

## ERP Plenary meeting

**MEETING DATE:** Thursday 14 January 2016, 15:00 – 17:30

**LOCATION:** Church House Conference Centre, London

### ATTENDEES:

Chair:	John Loughhead	DECC & ERP Co-chair
Members:	Keith MacLean	ERP Co-chair
	Martin Grant	Atkins
	Bob Sorrell	BP
	Carl Arntzen	Bosch
	Tom Delay	Carbon Trust
	Philip Blythe	DfT
	Philip Sellwood	EST
	Derek Grieve	GE
	Masao Chaki	Hitachi
	Rob Saunders	Innovate UK
	David Wright	National Grid
	Peter Bance	Origami Energy Ltd
	Nick Winser	Royal Academy of Engineering
	Maggie McGinlay	Scottish Enterprise
	Marta Smart	SSE
	Ali Naini	Turquoise International Ltd.
	Prof Julian Allwood	University of Cambridge
	Ron Loveland	Welsh Government
Alternate Member attendees:	Colin Green	ABB
	Craig Edgar	Atkins
	Jo Coleman	ETI
	Andy Bullock	GE
	Paul Turner	Ricardo
	Neil Angell	Shell
	Mike Weston	UKERC
Observers:	David Joffe	CCC
	Andy Poole	Federation of Small Businesses
	Andrew Wright	Ofgem
	Chris Stark	Scottish Government
Secretariat:	Farida Isroliwala	DECC
ERP Analysis Team:	Andy Boston	ERP
	Mark Workman	ERP
	Helen K Thomas	ERP
	Simon Cran-McGreehin	ERP
	Richard Heap	ERP
	Mathilde Bourgeois	ERP

## 1. Chair's introduction

Written apologies were acknowledged: Stephen Trotter – ABB (with Colin Green in attendance), John Miles – Arup, Kathryn Magnay – EPSRC, David Clarke – ETI (With Jo Coleman in attendance), Duncan McLaren – Friends of the Earth Scotland, Neville Jackson (with Paul Turner in attendance), Angus Gillespie - Shell (with Neil Angell in attendance), Jim Watson – UKERC (with Mike Weston in attendance). Allen Creedy – Federation of Small Business (with Andy Poole in attendance).

Changes to membership were noted as: Nick Winsor, who is now the representative for the Royal Academy of Engineering - replacing Dame Sue Ion, and David Ball who is now the representative for Drax - taking over for Peter Emery. Apologies were noted from David Ball for the January 2016 plenary meeting.

In the absence of any comments from members, the minutes of the October 2015 meeting were approved.

The key objectives of the plenary meeting were outlined as follows:

- I. Provide an update on project outputs for **Horizon Scanning project**.
- II. Provide project update and feedback from October post-plenary session relating to **Hydrogen project**.
- III. Discuss and approve the Project initiation document and scope of new **Energy Storage project**.
- IV. Discuss two papers on **1. ERP response to the re-setting of energy policy**, and **2. ERP's structure and future role**.

## 2. Horizon Scanning Project

Mark Workman (ERP) gave an overview of project thus far: the two workshops held at the end of 2015, and the methods used to interrogate the material they had produced. Key points were:

- In terms of scope, horizon scanning was only the first stage of the five stage fore-sighting process;
- That there was a rich output of material from the workshops with 80 pages of raw data which had been summarised in the material that was presented;
- There was a need for further analysis of the raw outputs; and
- There was a need for a discussion as to what the members of ERP wanted from the project as this would assist in the development of the direction that analysis for the work could be undertaken.

There were comments and questions from members including:

- Outputs thus far are basic. Nothing meaningful has come out of the work and there is a need to know how this relates to the work which the members of ERP associate with existing horizon scanning exercises undertaken in the energy sector.
- In line with the above, outputs should be compared to traditional energy sector scenarios and overlaid with other ERP projects unless it would require too many resources to look into too many interactive elements.
- There is a need to understand the methodological basis by which the work has been undertaken and link this to the development of a case for any work going forwards.
- Horizon scanning's general trends can be used to generate more specific detailed trends in other foresight activities.

- Some change could be incremental rather than disruptive; some factors are subjective views; and some might not be relevant for energy planning.
- Outputs depend upon assumptions, e.g. swings in commodity prices (including oil); the project should state its assumptions, partly to give insight for future similar work.
- Categories should be added for societal trends / disruptors, and for finance/commerce e.g. for disruptors such as distributed “Block Chain” accounting.
- For this work to be manageable, a top ten issues should be identified; the data behind these top ten issues should be shared with the ERP members.
- With regards the potential to take the next stages of the work forwards into the Future of Utilities there was some support but sense-checking is needed against similar work e.g. Utility 2.0 in US. Another idea tentatively put forwards was scenarios for possible futures with 100% EVs.

In terms of next steps, views ranged from discontinuing the work, to continuing it once there was clarity about how it would be translated into a utilities scenario. The steering group should discuss the feedback from the meeting and come back with a proposed way forward aligning with the project’s scope and aims, so that members of ERP can make a decision on whether to continue the work.

**Action: Steering Group to address requests for clarification.**

### 3. Hydrogen Project

Richard Heap (ERP) provided an update on the outputs from the project recapping the conclusions from earlier ERP work on hydrogen, and presenting conclusions from the post-plenary hydrogen workshop of October 2015 and from subsequent analysis, including:

- Hydrogen use is developing in several markets, with several UK companies receiving significant international orders; notably Intelligent Energy’s £1.2B deal with Indian Telecoms.
- Earlier conclusions noted the need for a system-wide approach to understand hydrogen as it crosses several markets and competes with other specific solutions. Several recent reports have explored the deployment steps for hydrogen, including the Leeds H21 project looking at the potential for using 100% hydrogen in the gas main to decarbonise heat.
- Another study looked at the volumes of hydrogen that would be needed for two different scenarios.
- An aspect that appears missing from most analyses is an assessment of the primary energy demand and the associated impacts. The additional conversion steps needed to produce hydrogen leads to energy losses, which mean more primary energy is needed. If this was to come from low-carbon electricity or natural gas, large-scale use of hydrogen could have significant implications for gas demand and CCS or on power generation capacity.
- This suggests that if hydrogen was to be widely deployed, the practical benefits it delivers need to be balanced against the impacts on primary energy, which could be long term.
- It was acknowledged that this analysis currently focussed on the technical impacts and the economics of the decarbonisation potential also need to be considered.

Members provided input and comments as follows:

- Conclusions about primary energy demand and carbon emissions are dependent upon the assumptions about the technology used and associated efficiencies. The project should explore the future limits to efficiency.

- CCS is essential if hydrogen is produced from SMR (Steam Methane Reforming of Natural Gas). In a non-CCS world hydrogen is non-viable.
- The various production methods and widespread use of hydrogen needs to be compared against other decarbonisation options. CCS on SMR is an efficient means of capturing CO<sub>2</sub>, but is it the best means to decarbonise the energy system.
- Hydrogen's role in balancing (e.g. grid-level storage or inject into gas grids) could be achieved in absence of CCS. However, it is inherently inefficient due to multiple steps, and should be compared to other options, although hydrogen could provide seasonal storage.
- Hydrogen for domestic heat could avoid some of the practical challenges of other options.
- The work could consider scenarios with and without CCS, along with considering other ways of producing hydrogen (e.g. PV cells, or high-temperature nuclear reactors). However the latter is still in development and early indications also raise questions about its efficiency and the number of reactors needed.
- H<sub>2</sub> from natural gas is a lower-carbon option than petrol, and could be useful if there is insufficient low-carbon electricity to allow all cars to be EVs.
- Hydrogen production could change the perception of CCS.
- The constant flow of CO<sub>2</sub> would be suitable for EOR.

The Chair summarised points made by members about whether conclusions are comprehensive and how key barriers could be removed. Next steps are to refine the recommendations including points made at this meeting and those identified from the workshop, with a view to report being published within six weeks.

**Action: Refine recommendations, for publication of final report within six weeks.**

#### 4. Energy Storage

Peter Bance (Origami) introduced the session and Helen Thomas (ERP) presented the project initiation document (PID) and project scope for member approval. Key points included:

- A previous ERP project in this area was carried out in 2011, which considered the role of Energy Storage; set out nature and scale of challenges for the UK energy system (and where storage could assist); and had an innovation landscape / technology development focus.
- The 2016 project aims to focus on the barriers to energy storage and how these may be overcome.
- The work will be technology-agnostic and focus on the financial, regulatory, legal, political, societal and commercial barriers, with less of a technical focus.
- The project would draw from 4-6 'use-cases' – a methodology carried out in other similar works e.g. The California Public Utilities Commission (CPUC) project showcased on the Berkley Energy website.
- The work aims to pull together strands from previous ERP reports that mention / are relevant to storage e.g. Hydrogen, Transport, Cities, Community Energy, Smart Energy and Managing Flexibility.
- The timeline for the work is July 2016, an 80% final report, with a possible workshop in Feb/March 2016 to contribute to the input gathering process. This has been proposed due to high interest in the project work / Steering Group from ERP members and other parties.
- The aims of the work were reiterated as:
  - **Identify barriers & possible ways to overcome them**
  - **Provide clarity for: policy-makers, regulators, network operators, customers, investors & ES developers (tech & supply chain developers) to:**

- *Help catalyse & mobilise an ES supply chain of value to the UK, stimulating investment. This will be achieved by enabling operational collaboration of the parties and actors that are key to the system-wide development and deployment of Energy Storage.*

Questions and comments from Members included the following:

- The project is exactly the type of work that the ERP should be doing.
- Members support the technology-agnostic approach, and should focus on finance barriers as a key consideration in addition to the other barriers.
- There should also be a focus on sourcing and providing policy options/solutions to barriers.
- The project should first consider how much storage capacity the UK might need, what services storage can offer, and how this compares with other possible solutions such as interconnection, DSR etc.
- Related to this, the purpose of storage is broader than just to enable greater level of intermittent supply, (e.g. it can also relate to interconnectors.); and there is an opportunity for the work to fill a gap in the storage discussion, i.e. on storage in context of demand response.
- Many of the cost barriers associated with storage can in fact be related to “soft costs” (installation, maintenance, added requirements), as opposed to the cost of the technology itself.
- The project PID seems to mainly note *electricity* storage, but the work should also consider barriers to heat storage e.g. the fact that hot water tanks are less common now in homes.
- The project could also look into the value of costs involved with new technologies each year, to compare levelised cost of storage with gas turbines.
- Storage business cases put forward currently tend to only include a limited range of their potential uses/services, and there is a need for necessary markets to be opened up. The issue would then be the complexity of ‘energy arbitrage’ between the various markets.
- There isn’t evidence on how customers might perceive storage – this could be interesting.

**Action: Members to contact Helen K Thomas with any thoughts and input re. scope and ‘use-cases’ at this stage.**

## 5. ERP Response to the Re-Setting of Energy Policy

The Chair introduced the session by stating that since the summer a number of announcements have been made that have redefined the policy landscape for energy – the context of which could be found in discussion paper 1, circulated to members prior to the plenary. Members were invited to discuss how this might affect ERP’s priorities going forward.

Questions and comments were raised by members and included the following:

- There is a need for a roadmap with collective buy-in, although this is not a new issue. DECC has the responsibility to say how they will meet Carbon Budgets in coming months but ERP could ask what would be required to produce that.
- Many roadmaps focus on economics and miss the engineering and innovation challenges. ERP’s role should be to identify questions that need to be answered within innovation and about best use of engineering, for example which would benefit for Catapults.
- The policy reset was mainly about deletion, what is left?
- There is an increased level of uncertainty about meeting the costs of nuclear and shale gas.

- An additional policy change not in the paper is the requirement for offshore wind to reduce costs. ERP could examine that.
- Companies cannot take such large financial risks (e.g. for CCS) in the face of short notice policy changes.
- One policy ambition is to return to markets by 2025, but that would require government to provide strong carbon pricing. Intervention may be reduced but we would still want to know what engineering requirements will be faced by then.
- ERP could comment on whether policy should lead or lag industry's work.
- To what extent did ERP influence any policy changes?
- There is a changing balance of deployment/innovation; ERP is one of the more informed groups to comment on that value.
- To maximise impact, ERP's comments need to be limited. It can't advocate certain technologies, but can bring up generic issues about investor uncertainty, where to innovate and how to meet carbon targets.
- On nuclear ERP could examine how much of promised innovation spend is new money.
- On CCS we can ask how targets will be met without or how we buy it in, but without care we will create collateral damage.
- On Offshore wind could ask for clarity on how much there will be post 2020 and what it depends on.

The Chair concluded by stating that:

- for the first time in 20 years, we have a Conservative secretary of state responsible for energy so changes were to be expected;
- it was a fiscal decision that had been taken on CCS rather than a statement that CCS had no role in future – ERP could ask what were credible options for this;
- the money for nuclear innovation announced in the SR had not already been spent, so ERP could comment on that;
- on offshore wind, the industry already understood the need to reduce cost; and
- the decision to support the "Mission Innovation" initiative brought with it a pledge for the UK to spend in excess of £400m in FY20/21 on clean energy technology research, development and demonstration projects that support Mission Innovation's objectives; the opportunity was there for ERP to say how to leverage this activity /spend that money.

He agreed the onus was on government to say how carbon budgets could be met but ERP could comment on details of innovation and deployment needed.

**Action: A-Team to email a note to members with headline comments about what should guide the future programme based on this discussion and recent input from members.**

## 7. ERP's Structure and Future Role

The Chair reminded members that the ERP's current Consortium Agreement will come to an end in December 2016, making it an appropriate time to review ERP. Members were advised that in light of recent discussions (between Co-chairs/Head of Analysis Team & ERP Members themselves), that there were a number of issues to examine as highlighted in Discussion Paper 2.

Future options ranged from business as usual for ERP (with amendments to incorporate members' feedback); to a joint solution with the Strategic Analysis function of the Energy Technologies Institute (ETI) and/or the Energy Systems Catapult. Gathering members' views before progressing

with any options was essential. However, discussions within government on how to structure innovation support meant that it was too early to say which options would be feasible. A clearer picture would be available by the next plenary meeting and therefore, a more substantive discussion would be included as part of the meeting agenda for April 2016.

In the interim, the ERP Team/Co-chairs/Secretariat would continue to meet with members to gauge level of interest and discuss what future ERP characteristics could look like. The timescale for discussions/decisions is however pressing and requires answers by April/May 2016.

**Action: ERP Head of Analysis/Co-chairs/Secretariat to continue to meet with members individually over next months for discussion re the above.**

## 7. AOB

The Chair made an announcement that UKERC are holding a conference in March on: ***Energy systems challenges in a world in transition***. UKERC would like to bring together the various centres investigating the energy system and are keen for participation (attendance, advice or support) from a broader group. ERP members and their organisations were therefore asked to consider involvement. A hand-out was made available and those interested were invited to Mike Weston.

Details of the next plenary meeting were provided as: **Thursday 21 April 2016, 09:45 – 13:00 (with a post-plenary session 14:00-16:00 on a transport theme) at The Royal Society, 6-9 Carlton House Terrace, London SW1Y 5AG.**

Members were invited to enjoy the ensuing post-plenary session, starting with a drinks reception whilst networking with additional guests. A post-plenary presentation / Q&A discussion was held with speaker Matthew Bell, CEO of the Committee on Climate Change. The meeting was brought to a close.