

1                    THE HEARING RESUMED, AS FOLLOWS, AFTER THE SHORT  
2                    ADJOURNMENT

3  
4                    ...an evaluation that says that the technical potential  
5                    of offshore wind is seven times greater than the total      14:20  
6                    EU energy demand. So there is no question that the  
7                    resource is there.

8  
9                    If we look at the current status. The UK has the most  
10                   offshore wind capacity installed. Ireland is, Arklow      14:20  
11                   Banks down here, 25.2%. But this is how it looks now.  
12                   We have one and a half ketowatt installed offshore out  
13                   of a total of 65 ketowatts in the European Union.

14  
15                   In 2008 we installed 366 megawatts. They year we      14:24  
16                   expect 420 megawatts to be installed and that would  
17                   take the total install capacity passed 2,000 megawatts.

18  
19                   2010 is going to be a very interesting year for  
20                   offshore. We expect annual installations for the first      14:25  
21                   time to exceed 1,000 megawatts. If you look at what  
22                   the 2008 market was, it was eight and a half gigawatts.  
23                   I can't tell you what the market is going to be in 2010  
24                   for onshore. The offshores have actually a bit more  
25                   certain forecast than the onshore markets. If it is at      14:26  
26                   the same level then we are actually above 10% of the  
27                   market in terms of capacity in the offshore sector. Of  
28                   course in terms of investments, this would be  
29                   significantly higher, maybe somewhere between 15 and

1 20%.

2  
3 We expect annual investments around €2.5b for the  
4 market in Europe for offshore technology. Around €2.5b  
5 in 2010. 14:27

6  
7 2020 we expect annual installations to approach 7  
8 gigawatts. As I said, 2020, our target for offshore is  
9 40 gigawatts. So we expect 40 gigawatts to be up and  
10 running in the European Union. That's quite 14:28

11 conservative compared to what both some governments  
12 have announced, but also other analysts. We like to be  
13 conservative but we try to make a calculation on those  
14 40 gigawatts. What's actually required to reach that.

15 We went back and looked at when was the on shore market 14:29  
16 in Europe at the same level as the offshore market  
17 today and we found the year 1992. Then we took and  
18 calculated what was the average growth rate per year in  
19 that 12 year period from 1992 to 2004 and the average  
20 growth rate on the onshore market in that 12 year 14:29

21 period was 32%. If we are going to meet the 40  
22 gigawatts we are saying for offshore, we need an annual  
23 growth rate of 28%. So of course we can do it, we can  
24 repeat offshore what we have done onshore, true, it's  
25 more challenging, but we are also 15 years ahead in 14:30  
26 terms of technology, development and knowledge. So of  
27 course that can be done. It is really a question about  
28 putting the right frameworks into place.

29

1 As I said, 100 gigawatts, at least in September there  
2 were 100 gigawatts of projects identified, proposals at  
3 various stages of planning and they are all identified  
4 in this. There is a very big map accompanying this  
5 report and all the projects there are identified in 14:31  
6 that report. Our target is 40 gigawatts so what we are  
7 saying is that either not all these are going to be  
8 built, or some of these are going to be built, or a  
9 majority of these are going to be built on the other  
10 side of 2020. If they are built, when they are built, 14:34  
11 it would meet 10% of Europe's electricity. Since that  
12 100 gigawatt figure was arrived at, through research,  
13 it has actually grown to, I think now it is at 120  
14 gigawatt. There is an enormous interest from investors  
15 in this offshore technology. 14:35

16  
17 The report also shows you detailed maps of each country  
18 and each region in terms of what is on-line. I'm  
19 taking here the Irish one, 25.2 megawatt. There is an  
20 identified pipeline of 3,755 megawatts at some stage of 14:35  
21 development in Ireland. If we take the region that  
22 Ireland belongs to, the North Sea, the Channel, and the  
23 Irish Sea, we have just above 1,000 megawatts installed  
24 already. 3,000 megawatts of offshore is under  
25 construction. There is a pipeline, in addition to 14:37  
26 that, at various stages of development which takes the  
27 total to 64 gigawatts and then, if you add Round 3, you  
28 have a total regional breakdown for this area of 90  
29 gigawatts of offshore projects at some stage of

1 development. Meaning that investors have shown their  
2 interest in it, or that areas have been identified and  
3 permits have been obtained.

4  
5 Of course we need grids. what we did was, looking at 14:38  
6 how can we accommodate this offshore expansion, and  
7 there is no need to reinvent the wheel, so what we  
8 looked at was existing transmission system operator  
9 plans. we also, in a project from last year, called  
10 "Trade wind" where we did simulations on electricity 14:38  
11 flows, looked at where would we need strengthening of  
12 the grids, where would we need bigger interconnectors.  
13 As you can see in the report, there is a step by step  
14 timeline in this grid development plan. They are also  
15 suggestions for how big these interconnectors should 14:39  
16 be. Most importantly, these grid plans are integrated  
17 with the developments. so all those hundred plus  
18 gigawatts of projects were identified first. Then we  
19 looked at all the transmission system operator plans  
20 and looked at which interconnectors here would actually 14:40  
21 help us build a grid that can support those areas where  
22 those 100 gigawatts of offshore projects have been  
23 identified. That gives us this 20 year offshore  
24 network development plan. The light blue areas, the  
25 colour is not very good on this, it is better in the 14:42  
26 report, but these light blue areas are all the areas in  
27 this region. There are also areas in the Mediterranean  
28 where projects have been developed. You see the Round  
29 3 projects out here. So this is where we, with some

1 confidence, can say that the future offshore wind farms  
2 are going to be built. Of course we need to take that  
3 into consideration when we try to figure out which of  
4 the TSO's planned infrastructure projects we should  
5 build.

14:44

6  
7 These red lines here basically show the existing  
8 infrastructure. This is what is currently up and  
9 running and this one is very interesting. It is called  
10 "Nor Net" and it was finished a year or two ago. I was 14:44  
11 in Norway last Thursday and I talked to the Statnet who  
12 vested in this, and basically the pay off time on this  
13 interconnector is four to five years for an  
14 interconnector that will last 40, 50, 60 years. I  
15 don't think you can find a stronger investment. They 14:45  
16 are also very interested in building a second  
17 interconnector here. This is really the conundrum.  
18 Why on earth, if you can get a pay back time on an  
19 interconnector of four to five years, why on earth  
20 aren't we building more? There are all kinds of 14:46  
21 reasons for that and some of the elements were also  
22 addressed by the Commissioner earlier.

23  
24 The yellow ones are planned offshore grids that are  
25 highly likely to go ahead. As you see here, we have 14:46  
26 the interconnector to Wales in that category.

27  
28 We have then taken some additional infrastructure  
29 lines. These are basically taken from that Trade Wind

1 study, which was a study of power flows to see which of  
2 the TSO's existing plans we should go ahead with. Then  
3 we added three grids, which are basically connected to  
4 three different markets. The project that is most  
5 advanced in that term is this (inaudible). It is 14:47  
6 basically an area where you have a Danish wind farm.  
7 It is where the Danish, the Swedish and the German  
8 waters meet. There is an offshore wind farm proposed  
9 in each of those areas. They are very close to each  
10 other and initially they just wanted to build a grid in 14:53  
11 from the German offshore farm to Germany from the  
12 Danish to Denmark and from the Swedish to Sweden. Of  
13 course that makes little sense from an internal market  
14 perspective. So it was proposed to link up these  
15 things and now those three countries are actually quite 14:53  
16 advanced in the process of finding a solution on how we  
17 can link up those three countries, both in terms of  
18 infrastructure and also to ensure that since we are  
19 building this grid anyway and it is going in more or  
20 less the same place. It is easier to draw lines on a 14:54  
21 map than to actually get this done. There is a lot of  
22 work going into that. What we are basically proposing,  
23 and this is also based on existing TSO plans, is to add  
24 two similar structures out here in the North Sea.

25 14:54  
26 This is how it looks out to 2020. Can you see we do  
27 some grids around Ireland connecting the UK and Ireland  
28 and also the continent here. The first stages of  
29 trying to connect to the large hydro reserves in

1 Norway, which really should be treated as the battery  
2 for wind energy in Europe. Of course that is why we  
3 need strong interconnectors from Norway. This is how  
4 we see it for 2020. For 2030 we, at a few more lines,  
5 one of them being a line from Ireland to France. 14:57  
6 That's how we see the grid developing. Again, these  
7 plans are developed, apart from the orange ones here.  
8 These are based on existing transmission system  
9 operator plans. Some of them are very advanced. Some  
10 of them are still lying in shells. Basically what we 14:58  
11 have done here is to look at which of all those plans  
12 would actually be able to accommodate the amount of  
13 offshore wind we are going to put into the grid in the  
14 future.  
15 14:58  
16 What is extremely important here, of course, is that it  
17 is not only about linking up the wind farm, so you have  
18 the areas here and we have a grid, etc., it is also  
19 about creating this internal electricity market. We  
20 have an inherent interest in developing the internal 15:02  
21 electricity market. As the Commissioner said, fuel  
22 prices are probably not going to go down in the future.  
23 The other element of that is that from 2013, as a  
24 result of the climate and energy package, the emissions  
25 part of it, if you want to emit CO<sub>2</sub> in 2013 you will 15:03  
26 have to pay for each tonne of it. So from 2013 you  
27 will have to pay for emitting CO<sub>2</sub>, starting with the  
28 first tonne, and you of course have to pay for your  
29 fuel if you don't use a no fuel option. Unless this

1 internal electricity market starts functioning much  
2 better than it does today, the risk of that exposure,  
3 basically we are exposed to the fuel price risk and the  
4 carbon price risk from 2013 and if the markets are not  
5 functioning, those risks are going to be borne by the 15:04  
6 consumer rather than the investor. We need to ensure  
7 that the people who are investing in new power  
8 generating capacity are exposed to carbon price risk  
9 and fuel price risk and starts competing on that basis.  
10 If the market doesn't work, that risk will be passed on 15:05  
11 to the consumer. If the market works, investors will  
12 be exposed to those risks and that will be an enormous  
13 competitive advantage for wind energy. Just for the  
14 sake of argument, say that in 2013 we are more  
15 expensive than coal and gas, we are all more or less 15:05  
16 within the same range, depending on wind energy sites  
17 and the price of gas, but let's just for the sake of  
18 argument say that wind is marginally more expensive,  
19 even then it would make sense to have that in your  
20 portfolio if you are a power company, or in your 15:06  
21 portfolio if you are a country because it is a hedge  
22 against future fuel and carbon price risk. It is like  
23 taking up an insurance. There is no fuel price, there  
24 is no carbon price from the day you install the wind  
25 farm. This is really the economic argument for wind 15:06  
26 energy, on a strict economic term is that this is a  
27 hedge against fuel and carbon costs. Unless the  
28 internal market works, we are not going to benefit from  
29 that competitive advantage vis-à-vis other

1 technologies. That's why these grids are incredibly  
2 important, also from an internal market perspective.  
3 It is not only about making sure we can get Ireland to  
4 produce cheap electricity for the rest of Europe,  
5 that's great for the rest of Europe and it is good for 15:07  
6 the consumer because we produce it as cheaply as  
7 possible because the Irish wind resource is fantastic,  
8 but it is also about the future competitive position of  
9 wind energy vis-à-vis the others. And for that to  
10 happen we need the internal market. We need investors 15:07  
11 to be exposed to carbon and fuel price risk.

12  
13 Supply chain - I'm going to skip over this fairly fast,  
14 but this is incredibly important. A very large part of  
15 this report is devoted to the supply chain. Basically 15:08  
16 we need to reach those 40 gigawatts. We need to  
17 install and operate 10,000 wind turbines and  
18 substructures, and all kinds of other things by 2020.  
19 That means we need to build an offshore wind turbine or  
20 three to four offshore wind turbines for every working 15:09  
21 day. That sounds like an awful lot, also, given the  
22 current level of development. For comparison we have,  
23 over the last, in 2008 we built, I think it's 13 or 14  
24 wind turbines per working day in the European Union.  
25 What we need, on average, is three to four offshore 15:10  
26 turbines per working day. One fourth of what we do  
27 currently onshore to get those 10,000 turbines. Of  
28 course we need to create a completely new industry  
29 here. It is not only about the wind turbines. It is

1 also about operations and maintenance. Vessels is  
2 incredibly important too. I talked to a developer of a  
3 ship and he said it costs €250m to develop the first  
4 ship. He needs to rent that ship out for five years  
5 before he starts actually building it. That's of 15:11  
6 course an enormous investment for a company. That does  
7 put some strains on the supply chain.

8  
9 The other element of this is harbour facilities. If  
10 you go Esbjerg or Bremerhaven and look at what they are 15:11  
11 developing in terms of harbour facilities for becoming  
12 centres for the future offshore sector, it's enormous  
13 and it's enormous areas that are needed. Also, on the  
14 east coast of the UK. But we need these harbour  
15 facilities and we need all that other supply chain to 15:20  
16 be in place and the people who move the countries and  
17 the regions that move first are going to get the  
18 benefits. It's no different from when the Danish  
19 manufacturers started with a head start in California  
20 in 1980. 15:21

21  
22 That's the last slide. It's just to tell you that  
23 every European citizen pays €700 for its energy  
24 imports. This was in 2008, or maybe it was 2007.  
25 €700. As I started by saying the European Union, as a 15:21  
26 whole, is importing 54% of its energy, I believe  
27 Ireland is 80%, higher, anyway this figure for Ireland  
28 is probably well above €1,000 for each citizen. If  
29 there are 100 people in here you can do the math

1 yourself. This is what was sent abroad, every one of  
2 us, to fuel exporting nations. Of course what Ireland  
3 needs to decide is that are we going to continue doing  
4 this and probably with a higher figure here because the  
5 fuel prices are likely to go up, or are we going to try 15:23  
6 and reduce this and spend the money and put the money  
7 that we save to work in the Irish economy? I'm quite  
8 sure it is clear from my presentation what I think is  
9 the smartest thing to do. There is really no  
10 alternative. If we don't do something at home, this 15:23  
11 figure is just going to keep rising and it is going to  
12 be much bigger for our children and our grandchildren.

13  
14 Thank you very much for inviting me. Thank you very  
15 much for listening. 15:23

16  
17 **END OF PRESENTATION BY MR. CHRISTIAN KJAER**

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19  
20 **COMMISSIONER PIEBALGS:** Thank you, Christian, for a 15:25  
21 very, I would say,  
22 passionate presentation. It is bringing home the  
23 message that we need to take action and we need to take  
24 action quite quickly.

25 15:26  
26 Our final speaker of the day is Ian Marchant, CEO of  
27 Scottish and Southern Energy. Ian is going to talk  
28 about how do we go from a pipeline of projects to  
29 actually producing the power. Ian, the stage is yours.