

ENERGY MATERIALS TOWN MEETING, 24<sup>TH</sup> NOVEMBER 2006

FOSSIL FUEL POWER PLANT MATERIALS –BREAKOUT SESSION

Chairman:- Derek Allen

Process

The following issues 4 questions were discussed relating to Fossil power plant materials:-

- 1 KEY DRIVERS? (3)
- 2 R & D CHALLENGES?(1)
- 3 BARRIERS? (3)
- 4 RECOMMENDATIONS? (1)

Individuals were asked to submit a number of answers (shown in brackets) which indicated their key points for each question.

The answers were then divided into 4 generic 'categories', shown on the following pages and the answers grouped under the most relevant category. (or across categories)

The Group was then asked to prioritise 1 category of the 4 which they felt was the no. 1 priority for questions 1-3. The results of the 'vote' are shown by the numbers in brackets next to the headings on the following sheets and highlighted in **green**.

For question 4 (Recommendations) they were asked to select a single answer they wanted to prioritise.

The output of the breakout session is summarised in the following pages and the priority areas highlighted in green.

Volunteers for the core working group and advisory group are also highlighted.

## **SUMMARY KEY MESSAGES/PRIORITIES**

### **Drivers**

- **Environment is seen as key driver, this includes efficiency related issues that will lead to reduced emissions**

### **R&D**

- **Materials development (including materials for aggressive environments) were seen as where the most R&D would be required**

### **Barriers**

- **It was unanimous that the key barriers were related to funding/policy, including a lack of long term strategy, funding policy**

### **Recommendations**

- **These again related to the need for a long term strategy and policy to support Materials technology in the area of Energy**

## DRIVERS

<p style="text-align: center;"><b>COST</b> No votes(1)</p> <ul style="list-style-type: none"><li>- ownership</li><li>- disposal</li><li>- cost/economy</li><li>- cost saving in material production</li><li>- energy efficiency</li></ul>	<p style="text-align: center;"><b>SEC. OF SUPPLY</b> No votes(2)</p> <ul style="list-style-type: none"><li>- supply/demand</li><li>- to ensure security of supply</li><li>- energy security</li><li>- modular (localised) power del.</li><li>- Alternate fuels</li><li>- New high temp materials for extended life, operation and efficiency</li><li>- Security of fuel supply</li><li>- Applications for which there are no alternatives to fossil - ring-fence</li><li>- Drivers: eminent, cast, safety</li></ul>
<p style="text-align: center;"><b>ENVIRONMENT</b> No. votes(10)</p> <ul style="list-style-type: none"><li>- Efficiency</li><li>- Environment</li><li>- Climate change</li><li>- Co2 reduction</li><li>- Environmental, useage &amp; recycling</li><li>- Pollution</li></ul>	<p style="text-align: center;"><b>OTHER</b> No votes (0)</p> <ul style="list-style-type: none"><li>- Plant problems - generator capacity</li></ul>

# R & D CHALLENGES

<p><b>NEW MATERIALS SYSTEMS</b> No. votes(7)</p> <ul style="list-style-type: none"> <li>- material development/production</li> <li>- new materials with new materials have to validate them properly before going into service</li> <li>- development of low cost high performance all singing and dancing materials</li> <li>- long term tests/alloy development creep related, temperatures?</li> </ul>	<p><b>GENERIC (modelling, lifing, NDE)</b> No. Votes(2)</p> <ul style="list-style-type: none"> <li>- shift creep design focus from materials to welds</li> <li>- lifetime extension of conventional power plant</li> <li>- life extension</li> <li>- economy of use for how long (will fossil fuels be complimentary to fusion?)</li> </ul>
<ul style="list-style-type: none"> <li>- New materials &amp; lifing</li> <li>- Development, manufacture, lifing and demand of new materials systems</li> <li>- Understanding performance of high temperature materials</li> </ul>	
<p>1</p> <ul style="list-style-type: none"> <li>- Material properties required for operating conditions</li> <li>- Higher temperature operation through new/improved high temperature materials and coatings</li> <li>- Higher temperature capable materials &amp; coatings</li> </ul>	<p><b>OTHER</b> No votes(0)</p> <ul style="list-style-type: none"> <li>-</li> </ul>
<p><b>HOSTILE ENVIRONMENT</b> No votes(10)</p> <ul style="list-style-type: none"> <li>-</li> </ul>	

(3)

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1

# BARRIERS

<p><b>FUNDING/POLICY</b> <b>No votes (14)</b></p> <ul style="list-style-type: none"><li>- no content strategy or continuity</li><li>- funding per se and continuity of funding</li><li>- lack of continuity of funding and escalation of UK costs</li><li>- fragmented funding</li><li>- reduced UK supply base and overseas export control</li><li>- lack of coherent strategy</li><li>- fragmentation of research base (closure of UK centres of expertise)</li><li>- more advanced technologies &amp; funding</li><li>- lack of funding/investment</li><li>- EC funding for energy materials</li><li>- Motivation - is there real political will to tackle climate change?</li><li>- Government policy</li><li>- Needs overview of usage and setting priorities</li></ul>	<p><b>RESOURCES</b> <b>(skills &amp; equipment)</b> No votes (0)</p> <ul style="list-style-type: none"><li>- Educational priorities (skills)</li><li>- Lack of skilled scientists/engineers</li><li>- Ensuring a trained work force for the future/people to carry out the research</li><li>- Decreasing skills base</li><li>- Lack of good test data</li><li>- Skills/resource shortage</li><li>- Lack of resources, new grads, experienced engineers</li><li>- Skills shortage in trained personnel, training opportunities</li></ul>
<p><b>TECHNICAL</b> No votes (0)</p> <ul style="list-style-type: none"><li>- Public information to take on board new fuels/new patterns of behaviour</li><li>- Lack of fundamental understanding of material props</li><li>- Lifting methods for new and used materials</li><li>- Technology limitations</li><li>- Time and cost required to validate long term material behaviour</li><li>- Don't understand all degradation mechanisms for plant conditions</li></ul>	<p><b>OTHER</b> No votes (0)</p> <ul style="list-style-type: none"><li>- Half-hearted collaboration between industry and academia</li><li>- Lack of collaboration</li><li>- Sharing information between competitive companies</li></ul>

# RECOMMENDATIONS

<p style="text-align: center;"><b>R&amp;D RELATED</b></p> <ul style="list-style-type: none"><li>- New materials</li><li>- Rolling long term programmes for development of improved materials</li><li>- DTI can lead R&amp;D with industry led projects focused small teams, less bureaucracy, no phoney innovation</li></ul>	<p style="text-align: center;"><b>POLICY/REGULATION</b></p> <ul style="list-style-type: none"><li>- Need strategy so know what we're aiming at <b>(1 vote)</b></li><li>- Consideration of energy use with respect to where/how we work and live <b>(1 vote)</b></li><li>- Development of an environment where work on fossil fuel power is seen to be PC</li><li>- Collaboration and significant funding <b>(1 vote)</b></li><li>- More consistent commitment to materials support</li><li>- development and usage</li><li>- focus more educational funding on physical sciences education, from schools to post graduate research and promote image of materials industry</li></ul> <div style="background-color: #00FF00; padding: 5px;"><ul style="list-style-type: none"><li>- Long term stable integrated funding strategy for the UK</li><li>- Long term view to policy and funding to support R&amp;D for energy materials / technology/ Long term funding made available for energy related materials concerns</li><li>- Long term funding policy linked to coherent strategy covering R&amp;D, tech transfer &amp; skills <b>(7votes)</b></li></ul></div>
<p style="text-align: center;"><b>RESOURCES</b></p> <ul style="list-style-type: none"><li>- Ensure continuity of research funding to maintain and build up expertise <b>(1vote)</b></li><li>- Integrated, sustainable high quality UK university base that generates materials graduates</li><li>-</li></ul>	<p style="text-align: center;"><b>OTHER</b></p> <p style="text-align: right;">(0)</p>

# **VOLUNTEERS**

## **Core Team**

Colin Small  
Mark Gee  
Tony Fry  
Rachel Thomson  
John Wells  
Peter Morris  
Jim Hannigan  
Jeff Banks

## **Advisory Team**

Bill Lee  
Phil Whateley  
David Allen  
Michael Lynch  
University of Notts