



**Cynulliad Cenedlaethol Cymru  
The National Assembly for Wales**

**Y Pwyllgor Cynaliadwyedd  
The Sustainability Committee**

**Dydd Iau, 13 Tachwedd 2008  
Thursday, 13 November 2008**

**Cynnwys**  
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Cofnodir y trafodion hyn yn yr iaith y llefarwyd hwy ynddi yn y pwyllgor. Yn ogystal,  
cynhwysir cyfieithiad Saesneg o gyfraniadau yn y Gymraeg.

These proceedings are reported in the language in which they were spoken in the committee.  
In addition, an English translation of Welsh speeches is included.

**Aelodau'r pwyllgor yn bresennol**  
**Committee members in attendance**

Lorraine Barrett	Llafur Labour
Mick Bates	Democratiaid Rhyddfrydol Cymru (Cadeirydd y Pwyllgor) Welsh Liberal Democrats (Committee Chair)
Lesley Griffiths	Llafur Labour
Darren Millar	Ceidwadwyr Cymreig Welsh Conservatives
Rhodri Glyn Thomas	Plaid Cymru The Party of Wales
Brynle Williams	Ceidwadwyr Cymreig Welsh Conservatives
Leanne Wood	Plaid Cymru The Party of Wales

**Eraill yn bresennol**  
**Others in attendance**

Bettina Bockelmann-Evans	Ysgol Beirianeg, Prifysgol Caerdydd School of Engineering, Cardiff University
Keith Davies	Cyngor Cefn Gwlad Cymru The Countryside Council for Wales
Peter Davies	Y Comisiwn Datblygu Cynaliadwy The Sustainable Development Commission
Michael Evans	Asiantaeth yr Amgylchedd The Environment Agency
Dr John Hamer	Cyngor Cefn Gwlad Cymru The Countryside Council for Wales
Peter Jones	Y Gymdeithas Frenhinol er Gwarchod Adar The Royal Society for the Protection of Birds
Ruth Lovell	Y Gymdeithas Frenhinol er Gwarchod Adar The Royal Society for the Protection of Birds
Dr Ian Masters	Prifysgol Abertawe Swansea University
Roger Wade	Asiantaeth yr Amgylchedd The Environment Agency

**Swyddogion Gwasanaeth Seneddol y Cynulliad yn bresennol**  
**Assembly Parliamentary Service officials in attendance**

Dr Virginia Hawkins	Clerc Clerk
Meriel Singleton	Dirprwy Glerc Deputy Clerk

*Dechreuodd y cyfarfod am 9.05 a.m.*  
*The meeting began at 9.05 a.m.*

## **Cyflwyniad, Ymddiheuriadau a Dirprwyon Introduction, Apologies and Substitutions**

[1] **Mick Bates:** Good morning, bore da, and thank you for attending this meeting. We are slightly late starting, but we have successfully established a video link for use in item 2. I need to make the usual housekeeping announcements before we move on. In the event of a fire alarm, you should leave the room by the marked fire exits and follow the instructions from ushers and other staff. No test is planned for today. All mobile phones, pagers and BlackBerrys should be switched off, as they interfere with the broadcasting equipment. The National Assembly for Wales operates through the media of Welsh and English, and headsets are provided for live translation or amplification of sound. The translation is on channel 1, and the amplified sound on channel 0. Please do not touch the buttons on the microphones, as this can disable the system. Please wait until the red light has come on before you speak.

[2] I have received apologies from Alun Davies, Karen Sinclair and Lorraine Barrett. I would like to put on record my thanks to the committee and to all the staff involved with the launch of the report on plastic bags, which received substantial publicity, as many of you will be aware. If ever a report truly engaged with the democratic process, it was surely that one. I find it strange that such an issue arouses so much interest. I have a copy of the responses from the Have Your Say website; they come from all over the world, and some of them are very funny, but by and large, they are supportive of the principle that we established. We look forward to the debate in the Chamber. Last night, I was rung up by a very enthusiastic person who wanted to say that Prince Charles has proposed, in some programme, some form of control over plastic litter. At this stage, I am not sure whether he was suggesting a levy or a total ban, but if the committee is willing, I do not see why we should not send him a copy of our report. I do not see any objections, so we will do so. Obviously, I will copy the letter to committee members beforehand.

9.08 a.m.

### **Ymchwiliad i Leihau Carbon yng Nghymru: Sesiwn Dystiolaeth ar Gynhyrchu Ynni Inquiry into Carbon Reduction in Wales: Evidence Session on Energy Production**

[3] **Mick Bates:** We move on to today's business. We are taking further evidence for our inquiry into carbon reduction in energy production. In this first session, we will take evidence from the Sustainable Development Commission and the Countryside Council for Wales on large-scale renewables. In the second part of the meeting, we will hear evidence from Cardiff University, the Environment Agency, the Royal Society for the Protection of Birds and Swansea University on energy production via marine technologies. In the first session we will be using a video link, and on the screen you can see Keith Davies and Dr John Hamer in Bangor—they are the representatives from the Countryside Council for Wales. I trust that all is well and that the sound is sufficient for you to hear us.

[4] **Mr K. Davies:** We can hear you loud and clear.

[5] **Mick Bates:** Here with us is Peter Davies, from the Sustainable Development Commission. I welcome all three witnesses to this session, and invite you to give your names and positions for the record, followed by an opening statement of a couple of minutes. Peter Davies, could you begin?

[6] **Mr P. Davies:** Thank you for the opportunity to come to today's committee meeting. I am Peter Davies, Commissioner for Wales on the UK Sustainable Development

Commission. Thank you for the opportunity to provide evidence. As you will be aware, the SDC strongly believes in the importance of urgently developing large-scale renewable energy solutions.

9.10 a.m.

[7] The decarbonising of the electricity supply system is urgent and critical. We have completed significant reviews for Governments on renewable energy. You will be aware of our tidal energy review and of our wind energy review, and I have a copy of the summary document here. We have also completed a review of nuclear energy, which recommended that the Government should not continue with nuclear energy as part of its de-carbonisation strategy, although that recommendation was not taken forward. That is the position of the commission, hence our commitment and support for large-scale renewable energy development. That does not mean that we do not recognise the importance of a more localised and dispersed renewable energy system; in fact, we emphasise it. We also emphasise the importance of energy efficiency. However, our basic position is that we need all of those solutions, both more localised, dispersed, and large-scale renewables as well as energy efficiency measures, if we are to deliver the scale of change that will be required.

[8] On the barriers to that scale of change, I draw your attention to the important report 'Lost in Transmission', which talks about the barriers to the expansion of large-scale renewable provision because of grid capacity and connectivity, and about the role of Ofgem. I know that the committee will look at it later. However, one point that I want to add about the barriers—and you are well aware of other barriers, such as in infrastructure, planning, and so on—is that we feel that there is a big weakness in a public engagement strategy, which is probably the most underrated factor that can limit the expansion of large-scale renewable energy development. We feel that it is underrated and needs to be prioritised much more effectively, both by the public and private sectors. I have included a brief analysis of that in my paper. Our chair, Jonathon Porritt, raised that with the British Wind Energy Association. It has taken a long time for wind energy companies to realise that the skills needed to engage with local communities are different from those needed to build windfarms.

[9] We now seem to be in attack-and-defend mode on large-scale renewable developments. We need to prioritise it and bring a much more effective strategy to community engagement as part of this process. There are significant knock-on effects for the economy. The green jobs strategy is about to go out for consultation. Unless we make more significant breakthroughs in large-scale renewable energy development, that will have a particular impact. I will quote a developer whom I will not name but whom I quoted in my paper on this:

[10] 'Developers are so busy dealing with problems and working through the vacuum, there's no opportunity to take forward these things'—namely, green jobs and local economic development—'as you're fighting fires all the time and everyone is putting (usually different) obstacles in front of you!!! Large scale projects really should be an opportunity to bring green industries to Wales, and this isn't happening, and won't happen while all the issues with engagement and local relationships (both with communities and local authorities) continue!'

[11] So, it is a critical issue.

[12] **Mick Bates:** Thank you very much. I am certain that we look forward to building a low-carbon economy in Wales. Thank you very much for those opening remarks. There were some interesting points that Members will take up.

[13] We now move to Bangor to hear from the Countryside Council for Wales. Would you kindly introduce yourselves and make an opening statement of two or three minutes, please?

[14] **Mr K. Davies:** Diolch yn fawr, Gadeirydd. Hoffwn siarad yn Gymraeg a bydd John yn cyfrannu yn Saesneg. Cyflwynaf fy hun yn gyntaf. Keith Davies wyf fi. Yr wyf yn bennaeth polisi amgylcheddol Cyngor Cefn Gwlad Cymru.

**Mr K. Davies:** Thank you very much, Chair. I would like to speak in Welsh and John will contribute in English. I will introduce myself. I am Keith Davies. I am the head of environmental policy for the Countryside Council for Wales.

[15] **Dr Hamer:** Good morning. My name is John Hamer, and I am the head of marine policy for the Countryside Council for Wales.

[16] **Mr K. Davies:** Yn gyntaf, hoffwn ddiolch i chi am ganiatáu inni ymuno â'r drafodaeth drwy'r offer fideo-gynadleda. Yr oeddwn yn meddwl y byddai'n helpu o ran trefniadau ymarferol inni a hefyd mae'n lleihau ein hól troed carbon ni fel mudiad.

**Mr K. Davies:** First, I would like to thank you for allowing us to join the discussion using videoconferencing. We thought that it would help us with the practical arrangements but it also helps to reduce our carbon footprint, as an organisation.

[17] Fel y dywedodd Peter Davies, yr ydym yn gweld pwysigrwydd sicrhau gweithredu buan ar ddatblygu ynni adnewyddadwy. Mae'r Panel Rhynglywodraethol ar y Newid yn yr Hinsawdd wedi profi, yn ddiamwys, fod newid yn yr hinsawdd yn digwydd. Mae adroddiad Stern yn pwysleisio bod y costau o beidio â gweithredu yn fwy na'r costau o weithredu. Mae'n bwysig bod y sector cyhoeddus, preifat a gwirfoddol yn cydweithio er mwyn darganfod atebion i ymateb i her y newid yn yr hinsawdd.

As Peter Davies said, we see the importance of taking early action on the development of renewable energy. The Intergovernmental Panel on Climate Change has proved, without a doubt, that climate change is occurring. The Stern report emphasises that the costs of not taking action are higher than the costs of taking action. It is important that the public, private and voluntary sectors collaborate to find solutions to respond to the challenge posed by climate change.

[18] Mae gan Gyngor Cefn Gwlad Cymru rôl benodol o fewn y drafodaeth honno, sef cynorthwyo i asesu effaith datblygu polisi a datblygiadau unigol ar dreftadaeth naturiol Cymru. Er mwyn gwneud hynny, mae gennym strategaeth ynni sy'n pwysleisio'r angen i fynd i'r afael ag effeithlonrwydd ynni a lleihau'r defnydd o ynni. Yn ail, mae angen inni sicrhau ein bod yn datblygu ynni adnewyddadwy yn y manau cywir. Yn drydydd, mae angen inni lanhau'r dulliau confensiynol o gynhyrchu trydan. Wrth ddweud hynny, pwysleisiwn yr angen i wneud hynny i gyd ar unwaith. Ni fedrwn ddisgwyl i rywbeth ddigwydd; rhaid inni ymateb i'r her ar sawl agwedd a gwneud y pethau cywir yn y tri sector.

The Countryside Council for Wales has a specific role to play in that discussion, namely to assess the impact of policy development and individual developments on Wales's natural heritage. To do that, we have an energy strategy that emphasises the need to get to grips with energy efficiency and reducing energy use. Secondly, we need to ensure that we develop renewable energy in all the right places. Thirdly, we need to clean up the conventional means of electricity production. In saying that, we must emphasise the need to do all that at once. We cannot wait for something to happen; we need to respond to the challenge on a number of fronts and do the right things in all three sectors.

[19] O safbwynt y dystiolaeth, yr ydym wedi ceisio crynhoi rhywfaint o'n gwaith ar hwyluso'r broses o ddatblygu ynni adnewyddadwy. Yr ydym wedi cynnig tri neu bedwar awgrym i wella'r broses yn strategol,

On our evidence, we have tried to summarise our work on facilitating the process of developing renewable energy to a certain extent. We have set out three or four suggestions as to how the process can be

a hynny er mwyn sicrhau ein bod yn symud yn fuan i ddatblygu ynni adnewyddadwy tra ydym hefyd yn gwarchod nodweddion pwysicaf ein treftadaeth naturiol. Er mwyn gwneud hynny, pwysleisiwn yr angen i sicrhau integreiddio systemau tir a môr yn well. Yn y gorffennol, bu'n duedd i systemau tir a môr gael eu hystyried ar wahân. Pwysleisiwn hefyd yr angen i integreiddio systemau cynllunio a chaniatáu datblygiadau cynhyrchu ynni a datblygiadau sy'n ymwneud â throsglwyddo ynni. Dyna'r pwynt y bu Peter Davies yn ei bwysleisio am y cysylltiad rhwng datblygiadau a'r grid cenedlaethol, er enghraifft.

strategically improved, to ensure that we move quickly towards the development of renewable energy while also protecting the most important elements of our natural heritage. To do that, we emphasise the need to ensure the better integration of land and marine systems, which, in the past, have tended to be thought of as separate. We also emphasise the need to integrate planning systems and to allow energy generation developments as well as energy transfer developments, which was a point that Peter Davies emphasised, regarding linking up developments with the national grid, for example.

[20] Pwysleisiwn yr angen i sicrhau bod gennym fframwaith gofodol sy'n ceisio darganfod yr ardaloedd sydd fwyaf addas ar gyfer derbyn newid sylweddol yn sgil datblygiadau ynni adnewyddadwy. Gwelwn brosesau asesu, megis asesiadau amgylcheddol strategol, yn ffordd hwylus o sicrhau mewnbwn strategol i'r amgylchedd tra ydym hefyd yn darganfod ardaloedd sy'n addas ar gyfer datblygiadau ynni adnewyddadwy.

We emphasise the need to ensure that we have a spatial framework to identify those areas that are most appropriate to get the significant change resulting from renewable energy developments. We see assessment processes, such as strategic environmental assessments, as a convenient way of securing a strategic input for the environment while identifying areas that are appropriate for renewable energy development.

[21] Yn olaf, o safbwynt datblygiadau unigol, gwelwn gyfle i randdeiliaid drafod yn fuan ar gychwyn unrhyw broses o gynllunio ar gyfer prosiectau mawr. I gyfeirio at bwynt olaf Peter Davies eto, fel rhan o hynny, rhaid inni sicrhau bod trafodaeth gyda chymunedau a rhanddeiliaid lleol hefyd, i sicrhau eu bod yn deall y manteision posibl y gellir eu cael o'r math hwn o ddatblygiad.

Finally, on individual developments, we see an opportunity for stakeholders to come together at the beginning of any planning process for major projects. To pick up on Peter Davies's final point, as part of that, we must also ensure that there is discussion with local communities and local stakeholders, so that they understand the benefits that can flow from these kinds of developments.

[22] **Mick Bates:** Diolch am y **Mick Bates:** Thank you for the evidence. dystiolaeth.

[23] Thank you, Keith. We will now move to a series of questions, and you will be familiar with the process. I will begin. Peter, what needs to be done to ensure that renewable energy can contribute to the Welsh Assembly Government's target of achieving 3 per cent carbon reduction per year by 2011?

9.20 a.m.

[24] **Mr P. Davies:** The position in which we find ourselves is that we have too many people looking for too many alternatives, and they all believe that their idea is always the right idea while someone else's idea is always the wrong idea. We get to the point at which different technologies are actively competing against each other and rubbishing each other's version of their capacity to deliver on that target. We simply need to get back to the starting point of recognising that we may not know all the answers at this stage, but we have to take on all those options.

[25] We have well established and proven areas of technology that are efficient and can deliver. Although it is attractive and is an important part of the solution, I do not think that we can rely on a totally localised, dispersed system of renewable energy provision. I believe absolutely in community energy development. I chair a community energy network in Pembrokeshire and so I know the capacity that there is at community level. One of my recommendations would be that we look at ways to encourage each community to have a sustainable community action plan, facilitated through its town or community council. That would incorporate localising supplies of community energy, whether that is wind or biomass, and so on. If every community in Wales had a sustainable community action plan that incorporated community energy, you would have some movement towards achieving that target and it would be at a relatively low cost, it could be facilitated quite easily, and it would involve the engagement of local people.

[26] However, that on its own will not be enough, and we need the large-scale renewables projects such as the biomass plant in Port Talbot, and we need large on-shore and off-shore wind developments. In addition, in the view of the Sustainable Development Commission, subject to the appraisal, and to the environmental conditions being met in the feasibility study of the tidal power of the Severn, we will need that barrage as well, or an equivalent of it. I realise that that is a point that you will come back to later, but I want to say at this stage that how we maximise the potential of the tidal range of the Severn is critical to our long-term renewable energy provision. We must take the time to look at it and to receive the feasibility studies, but we must also ensure a can-do attitude. That is the position that the commission has taken.

[27] **Mick Bates:** Thank you. Briefly, what proportion of that 3 per cent do you think large-scale renewables can achieve? There is already a target for terawatt hours that will not be reached, so what proportion do you think can be achieved from large-scale renewables?

[28] **Mr P. Davies:** This is where there is a gap between the reality of where we are and the objectives that we have set ourselves. We are currently on a small percentage currently, and we have been for a while, and that is despite the best efforts of the Welsh Assembly Government to move this agenda forward. That is why much more emphasis needs to be given to that engagement process. We simply cannot go out there and tell people that this will happen.

[29] **Mick Bates:** Can you offer a figure?

[30] **Mr P. Davies:** No, I would be plucking a figure out of thin air.

[31] **Mick Bates:** Thank you.

[32] **Mr K. Davies:** Yn gyntaf, rhaid sicrhau bod fframwaith strategol sy'n gosod y cyd-destun, a gall strategaeth ynni Cymru wneud hynny. Hefyd, mae gwaith i'w wneud o safbwynt datblygu fframwaith strategol ar gyfer ynni adnewyddadwy morol. Yn ail, rhaid sicrhau bod yr holl sectorau yn cydweithio'n strategol ac yn sicrhau cydddealltwriaeth o'r blaenoriaethau a sut y dylid symud yr agenda yn ei blaen. Yn drydydd, fel y pwysleisiodd Peter, yn rhan o'r broses honno, rhaid sicrhau bod teimlad o fewn cymunedau eu bod yn rhan o'r broses o

**Mr K. Davies:** First, we need to ensure that there is a strategic framework that puts this in context, and the Wales energy strategy can do that. There is also work to be done on developing a strategic framework on renewable marine energy. Secondly, we need to ensure that all sectors work together strategically and ensure a common understanding of the priorities and of how to drive the agenda. Thirdly, as Peter emphasised, as part of that process, we need to ensure that there is a feeling within communities that they are a part of the



ddarganfod atebion i'r her sy'n ein hwynebu. process of finding solutions to the challenges facing us all.

[33] **Mick Bates:** Lesley, I think that you were interested in what the best type of renewable energy would be.

[34] **Lesley Griffiths:** In relation to renewable energy technologies, Peter mentioned that perhaps people are looking for too many alternatives. What would be your preferred technologies?

[35] **Mr P. Davies:** We currently have proven cost-effective technologies, such as wind and solar thermal, which, again, are not being exploited fully. Fast innovation is happening in solar—Wales is well positioned for the solar industry—and tidal technologies. Our tidal review highlighted that Wales has huge capacity, certainly for barrage development, which is relatively straightforward, and in tidal stream technology, which is pretty well developed. The Scottish Government has been leading the way on support for tidal stream technology. We could accelerate the implementation of that technology.

[36] **Lesley Griffiths:** Keith and John, what would be your preferred technologies?

[37] **Mr K. Davies:** There are two aspects to the question: what are the preferred technologies and what is feasible? At the moment, realistically, wind energy must be a key component of a strategy; it is proven and there are plans to ensure that, terrestrially and off-shore, we can develop the technology, while other on-shore and off-shore technologies are currently in stages of development. We need to encourage investment in the development of those technologies and, in due course, I am sure that they will come on stream. The other element is to ensure that we continue to ensure that we are investing in the energy efficiency demand-management side of the discussion, to ensure that our homes, for example, are energy efficient. That provides a link between reducing the demand and need for energy and ensuring that homes are well heated, tackling the fuel poverty issue.

[38] **Mick Bates:** Darren, you are interested in the financial aspects. Perhaps you could question our Bangor witnesses on that issue first.

[39] **Darren Millar:** Of course. I appreciated the papers that you both sent in. I was particularly interested to read the Sustainable Development Commission paper on the need for better engagement with town and community councils and members of the public, because there are barriers, particularly given that wind technology is perhaps the more viable technology—it is certainly the current cheapest renewable technology on a large scale. We know that current Government policy has not persuaded a large proportion of the public that wind technology is the right way forward. Given the resistance, particularly to wind, do you think that we need to accelerate the development of other technologies? Does there need to be some kind of financial assistance from the Welsh Assembly Government—in addition to the UK framework—to bring that about, given that we do not have all of the devolved powers? I put that question to Keith first, and then to Peter.

[40] **Mr K. Davies:** The answer to that question is that we should be doing both. We should be continuing to roll out the existing strategy of wind-turbine development, while ensuring adequate investment in developing other technologies, which not only have green energy potential, but could also contribute towards the development of greener jobs or a greener economy in Wales. John might want to say something about some of the off-shore technologies.

[41] **Dr Hamer:** I would like to add to that from a marine perspective. We have a good understanding now, relatively speaking, about the issues associated with off-shore wind, and I

feel that the industry is now getting to a scale where it can progress projects in a fairly structured and a well informed way with a strong evidence base. From a wave and tidal perspective, the tidal stream and tidal range, the sector is much more in its infancy.

9.30 a.m.

[42] We recognise that there are various challenges associated with the development of these technologies. The developers of these technologies are looking for clarity and certainty, and we and the Government can play a role in helping them to understand the issues associated with their technologies to help them to bring them forward in a strategic way.

[43] **Mick Bates:** Thank you. I just point out to Members that the screen has frozen, but we can carry on with the sound alone.

[44] **Darren Millar:** I appreciate those answers. By the way, it looks to us as if you are good ventriloquists, because the screen is totally frozen at the moment, but we can still hear you. You know of the current economic situation in the country and that the Assembly Government will soon publish its green jobs strategy, but you seem to be suggesting that there need to be better financial incentives or drivers to allow for the development of these other technologies much more rapidly than we are seeing at the moment. What types of incentives might the Assembly Government be able to introduce?

[45] **Mr K. Davies:** That is quite a difficult question for us to answer on the technicalities of support. The Assembly Government will be consulting shortly on the green jobs strategy, and I would imagine that ensuring that there are mechanisms in place to secure investment in the further development and implementation of the renewable energy sector in Wales would be a central plank of any strategy to green the economy.

[46] **Mr P. Davies:** It is a crucial question. On higher education innovation development, the Low Carbon Research Institute, which has been supported by funding and involves most of Wales's universities, is a crucial development in collaboration on innovation. That is important.

[47] The green jobs strategy is potentially a green new deal strategy, because, as you are probably aware, there is currently a lot of work going on around green new deals—what does that mean for what you are asking about, such as incentives, investments, and so on, in the green economy or a low carbon economy? It is a challenge for existing business support structures—which I know have recently been reviewed and re-introduced in a new structure—in moving from a business-as-usual model of business support to what might be needed under a green new deal. It would be interesting to respond to the green jobs strategy on whether it is a substantive move towards a green new deal, or whether it is simply a bit more of the same resource efficiency in the environmental services sector. We need to turn the whole thing on its head and look at the incentives.

[48] On the specifics of incentives and investment, I would draw the committee's attention to the New Economics Foundation report on the green new deal, because it sets out a range of specific options on how this type of activity could be taken forward, although I will not be able to give you the detail of the report now. There are also developments in feed-in tariffs that incentivise consumers and clients, which will also be important in incentivising the consumer use of that.

[49] On what the Assembly Government might be looking at in the green jobs strategy, it is about assessing how it is mainstreamed in business support services in Wales. In talking to what I consider to be the industries and the businesses of the future, I am conscious that they are not necessarily saying, at this point, that they are receiving the type of support and advice

that they will need for their business models going forward.

[50] **Mick Bates:** On that point, you talk about the green jobs strategy and a low carbon economy. Has anybody produced an estimate of how many jobs might be created by the development of large-scale renewables in Wales?

[51] **Mr P. Davies:** I have seen a piece of work that has been done, which is not public yet, which talks about the potential of large-scale projects. I would not be able to quote from it.

[52] **Mick Bates:** That would be very useful information and it would help us very much with our recommendations. Darren, back to you.

[53] **Darren Millar:** I have just one further point. What evidence has the Sustainable Development Commission received from businesses about the impact that the current economic crisis in the banking system is having on the accessibility of capital to allow businesses to develop their programmes? Will that be a serious hindrance to the development of these sorts of large-scale marine technologies, for example?

[54] **Mr P. Davies:** Access to capital, at this point, is obviously a big issue and that is where the public sector has a particular role to play. We hosted an event yesterday, as you will probably be aware, that involved a large number of people from the construction sector, trying to focus in on using the crisis as an opportunity, with public sector support, to move towards low carbon, zero carbon and energy efficiency, as part of maintaining economic activity and sustaining economic activity at a local level through that route. The public sector, at this stage, has a key role to play in that sort of investment. I think that we, as a commission, would generally feel that that area of investment must be a priority. Although the commission does not have a viewpoint on this, as such, it may be a better investment than simply putting more money in people's pockets at this point.

[55] **Mick Bates:** Thank you. We have three major issues that I want to discuss and we are short of time today. I would like to hear the opinions of both groups on transmission, renewables obligation certificates and the strategic environmental assessments, so could we please move quite quickly through these last sections? Rhodri, would you like to take up the issue of transmission?

[56] **Rhodri Glyn Thomas:** Yr wyf yn falch iawn ein bod yn defnyddio'r cyswllt fideo; dylai'r pwyllgor hwn, yn fwy nag unrhyw bwyllgor arall, wneud defnydd cynyddol o gyswllt fideo er mwyn sicrhau nad yw pobl yn ymgymryd â theithiau diangen ar draws Cymru. Fodd bynnag, yr wyf yn credu bod rhaid i ni fynd i'r afael â'r broblem o ran cyfieithu ar gyfer pobl sy'n cymryd rhan drwy gyswllt fideo.

**Rhodri Glyn Thomas:** I am very glad that we are using the video link; this committee, more than any other, should make increasing use of video links to ensure that people are not undertaking unnecessary journeys across Wales. However, I think that we need to get to grips with the problem of translation facilities for the people who take part via video link.

[57] Yr wyf am ofyn dau gwestiwn penodol am y rhwystrau o ran datblygu'r rhwydweithiau ynni y cyfeiriodd Peter atynt. Cyfeiriaf yn benodol at gyhoeddiad y comisiwn, 'Lost in Transmission'. Llongyfarchaf y comisiwn ar ei safiad ar ynni niwclear—yr wyf yn llwyr gytuno â'r comisiwn—ac ar ei safiad fod angen i ni

I wish to ask two specific questions about the barriers to the development of the energy networks to which Peter referred. I refer specifically to the commission's publication, 'Lost in Transmission'. I congratulate the commission on its stance on nuclear energy—I totally agree with the commission—and on its stance that we need

edrych ar bob opsiwn arall o ran ynni adnewyddadwy. O ran creu trydan carbon isel, beth fydd yn rhaid i ni ei wneud o ran cryfhau'r rhwydweithiau hyn—yn benodol y cysylltiad â'r grid cenedlaethol? Mae tystiolaeth, ac yr ydych yn cyfeirio ati yn eich cyhoeddiad, ei bod yn ddrud iawn i gysylltu â'r grid. Mae llawer o wrthwynebwyr ynni gwynt, yn benodol, yn sôn am yr ynni a gollir drwy'r cysylltiad â'r grid. Beth sydd angen ei wneud yn y fan honno? Sut y gellid cryfhau'r cysylltiad hwnnw? Beth sy'n rhaid ei wneud o ran rheoleiddio'r fframwaith er mwyn datblygu'r cyfleoedd yn y maes hwn yng Nghymru? Dechreuaf gyda Peter cyn symud at ein cyfeillion ym Mangor.

to look at every other option of renewable energy. On the creation of low-carbon electricity, what will we have to do to strengthen those networks, especially the connection with the national grid? There is evidence, to which you refer in your publication, that it is very expensive to connect to the grid. Many opponents of wind energy, specifically, refer to the energy that is lost through the connection with the grid. What needs to be done on that? How can that connection be strengthened? What needs to be done on regulating the framework in order to develop the opportunities in this field in Wales? I will start with Peter and then cross to our colleagues in Bangor.

[58] **Mr P. Davies:** Thank you. I think that the report on Ofgem, 'Lost in Transmission', really sets out and challenges the role played by Ofgem, as the regulator, in putting climate change at the heart of its functions, which it is not currently. The issue of grid connectivity is particularly severe in certain areas, such as Scotland, where we have large energy potential, but the grid connectivity is very poor. It is interesting to look at the Irish proposals for a grid going down the west of Ireland to maximise the wind and marine energy potential of the west of Ireland. I must admit that I am not an expert on Ofgem and the connectivity point, but I can get more specific input from my colleagues who are experts on it and who work with Ofgem on a direct basis. One comment that they made to me was that they felt that Scotland was quite strongly engaged with Ofgem, but they were not as aware of what the engagement is in Wales—and I must admit, neither was I.

9.40 a.m.

[59] There may be strong engagement, but they did not feel that, to their knowledge, there was as much engagement with Wales as there was with Scotland in working through these issues with Ofgem. Obviously, it is particularly severe in mid and north Wales, whereas in south Wales, even down to where I live in Pembrokeshire, you have had quite strong grid connections historically. So, along the south Wales corridor, you have the potential for renewable energy and the grid, particularly out to the west coast. That is why that area of Pembrokeshire is particularly important in its capacity for renewable development. However, there are real connectivity problems in mid and north Wales, and that has to be addressed with Ofgem directly.

[60] **Mick Bates:** Keith, would you like to comment on transmission?

[61] **Mr K. Davies:** Gwnaf hynny o ddau safbwynt. Yn gyntaf, un o'r anawsterau sy'n ein hwynebu yw bod systemau gwahanol ar gyfer cynllunio a chaniatáu datblygiadau sy'n ymwneud â chynhyrchu ynni a datblygiadau sy'n ymwneud â throsglwyddo ynni. O safbwynt Cyngor Cefn Gwlad Cymru, pwysleisaf yr angen i integreiddio'r ddwy system fel bod y system gynllunio sy'n ymwneud â datblygiadau ynni adnewyddadwy'n ystyried y system trosglwyddo ar yr un adeg. Mae hynny wedi

**Mr K. Davies:** I will take that on two fronts. First, one of the difficulties facing us is that there are different planning and permission systems for power generation developments and for power transmission developments. From the Countryside Council for Wales's perspective, I would stress the need to integrate the two systems so that the planning system relating to renewable energy production considers the transmission system at the same time. That has been a weakness with regard to renewable energy strategy in

bod yn wendid o safbwynt strategaeth ynni adnewyddadwy yn y canolbarth. I sicrhau bod hynny'n digwydd, efallai fod angen sicrhau bod yr holl randdeiliaid sydd â diddordeb yn y maes yn dod at ei gilydd i sicrhau cynllunio integredig.

mid Wales. To ensure that that happens, perhaps we should ensure that all of the stakeholders with an interest in this field are brought together to ensure integrated planning.

[62] Mae'r ail bwynt at y tymor hwy. Yn ogystal â'r grid cenedlaethol fel rhwydwaith strategol cenedlaethol, mae goblygiadau datganoli cynhyrchu ynni hefyd yn awgrymu efallai, law yn llaw â hynny, fod angen inni ystyried sut yr ydym yn datblygu rhwydweithiau sy'n dosbarthu ynni'n lleol i gyd-fynd â'r strategaeth a'r rhwydweithiau cenedlaethol. Mae hynny at y tymor canol, ond efallai y gallwn ei ystyried wrth drafod dyfodol datblygu ynni adnewyddadwy yng Nghymru.

The second point is for the longer term. As well as the national grid as a national strategic network, the implications of devolving energy production also perhaps suggest that, hand in hand with that, we need to consider how we develop local energy distribution networks in accordance with the national strategy and networks. That is something for the medium term, but perhaps we can consider it when we discuss the future of renewable energy developments in Wales.

[63] **Mick Bates:** With regard to the Planning Bill and the formation of an independent planning commission, what role will you play in relation to big developments of over 50 MW, or in the development of transmission across mid Wales?

[64] **Mr K. Davies:** Our role as a statutory adviser to the process will continue. How that will work out in practice, I am not sure, but we will be a statutory adviser, advising whoever is the decision maker. We would still encourage the integration of consents between electricity generation and transmission.

[65] **Brynle Williams:** Is the opportunity being taken now, as windfarms are going in, to ensure that, in relation to transmission, sufficient capacity exists to connect this to wave power? It seems ridiculous that we are putting in windfarms and the provision is not there to also have wave power, whether that involves turbines or what. Is that capacity being built in to the system?

[66] **Mr P. Davies:** My understanding of this is that significant weaknesses still exist in addressing that issue. One recommendation in our report is to connect and then manage the process. The weaknesses are in mid and north Wales.

[67] The point about integration is key. It is interesting that the integration of transport facilities to get the windfarms constructed is not thought through well enough upfront, never mind connectivity to the grid. Connectivity is an issue, but as far as the larger scale developments are concerned, it is being managed.

[68] **Rhodri Glyn Thomas:** Hoffwn wneud sylw yn hytrach na gofyn cwestiwn oherwydd gwn eich bod am symud ymlaen, Gadeirydd. Credaf fod rhaid inni gael tystiolaeth fanwl am gost cysylltu â'r grid cenedlaethol. Mae hefyd cwestiwn am—

**Rhodri Glyn Thomas:** I would like to make a comment rather than ask a question, because I know that you want to move on, Chair. I think that we must get detailed evidence on the cost of linking to the national grid. There is also the question about—

[69] **Mick Bates:** The energy networks will come before the committee soon.

[70] **Rhodri Glyn Thomas:** Yn ogystal â'r rhwydweithiau hynny, rhaid inni gael

**Rhodri Glyn Thomas:** As well as those networks, we need to get Ofgem in to look at

Ofgem i mewn i edrych ar y mater hwn. Yr wyf hefyd yn awyddus i edrych yn fanwl ar y cwestiwn hwn a godir yn aml gan bobl sy'n gwrthwynebu datblygu ynni adnewyddadwy, sef yr ynni sy'n cael ei golli o'r grid. Dylem gael rhywun i esbonio hynny'n fanwl wrthym oherwydd clywaf dystiolaeth wrthgyferbyniol ar y mater hwnnw. Dylem ystyried yr hyn a ddywedodd Chris Thomas o Hermon yn ei dystiolaeth i'r pwyllgor ar sut y gall prosiectau cymunedol ddefnyddio'r cyswllt sydd gan brosiectau masnachol er mwyn datblygu'r rheiny a mynd i'r afael â phroblemau'r gost. Edrychaf ymlaen at sesiwn yr wythnos nesaf. Credaf y dylem hefyd wahodd Ofgem er mwyn inni godi rhai o bwyntiau Peter.

this issue. I am keen to look in detail at this question, which is consistently raised by those who are opposed to the development of renewable energy, namely the energy that is lost from the grid. We need someone to explain that in detail because I hear contradictory evidence on that matter. We should consider what was said by Chris Thomas from Hermon in his evidence to the committee about how community projects can use the links that commercial schemes have in order to develop those and to tackle the problems of cost. I look forward to next week's session. I think that we should also invite Ofgem so that we can raise some of Peter's points with Ofgem.

[71] **Brynle Williams:** If Scotland can offer more renewables obligations certificates for wave and tidal generation than England and Wales can, what impact do you think that that will have on investors' choice of locations?

[72] **Mr P. Davies:** I think that investors' choice is an important point. Wales is obviously open for business in relation to renewable energy—all of the words are there. However, the problem is that the experience of developers does not closely match those words. So, anything that reinforces in a practical way, as in your example, that you are open for business and are incentivising business will attract investors. So, evidence of certainty and examples of how that certainty is then being translated into practical delivery will attract investors. I think that we face a challenge in Wales in that we have a good framework and encouragement, but, as yet, we do not have enough delivery on the ground that people can talk up and that will attract more investors. The ROCs point is an example of good policy that will encourage investment.

[73] **Mick Bates:** Keith, do you have anything to add to what Peter said about encouragement through ROCs? If you do, please be brief, as we have little time left.

[74] **Dr Hamer:** I will just add briefly, if I may, that, in our experience, developers of emerging technologies, particularly wave and tidal devices, often look across the UK for appropriate sites, if not beyond the UK. So, they are certainly thinking in those terms. If there are areas that offer greater incentives than others, such as ROCs, there is a strong—*[Inaudible.]*—areas that can benefit from the incentives being provided. Renewables obligations certificates are—*[Inaudible.]* Scotland has also undertaken a marine renewable energy strategic environmental assessment, which has enabled the Crown Estate to undergo a licensing round for wave and tidal devices. That is a crucial point—there is now a framework in place for these developers, with these technologies, to go to Scotland.

[75] **Mick Bates:** The line broke up a little then, John, and there is a series of questions now for the Countryside Council for Wales, so please bear with us if the sound breaks up again.

[76] **Leanne Wood:** Could you explain the role of the CCW in the strategic environmental assessment process?

9.50 a.m.

[77] **Mr K. Davies:** Without getting too technical, we are a competent authority, which

means that the organisation or authority that ultimately is developing a plan, strategy or project, and has taken a decision on that, must consult with us in scoping the content of a strategic environmental assessment and the detail, as it is being developed. In effect, we give it advice on what we think the baseline environmental information should be and the key objectives and impacts to consider when developing a plan or a project. We also give advice on the process and the environmental statement document as it emerges. Finally, we give advice on how issues that the SEA flags up for their impact on the environment can be mitigated, and how that, in turn, could amend a developing strategy or project.

[78] **Leanne Wood:** What are your views on the relationship between the environmental impact assessment and the strategic environmental assessment? How effectively do you think that they relate to each other? In addition, to what extent is information from an SEA incorporated into an environmental impact assessment?

[79] **Mr K. Davies:** Again, to try to cut a long story short, the information for both processes should broadly be the same. The SEA helps to identify the issues and areas best able to accommodate change, but that does not necessarily do away with the need for a project-specific environmental impact assessment that, within the wider framework that is established by the SEA, looks at the specific impacts of a particular project in light of its design and detailed development.

[80] **Mick Bates:** Do you want to come back on that?

[81] **Leanne Wood:** Yes, I have a final question. What sort of framework is needed to ensure that the strategic environmental assessment works effectively?

[82] **Mr K. Davies:** On the framework, the key issue from our perspective is that it is viewed as a process, that the process is inclusive of stakeholders and that it is transparent. Ultimately, the SEA is meant to provide information and evidence to inform a decision-making process. An effective SEA must ensure that it is process-led, and that it is open and transparent.

[83] **Mick Bates:** Darren is next, and then Lorraine.

[84] **Darren Millar:** Peter, I have a question on strategic environmental assessments. There has been not been a strategic environmental assessment of the decision by the Welsh Assembly Government to develop large-scale windfarms on large parts of Forestry Commission land. Do you think that there should have been a strategic environmental assessment of that, given the scale of some of these projects, and that it is a national policy that has not yet been scrutinised in this particular way?

[85] **Mr K. Davies:** Is that for me or Peter?

[86] **Darren Millar:** It is for Peter Jones.

[87] **Mick Bates:** Peter Jones is not here yet. We have Peter Davies and Keith Davies.

[88] **Darren Millar:** I am sorry, we have so many Peters. I will call one of you Pedro, and one of you Peter. My question was for the CCW.

[89] **Mr K. Davies:** I think that Darren is alluding to technical advice note 8, which was developed prior to the formal implementation of the SEA regulations. At one level, TAN 8 is the result of a strategic approach to analysing the environment of Wales with a view to identifying the areas of Wales that are perhaps most able to accommodate large-scale renewable energy developments.

[90] On projects relating to the Forestry Commission land, if you recall my response to Leanne, I said that the strategic environmental assessment should provide the overall framework. However, the project-level environmental impact assessment comes in where specific projects are developed within that framework. That is where the current Forestry Commission-related projects are now—work is being developed on the environmental impact assessment process of those proposals.

[91] **Darren Millar:** Thank you for that answer. You accept, do you not, that, although a strategic decision was taken, it was not subject to a strategic environmental assessment in the way that it would be if that decision were made today?

[92] **Mr K. Davies:** If and when technical advice note 8 is reviewed, I would imagine that that would need to be subject to a formal strategic environmental assessment process. At the time that technical advice note 8 was being developed, that was not a statutory requirement. Having said that, the TAN 8 process is, at one level, an example of a strategic approach to assessing the capacity of the environment of Wales to accommodate change. It provides a framework for decisions on project level impacts, which the Forestry Commission land process is currently seeking to address.

[93] **Mick Bates:** Thank you, Keith. Next week, we will have a detailed discussion about technical advice note 8 and wind power in general.

[94] **Lorraine Barrett:** I do not know how you will answer this question in two minutes, but what research has Countryside Council for Wales undertaken to assess the environmental impact of large-scale renewable marine projects, and what are the main findings?

[95] **Dr Hamer:** I will tackle that question. The Countryside Council for Wales has undertaken a broad range of projects over the past few years to collect a strong evidence base to inform our advice on the potential impacts of marine renewable technologies, which range from projects to understand the baseline environments—whether it is seascapes or the distribution of benthic habitats and their sensitivities—to projects looking specifically at the potential impacts of new technologies. For example, we undertook a project a few years ago that analysed the likely removal of energy from the marine system by tidal stream technologies and the potential impacts that that might have upon marine communities. More importantly perhaps, we engage in a number of strategic UK-wide fora where collaborative research is undertaken on generic issues associated with marine renewable technologies to advance our understanding and improve our knowledge base. That has been a very fruitful relationship, particularly with the Crown Estate through the collaborative offshore windfarm research into the environment, COWRIE, project.

[96] **Mr K. Davies:** If you would be interested, Chair, we could provide you with the details of the extent to which we have been engaged in that work.

[97] **Mick Bates:** I think that it is very important. Obviously, we have papers before us today, which give quite detailed figures and details of the impact of marine technologies on bird life for example. Sometimes, it is very difficult to get what is another baseline view of evidence. It would be very useful in your role as a statutory adviser.

[98] I close this first session this morning and thank you for your papers and answers. The transcript will be sent to you to examine. I welcome the offers of further information about jobs, Peter—so that, when we make our recommendations, we can look at the economic side of this—and on the more detailed work that you have undertaken with regard to marine technologies. I thank you in Bangor; it seems that your connection has been frozen for a long time. I am sure that it is due to the weather or something in Bangor. I also thank you, Peter



Davies.

*Gohiriwyd y cyfarfod rhwng 9.59 a.m. a 10.03 a.m.  
The meeting adjourned between 9.59 a.m. and 10.03 a.m.*

**Ymchwiliad i Leihau Carbon yng Nghymru: Sesiwn Dystiolaeth ar Gynhyrchu  
Ynni  
Inquiry into Carbon Reduction in Wales: Evidence Session on Energy  
Production**

[99] **Mick Bates:** We will now take evidence on larger scale renewable energy projects. I welcome all of you to the committee—some of you have been before. I will ask you in a moment to introduce yourselves for the record and then to make your opening presentations. We are running about 15 minutes late, so please be fairly concise if you could, because Members have a series of questions that they wish to put to you. Please introduce yourselves for the record, starting with Bettina.

[100] **Ms Bockelmann-Evans:** I am Bettina Bockelmann-Evans from Cardiff University.

[101] **Dr Masters:** I am Ian Masters from Swansea University and Swanturbines Limited.

[102] **Ms Lovell:** I am Ruth Lovell from the Royal Society for the Protection of Birds Cymru.

[103] **Mr Jones:** I am Peter Jones from RSPB Cymru.

[104] **Mr Wade:** I am Roger Wade from the Environment Agency Wales.

[105] **Mr Evans:** I am Michael Evans from the Environment Agency Wales.

[106] **Mick Bates:** Thank you. Can we start with your presentation, Bettina?

[107] **Ms Bockelmann-Evans:** Good morning. My colleague, Reza Ahmadian, who could help to answer questions on the evidence, is in the gallery.

[108] The study on the Severn barrage was led by Professor Falconer, who sends his apologies that he cannot be here today. You are all aware of the general challenges with regard to producing energy from renewables and that the Severn estuary basin is ideal for tidal energy production, being capable of producing up to 5 per cent of UK electricity. I will focus on the Severn barrage and on the Cardiff scheme, which we have investigated just on generation, and you will see modelling results, which we could also produce for other schemes.

[109] Before I show you the results, I want to point out that the natural environment is already changing due to climate change, with rises in temperature. Predicted rises in sea level will also change the natural environment. Water quality has been improving due to the successful water framework directive and is in turn changing nutrient levels, which will affect aquatic life. With bird species, we are already seeing some reduction in numbers, and they are moving to the east coast of the UK, possibly due to climate change, as they already have warmer winters.

[110] This slide shows the main effect of the barrage, and I would like emphasise the reduced tidal currents with reduced levels upstream and downstream. The suspended sediment levels would therefore be decreased, and there would be more light penetration of

the water column as a result.

[111] This slide is our model domain, and the grid shows the Severn estuary and the barrage scheme. Our model shows that the risk of flooding from the Severn estuary could be reduced both upstream and downstream of the Weston-super-mare to Cardiff barrage. This slide shows the water levels. Next is a Google Earth image—you can see the brown water, with which we are all familiar, around the Severn estuary. The barrage would reduce the maximum tidal currents, but would also reduce the scope for tidal turbines in the Severn, which is something to keep in mind. However, reducing the sediment levels would produce clearer waters.

[112] I must apologise that this is not the latest version of the presentation; some of these smiley faces icons should be sad faces. This should be one of the sad faces, with the tidal range decreasing from 14m to 7m, which will lead to a loss of inter-tidal habitats. There will be reduced flood risk, both upstream and downstream. Tidal currents and suspended sediment will be reduced, so there will be an increase in light penetration and water clarity. Here is the other face that should be sad, or perhaps neutral—there will be a change in ecology affecting flora and fauna, but with the higher light penetration, productivity might increase. There could also be an increase in jobs across many sectors, and in tourism and recreational potential.

[113] **Mick Bates:** Thank you. Ian, would you like to make your opening statement?

[114] **Dr Masters:** My name is Ian Masters and I am on the academic staff at Swansea University. I am also finance director of Swanturbines Ltd, which was formed as a technology company to develop a tidal current turbine. It works like an underwater windmill, and is a freestanding device that looks like a standard three-blade wind turbine, operating from the flow of the current. Tidal current technology is completely predictable, in the same way that the barrage is. The units are invisible, with all of the structure being below the water line, apart from possibly some navigational markers on the surface. With scale—although we are not at scale yet—the technology is economic. It is available now, and there are some prototypes in the water. Our unit will go into the water next year, so the technology is more available than may have appeared from the evidence so far.

[115] Compared to our competitors, the Swanturbines device is simple. We have engineered out the complexity to make a unit that is robust in a harsh marine environment. It is also economic because of that robustness.

[116] I have one more point. The goal is not just to produce electricity within Wales, although that is a valid goal. This is also a potential export technology; there are markets all around the world—South Korea, Indonesia and elsewhere—where there is a real need for electricity, and tidal currents can produce it. So, we are not only producing electricity, but a technology and an export market and job-creation opportunities.

[117] **Ms Lovell:** I will let my colleague, Peter, make some opening remarks, and then I will add some to sum up.

10.10 a.m.

[118] **Mr Jones:** Our paper was focused on tidal energy in the Severn estuary, although we also look at some of the major renewables possibilities here in Wales. The Royal Society for the Protection of Birds is looking at the issue from a biodiversity perspective, and we have a fundamental message, namely that, while we fully recognise the seriousness of the climate change challenge that we face as a species and a planet, we believe that solutions to meet that challenge need to be found that do not harm biodiversity in all its forms in significant ways.

[119] You will have seen from the paper that there are major threats to global biodiversity, and predictions are made about falls in population numbers, the extinction of species by the end of this century, and so on, and so we do not think it appropriate that climate change solutions should add further to these species' extinction and environmental damage. We believe, on present evidence, that the proposed barrage between Cardiff and Weston-super-mare would significantly damage birdlife and other species. There are some 68,000 overwintering birds in the Severn estuary, a number of which are designated as being of international importance under European Union regulations. My colleague, Ruth Lovell, will speak about that in a moment.

[120] Therefore, we are concerned to ensure that any development of Severn estuary tidal energy should not be at the expense of those species. For that reason, we welcome the UK Government's feasibility study, and RSPB, together with other green non-governmental organisations, is co-operating in the work that is being done in relation to that study. Clearly, we recognise the strength of tidal energy in the Severn estuary and, like others, we believe that, if at all possible, commensurate with environmental safeguards, we should be seeking to harness that energy as best we can to meet UK energy and carbon emission reduction targets. We believe, moreover, in looking at one or two at least of the energy project alternatives to the traditional familiar Cardiff/Weston barrage. We believe that there may be alternative technologies among the 10—such as the tidal fence proposal, or the tidal reef proposal—which could protect that natural environment of the Severn estuary in its present form, and deliver, certainly in the case of the tidal reef proposal, as much or more electricity than the proposed Cardiff/Weston barrage, and at considerably less cost. The RSPB is awaiting the results of a study that it has promoted looking at the potential of the tidal reef concept in engineering terms.

[121] You will have noted from the paper that the RSPB also commissioned a study from Frontier Economics of the cost implications of a barrage in relation to renewable and other alternatives. The conclusion of that study was that the Severn barrage would be at least twice as expensive as a range of alternative renewable technologies.

[122] **Mick Bates:** Could you draw your opening remarks to a close, please, as Members have questions to ask?

[123] **Mr Jones:** I am just coming to a close. The Severn barrage is often presented as a major contributor to carbon emissions reduction and electricity generation, but I remind everyone that it would deliver only a 1 per cent reduction in UK carbon dioxide emissions at current levels and would generate only 4.5 per cent of UK electricity. I will now ask Ruth to say something about the EU regulations.

[124] **Ms Lovell:** Very briefly, I will reiterate the point about the key test that has to be gone through under the birds and habitats directives. Those regulations should be upheld, and there should be no weakening of them or derogation from them. They should provide a framework for sustainable development so that they ensure that the right projects go forward in the right places. We will be pressing hard to continue to see that the less environmentally damaging and potentially cheaper options remain up for consideration, so that the consultation that takes place in January includes some of the options that we are particularly interested in seeing.

[125] **Mick Bates:** Thank you, Ruth, for being brief. Roger, you are next.

[126] **Mr Wade:** I defer to my colleague, Michael.

[127] **Mr Evans:** In our evidence, we concentrate largely on the Severn estuary.

Environment Agency Wales is an Assembly Government-sponsored body, and an environmental regulator. We have duties across water, land and air, as well as flood-risk management powers. The agency is fully participating in the Government's current feasibility study of Severn tidal power, so we do not have any strong pro or anti views while the study is ongoing. We are providing evidence and expertise, given that we have considerable experience of barrage developments, including that in Cardiff bay.

[128] We are helping to assess the impacts on wildlife, water quality, resources, flooding, and fisheries, where we have particular duties. Most of our concerns relate to those, as well as the costs and the alternatives. This is in our overriding duty to give advice on sustainable development, and you have heard some of the concerns already this morning. In addition to what the RSPB has said about the habitats directive test, we think that fish will present a much more difficult test than birds, where we have some experience and where it appears to be technically possible.

[129] A range of species protected under the habitats regulations lives both within the estuary and within associated rivers, such as the Usk and Wye. A barrage option could lead to the extinction of some of those stocks. The twaite shad, which is an unusual fish, is confined to four Welsh rivers in the UK—the Severn, the Towy, the Usk and the Wye—and three of them would potentially be above any barrage. Anyone who knows their shad knows that they are very sensitive to any disturbance and have particularly high mortality rates when they pass through turbines. So, they are our major concern.

[130] **Mick Bates:** We have some figures in our research document, which we will come to later. Thank you very much. I will start with a question directed at Ian. How well developed are marine technologies, and is there sufficient investment from the Government to make these technologies more commercially viable?

[131] **Dr Masters:** At the moment, many people are looking at this area. I was at a tidal summit this week, and there is a real appetite, particularly in the City, to invest in such technologies, because it is a clear technology and a good export area. The difficulty is that there is not yet, in the UK, the market pull, particularly through the renewable obligations certificate mechanism. We have to wait until the draft energy Bill has been resolved to see whether there is a financial incentive for the big money to get involved in these projects, and that will make it happen. There has been a lot of talk on technologies, and some are in the water. We will be getting there ourselves. However, if people spend between £30 million and £50 million on a demonstration project, are not clear whether the project after that will be financially viable. That will depend on the market pull in the medium term, but that pull is not in evidence at the moment. So, we believe that the technology works. There has been enough small-scale testing going through to first prototypes into the sea. The difficulty is the stage beyond that. It is an engineering challenge, but engineering challenges can be solved.

[132] **Mick Bates:** You seem to be saying that there is not enough Government support to encourage a commercial industry. What level of support would be required to move it forward?

[133] **Dr Masters:** The figure that has been talked about is of the order of £500 million.

[134] **Mick Bates:** That is from the UK Government, of course.

[135] **Dr Masters:** Yes, but that is a realistic amount of money if you are taking three or four tidal technologies or three or four wave technologies through to the small farm stage. Whether that money comes from the utilities companies, because they see that there is a market, or from Government or from other sources is debatable, but that is the amount of money that you might need to prove the technology through to a commercial level.

[136] **Mick Bates:** Finally, on that point, Ian, does that £500 million include all marine technology or is it specifically for turbines?

[137] **Dr Masters:** That would be for modular technologies, turbines of the various configurations, and some of the wave devices that exist. That would give you enough to build a medium-sized industry of between five and 10 players, or between five and 10 bits of technology.

[138] **Mick Bates:** Lesley has the next question, as long as she has fully recovered from her coughing fit.

[139] **Lesley Griffiths:** Sorry. Where do you think tidal energy systems should be sited, Ian?

10.20 a.m.

[140] **Dr Masters:** The places where there are good tidal flows are clear. There are some restrictions on that, including navigational, grid connection, and habitats and environmental restrictions. So, if you are looking at modular systems such as tidal stream, you can draw lines on a map outlining where the potential resource is, and then start to ask questions about resources. In Wales, the biggest site is in and around the Anglesey area.

[141] **Mick Bates:** Bettina, would you like to comment on where these tidal systems should be sited?

[142] **Ms Bockelmann-Evans:** I could point out with the models that we use and with the predictions that we make that they are neutral. They control the effects of any of these schemes, so they are useful tools with which to make decisions. We are currently looking at the Severn/Bristol channel area, but we could set up that model along the whole Welsh coast as a next step. However, you can see clearly the currents and their velocity in the water, which are directly related to the energy potential in that area. Working with people who develop the different tidal energy schemes, we could show that for all kinds of different options. The maps of where energy is available are the base for our models.

[143] **Mick Bates:** Is the Government using the same model as you, or are there other models?

[144] **Ms Bockelmann-Evans:** I am not sure about the Government. I know that Professor Falconer has been presenting these results at UK Government level.

[145] **Mick Bates:** Roger, do you want to add to that?

[146] **Mr Wade:** The Sustainable Development Commission work identified most of the work on tidal range and currents, but perhaps the next step is to look at the environmental issues. That could be mapped to some extent, although we are still waiting for things like the Strangford Lough turbines to show the environmental consequences of marine turbines. However, you could identify and map out the better positions from an environmental point of view as well as from a tidal energy point of view. That might make it easier for people to identify the best sites.

[147] **Brynle Williams:** Going back to connectivity, I would like to ask you what I asked previous witnesses. How closely are the tidal and wind energy companies working together? Are there discrepancies between companies that are not matching connections? Clearly, connectivity is a major issue, as we have to get that energy into the grid. You said that

Anglesey is an ideal area, and so we could connect using the old Wylfa power station and its grid system, but is there consultation between the tidal and wind energy industries?

[148] **Dr Masters:** That connectivity and conversation is happening on a number of levels. The British Wind Energy Association is quite active on grid development in Wales, and it has a marine section, so there is connectivity there. I have been instrumental, together with Professor Roger Falconer at Cardiff and Professor Mark Cross at Swansea, in setting up the Marine Energy Task Group for Wales. The two major players are represented on that group, namely Npower and E.ON. They have offshore and onshore wind developments in Wales, and they are also looking at marine sites in Wales. So, with their input, that issue is being tackled head on.

[149] E.ON has just undergone a recent reorganisation and now renewables is a single market unit globally. It is asking why, if we have all these different technologies, more renewable power is not on the grid. Which is the best one in this location, with this baseline infrastructure? The regulated nature of the grid is a difficulty, in that it will put a development project together only when there is a clear need for it. Grid development is a little bit of a chicken-and-egg situation. It is regulated and cannot be proactive in that way.

[150] **Darren Millar:** To the Environment Agency, we have heard in our evidence-taking sessions about the difficulties faced by the marine technology industry, given the lack of public investment to deliver the technologies through to commercial viability.

[151] One of the opportunities that surely presents itself is the opportunity to use some Government money to help to develop these technologies, given the flood protection benefits that some of them could have; for example, smaller barrages, or slowing the currents down, which could cause the erosion of sea defences, and so on. What active work is the Environment Agency doing to help to bring the flood defence side of things together with energy development opportunities? For example, there is an excellent opportunity in my constituency, just off the coast of Kinnel Bay and Rhyl, where I could see the compounded benefit of energy being generated from flood defences. Are you advising the Minister on that, and are you seeking opportunities on that front?

[152] **Mr Wade:** I know that we are doing it for hydropower; we have a full-scale project at the moment that is looking at mapping hydropower potential, which would include our rivers. However, as far as I am aware, we have not yet reached the stage where we are looking at lagoon-type options and flood risk. We have obviously costed out, or attempted to, what the potential benefits and disbenefits of a tidal barrage on the Severn would be for flood risk. It would appear, from what we know, that the benefits are fairly minor in comparison with the overall cost—they are there, but there are also potential disbenefits. You might find that the defences could be undermined either by drying out or by a different wave action from the impounded lake. So, it is not absolutely clear that it will be a total benefit. There are issues on both sides of the equation for us, but, as far as I am aware—Michael might pick up this point—we have not really started to look at the real possibilities. This is in the future. We are doing it for hydropower, so, hopefully, it is the sort of thing that we will look at in the future.

[153] **Darren Millar:** To reinforce this point, there are opportunities out there. There is a serious flood risk in parts of my constituency, in the Towyn and Kinnel Bay area in particular. That flood risk is predominantly a tidal flood risk as a result of the River Clwyd. So, there are opportunities, which I urge you to explore and, if possible, to provide more evidence on such opportunities to this committee in the future. We will be undertaking an inquiry on flood risk in the future, and a combination of the two would be interesting.

[154] **Mick Bates:** Bettina, I think that you want to come in on this point.

[155] **Ms Bockelmann-Evans:** I would like to make a quick point. There is already a benefit from some of the schemes on flood risk. However, if sea levels rise at the higher end of the predictions, they would be very useful. Climate change has to come into the discussion much more and would make those schemes much more beneficial.

[156] **Mick Bates:** So, are you saying that, in your modelling, for example, the impact of climate change on sea levels has been taken into account?

[157] **Ms Bockelmann-Evans:** Not so far. We are applying for EU funding at the moment to look at this. The EU wants people to look at including climate change in their predictions and in modelling output in relation to habitats. That will become more of a part of the EU regulations.

[158] **Mick Bates:** I would like to ask the Environment Agency about that. Does your modelling include the impact of climate change?

[159] **Mr Wade:** Yes, it does. Our shoreline management planning is looking at the next 100 years and takes on board the predicted sea-level rises, which we are given by the Welsh Assembly Government and Department for Environment, Food and Rural Affairs. They are higher than the predictions of the International Panel on Climate Change. So, they are specifically to be incorporated in any planning of flood risk management.

[160] **Mick Bates:** Thank you. Brynle, I think that you have an interest in marine biomass.

[161] **Brynle Williams:** This intrigues me. What are your views on marine biomass?

[162] **Mick Bates:** Would the RSPB like to comment?

[163] **Mr Jones:** Could you perhaps elaborate a little, Brynle, on what you have in mind when you refer to marine biomass?

[164] **Brynle Williams:** Harvesting algae, whether from fresh water or the sea, to produce energy from these organisms. I find it rather intriguing, although I know little about it.

10.30 a.m.

[165] **Ms Lovell:** We agree. It is not an area at which we have looked, and it would be a site-specific issue for us. We would have to look at mechanisms to harvest it, its impact on that area, its sustainability and its impact on any other species that were feeding in that area. We do not have a general position on it, because it is not something that we have worked on or have considered previously, but if a site-specific proposal was made we could look at it and formulate a position. However, at the moment, it is not something of which we are very aware.

[166] **Ms Bockelmann-Evans:** Having more light penetration in the Severn would affect the potential for those types of changes in the biomass, so it is something that we want to look at in the future. Our computer models could make those predictions.

[167] **Mr Wade:** There are two issues here—there is a kelp type of thing, which I know that Bangor University looked at some time ago to grow kelp locally in the Menai straits and so on. That has some interesting areas, although, whenever I try to follow it up, I do not seem to get much more information on it. However, it is something of interest. You also have a much wider issue of whether or not you can sequester carbon in the sea. There have been many suggestions about how to do so, such as adding iron, because that is sometimes considered to be a limiting nutrient for growth of vital plankton at sea. There are also many other interesting ideas about recirculating water from the deep parts of the ocean to the surface water, so that

you get much more productivity. One key issue on carbon balance, in general, is how much carbon gets absorbed by the sea and the land, and if you could get much more carbon absorbed by the sea, you would be taking carbon dioxide from the atmosphere.

[168] So, there are many interesting areas to be looked at, but they are embryonic at the moment, and we need to keep tabs on what is going on.

[169] **Darren Millar:** We heard earlier in our evidence that the ROCs were much more attractive in Scotland for marine technologies than they are in England and Wales, because of the framework that the Scottish Government has introduced. That will have an impact on where people want to locate their technologies, in working them up to commercially viable schemes. What action needs to be taken in Wales to ensure that we can support businesses such as yours, Ian, so that we do not lose out on the development of green jobs in the future to other parts of the United Kingdom, because we are competing not just with the rest of the world, but also with other parts of the UK?

[170] **Dr Masters:** For a project such as a tidal stream farm project in which you have an array of turbines—they look very much like an array of wind turbines, just that they are underwater—there are a number of barriers. One barrier is the cost of the electricity, which is relatively pivotal, and hopefully the new energy Bill will solve that. For your site, you also need baseline environmental data over a relatively long period of time, and that is something that could conceivably be collected by a university or the Environment Agency; that bit can be done. Grid connection queue times are quite long, as you were hinting at earlier. So, the grid connection question to a potential site needs to be proactively dealt with, as does the navigational question on that site. If you can get baseline data, you can have confidence in a grid connection and in aspects such as navigation issues, making sites much more attractive. On the shortcuts, it is all about reducing the risk to those who would invest in the project. If you do not give them a time risk, an environmental impact risk and a grid connection risk, they will say ‘I will go and do something else with my money’. It is those barriers that you need to start bringing down.

[171] **Darren Millar:** I assume that businesses such as yours are looking to be able to plug in some technology to see how it works. If all of those things were already in place, you and others could use that as a nursery for the technologies going forward.

[172] **Dr Masters:** Yes. The first-stage nurseries are quite well defined. There is the European Marine Energy Centre Ltd site in Scotland, which allows you to plug in single units. The target at the moment is the scale beyond that, where you may be putting 10 or 20 units into the water. If you want 20 units in the water off Anglesey, and if you started today, it will take two years, because you need a year of environmental data.

[173] **Darren Millar:** Do you believe that just getting rid of those barriers—not looking at the ROCs, or other financial incentives—would be sufficient to keep the technology here in Wales, and to attract investors to Wales?

[174] **Dr Masters:** It would definitely help.

[175] **Mick Bates:** It is worth investigating this a little further. Is there sufficient investment in Wales to keep businesses such as yours here? It seems from what you have just said that you are developing in Scotland.

[176] **Dr Masters:** That is because there is a site there that has environmental consent, as well as having a cable; those things are expensive and take time, and we, as a technology company, do not have the resources to develop those on our own. The EMEC site, which is five units in the water, and five wave units, has had £17 million spent on it so far, and it is



only a place to plug in. Therefore, do not underestimate the scale of the project.

[177] **Darren Millar:** How difficult is it to attract investment at the moment, given the current economic situation? Are you finding that people are more attracted to green technologies and to investing in green technologies—which seems to be a growth sector, despite the economic downturn—or are you finding it difficult to get money from the banks, because of the credit crisis?

[178] **Dr Masters:** In our experience, there is a lot of money in looking at lower-risk projects, beyond the technology development stage.

[179] **Mick Bates:** Thank you. At this point, I would like to say that we have a distinguished guest in the public gallery. I offer a warm welcome to the King of Lesotho and his guests. I hope that you will find these proceedings interesting. Investment is always something that we all want to see accrued, especially if it is for low-carbon technology.

[180] We will now move on to the proposals in the Severn estuary. Members will start to examine some of the evidence in the papers, particularly regarding bird life and fish. They will become crucial environmental issues for us, as the committee seeks to make some form of recommendation, against the background of the big feasibility studies that are taking place in Westminster. The Government announcements on that are expected in 2010. Leanne has the first questions on this issue.

[181] **Leanne Wood:** A recent report by the House of Lords European Union Select Committee raised concerns about the timescale for the Severn barrage. The report recommended that the Government should not rely on the inclusion of the estimated generating capacity of the barrage to reach the 2020 renewables target. Can you give us your thoughts on this, and tell us what we could do in the meantime?

[182] **Mr Jones:** The current projection for an operational Cardiff to Weston-super-mare Severn barrage, at the earliest, is 2022; that is the Government's own projection. The European Union renewable energy target is set for 2020. We know that the UK Government has entered some kind of provision to enable its projected 2022 electricity output from the barrage to contribute towards meeting the UK's 2020 target, which is an interesting sleight of hand, but there we are.

[183] However, on meeting climate change needs, the current state of the science is that 400 parts per million of carbon dioxide in the earth's atmosphere may represent a tipping point of natural runaway global warming. Given current levels of carbon dioxide in the atmosphere, and annual increases, we are likely to reach that figure in 2015, or thereabouts—well before a barrage or anything similar to it is likely to be operational.

10.40 a.m.

[184] Therefore, in meeting climate change targets, we need to look at other, quicker options that can be considered. The easiest and cheapest approach—this is the RSPB's perspective—is demand reduction and associated energy-efficiency measures, which could be put in place much more quickly and much more effectively than a big energy project such as the Severn barrage or, for that matter, nuclear power. That, again, has a long implementation timescale before it can become effective. So, we would be looking to see major efforts in demand reduction, energy efficiency and other renewable technologies, for example, existing wind technology, which can be developed on a more rapid scale than perhaps has been the case up until now, to deliver additions to output.

[185] We do not envisage a Severn barrage meeting global climate change requirements,

not on the timescale that the science points to. Research that we and others have commissioned, and reports that we have produced with others, suggest that it is possible to have alternative renewable energy mixes, with energy efficiency measures, that can deliver the EU targets for 2020 without a Severn barrage.

[186] **Mick Bates:** The RSPB states that the completion date for a barrage is 2022. What does your research show, Bettina?

[187] **Ms Bockelmann-Evans:** Technically, on an engineering level, it could be put in place earlier. The problem is looking at all of the environmental and legal issues. I believe that climate change is such a big issue that we have to pursue all of these different methods and ensure that schemes can be implemented as soon as possible.

[188] **Mick Bates:** You cannot say that it could be built within 10 years, for example, so that it would help us to reach these EU targets?

[189] **Ms Bockelmann-Evans:** From a purely civil engineering point of view, that could happen.

[190] **Mick Bates:** It could be done earlier than 2022?

[191] **Ms Bockelmann-Evans:** I would say so.

[192] **Rhodri Glyn Thomas:** I do not quite understand this fixation with target times, because we need to meet the targets within those times, but we are talking about something that is far larger and more important than that. We must continue to develop renewable forms of energy. I was looking at the figures for all the possible marine renewable energy options, and I would argue that we need to achieve all of those if we are serious about renewable energy in Wales. That point was made by Peter Davies earlier. We are now in danger of going back to what Peter warned us against, that is, pitching one scheme against another and of trying to argue the merits of one scheme and undermine others. I have not come to a final view on a Severn barrage yet, although my party seems to have come to a final view on it. I am open to looking at the potential of a barrage. However, if we want to look at harnessing the benefits of all of these schemes, how much grid strengthening would have to be done to cope with that? Is the capacity of the grid a major issue here as we develop renewable energy?

[193] **Mick Bates:** Who would like to answer that? Ian, you have mentioned this before.

[194] **Dr Masters:** The grid is difficult in the sense that there is a clear indication that the national grid should not spend money investing over a long period of time on a grid connection for technology that is not be ready to be plugged into it. However, on the other hand, some of the grid queues are so long that that is the critical path in many projects. For example, some of the TAN 8 projects are for onshore wind where access to the grid is possibly easier, but there is a long wait for grid connection. So, we have to deal with that issue of what we are going to put on the end of these cables and when connection will arrive; we need to start being proactive on this. When you are putting cabling across country, cables are quite an emotive issue for the public—it takes a long time to get public consensus. If we are not proactive, that will be a problem.

[195] **Rhodri Glyn Thomas:** Are we going to get some evidence on grid capacity and connectivity?

[196] **Mick Bates:** Yes, in our next session. Peter and Roger want to come in on this.

[197] **Mr Jones:** Not specifically on grid capacity, but to pick up on what Rhodri Glyn

Thomas said, can we just remind ourselves that there are 10 options for harnessing tidal energy in the Severn, not just the Cardiff/Weston barrage? Of course, from an RSPB perspective, as I mentioned earlier, we are particularly interested in one or two of the alternative technologies that appear to be far more benign environmentally than the Cardiff/Weston barrage or a similar type of development. We must not lose sight of the fact that what we are really considering is how best to harness the Severn's tidal energy, which I am sure that we are all agreed we should be endeavouring to do. There are alternative options and some of those options are quite capable of performing as well, or better, in relation to output, than the proposed Cardiff/Weston barrage, and at considerably less cost. A decision will be taken at the end of this year about the second phase of the UK feasibility study, by a ministerial group, which will include our First Minister and the Minister for Environment, Sustainability and Housing, and I would hope that this committee would find a way of impressing upon those colleagues that these environmentally more friendly options must be kept in the picture and not removed. The fear, at the moment, is that they might be deleted, simply because there are no working examples or prototype examples available to justify their continuation. On the habitat regulations, there is a requirement to look for reasonable alternatives and we believe that tidal reef and possibly tidal fence technologies are reasonable alternatives that are available for application in the Severn estuary. I would be grateful, Chair, if some way could be found of impressing upon our representatives at the ministerial meeting that they should use their best endeavours to keep those options in the picture.

[198] **Mick Bates:** While I accept that you have just put that on record, I think that it would be as well if you were to write to us on that point.

[199] **Ms Lovell:** To come back on Peter's point about the fact that we have commissioned an engineering study, we would very much like to share the results of that study with you, so, once we have that information, we would like to follow it up with details to help your submission.

[200] **Mick Bates:** Thank you very much. Darren, I know that you wish to come in briefly.

[201] **Darren Millar:** Leanne asked earlier about the timescale and 2022 was earmarked for the development of a barrage, if it were to get the thumbs up and the go ahead. On the other technologies, what is the lead time needed in order to get those in place? In other words, could we be generating significant energy from the Severn well before 2022 if the other technologies were pursued more vigorously? Can you give us a bit more detail on the tidal reef? There is not a lot of information in your paper about that and I am much more familiar with the concept of a tidal fence because of your work and the work of others, such as the WWF, on that front.

[202] **Mick Bates:** Could I ask for there to be a very brief response and if you have further information for it to be sent to committee?

[203] **Mr Jones:** Yes, Chair. The quickest way in which I can respond to that request is to forward to the committee the report that has been produced by a company chaired by Rupert Armstrong Evans, whose concept the tidal reef is. Just in a sentence, according to its advocates, the tidal reef would be able to generate something like 20 TWh of electricity a year, compared to 17 TWh from the Cardiff/Weston barrage, at about half the cost of constructing a Severn barrage, while not having a significant impact on the inter-tidal habitat and salt marsh on which birds, in particular, depend for feeding and roosting over winter. I will forward that information to you, Chair.

[204] **Mick Bates:** Thank you very much.

[205] **Mr Wade:** One of our concerns about the feasibility study, as it is at the moment, is

the emphasis on existing technology. Quite a few of the projects that were put forward were 20 years old. The study concentrated on the technology, and not on the holistic view of what the project should be. In other words, the study did not start with the environmental concerns to begin with and to look at how those could be addressed. I think that we would support, to a large extent, the concept that you need to be able to look at new technologies as well, but that might put the timescale even further back. However, if you are talking about timescales, the smaller barrages—the Shoots barrage or even the Beachley barrage—could probably be built quicker because they are smaller and would not require so much construction. If you are looking at the newer technologies, it is probably fair to say that there would have to be a lot of environmental, technological and engineering development associated with that, which may put things back even further.

10.50 a.m.

[206] **Mr Evans:** Just to add to that point on timescales, the Government has designed its own terms and guidance, called ‘optimism bias’, which has largely been around the costs and how publicly-funded projects tend to run over budget, but they also run over time. Something on this scale, with so many unknowns, and in such a dynamic environment, is likely to suffer greatly from delay. Certainly, there are questions about of the environment to which we do not yet know the answers—they would be covered during an environmental assessment stage. There are all these questions and delays, and then you have the construction logistics to consider, such as whether you have enough engineers, whether you have the docking facilities, whether you have ever built turbines this big—‘no’ is the answer on a Cardiff to Weston-super-mare barrage—and whether you have ever built caissons. There are so many unknowns that it is more likely to be delayed than to be able brought forward.

[207] **Mick Bates:** While those comments are interesting, they involve a lot of speculation. We as a committee are trying to make recommendations, given the urgency of climate change and of reducing carbon emissions, so that we can combat the serious issue of temperatures increasing to such an extent that we will lose habitat. What loss is already occurring? Bettina gave us figures showing that bird populations are already moving due to climate change. We have looked at the experience of the Cardiff barrage, where there has been offsetting. To what extent—this question is for the RSPB—does offsetting work, given that a large offsetting project was done when the barrage was built in Cardiff?

[208] **Mr Jones:** On the Cardiff barrage, research on the redshank in particular has shown that that species, which has been displaced from the Cardiff bay area out onto the wetlands near Newport, has suffered a significant reduction in overall numbers and a reduction in the surviving birds’ body size and weight, particularly the juveniles. For that species, the information that is available is not encouraging.

[209] Overall, however, bird numbers in the estuary have increased in the last two years. If one looks at the wetland bird survey, one can see that, overall, the species recorded have increased in numbers rather than reduced. I fully accept that there has been a massive 50 per cent reduction in the population of the dunlin species, but that has been compensated for by increases in other species, including internationally important species.

[210] Obviously, climate change will impact on the presence of birds in the estuary. These are migrating, overwintering species, and the likelihood is that, with warming, the birds that presently fly in from Siberia and the Sub arctic across the British Isles to overwinter in the Severn might cease to do so, and might either not migrate at all, or might settle on the coast of East Anglia and the north-east coast of England rather than coming across.

[211] Those are rather pessimistic projections based on what might happen if we do nothing to mitigate global warming. The simple fact of the matter is that we have an estuary, and it

has a particular population of important bird species. In the RSPB's view, it is important to protect that, and we should not be adding to the removal of those species from the estuary through our own actions.

[212] With regard to compensatory habitat for a Cardiff/Weston barrage, around 14,500 ha of mudflat and sand flat in the estuary are currently populated by these 68,000 birds. According to guidelines for finding compensatory habitat, the usual estimation is to look for an area some three times the area being lost, because you cannot direct birds to a particular alternative location. So, compensatory habitat would have to be found of around 42,000 ha of appropriate alternative space that would be suitable for the species displaced from the estuary, not just suitable for any species. We are looking at an area virtually the size of Anglesey as compensatory habitat. The RSPB would currently find it difficult to identify anywhere in the flyway of the birds affected that could meet that requirement.

[213] **Mick Bates:** We will leave that issue there, as Members wish to come in. I see that you also wish to comment, Mike. I will come back to you in a moment, Ruth.

[214] **Mr Evans:** It is a short point. Climate change will affect all habitats and species. With regard to the UK's responsibility, the priority must be to look at helping species and habitats to adapt in the most important sites. The Severn estuary is an internationally recognised site. Even 100 years from now, because of its size, location, orientation and tidal range, the Severn estuary will still be an internationally important site, but the species will be different.

[215] **Mick Bates:** That is an important point, because it seemed to me that the impact would be detrimental to the particular species that we are hearing evidence about, but you are saying that the species will change anyway.

[216] **Mr Evans:** It is inevitable that the species will change, and we must help these species to adapt to the changing environment. My point is that the Severn estuary will remain an important site, even if we lose species, because other species will move in.

[217] **Mick Bates:** I see your point. I call on Ruth to respond briefly, and then Rhodri.

[218] **Ms Lovell:** Following on from that point, I emphasise that the Severn estuary will be important in future, and could be increasingly important in future, as other areas around the UK are squeezed—the idea of coastal squeeze—and other sites are lost. So, species will change across the whole of the UK, in response to climate change, as the range of a particular bird species increases and it moves further north due to warming and so on. I wished to re-emphasise that point.

[219] **Mick Bates:** Thank you. That is an important point.

[220] **Rhodri Glyn Thomas:** I will confine myself to a comment rather than a question, because I know that we are rapidly running out of time. Peter made an important point, namely that we should not close the door on any options at the moment in relation to the Severn estuary. We should not have a debate just about the barrage, but the barrage has to be part of the debate. I understand that that is also the present view of the Government.

[221] However, as Roger said, there is a real danger that, in trying to meet the targets—and if we are honest, we do not have a hope in hell of meeting any of the targets that have been set—we talk only about existing technology, without looking at new technologies, because we want a sharp, short hit on this particular issue. In the long term, that could be detrimental. There is a fine balance to be achieved. We must look at the targets and make every effort to meet them, but we must also look at the longer term and ask what will be of greatest benefit

in addressing the challenges of climate change. Sometimes, when you have a short-term view of targets, you lose sight of the long-term goal. That is the balance that we must look for.

[222] **Mick Bates:** It is with that in mind that we will deliberate on evidence that we have received this morning.

[223] We need to examine the question of fish, which has become increasingly important. We have some figures from the SDC report in our research briefing. Roger, can you give us some guidance on how robust—

[224] **Mr Evans:** I am a fish biologist, so perhaps I can try to—

[225] **Mick Bates:** At last. Briefly, we have figures that say that the injury rate on salmon can be as low as 10 per cent. How robust are these figures and what research is the Environment Agency undertaking to help us when we discuss the impact on species?

[226] **Mr Evans:** There are many unknowns with fish; you would expect me to say that, I am sure. Fish do not like turbines. You can make the turbines more friendly in order to mitigate some of the damage to fish passing through them, but they will inevitably cause damage to fish. A particular problem of the Severn estuary is that, if you have a barrage across it, fish may go through the turbines many times, because, as the tide goes in and out, it takes the fish with it. Species such as salmon may hang around in the estuary for some time before they choose to go upstream into their natal rivers to spawn. These fish could, potentially, passively move up and down through the sluices and turbines, if they survived that passage, several times. Based on the design of the turbines that would potentially be installed, five passages could wipe out 90 per cent of adult salmon. These turbines are pretty invasive and pretty destructive.

[227] The difficulty with the Severn estuary is that it is not like Cardiff bay, where a freshwater environment meets a marine environment and a fish can orientate to a safe passage by detecting the freshwater flow. In the Severn estuary, the waters are mixed, so it would be difficult to design a fish pass to which fish could find their way and move through.

11.00 a.m.

[228] Even if they knew that there was a safe passage, the question is whether they would be able to resist the flow of the estuary and orientate and swim to it. It is a unique environment with some new challenges in relation to fish passages. The consensus is that a barrage, in particular, would have a major impact on species and could actually lead to the local extinction of shad in those rivers.

[229] **Mick Bates:** What is the evidence from La Rance where there has been a barrage now for forty years?

[230] **Mr Evans:** Unfortunately, there is not good evidence from La Rance. The environment is very different. We do not think that it had a migratory run of fish before. Fish certainly do go through turbines, but the nature of the Severn estuary is unique, and I think that it needs to be studied in that context. You cannot always learn all of your lessons from other examples; you have to use those lessons and try to predict what will happen in the estuary.

[231] **Mick Bates:** What is your current view on the impact further inland with regard to the Wye and Severn?

[232] **Mr Evans:** For salmon and shad to complete a life cycle they need to go to sea.

Therefore, inevitably, they will need to pass any structure within the estuary. As I said, looking at the current designs upon which this study is pretty much based—the existing technologies and what can be deployed in the short term—we think that it would have a pretty devastating effect on the fisheries of those rivers.

[233] **Mick Bates:** Is there any information on that—the impact, let us say, on tourism on mid Wales's rivers?

[234] **Mr Evans:** We are gathering some of that evidence now for the feasibility study. The costs of its economic impact are likely to be quite small in the millions, rather than the costs and gains of a barrage in billions, but they will be significant particularly in rural areas of Wales where these fisheries are established.

[235] **Mick Bates:** Thank you. Finally, Bettina, would you like to comment on some of the evidence that we have just heard about bird species and fish, in particular?

[236] **Ms Bockelmann-Evans:** I will make a quick comment on the fish. Again, with climate change predicted to cause warmer and drier summers, one issue is that rivers might be warming, which will cause a problem for the fish that are migrating up those rivers. We do not know how those populations would develop in future given climate change alone.

[237] **Mick Bates:** Do you have any figures to suggest what the likely impact of the warming of rivers would be on salmon, for instance?

[238] **Ms Bockelmann-Evans:** No, I do not have those figures.

[239] **Mick Bates:** Perhaps there are none.

[240] **Ms Bockelmann-Evans:** I could ask Professor Falconer whether he can get something, and, if so, we can send them to you.

[241] **Mick Bates:** If that is possible, I would be grateful.

[242] **Mr Wade:** We have some figures on the potential warming of rivers and flow rates in rivers that might have an impact on salmon, but I guess that our view is that you should try to find ways of adapting to that to try to maintain the habitat for the salmon. It is not exactly an opposed view but the key issue for us would be to see whether we could do something to keep them there.

[243] **Mick Bates:** Eventually, this will be a political decision based on the evidence that is received through this feasibility study. As I reminded the committee, that decision is to be made by the Government by 2010. It is a fairly short timescale on this. It will be subject to a great deal of speculation, but the planning side of it is still critical and the Planning Bill does make provision for an independent planning commission that would take decisions that are of overriding national strategic importance. It may be that the pressures of climate change—as Bettina points out—in its urgency, would become overriding.

[244] Are there any final points that Members wish to raise while the witnesses are here this morning? I see that there are none. In that case, I thank you very much for the evidence that you have presented today. It seems to have raised many more questions. You will be given a copy of the transcript, and we will be very grateful for any further information that you have, particularly on the research side, that would help us to form our view and put it to the Minister eventually through our recommendations. I thank you all very much, and I also thank Members for their questions.

11.04 a.m.

**Papurau i'w Nodi  
Papers to Note**

[245] **Mick Bates:** We have two papers to note, one of which is from the Micropower Council. You will have seen the letter urging us to continue with the support. The second paper to note is a letter from the Minister for Environment, Sustainability and Housing, which we will discuss in a moment.

[246] The next meeting of the Sustainability Committee will be held at 9 a.m. on Thursday 20 November when we will be taking further evidence on carbon reduction and bio-energy production, focusing on wind power. One of the people who wrote technical advice note 8 will be present, along with the industry representative and someone who represents the opposition to wind power development.

11.05 a.m.

**Cynnig Trefniadol  
Procedural Motion**

[247] **Mick Bates:** I propose that

*the committee resolves to exclude the public from the remainder of the meeting in accordance with Standing Order No. 10.37(vi).*

[248] I see that the committee is in agreement.

*Derbyniwyd y cynnig.  
Motion carried.*

*Daeth rhan gyhoeddus y cyfarfod i ben am 11.05 a.m.  
The public part of the meeting ended at 11.05 a.m.*