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Witnesses: Mr Francis Egan, Mr Andrew Austin, Mr Tom Crotty and Mr Andrew MacKenzie

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Members present

Lord MacGregor of Pulham Market (Chairman)
Baroness Blackstone
Lord Hollick
Lord Lawson of Blaby
Lord Lipsey
Lord May of Oxford
Lord McFall of Alcluith
Baroness Noakes
Lord Rowe-Beddoe
Lord Skidelsky
Lord Smith of Clifton

Examination of Witnesses

Mr Francis Egan, CEO, Cuadrilla, **Mr Andrew Austin**, CEO, IGas Energy, **Mr Tom Crotty**, Director, INEOS, and **Mr Andrew MacKenzie**, Gas Procurement Manager, INEOS

Q76 The Chairman: Welcome to the Economic Affairs Committee. This is the fifth public hearing of our inquiry into the economic impact on UK energy policy on shale, gas and oil. I ought to say at the outset that I understand that this hearing is being televised. I thank all four of you for coming, and I thank you, Mr Egan, for the written evidence on behalf of Cuadrilla and Mr MacKenzie for the written evidence from INEOS. We have also seen Mr Austin's interview in the *Daily Telegraph* on 13 September. I would be grateful if you would speak loud and clear for the webcast and the shorthand writer. When you are in agreement with whatever question is asked to which the first respondent has given the answer, just nod. Do not feel that you have to reply to each question; we leave that happily to you. Would anyone like to make an opening statement, or shall we go straight into questions? We are very grateful for your written evidence, which we have all absorbed. No? Then we will go straight into questions.

I begin by saying that we have had a lot of written evidence already, including your own, about the potential for shale gas in the UK. I do not really want to go over that ground today because we have pretty well had the evidence on it. One of the points that comes out clearly from it is that there is still considerable uncertainty about the potential until the drilling and all the experimental work has been done. How long do you think it will be before production of shale gas can commence in the UK?

Andrew Austin: You are absolutely right. Thank you very much for the opportunity to address the Committee today. The first thing is that we need to go through the stage of actually working out whether we can make gas flow at the right rate to make it economic. I know that previous evidence has already come before this Committee from the British Geological Survey and others, which talks about how much gas is in place. We have a reasonable idea of that with a degree of certainty, so we know that there is an awful lot of gas there. We now need to establish whether we can technically recover it and at the right sort of prices that make it competitive as an energy source for the country. We need to go through that process, and as an industry that is in effect what we are asking the population for at the moment: the opportunity to work out whether we can make this work for Britain. As to when shale gas can then start forming part of the energy mix, I think it will be a minimum of three to five years before you started seeing a material amount of production from shale gas contributing to the mix, on the assumption that we are able to make it flow. At the moment, we have only one data point on that—a Cuadrilla data point, which was positive—but we certainly need more data to work out whether it can make a difference for the country.

Francis Egan: Just to add to that, I think we are confident that there is a large volume of gas in the ground. As Andrew has said, we have tested a well and we know that it will flow from at least one well. I share the view entirely that we need further exploration wells. That

distinction between exploration and exploitation or production is not particularly well understood. People want to know lots of answers to questions—about how many wells, how much gas, how much tax, how many jobs, et cetera—without actually drilling any wells, which is quite difficult. It is also not well understood that we probably need to drill only a relatively modest number of wells to begin to answer exactly those questions. I would say that with 10 to a dozen wells, certainly in the Bowland shale, you will have a pretty good understanding to take that forward. We do need to start. From 2008 to probably the end of this year, we will have drilled a grand total of three wells in the Bowland shale and partially fractured one. I would not call that an accelerated exploration programme.

Tom Crotty: If I could add one other point from the chemical industry's perspective, I think that Andrew MacKenzie and I are here representing two things. One is the energy-intensive users of shale gas—steel, aluminium and chemicals—and the other is the chemical industry. We have a specific issue, which is that this is not only an energy benefit for us; it is our basic building block or material—our feedstock. So we are keen to understand the content of that gas as well as the quantity, because that will determine how effective it is as a feedstock for the manufacture of chemicals, which is another key component of its economic benefit to the country.

The Chairman: Have there been any delays to your exploration schedule? What are the reasons for the delays, and why are you not drilling now?

Francis Egan: Physically, we could drill tomorrow. We have a rig and sites that we could drill. There have been well documented delays as a result of the seismic tremors near Blackpool, which shut down the industry for 18 months to two years. Currently, the long-lead time, the thing that takes the longest time, is the planning and permitting process. We need to work our way through that for exploration, and we will. It is very thorough, but

certainly, if we move from exploration to exploitation, we will need—and by we, I mean the country—to streamline that without reducing its effectiveness but making it more efficient.

Q77 Lord Lawson of Blaby: May I ask you a supplementary? You talked about asking the population. I am not quite sure how you ask the population, but leaving that to one side, since you clearly want to get ahead with this exploration as soon as possible to find out what the facts are, is there any problem with the authorities in any way, either with the department—DECC, with the Environment Agency or with any other authority in going ahead at the pace you would clearly like to find out what is there, given all the facts you mentioned?

Andrew Austin: It is fair to say that a level of scrutiny and consideration has probably been given by the Environment Agency in particular, and by DECC and the planning authorities to a lesser extent, which is over and above what we have seen for conventional oil and gas exploration. That is due to the heightened interest that there has been in shale gas exploration and fracking in particular. The level of consultation and engagement, and the time spent considering applications, has been considerably longer than what would otherwise have been looked at as industry best practice. We as an industry, and I am sure that I speak for Francis as well, want to make sure that the communities in which we are dealing are fully aware of everything that we are doing and that everyone has had a full level of time and opportunity to talk about the implications of what is happening. But clearly that has taken significantly longer than it would have done for conventional oil and gas, let us say three or four years ago, as a result of the heightened awareness of communities and the concerns that have been raised.

The Chairman: The BGS told us in oral evidence that a complete picture for the whole of the UK would be “an enormous task and complicated, long-winded and difficult”. It thought that it was probably sensible to concentrate in the areas that had the most. Looking beyond

the Bowland shale, do you have a view of how long it will be before we have a clear view of the national potential?

Francis Egan: There is the study in the Weald basin, as I am sure they told you, which I understand they are due to report on in the first quarter of next year. But they have already confirmed their mid-case estimate. There is a lower and an upper band, and their mid-case is that there is 1,300 trillion cubic feet in the Bowland shale. So, frankly, there is more than enough to be getting on with in the Bowland shale and we would quite like to be getting on with it.

The Chairman: I see lots of nods. Lord Smith?

Lord Smith of Clifton: Which areas of the UK do you believe are the most prospective and prosperous for shale gas?

Francis Egan: The Bowland, certainly for gas, extends from Lancashire across the Midlands and Yorkshire. In effect, it extends down to Europe. We have licensed areas in Holland where we see the same geological formation. In the south-east, we will see what the British Geological Survey comes up with but the expectation is of a higher likelihood of oil there.

Lord Smith of Clifton: And also in the Scottish lowlands?

Francis Egan: We have not done an assessment of that, so I cannot comment on it.

Lord Smith of Clifton: Are there any specific areas in the UK where you would not drill for any reason, even if there were potential resources in place?

Andrew Austin: Anywhere we choose to drill or would look to drill would have to be with the acquiescence of the local community and in working with it. Frankly, if you do not have the social licence to operate with the acquiescence of the people you are with, when you are dealing with your neighbours that is going to be the constraint. It goes back to Lord Lawson's question earlier about what the barriers are right now. They are getting local

acceptance where we are trying to drill. We need to work with those communities, and it is the inability to manage that that would rule out any particular area.

Q78 Lord Smith of Clifton: Presumably, you would not seek to drill in heavily dense urban areas.

Andrew Austin: It would not be your first choice of area to go because of complications in engagement. If you can deal with a smaller amount of people, it is clearly easier to get the buy-in from that group. But we should not rule any areas out because, ultimately, energy security is something for the whole population.

Francis Egan: It is worth clarifying that when we say drilling, we mean that we establish a drilling site that is typically less than five acres. From there, we drill underground. At Wytch Farm in the south of England, they have drilled underground for 10 kilometres. This would be two kilometres more underground and it is a six-inch diameter hole. Frankly, there is more disruption from British Telecom digging up outside your house than you are likely to see from a six-inch diameter hole two kilometres beneath it. They are going to drill geothermal wells in the centre of Manchester—I live in Manchester—a stone's throw away from Piccadilly train station, so we already drilling in urban areas in the UK. Right now, I think that Andrew is absolutely right: we would not start there, but over time things may change.

Andrew Austin: There is also a history of getting the acquiescence of communities over time. We operate an oilfield in the Gainsborough area, right in the middle of a very densely populated area. The locals are aware of it and many of them are employed by our company as well. This feeds through into Tom's business in terms of local people being involved in the petrochemical industry with jobs being linked to that security of supply close to home, so there is a history of that.

Tom Crotty: Going back to Lord Smith's original question about the areas, he mentioned Scotland. It is just worth saying that while I know this is not an area where Andrew and Francis are directly involved, it is another area where I think there is significant potential. The shale deposit in central Scotland is very old and well known. Our site exists in Grangemouth because back in the 19th century, well before the North Sea work was even thought of, it was processing shale oil from those surface deposits. That deposit, which runs all the way from the coast into and past Glasgow, is another opportunity.

Q79 Lord Rowe-Beddoe: I noted that somebody mentioned the "acquiescence" of the population. Many of the Committee have received communications from the villagers of the Balcombe area. I have no idea as to whether what they say is accurate, but some 82% to 85% of the population are against Cuadrilla's drilling. If that be the case, it would appear that an extraordinary public relations exercise needs to be undertaken. Mr Egan, I understand that you are a small, "specialist" British SME, but surely you understand that if this is half true, or whatever it might be, it needs to be tackled. People need to understand what the scare stories are, if they are scare stories. It needs to be communicated and a major public relations exercise needs to be undertaken, I would suggest.

Francis Egan: You are absolutely right. Just to illustrate the scale of that, I am sure you are aware that most of those protests were against shale-gas fracking. Balcombe is not shale, it was not gas and we were not fracking. That will give you an indication of the challenge. I agree with you that there is a challenge.

Lord Rowe-Beddoe: Well, it is a challenge. Did the water turn green or not? I do not know.

Francis Egan: Again, the water turning green is a wonderful story. It was upstream of where we were drilling and after we had finished. It was investigated by the Environment Agency

and there was no trace of anything to do with drilling. It is most likely dye, I would think, but there you have it. It is a great story.

Lord Rowe-Beddoe: If I were in your position, I would be taking my public relations exercise very seriously and letting the world know what I was doing, why I was doing it and what the implications are both for and against. It would appear from this correspondence that this has not been gone through.

Andrew Austin: I think it is fair to say that all of us are aware that we have an uphill public relations challenge. It is an information challenge. Maybe I can say this in a way in which Cuadrilla cannot, but an open letter was written to a number of newspapers post the activities at Balcombe once Cuadrilla had gone off-site, which actually expressed support from a number of villagers and from the parish council. I cannot remember the percentage—

Francis Egan: Sixty people signed it.

Andrew Austin: It was 60 of the villagers basically saying, in an open letter, that the demonstrations there were not about the activities that were happening. That was a testament to people realising post of that. As a company, we have taken this very much to heart in relation to our next activities, to make sure that we are communicating significantly in advance. We have had a number of public meetings and meetings of our community liaison groups. There have been site visits and a lot of liaison with the local police and the local council to ensure that everybody is fully informed up front as to what we are doing, that we are absolutely open as to what is happening and that any communication gaps, which you rightly identified, are as covered as they can be up front.

Q80 The Chairman: Mr Egan, can I ask you a question on this very point? You say in your written evidence that, “it is also the case that scare stories are not immediately and decisively addressed by the relevant regulatory bodies”—you draw attention to the

regulatory bodies—“who should be able to deal with the misinformation immediately and with credibility”. How would you like to see that done better?

Francis Egan: I would like to see the regulatory bodies, particularly the Environment Agency, play a more active role in the early stages of consultation and communication to reassure members of the community when they are exposed to scare stories. I was at Balcombe, and I had people come to me who had been assured that they would get cancer from our drilling a well. I am pretty sure that when any incidence of cancer in Balcombe is recorded in years to come, there will be zero correlation between any incidence of cancer and the drilling of our well. If I say that, I am seen as having a vested interest, and I understand that, but someone from the Environment Agency could put the facts in front of them. In Lancashire, we are drilling through an aquifer that is 40,000 parts per million salt, but people will still say that we are going to destroy the domestic drinking water supply of Lancashire. It is nonsense but, again, if I say it is nonsense, it does not carry the same credibility, and I am sure that the Environment Agency will say it much more diplomatically than that.

Andrew Austin: I welcome the response from Public Health England this week, which said that there were minimal if any risks from shale gas exploration. That starts to help inform that dialogue.

Tom Crotty: I think there is also some responsibility—duty may be the wrong word—on the part of the potential users also to stand up and be counted, which is one thing that we are trying to do. Energy-intensive users such as us, Tata Steel and companies like that are trying to stand up and say positive things about the value that this will create for the economy and its importance to the ongoing security and survival of energy-intensive industries. We employ almost a quarter of a million people in this country, and I believe that without this sort of development we will no longer be able to do that in 10 or 15 years’

time. We have a duty as well. The Chemical Industries Association has, as one, just published a brief note, *Shale Gas: The Facts*, which is trying to address some of these issues. I think we will see more of that happening downstream of these gentlemen.

Q81 Lord Lipsey: PR is no doubt important, but the most important thing is that you behave in a way that is beyond criticism. I quote from a letter that we have had from a Balcombe resident who does not appear to be any kind of extremist. She asks of your company, Mr Egan, “In what sort of organisation does it take five weeks to release a report on excessive drilling noise, causing weeks of sleepless nights and in the mean time forcing Balcombe residents to do their own monitoring to prove the breaches? The EA was present at a meeting on Sunday 8 September when, finally, Cuadrilla’s independent acoustics expert asked for the drill to be shut down immediately because it was at 51 decibels, not 42. They spent the next 48 hours battling the drill”. What explains that kind of behaviour?

Francis Egan: First of all, I would like to see the data supporting the “weeks of activity”. The incident in question happened over a weekend. The night-time limit is 48 decibels and the day-time limit was 52 decibels. As required at the start of the drilling operation, we had measured and we were in compliance with both. I got a report on a Saturday night that there was a complaint from one of our nearest neighbours. We sent somebody out there to measure it and he asked us to move away from the monitoring point. We moved away and we measured 52 decibels. The difference between 48 and 52 decibels—four decibels—is less than a whisper. If I whisper across the room at you now, that will be a lot more than four decibels. None the less we, not the Environment Agency or the planning department, immediately shut down the operation and it stayed shut down while we put in additional noise reduction measures around the rig. We cannot say this with certainty—it is certainly possible that it was the rig—but at four decibels it is certainly possible that it was other sources of noise. We shut it down and put in the additional monitoring system. We started

up again and measured. It was beneath the limit and stayed beneath the limit. That is a mark of a responsible operator, and I do not know what anybody else would expect us to do. And I dispute the weeks of sleepless nights.

Lord May of Oxford: A responsible operator would not have exceeded the decibel levels in the first place.

Francis Egan: I agree with you, but if it is within four or five decibels it is marginal.

Lord May of Oxford: It is pushing the limits.

Q82 Lord Hollick: You make the point, which I am sure is valid, that communities are going to want an independent assessment of environmental risks—noise risks and all that sort of thing. You clearly engage with the Environment Agency, Public Health England and any other relevant agencies. Have you detected any reluctance on the part of those bodies to become engaged in the debate? Is the fact that they have not become engaged in it early because they have reservations about the accuracy of some of the information? Can you give us a sense of the dialogue that you have had with those agencies?

Francis Egan: I do not detect reluctance. The level of scrutiny that shale gas and onshore drilling have come under in the UK is unprecedented. The Environment Agency has not had to respond in that way before. I do not think that a well has been drilled onshore in the UK before where Sky TV was flying over it 24 hours a day. Two thousand wells have been drilled onshore in the UK, which is all pretty much the same. So I do not think it is a reluctance to become engaged; it is a fact of life that that level of engagement needs to be significantly greater than was probably historically the case. It is taking time to recognise that and to respond to it.

Lord Hollick: When you have made that point to the Environment Agency, what has been its response?

Francis Egan: They are willing to engage. They have attended a town hall meeting at Balcombe and they are proposing to attend meetings that we will hold in Lancashire. The individuals on the ground are very competent. I have a lot of respect for the Environment Agency and the work that they do.

Lord May of Oxford: I have had a bit of a look at the Public Health England report. Public Health England is an executive agency of the Department of Health and provides a nationwide integrated public health service, supporting people to make healthier choices. It gives what is basically a qualified, favourable review, and I am a little surprised that you did not mention it. It also alerts us to some things that need to be very conscientiously observed. It says: “The currently available evidence indicates that the potential risks to public health from exposure to the emissions associated with shale gas extraction are”, relatively, “low if the operations are properly run and regulated”. Then it sets out a bunch of bullet points that it hopes will be fully taken on board. I will just read you three of them and then I would like you to reassure me that, although you did not mention it—I would have mentioned it if I had been you—you are really fully on board with this.

First, it says that “Public Health England needs to continue to work with regulators to ensure that all aspects of shale gas extraction and related activities are properly risk assessed as part of the planning and permitting process”, and, secondly, that “Effective environmental monitoring”, which probably includes decibels, in the vicinity of shale gas extraction sites is needed throughout the lifetime of development, production and post-productions”. Thirdly, there is the thing that could on the whole be reassuring: “Evidence from the USA suggests that the maintenance of well integrity, including post-operations and the appropriate storage and management of fracking fluids and waste, are important factors in controlling risks and appropriate regulatory control is needed”. I would like to be reassured that you are really actively engaged with the regulators in this sense.

Francis Egan: We have engaged our consultant to do environmental impact assessments for all our upcoming operations in Lancashire, where we are proposing to drill, hydraulically fracture and flow-test wells. I hope that if you take the opportunity to review their assessment, you will see an extraordinarily thorough review of all the environmental issues associated with that process. Yes, I can reassure you that we will do that, including the monitoring of emissions. We did baseline monitoring at Balcombe, where the groundwater has high levels of methane in it. That has not polluted the water supply of West Sussex but it is there. We will do the same in Lancashire and we will have ongoing monitoring before, during and after the operations.

Lord May of Oxford: If I were you, I would cultivate a close relationship with the outstandingly good and very stropo woman who is the Chief Medical Officer.

Andrew Austin: May I add to that? This is something that as a country we need to be quite proud of: that we have regulators who are very capable in all the areas you talked about. Prior to planning thorough risk assessments are undertaken, and there is baseline monitoring, as Francis has said, which we have carried out at various sites. Older sites that have been around for 10 or 20 years often have water monitoring boreholes around them, which are regularly monitored by the Environment Agency and us to ensure that there is no contamination going through. Also, the real key to this in dealing with water and questions about aquifers is well integrity. Again, the UK has gold standards throughout the North Sea, which we have adopted for 30 or 40 years and which are the same standards that are applied onshore. So this is not us policing ourselves but a well established regulatory system that is being applied to an established industry, and a new angle on that industry in shale gas is being executed. That should give a degree of confidence that it is not us policing ourselves: rather, that the public can rely on the quality of the regulators.

Baroness Blackstone: Were you surprised by the very high level of scrutiny that you described just now? If so, what do you think the reasons for it are?

Francis Egan: On the first question, the answer is probably yes. The reasons for it are that in that instance it became a touchstone for shale gas fracturing when it was not shale gas or fracturing. If you look at the bare facts, the protests were not against what was actually happening; they were about what people were concerned might happen.

Baroness Blackstone: Do you think that people are misinformed in some way about what might happen, and if so how?

Francis Egan: In some ways, yes. I will give you an example. I have frequently read and heard that we use hundreds of toxic chemicals in our fracturing fluid. We propose to use one chemical, which is non-toxic, in our fracturing fluid. The Environment Agency will review it and approve it, and if it is declared hazardous to groundwater we will not use it.

Baroness Blackstone: Coming back to the PR point that was raised before, have you publicised that?

Francis Egan: Yes. It is on our website. People frequently say to me, “You don't say what is in your fracturing fluid”, and I say, “It's been on our website for the last three years and if you go on to the Environment Agency website, it is on there”. We say that frequently.

Lord Lipsey: You have talked about gas so far. Can you tell us what you think the prospects for tight oil are in this country?

Francis Egan: In the oil industry, tight oil is not necessarily shale. As you probably know, it can be a conventional reservoir. That in fact is what we were drilling for in Balcombe. As I said, it was not shale and not gas. There is oil there. We cannot say without testing the well whether it is likely to be commercial. There are not a lot of data points for it yet, so I cannot really answer other than with that.

Q83 Lord May of Oxford: We had written evidence that told us that the costs were much higher at the start of drilling and hydraulic activity, then fall dramatically over the first few years as the industry develops its knowledge of the local geology and economies of scale. Do you have a view of what the potential cost of developing shale gas in the UK is likely to be?

Andrew Austin: The simple answer is no but I would like to try to add a little context to that. A lot of the cost of developing it is about the rate at which you are able to make it flow. That is the biggest variable in any equation that we are looking at. You rightly point to the cost of the supply chain in the process. Clearly, there is not the same depth of supply chain for onshore oil and gas in the UK as there is in the United States, although there is a supply chain. So it is realistic to expect that the cost of execution here would be of the order of 150% to 200% in the first instance of what it would be in the United States, because of having high levels of environmental monitoring and less depth in the supply chain.

The biggest determinant is actually down to the flow rates. Even with US-typical flow rates and those increased costs, given the way gas prices are in the UK this still has the possibility of being a very economic business for the country. But we need to get past this point of understanding where the flow rates are first before we are able to make any real predictions.

Lord May of Oxford: I have three short follow-ups. First, does that comparison with gas prices still stand up if you allow for what some would regard as the deliberate, semi-criminal overpricing of gas at the moment?

Andrew Austin: I think that we are talking about the wholesale price of gas rather than the price at which it is delivered to households.

Lord May of Oxford: Very good. I should have realised that. In its written evidence, Cuadrilla said that UK production costs will probably be higher than in the US. I wondered whether you agreed and what the reasons were.

Francis Egan: They will certainly be higher at the start but, first, to step back and distinguish again between the exploration and exploitation phases, costs are invariably much higher in the exploration phase. What drives the cost of shale gas development primarily is the wells. As Andrew said, flow rate dictates how many wells you require and the cost of the well is the biggest single input to the overall capital cost of the project. In the exploration phase, you do a lot more analysis with the well. You take many more samples out of the well and you take a lot longer, because you are learning from the well. In the production phase, it is much more of a factory process and you are drilling wells purely to produce, not to learn about the subsurface, because you have by and large learnt those lessons. So typically in the production phase, you would expect at least a 50% reduction over time in the cost of the wells.

People argue about the break-even costs in the US—I have seen various reports—but it is around \$3 per unit. It does not matter what the unit is. For the equivalent wholesale gas price in the UK, it is \$12 to \$14 per unit. If costs were to double, there would still be a significant margin from where we sit today in wholesale gas prices versus the break-even costs in the UK. If costs were to treble, we would be getting closer to break-even prices, but there is certainly scope, as Andrew has said, to develop an industry. But that takes time. You need to get to an economy of scale. At the rate they are drilling in the US, by the time we have finished this conversation they will have drilled half a dozen wells. We are drilling three wells in four years. It takes time to build an economy of scale. That is the key to it.

Andrew Austin: I go back to the point about knowing what those flow rates are. If that flow rate is half the typical rate in the US, the economics are linearly affected.

Tom Crotty: Could I make a slight addition to that? When we are doing these comparisons, we operate extensively in the US, and we are operating on shale gas ethane on our chemical plants. One of the other key differences between the US and the UK is that the UK's gas infrastructure is infinitely better than the gas infrastructure that the US had and even today still has. Once you get to the production point, our ability to capitalise and utilise that gas is significantly better than the US's. People sometimes forget that.

Lord May of Oxford: That is a good point. Lastly, one of the earlier witnesses, Professor Robert Muller, suggested that, in the US, shale gas business and technology are advancing rapidly, which prompts the question: might not these events be applicable here in ways that can reduce your costs?

Francis Egan: Undoubtedly. One of the key things in Lancashire, for example, is the thickness of the shale. In its order of magnitude it is thicker than anything that has certainly been exploited in the US to date. That opens up the possibility of drilling horizontal wells at multiple levels—a little like floors in a building, as I think we said in our written evidence—so the surface impact is significantly less. For one vertical well at the surface, you can have multiple horizontals. That technology is moving ahead and will continue to move ahead. That is just one example. The recycling of flowback water is another example. The use and reduction in chemicals is another. The technology will continue to advance.

Q84 Lord Hollick: I wonder whether we could move from the cost of developing shale gas to what the cost of the gas that is going to be produced is likely to be. In your business plans, you must have made some assumptions, which clearly need to be tested by drilling, about the likely cost of the gas that you will produce and its sale price. You have decided on balance that that looks to be a profitable project. You made the point, Mr Austin, in your *Telegraph* interview that if you can get to a place where shale gas can displace 50% of our import dependency, it will definitely make an impact on gas prices. That is perhaps rather at

the top end of estimates, but I do not know; you might like to tell us. What is your current expectation of the cost of gas that you are going to produce and therefore its impact on pricing throughout the United Kingdom?

Andrew Austin: Unfortunately, I do not have a crystal ball as to where the overall price of commodities will be in three to five years' time, but I can see a direct link, as I said in the article in the *Telegraph* that you referred to, between the materiality of the exploitation of shale gas in the UK and its effect on prices. At the limit, if we have maybe one or two sites and we are unable to go any further than that, then for whatever reason, either flow-rate related or public acceptance-related, clearly it is only going to have a negligible effect on the gas prices that are experienced at a wholesale level across the country. The greater the level that that industry is able to get to to be able to displace imported gas from other places, the more chance it has of having an effect that I would say is positive but negative in the sense of price and the impact on gas markets in the UK. The more certainty that we have about the amount of gas that we have and can deliver within our borders, much as the North Sea gave people the ability and the confidence to invest, the more confidence people will be given to invest. That might seem a long-winded answer, but it is linear to the size of the exploitation. If we can make a material difference, it will start having a material effect, but if there are only one or two sites and people say that gas prices have not gone down as a consequence, it will not, because the bulk of gas will still be coming at the margin in an imported form.

Lord Hollick: Mr Egan, when you make a presentation to your investors, what price of gas do you assume in your model?

Francis Egan: Again, we need to distinguish between the exploration phase and the exploitation phase. Typically in an exploration phase, because you have not yet drilled and, as has already been discussed, you have not established a flow rate for a while, the level of investment is materially less, and frankly the exploration companies are not deciding

exploration programmes on the long-term price of oil or gas; they are deciding in development programmes on the long-term future of oil or gas.

Moving to your question, I have worked in oil and gas all my working life and I have never seen an accurate oil and gas price forecast. You can look back at them. I remember when North Sea oil fell to \$10 and the industry was dead, but it is still going pretty strongly today. All you can do in oil and gas is control your costs. You do not control the price of a commodity. What controls the price of a commodity is supply and demand. You will see, and I think you will have seen in any commodity, that over time it gets more efficient and it drives down costs. That is our job: to do it safely, to do it effectively and to drive down cost. That is how we make money. We will model what the price is now and we will model lower prices than that, because we will want to make money if the price goes down. If the price goes up, the price goes up, but we will control our costs so that we can make money if the price goes down.

Andrew MacKenzie: I absolutely agree with Andrew that it is very difficult to assess what prices are actually going to do. In the simplistic economic argument that more supply is likely to have a downward effect on prices, to some extent—certainly from the large users' point of view—the concern is not so much about absolute price but about the competitiveness of price and the differential between Europe and the UK. In the US at the moment it is clearly very high. You only have to turn the clock back about three years to pre-Fukushima, so not very far. Fukushima changed the global gas demand balance when the UK and the US prices were pretty well correlated with each other because liquefied natural gas was balancing the two markets, and it did not take an awful lot to make that change. That just illustrates that predicting what prices do is tricky.

Q85 Lord Hollick: If the United States decides to export shale gas in substantial quantities, would that alter your enthusiasm to continue to drill and explore in this country?

Francis Egan: To drill and explore? No. By the time that happens in the US, if we have not drilled and explored a few wells we will be doing something else. When it comes to an investment decision for long-term development, shale is not like conventional oil and gas where you decide up front and you invest significant sums of money, potentially billions of pounds or dollars, in a single asset such as the Forties field in the North Sea. Shale is an incremental series of production sites that can carry on for 20, 30 or 40 years, so it involves a series of relatively modest capital investment decisions. It is not as though you come to the start of it and say, "Am I going to do all of this?". You develop it incrementally over time, so in some ways it is an easier investment proposition.

I do not think that, separately, US shale gas exports are going to fundamentally alter the gas price, but if China exploits its shale gas reserves, as it will, that could be interesting.

Lord Hollick: In what way?

Francis Egan: If it successfully exploits what people think is there, that could have a significant downward impact on gas prices.

Tom Crotty: Just on your point, just to bring this into reality, we as a company are in the process of making plans to import US shale-based ethane into Europe as we speak, because we have to. The gas supply that we rely on from the North Sea is now diminished to the extent that we can only run our major petrochemical complex at half rate, so we have to find another way of doing that. We have long-term contracts in the US to bring ethane in. We are having dedicated tankers built to last to do that. It will give you some feel for the price differential that we can do all that and still make a profitable entry into our European plants. We see that very much as a stop gap, because I guarantee that if we go back in 15 years' time to those US suppliers and say, "Can we have some more, please?", the chances are that they will say, "No, sorry, we are using it all ourselves". For us this is a stop-gap way

of maintaining our business competitiveness over the next 15 or 20 years while indigenous supplies are developed.

Q86 Baroness Blackstone: Turning from costs and pricing questions, can you put your hands on your hearts and say that fracking is completely safe? And in answering that question, could you indicate the main risks and how you will manage them?

Francis Egan: If you want me physically to do it, the answer is yes. We would not do it if we did not think it was safe to do it. We live in this country. Our children drink the water in this country. We are not living on a different planet. The risks have been well documented. Water is talked about a lot, and I talked a little about it today. We will use non-hazardous to groundwater fracturing fluid. As Andrew has said, we will construct our wells meeting all the requirements of the UK regulatory system. We will put in an exhaustive seismic monitoring array around each well site and, as we are currently doing, we will have a top-class engineering firm, Arup in this case, complete an environmental impact assessment, and it will tell us—it is not us doing it—if there is something unacceptable there. If there is, irrespective of Cuadrilla, Arup will not put its name to it as part of a planning application. The European Union has asked for environmental impact assessments, but we have already said that we will do it. It is not strictly a legislative requirement, but we are doing it for exploration wells. If there are more requirements, we will meet those.

Andrew Austin: In terms of putting one's hand on one's heart, we already operate a number of wells across the country that have been hydraulically fractured in the past and produce oil and gas from those wells now. We do so in a safe way. Again, I go back to Francis's point about us being here for the long term. We work in the communities, our employees are in those communities, and we live in the same communities. We are not going to do this if we are going to harm the environment, because that is just too short term. As much as anything else, it is just not good business. Added to that, we are dealing with world-class regulators

who can work with us in making sure that it can be done safely. So to answer the question directly, yes, hand on heart, we feel that we can do this safely.

Baroness Blackstone: We had evidence last week from Professor Robert Mair, who said, “The jury is still out on the precise quantities of methane emissions” caused by fracking. Would you like to comment on that, and on what steps you might take to do all this?

Francis Egan: In the US, I think it is recognised that the largest source of methane emissions comes from the practice of water flowing back with the gas being stored in open pits on the well sites. That water contains some methane entrained in it and that is vented off to atmosphere. All the studies relating to methane emissions out of the US will show that that area alone is the largest percentage contributor to methane emissions. That practice will not happen in the UK. In the UK, all the water that flows back is separated in a closed tank system, and the water is tankered off the site and taken to an Environment Agency-approved treatment plant. The exploration phase is flared and the production phase will be transported into a transportation system or will generate electricity, or whatever the usage is. If you take that single step alone, you take the majority of methane emissions out of shale gas.

The other sources are probably no different than they are for conventional gas: typical compressors, seals, pipelines, ditto. A good maintenance programme will address most of those. I do not think that anyone can ever say that you will have zero emissions. I am sure that Transco transporting gas through the network has some emissions. DECC’s chief scientist produced a study that concluded that the emissions in the UK should be less than LNG imports, comparable to conventional pipeline gas, and three or four to five times less than CO₂ from coal. It is possible to manage them, and they are being managed. That is the regulation in the UK; it is quite different. In fact, in the US that practice has by and large stopped now in any event.

Baroness Blackstone: Have you learnt anything else from the US experience that might lead to different practices here in the UK?

Francis Egan: Again, in seismicity—this is probably more the UK’s experience—the degree of monitoring and what is called the traffic light system to control that in the fracturing process is order of magnitude ahead of anything that has been done in the US, or in fact for geothermal projects or any other projects in Europe. That is another example of UK regulation being significantly more stringent.

The Chairman: Mr Crotty, for the sake of the transcript, you have been nodding vigorously through the last two answers. Is there anything you want to add?

Tom Crotty: No. I think we have clamped our hands to our hearts, along with the producers here, in that we have done a lot of analysis on the risks. We run high-hazard operations in the chemical industry, so we are used to analysis of hazards, and we believe that there are no hazards here that cannot be very, very safely managed. That is a key part going forward.

Q87 Lord Skidelsky: In the written submission, PHE concluded that, “The currently available evidence indicates that the potential risks to public health”—from exposure to the emissions—“in the vicinity of shale gas extraction sites are low if shale gas extraction is properly run and regulated”. Presumably the purpose of regulation is to reinforce the hand to the heart to make sure that the organisations are efficiently managed. Do you believe that the necessary regulations are in place to allow you to proceed? If not, what do you believe is needed? In particular, do you think that there is a delay in regulation because of waiting for the European Union to produce its own set of regulations?

Andrew Austin: I do not think there is any immediate delay in waiting for the European Union, because again, as I have said before, there is a long history of successful oil and gas production in this country. That is a dynamic process as well. It is not just stuck in one

moment in time. This picks up on what Lord Hollick was saying a moment ago about the US experience. As technologies evolve and as people can do things in a cleaner way, et cetera et cetera, those get fed back into the regulatory process.

Also, the industry as a whole is looking for best practice, so whether best practice is represented by IGas, Cuadrilla, Centrica, EDF or whoever it may be, that best practice will be fed back into each of those operators because it will be reinforced first by the regulator and secondly by our own licence to operate. There is a virtuous circle in that. In terms of delays, we need to ensure, as was said earlier, that we keep informing the public about the quality of that regulation and that it is seen to be being done, as well as being in place behind the scenes.

Lord Skidelsky: So the purpose of regulation in part is to reassure the public?

Andrew Austin: The purpose of regulation is to reassure the public that the environment is being protected, not just to reassure the public for its own sake.

Lord Skidelsky: The public would not trust the companies to do it themselves?

Andrew Austin: It is better for both the companies and the public that there is someone independently looking at that.

Francis Egan: That is not uncommon for most industries. On regulation, there is effective regulation and there is efficient regulation. You asked about effectiveness. I think it is effective, but I think we have a way to go, certainly in the production phase, to make it efficient. Again, we need to understand the distinction between exploration and production. If it is to be produced, the pace of activity will have to pick up significantly. That includes effective regulation that happens more quickly.

Q88 Baroness Noakes: We talked a little earlier about the experience at Balcombe, where we saw a conjunction between a local set of reactions and a national one based on beliefs about the decarbonisation of electricity. Do you believe that we can get past both

that local and that national opposition so that you can get to a stage where you have sufficient support from both the local community and the national community to allow you to do exploration and then production, or do you think that the level of opposition that you experienced there is going to have a fundamental impact on the way in which you operate?

Francis Egan: We believe that we can or we would not continue to do what we are doing, clearly. Going back to an earlier question, we do not underestimate the scale of the challenge. It is interesting that you mentioned decarbonisation, because that is at the root of a lot of the NGO position and it sometimes gets mixed up with water and seismicity, but when you say, “We can deal with that and we can deal with that”, it comes down a lot to the impact on CO₂. Invariably when you get to that position, the conversation turns to electricity and lights going out, and away you go. Electricity is 20% of our energy demand, and the other 80% is never talked about. What heats our homes? What fuels our businesses? We will be using natural gas in this country for decades to come, so it is really a question of whether we are going to export our CO₂ emissions to Russia and Qatar, or whether we are going to monitor and measure them here.

Baroness Noakes: I understand the arguments. The question is whether you think that you can get this opinion to turn? You clearly cannot operate on the basis that you have that level of opposition every time you try to do a bit of exploration, let alone production, so my question was really about how you get to the other side.

Francis Egan: I am sorry for repeating myself. I would say yes, but we need a lot of support to do that. Again, rehashing some of the earlier conversations, it cannot just be Cuadrilla or IGas saying this, because people say that we have a vested interest, and of course we do; we are explorers and we want to make it a success. So we need regulators, independent academics, customers and communities ultimately to say, “Yes, this can be done”.

Baroness Noakes: Do you think the system of payments that is being proposed for communities will help? Are they at a sufficient level? How do you see this playing out?

Francis Egan: Again, it is early days. We are in the exploration phase, and the industry has said that it will give £100,000 per fractured site, and 1% of production revenues when we get to that phase. The proof of the pudding is also in the eating. We have to find a way of making a material impact in communities, and it is certainly possible to do that.

Andrew Austin: Can I add to that on the community point? Direct community benefits in the form of cash are one of probably four parts of a contribution that an industry can make and should be seen as part of a portfolio of local benefits, not the sole panacea in that mix. Having them as the sole panacea creates the danger that people will feel that you are bribing people in local communities and are saying, "If we pay them enough money, they will allow it to happen in this area". I do not think that is the way we should be going as an industry and as a country, but they are part of it.

Clearly we also need to look at whatever disruption is caused and whatever implications for the local community there are that are directly on the negative side, but there are also significant benefits in jobs locally. The IoD has talked about 74,000 direct jobs across the country. I can look at my own business and talk about the number of apprentices, the length of time that people are typically employed against those assets, and the quality of those jobs. That does change the local communities' attitudes to what is going on.

Another very important area is the indirect jobs and the ability to give other industries the security to invest using that gas infrastructure and the products that are produced. That is also an important part of it.

Fourthly, it is the ability to use local services such as local fabrication and local scaffolders, down to the level of drilling where you have crews staying in local hotels and eating at local burger vans. It is literally at that level. You do see that as a direct impact in that locality, and

over time that will come through. That part of the picture needs to be demonstrated by action. I do not think that this is just about paying money into community funds. That is definitely a part of it, and an important part, but it is part of package.

Tom Crotty: I would just add from the user side that we must not underestimate the impact downstream on jobs in particular. As I said, the energy-intensive industries in this country employ a quarter of a million people, and indirectly that is probably about three-quarters of a million, according to the IoD. Those jobs are currently at risk because of the lack of competitiveness in UK energy markets. Only a week ago, we saw Tata Steel losing 500 jobs, clearly classified as being because of energy problems. BSF closed a chemical factory up in Scotland about two weeks ago and 150 jobs were lost, again because of energy competitiveness. These are real current issues where an improvement in the energy mix in this country will make a substantial difference. Those are difficult issues to explain to people, and they take a long time to explain, but there are real none the less.

Q89 Lord Rowe-Beddoe: Before I deal with the question that I am about to deal with, I would like to take you back for one moment to the set of questions that Lord Hollick raised about price. In your written statement for INEOS, Mr Crotty and Mr MacKenzie, you say something that is the statement of the obvious, I suppose, in current circumstances: “Energy prices in the UK are already uncompetitive and this is set to worsen drastically”. Could you in one line tell us why?

Tom Crotty: Either of us can answer that. Fundamentally, we have to sell our products globally. Today, the cost of energy in the UK is three times that in the US and three times that in the Middle East. They are our two major competitors for the manufacture of petrochemicals.

Lord Rowe-Beddoe: And the reasons why they are so uncompetitive, you venture?

Tom Crotty: There is a clear supply/demand issue with gas in particular. That is what has transformed the US energy markets, and clearly that is why Middle East energy costs are so much lower.

Lord Rowe-Beddoe: Thank you. Sorry to make you go back, but I just wanted to flesh that out. Professor Stevens wrote to the Committee in evidence that, “The state of the service industry in the UK to undertake onshore shale operations is very weak with few drilling rigs and even fewer units that can hydraulically fracture”. He states that in the United States in one particular shale play in 2008 there were 199 rigs, and that in 2010 there were apparently only 34 rigs in the whole of western Europe. The question, therefore, is: do we have a satisfactory supply chain that is ready, willing and able to deal with hopefully the success of your drilling operations?

Francis Egan: No, because supply chains do not hang around waiting for wells that may or may not be drilled. We have sufficient capacity to drill the wells that we need for the exploration phase, and if that phase is successful the capacity will arrive. The North Sea is a classic example of that. There was no capacity in Aberdeen, as you are well aware, when North Sea oil and gas started. If there is a market, people will supply it. It takes 18 months or so to build a rig. It is not that technically complicated; this is not the deep-water Gulf of Mexico that we are talking about here.

Baroness Noakes: So what will the lead times be to get the supply industry ready to supply you with what you need for the development phase?

Francis Egan: It will depend on what pace that grows at, because as I said it will get developed side by side. So you will start with a handful of sites, maybe just two production sites, and then you will increment. What drives the pace of growth is the number of rigs, which is exactly the stat that you just quoted. We have said that at peak you could have

somewhere between 10 and 20 rigs operating just in Lancashire. You could get 10 rigs in one fell swoop, but that is unlikely. You will probably increment two, four, eight, 10.

Andrew Austin: Maybe to answer what is at the bottom of the question whether this is going to be an impediment to the growth of the industry, I would echo what Francis has said: that we can get through the phase of the appraisal phase with the existing supply chain but that through that process we need techniques and technology that are usually held in people's heads and on laptops that can fly around the world. Going back to the comment earlier on about the speed at which things have happened in the United States and the speed at which new shale plays have opened up, the half life associated with opening those up has shortened significantly. Over time people have learnt techniques, which is why Francis said earlier on that maybe 10 or 15 rigs in Lancashire will give us enough information to know whether this is material. If you go back to Barnett, you would have been looking at maybe 100 wells before you had the same level of information, so it has moved forward. We can get through that stage. In conversations that I and I am sure others have had into the development stage, the service companies are ready to provide that kit and those people. They need to know that they have a market. So I do not think that this Committee should look at that as being an impediment. It is clearly something that we have to go through, but if we can give them the confidence from early results we will get the supply chain to follow. They will want to be based locally and close to where the operations are. That gives rise to the opportunity to create a new onshore version of Aberdeen somewhere in the UK, probably in the north-west, which is a centre of excellence. The UK is at the forefront of that for Europe, given that at the moment it is probably the most attractive place to look at for shale gas exploitation.

Francis Egan: That is the bigger prize, because there will be no multiple service centres if this takes off in every country in Europe. There will be a first-mover advantage.

Lord Rowe-Beedoe: So clearly this is not a concern.

Andrew Austin: It is an opportunity.

Francis Egan: Yes, it is exactly that.

Tom Crotty: I would like to underpin this first-mover advantage for the UK. Again, being selfish and talking about the chemical industry for a moment, the reason why this is so important for us is that among the large petrochemical units—the crackers that make basic petrochemicals—of which there are about 40 in Europe, only four are actually gas-based. The rest are oil-based and two of those four are in the UK, so our opportunity to exploit this is infinitely better than that of any other part of Europe. The other two are, logically, on the other side of the North Sea in Sweden and Norway. That is another reason for pressing ahead.

Q90 Lord Lawson of Blaby: As a Committee, we are obviously interested in the economics of the production of gas and, to a lesser extent, oil from shale. Clearly, looking at the United States, there is a presumption that there might be a huge economic benefit from this, not least in getting cheaper gas than would otherwise be the case. Of course it is only a presumption and, as you have pointed out, until the exploration can really get under way, one will not know whether that presumption is a reality. It seems to me that not much more can be said at this point about the economics.

However, we in the Committee are also interested in public policy, so I ask all of you: is there anything in public policy that you would like to see done that is not being done, or not done that is being done? When I talk about public policy, it is in particular about the Environment Agency—the speed at which it operates, and so on—and the Government.

Andrew Austin: I think we have seen from the Government a sterling attempt, under the establishment of the Office of Unconventional Gas and Oil, to get different parts of government joined up. We have actually seen that very practically in meetings where we

have all variously been present. When you go into a meeting to talk about taxation policy, you will have representatives from DCLG, DECC, the Environment Agency et cetera in the room, and vice versa when you are talking about other issues. What the Government have done in that sense has been very positive.

We would like to ensure that we can get a streamlined, fit for purpose regulation regime with the Environment Agency in particular. At the moment, different pieces of policy that were constructed for other uses are being applied there but in some cases slightly outside their original remit. I am not asking for a short-cut environmental consultation situation at all. It is absolutely imperative that a high level of consultation is engaged in with every stakeholder involved. If we do not do that, and efficiently, we will lose the social licence to operate that I spoke about earlier. We need clarity in the policies and rules that we are going towards, and applicability in those—taking into regard everything that has happened in the historical best practice of the industry, et cetera—rather than trying to find other regulations that we can apply in some way to an industry that is here.

Lord Lawson of Blaby: Would Mr Egan or anybody else like to add anything to what you have said?

Francis Egan: I have already commented on having effective but efficient regulation. If we are to move into a production phase—and you are quite right that the exploration needs to be done and the answers bought forward from that—it will require a step change in the pace and scale of operation. That needs to be prepared for.

My perception of the general policy is that we spend a lot of time talking about electricity, which is vital, but as I say it is 20% of our energy supply and we need to think about the other 80% as well.

Lord Lawson of Blaby: I do not know whether anybody else wants to add anything, but I am still slightly puzzled, because what you spend your time talking about is, to a considerable

extent, up to you. Consultation with the local population is largely up to you. I know that you are walking on eggshells and do not want to upset Ministers and apparatchiks of one kind or another, but it is important for the Committee to know whether there anything which you think the Government or the Environment Agency could be doing better than they are at present.

Andrew Austin: Giving absolute clarity about the nature of the rules that we are expected to work with and the way in which they are applied.

Lord Lawson of Blaby: Is it not clear at the moment?

Andrew Austin: There are points when you feel that you have overcome certain barriers in dealing with things, but then other obstacles are put in your way, with further levels of disclosure, requirements or legislation. Legislation fit for this purpose would really help, as would giving local councils clarity, for instance, when they are looking at the planning process and the things they need to be involved in and the things for which other competent authorities are assuming those responsibilities on their behalf. For instance, does a local council need to understand the entire fracking process and its implication for local groundwater? No. A resolute answer has been laid out by the DCLG in planning guidelines, which say that the competent authority to deal with the integrity of aquifers and well integrity is the Environment Agency. That kind of clarity makes our job easier when taking things forward. That is absolutely not about appealing for a short cut in consultation; it is about making sure that we are clear about which regulations we are and are not working with.

Francis Egan: The other thing to make clear again is this distinction between exploration and production. Most of what we are asked to respond to is about production: how many jobs, how much water, what level of emissions and, depending on who you are talking to, how many thousands or millions of wells. What we really want to do, as I said at the start, is

to drill half a dozen or 10 wells. There needs to be a refocusing. Let us drill that half a dozen or 10 wells and assess the risks associated with those.

Lord Lawson of Blaby: What is stopping you?

Francis Egan: As I said, we could start drilling tomorrow. Primarily, we need to get the planning approvals and the environmental permits to do that. Some of the questions that come out of that process are not strictly related to drilling 10 wells but 4,000 wells.

Lord Lawson of Blaby: So where you would like to see better performance in having greater clarity and common sense, and all that? Is it from the Environment Agency, the Government or both?

Francis Egan: I think the sense of focus on having 10 or 12 wells versus questions on having 4,000 is across the piece.

Q91 Lord Lawson of Blaby: One last point, unless anybody else wants to add anything. Earlier on, Mr Egan, you suggested that people who object are objecting on the basis of claims that are manifestly false, but that if you say this nobody believes you. Were you suggesting, therefore, that some impartial authority that does not have a financial interest, such as the Environment Agency or some direct form of government, should be informing the public of the facts and the truth, because they do not believe you? Is that what you would like to see?

Francis Egan: Yes, that would be beneficial.

Tom Crotty: Just to reinforce that point and maybe to loop back to your earlier question, Lord Lawson, I personally believe that there is an enhanced role for government in getting the imperative explained in the public domain. I do not yet believe that there is any understanding in this country of the crisis that we are facing in energy supply. That is something that the Government need to expand on more clearly and consistently because people should understand how critical it is, particularly from where we are sitting in the

energy-intensive sectors. We will not have energy-intensive industries in this country 20 years from now unless we do something about it, and that is not coming across clearly enough.

The Chairman: I would like to hear you say more about the risks of not going ahead and the scale of the benefits that you see in moving beyond the exploration phase and looking further ahead.

Tom Crotty: One good way to start on that is to look at what has happened in the United States in just the last four years. There has been no new investment in the petrochemical industry in the United States for 25 years. There are now 11 major facilities under construction and another seven in the planning phase, and by major facilities I am talking about individual spends of between \$500 million and \$1 billion. That transformation in the industry has been brought about by the development of shale gas. There is both an opportunity for us to look at and copy that and a huge threat if we fail. I guarantee that the outcome for the UK chemical industry, and indeed the European chemical industry, will be that we will be supplied by imported materials 20 years from now, if we do not do anything about this—

Francis Egan: That is a threat.

Tom Crotty: —and the result is that it will have a massively negative impact not only on our economic performance but on our environmental performance, which makes no sense to me.

Francis Egan: I have heard it said that we can satisfy our energy needs from renewables and energy efficiency. Maybe we can, but that is not going to happen quickly. I keep going back to this: if we could do that in electricity alone, that would be a huge and probably welcome step. Electricity is 20% of our energy demand but 40% of our energy demand is heating, almost all of which is supplied by gas. We will import all our gas. That will be the inevitable

outcome of this, and we will lose billions of dollars of tax revenue and pay the security prices associated with that. The opportunity is to explore and drill a dozen wells. If it is not there, it is not there, but will we just walk away from it?

Andrew Austin: That is the point. The country deserves to find out whether this can make the difference. It goes through to really old-fashioned things such as the balance of payments, in terms of the energy-intensive users and the effect of having to import bulk chemicals, oil and gas. It is much better if we can do that for ourselves.

Q92 Lord Hollick: Following on from Lord Lawson's question, you have put forward a number of issues—some fundamental to the strength of the UK economy—that clearly need to be taken into account. Do you think that the Government and the relevant Ministers are sufficiently engaged in the process of, first, informing the public about all the issues and, secondly, helping to bring the debate to a conclusion?

Tom Crotty: No. I believe that there is no consistency on that yet, either across government or time. This message needs to be repeated consistently and over time, which is currently still lacking. We are getting it in parts but not totally.

Lord Hollick: So there are mixed messages?

Tom Crotty: I believe there are still mixed messages, yes.

Lord Skidelsky: Could you just say a word about the job creation potential of fracking? The IEA suggests that the production phase of shale gas could support 74,000 jobs. AMEC's prediction was that 15,900 to 24,300 jobs would be created at peak construction. Is that the difference that you were talking about earlier, Mr Egan, between the construction and production phases? Is there a discrepancy or not, and if there is, why?

Francis Egan: I was smiling at the fact that they got it down to 300. Perhaps the forecasting ability on jobs is better than that on oil and gas prices. To forecast it at that level is quite something. I have seen 25,000 through to 100,000, and the IoD was at 74,000. It will depend

pretty much on how many rigs are operating in the country and how many sites are running in parallel. I would not attempt to put it even at 1,000, let alone 3,000, but it will be tens of thousands of jobs. It certainly has that potential if it can be developed at the scale that we believe it could be if the exploration phase is successful.

The second thing I would say about this is that when we say this we often hear it said that this is going to destroy jobs and renewables. It is as though people cannot have two energy industries alive at the same time. I just do not understand that at all. Why cannot we have both?

Q93 Lord McFall of Alcluith: Can I get back to the issue of the message? I think you have set yourselves a very high barrier here. For example, in the INEOS submission you talk about “£100,000 to the community” and other benefits that could include “new jobs, local economic growth, revenues for the community, and lower energy bills”. There does not seem to be any clarity in that. If I was looking at that, I would be quite concerned. Andrew, you made the point earlier that you need local acceptance and that an inability to manage that would rule out going ahead. That is a big barrier in itself.

I noticed from the clippings, Andrew, that your favourite film is “Local Hero”, which is about oil and gas exploration in the west coast of Scotland. Burt Lancaster, aka Felix Happer, goes there but concerns himself more with looking at the northern lights than with his oil company, so I suppose you will differ in that respect. The local community there was for it because there was big money in it, but Fulton Mackay’s old man put an oyster in it by saying, “Wait a minute, who will look after the beach when you go away?”. There is the issue, if you use this as a metaphor today, of who will look after the beach. I am interested in what you are going to do in the terms of that message. For example, do you have any idea what should be done with the £100,000 that you are giving at the moment if the well has been drilled? I have experience of this in my past representative life. If you give that money, who is it going

to be handed to? Who is going to monitor it? What influence do you or your proxy have over that? If there is no strategic view on that, and if there is no clarity, this could end up a mess.

Andrew Austin: Okay. Starting with “Local Hero”, it was the soundtrack as much anything else which I appreciated in that movie. The points that are made are important. Actually, there is a read across in that the local community could see the benefit in jobs, local fabrication and local services coming through, but with that came a degree of environmental responsibility, as you rightly pointed out.

Lord McFall of Alcluith: What I am saying is that the points that you are making at the moment are hypothetical, and I want to put some flesh on them.

Andrew Austin: The basis of what we do every day as a business is not hypothetical. We operate over 100 sites across the country right now. Where we produce oil and gas we deal with the Environment Agency and we produce water, which we reinject. There is a whole business going on out there right now.

Lord McFall of Alcluith: Yes, but you are giving £100,000 to communities. That is a big thing.

Andrew Austin: We have been running a community fund for a series of years through which we put money back into the local community, and that is independently matched. As an industry we have talked about formalising a number of informal schemes which a number of individual operators have had in the past. We have an independently managed fund which we put an amount of money into each year. That fund is made up of local parish councillors in areas where we have operations and they determine, on the basis of bids received from local community projects that are scored against their local content, their applicability to the people immediately around sites and their ability to add to the value of other grant money that is coming in to make things happen. They are typically things like education projects,

play areas, speeding schemes, defibrillators in village halls across Lincolnshire, a community swimming pool, heating projects—that kind of project. There is some real experience in doing that. There is also a lot of experience in restoring the environment. Going back to your point about who is going to look after the beach post us, we have a responsibility to return that land to where it was when we have finished our operation, and we do. There are remediation schemes in place at the point of permitting that we are monitored on through that process.

Lord McFall of Alcluith: Francis, do you have any points?

Francis Egan: Just to reinforce that point, the model that we envisage is a locally run community benefit, be it by members of the parish council or other members of the community, and they will decide how that £100,000 will be allocated, not Cuadrilla, IGas or another company. We are working with experts in that field—I will not say more because it is a work in progress—to help us to structure that. That is the model that we envisage for how that will be spent. The community itself will dictate.

Andrew Austin: We were already on board with that: that that has to be seen to be independent of our activities.

Lord McFall of Alcluith: Does INEOS want to add anything?

Tom Crotty: Not really. We have said from day one that it is very important that there is a methodology that allows benefits to be channelled back into these communities. If I was in the community, I would expect to see that. That is what I put on the plate.

Q94 Lord McFall of Alcluith: On the issue of the tax regime, the Government launched their consultation document in July this year, and the paper outlines a proposal for a pad allowance that will reduce the tax in a portion of the companies' production income from 62% to 30% at current rates. Do you believe that shale gas business in the UK requires a distinct tax regime to stimulate activity?

Francis Egan: I believe that it does require a regime that reflects the staged development that I talked about earlier. The pad allowance is actually not that distinct. It is modelled on the small-field allowance that exists and has existed for some time in the North Sea and has been applied to the west Shetlands and other new frontiers where typically the development costs up front are very high. Yes, it has been described as a tax subsidy but it is not a tax subsidy. Not a penny of the exploration funds comes from the Government. The companies take all the exploration risk. It is a sliding scale from 30% through to 62%, and that reflects the fact that at the start, as we discussed earlier, the economies of scale just are not there and those early pads will probably be economically quite challenged.

Lord McFall of Alcluith: So do you think there is further work for the Government to do on the tax regime?

Francis Egan: They are doing it. A consultation is under way.

Lord McFall of Alcluith: But are you happy with the progress the Government are making on that?

Francis Egan: Yes.

The Chairman: I think you are all nodding in agreement.

Tom Crotty: Absolutely, and one of the benefits of the fact that the Government have responded on this goes back to what we were saying earlier on: that it is a public statement of commitment to the development of this industry, which I think is very important.

Q95 The Chairman: One last question. Do you think that shale gas can stimulate additional industrial development to utilise the gas locally, as has occurred in the United States?

Tom Crotty: I believe so, yes. We are, by dint of history, fortunate in that our major chemical operations happen to be in the Firth of Forth and in the north-west of England and so are sitting more or less on top of the two major deposit areas. So we would be hopeful

that you could get quite of local downstream growth as a result of that, which would lead to further downstream investment.

Francis Egan: Wood Group in Aberdeen started off as a small naval fishing company, and now it is one of the largest service companies not just in the UK but globally. There is no reason why that cannot be replicated in shale, for Europe at least.

The Chairman: Mr Crotty, I understand that the Scottish Government have proposed a restrictive planning process, which has been presented as severely limiting the likelihood of shale gas exploration or production in Scotland, not least in Grangemouth. Have you something to say on that?

Tom Crotty: It is something that we are talking to the Scottish Government about. We do not believe that it is helpful for future growth.

The Chairman: Gentlemen, have you any final comments that you would like to make? No. Then can I thank you all very much indeed for coming and for giving such clear answers? Thank you very much indeed.