



SHAPING THE FUTURE OF UK INDUSTRY

ROADMAPS TO 2050: REDUCING CARBON EMISSIONS
WHILST STAYING COMPETITIVE



Royal Academy of Engineering
 Prince Philip House
 3 Carlton House Terrace
 London
 SW1Y 5DG

Panel and speakers

BIOGRAPHIES

Welcome

We have a great programme planned for today, focusing on the draft findings of the Industrial Decarbonisation 2050 Roadmaps, namely how the UK's most energy intensive industries can reduce carbon emissions and improve their energy efficiency while remaining competitive. With a keynote address from the Secretary of State for Energy & Climate Change, Ed Davey, and insights from leading industry and technical experts, you will have the opportunity to discuss the study's preliminary findings, opportunities and emerging issues during a 'question time' style morning session chaired by Roger Harrabin. The afternoon includes workshop sessions to explore critical areas in more depth.

Time	
09:30 - 10:00	Registration
10:00 - 10:05	Welcome from Chair, Roger Harrabin
10:05 - 10:15	Industry context, Terry Scuoler, EEF
10:15 - 10:45	Study approach, sector outputs and cross-sector findings Paul Noble, Parsons Brinckerhoff and Ulrika Wising, DNV GL
10:45 - 11:00	Government context Ed Davey, Secretary of State
11:00 - 12:15	Panel debate
12:15 - 13:30	Lunch
13:30 - 13:50	European context
13:50 - 14:50	Break out groups to discuss cross-cutting strategic conclusions
14:50 - 15:10	Tea & coffee break
15:10 - 16:00	Break out groups to discuss cross-cutting technologies
16:00 - 16:15	Workshop close, David Wagstaff, DECC



Ed Davey, Secretary of State, DECC

Edward Davey was appointed Secretary of State for Energy & Climate Change in February 2012. He is the Liberal Democrat MP for Kingston and Surbiton. From 1989 to 1993 he worked in the Commons as an economics researcher for the Liberal Democrats, becoming the party's senior economics' adviser.

Edward became Liberal Democrat MP for Kingston and Surbiton in 1997 and was appointed the party's economics affairs spokesman in 1997. After the 2001 election he joined the Shadow Cabinet as Shadow Chief Secretary to the Treasury. In 2007 he was appointed Shadow Secretary of State for Foreign and Commonwealth Affairs and remained in that post until 2010.

He then became Parliamentary Under Secretary of State for Employment Relations and Consumer Affairs at the Department for Business, Innovation & Skills from May 2010 to February 2012.



Jigar Shah, Executive Director, Institute for Industrial Productivity

Jigar Shah is the Executive Director of the Institute for Industrial Productivity (IIP), an international non-profit organisation with a mission to decarbonise industry through promotion of best practices and policies in engagement with government and private sector. Jigar has over 25 years of experience in improving resource efficiency in the manufacturing sector. Prior to joining IIP he was at the International Finance Corporation (the World Bank Group) and was responsible for assisting IFC's clients in undertaking climate friendly investments in energy efficiency, water management, and resource conservation.

Jigar has a PhD in Chemical Engineering and has taught graduate courses in Sustainable Energy as an Adjunct Professor at McMaster University, Canada, and George Washington University, Washington DC. He has participated in various international events including the Clean Energy Ministerial, 3GF, and the Vienna Energy Forum.

He is on the Technical Advisory Committee of the UNIDO Green Industry Platform and a member of the US and Australia led Solutions Center Advisory Board.



Niall Mackenzie, BIS

Niall Mackenzie is a career civil servant who has worked in six government departments over the past 28 years covering a wide range of policy areas including sport, tourism, broadcasting, gambling, health, and the environment.

He joined the Department for Business Innovation & Skills in August 2014 as Director for Energy, Material and Agri-tech, to drive delivery of the industrial strategies for nuclear, offshore wind, oil and gas and Agricultural Technology and government action to support growth in the foundation materials' sectors. Prior to that, his focus had been in the Department of Energy & Climate Change on carbon trading and market incentives for improving industrial and business energy efficiency.



Jesus Gonzalez, President, Cemex UK operations

President of the UK operations of global building material solutions provider CEMEX, Jesus Gonzalez is a native of Madrid, married with two sons and is a keen sports fan.

Educated at the Polytechnic University of Madrid, he obtained a BSc in Naval Engineering before obtaining a MSc in Business Administration from the University of Navarra, Barcelona. Jesus has spent a large part of his career outside of Spain on the other side of the Atlantic in the USA, Mexico and Central America.

Jesus joined CEMEX in 1998, and has held a number of senior positions since including Director of Strategic Planning with CEMEX Corporate in Monterrey Mexico (1998-2000) and Vice President Strategic Planning CEMEX USA, based in Houston, Texas (2000-2009). Jesus was then appointed Regional President for CEMEX Central America based in Panama (2009-2011) before taking up his current post as Country President for CEMEX UK Operations in May 2011. Prior to joining CEMEX he worked for McKinsey & Company, a global management consultancy firm.



Paul Booth, Sabic, European Director Government Policy

Paul has worked in the chemical industry for 40 years and is now in a senior executive position with SABIC.

Born on Teesside, Paul started his career as an apprentice with ICI and is now Chairman of SABIC UK Petrochemicals as well as European Director for Government Policy and Public Affairs. Paul is a member of the CIA Council and is now Chairman of the North East Process Industry Cluster (NEPIC), he is also one of the industrialists on the new UK Government sponsored TVU LEP (Local Enterprise Partnership) and additionally Board Member for Plastics Europe North.

Paul has had a long and passionate interest in the training and development of people and sits on the Board of Governors for Teesside University. Additionally he has a deep interest in sustainability issues and is involved in a number of projects designed to ensure the long term future of the chemical industry. Paul is now Honorary President for SCI (Society of Chemical Industry) in the UK.



Paul Noble, Parsons Brinckerhoff Project Director, Industrial 2050 Roadmaps Project

Paul has spent much of his career working with energy intensive industries initially as an environmental consultant and more recently in the energy sector. Paul is Industry Sector Lead in Parsons Brinckerhoff's Energy and Industry business. His experience covers a range of disciplines including industrial master planning and roadmaps, energy efficiency and heat recovery, commercialisation support to cleantech startups, due diligence and stakeholder engagement.

Paul has particular experience in directing multi-disciplinary teams, currently for the Industrial Decarbonisation and Energy Efficiency 2050 Roadmaps and previously in leading the North South Tees Industrial Development Framework Project. He has also led technical due diligence teams and delivered energy efficiency projects within energy intensive industries. Prior to his current role, Paul led business development activities for Parsons Brinckerhoff's engineering business within the energy and industry sectors.



Chair, Roger Harrabin

Roger Harrabin is a well respected environmental journalist. He has broadcast on environmental issues since the 1980s and has won many awards in print, TV and radio. He has travelled widely reporting on environment and energy and interviewed many leading figures including Margaret Thatcher, Tony Blair Al Gore, John Kerry, Ban Ki-Moon, James Lovelock, Sonia Gandhi, Gordon Brown and Bjørn Lomborg.

Harrabin was born and raised in Coventry, England and studied English at St Catharine's College, Cambridge, where he was president of the Junior Common Room. He joined the independent Thames TV News as a producer whilst freelancing for several years as a Saturday sports sub-editor in Fleet Street on The News of the World and The Sunday Mirror.



Terry Scuoler, CEO, EEF

Terry became CEO of EEF in March 2010 with a vision and commitment to take part in a renewed interest and resurgence in the UK's manufacturing and engineering sectors. Terry sits on the boards of the Sector Skills Council for Manufacturing and the University of Sheffield Advanced Manufacturing Institute. He is also chair of the Council of European Employers of the Metal, Engineering and Technology-based Industries (CEEMET).

After graduating, Terry attended the Royal Military Academy at Sandhurst and served as an infantry officer for five years. He left the Army in 1978 and began his commercial career in publishing and the construction industry.

David Wagstaff, Head of Heat Strategy and Policy, DECC

David joined the civil service from the retail trade twenty years ago and has held a range of positions in the (then) DTI, the Office of Climate Change and Department of Energy & Climate Change. His expertise spans employment relations and audit regulation as well as all aspects of energy and climate change policy. His roles at DECC have included Director of Strategy and Head of Distributed Energy and Heat. He is now in charge of Heat Strategy and Policy.

He and his team have produced two landmark documents, The Future of Heating: A strategic framework in 2012, and The Future of Heating: Meeting the challenge in 2013. He is now managing a large programme of work to implement the commitments in the 2013 document, overseeing around 40 staff including the newly created Heat Network Delivery Unit.



Ulrika Wising, Head of Sustainable Energy Use, DNV GL

Ulrika Wising is currently heading up the Sustainable Energy Use section in Europe. The Sustainable Energy Use works for policy makers, policy implementers, and large energy consumers to help them set and achieve their energy management and sustainability objectives. We provide value to our clients through strategic planning, market and technology research, implementation support, and performance measurement.

Ulrika Wising holds a PhD in Chemical Engineering, specialized in Energy Efficiency in Industry and a Master Degree in Chemical Engineering with a process focus. After having completed a post-doctoral fellowship in Montréal, she has been working with energy intensive industry, helping them improve their performance and reduce their energy costs.



Project summary

INDUSTRIAL DECARBONISATION AND ENERGY EFFICIENCY 2050 ROADMAPS

Overview

The Department of Energy & Climate Change (DECC) and the Department of Business, Innovation and Skills (BIS) set up this joint project to identify how UK industry can reduce carbon emissions while remaining competitive. The project focuses on the eight industrial sectors which use the greatest amount of heat and the largest source of industrial emissions: Cement, Ceramics, Chemicals, Food and Drink, Iron and Steel, Glass, Oil Refining and Pulp and Paper. The project aims to:

- Improve understanding of the emissions abatement potential of individual industrial sectors, the relative costs of alternative abatement options and the related business environment including investment decisions, barriers and issues of competitiveness
- Establish a shared evidence base to inform future policy
- Identify strategic conclusions and next steps to help deliver cost effective decarbonisation for UK energy intensive industries in the medium to long term (2020-2050)

A collaborative research exercise

A consortium of Parsons Brinckerhoff and DNV GL is leading delivery of the research elements of the project, using a collaborative process that has involved strong contributions from sector trade associations and their industry members, academics and other experts such as technology and equipment companies. Engagement with sectors began in November 2013, with a view to finalising and publishing reports in March this year. This workshop is an important step on the way towards that goal.

The research is focused on answering the following principle questions:

- What are the current emissions from each sector and how is energy used?
- For each sector, what is the business environment, what are the business strategies of companies, and how do these impact on decisions to invest in decarbonisation?
- How might the baseline level of energy and emissions in the sectors change over the period to 2050?
- What is the potential to reduce emissions in these sectors beyond the baseline over the period to 2050?
- What emissions pathways might each sector follow over the period to 2050, under different scenarios?
- What future actions might be required to be taken by industry, government and others to overcome the barriers in order to achieve the pathways in each sector?

Glossary

Inputs	Findings	Pathways	Conclusions and next steps
Literature	Emission data	Analysis of evidence to construct decarbonisation and energy efficiency pathways	Analysis of evidence and pathways to develop strategic conclusions and next steps to overcome barriers and enablers and implement pathways
Publicly available emissions data	Decarbonisation options and associated data		
Interviews, surveys, meetings and workshops with stakeholders	Energy efficiency options and associated data		
Sector teams comprising government policy and analytical teams, trade associations, academics	Barriers and enablers		

A research methodology was followed in each sector which included data collection and analysis as above.

In addition to eight sector roadmaps, a final summary report will be produced drawing out the key cross-sector themes and conclusions arising from the overall project. The strategic conclusions and common technologies will be summarised and discussed at this workshop.

Project scope and methodology

The project is seeking solutions around how industries in these sectors can reduce their greenhouse gas emissions and increase their energy efficiency while remaining competitive.

For each sector roadmap, the project team initially collated current energy use data with reference to available datasets in the agreed reference year (2012), developed possible future scenarios to 'stress test' the pathways and defined key sub sectors / processes that make up significant emissions. A database of decarbonisation and energy efficiency options was then developed through review of literature and engagement with stakeholders. This database was as an input to simulate the deployment (from 2014 to 2050) of particular combinations of options to investigate possible pathways to carbon reduction bands. Finally, following further stakeholder engagement at a second workshop (in which draft pathways and possible next steps were discussed), strategic conclusions were drawn from the research and analysis.

In the project we are seeking solutions based around keeping manufacturing in the UK: it is not the purpose of this study to analyse the offshore emissions of manufacturing abroad. Embedded emissions from off-site manufacture of materials used to construct plant are outside the scope of quantitative assessment. The project model includes an assessment of the impact of electricity grid carbon factors (which impacts indirect emissions associated with imported electricity to sites). However, emissions associated with off-site feedstock or fuel extraction, production, processing and delivery are excluded.

The project acknowledges that there may be cost effective abatement options from material/resource efficiency, but this is also not the central focus of this project. The impact of substantial material and resource efficiency is assessed as a simple sensitivity in some sectors and has also been identified within interviews and therefore forms part of the qualitative research.

In delivering the project (especially the quantitative modelling), it has been necessary to clearly define a range of key concepts. For ease, these have been identified in the glossary.

Adoption

The percentage of sector production capacity to which a carbon reduction option has already been applied. Therefore, of the list of options being assessed, this is a measure of the degree to which they have already been deployed in the sector.

Applicability

The percentage of the sector production capacity to which a particular option can be applied. This is a measure of the degree to which a carbon reduction option can be applied to a particular part of the sector production process.

Carbon reduction band

The percentage ranges of CO2 reduction achieved for a given pathway in 2050 relative to the reference year (2012) e.g. 20-40% of the reference year emission.

Carbon reduction curve or profile

A quantitative graph which charts the evolution of sector carbon emissions from 2014 to 2050.

Deployment

Once the adoption and applicability of an option has been taken into account, each option can be deployed to reduce part of the sector's CO2 emissions. Hence, the deployment of the option from 2015 through to 2050 is illustrated in our analysis by the coloured matrix on the pathway presentations.

Grid CO2 emission factor

A specific scenario assumption specifying the carbon intensity trend of grid electricity to 2050.

Option

A carbon reduction measure, often a technical measure, such as a more efficient process or technology.

Option pathway, or option configuration

The selection of particular options and their deployment over time that defines a pathway.

Pathway

A particular selection and deployment of options from 2014 to 2050 chosen to achieve reductions falling into a specific carbon reduction band.

Scenario

A specific set of conditions external to the sector which will affect the growth and costs of production in the sector and affect the timing and impact of options on carbon emissions and energy consumption.

Scenario assumptions

A set of specific cost and technical assumptions which characterise each scenario. These include forward fuel price projections, grid CO2 factor projection and background economic growth rate. The assumptions also include sector forward production projections.

Sensitivity case

The evaluation of the impact of changes in a single assumption on a pathway.

Associated organisations

Notes

DECC

The Department of Energy & Climate Change (DECC) works to make sure the UK has secure, clean, affordable energy supplies and promote international action to mitigate climate change. They support consumers and keep energy bills down, including through implementation of the Green Deal. They promote action in the EU and internationally to maintain energy security and mitigate dangerous climate change as we chart the way towards a global deal on climate change in 2015.

BIS

The Department for Business, Innovation & Skills (BIS) is the department for economic growth. The department invests in skills and education to promote trade, boost innovation and help people to start and grow a business. BIS also protects consumers and reduces the impact of regulation. BIS is responsible for: working with further and higher education providers to give students the skills they need to compete in a global employment market, supporting innovation and developing the UK's science and research industry, which is important to help economic growth and making sure consumer law is fair for both consumers and businesses, and that consumers know their rights and are able to use them effectively.

Parsons Brinckerhoff

WSP and Parsons Brinckerhoff have combined and are now one of the world's leading engineering professional services consulting firms. Together they provide services to transform the built environment and restore the natural environment, and their expertise ranges from environmental remediation to urban planning, from engineering iconic buildings to designing sustainable transport networks, and from developing the energy sources of the future to enabling new ways of extracting essential resources. They have approximately 31,500 employees, including engineers, technicians, scientists, architects, planners, surveyors, program and construction management professionals, and various environmental experts. They are based in more than 500 offices across 39 countries worldwide.

DNV GL – Business Assurance

As a world-leading certification body, DNV GL helps businesses assure the performance of their organisations, products, people, facilities and supply chains through certification, verification, assessment, and training services. DNV GL delivers deep insight and pragmatic support to major companies enabling them to build effective sustainability strategies. Partnering with their customers, the company builds sustainable business performance and create stakeholder trust.

DNV GL enables organisations to advance the safety and sustainability of their business by the purpose of safeguarding life, property and the environment. With their origins stretching back to 1864, the reach today is global. Operating in more than 100 countries, DNV GL's 16,000 professionals are dedicated to helping our customers make the world safer, smarter and greener.



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