the amount of solar gain entering the house from June through until September. However this house has so far not overheated at all since I moved in in 2012. The highest temperature reached was 24.5° in 2015, however this is without any external shading yet on the windows or any curtains yet on the windows. So a finished house would be a lot lower than 24.5°, which is a very comfortable temperature.

Ben: You mentioned that you've got concrete core here and that's stabilising the temperature. Why did you go down that route? Why did you want to, even on your leaflet here you show me some of the benefits of your house, and you've picked a solar house. We've talked about Passivhaus, so why are you keen to go down this route?

David: I was keen to go down the thermal mass route because it's a way of making fuller utilisation of passive solar energy, which is almost free if you are building a new house. It's the cost of building larger windows is very very small indeed because although the window costs money it replaces some wall, and therefore the net cost is fairly modest. Passive solar is something which everybody should be using long before they consider using solar water heating or solar photovoltaics.

I think I was in some ways learning from the experience in North America where some of the houses built 40 years ago with very high insulation were high mass. Most were low mass timber frame construction and the timber frame construction houses found that they did have to ration their window area, and I just wanted to have a large window area and not have any worries about overheating, so that's one reason why I went down the thermal mass route. I was fairly sure it would be comfortable in the worst heatwaves of the future, and that's so far how it's turned out, because I haven't even added external shading yet and if I did the house would probably be another 2-3 degrees cooler in summer heatwaves.

Ben: Tell me about the biggest challenges that you have had on this project. It's now, we're into 2016, and I can see you still have a few things to do. So what have been the challenges through this?

David: I would say the challenge has been getting things built as you want them to be built and also getting materials to be supplied to the specification that you agree with the supplier will be met.

I was quite surprised on my build that the failures in the materials were, if anything, more than the failures in workmanship. We all know that workmanship is not always brilliant in the British construction industry, and I made plans for that and I had taken some care to employ reasonably good tradespeople. As a result, only two phases of the house really had any problems with workmanship. But I did find that the suppliers of materials were letting me down in some respects, including suppliers of three insulation materials which certainly didn't meet the specification and as a result gave problems.

Ben: Were you very active on site the whole way through? Can you give us a picture of was this a self build or more of a custom build?

David: This was a self build. I was employing people on a direct labour basis. I did very little of the manual work myself but I employed people to do all this specialist or even the less specialist building trades, including concrete pouring, carpentry, block laying, electrical work and plumbing. If I did it today I would probably find a contractor to undertake the work because it's much easier now to find a contractor able to work to the Passivhaus standard than it was when I started this. And if you live in most parts of England and Wales it should be possible to find a decent builder I think.

Ben: And finally, what lessons have you learned? Has this been interesting to you also, as I know you advise other people, but to actually be doing it yourself?

David: I think it's been interesting in the sense that although I was already well aware that building sites didn't always operate with clockwork precision, operating a building site myself brought this home to me, and I was quite surprised at some stages by how unclockwork the British building industry is.

I've got many friends and colleagues abroad in countries like Germany and Switzerland, and when they've come to the UK and seen, if they've ever watched a building site operating for any length of time, they've always come to the same conclusion as me, that things don't operate smoothly. Why not? They should operate better than that and systems ought to be put in place that mean that they can operate better than that which would make life much easier for self-builders, because self-builders don't always have a construction background and therefore they need to rely sometimes on building tradesmen doing things right. And my experience showed that in one or two cases building tradesmen didn't know how to do it right and I was aware that they were making mistakes, but the average self-builder might not be aware.

I was always at site at least once a day, but if you have tradesmen who are particularly inept at their task, just occasionally this isn't enough. Because I had some tradesmen lay a stone floor in the house. Incidentally the stone floor was made from waste kitchen worktop off-cuts. The interesting thing about laying the floor was that the gang who I employed were apparently unable to understand drawings and I later wondered if they were actually illiterate and I didn't dare ask them such a deep question, but I had

my doubts. Because they lost the pattern with which I'd laid out the stone showing that it fitted the room, and they didn't lay the stones with the joints widths shown on the drawings and things went wrong in far less than a day, and it was too late to put it right by the time I spotted that things were going badly wrong.

So just occasionally you will have these real cock-ups and I think if we had a better trained building industry we wouldn't have these experiences which can make very good TV as Grand Designs always shows, but aren't always so pleasant if you're on the receiving end.

Ben: Well, David it's been fascinating to have a chat with you. I'm sure there's lots more that we could talk about, but we're going to take a pause there. Thank you very much.

David: Okay, well thank you for interviewing me and I hope these words are helpful to the budding self-builders out there.