



Select Committee on Science and Technology

Corrected oral evidence: Off-site manufacture for construction

Tuesday 5 June 2018

4.30 pm

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Members present: Lord Patel (Chairman); Lord Fox; Lord Griffiths of Fforestfach; Lord Hunt of Chesterton; Lord Kakkar; Lord Mair; Lord Maxton; Baroness Morgan of Huyton; Baroness Neville-Jones; Lord Renfrew of Kaimsthorn; Lord Vallance of Tummel; Baroness Young of Old Scone.

Evidence Session No. 10

Heard in Public

Questions 71 - 77

Witnesses

Richard Harrington MP, Minister for Infrastructure and Construction, Department for Business, Energy and Industrial Strategy; Fergus Harradence, Deputy Director, Construction, Department for Business, Energy and Industrial Strategy.

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.

Examination of witnesses

Richard Harrington MP and Fergus Harradence.

Q71 **The Chairman:** Good afternoon, Minister and Mr Harradence. Thank you very much for coming today and for taking time to assist us with this inquiry. You are our star performers today, so we are looking to you for all the answers.

Richard Harrington MP: I shall do my best.

The Chairman: Before we start, all the questions are addressed to you, Minister, but you can decide whether you are going to answer or you want Mr Harradence to answer.

Richard Harrington MP: Lord Chairman, I have always disapproved of Ministers who bring officials with them to Select Committees, but such is Fergus's speciality in this sector that I thought it might be a good idea if I brought him with me in case you had any additional questions. But I will not be ducking out of them myself.

The Chairman: Thank you. We normally do not allow Ministers to be accompanied, but for the very reason you mentioned, this time we have made a concession.

Richard Harrington MP: Thank you.

The Chairman: We know both of you, but before we start perhaps you can introduce yourself for the record. We will then move on to questions. If you want to make an opening statement, please feel free to do so.

Richard Harrington MP: I am the Minister at BEIS with responsibility for business and industry.

Fergus Harradence: I am the deputy director for construction in BEIS.

The Chairman: Do you wish to make an opening statement, Minister?

Richard Harrington MP: If it is acceptable, Lord Chairman, I would like to go straight to the questions, and I am of course happy to expand on anything.

Q72 **The Chairman:** If I may, I will kick off with the first question. What policies might the Government enact to improve or increase the use of off-site construction? I would like your comments on how you think that might be done. Do you think the Construction Leadership Council might have a role to play, or will it be all mapped out in the construction sector deal? Perhaps you might also tell us when we will get that deal.

Richard Harrington MP: If I may, I will divide the question and deal first with the Construction Leadership Council. Its title sounds rather stuffy compared to the organisation that it actually is. It has a very clear strategy to push on-site construction to off-site construction. I think the Americans would call that a mission statement. A core part of its very existence is to promote construction in factories for reasons of cost and the environment. Those are the two things.

It is independent of the department, although I co-chair it. Traditionally with these councils there is a Minister and an elected leader from the industry itself. I have not been to one yet, because I took on responsibility for construction only quite recently. There is one in the first week of July, which I will co-chair. The department provides the service itself, including the administration, but it is an independent council.

Leading on from that, and to answer your question about how else the Government can influence it, one of the main things is the fund of £170 million, which we call the Transforming Construction programme. It is precisely to transform construction from the traditional: what we would all accept as building site-type construction, with all its skills, or shortage of skills as it often is, the price of which has gone up dramatically.

Having first got involved in construction myself when I was 23 and in business, I know that the price has hugely outstripped inflation. I am a little out of touch now, because I have not been in business for 10 years, but even in my time it went up from about £40 per square foot to £200, or to £250 per square foot in some more complicated central London sites. That is because of the cost of materials and labour and all the on-costs, many of which are improvements to do with health and safety and that kind of thing.

The Government's policy is that there are so many reasons why we should move to factory-based construction, which by the way is not new. Many structures that we are familiar with, such as Paddington station, were built predominantly in factories. This has been going on for more than 100 years. People will remember the huge construction of prefabricated houses after the Second World War, all of which were built in factories. This is not new, but of course it is the technology that is changing.

It is not widely known, although it is public, but half of the BEIS budget goes on research and development, one way or another. Incidentally, the other half goes to nuclear decommissioning, which is spoken about even less. All the different funds that the budget goes to, such as the industrial strategy challenge fund and the Transforming Construction programme and so on, are research and development based. That is the Government's key role, apart from the direct involvement of government contracts, which perhaps I could come to in a moment.

The Chairman: In responding on the question about government contracts, you might address the issue of contracting for value rather than capital cost.

Richard Harrington MP: I can happily do that. I should perhaps mention the sector deal, which you brought up. As I am sure members are aware, sector deals are an important part of our industrial strategy. They are intended to get a lot of different companies and stakeholders involved with government.

It is a move away from previous generations, when the feeling was that government should be directly involved in industry, with civil servants and Ministers literally talking about taking stakes in businesses. I

remember in my childhood, when I was doing A-level economics, visiting the NEDC as it was called then, or the development council. It was very impressive to us sixth-formers, but basically it was a room full of people deciding what stakes in businesses to take, with politicians actually interfering, usually for political reasons. I am not making any party-political point, and that is still how it is decided in a lot of parts of the world.

It moved from that to a general belief that government could not really get involved in industry because the market itself would decide. That was discredited as well. The industrial strategy is not the first that Governments have had in their history, but it is based on this partnership. So government puts money where it thinks it will add value rather than investing in individual businesses, and research and development is typically part of that.

To get on to the relevant point, the sector deal is a deal between the sectors, broadly speaking. We try to do it not just through the big companies but through different organisations such as construction, the council, the Nuclear Industry Association and so on. I could go through all the different sectors, which hopefully represent the whole of industry and government. It is typically an arrangement whereby each side has a clear offering: government will do this if industry does that.

It was hoped that construction would be one of the first ones to come about. It is in the first batch, but it is fair to say that it has taken longer than people originally thought. Let me explain why. In the first instance, most industries do not have people trained to write a sector deal. Maybe they should, I do not know. Some got through it by hiring very expensive and competent people to do it. Sir John Bell chaired the life sciences one and Peter Bazalgette did the creative industries one. But many industries do not have that level of access to people who are used to the way that government works, so it takes longer. We have officials who can help, and obviously we help them do it because we want them to do it, but there were no prizes for being first. It is not a race. That is one reason.

Secondly, the industry itself had to decide what it wanted in particular. Usually it is a combination of skills, a deal for skills. Construction is a lot more complex than most, first because it has its own methods of recruiting apprentices, which it always has, some of which work and some of which do not. There are some fundamental problems with skills so that contracts tend to last for shorter periods than apprenticeships, et cetera.

Then there is the question of how government should be involved in off-site construction, which is what we are here to talk about today.

The Chairman: When do you think it might be published?

Richard Harrington MP: I am going to use a Civil Service word, which I will probably get into trouble for, but if I say "imminently", I hope that will be acceptable to the Committee.

Baroness Morgan of Huyton: We were just told by previous witnesses that they thought it was finished at Christmas.

Richard Harrington MP: The draft may be finished, but I am afraid it has to go through all the different departments and approvals and write rounds and everything. It is my job to get them through, and I am very happy with the construction one. The press say that you are “hailed” before Committees, so if it is not published imminently, I could do with a good hauling. And I would willingly accept it.

The Chairman: Will it be in the next Session of the Parliament?

Richard Harrington MP: I would hope that it would be in this Session, Lord Chairman.

Lord Hunt of Chesterton: Presumably you discuss it at the committee you are going to be at in July.

Richard Harrington MP: Yes. I have a weekly meeting with officials on how these deals are going along to discuss what we need, what the industry has said and so on. If there has been disappointment at the time period, I do not apologise for that. What I apologise for is if members of the industry perhaps thought it would be an easier process than it has been. I hope it is worth waiting for. Anyone can organise a drinks party and a press release. Departments are full of people who do that. But to me, this is much more than that. It has to be something that is delivered and that means something.

The Chairman: So whenever it comes out it will be full of information.

Q73 **Baroness Neville-Jones:** Minister, could you tell us how the £170 million figure was arrived at and what it will be spent on?

Richard Harrington MP: I would like to ask Fergus to answer that, because I do not want to waffle. He knows the specific answer.

Fergus Harradence: As the construction sector, we put in a bid for a sum of money to the industrial strategy challenge fund, a competitive fund run by Innovate UK that is now part of UK Research and Innovation. The original bid was slightly higher than £170 million, but that was the figure arrived at following an internal Innovate UK analysis of the bid and what it decided to fund, taking account of the fact that it already funds certain activities in this area. It has regular calls for innovation funding that are relevant to the built environment, but this is new and additional funding for the industry on top of what it would have expected to get from within the core budget.

Baroness Neville-Jones: So what is it going to be spent on?

Fergus Harradence: Seventy million pounds is going to be spent on what we call the core innovation hub, a centre that will take forward the development and commercialisation of digital and off-site manufacturing technologies. Around £30 million will be invested in an active building centre, which essentially will develop technologies that will enable buildings to be energy self-sufficient or ideally energy positive. It is about energy generation and storage technologies for the built environment. The remainder, about £70 million, will be awarded by various competitions and will support R&D projects and demonstration projects.

Baroness Neville-Jones: Are the first two that you mentioned new organisations? How will they be composed?

Fergus Harradence: No. The core innovation hub is likely to be a consortia of existing organisations, and the active building centre is likely to be established within a university, probably within an existing research group.

Baroness Neville-Jones: Is the other one going to be industry?

Fergus Harradence: Yes. It was a requirement of the competition that the core innovation hub consortia be led by a research and technology organisation.

Baroness Neville-Jones: So there is actually an evolved programme.

Fergus Harradence: An evolving programme, I would say. We have planned some of it, but there are further steps to go until we have finally defined it. It will be implemented over a four-year period.

Baroness Neville-Jones: I was just going to ask you that.

Baroness Young of Old Scone: In addition to the £170 million from government, is money pledged by the sector to match that?

Fergus Harradence: Yes. The Innovate UK estimate is that the £170 million from government will leverage around £250 million of matched funding from the industry through its contribution to funding R&D projects, where under state aid rules we can fund a maximum of 50%, or through activities that it chooses to fund in the centres that we will set up.

Baroness Neville-Jones: That is an estimate.

Fergus Harradence: It is an estimate at this stage.

Lord Fox: I am slightly struggling with the phrase "core innovation hub". Will it work like a catapult, with companies coming in and trying stuff, or will it generate its own stuff? How do you envisage it?

Fergus Harradence: It will essentially work in a similar way to a catapult centre, but it will be a consortia of different institutions with slightly different specialisms, taking account of the fact that there is no single institution in the UK that has all the expertise that we think we will need.

Lord Fox: How will the governance of that work? Will it be through Innovate UK?

Fergus Harradence: The funding will be managed through Innovate UK, and obviously the consortia that win the competition will have various performance metrics against which they will be assessed in delivering the output.

Lord Fox: Assessed by whom?

Fergus Harradence: Quite how they will be governed is for the consortia to decide. The competition is still open and bids are being put

in, which we will assess in the next few weeks, so I am afraid I cannot give you any details.

Lord Fox: Is the "we" BEIS? Who is doing the assessment?

Fergus Harradence: It is overseen by Innovate UK.

Richard Harrington MP: There is a panel, which I believe you are involved in.

Fergus Harradence: I personally am one of a number of assessors who will be involved.

Lord Fox: I was trying to work out which of your hats you are wearing. It is the Innovate UK hat in this case.

Richard Harrington MP: There are inside and outside experts on the panel.

Q74 **Lord Griffiths of Fforestfach:** The Chancellor said that five government departments are going to adopt a "presumption in favour" of modern methods of construction, including off-site, next year. When I first read that expression, I felt that it could have been lifted from a script of "Yes Minister", because it can mean almost anything.

Richard Harrington MP: It probably was.

Lord Griffiths of Fforestfach: I am sure that was not on your mind, as you have a very practical understanding of what it means. Will you spell that out for us? When I worked in No. 10 I found that co-operation between two government departments was difficult, so to get to five, and to add in the Treasury if it is one of them, will be very complex.

Richard Harrington MP: The Treasury is not directly involved in this. Let me explain which departments are. I have not had the pleasure of working in No. 10 as Lord Griffiths and Baroness Morgan have. I cannot speak for other members, but Baroness Neville-Jones has worked in buildings adjacent to No. 10, I know.

Lord Griffiths of Fforestfach: Sounds sinister.

Richard Harrington MP: She should answer that herself. I cannot really comment on that. I take it as I find it as an organisation and as a way of doing it, which I also was inherently cynical about based on my experience in the outside world rather than within government.

They are the Department for Transport, the Department of Health, the Department for Education, the Ministry of Justice and the Ministry of Defence. These are the departments in which there is a mass of government expenditure on buildings. The Treasury is, of course, always there, because it funds everything. It generally regards all the other departments as mere back offices for the Treasury, does it not?

In this case, there is a working group, which includes us as a department and external people. I thought that the presumption in favour did not actually mean very much, but it is a pledge that, from next year, for every built asset that these five department contract there is a presumption in favour of it being made in a factory rather than on the

building site in the traditional way. That does not bind them absolutely, because some buildings just would not be suitable for it, but it is possible for many.

Most large supermarkets, for example, and this is nothing to do with public expenditure, are built in factories now. I saw to my amazement in my own constituency of Watford a Morrisons supermarket built in 16 weeks. I observed it, because I was asked to do the footings—you are given a spade which you then put in your office and people ask what it is. Every morning, these huge walls would appear, and it was finished on the day it was supposed to be finished on. I imagine that it is quite possible for buildings such as schools to fit into the process. It is very achievable.

The scepticism I might have is that, as you say, it is the sort of thing that sounds good when you talk about it. I am sure nobody enters into it thinking that they are not going to do it or are going to stop it being done, but in practice there are factors pulling away, such as local planning, where councillors and officers might have a completely different view, or budgetary constraints.

That goes back to the question from the Lord Chairman, which I did not answer, on the lifetime of an asset. We moved on, but perhaps I can answer it in this context. The presumption that everyone has exactly the same type of building made in a factory might be good to get the cost of construction down, but is that better for the lifetime of an asset? Once again, the lifetime of an asset is great in theory, but in practice it might not be, because budgets are to try to get the price down because the Treasury has set a ceiling.

The Green Book for the public sector defines best value over the long term and has done so for many years; it is nothing to do with this Government. That usually means asking: is it worth spending more in the construction phase if you can benefit from that through lower costs of running a building? Of course, all these public buildings are equally as important to the Exchequer one way or the other.

Lord Griffiths of Fforestfach: To what extent do you need to ensure that these five departments have the right resources and skills to do this? Are they in any way accountable to you, so that you or other Ministers can tell, say, the Department for Transport, that it has been very lax in the presumption in favour and will have to change things because you are just not happy?

Richard Harrington MP: That will be done through the cross-governmental working group, which is there to monitor it and to make sure that it happens. As far as I am concerned, wearing my construction and more general BEIS hat, and as someone responsible for the implementation of the industrial strategy, I have asked for and will receive reports on a regular basis, I hope. I have asked for those, and a system will be set up when this gets going in a year's time to monitor it, because sometimes people start with the best intentions but there are always reasons why it cannot be done or cannot be done until the following year.

As has been implied, the Chancellor made a very strong statement about this not long ago in the Budget Statement 2017. The Chancellor is also behind it, maybe for reasons that are not quite to do with improving the construction industry but because it makes a lot of sense financially. Even if it were traditional construction and not off-site construction, it would still make a lot of sense to do it. It is more than in the wind; it is a real policy, and it is my intention to make sure that it is implemented properly. I have said specifically that if any department has a problem we will discuss it openly at the beginning so that it is not said a year later when it has not happened.

Baroness Neville-Jones: Minister, you did not mention DCLG as one of the five departments. Is that right?

Richard Harrington MP: DCLG is not one of them.

Baroness Neville-Jones: I ask, because I wonder how these departments, even if they have the skills, have the power.

We paid a visit to Laing O'Rourke, which is invested very heavily in this. It told us a story that bears on this question. Part of Yorkshire—I do not know which part—commissioned some schools, and these schools were built. Laing O'Rourke invested considerably in the whole business of designing the schools, and after the first delivery it then had a template for more schools at a unit cost that presumably would have been profitable for it.

The next time round, however, Yorkshire reverted to traditional procurement—there was no follow-through. How will you, sitting in London with the central departments, ensure that the message gets through to the bodies that will commission these buildings, whether it is NHS England or local hospitals or schools, so that the good intention of central government is realised?

Baroness Morgan of Huyton: Can I add to that? I was not on the visit, but it is my understanding that the capital for that would come from DfE and not from Yorkshire, so how are we in a situation where capital is coming from DfE and Yorkshire is deciding to do something different with it? You might have to go away and look at that, but it is symptomatic of some of the challenges.

Richard Harrington MP: I am afraid I do not know that example, but as Baroness Morgan says, he who pays the piper calls the tune. The Government will have to stipulate that.

Baroness Neville-Jones: And are you really going to do that?

Richard Harrington MP: I am familiar with Laing O'Rourke and have met Ray O'Rourke. It is a big-scale company and they are competent people, but there must have been a reason for Yorkshire to change its mind.

Baroness Neville-Jones: It was not divulged.

Richard Harrington MP: I cannot comment on it, because I do not know. But if it was cheaper and if it was just as good, why would it? I

think you and I should declare an interest, Baroness Neville-Jones, as Leodiensians ourselves.

Baroness Neville-Jones: The general point, Minister, is that you are going to use the influence and the power of central government.

Richard Harrington MP: We are going to have to. I am trying in my sectors to continue mentioning it. For example, I have asked for a meeting with Sir Edward Lister, the chairman of Homes England, explaining that, at this point, even though I do not have the direct power to do it, we will be viewing the work of Homes England all over England through the prism of off-site construction, because it is in our industrial strategy and there is a five-department presumption. We have to keep banging away at it.

Baroness Neville-Jones: So presumption means exerting quite a lot of downward pressure.

Richard Harrington MP: I think so. My personal pressure is probably not enough, I have to say, but if it is repeated and repeated by people such as the Chancellor, and if the Treasury starts making this conditional, which it is in its interest to do because of the cost and because it is in all our interests to have an industrial strategy, in the end, that will make authorities such as the one in Yorkshire decide to comply.

It may be that there is no cost difference or it can show that it is not as it appears, and that is why I do not want to criticise Yorkshire without knowing its reasoning. I do not believe that it would be completely illogical and irrational. Without impugning Laing O'Rourke, or any other company for that matter, sometimes companies do see things just from one perspective.

Lord Mair: Minister, in the previous session we heard from Tony Meggs of the Infrastructure and Projects Authority about the presumption in favour. He expressed the view that from 2019 the five departments would be expected to set out in the procurement process that they would want to see at least one off-site manufacture option. What is your comment on that?

Richard Harrington MP: I hope that it would be more than that. That would be part of the presumption in favour, but for the people promoting and managing a project there might be reasons why it is not suitable. That is why we could not make it completely compulsory for all projects to be constructed off-site. The Government are a big procurer, and they cannot do it as directly as perhaps they would have done in different generations, because it was shown for other reasons not to be very efficient, but in the end they can stipulate these matters subject to cases where it is just not appropriate to do so.

Take housing as an example. I can see that a very small development of different units for different use, such as sheltered housing, would not be appropriate. But in many other cases it would be, if it is going to be built on a large scale with exactly the type of modular unit that can be done according to a central design that is much cheaper and more efficient to use.

I have observed quite a lot of it. There is the Building Research Establishment in Garston in my constituency. The BRE has been researching this kind of thing and these different materials for a long time. It is now the time, now that we have different types of computer design and all the other things. We are on the cusp of it, but the Government have to push it by pushing government procurement contracts.

Lord Vallance of Tummel: Can I push you a little further on procurement? In your introductory statement you said that there are two types of benefit from off-site manufacture, one of which is cost and the other is environmental. When you were doing A-level economics I have no doubt that you picked up things about externalities. Of course, the improvements in the environment are very much to do with externalities, one of which was set out when the sector plan was announced but before it was published: to reduce greenhouse gases in the built environment by 50% by 2025. That is quantifiable. Do you think that externalities of that sort should be quantified in government procurement in the same way as costs and, if not, why not?

Richard Harrington MP: First, maybe the reason I did not get the top grade in economics is because I did not understand externalities. This is precisely what government can stipulate in procurement contracts, and government stipulates so many things now in a way that would not have been dreamed about only 10 or 20 years ago. Again, government has to stipulate these things if it is to achieve perfectly proper targets to do with the environment. I would say absolutely yes.

Lord Vallance of Tummel: There are armies of economists who will give you the cost of carbon, so you are saying that the cost of carbon should be included in government procurement of infrastructure of this kind.

Richard Harrington MP: Yes, because the Government have an overall carbon target and this is one way of achieving it. There are armies of economists who will tell you completely the contrary, but Governments have to decide, in the United States as well as here.

Baroness Young of Old Scone: One of our previous witnesses said that as yet no performance criteria had been set for the presumption. Is that going to happen, and have you any idea about what they might contain? They could in themselves be quite effective drivers.

Fergus Harradence: There is not a set at the moment, but it is certainly something that we could consider as we develop and work out what the presumption means in practice.

Baroness Young of Old Scone: A simple one of "more off-site construction" is rather bald. There are other things to consider such as capturing externalities.

Fergus Harradence: On off-site construction we would want to capture as comprehensively as possible all the evidence we can about the benefits, whether that is reduced carbon emissions, reduced time taken to complete jobs, reduced error rates and reduced waste produced, taking account of the fact that the construction sector accounts for about

60% of all UK waste, and not least of all the reduced cost of construction. We have done some work on this relating to specific subsectors, and there are good case studies of the benefits of off-site construction in relation to a range of built assets, but we have not done it comprehensively across the board.

The Chairman: Lord Mair, did you have a quick question?

Lord Mair: No.

Q75 **Lord Fox:** Turning to the construction sector, we have heard countless witnesses tell us that it is fragmented and that co-operation is difficult. In particular, when you move into private sector contracts rather than the ones you have been talking about, it is very difficult to drive the sort of behaviours you describe. How can government involve itself in encouraging this?

We have just heard a couple of questioners talk about the environmental standards, but I would like to throw in here the Hackitt review, which is looking at the sense of an integrated building. We have a very disintegrated industry, and one of the key findings of the Hackitt review is that we need an integrated approach both to the production of the building and to its final sign-off. Is that one way of driving the private sector to integrate? What drivers does government have that it is not currently using and should start to use to create that world?

Fergus Harradence: Ever since the unfortunate fire at Grenfell Tower last year, and during the process of developing the sector deal, we have been taking account of the likely findings of the Hackitt review. The interim report published in December last year identified a number of serious failings in the way the construction sector goes about commissioning and completing jobs and the failure of the people responsible for managing the overall system for ensuring building safety, which in theory is supposed to work but in practice clearly did not work properly.

We have taken account of the recommendations and looked at what the actions we are proposing to undertake through the sector deal can do to contribute to the wider objective of ensuring building safety in the UK. There are some very obvious areas where the objectives are aligned. The greater use of digital technologies in the design of buildings and the management of the construction phase will make it easier not only to design safe buildings that incorporate safe materials but to ensure that there is better control of the change process within construction.

Lord Fox: You then have a manual for the building afterwards.

Fergus Harradence: Yes, and you will be able to hand over to the ultimate client or building owner a detailed digital model that tells them exactly what is in the building and what has been done to it. If they wish to plan further work and make further improvements in the building, that will similarly be recorded.

So everybody, which in theory includes the emergency services, the local authority and any other relevant regulators, will have access to a comprehensive dataset. If you continue to build buildings this way over time, you build up a very detailed picture of the urban environment and the built assets within it.

Richard Harrington MP: I have seen for myself how fragmented the whole process is. Some of it is to do with the way history has evolved. We have buildings—we are in one—that are from about five different ages effectively in one complex. When I was in the hotel business, you would buy a hotel and no one had any idea what it was built of. Obviously, because of inspections, you would have health and safety reports, fire reports, and different things like that, but it was fragmented and involved catching up from the past.

Now, with the construction sector changing as it is, we have a chance to make sure that in future every owner who buys the land and builds the building, be it a company or government, all the way through its lifespan, has access to the same information. That is so much easier, as Fergus said, because it is digitally based.

Lord Fox: Do you think this will drive off-site manufacturing?

Richard Harrington MP: I think it will, because it is so much easier to control rather than using 20 or 30 different subcontractors, all of which might be doing their job properly but are not paid to look at the big picture at all. It is inevitable and absolutely right that it should.

Q76 **Lord Hunt of Chesterton:** How are the Government ensuring that the necessary training is available to provide the skills needed for off-site construction and other modern methods of construction? You just made the point about the skills needed for the digital management of buildings.

Apropos of this, one way in which companies can learn, as we heard from the previous witnesses this afternoon, is by taking as an example other buildings that have been put up. Somebody from Sellafield gave the example of borrowing the design of buildings from an adjacent local authority, so not having to go through some formal judging procedure. That seems to me very important.

Richard Harrington MP: It is. The core point is that the skills that the industry needs are changing dramatically. The Government are working with the Construction Industry Training Board and the industry generally to try to analyse what skills are needed for the future. It is very different from mainstream building now. Digital skills are obvious, but it is not just to do with the construction itself; there is design, logistics, site management and so on.

I could pick out so many different sectors of the economy, but take as an example car factories. I have visited Cowley near Oxford twice in my life, once when I was 18 and once a few weeks ago. It is completely different. Most of the people who are building cars there are trained to use some form of computer for what was once a completely manual task. The whole system is based on everything other than physical labour. But

building sites have not changed very much at all in that period. The core skills of bricklaying, plumbing and electrics, which are very much divided skills, are still being trained to this day, but that will have to change.

How are the Government going to kick-start that? One way is what we have been talking about: the presumption of building off-site, which clearly involves very different skills. Another way is the successful application of the apprenticeship levy, with which there has been some problems, not in the levy itself, which is generally supported, but in its implementation. There were 100 different standards that were all over the place, but now the Government, with Gerry Berragan and the Institute for Apprenticeships, are looking for standards that will really reflect what the building industry needs in the future. There has to be a vision and things have to change. The car industry is just one example, and the way that cars are now manufactured is fundamentally different. It will change again, but the modular construction requires totally different skills.

The Government can kick-start it in two ways. One way is to work with industry on the skills, which I have explained. The second way comes back to the Government using their money to push these things through. It is for the benefit of everyone. We cannot allow the same situation every time the economy expands. Everything is cyclical. At my age I have seen at least two or three economic cycles, and they always happen one way or another, whatever Governments and Prime Ministers might say—of fund managers, for that matter.

We always have the problem of skills shortages when we go up the economic cycle. I hope we are now in a position to change things so that that will not happen. The skills part of it is critical. Construction, rather than the perception of it being an old-fashioned, traditional industry, will change dramatically. I cannot say that it is going to be as glamorous as iPhones and iPads, but it will be fundamentally different, and future generations will see the benefit of that.

Lord Fox: You brought up the subject of apprenticeships. We heard from the previous panel that one issue currently facing firms is that the length of their contracts is in many cases less than the time it takes to complete an apprenticeship. There are two conclusions from that: one is that you try to produce a modular system of apprenticeships where people can move to different firms to complete them, and the other is to try to drive a greater degree of certainty within the building industry to enable it to train its own people.

Fundamental to the skills problem is that there is so much uncertainty, because many firms are not investing for the long term, because they do not actually know what the long term is. It is a chicken and egg situation. What are the Government doing to try to get some certainty into this?

Richard Harrington MP: You are certainly right in that the current traditional model for short-term construction is based project by project, usually for cash-flow reasons. Even some of the massive building sites are phased, in particular in residential property, for reasons of cash flow. That has to change, and the skills element is part of that.

Not in this life, but when I was David Cameron's apprenticeship adviser in 2011, which predated the levy, I visited the construction industry apprenticeship centre at King's Cross. That is not exactly what it is called but that is what it is. Its problem was that contracts were typically for two years and apprenticeships were for three years or more.

At the time, the companies with more substance behind them and more vision included Carillion, which was very good at apprenticeships. At the centre, I met apprentices from all different companies, and Carillion had a vision beyond the two-year contracts. Now, I know what happened and I am certainly not making light of it, but there is no question that the Government have to help the bigger companies in particular with longer-term contracts. Local authorities and housing associations have to take a longer-term vision, otherwise there will always be this skills problem.

I am sure it is the same elsewhere. In another sector completely, I visited Airbus in north Wales where they make the wings for the Airbus planes. But it cannot predict the future beyond the orders that it has, in the same way that a construction company will not be able to predict exactly what it is going to do. But construction companies also have to think more long term. If they are investing a lot of money, as the O'Rourkes are in these massive factories, they have to tell their customers, who are predominantly but not exclusively government, that they can do it at a better price if they are guaranteed four or five years' work, because that helps with the skills and everything else.

It has to change. It is too old-fashioned to put every little bit out to tender and use different companies. Should the top contractor be the apprenticeship provider, some of which are very small and made up of only five people? Even on big contracts, people are paid by the day or by the square metre. This all has to change, otherwise we will never get to grips with the skills end of it. The Government have to pump-prime this.

Baroness Neville-Jones: I want to pursue this for a moment. It has become fairly clear that if you are going to have off-site manufacturing as a predominant element, the business model has to change because the amount of up-front capital that is involved at early stages is much greater than something that involves the traditional, rather slow cash flow—I can wait three or four years as the client before I actually have to fork out anything significant.

How are you going to turn all this around? What is the Government's master plan? Can you marshal enough projects that you can guarantee a flow so that the companies themselves have confidence that they will have a business flow? How will you get the thing going in the first instance?

The Chairman: In short, it will require a consistent pipeline of construction projects.

Baroness Neville-Jones: You said that the industry has to change, but it seems to me that the public procurer has to change, too.

Richard Harrington MP: We have the power. A quarter to a third of all construction is government funded one way or the other.

Baroness Neville-Jones: You have the power, but will you use it?

Richard Harrington MP: Why would we not use it, Baroness Neville-Jones?

Baroness Morgan of Huyton: You are showing great conviction, Minister, and you are really clear that it has to change. What we want to understand is: is it definitely going to change?

Richard Harrington MP: Yes, because otherwise off-site construction will not happen. Companies are not going to build what are effectively huge factories completely on spec. Everything is on spec to some extent—we used the Airbus example—but companies take a commercial view based on likely orders. Government spending has to reflect this.

By the way, it is not just government spending. I am sure that the big housebuilders will also have to guarantee 1,000 units in three months, or whatever it is, otherwise the capital expenditure will not happen. The Government have the purchasing power to be able to do that.

Baroness Neville-Jones's point was: does government intend to use it? Unless this is pushed really hard, it will not happen. That is why, to go back to the five departments, we have to make sure that it does happen. The Treasury sees that. It may see it just for financial reasons, but we see it as something broader than that.

As I said, it will have a fundamental effect. It is almost like the Industrial Revolution happening again, in the same that many industries existed before the Industrial Revolution but were done in people's homes—for example, weaving and spinning—and then moved to factories. We have learned all those lessons and we have to make sure it changes, unless we want to live in a different type of economy where the Government do everything, which some people might want.

However, we live in a mixed economy, and the only direct power we have is to make sure that the Government use taxpayers' money for that. For financial and other reasons, it will happen. It has to.

Lord Fox: I want to press the point about cash flow but look at the private sector. Private sector developers have a model whereby money does not go out the door in many cases until money has come in through the door for what they have built. This is asking them to make a substantial reversal of their cash-flow model. How are you going to persuade them that it is in their interests to do that?

Richard Harrington MP: I disagree with the presumption you are making, Lord Fox.

Lord Fox: Were Lord Borwick here, he would be making that point, and he knows far more than I do about property development.

Richard Harrington MP: He knows far more than I do as well. Builders have a lot of cash flow issues now. If Barratt builds an estate, it is not paid the money until it finishes constructing a house, so it is not such a fundamental change. The difference goes into the cash flow, because at least Barratt pays the money up front and pays all its subcontractors on

contract. So it is a change, but not such a major change in financing. Financing is not our problem. These companies have the security for it and the sales. They may have to change their model, but they will have to change their models in many ways.

The Chairman: You said that there is a model, but can the Government help? Let me give an example. As I understand it, in France for instance you buy your apartment and the Government have legislated that at one-third of completion you pay one-third of the price and at half you pay half. The construction industry there always has a cash flow.

Richard Harrington MP: That is for properties that people have constructed for them in the private sector. There are many examples of where that can happen here, in particular when building individual properties, but I agree that it does not happen en masse. It is not a matter for legislation, but the construction industry will have to change its cash-flow model. Take the idea of companies funding a lot of their production by not paying their suppliers for 30, 60, 90 or 120 days or through retentions. All this has to change. That is not the fundamental point in Lord Fox's question, but cash-flow models do change.

Lord Fox: But there are opportunities, for example, to encourage securitisation, so they could secure it in advance and use that as a cash-flow float. The Government could play a role in encouraging those things.

Richard Harrington MP: They could. I also think that institutions, when they understand this type of construction, will move into it a lot more. We see institutions involved now. For example, Legal & General and others got involved in the construction of what were fairly primitive buy to lets. The institutionalisation of it has significant cash-flow effects, because they do not get the money back for 10 or 20 years. I am not exactly sure what the yields are, but it is lengthy period.

Many of those institutions are now saying that they will move into actual production and become the factory and the supplier. Cash-flow models do change and institutional money will have to come in as an alternative to the fairly primitive forms of funding that are used now, which use client's money in advance and retentions and other things like that.

Lord Hunt of Chesterton: Do you have financial people planning the future?

Richard Harrington MP: Plenty of them.

Lord Hunt of Chesterton: Are they putting together a coherent policy on this?

Richard Harrington MP: They are. There is more to it than just the financial side, but we have a lot of financial people.

Lord Hunt of Chesterton: Will that be in the document that we are going to get imminently?

Richard Harrington MP: It is in the sector deal, which is broader than just off-site construction, so I cannot promise that, otherwise I will be

accused of misleading the Committee, which I have no intention of doing—not if I can help it.

Lord Kakkar: I want to come back to the Treasury's role in driving forward the five departments. What will be the trigger to actually make something happen and really push this so that procurement by these five departments occurs in the way that you envisage?

Richard Harrington MP: In my opinion, it will be the Treasury saying that this is what is happening here.

Lord Kakkar: What would make the Treasury decide that this is what it has to say?

Richard Harrington MP: If it sees that the policy as laid out in the Chancellor's Autumn Budget Statement is not happening. We have to make sure that it does happen. As for an absolute trigger of 5%, 10% or 20%, I do not know, because we do not have one. I think it would be wrong in the short term to have one, but this is public and it would be a total failure of policy if it does not happen. I believe that the financial pressures to do it are there as well and, as I discussed before with Baroness Morgan, in the end that overrides everything else.

Q77 **Baroness Young of Old Scone:** Minister, can we focus on the housing sector? The levers that government has in that sector are comparatively small; it is not a big investor in housing development any more. However, we have a real opportunity with the housing targets and the major dash for housing.

Where do you see the leverage coming to influence the speculative private sector builders of low-rise housing in particular, which is where we seem to be least well developed? Is it wrong to say that it is in their interests not to find a way of building out sites quicker, because that means that prices then drop, which is not in their interests in view of the investment that they have already made in land banks?

Richard Harrington MP: If I may, I will first answer the question about the public sector. You made the point that government does not have a direct influence, but actually it does through the funding of housing associations and so on. I know we do not use the terminology that we used to of "direct expenditure", but it comes back to the fact that it is perfectly reasonable for government to say that, if we are going to fund this project for this housing association, it is done using modular construction off-site. There is more influence there than might first appear. Government has to use that quite ruthlessly.

On the question of the private sector in effect going slow on this, you are probably right. Management is used to a certain way of doing things. The Government can tell schools all they like that we need more and more apprentices, but the current management—the teachers—will, for perfectly good reasons because it is the way they were brought up and developed, try to say that it is better for children to go to university.

It may be that the current management in the private sector are used to a lifetime of handing out these contracts for the different components of a traditional construction site, and it takes time to change. In the end, if a property developer sees that they can get a better deal for a better product at a lower price, they will do it. They will have every reason and influence to do it, because their building costs have gone up dramatically.

Quite apart from the actual cost, there are big skills shortages on building sites. When you speak to people, the main thing they say is that they cannot get the contractors and the labour. I do not suppose it is the business of this Committee in particular to go into Brexit issues and general migration issues, but putting any principle to one side, the fact is that there is a significant shortage of skilled labour and this will push it. If I were a big developer and I had a choice between paying £150 or £170 per square foot for a basic house in a conventional way, and there is a way of doing the same quality product for two-thirds of that, I am going to choose that. The pressure is more economic than governmental in the private sector.

Baroness Young of Old Scone: Is there a government action to help to kick-start that process? You have already made the point that up-front investment in manufacturing facilities could be a blockage for individual housebuilders.

Richard Harrington MP: Yes. I do not think it is a government policy in the private sector. If the Government kick-starts this predominantly in the public sector with hospitals and that type of thing and where they can control it—housing associations being a classic example, but there are others—the private sector will follow. At the moment, a typical housing association property is built in exactly the same way as a private sector property. Why should it not be? It is fundamentally the same product, so if one goes the other will go.

The Government are much better kick-starting this where they have direct financial control, albeit through an intermediary delivery organisation such as a housing association. While housing associations are independent in their legal standing, it is quite right that government should apply conditionality to the money that they spend. That is why I am seeing Homes England about it. We have to push this in every way we can. But it is not easy and we cannot command the big housebuilders, “You will build in this way”. They have shareholders and pressures, and I am sure that as they see the costs of modular construction come down they will go for it.

Lord Mair: May I ask one question about the role of your department in standards? A lot of what is being talked about in off-site manufacture would very much be enhanced by more standardisation. Can you comment on that?

Richard Harrington MP: Would you like to have a go at that, Fergus?

Fergus Harradence: When you say standardisation, do you mean standards in the sense of product and process standards or standard designs?

Lord Mair: Probably both.

Fergus Harradence: In relation to standardisation, BEIS as a department sponsors the British Standards Institution, so we oversee the framework by which standards are developed in the UK. One of our activities includes a strand of the transforming construction programme to develop new performance standards for buildings that are manufactured off-site and the associated production methodologies that will be used so that people have assurances about the quality of the product they are ultimately going to buy. We see that as part and parcel of having an effective innovation programme that leads to products that will be commercialised and adopted on a large scale.

The standardisation of designs is ultimately a question for the organisation that is commissioning the project or undertaking the developmental work for a client.

Richard Harrington MP: I will comment, if I may, on the design element. At the moment, for residential housebuilding it is very much a standard product for cost reasons. Yes, there is design choice A, B, C or D, but really it is the same product—there might be a different gable or type of window or something. That will continue. People, I am sure, will continue to pay a premium price for a premium product, as they do with a suit.

There are clever ways of making things look different using computerised design. They are very good at this in America. Admittedly, they do not have the weather problems we do, but they can go from a piece of land to building a house in the factory usually in 13 weeks. But they look different. People think they have endless choice, but they do not really. It is just the different things that are put on it. I think we will see a lot more of that, which of course helps modular factory-based construction.

Then we get back to the whole question: does everybody want the same? In the past, housebuilders have successfully created the illusion that people are buying different when they are fundamentally buying the same. It will be very much that, albeit built off-site.

Lord Mair: But presumably government will want to drive standardisation of the components, because the more that is happening, the more it will incentivise off-site manufacture.

Richard Harrington MP: I think the economics will do that. One of the advantages of computer-aided design and production is that there might be more flexibility in the standards and in the choice of different products. But clearly government has to be involved in safety standards and everything else.

Lord Fox: There is a different standard on waste. One of you mentioned that on-site building is responsible for a huge amount of waste, which is at the moment almost a subsidy of the process. What are you doing to drive down the waste? Surely a serious financial penalty on waste would drive you further towards the goal of more off-site manufacturing?

Fergus Harradence: There is already the landfill tax, which I would have thought the construction industry—

Lord Fox: Which is clearly not deterring people from wasting a huge amount of what is on site.

Fergus: As with all industries, it is not that the construction sector intentionally wastes this amount of product. The level of waste—

Lord Fox: It is the process. That is exactly why I am asking the question.

Fergus Harradence: It is the intrinsic inefficiency of the process and the fact that people make errors on site; hence the reason why we want to move to digitally designed manufactured buildings—because it enables you to run much more efficient processes and minimise waste.

Lord Fox: At the moment, they can use the inefficient process economically. If it was less economic to be so inefficient, they would perhaps be encouraged to be more efficient.

Lord Vallance of Tummel: It is an externality.

Richard Harrington MP: That is a good point. I must say, I have not considered it. It is a consequence that we have to watch for.

The Chairman: Minister and Mr Harradence, thank you very much indeed. You have been most informative. There is no doubt, Minister, about your commitment to increase the level of off-site construction. Therefore, it makes me feel that our report will be well received by the Government.

Richard Harrington MP: I look forward to receiving it, Lord Chairman. Thank you for your questions.