

MEETING DATE: 17 January 2012
LOCATION: 58 Princes Gate, London SW7 2PG

ATTENDEES:

Chair:	David MacKay	DECC
Members:	Nick Winser	National Grid
	Tom Delay	Carbon Trust
	Julian Allwood	Cambridge University
	David Clarke	ETI
	Jeremy Watson	DCLG
	Sue Ion	Royal Academy of Engineering
	Graeme Sweeney	Shell
	John Miles	Arup
	Alison Wall	EPSRC
	John Loughhead	UKERC
	Graham Pendlebury	DfT
	Paul Lewis	Scottish Enterprise
	Peter Bance	
	David Eyton	BP
	Mike Farley	Doosan Power Systems
	Ron Loveland	Welsh Assembly Government
	Stephen Trotter	ABB
	Duncan McLaren	Friends of the Earth
	Neville Jackson	Ricardo
Non-members:	Richard Neale	Atkins
	Garry Staunton	Technology Strategy Board
	Keith MacLean	SSE
Invited:	Mike Thompson	CCC
	Ellen MacArthur	Ellen MacArthur Foundation
	Jamie Butterworth	Ellen MacArthur Foundation
Secretariat:	Farida Isroliwala	DECC
	Ian Welch	National Grid
Analysis Team:	Jonathan Radcliffe	ERP Analysis Team
	Richard Heap	ERP Analysis Team
	Mark Workman	ERP Analysis Team
	Helen Thomas	ERP Analysis Team

1. Chair's introduction

David welcomed Members to the meeting, and noted apologies from Dave Clarke, E.ON; Peter Emery (Drax Power); Ian Marchant, SSE (with Keith MacLean attending as alternate); Neil Morgan (Technology Strategy Board (with Garry Staunton attending as alternate)); and Martin Grant (Atkins, with Richard Neale attending as alternate).

The minutes of the October 2011 meeting were approved.

David outlined the main objectives of the meeting: to discuss a draft report on managing intermittency, consider key issues arising from the meeting with start-ups from the October meeting, and agree the scope of a new project on resource-use efficiency.

2. Project updates

2.1 Bioenergy

Graeme Sweeney summarised the ERP discussion paper on the Committee on Climate Change (CCC) Bio-energy review. He emphasised the way in which uncertainty was dealt with, concerns regarding the optimistic deployment rates for other technologies and the need for greater transparency in the way in which the results and recommendations were derived. He emphasised the need for industrial input into the CCC's work and that this might be facilitated by the development of a more systematic relationship between ERP and CCC. He requested ERP membership support to engage DECC (ORED and Office of David MacKay) and the CCC based on the issues raised in the discussion paper.

There was general support for this approach with a number of members agreeing that engagement with the CCC, and BBSRC, would be valuable.

Other points made in discussion included:

- The key uncertainty of soil carbon in bio-energy carbon balance was emphasised.
- There was a need for more clarification on the specific uncertainties that need to be addressed, the type of policies that can be used to manage uncertainty and that the issue on transport technologies (EVs and H₂) should be broadened to demand management and modal shift.
- Keeping the focus tight and on biomass was the best way to make a difference on any engagement with Govt.
- The ETI Bio-energy programme was seeking to address a number of the uncertainties highlighted in the ERP discussion paper.
- Devolved administrations have different approaches.

David MacKay found that Graeme had the ERP's support to engage the Government and CCC based on the issues raised in the ERP discussion paper. Mike Thompson stated that the CCC would be happy to engage with the ERP on the ERP bio-review discussion paper.

Action

Graeme Sweeney to arrange meetings with DECC and CCC to cover issues made in the discussion paper, with due regard to points raised by Members.

2.2 International engagement

John Loughhead reported back that the Steering Group had discussed the proposed framework for assessing the UK role in engaging in international energy innovation. There was good participation with some refinements made to the approach. Assessments would be made of different technology areas and presented to ERP in April.

John took the opportunity to alert members to the European Commission's proposal for 'Horizon 2020' as the successor to Framework Programme 7.¹ There was a window of opportunity in the next twelve months for influencing the outcome.

John also reported back on a new initiative in France, establishing 15 new 'centres of excellence' in energy with €1bn funding over 10 years as public-private partnerships.² The proposals for the centres had just been reviewed, results were expected within a few months.

2.3 Nuclear fission

Sue Ion reported that the nuclear fission roadmap, which ERP had a strong role in developing, would be published within the month. Although it was not a full roadmap (as it did not assume a preferred destination), rather giving an outlook of the implications for R&D of different deployment scenarios, it emphasised the need to make decisions in the next few years. ERP's involvement in the activity would stop following publication.

Sue asked Members to get in touch with the Analysis Team if they wished to make an input.

David MacKay responded that the roadmap would be of value to Government.

Action

Members with an interest in the nuclear fission roadmap to contact Richard Heap on the Analysis Team.

[After the meeting the draft Roadmap was circulated to all Members for comment.]

3. Innovation challenges to managing intermittency

The item on challenges to managing intermittency followed the Committee on Climate Change's Renewable Energy Review that had been presented to ERP in July 2011. An analysis of the Review had been discussed by ERP in October 2011, and members from ERP subsequently met David Kennedy and Mike Thompson from the CCC Secretariat in November 2011.

Jonathan Radcliffe presented the main points from the draft report:

- The CCC had concluded that the 2020 renewables targets should not be increased, and that the costs of managing intermittency were low relative to the cost of the generation.
- The CCC's scenario for 2030 with 50% renewable generation (predominantly on- and off-shore wind) had significant demand side response (from heat and transport) with increased interconnection allowing imports to provide back-up capacity. 30GW of CCGT for balancing ran at load factor of less than 20%.
- Delivering each of the flexibility options for managing intermittency had its own challenges. The scale of the challenge should not be underestimated, and innovation would be critical to ensure the technologies could be deployed at scale. The report highlighted areas in which investment in RD&D would be

¹ See <http://ec.europa.eu/research/horizon2020/>

² See <http://investissement-avenir.gouvernement.fr/content/action-projets/les-programmes/%C3%A9nergie>

necessary. There was a risk of missing opportunities to develop technologies in coming years that would enable most efficient low-carbon pathways to be attained.

- Increasing understanding of system operation in an energy system with large amounts of intermittent generation was equally important. The CCC scenarios and modelling by Poyry made a useful start, but raised questions over the business case for deploying the technologies, and the market framework in which they would exist. Further analysis should also look at the impact of not meeting some of the technology deployment levels, and be realistic about imported electricity at times of wind lulls that could affect continental Europe.

The paper was well received, with points made in discussion including:

- The CCC's scenario for managing large amounts of intermittent generation were seen by many members as being over-optimistic as to what could be achieved by the flexibility options described.
- It was good to see the ERP paper describe the different timescales over which challenges to energy supply/demand would be affected being addressed by the paper. The impact of high/low wind was asymmetric: in the event of excess wind there was a likelihood that power could be exported to a region of demand, but in a wind lull it was not clear that power would be available to be imported. Though the CCC's example of a low wind event spanned a few days, the UK had experienced 14-day anticyclonic events.
- Building-in overcapacity to provide security-of-supply from imports would affect the economics of interconnection and how this could be commercially realised.
- Vehicle-to-grid could have an impact, but the technology had several steps to progress through before it became a feasible option. An IBM report on EVs providing balancing power was noted.
- The distribution system was emerging as a critical area to consider under future scenarios. Smart grids were anticipated to avoid overuse of distribution networks, not integrating intermittent generation through the deployment of distributed energy storage to provide back-up capacity.
- It was noted that the ECF report 'Power Perspectives 2030' considered 80% generation from renewables on a European scale.
- Different models of energy storage contract and supply, including for hydrogen and demand side response, should be explored.
- The overall value of interconnection should not be overlooked by the paper.
- The paper brought some much-needed realism to the fore – practicalities of approaches needed to be thought through. The analysis showed how innovative solutions would be important, for both technology and market solutions.
- Single-point optimisation around electricity was not appropriate for the energy system, which included other vectors including gas.
- The importance of developing the correct business models and market frameworks should be stressed. 'City' thinking should be embedded when thinking about future scenarios.
- The scenarios assume the high deployment levels of some technologies, such as for electric vehicles. Lower take-up of these would change the nature of the challenge.

- It would be useful to understand how other countries (such as Germany) are tackling the challenges.

There was general agreement that the report should be published, with some refinements as proposed by members.

In terms of follow-up activity, it was suggested that ERP should work more closely with CCC in future. It was good to have their participation at ERP plenary meetings, perhaps this should be reciprocated?

It was also proposed that organising workshops with DECC and CCC could provide a way for a wider stakeholder group to discuss the issues further with policy makers. This would complement advice provided on technology innovation.

Actions

- Jonathan to prepare the paper for publication – a new draft should be circulated to members.
- Jonathan to explore, with DECC electricity system balancing and EMR teams, the possibility of organising two workshops which address (i) technology and modelling, and (ii) market frameworks and business models, for delivering flexibility options in future energy systems.
- Co-chairs to consider future engagement with CCC.

4. Issues arising from meeting with start-ups

ERP met with a group of seven start-up companies at the October 2011 plenary meeting, to improve ERP's understanding of the challenges faced by SMEs, consider how ERP could incorporate the views of SMEs more effectively in its work, and potentially to make recommendations on support for SMEs.

Jonathan Radcliffe presented a short paper which set-out three themes had emerged from the discussion at the October meeting – the role for start-ups/SMEs, investment and finance, and impact of policy/regulation:

- On the role for start-ups: though not very well-recognized in the innovation landscape, they could provide a route for technology development in parallel with that undertaken by larger corporate R&D.
- On investment and finance: the bias of public sector support was heavily to R&D, though the requirement for increasing investment was at a later stage. Venture capital provided a source of funding, but it was not well-suited to an area with long time-scales and significant costs for scale-up.
- On policy and regulation: start-ups and SMEs developing single technologies are particularly exposed to changes in policy than larger companies with a portfolio. Policy regulation which had an outlook on how technologies could have an impact in the future would help bring technologies being developed by SMEs through.

Jonathan noted some recent policy developments which were relevant to support for SMEs generally (not focusing on the energy sector), including from the Autumn Statement, the Government's Innovation and Research Strategy, and a speech by science minister David Willetts on 'Our Hi-tech Future'.

In discussion the following points were made:

- The paper reflected the discussion at the October meeting, though that had been limited by the time available.
- SMEs are mobile, though in the UK the support for SMEs is growing, we are still not internationally competitive.
- The tensions between corporates, VC and Government funding were evident and it would be interesting to bring those groups together to validate (or otherwise) some of the conclusions that had come from the previous meeting.
- The SBRI was a useful mechanism, but it should be more like the SBIR in the US.
- Big companies were not the enemy of SMEs
- The role for corporate funding of SMEs was important given the lack of VC.
- A structural embedding of the direction of travel for the energy system would help the SME community attract funding.
- Political risk was greater than technology and commercial risk.
- Late stage funding from Government carried too many conditions, which had meant it was not spent in the past (including on marine and CCS technologies).
- It was noted that the House of Commons Science and Technology Committee inquiry on the commercialisation of research had invited evidence to be submitted by 8 February.

It was questioned whether ERP's scope covered issues around SMEs. It was also noted that this was a big and complex issue and it was questioned whether ERP had the appetite and resource to get to the root of the problem. A response was that ERP should take the long-term view, and as such should include economic and policy aspects which could trigger innovation.

One option would be to invite a group of non-start-up SMEs to ERP, possibly with representatives from finance/investment, but allowing a longer time discussion time for ERP. Next steps would be discussed by ERP in the context of its overall workplan.

This was also an area for ERP to engage with the new BIS Chief Scientific Advisor on.

Action

- Analysis Team to develop proposals for meeting with SMEs to put to ERP.

5. Project proposal – resource-use efficiency

Nick Winser introduced Ellen MacArthur and Jamie Butterworth (CEO) outlining the work that the Ellen MacArthur Foundation (EMF) is undertaking on resource use - specifically the role of the circular economy.

Ellen MacArthur highlighted the role of systems thinking, education in the development of an understanding of *where you are going with the circular economy*, the need to design for disassembly and the role of business in developing the agenda.

Mark Workman then presented the outline of the ERP resource use efficiency project proposal.

Julian Allwood followed the presentation by stating that there were three aspects to resource use efficiency: scarcity (physical and political), energy use - to transform resources - and mapping and agricultural productivity. The work should cover sectoral concerns regarding resource scarcity, activities seeking to address the risk posed by the agenda and outline strategies orientated around a pan UK survey.

A number of concerns regarding the review were expressed by members. These included:

- It was potentially an enormous issue and there was a need for boundaries in its scope. There was general agreement that the focus should be clearly on impact on the UK, and for the energy sector.
- The project should include demand side issues, with a focus on systems thinking and links with innovation issues to the members.
- ERP should look at where it could bring useful insights, provide innovative thinking and deliver added value given other work being undertaken in the space.
- The Carbon Trust would be happy to contribute through its work on aluminium and steel.

Jamie Butterworth stated that McKinsey and the EMF were undertaking a project, to be released at Davos at the end of January, which sought to address the energy and demand side opportunity of developing a circular economy. The work split biological and non-biological processes / resources.

Subject to the scope being rewritten to take into account the members concerns - specifically the UK focus and linkages to energy - the project was given the go ahead.

During the EMF talk, the opportunity to link the ERP work to the EMF was raised. To this end, it was requested that a number of questions relating the ERP work and that which the EMF were seeking to address related to energy flow and the circular economy could be posed at the next plenary; 20 minutes should be set aside to discuss these points.

Actions

Mark to redraft the scope of the project.

6 Any other business

Members were happy with a proposal to have an afternoon meeting in July followed by a dinner.