Energy Materials – Meeting the Challenge

Making the UK the best place to do business in materials

'Energy Materials – Meeting the Challenge'

Derek Allen,

Chairman,

MatUK Energy Materials Working Group

Burleigh Court, 9-10th October 2008

Setting the Scene

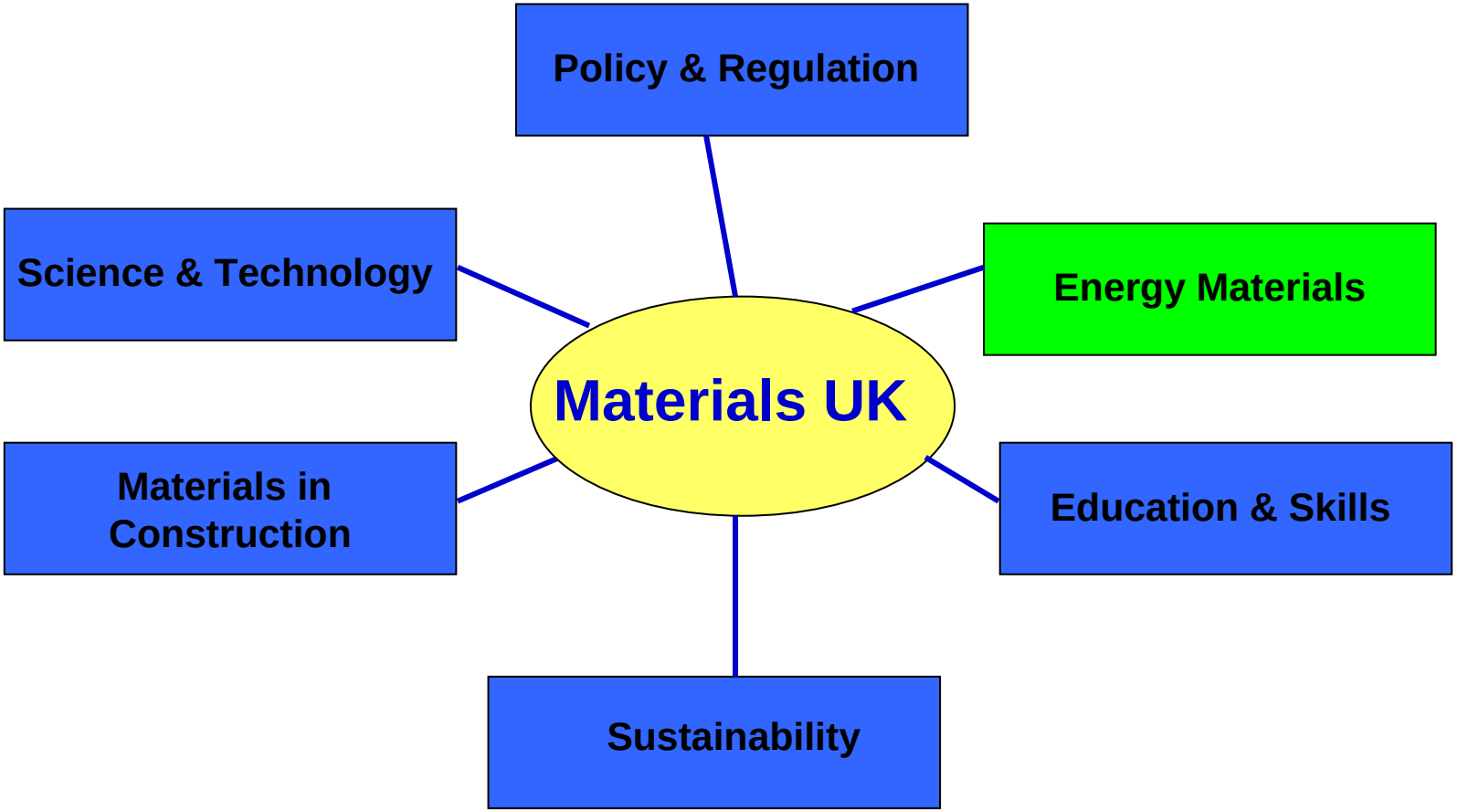
- Background
- Why Energy?
- The Strategic Research Agenda (SRA) and implementation
- Structure and objectives of the Conference

The History

- The Materials Innovation and Growth Team (IGT) was set up in January 2005 by the UK Government to review materials industries. Its scope covered..
  - All materials, production, supply chain issues
  - Engaged Policy & stakeholders

- It reported in March 2006 after 15 months work
- Key outcome-to form MaterialsUK (MatUK) to implement its recommendations to develop a strategy for Materials in the UK
- MatUK formed a number of Working Groups in priority areas identified by the IGT

Working Group Structure



Who has been involved in the Energy Group?

- Advisory Committee,

  Industry; Alstom, EON UK, Johnson Matthey, UKAEA, Siemens, Pilkington, Doosan Babcock, British Energy, BP, Rolls Royce, BNFL, Corus, Alcan, National Grid, RWE, AREVA, Pilkington, Rolls Royce Fuel Cells, UKAEA, Oxford Instruments,

  Other organisations; Materials KTN, IoM3, MoD, QinetiQ, NPL, Manchester University, TWI, Oxford University, BERR, Imperial College, Cranfield University, UKERC, EPSRC, Namtec, UKTI and RDA's.

- Secretariat supplied by BERR

- 100's of companies around the UK have been consulted throughout the process

.....Why Energy?

Three Major Energy Challenges

Security of Supply

BLACKOUT BRITAIN

Not since the 1970s have we been at greater risk of power cuts. So is it time to stock up on candles?

by Michael Hanlon

Fuel costs to rise again

Lucinda Kemeny and Dominic O'Connell

UK COAL CHALLENGES DRAX BIDDER

BRITAIN's biggest coal producer is planning a legal challenge to thwart BHP Billiton's bid for the Drax power station.

UK Coal, the quoted coal miner formerly known as RJB Mining, claims BHP's involvement with Drax would be anti-competitive.

Gordon McPhie, chief executive, said: "We would certainly go to the Office of Fair Trading, and I think there would probably be a case in Europe as well."

Drax, Europe's largest power station, is a big customer for UK Coal, taking 7.5m tonnes of its 19m tonne annual production. The station is up for grabs because its owner, the American power company AES, has handed control to the plant's creditors, which are led by banks and bondholders.

BHP has tabled the highest offer so far for the station's debt — control of the debt brings control of the station — offering 70p in the pound for the outstanding loans, against Goldman Sachs's 64p and International Power's 65p.

However, BHP's offer is in line with British competition law. It has offered to supply Drax with coal for the next 15 years but only on the basis that it will meet 100% of Drax's needs from 2006 to 2010, and 80% for the following eight years.

McPhie said this would make BHP a dominant supplier in the market for coal delivered to plants like Drax. "We need to consider all our options," he said.

BHP declined to comment but insiders said that UK Coal would not completely lose out if its competitor won the bid. This is because BHP would have to source some of Drax's coal from other suppliers.

Storms approaching: big firms are being urged to sign agreements to cut power use as the threat of winter blackouts looms

Climate change

THE CHINA CRISIS

Spectacular growth now biggest threat to environment

Consumption: China – growing at nearly 10% a year – already consumes more grain, meat, coal and steel than the United

Wealth: China's population will grow from 1.3 billion to 1.45 billion in 26 years – when its per capita income will be equal to that

Oil: On current trends, China will by 2031 be consuming 99 million barrels of oil per day. Total world production today is

Forestry: China is already the biggest driver of rainforest destruction, says Greenpeace. Half of all rainforest logs

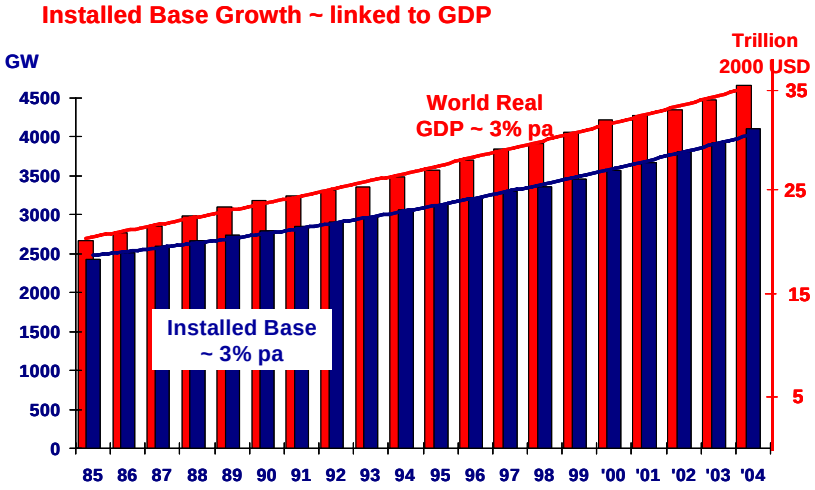
Global warming: By 2025, China will overtake the US as the top emitter of the greenhouse gases causing

Cars: By 2031, China would have 1.1 billion cars if it matches current US trends – bigger than the current world fleet of 800 million

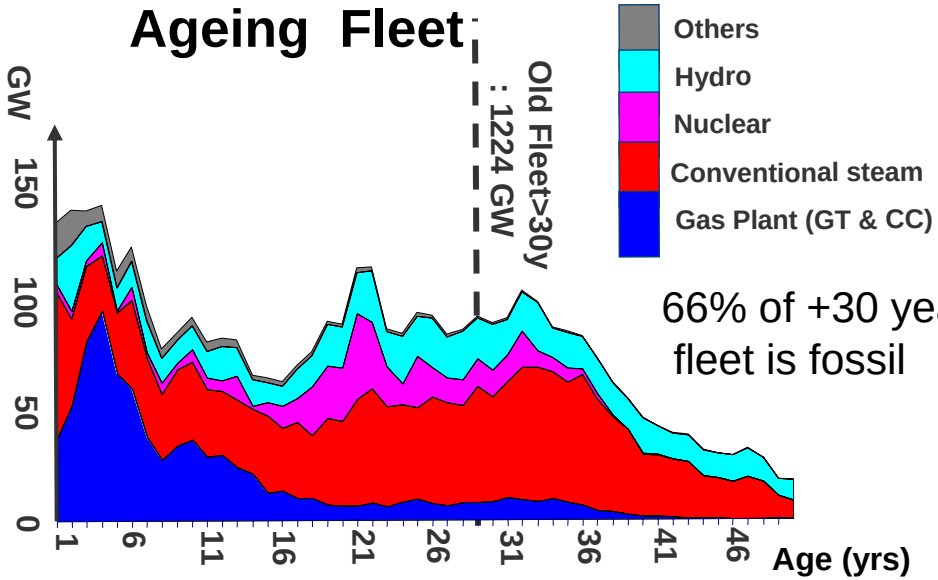
Affordable Energy

Drivers

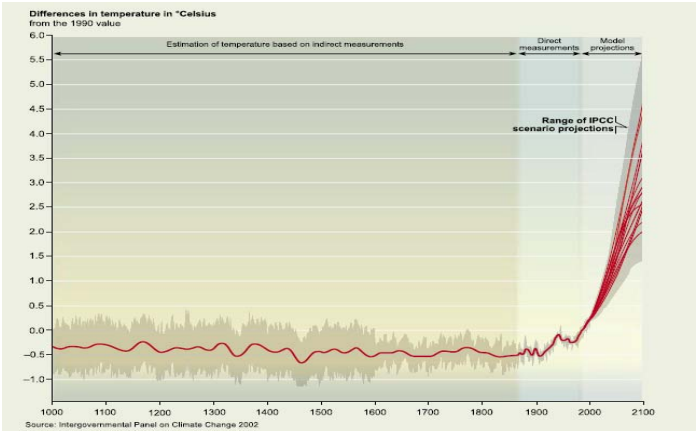
GDP Growth



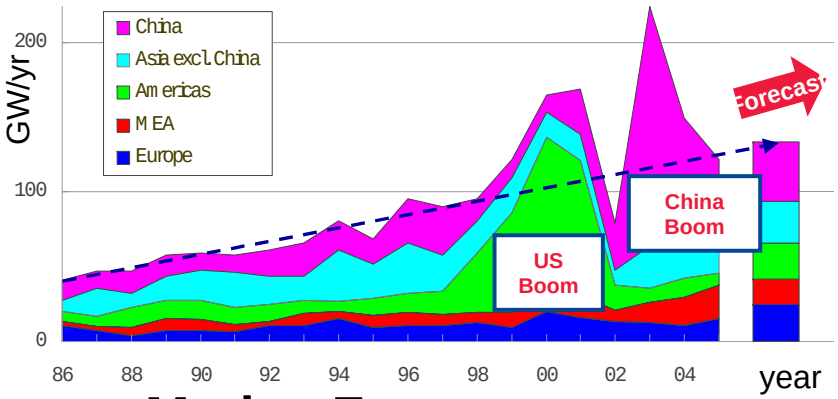
Ageing Fleet



66% of +30 year fleet is fossil



Environment



Market Forces

Our Objectives

The SRA is Industry led & market driven

A means by which we can;

- Identify and deliver materials solutions to the energy sector to help meet Energy Policy objectives
- Identify business opportunities for the materials community in UK

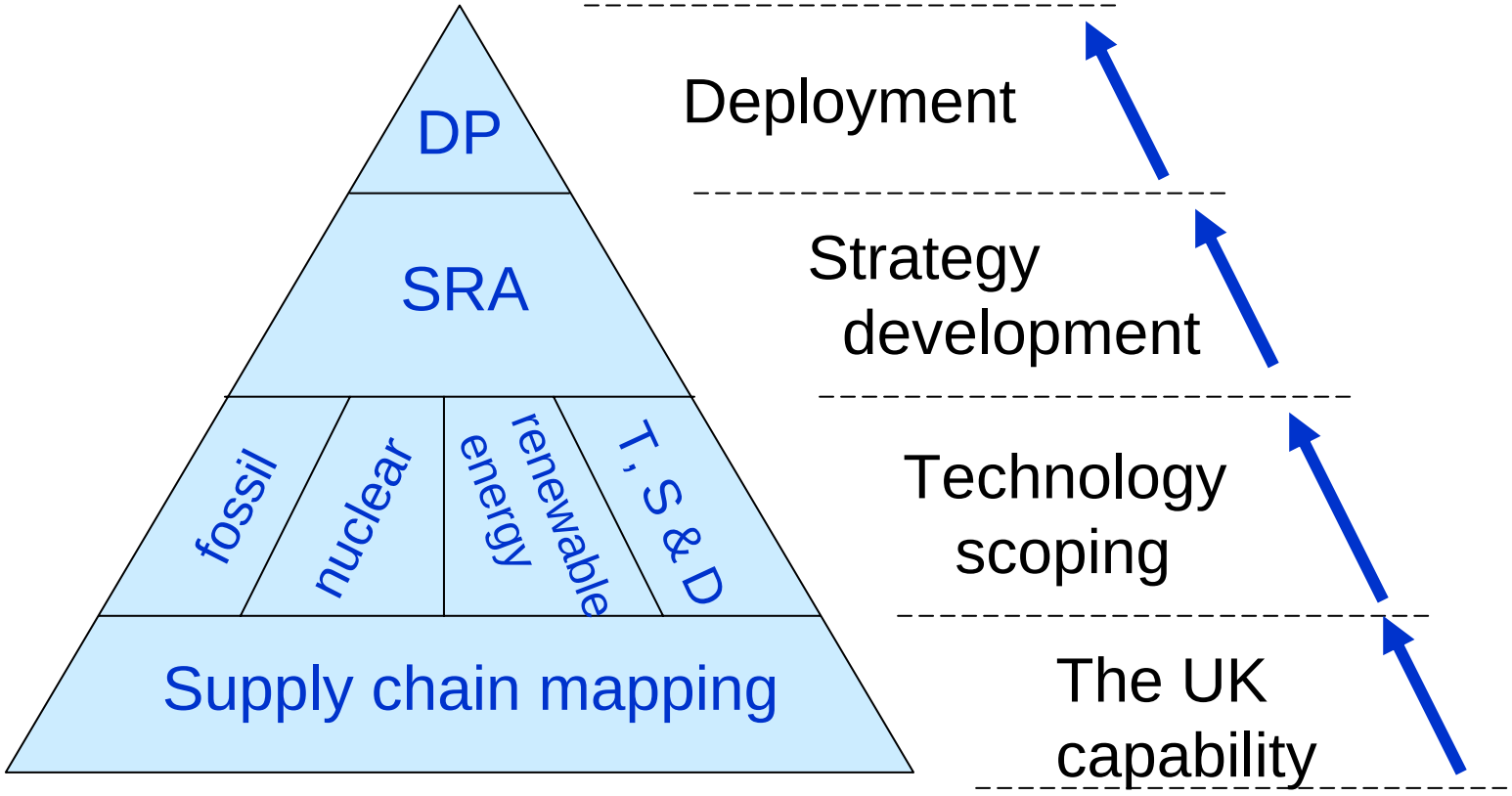
and develop;

- **Coordination**
- **Long term strategy and funding policy**
- **A unified 'voice' with influence**
- **International links**

which will;

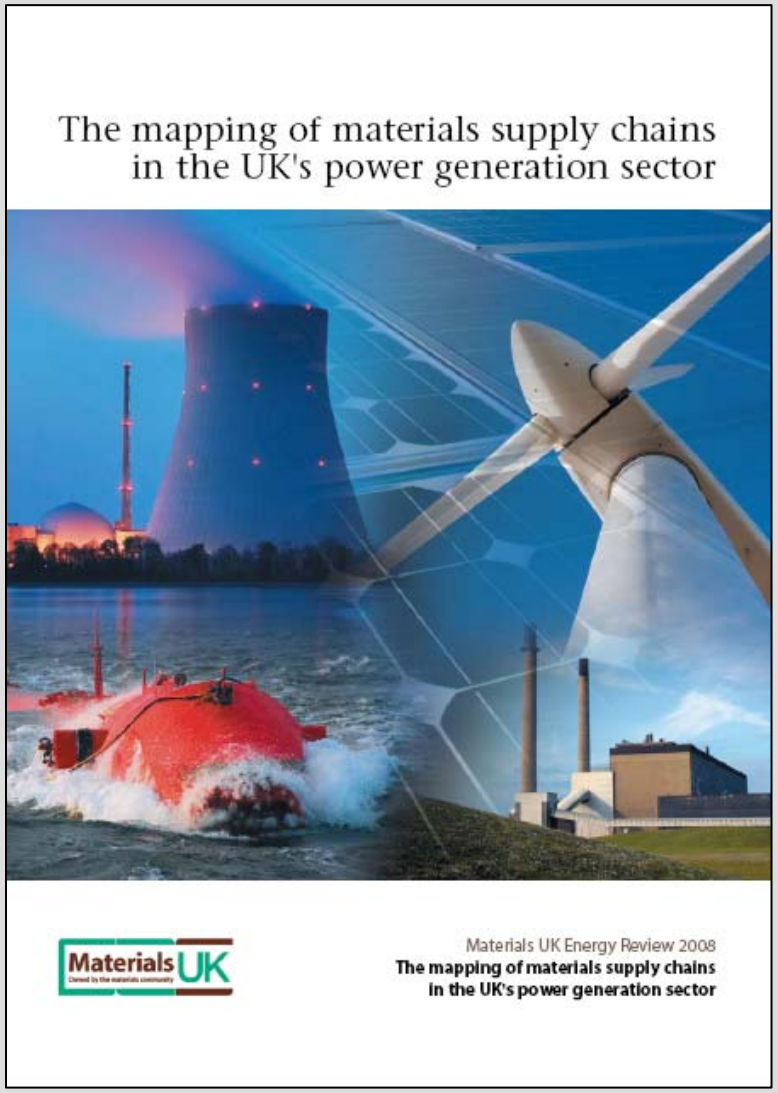
- Advise government and funding agencies on priority areas
- Help define UK priorities for overseas funding where UK has direct input (FP7)

Developing the Strategic Research Agenda



What have we delivered?

A review of the
UK Energy Materials
supply chain published
May 2008



What have we delivered?

…4 key technology scoping reports and the SRA published December 2007

What have we achieved?

- Worked with the Technology Strategy Board to help develop the Autumn 2007 Call on Energy Materials (£12m)

Technology Strategy Board

Materials for Energy
Autumn 2007 Competition for Funding

The Technology Strategy Board and the Engineering and Physical Sciences Research Council have allocated an indicative amount of £12M to fund highly innovative collaborative research proposals in Materials for Energy. Funding is available for industry-led collaborative projects across a range of Technology Readiness Levels, from basic research to applied research and development in materials technologies that will enable the UK to rapidly meet the urgent and difficult challenges posed within the global Energy Sector.

The focus will be on the development of materials technologies for:

- Energy generation
- Energy transmission and distribution
- Energy storage
- Energy conservation

It is also anticipated that materials developments in these areas will have spillover energy-related benefits for other industrial sectors; e.g. transport, including aerospace.

- Through chairmanship of EuMat worked within FP 7 to deliver a call on Energy Materials in December 2007

European Commission funding for projects on
Novel materials for energy applications

Joint Call between two areas of the European Commission's Framework Programme 7 (FP7) - Energy and Nanosciences, nanotechnologies, materials & new production technologies (NMP)

Key aspects of FP7

- Research and demonstration programme
- Collaborative (min. of 3 different member states or associated countries in proposal consortium)
- Cost sharing:
  - Research - 50% (75% for SMEs, public bodies, universities)
  - Demonstration – 50%
- Innovative
- European impact

Call for Proposals

- Call to be published on 30th November '07
- Stage 1 deadline likely to be in February '08
- Budget 25M€
- 2 stage submission process:
  - Evaluation Stage 1 proposals: February/March 2008
  - Evaluation stage 2 proposals: May/June 2008

The Call is currently only in draft format however early indications are that the priority fields of application for energy technology are likely to be energy conversion and storage, photon capture and CO_2 capture and storage.

To receive more information please contact energie@enviros.com (UK National Contact Point for Energy in FP7).

The Strategic Research Agenda

Why is the SRA unique?

- Delivery of the UK Energy policy will require a balanced portfolio of low carbon technologies to deliver its objectives.
  - This means that a wide range of underpinning materials R&D is needed
- This has instigated a detailed materials review across the numerous energy technologies from generation to storage. The 1st in UK but also in Europe
- It speaks on behalf of the community-industrially driven by need and opportunity
- Its recommendations are already advising and influencing both the UK funding agencies and Europe

SRA scope

The SRA covers the following issues;

- Overview of energy market
- UK materials supply chain
- Sustainability/Natural resources
- Skills
- International collaboration
- Technology challenges
- Funding
- Recommendations

Key Areas for Materials to address

The recommendations of the Task Groups have been distilled down into 3 key common thechnology themes where UK materials R&D should focus:-

- Reducing time to market and life cycle costs (eg. solar, fuel cells, marine)
- Higher performance in harsher environments (eg. Carbon capture, co-firing, nuclear)
- Improved life management and reliability (eg offshore wind, nuclear)

Underpinning the SRA

7 key recommendations to support delivery

- Communication
- Establish Coordination & Delivery Body
- Stable/Sustainable funding
- Energy Materials Knowledge Management
- Innovative Technology Transfer
- International Engagement
- Development of Skills and Resources

Structure and Objectives of the Conference

Implementing the recommendations of the SRA

- Key stakeholders perspectives
- How to meet the technology challenges and benefit the UK
  - Fossil
  - Renewables
  - Transmission, distribution, storage
  - Nuclear
- An international perspective from the USA
- Networking, exhibition and posters
- Defining the next steps to implementation

The Challenges:- Looking ahead

- Global electricity generation predicted to almost double by 2030
- 15% energy from renewable sources by 2020 (ie >30% electricity from renewables)
- 7000 new wind turbines by 2020
- Zero Carbon homes by 2016
- 10 billion Euro investment in 12 CCS plants across Europe
- Globally the overall value added of the low carbon energy sector could be as high as $3 trillion per year worldwide by 2050, it could employ more than 25 million people in jobs.
- etc, etc

.....and finally

Don’t believe everything you are told.

Please engage, challenge and debate.

.....and enjoy!!

Materials UK
Owned by the materials community

Energy Materials –Meeting the Challenge

ALSTOM

corus

DOOSAN Doosan Babcock Energy

e·on UK

energy technologies institute

ETD

IOM³
The Institute of Materials, Minerals & Mining

namtec
national metals technology centre

npower

RWE Group

NPL
National Physical Laboratory

Technology Strategy Board
Driving Innovation

TWI WORLD CENTRE FOR MATERIALS JOINING TECHNOLOGY