



Built Environment Committee

Corrected oral evidence: Modern methods of construction—what's gone wrong?

Tuesday 24 October 2023

10.45 am

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Members present: Lord Moylan (The Chair); Lord Best; Lord Carrington of Fulham; Baroness Cohen of Pimlico; Baroness Eaton; Lord Faulkner of Worcester; Earl Russell; Baroness Thornhill; Baroness Warwick of Undercliffe.

Evidence Session No. 1

Heard in Public

Questions 1 - 19

Witnesses

I: Carl Leaver, Chairman, TopHat; Michael Stirrop, Chief Commercial Officer, Vistry Group.

Examination of witnesses

Carl Leaver and Michael Stirrop.

Q1 The Chair: Welcome to this meeting of the House of Lords Built Environment Committee and the first evidence session in our inquiry on modern methods of construction. Our witnesses today are Carl Leaver, chairman at TopHat, and Michael Stirrop, chief commercial officer at the Vistry Group.

Please could members and witnesses keep questions and their answers brief? My name is Daniel Moylan, and I am the chairman of the committee. I will not introduce everybody around the table individually now but as they ask their questions. You will see that they have nameplates in front of them, so you can see who everybody is.

We have two members attending remotely. Again, with the wonders of technology, they have nameplates on their screens as well, so you can see them. Our first question will be led by Lady Cohen of Pimlico, who is joining us remotely.

Q2 Baroness Cohen of Pimlico: Good morning. The question is really for TopHat. You are suggesting that delivery of a second factory would enable you to go on and not get into the same trouble that, say, Ilke Homes got into. My understanding, and I am a daughter of a long-dead system builder, is that if you have the land supplied to you or you own it already, you have a far better chance of developing something new. If you do not have the land, private investors—smaller investors—have great difficulty in holding on for long enough.

Carl Leaver: Yes, and that is what Ilke thought. Ilke's strategy was to buy and develop its own land. Some issues impact the sector as a whole—that is, category 1 and category 2 alike. There are other factors in the demise of Ilke and L&G Modular, which are probably the two most significant failures in recent months, that were much more about their own strategies and some of the operational decisions they made. I am happy to go into my thoughts on the various factors that brought about their downfall, if that would be helpful.

The Chair: To put it another way, you have made losses in recent years.

Carl Leaver: Yes.

The Chair: We are not trying to do a forensic examination of your company's history. Our purpose is to understand why something that looks so promising and that should, on the face of it, be a roaring success, is running into so many difficulties, especially at the category 1 end of the spectrum, with the prominent withdrawals, bankruptcies and administrations that you have mentioned.

So you have some losses from the past, but you are clearly, in a sense, doubling down. You are not retreating; you are building another factory.

Could you tell us your plan for success and how perhaps it contrasts with others? That might be the best way of answering the question.

Carl Leaver: Our strategy is built around achieving scale and, through scale, unit economics that mean that we can sell our product at a price that we can make a decent profit on. Our approach is quite different from other modular builders' in that we have a timber-frame solution, which, importantly, means that our whole-life embodied carbon is 83% less than a traditionally built brick-and-block home. But it also means that we can apply certain technology and automation to our production methods to keep our cost down. The benefit of us moving production into our new facility, for example, which will have approximately 60 3D robotic arms, like you would see in a car manufacturing plant, is that it will reduce our labour cost by about £15 a square foot, which is very material in the context of overall build costs. Scale will also allow us to procure materials at a much lower cost, which in turn will enable us to reduce our selling prices.

The other important factor about TopHat is our approach to design. Historically, I think it is fair to say, the modular industry, certainly the category 1 modular industry, has been associated with a very standardised product. It all looks the same. That was certainly the case with Ilke, less so with L&G Modular. L&G Modular built a brick skin on-site. For a category 1 modular manufacturer, that is a difficult concept to get your mind around, but it enabled them to make their homes more in tune with the local vernacular.

At TopHat, two factors mean that we can offer much greater design variation. The first is that we have built a technology platform that links design through supply chain production, deployment and aftercare; it links it all together with a single digital thread. That means that you can vary the design of an individual house at the start of the process and it will ripple through everything and not cost you anything in productivity. That is the first very material difference with our approach.

The second very material thing is our proprietary brick facade product. It is a printed brick, a resin and brick dust product that can be printed in any design and any bond that you care to wish for. You can have affordable housing with a Roman brick finish, which otherwise you do not see outside of Mayfair because it is so costly. We can do herringbone, we can do London bond, we can do black and red mixed in together—any pattern that you care to wish for. In conversations with planners, that is enormously appealing for them, because they can make a very material change to the appearance of a house to sit with the local vernacular.

The Chair: Are those brick facades installed in the factory?

Carl Leaver: Yes. Incidentally, we are talking to most of the major housebuilders about supplying that facade to them for their typically open-panel production, and in one case at least for their block production, so the outer skin is our panel rather than their brick.

You may know that Persimmon invested in our business, which we see as a big vote of confidence. As part of that, we built two pilot homes, which we deployed in six days. In that situation, we had to work very hard to make the brick facade look as plain as the Persimmon red brick, because the quality of the appearance of the facade looks like hand-built bricks.

Q3 The Chair: In that case, I heard that there were difficulties with transporting loads larger than certain sizes on the road. You need motorcycle outriders, police escorts and so on, which we have occasionally all seen on the motorway when large loads are being moved. Are your units limited in size by those restrictions?

Carl Leaver: Yes. The external dimensions of a unit can be no more than five metres wide, I think; it varies in different parts of the country. We need wide-load outriders—not motorcycles typically, but vans—on major routes. Unfortunately, in some parts of the country, the police force insists on a police escort, which to my mind is completely unnecessary—and they charge for that. Then you have the problems of police availability to do that kind of work, because, of course, we would prefer them to be chasing criminals rather than escorting TopHat modules.

Other than that, overall, vehicle movements to one of our building sites are about 80% less than for a traditionally built home. In that sense, you can see that we are in effect doing what Sainsbury's or Tesco did for grocery retail many years ago; they centralised distribution, so their suppliers dropped off very large loads to central warehouses which Tesco or Sainsbury's broke down into smaller drop sizes to go to their shops. That significantly reduced vehicle movements. Ultimately, the costs that were taken out of the supply chain were passed on to customers.

One issue with modular is that some of these things are still at a very nascent stage. A supplier to us does not quite grasp the fact that they are saving a huge amount of money on their distribution—in fairness, we do not yet have the volume that we will have through our second factory in Corby—so they can afford to reduce their cost to us without damaging their margins. These things will take time to work through the system.

Baroness Cohen of Pimlico: There ought to be enormous cost savings, because factory labour can be trained very quickly to put things together in factories.

Carl Leaver: Exactly.

Baroness Cohen of Pimlico: It is the on-site costs that may give you more difficulty.

Carl Leaver: I would go further than that and say that it is not just us, but the industry as a whole. I would go so far as to say that without category 1 modular there is zero chance of building 300,000 homes in this country. My evidence for that is that we have never done it before, and if you look at what is happening in the employment universe for traditional construction, it is terrifying. Before the global financial crisis, there were 2.6 million employees in construction. Today, there are

400,000 fewer. Of those that remain, about 500,000—nearly 25%—are over 55, and this is a pretty gruelling job.

Incidentally, last year there were 12,000 apprentices in the whole of the construction sector. To give you a very recent example, my chief executive was out on-site last month with the regional managing director of a major housebuilder. Despite new housebuilding having fallen by 50% this year—it has literally halved—he still cannot find bricklayers. These downturns are utterly devastating for SMEs and contractors. Before the financial crisis, there were 6,000 SME housebuilders registered with the NHBC. Today, it is 2,000. The major housebuilders have been able to recover the volumes they were producing before the financial crisis, but SME volumes are still half what they were. People just give up. They have had enough. It is too difficult.

Q4 The Chair: Good. I have a question for you from one of our members, Lord Barclay, who sadly cannot attend today. How long do your homes last, and to what extent could they be described as sustainable and recyclable?

Carl Leaver: Our homes are designed with a life of 60 years, which is the same as traditional construction; there is no difference between the life cycle of our homes and that of traditionally constructed homes.¹ Some of you may even live in timber-framed homes that were built in the 17th century. It is not new. I do not think there is a difference in the life cycle. We almost need to dispel the thinking that MMC is wholly different from traditional building. All we are doing is industrialising a build process in the same way as the Victorians industrialised brickmaking. No one said, "Is this is not a brick anymore?" Of course it is a brick; it is just produced in a much more efficient way. That is what we are doing with modular.

All the talk of different standards for modular is concerning. Talk of the standardisation of modular is even more concerning. Perhaps we can talk about that a bit today, because there are a couple of initiatives under way in DLUHC that I am extremely concerned about and which we just cannot get heard on. Incidentally, thank you for inviting me here today, because this is the first time I have managed to speak to a parliamentarian.² Even though Housing Secretary after Housing Secretary has extolled the virtues of modular building, I have yet to have a meeting, either in my role as chairman of TopHat or as chairman of the industry association, Make UK Modular.

We just need to get past this. We are simply industrialising a process. We are not producing something fundamentally different.

¹ Witness note: TopHat expects its homes to have a lifespan as long as a traditionally built home. 60 years is the minimum guaranteed lifespan for warranty purposes, in line with new traditional built homes.

² Witness note: This reference is specifically regarding recent Government Ministers who have not met with TopHat in over two years. TopHat has regular engagement with individual MPs.

The Chair: Because this is the first public meeting of this inquiry, I should have declared the interest that I was, until 31 August, a member of the board of the Ebbsfleet Development Corporation and chairman of the Ebbsfleet Garden City Trust. Janet, may I invite you to declare any interests you have that you should be declaring at this point?

Baroness Cohen of Pimlico: They are pretty much historical, Chair. My late father designed, built and sold bungalows under the trade name of Arcon, which, after the bombing, peppered much of England from 1945 on. The business was sold to Laing O'Rourke when my father died. That is a historical matter, and why I know that our system of building works.

Q5 **Lord Best:** My interests are all historical as well. I will come to Michael Stirrop, if I may, and get your views. I am not entirely convinced that we have got to the heart of the matter. Some of the companies that have just gone out of business have been building up to this point for 10 or 20 years, even from the prototypes, the first ideas, and within six months we have seen the collapse of four major players. In fact, in terms of category 1, TopHat must now be 95% of the market. We are left with one provider, and category 1 is incredibly important because it is likely to add volume as well as speed and efficiency.

Is planning at the back of this? What is going on such that everybody, starting all those years ago, comes to a point where within a few months they are falling like ninepins? We have heard that Berkeley, which has been doing very well with steel construction and so on, is facing planning difficulties. I think your volume is down. Maybe that is a big thing. There was a press report about Vistry yesterday. Have a go at saying why suddenly is everything coming to a head and these problems are emerging so severely.

Michael Stirrop: Yes, we are a large UK homebuilder. We are also an MMC developer of category 2. I agree that the planning environment is a constraint. It is very difficult for us to build standard-form houses consistently across the UK. Of the 2,500 homes that are being constructed through our factories this year, 75% have non-standard internal configuration. That does not mean that they cannot look attractive and bespoke from the outside. This is about the form of the development.

There have been a few missed opportunities in the planning environment in the push for a consistency of design codes. We wanted involvement in the national model design scheme, which did not occur. It does not reference MMC enough. There is no impetus in the planning world to push MMC schemes over traditional brick build. There is not enough reflection on the embodied carbon that is attached to the houses that we construct on an open-panel basis.

Planning presents us with a number of challenges. The construction of a home through one of our factories takes time—buying the land, seeking planning, and getting from an outline planning permission to detailed planning permission takes nine months. You then have a six-month

design period for the house itself. So, unless you have forward visibility on output, that will be a constraint.

You cannot get away from the fact that, unfortunately, MMC is more expensive than traditional means of construction. Like for like, it is still more expensive, according to our analysis. There are huge benefits to it, but pound for pound it is still more expensive. You cannot get away from the fact that the market has come back substantially for us. We are building houses in the factory that are pre-sold to providers of affordable housing. The majority of our business is moving to the strategy of an affordable pre-sold position, which is why we are as keen to invest in MMC as we are, but we are still building houses that are sold to the general public.

If activity levels are coming down by 30%, 40%, or 50% in areas, that will have an impact on the factory's outputs. The cost of providing the product is very heavy on the fixed costs. The timber that we make is a small proportion of the cost of an open-panel house. So deliverability and the operational order book that you need in those factories are vital. As soon as that goes, you are, in isolation, losing quite a lot of money.

I cannot comment on the business models of the ones that have moved out of the industry. We have had the option of moving into modular, so as a company we could decide to do that now. There are a few constraints. There is expertise and understanding on-site. Trade availability is an issue. Transport and logistics are an issue. We can get two open-panel houses on the back of a standard 40-metre artic lorry, which can go anywhere in the UK. By comparison, the more you do in the factory, the more potential there is for a complexity of logistics. Also, the cost at the moment is restricting cash flow, which is understandable, given the early nature of what has been done.

Q6 Lord Best: I was trying to summarise in my mind where the real pinch comes. If you got the volume up, that would make a huge difference. It is slightly surprising for us to hear about the construction industry's difficulties in getting the labour it needs, and that it is more expensive to do it in a factory, where a machine will replace a lot of that labour. That extra cost is because you have to build a great big plant and divide the cost of that by the number of units. The more units, the cheaper it all becomes. So it is down to volume. If we get our 300,000 homes a year, will it crack the problem?

Michael Stirrop: I think it would. Planning needs to be aligned with that, and I am sure we will come on to the environment that sits behind that. We need demand support. Our business is a partnership model, so for 65% of our business we are trying to pre-sell before coming on-site, which allows us to have certainty and delivery on those homes. The other 35% in the UK is most of the other housebuilders predominantly building to the open-market private customer. If 70% of those homes are to a private customer, and if that sales rate falls back by 30% or 40%, housebuilders cannot afford to carry on building those units, because the economics of it just do not work.

Lord Best: The secret of your success is having 65% of all your stuff already pre-sold here, which is different from the others.

The Chair: That depends, as I understand it, on demand from the affordable housing sector. The demand from the affordable housing sector is effectively mandated by government.

Lord Best: Yes. It is dependent on the grants.

The Chair: It is not a market demand. It is a government-stimulated demand.

Carl Leaver: Exactly. If I may, Lord Best, your conclusions are right. Critical to the success of modular is that we get to scale and have highly automated facilities—neither Ilke nor L&G were highly automated incidentally—because that is what saves the money and pays back the cost of the machinery and facilities.

If you have scale and automation, these are quite heavy investments. To pay back on those heavy investments, you need consistent demand. The biggest issue that we have all faced since the advent of Covid is the stop-start nature of the customer base—the people who want to develop houses and the people who want to buy houses—and the planning system, which is frankly very slow and somewhat dysfunctional.

If you have a project that is stalled or cancelled, you still have a factory and hundreds of employees who you have to pay, so consistency of demand is critical.

Rather than owning our own land, which ties up more capital and takes you down the avenue of groundworks—that was another significant reason for the failure of Ilke and L&G Modular; it was the groundworks element more than the modular element, the extraordinary cost found in the ground—TopHat focuses on trying to broaden our routes to market. As part of Persimmon's investment, we signed an MOU with it for the supply of 5,000 homes over five years. That will provide a baseload in our factory. We have other big strategic customers that we are developing relationships with that will increase the level of that baseload to make us less susceptible to swings in the market.

The Government could do a lot to help category 1 modular—and category 2 to an extent, although category 1 is much more vulnerable to swings in volume, because our factories are typically bigger and we employ more people in them, so our standing resource, our fixed cost base, is much higher than category 2. For instance, and you have referred to this, there is currently a requirement in the affordable homes programme, the grants programme for affordable housing, for any grant takers to commit a certain amount to modular housebuilding, but the definition of modular in that context is very wide.

The Chair: Yes. We will be taking that up with Homes England. We are aware that that is a bit of a loophole.

Carl Leaver: As part of Make UK Modular, we have called for 10% of that to be ring-fenced for category 1.

The Chair: We will come to that—not in this session, but we are on it.

Q7 **Baroness Warwick of Undercliffe:** I have a tangential interest in that I am the chair of the Property Ombudsman. I wonder if we can continue down this line, because one of the things we are trying to work through is whether there are issues that are specific to modular, or whether there are more general issues that affect the whole sector but where modular lags behind, is unable to take advantage or suffers from more. Because so many have closed over the last year, a considerable amount of attention has been paid to that. Mark Farmer told us that the rate of insolvencies among MMC businesses was similar to that of the traditional construction industry, which was interesting, because so much publicity has been given to MMC. He also said that MMC category 1—I think this picks up on the point you were just making—will not be able to recover as quickly as the rest of the industry might.

Could we unpack some of the issues that you have both been talking about by indicating whether it is the specific business model of the MMC company that might have contributed most to their demise or whether it is wider barriers in the sector that prevent category 1 businesses taking off? That would help us to form our recommendations in our report.

Carl Leaver: I was not in those businesses, so I do not have an intimate view of what happened, but I do have a reasonable sense of what happened. Ultimately, both businesses ran out of cash. I think there were strategic choices and operational decisions. On the strategic choices, I have talked about product and about the fact that one of those companies built a brick skin on-site, for instance. It used very expensive materials such as cross-laminated timber and hot-rolled steel floors. The other company found it very difficult to offer any form of design variation. They were not necessarily offering what the customer wanted. That is a strategic decision.

The other strategic decision was to go down the route of developing their own land. That takes you into groundwork, which is notoriously one of the biggest areas of risk. Certainly for modular we can control everything in a factory, but when it hits the site, that is when things can go deeply awry. Developing your own sites takes you into the groundwork, but it also ties up capital. In both cases, there were significant losses on the groundworks front for projects that were due to run for years, so looking forward there were only losses in prospect.

Turning to the operational decisions—we all face this pressure, as I mentioned—is that having a consistent level of demand is critical to success. When the wheels came off post Covid-19, and more recently with the downturn, one of those businesses, maybe both, decided to price very tightly to try to fill up the factory. They did not take into account what happened after Covid-19, which was a period of super-inflation that,

frankly, I do not think any of us had seen for many years. That, too, made the projects that they were now committed to unprofitable.

I think that these strategic choices and operational issues led to their demise, which happened in this relatively compact period because of the downturn. It was a consequence particularly of the operational decisions on pricing, some of the losses that they made, and some of the risks that they took on groundworks, because they were desperate to put volume through the factories.

Q8 Baroness Warwick of Undercliffe: Could you add anything to what you said before about the wider barriers that category 1 businesses face?

Carl Leaver: I think the biggest single barrier to success is consistent volume. That is not helped by these recent failures.

The Chair: Lots of businesses operate in a market environment in which consistent demand would be wonderful, but they do not get it. They do not get it in car manufacturing; they do not get it in other areas. They do not have consistent demand, but they manage, even though they have large capital investments, because they have factories. If this is a necessary condition, nobody will ever be able to supply it to you. Who will give you consistent demand?

Carl Leaver: I think there is a hump of market acceptance that we have to get over. There are a lot of detractors of category 1 modular; it is almost a religion in some quarters. It was the same, incidentally, with manufacturing and automating cars. It took one company, Nissan, to come to the UK to completely change the way we manufacture cars. That is all it takes, just one company to do that. That is what TopHat aims to do. It aims to be the company that revolutionises the way we build homes in the UK. There are detractors, but if you think of the market as 300,000 homes, TopHat will have a capacity of 4,000 homes when we open our new factory. It is not beyond the bounds of possibility and hope to expect to keep that factory consistently busy in that size of market.

The Chair: That is a different matter though, is it not? That is not consistent demand being supplied to you. That is consistent production, because you are a small part of a market with practically unlimited demand at the moment.

Carl Leaver: Exactly. That is my point.

The Chair: You have that already. I wonder why you keep emphasising this, because it is not something that you can be given but something that, in a sense, you have already if you want it. Am I making sense?

Baroness Warwick of Undercliffe: Is there an issue of investment here? You are talking about government investment in social homes. It must be critical to all this, as well as consistency from government about the number of social homes that they are prepared to produce. What about other investors? Normally, businesses will look for investment from the investment sector. Is that a specific issue? We are trying to get at

where the main barriers are.

Carl Leaver: The reality is that the market has halved. New housebuilding has halved overnight. In difficult environments, people tend to migrate back to what they know. You remove some of the incentive to try something new. If you are paying a bricklayer £150,000 a year, which is where the wages reached for bricklayers, there is a very strong incentive to try a different method. If you have halved your volume, the cost of bricklayers has come down, and you are in this more febrile environment where everybody is concerned about worst-case scenarios rather than better-case scenarios, you retreat to safety.

Nissan built that factory in the UK with hundreds of millions of pounds worth of government support. We have had none. We are trying to change a whole industry with private money. We have had no support. As I say, this is just about the hump of acceptance. When we get the volume going through our factories, the demand will grow because people will see the quality of the product, and the price of the product will come down with volume, while traditional building will go in precisely the opposite direction at the same time.

Q9 **Earl Russell:** You just asked about government financial support. In your view, what form could that take if you had a magic wand?

Carl Leaver: I will give you my sensible answer and then I will give you my dream answer. My sensible answer would be that, post the failures, if government could inject some confidence into the sector by standing as guarantor on projects, that would be a massive help. We have had companies pulling back on category 1 modular because they just see contagion. To your point, when a traditional contractor goes bust, nobody says that the whole of the contracting industry will go bust. They recognise it is an isolated situation, but that is never the case for modular. If a project goes wrong, it is the system. If a manufacturer goes wrong, the whole sector will fail.

Earl Russell: And the magic wand would be—

Carl Leaver: That, and the affordable homes programme ring-fence of at least 10% for category 1. Things could be done with the planning system to give a presumption in favour of approval, and a mandatory eight-week period would again incentivise the use of modular over other things. I would also say lower stamp duty for highly energy-efficient homes, which almost all modular homes are compared to traditional construction, which is well-incentivised. If I had a magic wand, it would be grants, but I will not go there, given the current financial situation.

Michael Stirrop: That it is relevant for us, too. We are a UK housebuilder that has a choice of which route to go down. Of the 16,000 to 17,000 homes we build a year, we have decided to go down the open-panel route. I can draw attention to the fact that we have just reopened a 360,000 square-foot factory in the East Midlands with a capacity of more than 5,000 in time at that one facility. That facility was opened by

Countryside prior to Vistry acquiring them in November but on a closed panel basis. When we reopened it, we went backwards to go forwards. That is important, because I strongly believe that the more category 2 MMC there is in the market and on-site, the more chance of success some of these category 1 operators have. The understanding and the economics of assembly on-site are really important.

We could decide to go to category 1 now, either as a manufacturer of the category 1 or just buying it from one of the other operators. We have decided not to. The economics are that it is, unfortunately, more expensive. The logistics behind the design and the warranty to an end user are massively important. Category 2 has the huge support of the NHBC and the industry insurance bodies, which gives the customer we sell to, who does not know anything about the construction industry, massive confidence and massive protection. The warranty available to category 1 is much more complex and affected by media and confidence. We need to invest in both category 2 and category 1, because we want our business to be majority MMC category 2. Once we do that, we can move forward with some of the more complex innovations in the sector.

The brick slips that Carl mentioned are interesting to us as a sector, as they are a significant part of the embodied carbon in most of the houses that are constructed. We have taken a conscious decision to go backwards before we go forwards because of the experience of trying to build these things on-site. A closed-panel house with windows, insulation and plasterboard was difficult to implement on a site, and when we are dealing with hundreds of sites around the UK and the understanding of the industry is not quite there, we need a lot more work to be done.

There is a gap in the co-ordination of any sort of body on training and development. You will struggle to find more than a handful of training courses for MMC in the UK. There seems to be a hub of activity in the MMC space around the Midlands, for obvious transport and logistical reasons, but it is also a good location. There is a labour force there that seems to work well. We have just reopened a facility and managed to recruit pretty well into that. I am not concerned about a limitation on factory expertise, but I accept that the complexities of assembly on-site are where we have the most issues.

Q10 Baroness Thornhill: Good morning, gentlemen. I have no relevant interest to declare.

Mr Stirrop, you have beautifully segued into the question that I wanted to get into a bit more deeply. Perhaps Mr Leaver could give us a general overview and you could expand on what you were saying. From my understanding and reading, I am getting myself in a fog about building regulations, warranties and insurance providers. There seems to be a whole chicken and egg situation there that is affecting the industry and the progress of things that nobody seems to be breaking down. You cannot get insurance for things. You were talking about the warranty, and there is real confusion about building regulations and how different they should be.

It seems to me that the area is a bit chicken-and-egg, and I would like you to tell me how we can help to break that down. Perhaps you could give specific examples of how that is affecting your business in particular, as well as give an overview, which you seem to have, on that whole conundrum.

The Chair: We will come to Mr Stirrop first. This is an area where, of course, government could help when it comes to building regulations.

Baroness Thornhill: Precisely.

The Chair: This is something where we could make some solid recommendations to government.

Michael Stirrop: On the basis of a category 2 proposition, I believe that the current building regulations work and we have some good insurance backers behind that. For me, it is about the category 1 offering.

The Chair: Mr Leaver, would you like to tell us about category 1?

Carl Leaver: Of course. I alluded to this earlier. A house is a house. One set of regulations is perfectly capable of covering all forms of housebuilding. If you got into specific building regulations for category 1, you would then have different regulations for steel-frame category 1 versus timber-frame category 1 versus category 2 closed-panel versus category 2 open-panel. You would have an endless array. At the end of the day, we want to know from our building regulations that what is being built is being built to a standard. That standard should be the same whatever the means of production.

The Chair: Do you have difficulty with building regulators?

Carl Leaver: Never. I do not understand where this is coming from. Incidentally, this is not me trying to avoid regulation, because I think that the market needs to be regulated. I would be strongly in favour of increasing all the standards encapsulated in our building regulations, particularly built standards, which are much more poorly monitored than they ought to be. The evidence for that is in some of the quality issues that have been seen in the traditional building world.

Some traditional builders who comply with building regulations cannot get NHBC approval. The two things are separate. They are detached. We are in the process of getting NHBC approval, and I think we will have that before the end of this calendar year. It is not easy, especially when you are doing something new, but nor should it be easy. If it was a cosy relationship, you would be concerned as regulators. I do not think traditional builders find NHBC easy either.

I am concerned about calls from some quarters for the separate regulation of MMC, and category 1 in particular. There are a couple of things ongoing at the moment in DLUHC, but, again, I have no idea of the genesis. Well, that is not quite true. There is one project called the Digital Kit of Parts, which DLUHC has kicked off to create a standardised

kit of parts for MMC. Category 1 is thankfully exempted from that at the moment, although there are people who want to include it.

I understand where that comes from. The Government wanted to build a load of hospitals, schools and prisons, and they were the customer, so it was perfectly proper for them to say, "We want them all built the same way with the same methodology to reduce costs and improve our understanding of the buildings' construction methods". As far as I understand, that was successful, but of course the Government do not build houses, so defining the standards by which houses are built—I am talking about design standards, not just outcomes such as the heat performance or carbon footprint of the house but how they are built, how they are transported, all those kinds of things—feels like a centrally controlled economy when you are not the customer. It is very surprising to be facing this kind of thing.

Secondly, variety of design, local vernacular and beauty are not relevant for hospitals but they are very relevant to schools. It is the antithesis of standardisation. I could rant on about the need for innovation and how standardisation would snuff it out. I am very concerned about this. We need a vibrant and innovative industry that can move at pace, fix problems and seek out further opportunities, because we have a crisis.

The Chair: What is DLUHC suggesting is done with this kit of parts?

Carl Leaver: They want it to be a standard digital kit of parts that they make available to architects, designers, builders and so on to use when they are designing and building houses.

The Chair: Why?

Carl Leaver: Good question. One reason that is sometimes proffered is: what happens if you have a modular site, particularly a category 1 site, that is half-finished and the company goes bust, as Ilke did? How is it finished? First, I would not determine a whole policy for an industry off the back of a failure. Secondly, the evidence is that they just get finished, either traditionally or by another modular manufacturer. Incidentally, there was a very significant failure recently; a £500 million traditional building company failed and it had to knock down several of its sites because nobody would take them on and finish them. The fact that it is traditional does not guarantee that will be taken forward anyway. That is the only rationale I have heard.

The Chair: We have heard the suggestion from government sources that, because there are no standard parts, there is no intellectual property in the parts, and the insurance approach for MMC is bedevilled by that. I am not arguing with you. It is very important to get your perspective as an MMC builder. If you are saying that that rationale is wrong, that is important for us to know.

Carl Leaver: I think it is wrong. I think there is a gravy train for consultants at the moment and that they are coming up with something

that ultimately will be unworkable. It is wrong, because there is nothing fundamentally different about a volumetric home when it is built than any other home. It is a timber-framed home, exactly like a category 2 timber-framed home. There might be two skins of wall between one home and another home if it is a terraced house, and it will have a ceiling and a floor between floors rather than just a single level. Other than that, there is no difference. There is great confusion over this, which is leading to the call for separate building regulations and the Digital Kit of Parts.

There is another process going on that is being led by British Standards—I think it is called ISO 8600³—which also talks about standardisation, but nobody really knows what it is about, because it has not been clarified. My business is now subject not only to building regulations but to BOPAS accreditation, and ISO 9001, ISO 14001, and ISO 45001. We do not need more regulation. It is the last thing we need. We just need to be held to the same standard as a traditionally built home.

The Chair: Dorothy, are you happy with that?

Q11 **Baroness Thornhill:** Yes. I want to push you a bit more. I understand what you are saying, and I can go with it, but I was concerned that the National Fire Chiefs Council seemed to be causing issues around fire safety in MMC buildings. I wonder what you feel about that. Obviously, that will impact warranties and insurance.

The Chair: Yes, specifically timber-framed MMCs.

Baroness Thornhill: Yes.

Carl Leaver: We, as Make UK Modular, wrote to the London Fire Brigade⁴ after the PR release, but we have not managed to have a conversation. We have not received a reply.

We test for fire in the same way anybody else does. We fire-test all our components, including our wall make-up, which is tested complete for its resistance to fire and its structural integrity. One difference from modular that is often raised is that there are spaces between the modules, and if fire gets into those spaces, it can rip through. I would argue that every house has vulnerabilities, which is why there is fire-stopping in every house. It is a question of design and monitoring whether that design has been properly implemented. We use oversized insulation in those cavities to perform that fire-stopping so that it can take out all the variability in the size of the cavity; it just squashes it down. We take photos of every module, every fire-stopping example, to eliminate that perceived risk.

Where there have been problems—there were two fires, in particular, involving timber-frame category 1 modular—it was not a problem of category 1. It was that the firestopping was not done properly. If the firestopping is not done properly in a traditional home, the outcome will be an awful lot worse than if it is done properly, and the same is the case

³ Witness correction: read PAS 8700.

⁴ Witness correction: read National Fire Chiefs Council

for category 1.

Q12 Earl Russell: I am shocked to hear that you have not managed to speak to other parliamentarians, but it is our pleasure to have you here today.

As with the other question, this question is something that the committee might be able to have an impact on. I want to ask you about data and the lack of comprehensive databases and datasets on the performance of MMC homes. Is this acting as a barrier to obtaining the warranties and the insurance that you need for delivering MMC?

The Chair: Let me throw in mortgages as well.

Earl Russell: Yes, and mortgages for the end purchaser of the homes. Let me ask you about the difference between category 1 and category 2. Are there are areas where this committee might make recommendations to help to improve or overcome any obstacles?

Carl Leaver: I will pick up category 1. No, I do not think it would make any difference. To be clear, Ilke and L&G were both covered by NHBC. I believe we will be covered by NHBC by the end of this year. We are already covered by Premier Guarantee. Checkmate and Build-Zone also insure our buildings, which in some ways is a more robust insurance programme than NHBC, which is a self-insurer.

All those insurers do their own detailed review of your build design, manufacturing methodology and deployment methodology before they agree to cover you, and no database will change that. That said, in my view there is real value in a database, because it will build confidence in the sector and therefore help to create consistent demand by getting over the hump of broad-scale acceptance.

Make UK Modular is doing that job for the category 1 sector, in the same way as the National Home Builders Federation does for traditional builds. Make UK Modular has been gathering data from its members—and, indeed, from the broader industry—and you can find a lot of the statistics in Make UK Modular's report, *Greener, Better, Faster*. That shows, for instance, that our houses take on average 55% less energy to heat, are 50% faster to build, have 83% less whole-life embodied carbon and 90% less materials wastage than traditional build, 80% less—

The Chair: Let us stick to the question if we can. That is great, but the question is really about the database and the warranties.

Carl Leaver: I do not think it will make any difference to warranties, because we are dealing with all those companies as it stands anyway, so there is no issue.

The Chair: What about mortgages?

Carl Leaver: There is no issue. We have our own single development, which we did to enable us to develop our process and so forth. With Kitchener Barracks in Chatham. We deal with the entire high street. We

have never had an issue with mortgages. Again, I know you hear that we have problems, but these are non-existent problems. I am afraid we have people coming up with solutions to non-existent problems.

Earl Russell: That is why we have you here and it is in our interest to hear your evidence. Could we hear about category 2 as well?

Michael Stirrop: I was just going to come in. The warranty is an absolute requirement of any mortgage, so if you have NHBC warranty for a value, that will allow you to get a mortgage and for people to buy them. There is a broader confidence point, though. Because you are selling, category 1 is identified and separated from MMC in a pretty negative way.

The Chair: By whom?

Michael Stirrop: By the media, by partners we work with. Our business is selling a proportion of our houses to the general public. Some people will have an interest in where it is coming from, what the quality will be like—

The Chair: Seriously, I just want to know from whom.

Michael Stirrop: Yes.

The Chair: I have not seen a lot in the media about MMC modular building, but I have never seen anything negative about it. What are the sources? Is it the banks? Who is going around being negative?

Michael Stirrop: All I can say, from our business perspective, is the feedback we get from customers, from our key partners and from—

The Chair: Who are the key partners?

Michael Stirrop: Housing associations.

The Chair: Housing associations are the main consumers.

Michael Stirrop: They still have a view on defect liability. If a housing association is buying a house from us—for example, for affordable rental or shared ownership—they have an interest in that house going forward. There are parties out there that will specifically not buy modular in category 1.

The Chair: Housing associations?

Michael Stirrop: Housing associations.

Carl Leaver: There is a sort of reverse indemnity with the warranty providers. I do not know if you are aware of it. NHBC, which is self-insured, incurs cost to put something right only if the original builder of the home has gone out of business. They have an interest in the ongoing solvency of their clientele, so that will also be in this mix, which of course has nothing to do with databases or building regulations but their

confidence in the future of the sector and the participants in the sector. So the same things that are affecting potential customers' confidence will also be affecting those insurance companies.

Q13 Lord Faulkner of Worcester: I have no relevant interests to declare. I want to go back to the role of government in the development of MMC. Mr Leaver, you have referred to that subject in a number of your answers, and there is no need to repeat those. Please say succinctly how, with category 1 modular, you think the Government can specifically help. You mentioned the government help for the Nissan car factory and said that there was absolutely no support for your sector. Are you realistic about hoping that that might change?

Carl Leaver: I am realistic in not hoping that it will change. As I have said, if government could restore confidence in the sector by standing behind the sector and guaranteeing projects and that suppliers will be paid, that would be huge. The biggest thing they could do to catalyse change would be the AHP. If they ring-fenced, say, 10% of that for category 1 so that people cannot avoid using category 1, it would force the product into the market, which would help the speed of acceptance in the market. There are other things that I mentioned to do with stamp duty incentives and accelerated planning, but those two things more than anything else would be a huge help.

Lord Faulkner of Worcester: You mentioned in your earlier answer the very high cost of paying bricklayers—a staggering figure of £150,000 a year.

Carl Leaver: That might not be typical, but was often between £100,000 and £150,000, yes.

Lord Faulkner of Worcester: Is that a consequence of there not being a supply of bricklayers from elsewhere in Europe coming into the UK?

Carl Leaver: Yes. The Government have just included bricklayers and four other trades, so five trades in total, on the list that allows immigration; I forget what the list is called. The fifth of those lists is actually "any construction workers not included above", so basically anybody who is remotely to do with construction is now allowed to come into the country to work. Michael, you will have much more experience of hiring and what the conditions are like.

Michael Stirrop: Bricklaying is a barometer of the market. When times are good, we cannot get enough of them. When times are not so good, people leave the sector. We saw a shift in labour around Brexit, more when the vote happened rather than the implementation post that, so I do not necessarily think there is a problem with national transport of labour into the UK. I do think that bricklaying is fairly—not unprofessional, but unstructured—business model across the UK. Individual bricklayers will regularly transition between bricklaying companies based on price, so although we as a housebuilder will contract

with a bricklaying contractor, the labour force that works with that contractor is quite transient. That is a concern.

MMC and category 2 is important for us, because we live in a cycle of the housing market where we need so many homes, and when we are providing our timber-frame houses we need half the number of bricklayers to construct every house, on average. Therefore, the more we can do in the factory, the more resilience we have against market conditions. That needs to be taken into consideration. We are investing now for three to four years into the future, so we have to make a plan.

Q14 The Chair: Is it helpful to the modular sector or the MMC sector if the labour supply is constrained? I think that changes the balance of price.

Michael Stirrop: It does in the longer term.

The Chair: It does from one week to the next, frankly. If half the bricklayers in the country just down tools tomorrow—

Michael Stirrop: We cannot convert a masonry house into a timber-frame house.

The Chair: No, you cannot, but the effect on the market would be very rapid. How well and how swiftly you responded to it would be another matter, but the effect on the market would be very stark.

Carl Leaver: If you had asked me two to three years ago whether the major housebuilders would ever be customers of TopHat, I would have said a flat no. Since then, we have had a significant investment from Persimmon and are in conversations with pretty much all the major housebuilders about different elements of our offer, whether that is simply the brick façade or something that we call wind and watertight, which is basically an unfinished module shipped volumetrically with a roof—literally, you will be on-site and wind and watertight within a day—through to full volumetric. Those conversations were a lot more intense before the recent downturn, which is exactly to your point, Chair.

The Chair: You will never modernise the sector if you continue to feed the demand for cheap labour building in eighteenth-century style. Why would there be an incentive to modernise the sector, because it requires such upfront investment?

Q15 Lord Carrington of Fulham: Thank you very much. I should just make it clear I have no interests at all in this sector—and very few in any other sector, for that matter.

We have talked about what the Government could do, but a lot of the difficulties of planning and of acceptance of housing in general—the shape, nature and location of housing—is down to the people we have not spent much time talking about, the people who are going to live in those houses. It is really about the acceptance of modular building by the people who are going to be the tenants—buy the house or rent it—or whatever structure you are going to have.

Michael Gove made a speech some months ago saying that he felt that the design quality of housing was not quite at the level that encouraged people to put pressure on local councillors to allow developments in areas where people were concerned about their own environment. That is a long way round of saying that design quality, space to live in and how the development looks overall is critical.

I can understand that if you are building both category 1 and category 2, but with category 1 in particular, whatever skin you put on it, the fundamental shape of the building from the designer's point of view may well always end up being what is often resisted, which is the box-type structure of the typical private housing estate. How do you get round that? How do you make people say to their local councillor, "I want you to approve modular construction in the development, because that'll produce something that will fit into our locality and be something that I want to live in and that will have value when I come to sell it, because it will be a desirable property to live in"? How do you overcome that resistance?

The Chair: Michael, similar to that, what feedback do you have from customers who live in your homes? Are you making a better product for the consumer to live in from the inside? Lord Carrington is talking to some extent about the outside. You mentioned Nissan. One of the things about Nissan that we older persons remember is that they did not just build the cars differently; they built cars that worked out of the box, and all that stuff about running the old Austins in for six months and not knowing where the choke was went away. Suddenly the car worked. Do your houses work in that sense, or are you still staggering them six or 12 months later?

Michael Stirrop: History—the statistics for our business—would tell us that there is a lower defect per house in a category 2 MMC house than in standard construction. That is consistent across the UK, because the houses are built in a factory environment, transported and put together in an easier way. If you drive down the street, you would not be able to tell the difference between a timber-frame category 2 house and a standard construction.

The Chair: Lord Carrington's question is whether you can do better than the standard house?

Michael Stirrop: We can.

The Chair: Can you make people say, "I really want houses like that. They enhance our village"? I think that is your question, Matthew, to some extent.

Lord Carrington of Fulham: It is certainly part of the question, yes.

Michael Stirrop: We have plenty of examples of MMC category 1 and category 2 that look good. There is good design, and people want to be part of them. What is difficult is when there is a standard of design code that does not take account of our wanting to build in MMC. A very good

example of that, which is easy to understand, is the window size in a house.

In the new environment, under overheating regulation 1(0), you must have consistency of design of openings within the house. There are certain parts of the UK that have traditionally had smaller homes, and in Cambridge, for example, there is a lot of glass, a large expanse of windows. That is very difficult to achieve for MMC providers having to manufacture them in a factory. If we have a design agenda that takes account of that, we can feed into it. I strongly believe that.

We have lots of examples of very good-quality developments that people want to be part of and who do not have any issues with a category 2 timber-frame building. Thinking up front about elements that are moved around at the end and cause the construction to be more difficult means that they are dealt with at the outset. That is why we were disappointed that that was not part of the design review currently being undertaken.

Carl Leaver: You would get that response from a lot of category 1 manufacturers, but not from TopHat, which would give you a slightly different response because of what I talked about earlier—the technology platform that we have invested in.

If I can characterise this or try to bring it to life, the front end of it is like an online car configurator. Basically, you can change before your eyes the size of the windows, the colour of the cladding, the pattern of the bricks, the porch, whether the house has a bay window or not; you can change the internals to take out the en suite bathroom or add an en suite bathroom, have an open-plan living arrangement downstairs or not. We have been able to create a system that allows for what we call mass customisation. That allows us to change the size of our modules from 5 metres wide to, say, 3 metres wide. We can put two modules together to form an L-shaped house. We can have front-to-back roofs, side-to-side roofs, flat roofs. When you come to a streetscape, therefore, we can produce something very beautiful. I would stand by that and say that it is more beautiful than many traditionally built houses.

Lord Carrington of Fulham: And varied?

Carl Leaver: And varied.

Lord Carrington of Fulham: Because varied is often the problem in developments.

Carl Leaver: We did a development in Rugby for Urban&Civic, where the colour and pattern of the bricks and the colour of the roof tiles vary; some roofs are front to back, some are side to side. We do not have any flat roofs on that development.

The Chair: This is a site we visited as a committee for a different inquiry, but I do not think we specifically had our attention drawn to your work, because we did not know we were going to do an MMC inquiry. Is this Houlton?

Carl Leaver: It is.

The Chair: We saw some, but I do not know whether it was specifically said that they were TopHat houses. I do not have a picture of your houses in my mind, but we know the site. We have been there.

Carl Leaver: To be clear, all those houses are our brick-facade product.

The Chair: You are not doing all the houses.

Carl Leaver: No. Sorry. We developed around 40 houses. It was called The Slivers.

The Chair: It was one part of the site.

Baroness Thornhill: It was a nice terrace with interesting roofs. We passed it on the way back.

Carl Leaver: It was only on one side of the road.

Baroness Thornhill: Yes.

Carl Leaver: I would say that we absolutely can deliver beautiful, varied homes, and we have used that configurator with planners. We have sat down with planners and said, "Okay, what do you want? Front to back? Side to side? Black brick? Red brick? Multi-coloured brick? Herringbone? You can have anything you want".

Q16 **The Chair:** Have either of your firms got into 3D printing?

Carl Leaver: We call our product a printed 3D brick, which is a bit cheeky. It is a screen-printed, three-dimensional shape. It is not strictly 3D printing.

The Chair: Have you, Michael?

Michael Stirrop: No.

Carl Leaver: A US company has received an extraordinary level of investment and has a contract with NASA to build houses on the moon with 3D printing.

Baroness Thornhill: There is nobody living there at the moment, so demand is a bit low.

The Chair: It is a hot topic, because the Chinese want to get their village on the moon first, so there have to be rival programmes for building villages on the moon. China has put an international consortium together to do this.

Q17 **Earl Russell:** You are meeting all the building regulations. Is there an opportunity in this sector to surpass some of those regulations?

Carl Leaver: We already do.

Earl Russell: What about the lifetime of the homes? I think we were

given an answer of 60 years. Here, however, you have much more scope to control the process, to be exact and to have consistency of materials, technique and production. Could your industry do more to make these homes more attractive both to the end consumer and to government? Could you develop that more as part of your sale to government?

Carl Leaver: First, the 60-year lifetime is the standard by which all homes are assessed. To be candid, I am not technically competent enough to know whether there is a methodology that would take it beyond that. However, I can say that we surpass building standards in most areas—insulation and whole-life embodied carbon—so in terms of the practical performance of our homes, we surpass it.

I am a great fan of the Future Homes Standards. One reason why modular construction is currently somewhat more expensive than traditional construction is that we are already way beyond compliant with the Future Homes Standards. All our houses have air-source heat pumps and are all significantly more airtight, so we can do if not a full passive house then certainly heat exchange; we have done that in some of our houses in Kitchener Barracks, and we are about to launch a zero-bills product, in partnership with Octopus, where we will guarantee householders zero bills based on normal use for at least 10 years. We can do that, because the amount of energy that Octopus can harvest from the solar panels and the batteries that we put into our homes is so much greater than that utilised because of the thermal efficiency of our homes.

Q18 Baroness Eaton: I have no interests to declare on this subject. Both of you have mentioned first the shortage of apprenticeships and that there are not many apprentices. You also mentioned the difficulty in training for MMC. Do you think the existing training programmes in the construction industry are adequate to equip you for the MMC industry?

The Chair: And a few comments on the Construction Industry Training Board at the same time would not go amiss.

Baroness Eaton: They would not.

Michael Stirrop: From our perspective, there still needs to be a hell of a lot of work done in promoting apprenticeships across the UK. We have invested quite heavily in apprentices and trainees in our own business, but there is a real sense of a gap in any sort of body that brings the entirety of the sector together. We are a small proportion of the MMC capacity of the UK. Going back a few years to the Code for Sustainable Homes era, we had the BRE as a body that supported the sector. In our experience, that brought together and championed some of that.

Some direct funding into training would make a difference. It takes a long time to bring individuals through our organisations; we are doing that, but we would like to do more. If a framework of additional funding was available, some of the colleges that do not currently provide training would do so. A lot of the institutions that we interact with work on the

basis of demand, and if the demand is not there, those colleges will not exist. So from my perspective, some help in that area would be good.

- Q19 **Lord Best:** Mark Farmer made the point to us that if you spend many millions creating a factory, you will train a workforce for sure that will behave exactly as it should on-site, and we need not worry about the training situation in a factory; it will happen, because no one will invest in the place unless they know that that will be done. Are you talking about on-site when the product arrives somewhere and meets the UK construction industry? Is that the problem?

Michael Stirrop: From our perspective, the biggest barrier is the assembly on-site, so you are correct. It is the trades that interact with the follow-on. The panels will be erected on-site by the carpenters. The dry liners, the plumbers and the electricians will come in afterwards and interact. That is where the tension comes in.

We have done a closed-panel solution. As I said earlier, we went back to open panel on the back of it costing more and having some frustrations in building on-site, which concerned us as an organisation. We do not do enough of it in the sector, so there is a lack of understanding and clarity about how a dry liner prices, given that we have assembled a house with the plasterboard already there and some of the insulation already in.

There is an evolution in how the dry liners have to operate their businesses alongside us, which is why I come back strongly to saying that if we do more category 2, we will support the overall MMC in the sector. We are invested in our business to developing all our homes to be in that category, and I think it aligns itself quite well with the Future Homes Standards, which are coming in 2025. I think we will get some traction in the market if we do that. It is a combination of both.

From our perspective, the more we do on category 2, the more likely we are to involve category 1 on our sites. We still have a choice. We own the assets. We own the land. We have to get through planning, which, as I have said, is a difficult process. The national agenda is aligned, but some of the local politics and the implementation of planning at a local level need some support.

That is why I come back to the design code. Give us a framework to work to and we will work with it and show you what we can do. At the moment, it is too local, too bespoke and although there are examples of good engagement with local authorities about what design looks like, there are plenty of examples of where it is pretty poor, in truth. When we are dealing with such a big population of local authorities, that framework from government, consistently through standards all the way through, is very important.

Carl Leaver: I agree with Mark Farmer. We will employ about 1,000 people in Corby at our factory, and we are working with Bedford College on a bespoke programme. We will absolutely ensure that we have factory operatives who are properly trained. The whole beauty of category 1 is

that you try to do as little as possible on-site precisely because of the issue of a precision manufacturing industry meeting muddy fields and guys who have done things in a certain way for a long time.

We find that difficult, but I am not sure that a form of training course would make a huge difference, because the systems are quite different from one category 1 to another category 1, to category 2, to open panel versus closed panel. There are probably more commonalities between category 2 open and closed-panel manufacturers than there are between different category 1 manufacturers, so I am not sure that a training programme would help us.

The Chair: I do not understand why, when the box leaves your factory, you hand over the next stages to the developer.

Carl Leaver: No, we install. Our perfect contract is for the developer to build their own foundations to our specifications, and then we install on that.

With Persimmon, our model is that they pick the module up from the factory door and they install, and we will train them to do that. For the most part, however, we are doing the installation ourselves, which does run into issues. I have little doubt that when we get to a consistency in the demand, we will start to employ our own installers. In fact, Michael and I had this conversation outside. A plumber who is only there to connect the services into the house with our product, because all the internal plumbing is done, will try to charge the same as they would to plumb a whole house, because that is their charging mechanism; they charge per house and they are so unfamiliar with what we do. So I think we are more likely to go down the route of employing our own installers.

The Chair: Okay. Thank you both very much indeed for the time you have given us. We have found it very enlightening and very interesting.