Centre for European Reform (CER)—Written evidence

1. Energy is central to climate change mitigation. Over three quarters of the EU-27's greenhouse gas emissions come from the production and use of energy. Energy is also central to the economy, fuelling industry and providing substantial employment.

2. There is a need for substantial investment in modernising and upgrading energy infrastructure. In the UK alone, the government estimates that around £200 billion of investment will be required for energy infrastructure by 2002. There is also the import cost of energy. The European Union's energy import bill in 2010 was €355 billion.

3. Low-carbon energy may eventually become cheaper than high-carbon energy (particularly when indirect costs and energy security factors are taken into account). But it is currently more expensive. So there is potential conflict between the need for decarbonisation and the need for economic growth and improved competitiveness.

4. However, there are solutions to this potential conflict:

   - much greater efficiency in both energy use and energy supply;
   - expansion of renewable energy;
   - expansion of nuclear and demonstration of carbon capture and storage (CCS) as necessary low-carbon bridge technologies;
   - overhaul of the Emissions Trading System (ETS) to make it an effective market signal, combined with border tax adjustments to avoid negative impacts on European competitiveness;
   - sensible investment in energy R&D.

Energy Efficiency

5. EU countries have agreed to reduce the amount of energy they consume by 20 per cent by 2020.This target is not binding – unlike the other two in the EU's climate change package (to reduce greenhouse gas emissions by 20 per cent and increase energy from renewables to 20 per cent, both by 2020). The EU should not spend too much time arguing about whether the energy efficiency target should be made binding. Instead, it should tighten up existing laws, and spend more of its existing budget on energy efficiency programmes.

6. The EU should tighten standards for the use of energy in buildings, electronic appliances and cars. And it should have the power to set minimum standards and remove the most energy inefficient vehicles from the market – as it has already done for products like washing machines and refrigerators.

7. Europe wastes massive amounts of energy because most power stations do not capture and use the heat they produce when they generate electricity. EU countries should quickly move to combined heat-and-power (CHP) systems. This should cover fossil fuel power stations, biomass power stations and nuclear power stations.

8. Switzerland got 7.5 per cent of its heat from nuclear power stations in 2009. Within the EU, Slovakia got over 5 per cent of its heat from nuclear stations in 2009. Hungary and the Czech Republic also use nuclear heat. But in the EU's main nuclear players, such as France and the UK, the heat is simply expelled into rivers and seas.

9. CHP becomes a more usable technology when a country has installed a district heating system, to transport the heat to homes and factories. In the Nordic countries heat produced in this manner is transported up to a hundred kilometres.

10. Denmark leads Europe in energy policy. Denmark installed extensive district heating networks in the late 1970s and 1980s, and now tops the European league of combined heat and power as a proportion of total energy generated. Successive governments have implemented ambitious and consistent policies on energy efficiency since the oil shocks of the 1970s. As a result, Danish energy intensity declined by over a quarter between 1990 and 2006. Denmark today only uses 60 per cent of the energy per unit of GDP of the EU average, the lowest use of energy per unit of GDP of any EU country.

11. In Central and Eastern Europe, district heating was extensively installed during the Communist era, and need widespread refurbishment to reduce the loss of heat. The least efficient lose around half the heat. Nordic district heating systems were in most cases installed more recently, but would nevertheless benefit from upgrading. In other member-states, there is scope for a major expansion of district heating networks.

12. The arguments for greater effort on energy efficiency and CHP are expanded in my policy brief 'Delivering energy savings and efficiency', CER, January 2011[2]. The arguments for investing in district heating systems are outlined in my policy brief 'Connecting Europe's energy systems', CER, October 2012[3].

Renewable Energy

13. A massive expansion of renewable energy must be a priority for the EU. Renewable energy is low-carbon, so expansion is necessary for climate policy reasons. More use of renewables is also necessary for energy security reasons, as this would enable Europe to reduce the hundreds of billions of Euros it pays annually for the import of fossil fuels. And renewable energy could be used to help heavily-indebted eurozone countries recover economically. (The most heavily-indebted countries are well placed geographically to expand solar or wind power: solar power in Spain, Portugal, Italy, Greece and Cyprus and wind power in Ireland.)

14. The EU has too many targets. Politicians are attracted to targets – they provide an easy soundbite and are often 'Not In My Term of Office'. (NIMTO). The fact that Europe's leaders chose three targets of 20 per cent, all to be met by 2020, strongly suggested that soundbites were leading analysis. Nevertheless, there should be post-2020 renewables targets.

[2] http://www.cer.org.uk/publications/archive/policy-brief/2011/delivering-energy-savings-and-efficiency
[3] http://www.cer.org.uk/publications/archive/policy-brief/2012/connecting-europes-energy-systems

15. Many politicians, businesses and commentators believe that governments should always desist from 'picking winners', that governments should set the policy framework and then leave it to the market to expand or contract particular sectors or technologies. The British government is arguing that a post-2020 renewable energy target is too prescriptive, and that the EU should instead set only a post-2020 greenhouse gas reduction target.

16. This is a legitimate approach, based on the accurate belief that governments do not have a good track record in picking winners. However, outcomes should only be left to the market if the market is working, and – as discussed below in paragraphs 34-36 - the carbon market is not.

17. Regulation could be used to prevent the construction of new fossil fuel power stations which do not have CCS, by setting a cap on the amount of greenhouse gases that are permitted per unit of electricity generated. The Emissions Performance Standard approach has been used in California, and is being proposed by the UK government. An EU-wide Emissions Performance Standard would – if set at a low enough level - rule out cheap, highly polluting forms of energy. So it would make up for the lack of a strong market signal. New energy infrastructure could then in theory be left to the market, with the private sector deciding whether to invest in renewables, CCS or new nuclear.

18. However, new infrastructure can only be constructed if it is given planning permission, and in a democracy this is only given if proposed developments have public support. Nuclear power has always had many opponents, and their number has increased since the 2011 Fukushima incident. CCS also has many opponents in some countries – notably in Germany. Much of this opposition comes from people who live near the proposed storage sites, but some also comes from campaigners who argue that CCS would divert money away from investment in renewables.

19. Renewable energy is the 'best' energy source (though not all renewables are as good as each other). Renewable energy will cut air pollution as well as slowing climate change. And, as the name indicates, renewables will not run out – unlike fossil fuels and uranium. Renewable expansion will also improve Europe's energy security by reducing the need to import oil, gas and coal.

Low-carbon bridge technologies

20. However, energy policy cannot afford to make the best the enemy of the good. Nuclear power and CCS are not ideal, and certainly not cheap. But they are low-carbon. The EU currently gets around ten per cent of its total energy from renewables, with a target to increase this to 20 per cent by 2020. If that target is met, that will leave 80 per cent of the journey still to travel.

21. The best must not be the enemy of the good, but the fact that one energy source is better than the worst one does not mean that it is good enough. Gas is lower carbon than coal is (though fugitive emissions from fracking mean that shale gas is likely to be higher in greenhouse terms than conventional gas is). But gas without CCS is not low carbon enough. Gas generation emits around four times as much carbon per unit of electricity as nuclear does, and sixteen times as much as wind power. The main

danger of a policy approach which set only post-2020 greenhouse gas reduction targets would be another dash for gas.

22. Nuclear and CCS are a necessary part of the mix for the next five decades at least. If these technologies are to be justified as necessary bridge technologies (the phrase used by Angela Merkel to justify keeping nuclear power stations open, before her post-Fukushima u-turn), it would be helpful to give the public an indication of how long the bridge is likely to be.

23. An agreed statement about how quickly the EU can move to total reliance on renewable energy would also help answer the argument of CCS and nuclear opponents that these technologies are not as desirable as renewables are. That argument is correct, but is often used by campaign groups to imply that Europe can move to a renewable economy almost overnight. It cannot. Europe will take at least five decades to move from the current situation of a little over ten per cent of energy from renewables to 100 per cent. Where will the non-renewable energy come from during that time? Nuclear and CCS are less desirable than renewables, but more desirable than fossil fuels without CCS.

24. Governments need to engage in this public debate, because public opposition to energy infrastructure has prevented, and will continue to prevent, many projects being constructed. So, paradoxically, a specific renewable energy target could help build public support for, or at least acceptance of, nuclear and CCS as necessary bridge technologies.

25. The EU should therefore set a renewable energy target for 2030, and one for the end of each decade thereafter. These targets should be presented, explicitly, as indications of how long the transition to a 100 per cent renewable economy will take. The earliest plausible date when Europe can be totally reliant on renewable energy is 2060. Denmark has set itself a target to achieve this by 2050. This is definitely a NIMTO target, but the Danes have a good track record on delivery. And Denmark is starting from a higher base than the EU overall (22 per cent of its total energy in 2010 – more than double the EU proportion). Yet 2050 is 38 years away. And other member-states will take longer. Rejecting nuclear power and going slow on CCS, as Germany is doing, might speed up renewable expansion. But it will result in more coal and gas being burnt, so the climate will pay a heavy price.

26. The EU should set a target to be 100 per cent renewable by 2060, and work backwards from that to set the following targets: 80 per cent by 2050; 60 per cent by 2040; 40 per cent by 2030.

Should European support schemes for renewable energy be harmonised?

27. Member-states operate different renewable support schemes. The existence of many different schemes increases administration costs, for both public authorities and developers. A harmonised EU-wide renewable energy support scheme would reduce administrative costs. It would also introduce, once the EU scheme had been negotiated and adopted, greater regulatory stability.

28. National governments often change renewable policy in order to reflect different priorities (following a change of government), technological and cost changes (the price of solar panels has fallen very considerably in recent years), or to reduce public expenditure. Regulatory changes undermine investor confidence. Most of the investment in new renewable energy capacity will have to come from the private sector. Regulatory uncertainty increases the cost of capital and reduces private sector willingness to invest. EU policies are usually longer lasting than national policies, because they are so difficult and lengthy to negotiate and because the Commission is not driven by an electoral cycle. So an EU renewable energy support scheme could deliver greater regulatory stability – but only once it had been negotiated and implemented. In the interim, the prospect of an EU scheme would introduce yet more uncertainty for investors.

29. A Commission proposal for an EU scheme would also have little chance of success. National governments would argue, correctly, that each country has different potential for renewable energy. A single level of subsidy for solar power Europe-wide would not represent rational policy making. (Germany has subsidised solar power at very high rates for industrial policy reasons, not climate or energy reasons.) Different countries also have widely differing social constraints on the amount of subsidy they can raise from energy customers in order to support renewables.

30. A proposal to harmonise renewable support schemes would therefore introduce greater regulatory uncertainty, and would not be adopted by the Council of Ministers. The Commission should therefore drop this option. It should focus instead on greater co-ordination of member-state schemes. The structure of the schemes – the type of subsidy mechanisms used rather than the rates – should be more closely co-ordinated. The Commission will publish guidelines on the structure of renewable support schemes in 2013. These proposals should focus on co-ordination rather than harmonisation.

Renewable energy trading

31. It does not matter in climate terms where renewable energy is produced, as long as infrastructure exists to transport it to consumers. The 2008 'renewable energy directive' includes arrangements to encourage co-operation between member-states, and between member-states and countries outside the EU. But these arrangements have not been widely used. According to the Commission, only Luxembourg and Italy indicated an intention to use the co-operation mechanisms to meet their 2020 renewable target, and Italy subsequently said that it might not need to use the mechanisms.

32. Renewable energy trading should be promoted – as the Commission intends. This could help Greece, Italy, Spain, Cyprus and Malta economically (with solar) and Ireland (with wind). A good example of the potential is the Helios solar project in Greece. The Greek government has identified solar power as a potential driver of economic recovery. Helios would cover 77 square miles with solar panels, with the potential to produce 10 gigawatts of electricity – roughly the size of ten large conventional power stations. The sun does not shine every day, even in Greece, but that country gets on average 300 days of sunshine each year. And the sun is stronger than in Northern Europe, making the solar panels more efficient. So Helios could

make a significant contribution to European renewable energy production. But it would not be cheap to construct. Helios would cost €25 billion, including grid upgrades, and the Greek government would not be able to afford this even in better economic times.

33. Germany succeeded in kick-starting the global solar industry, and is now a significant manufacturer of solar panels (though increasingly being undercut by China). Once made, solar panels are easy to transport (unlike wind turbines, for example). So it would be logical for both energy and economic reasons for the panels to be installed in Greece rather than Germany. Once the electricity grid through the Balkans has been upgraded, Germany (and other member-states) could then use the electricity. This would be much more cost-effective than electricity from solar panels in Germany, or other northern European countries such as the UK.

The Emissions Trading System

34. Allowances under the Emissions Trading System are trading at less than €8 per tonne of carbon dioxide. This is far too low to stimulate increased investment in energy efficiency or low carbon energy. The system must be overhauled so that it provides higher prices and greater stability. As a first step, the cap on the volume of emissions should be lowered, to reflect the fact that the economic recession has led to lower emission levels than expected when the cap was set. A lower cap should be combined with a price floor and a price ceiling.

35. Without safeguards, an effective emissions trading system would lead to more manufacturing in countries with cheap energy and no carbon price. The EU should therefore introduce border tax adjustments, with revenue returned to the country of origin for spending on energy efficiency and low carbon energy.

36. These proposals are expanded in my policy brief 'Saving emissions trading from irrelevance', CER, June 2012[4].

Research and development

37. The Commission proposes, in the next multiannual financial framework, to increase the amount allocated to R&D and innovation, from €55 billion in the current financial framework to €80 billion in 2014-20. This is welcome but still inadequate for a continent whose future prosperity will depend on staying at the technological frontier. Energy technologies urgently need more research and development. The Commission published a Strategic Energy Technologies plan in 2007, but member-states have yet to provide the necessary funding.

38. The attempt to stay at the technological frontier should not lead to EU funding of all scientific research. The EU should make substantial savings by cancelling its participation in the international nuclear fusion project, ITER. The total budget for this project has almost tripled since 2001, and is now €16 billion. The EU will have to pay €6.6 billion of the total cost. In 2010, the Commission awarded ITER €1.4 billion, from unspent parts of the EU budget and the research programme. In its financial

[4] http://www.cer.org.uk/publications/archive/policy-brief/2012/saving-emissions-trading-irrelevance

framework proposals the Commission suggested that ITER should be placed "off budget" because the total amount of expenditure is unpredictable each year. That is certainly correct. But the question of on or off budget accounting is very much second order: far more important is that it is simply not worth the cost. Even if it works eventually (which is far from certain), ITER will not generate electricity for the grid until 2040 at the earliest, so fusion will contribute little to efforts to control climate change or to increase energy security. The EU should redirect the money from ITER to programmes for energy efficiency and renewable energy.

3 October 2012

Centre for European Reform (CER) and Dr Karsten Neuhoff—Oral evidence (QQ 1-33)

Evidence Session No. 1 *Heard in Public* *Questions 1 - 33*

WEDNESDAY 31 OCTOBER 2012

Members present

Lord Carter of Coles (Chairman)
The Earl of Caithness
Lord Cameron of Dillington
The Earl of Courtown
Lord Giddens
Lord Lewis of Newnham
Lord Maclennan of Rogart
Baroness Parminter
Lord Plumb
Lord Renton of Mount Harry
Lord Whitty

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Examination of Witnesses

Stephen Tindale, Associate Fellow, Centre for European Reform, **Dr Karsten Neuhoff** Head of the Department of Climate Policy, DIW Berlin, German Institute for Economic Research, via video conference.

Q1 The Chairman: Mr Tindale, good morning and welcome. Dr Neuhoff, good morning and welcome. Thank you for agreeing to come to speak to us today. As you know, we are at the very early stage of our inquiry, so we are looking for some particularly clear guidance from you on your thoughts.

If I could deal with the formalities first, please. You should have in front of you a list of interests that have been declared by Committee Members. This is a formal evidence-taking session of our Committee. Full shorthand notes are being taken and they will go on the public record in printed form and on the parliamentary website. We will, of course, send you a transcript for you to look at, a copy, and you will be able to revise it in terms of any minor errors. The session on the record is being webcast live and will be subsequently accessible via the parliamentary website. I think that is fairly straightforward.

I shall explain how we would like to proceed with this. We will each ask six questions and perhaps we could agree that Mr Tindale will go first and Dr Neuhoff second, and then we will just get some routine into that process. Of course, Members of the Committee will obviously want to ask supplementary questions as we go along, so we hope to get a flow to that.

If I may, I would like to start with the first question, which is the question of costs or investment in EU energy policy, and to try to establish whether you have a view as to whether energy policy should be driven by reducing costs, particularly in the medium-term, gas, and so on, or by boosting investment, and what the balance should be about short term gain and longer-term investment in the sector.

Stephen Tindale: My view is that it has to be a balance between reducing costs and getting investment. If I had to choose, the more important thing would be getting investment because if we do not get investment, first, the lights might go off, and secondly, we will not reach our decarbonisation requirements. New investment in the energy infrastructure is absolutely crucial, and that applies not only to generation but also to networks and distribution.

Q2 The Chairman: Do you think, as we have heard argued from the United States, that if you could exploit shale gas in the short term—and obviously we are going to get to the question of shale gas later on—and effectively tax it in some way to pay for a better renewables policy, is that something you see as a possibility?

Stephen Tindale: It is a possibility. Gas is much less damaging to the climate than coal or oil, but it is not low carbon enough without CCS; if CCS is affordable, which we do not know yet. Another dash for gas would be an option for the next 18 years or so until 2030, but it would be much more sensible if policy then stated that, in 2030 or around 2030, the gas stations would be closed down. Gas stations are cheapish to build, compared to nuclear stations, for example, and the cost is largely driven by the costs of fuel, whereas for nuclear or for offshore wind—to take a couple of examples—they are very capital intensive and then the fuel is either free or cheap after that.

It is important to give a clear signal to investors/developers that this is a transitional measure for the next couple of decades. Then perhaps CCS can be retro-fitted if it is proven at scale by then, or the gas stations are shut down and, therefore, the investors/developers have to make the calculations and make sure that they get enough profit over the next two decades or so.

Dr Neuhoff: Thank you very much for the question. From a European perspective, I think it is important to maintain the clear framework at the European level, combining energy security, environmental goals that are achieved, and economic provision of energy and to make sure that that is a stable framework that is in place today and, therefore, will also stay in place in the future.

My sense is that a lot of the utilities are starting to ask, "Where are we going in the future?" So, the way to address your question, in terms of how to minimise the costs for consumers, is primarily through increasing the stability of the framework, such that investment risks are minimised and policy risks for investors are reduced as much as possible. I do not see that much of an opportunity to make a trade-off short term versus long term because if we do something in the short term that is not consistent with the longer term perspective, then that will ultimately frighten investors and increase costs for consumers.

Q3 The Chairman: To that question, though, if investors had a fixed time horizon, as Mr Tindale suggested, of a finite period in which to recover their investment, do you think that has merit?

Dr Neuhoff: Sorry, I did not understand the question.

Q4 The Chairman: Mr Tindale was suggesting that, to give investor confidence so that there was stability, you needed to set a framework but on the other hand you put a finite amount of time on gas, for instance, so that investors knew that at the end of that time there had to be alternatives—more sustainable sources of generation.

Dr Neuhoff: For me, the German experience over the last two years was quite intriguing, in that in Germany we had a very long discussion over what role nuclear should play and what role renewables should play in providing energy. In this discourse there was quite a lot of uncertainty for all parties involved as to whether there is sufficient robustness in the framework for their specific technology of choice. After Fukushima, when it became clear that all political parties signed up to a clear commitment to phase out nuclear, suddenly it was clear for companies that they had to follow this trajectory. I think this clarity that has emerged is the most valuable part that came out of the discussions last year. So for me, really, it is how can we provide clarity for investors, where we know that is something that is implemented today and will stay in the future? That is all I can refer to from the German experience.

Q5 Lord Lewis of Newnham: Perhaps I am wrong in this respect, but one of the problems you have with renewables is the actual cost. For instance, I believe that electricity in Germany now is very much more expensive. I am not sure how far this is related to the larger extension of renewables you have, but it is that side that worries me slightly.

Dr Neuhoff: Indeed, that is something that is very much discussed these days in Germany. Two weeks ago, the German Government announced the costs for consumers and small businesses to pay for the subsidy level for renewables, which will increase at the beginning of next year. Ultimately, by next year, consumers will pay on average about 2.5% of their expenditure bill for their power.

An interesting aspect emerged when we took a more historic perspective and realised that in the mid-1980s consumers spent 2.3% of their household bill just to pay for power. Ultimately, costs are seen as something quite big but if you put it into a longer-term perspective that is actually a number that does not really fall that much out of historic perspectives. The challenge that has been earlier identified in the UK is how to deal with the very poorest segment of households and to put specific policies to help these household segments. But overall, the number suggests that it is not as big of an issue as one might sometimes feel looking at the discussions.

The Chairman: Thank you. I think Mr Tindale wants to come in and then Lord Giddens.

Stephen Tindale: I just wanted to comment that, in talking about the costs of renewables, in my view it is important to unpack what we mean by renewables because some are much less expensive than others. All of them are still more expensive than unabated fossil fuel but onshore wind, for example, is not that much more expensive, whereas solar photovoltaics, in my view, are not economically efficient in northern Europe, in the UK or in Germany. Offshore wind is expensive but once the grid is built it will then be there to exploit offshore wind, so in that sense it is a one-off cost. Biomass is potentially cheap. The UK Government is still struggling to define: what is sustainable biomass and what is not sustainable biomass, which is very important. The EU is struggling as well to define that. Some biomass is better

for the climate than fossil fuels. That is relatively inexpensive and, as it can be used for heat as well as for electricity generation, it is an important part of the package going forward.

Q6 Lord Giddens: Against the background of the fact that the eurozone at the moment is flirting with recession, what role can energy investment play in generating net new jobs and generating growth? I have just came back from a conference in Germany where there was a lot of debate about this. It was suggested that, in some sense, the eurozone countries should assume the lead in this, so that they would have a different finance structure from the orthodox EU budget. One of the main points for our inquiry is to see what the relationship is between energy investment, growth and job creation, so I would welcome your comments on that and also on the practicalities of it in a European context.

Stephen Tindale: As you know, the jobs from renewables are much debated.

Q7 Lord Giddens: It would have to be net new jobs.

Stephen Tindale: Exactly. I was just about to say that the net jobs factor is sometimes overlooked. The fact that jobs in fossil fuels will reduce has to be counted in the equation as well. In my view, in terms of job creation, the most sensible job rich approach is energy efficiency, which would help in terms of fuel poverty and social issues as well, particularly in the UK. There are significant numbers of jobs in renewables. However, I think in terms of net jobs, it is not going to be the main argument in favour of renewables.

In terms of getting the eurozone out of its current economic difficulties, Greece, Spain, Portugal and Italy are all well-placed in terms of solar potential, and Ireland is well-placed in terms of wind potential. The fact that the eurozone countries that are facing the biggest economic difficulties also have very substantial renewable energy potential is a fortunate coincidence. To unlock that—for example, the Helios project in Greece, which could generate about 25 gigawatts of renewable electricity, and obviously solar power makes more sense in Greece than it does in the UK—would be a major energy step forward and it would help. It would not solve but it would help Greece's economic situation. I think the way to unlock that is to promote renewables trading, in terms of what counts towards one country's target as against another. It does not make any difference to the climate where the renewable electricity is generated, so it makes more sense to generate electricity from solar panels in Greece than it does in Germany or the UK.

Going back to the jobs issue, the panels could then be made in Germany and transported to Greece—solar panels are much easier to transport than wind turbines—so the trading should be supported. The European Commission is trying to get that off the ground but it has not been much used so far.

Q8 Lord Giddens: We need to persuade the political leaders to endorse it because they run Europe now. Angela Merkel is our President, de facto. The Commission is somewhere down the Rhine.

Stephen Tindale: We need to persuade the leaders. That would certainly help. We also need to persuade some of the environmental groups which think that the transition should be in every country. In my view, it is more important to get a Europe-wide transition, and then a global transition.

The Chairman: A good point for Dr Neuhoff to come in there, Lord Giddens.

Dr Neuhoff: Yes. In this current situation, shifting investments earlier, and making investments that replace fuel imports, are two aspects that can help quite a bit in the job creation part across many European countries.

That comes back to your question then in terms of what are the instruments that we have available. My sense is that EU funding can be quite helpful to unlock investments on the energy efficiency side whereas if I look at infrastructure investment on grid or power it is the financing ultimately that matters. So the focus there should be a bit more in terms of how to facilitate financing at low financing costs and, therefore, lower costs to consumers. There we can start with the European Investment Bank where there has been some recapitalisation. I think it will be important that there should be clear criteria that this money is going to be used to advance the type of projects that have the jobs and the environmental impact that are desirable from European policy objectives.

Where European co-ordination can become a lot more helpful is with regard to regulation. The UK was one of the leading countries in good regulation of grid expansion and, therefore, reducing the costs of capital for the national grid. In other European countries we are still a bit further away from that. From the finance sector, actors look at grid investment as something that is almost like utility investment and they do not really attribute the safety, stability and longevity of this asset to the specific investment opportunities. We almost need to have a more common perspective on grids, such that investors can say, "Okay that is a business model for grids, which is bigger than just one country. It is worthwhile for us to look at that. It is worthwhile for us to take that as a long term investment opportunity", and take this forward.

On the renewables side, again I think regulation can help a bit. For example, the feed-in tariffs in Germany provided long term guarantees to investors and, therefore, facilitated low financing costs. I think we can integrate a stronger European approach. In contrast to Mr Tindale, I would perhaps argue a bit more for use of other mechanisms under article 9 of the Renewables Directive, where countries can advance joint projects and, therefore, jointly say, "Okay, we want to have this kind of a strategy", but they do not need to shift to a trading for certificates approach on a European level. My sense is that these certificates will remain relatively uncertain for investors for quite a few years and, therefore, are difficult to use for a simple and cheap financing structure. I think there are more closely aligned strategies at the national level under this European Renewables Energy Directive, could be quite helpful.

Q9 The Earl of Caithness: I have two questions. The second one will relate to carbon capture and storage, but can I ask you, first, whether we should set technology-specific targets for innovative technologies, or should we go for a more technology neutral approach?

Stephen Tindale: In my view, we should set targets for renewables because it would be sensible to leave it to the markets and only set a greenhouse gas reduction target if the market was working. That is a very large "if", and the carbon market at the moment is not working. The ETS is €6 or €7 per tonne at the moment. That is far, far too low to drive investment into low carbon options. Therefore, a combination of strengthening the market mechanism and, where possible, regulating. A Europe-wide emissions performance standard, for example, would be a sensible way forward, and also setting technology-specific targets on renewables, partly because the renewables 20% target has been very effective in driving investment into renewables and partly also for public relations reasons. I do not mean that in a dismissive sense, but actually convincing the public that low carbon bridge technologies are a necessary part of climate control.

The video link cuts out.

Q10 The Chairman: It did not like what you were saying.

Stephen Tindale: No, it did not. I was just about to talk about nuclear, so who knows. Angela Merkel, before Fukushima, used the phrase, "low carbon bridge technologies", which I think was a sensible phrase because it will take several decades for the EU to become 100% reliant on renewables. It is not even formally or informally committed to 100% renewables economy yet. In my view, it should be. To persuade the public that nuclear and CCS are two necessary bridge technologies, it is important to say how long it is going to take to get to 100% renewables. The only country that I know of that has set a timetable yet is Denmark, and it has said 2050. That is obviously a "not in my term of office" target, but the Danes have a good track record on delivery and a very progressive energy policy overall. It is not perfect but is probably the best in the EU. A target for renewables would actually, paradoxically, help persuade the public in key countries that nuclear and CCS are important bridge technologies.

In the UK we are quite fortunate that we have a lot of sea around us, so CCS is more popular or less unpopular here than it is in Germany, for example. Karsten has gone, I am afraid, but in Germany they are proposing to store for many millennia, so it is more like disposal really, but to store the carbon dioxide onshore. The same happened in the Netherlands. In Rotterdam, people are very unhappy about having carbon dioxide under their houses. In Rotterdam it was mainly because house prices would fall, but there were also some potential health concerns about it relating to Lake Nyasa and so on.

I think CCS is an important bridge technology. Nuclear is also an important bridge technology. To persuade the public of that, we have to underline that it is going to take several decades and some of the environmental groups—I have been guilty of this myself in the past—suggest that, not explicitly but implicitly, we can go to 100% renewables almost overnight. It is not going to be like that.

Q11 The Chairman: Dr Neuhoff, would you like to comment? No, we have lost the sound, I am afraid. Shall we redial? Let us do that. It will be much better. Shall we do that? Okay.

Mr Tindale, one of the questions we might just be thinking about as well is this question of the existing 2020 targets and what the view is on sticking with those, on the grounds they are too expensive for the time of austerity and so on.

Stephen Tindale: I do not agree with that view because the energy efficiency, in particular, will help get out of economic difficulties and create many jobs. The 20% greenhouse gas production target is at the low end of what the EU should be doing in terms of meeting a two-degree limit to climate change. In terms of renewables, as well as the climate advantages, it has major energy security advantages and the price of importing oil and gas into the EU runs at about €350 billion a year, so there is potential to save a lot of our import bill.

The Chairman: Thank you. Dr Neuhoff, are you back with us now? No.

Q12 Lord Lewis of Newnham: One of the things that worries me specifically about CCS—I am sure we will get on to this particular problem—is that there has been very little success, as one sees, in actually making any direct application of these techniques. I am worried very much by the emission regulations that are going to come in in 2017 and 2020, which are going to impose a tremendous loading onto present power stations from the

point of view of their emissions. How do you view this particular problem? This is once again legislation with dates associated with it.

Stephen Tindale: Yes. Future emissions standards are a sensible way forward because the EU has quite a good track record in terms of technology forcing standards, and so there is a role for that. Whether CCS will meet the requirements, who knows? It has been demonstrated at small scale. It has been demonstrated at all parts of the production, distribution and transport, but it has not been demonstrated at large scale or integrated.

Of course, as we saw from DECC's press release yesterday, there are different types of CCS—pre-combustion, post-combustion, oxyfuel. How much is it going to cost? Well, how long is a piece of string? We have no idea about that, and so it needs to be demonstrated at scale. If I had to choose between the three, I would say oxyfuel looks the most exciting but it needs to be demonstrated at scale. The UK Government and the previous UK Government have messed up somewhat on CCS competitions, to put it one way, so I think they need to crack on and actually allocate the money.

The EU should co-finance as many as possible through the NER300 approach, but the collapse in the ETS price, as Professor Grubb has written about very eloquently, has reduced the amount of revenue that the ETS will deliver. That is going to make it even more difficult––hence the need for a floor price.

Lord Lewis of Newnham: Thank you.

Q13 Lord Giddens: Can I just ask you briefly about what has already been done in respect of energy efficiency? I think it could be quite important in consumer behaviour, because if you are living in a German insulated house you save money, you buy yourself a big Mercedes and you steam up and down the motorway, and so you are not actually—

Stephen Tindale: Indeed. Do they not have speed limits yet in Germany? I do not know that. Karsten does.

Q14 Lord Giddens: Ever since Jevons we know it is quite a significant thing.

Stephen Tindale: Absolutely, yes.

Q15 Lord Giddens: I just wanted your view of it.

Stephen Tindale: My more serious response is that the rebound effect, in terms of end use energy efficiency, is going to be very substantial and will reduce the climate advantages and some of the economic advantages of energy efficiency, whereas the social advantages will be substantial. I think the important point about energy efficiency is that it should not only be about end usage. It should also be about production and generation. The European Commission proposed in its draft Energy Efficiency directive that most new power stations should be combined heat and power, which would be an enormous improvement in energy efficiency because all that heat is just going up the cooling towers at the moment. If you capture it and use it in district heating, yes, you lose a bit of the heat but it was going up chimneys anyway, so that is not a major loss. In Scandinavia, the district heating systems go 100 km, and of course Copenhagen led the way on this. The rebound effect for energy efficiency in the end use of energy is likely to be more substantial than—

Q16 Lord Giddens: Yes, it will work for producers. It is more problematic for consumers, though. It depends on their behaviour afterwards really.

Stephen Tindale: Yes.

The Chairman: Dr Neuhoff, are you back with us?

Lord Giddens: He is having the most miserable time of his life.

The Chairman: They cannot fix the link.

Lord Renton of Mount Harry: May I ask a slightly different question?

The Chairman: Can I just deal with the connectivity, as we call it, and then if I may come to Lord Renton. Dr Neuhoff can hear us but we cannot hear him. If he does not mind staying on the call listening, and then possibly we will send him these questions and see whether we can get a written answer and actually get more of his evidence in, if that is okay with everybody. I will wave to you now and say thank you, and hope you can stay on with us.

Lord Renton just wanted to come in and then we will—

The Earl of Caithness: I just want to ask my second question.

The Chairman: Yes.

Q17 The Earl of Caithness: It was actually more for Dr Neuhoff. He said that we wanted EU co-ordination and Angela Merkel has said that we must have bridging technologies that must include CCS. I find that very difficult to reconcile when it seems to be that Germany are going to build 29 new gas stations and 17 new coal stations and none of them are going to have CCS. Can he let us know what the German position is with regard to CCS, why is it so unpopular, and how one can possibly get any sort of European co-ordination when a major player within Europe is ruling out both nuclear, which produced 23% of Germany's electricity in 2009, and now CCS? It does seem to be making life very difficult.

The Chairman: I am sure Dr Neuhoff is grateful that he can write to us on that. It gives him time on that. Thank you, Lord Caithness.

Q18 Lord Renton of Mount Harry: My original question has really been answered, but if I could just say a personal thing. We have a small house off the west coast of Scotland and there is now a possibility of a very large offshore wind farm, about five or six miles away into the sea but from the Island of Tiree, where we live. That started two years ago. Nothing more has happened. There has been an awful lot of discussion. There is the possibility now that, actually, it is so far out that it is going to be too expensive and not going to happen. This does cause an enormous amount of disturbance to those who are involved. In this case on a small island, they do not know—the 800 people on the island—whether that is going to shoot up in time or not.

Is there any way that you can see in which the different possibilities, in a sense, are made to happen or to be answered more quickly, because it seems to me that a lot of the trouble for those who are touched by it is that they really do not know what their position is going to be in the future, and of course it is very worrying for many people.

Stephen Tindale: Yes. The issue of the timetable for decisions being made is one of the major complaints, both from developers and from residents. One reason why it takes a long time is that the public authority—whether it is local government, or the Scottish Government in this case, or the UK Government—has to consult properly as otherwise it might face a judicial review. Broadly speaking, public authorities are committed to consultation and that takes time. One of the challenges for those of us in favour of offshore wind is to get people who support it to speak out as well as people who oppose it. They

speak out anyway, but the pro side tend not to. They tend to stay at home and watch TV instead.

Q19 Lord Renton of Mount Harry: That is absolutely true in the case I have mentioned. There are those who support it and those who do not. Both are very noisy.

Stephen Tindale: Yes. Oh really?

Lord Renton of Mount Harry: They are very noisy.

Stephen Tindale: Yes, well, I am pleased to hear that the pro side are being noisy as well. An increase in regulatory stability would be a step forward. Going back to the feed-in tariff or the renewables obligation, if we were starting from scratch a feed-in tariff would be a preferable way forward, because it provides guaranteed income and, therefore, reduces the cost of capital, but we are not starting from scratch. For the last decade we have had a debate in the UK about whether we should move from the RO to the feed-in tariff, and now we have CfD FITs on their way, possibly, and that is yet more regulatory instability.

An important thing, both to reduce the cost of capital and to speed things up a bit by the UK Government, is just to leave it alone. Just introduce your EMR changes but then just leave it alone and get cross-party support for that if possible, which would help both the developers and help speed up the planning process.

On offshore wind, the planning process is less sticky than for onshore and the UK Government and the Scottish Government have done quite well on that. The Scottish Government actually has done better than England and Wales have. The SNP are doing some good things on renewables, and the Beauly-Denny line eventually being approved was a major step forward.

I do not think I have really answered your question, but I can understand why people get frustrated by the seemingly endless delays in decision-making. That is one of the major challenges that everyone has to try to overcome.

The Chairman: Can I take us then to the next question. We are covering a lot of ground but we have four more questions to go in a relatively finite amount of time.

Q20 Lord Cameron of Dillington: I want to talk about the European grid and energy infrastructure and interconnection. You both obviously favour this, both for security reasons and also because it encourages renewables, particularly the intermittent sort because you can play one country off against another in that respect. You both seem to indicate that it will reduce costs for consumers. I wonder whether you could put a bit more flesh on that argument in terms of costs saving. Clearly, it would be very expensive up front but I am not quite sure how the price would come down later.

Stephen Tindale: I am very sorry that Dr Neuhoff cannot answer this one. It would reduce costs in two ways. First, it would enable the intermittent renewables that are currently being generated to be used, which are sometimes simply being wasted because there is no grid to take them anywhere. It would enable them to be used. A good example of that is the trans-Pyrenees grid, which has been talked about for 30 years. Before its recession, Spain was often producing more electricity than it could actually export because it had done well on solar and on wind. Getting that to people so that they could actually use it would reduce costs.

The trans-European super grid—if it ever happens, which I very much hope it will—as long as it was two-way, would enable electricity from solar in southern Europe to be transported

north and then wind generation from northern Europe to be transported south during the night and so on. It would have to be two-way.

On the cost of the electricity grid—not only electricity as gas is also part of the equation—it is crucial to leverage in private sector investment. Most of it will come from the private sector clearly, but the energy project bonds, which the European Investment Bank is trialling at the moment, are a very important part of that. The Commission's proposals for the European budget—the multiannual financial framework—had €50 billion for a connecting Europe facility, of which €9.1 was going to go for energy. Earlier this week the Cypriots suggested reducing that to €7.1 billion. Who knows what the House of Commons will say this evening but I suspect that it will not want to increase it.

We need to look at that in terms of what are the priorities in terms of EU spending, and in my view energy infrastructure is a major priority. There are many other parts of the EU budget proposals that could be reduced. Some of them concern energy; for example, nuclear fusion—a complete waste of money, in my view.

Q21 Lord Cameron of Dillington: You have talked about the trans-Pyrenean. As a matter of interest, do you know what the attitude is within the other member states to a European grid? For instance, we have a problem with our grid in the UK, Scotland coming across the border where you have quite a lot of possibilities for energy renewal and we cannot get electricity down. Do other countries have similar problems within their own boundaries?

Stephen Tindale: Yes. In particular Germany, which is going to shut down nuclear power stations in the south and get a lot more renewables from the north, including offshore wind. The grid inside Germany needs very substantial upgrading and extension. Germany has been using neighbouring countries' grids to transport electricity and some of them—such as Poland—are now saying, "Enough is enough". The German population is more positive towards wind than the UK population in general, but not more positive towards electricity pylons.

Lord Cameron of Dillington: Pylons, yes.

Stephen Tindale: Which even I have to accept are not beautiful, so it is a major challenge. In terms of a trans-European grid and cross-border interconnections, all Governments are in favour of it, theoretically, but they all want to be the ones to take the decisions. Subsidiarity comes into play. In my view, with regard to the priority infrastructure projects that the Commission is proposing—it is saying that decisions should be taken within three years—I think it would be a step forward to say that if these priority decisions are not taken within three years they will be taken away from the national Governments and given to the Agency for the Co-operation of Energy Regulators, ACER.

Lord Cameron of Dillington: Thank you very much.

Q22 Lord Whitty: Before I go into what I want to talk about, which is energy efficiency which we have partly covered, on that last point on the European super grid, you are clearly an advocate for it, Mr Tindale, including giving greater powers to the European regulator to get us there. Would sufficient benefits arise if we could not get a totally pan-European super grid but we could produce a north west European super grid, which would have fewer technological problems, fewer investment requirements and probably sharper decision-making?

Stephen Tindale: Yes. We should certainly go for a North Sea grid, partly to harness the offshore wind capacity, and wave and tidal, which will be in the 2020s, I suspect—in a big way, partly to harness the renewables, but also partly to enable us to use Norway and Sweden's pumped-storage capacity to overcome the intermittency problem.

Q23 Lord Whitty: Thanks, that is helpful. On energy efficiency itself, from what you were saying in response to Lord Giddens—there clearly is an energy efficiency target, but much of that relates to end-user energy efficiency—you seem to be shifting the balance of energy efficiency interventions or emissions to the efficiency of the grid, or the efficiency of the system, so the grid will be losing less heat using CHP and district heating and so on. Is that a correct interpretation of where you are, and do you think that is yet reflected, for example, in the policy regime for the 2020 targets for energy efficiency or beyond?

Stephen Tindale: It is a correct interpretation and it is not reflected in policymaking, either in Europe or in the UK. The Commission—as I think I said—said in its Energy Efficiency Directive proposals that most new power stations should be CHP. That was rejected by the Council of Ministers, which I think was a major mistake. The Danish Presidency at the time was keen on CHP, given Denmark's own track record, but was unable to get that through the Council of Ministers.

In terms of the end use of energy and the system, much greater energy efficiency refurbishment of houses is crucial mainly for social policy reasons and fuel poverty reasons because of the rebound effect rather than for climate reasons. Obviously there is climate mitigation as well, but I do not think that should be the main driver of the policy.

The UK could do an enormous amount in terms of combined heat and power expansion and district heating expansion, and the involvement of local government in energy again, which Chris Huhne announced when he was Energy Secretary, is a step forward. However, we have an enormous way to go before we catch up with the Scandinavians, for example.

Q24 Lord Lewis of Newnham: How far would you include waste incineration with the combined heat and power relationship? If I understand it correctly, this is done in Sheffield and in Nottingham but I think they are about the only two with any extensive arrangements of this sort.

Stephen Tindale: Waste incineration does have health implications. There is technology to capture them and scrub their exhaust but it has to be very carefully monitored and regulated. The Environment Agency has a central role in that. Leaving that aside, of course not all waste is organic. It is partly plastic, so fossil fuel as well. So it is not a fully renewable technology, but it is probably lower carbon, certainly than coal and probably gas.

Lord Lewis of Newnham: Thank you.

Lord Whitty: Can I just follow up on the rebound effect because Lord Giddens seemed to imply that you would always get nearly 100%—if not 100% plus—rebound rate. In practice, that is not the case. There is always a rebound effect because people use the money saved or the time saved for other purposes, but it is rarely anything like 100%. Even with investment in energy efficiency homes, which you mentioned, people who save the money as a result of that are unlikely to buy a Mercedes and go down the Autobahn but, even if they did, it would not be 100%. Even if they spent it on going to the Bahamas, it would only be about 40% rebound, so there is a benefit in terms of deployable energy and, therefore, of carbon.

Q25 Lord Plumb: I think we have already established that energy costs are important in terms of investment choices. There are plenty of choices, but it is a question of which way companies go. I wonder whether Mr Tindale can tell us—and certainly Dr Neuhoff in his response—how significant that impact is on energy costs for companies such as steel and cement companies and other large companies. Should this be specifically the responsibility of those companies or should measures be put in place to assist energy-intensive industries to absorb those energy costs?

Stephen Tindale: The latest DECC consultation suggests that various decarbonisation programmes and subsidies are going to increase electricity use in energy-intensive industries by around 28%, so that is significant. In my view, the way to tackle that is, first, to give them financial help consistent with state aid, which is what DECC is proposing to do. That is sensible for preventing carbon leakage within the EU. Globally it is also a way forward. But in my view a more effective way of reducing carbon leakage, or preventing carbon leakage, would be through border tax adjustments from any country that does not have a carbon price. This would be consistent with World Trade Organisation guidelines because the criteria would be clearly stated and if you were in America or in China you would be dealt with in exactly the same way under these criteria.

It would also be a way of encouraging all countries to have their own carbon price. The border tax adjustment should work in the way that countries with a carbon price do not pay tax or, depending on the level of the price, they could pay a reduced tax, whereas countries that do not have a carbon price would pay the tax. A Government in country X would have a choice, "Shall we collect this revenue ourselves or shall we let the Europeans collect it?" In my view, that would be quite an effective way of encouraging carbon pricing around the world.

Q26 Lord Plumb: But it could lengthen the negotiations quite considerably, I imagine.

Stephen Tindale: The negotiations, which?

Q27 Lord Plumb: To arrive at that situation where some countries would be paying tax.

Stephen Tindale: It could not be negotiated through the UNFCCC because then it would probably never happen. It would have to be negotiated in Europe, which would not be overnight but it could be done. Then it could be bottom up and individual countries could decide whether to have a carbon price or not.

Lord Plumb: Thank you.

Q28 The Earl of Courtown: We have already mentioned—you, in particular, Mr Tindale, have already mentioned—the emissions trading system. If there has been progress with the ETS, what scale of revenues would you expect to be raised? Is there any way that this can be pointed to any particular type of expenditure? What changes are required to it in order to improve its ability to encourage low carbon investment and what prospects do you see for such changes?

Stephen Tindale: How much progress so far? Very little. The change in 2008 to auctioning was a step forward, but then the recession arrived and so there were still, again, far more too many permits. Since not many people expected the depth of the recession, the Commission cannot really be blamed for that. There are now still far too many permits, and so set-aside, back-loading or whatever is a necessary first step but not a sufficient step. They might prevent it collapsing to zero but they will not raise it very much and they will not give stability. Stability is very important for investment decisions.

A more sensible way forward would be to have a price floor, which would be only a fall-back or a sort of safety net approach. It would not be turning it into a tax and so in my view it would not require unanimity. If it would require unanimity it would never happen, of course, because of some Governments.

A floor price could be combined with a ceiling price as well, which would be a more political move. The necessary price is probably—well, who knows?—€70 or €100 per tonne. It is never going to go anywhere near that in the foreseeable future so a ceiling price would be more political negotiation. If we had a decent carbon price—I think €30 per tonne would be a sensible place to start—then we would certainly need border tax adjustments because carbon leakage would become a much more significant problem.

Sorry, I cannot remember the other bits of your question.

Q29 The Earl of Courtown: Yes, I was also asking what changes are required in order to improve its ability to encourage low carbon investment.

Stephen Tindale: Yes, well, stability. A floor price and ideally a rising floor price would be the way to do it. In terms of revenues, Professor Grubb's paper has some good numbers. If we had a €15 per tonne price, then the revenue would be about between €150 and 190 billion between now and 2020, whereas now it is going to be obviously much less.

Again, Karsten cannot answer but I think that is one of the possible ways of encouraging the German Government to support strengthening the ETS because, whether you think it is sensible or not, the Energie Wende is not going to be cheap so they need some money.

Q30 Lord Giddens: Just before we conclude, can you comment briefly on the role of shale gas? If it combined with closing down coal-fired power stations, could it also help reduce emissions?

Stephen Tindale: Yes. It would be very desirable to close down coal-fired power stations and replace them with gas stations, whether shale or conventional. The suggestion from Cornell a couple of years ago that, because of emissions from the process, shale gas might be as high in carbon as coal has not been backed up by other—

Q31 Lord Giddens: No. I think that has been rubbished, actually.

Stephen Tindale: Yes, I was being polite. I think shale gas—and the Environment Agency here has said this—needs to be very clearly regulated, partly because of the diffuse pollution and partly because of possible impacts on local environment, the water table and so on. It is an acceptable way forward as a bridge technology, and shifting from coal to gas is certainly desirable. Going back to what I said about gas earlier, I think the clear signal needs to be taken that this is only a transitional step and it is not going to be gas for the next 50, 60, 70 years unless CCS delivers.

Q32 Lord Giddens: The trouble with all of these things is that you have no way of predicting technological change and it is pretty hard to plan against something that might come from a side fuel and transform almost everything.

Stephen Tindale: As shale gas has in the US.

Lord Giddens: In the US it did that, yes. Well, it has not changed everything but it made an enormous difference to everything.

The Chairman: Are there any more questions?

Q33 Baroness Parminter: Just a quick question, Mr Tindale. In one of your responses earlier you said that, in an ideal world, there would be a more pan-European response to the energy situation if you did not have to deal with all the subsidiarity. We talked about interconnectivity and we have talked about ETS. Are there any other European initiatives that could be pursued that would help deal with the energy security and affordability issues, which at the moment are not being addressed purely because of the politics of subsidiarity?

Stephen Tindale: There are other initiatives that could and should be pursued, in terms of climate policy; for example, a European-wide emissions performance standard, for which Chris Davies has been arguing—not yet successfully.

In terms of affordability, the other pan-European approach would be to ensure that much more of the structural fund money is spent on energy efficiency. That would also improve energy security because it would reduce the amount of gas that needs to be imported. Hungarian commentators have done some very impressive work on how much could be achieved in Hungary. With Hungary not being that rich a country, that needs to be supported through the EU budget.

In terms of energy efficiency, I think there is more that can be done with EU spending. In terms of other policies, the Commission is sensibly not seeking to get involved in the fuel mix issue, apart from renewables, which is a bit of a step out of that approach, but, as I tried to explain earlier, I think it is a very sensible approach.

The Chairman: Mr Tindale, thank you very much. That has been really helpful.

Dr Neuhoff, the great contribution you made in the brief time makes us look very much forward to the answers to the questions. I think we must try and find a way, possibly, of hooking you up again, or actually getting you here, because there are many things we know you would like to advise and help us on. Thank you very much, and apologies for the technology failure. To both of you, thank you very much.