

ENERGY STORAGE: AN INTEGRATED APPROACH.

Institution of
**MECHANICAL
ENGINEERS**

Renewable Power Committee
Conference

23 September 2014
Birmingham
www.imeche.org/events/C1413



With political leaders promising consumers fixed energy rates for the future, it is essential that the energy sector and the Government look to the long term investments to create financial savings for the continued security of the industry.

The Electricity Storage Network recently reported that the application of energy storage technologies for renewable sources could potentially generate a total systems saving of £10billion per year by 2050.

The facts highlight that investing in the role of renewable energy storage solutions in the UK market will generate long term savings for the industry and secure the future of UK energy.

Energy Storage 2014: An integrated approach, on 23 September in Birmingham, has been specifically designed as a forum where mechanical engineers

within the energy storage industry can debate and learn from newly funded projects and existing sites. Energy Storage 2014 will take an in-depth look at renewable energy storage, the mechanics behind the technology, the current position of UK policy and targets, and future developments.

WHEN	23 September 2014
WHERE	Birmingham
BOOK ONLINE	www.imeche.org/events/C1413

BENEFITS OF ATTENDANCE:

- Discover the latest developments at the **Highview Power Project**, which won £8million as part of the DECC storage demonstration competition to build a **5MW/15MWh system**
- Explore the technical **development targets of adiabatic compressed air energy storage** and address the current development of this technology with the **RWE**
- Gain insight from the **National Grid's** latest report on building a business case for system operators using storage
- Understand **UK Power Networks'** strategy for the Smarter Networks Storage Projects for distribution-connected storage with the **German Aerospace Centre**
- Explore ongoing developments on high-temperature heat storage for CSP and industrial processes with the **German Aerospace Centre**
- Gain an **international perspective on global energy storage strategies** with case studies from California and Germany

SUPPORTING ORGANISATION:



MEDIA PARTNER:

new energy
magazine for renewable energy

WITH THANKS TO THE RENEWABLE POWER COMMITTEE

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SPEAKERS AND CONTRIBUTORS

IAN ARBON CHAIR

ENERGY, ENVIRONMENT AND SUSTAINABILITY GROUP, INSTITUTION OF MECHANICAL ENGINEERS

Ian Arbon is a Chartered Mechanical Engineer, a Registered European Engineer and a Chartered Environmentalist with an MSc in 'Renewable Energy and the Environment' and an MBA. Ian is also a Visiting Professor in Alternative Energy at Newcastle University and Honorary Professor in Sustainable Energy at the University of Glasgow where he teaches on renewable energy at MSc level.

NICK WINSER KEYNOTE

EXECUTIVE DIRECTOR, UK, NATIONAL GRID
Nick Winser is also a Non-Executive Director of Kier Group plc where he Chairs the Safety, Health and Environment Committee. Nick was appointed as a Director of Way Ahead Support Services, a local charity for the disabled in Warwickshire, in 2011 and has also held the rank of Major in the Engineer and Logistics Staff Corps (RE) V, providing advice to HM Forces and the Ministry of Defence since 2011.

ALISTAIR STEELE

PROJECT MANAGER LV BATTERIES PROJECT, SCOTTISH AND SOUTHERN ELECTRIC
Alistair Steele currently works for the networks business within SSE. For the last four years Alistair has managed leading-edge smart grid projects covering a range of subjects, with a focus on energy storage. He has a degree in Electrical Engineering and he is currently working towards IET Chartership status.

IAN LLOYD

NETWORK TECHNOLOGY PROJECT MANAGER, NORTHERN POWERGRID

Ian Lloyd started his career in the electricity supply industry as an Electrical Apprentice at Aberthaw Power Station in South Wales. Over the next 10 years he became a specialist in the semiconductor industry supporting the manufacturing process for integrated circuits on silicon wafers. Ian then restarted his career in the electricity supply industry with Northern Powergrid and has project managed the customer led network revolution project for the last three years.

KEITH MCGRANE

HEAD OF ELECTRICITY STORAGE, GAELECTRIC
Keith McGrane has over 17 years experience in scientific research, project finance and renewables. He has been involved with the development of Ireland's first offshore wind farm and the financing of its independently developed wind portfolio. Keith joined Gaelectric in 2008 and has since grown the team and positioned the Larne project and Gaelectric Energy Storage as the foremost Compressed Air Energy Storage company in the European market.

TOBY PETERS

CO-FOUNDER OF HIGHVIEW ENTERPRISES LTD AND CEO OF DEARMAN ENGINE COMPANY
Toby Peters conducts research and development on liquid air as a cost-effective solution to two major energy challenges: bulk grid electricity storage and cheap and convenient low/zero emission transport. He was one of the co-inventors of liquid air energy storage and co-founded Highview Power Storage. More recently, he founded the Dearman Engine Company, currently developing a pioneering liquid air piston engine for on and off highway vehicles.

GARETH BRETT

CHIEF EXECUTIVE OFFICER, HIGHVIEW POWER STORAGE

Gareth Brett has worked with Highview since 2006 and joined the Board to become full time CEO in December 2008. Gareth began his career with Southern Electric in 1977, where he led the development of three major UK independent power projects. These IPPs used a wide range of technologies including gas fired CCGTs, thermal coal plants, open cycle gas turbines, diesels, wind turbines and hydro plant. Prior to joining Highview full-time as CEO, Gareth was also Head of New Nuclear Build for British Energy.

PROGRAMME TUESDAY 23 SEPTEMBER 2014

08:30

REGISTRATION AND REFRESHMENTS

09:00

CHAIR'S
OPENING
REMARKS

ENERGY STORAGE: THE MISSING LINK IN THE UK'S ENERGY COMMITMENTS

Ian Arbon, Energy, Environment and Sustainability Group, Institution of Mechanical Engineers

- Address the need for the Government to support an integrated approach to energy storage that includes electricity, heat and transport
- Recognise that energy storage cannot be incentivised by conventional market mechanisms
- Understand the perception of the UK's obsession with the 'cheapness' of energy and what this means for the market

09:15

KEYNOTE
ADDRESS

ADDRESS THE GLOBAL DRIVERS FOR NATIONAL GRID'S ENERGY STORAGE STRATEGY

Nick Winser, Executive Director, UK, National Grid

- Understand National Grid's energy challenges to meet 2050 targets
- Explore the drivers for change in the context of electricity, heat and transport
- Recognise the areas of focus for policy makers and technology providers

09:40

QUESTION
TIME

ACHIEVE AN INTEGRATED APPROACH TO DIFFERENT TYPES OF ENERGY STORAGE

**Panellists: Alistair Steele, Project Manager LV Batteries Project, Scottish and Southern Electric
Ben Godfrey, Innovation and Low Carbon Networks Engineer, Western Power Distribution**

- How to meet targets and reduce independent costs through the integration of static and moveable energy
- Look to develop partnerships where possible to reduce constraint payments
- Understand the next stages in policy implementation, the current grid constraints and creating a sustainable energy storage strategy

Submit your questions in advance to eventenquiries@imeche.org

DISCOVER THE MECHANICS BEHIND THE TECHNOLOGY APPLICATION

10:20

CASE
STUDY

LOW VOLTAGE (LV) ENERGY STORAGE PROJECT

Alistair Steele, Project Manager LV Batteries Project, Scottish and Southern Electric

- Understand the potential benefits, practicalities and costs of installing electrical energy storage (ESS) on the LV network
- Analyse the results of SSE's forthcoming 2014 report, with Ofgem, on the LV energy storage project
- Prepare the data and the key lessons that can be applied to Tier 2 projects to support the large scale roll-out of this technology

10:45

NETWORKING REFRESHMENT BREAK

11:15

CASE
STUDY

NORTHERN POWERGRID'S CUTTING-EDGE TRIAL OF ELECTRICAL ENERGY STORAGE TECHNOLOGY AND THE GRAND UNIFIED SCHEME (GUS)

Ian Lloyd, Network Technology Project Manager, Northern Power Grid

- Gain insight into the observed behaviours and outcomes to date to understand the energy storage deployed
- Explore the early results of how to tackle the energy demand, peak load and voltage control utilising real and reactive power
- Explore the aims and outcomes of the project and the integration of the product with a network control system

11:45

CASE
STUDY

A EUROPEAN PERSPECTIVE TO COMPRESSED AIR ENERGY STORAGE (CAES)

Keith McGrane, Head of Energy Storage and Offshore, Gaelectric

- Gain insight into the European perspective on energy storage and how it can be applied to the UK
- Understand the possibilities of the application of CAES to increase capacity
- Explore the market potential for CAES and the impact it could have across Europe

12:10

BUILD ON PROVEN AND UNDERSTOOD MECHANICAL ENGINEERING AND TECHNOLOGY TO ACCESS CRYOGENIC (LIQUID) ENERGY STORAGE (CES)

Toby Peters, Co-founder, Highview Enterprises Ltd and CEO, Dearman Engine Company

- Explore the sustainability benefits of CES and what we can take from existing processes to forward industry deployment
- Understand how to benefit from the well-established global supply chain of major components to drive down cost
- Discover the benefits of the basic CES cycle and how thermal integration can considerably improve 'round-trip' efficiency

12:35

EXPLORE HOW HIGHVIEW LIQUID AIR ENERGY STORAGE HAS EMBRACED SCALING UP, DEMONSTRATION AND COMMERCIALISATION

Gareth Brett, CEO, Highview Power Storage

- Hear the latest update on the 5MW/15MWh DECC Project with Viridor and DECC
- Develop an understanding of the current business model and what this means for future developments
- Understand the importance of the supply chain and delivery partners to limit delays and meet financial targets

13:00

LUNCH

SPEAKERS AND CONTRIBUTORS

ERIK HAUPTMEIER

MANAGER OF TECHNOLOGIES POWER NETWORKS & STORAGE, RWE GROUP CENTRE
Erik Hauptmeier deals with the assessment of innovative technologies with respect to energy storage and electrical power networks. In parallel he leads the Strategy and Technology Committee of the European Association of Energy Storage. Prior to RWE he was Deputy Head of Electrical Network Operations in chemical industries ensuring safe operation of high, medium and low voltage networks for a local infrastructure and service provider.

BEN GODFREY

INNOVATION AND LOW CARBON NETWORKS ENGINEER, WESTERN POWER DISTRIBUTION
Ben Godfrey BEng MIET is an Innovation and Low Carbon Networks Engineer for Western Power Distribution. Following the acquisition of Central Networks by Western Power Distribution, Ben has been working on a range of Tier 1 and Tier 2 projects through OFGEM's Low Carbon Networks Fund which include Network Management on the Isles of Scilly and the Milton Keynes based FALCON (Flexible Approaches for Low Carbon Optimised Networks).

STEFAN ZUNFT

HEAD OF THE RESEARCH GROUP FOR THERMAL COMPONENTS, GERMAN AEROSPACE CENTRE (DLR) INSTITUTE OF TECHNICAL THERMODYNAMICS
Stefan Zunft has been Head of the research group "Thermal Components" at the DLR Institute of Technical Thermodynamics since 2006. His work focuses on the development of high-temperature heat storage and heat management in solar and industrial applications. Stefan studied at the Universities of Hannover and Stuttgart, graduating as a mechanical engineer from the University of Stuttgart in 1991 and received his PhD in 2002.

CARLA PETERMAN

COMMISSIONER FOR THE RENEWABLE PORTFOLIO STANDARD, THE CALIFORNIA PUBLIC UTILITIES COMMISSION
Carla Peterman's role examines alternative transportation and energy storage proceedings. Commissioner Peterman's previous positions include: California Energy Commissioner, researcher at the University of California Energy Institute and the Lawrence Berkeley National Laboratory, and investment banking associate at Lehman Brothers.

NICK HEYWARD

PROJECT DIRECTOR, UK POWER NETWORKS
Nick Heyward has been involved in technical innovation and research since 2003 across a range of different fields, from video processing and compression, to technology, renewables and clean-tech industry research. Now currently in the innovation arm of UK Power Networks, the UK's largest distribution network operator; Nick has led a portfolio of projects covering smart grid communications, asset tracking and grid-scale energy storage.

ALICE ETHERIDGE

BALANCING AND MARKETS MANAGER, NATIONAL GRID
Alice Etheridge is responsible for developing National Grid's future strategy on energy and whole systems balancing. Alice joined National Grid in early 2013 after spending nine years working in the civil service, most recently at the Department of Energy and Climate Change on future electricity balancing and electricity demand reduction.

Find out more about our speakers at www.imeche.org/events/C1413

- This programme is subject to change.
- The Institution is not responsible for the views or opinions expressed by individual speakers.

PROGRAMME

14:00
ROUND TABLES

EVALUATE WHERE SUBSIDIES ARE REQUIRED FOR ENERGY STORAGE TECHNOLOGIES AND IF CURRENT FUNDING IS DISTORTING MARKET NEEDS

Ian Lloyd, Network Technology Project Manager, Northern Power Grid
Stefan Zunft, Head Of The Research Group for Thermal Components, German Aerospace Centre (DLR) Institute of Technical Thermodynamics

- Select from one of the following roundtable discussions to debate the commercial viability of the technology:
 - 1) Thermal solar storage
 - 2) Battery storage
 - 3) Compressed air energy storage
 - 4) Cryogenic energy storage
- Spend 30 minutes discussing the selected topic's potential for implementation and challenges that may occur
- For the final 15 minutes the facilitator from each roundtable will report the table's conclusions and provide an opportunity for Q and A

14:45
CASE STUDY

FRAMEWORK CONDITIONS AND TECHNOLOGY DEVELOPMENTS FOR ADIABATIC COMPRESSED AIR ENERGY STORAGE IN GERMANY

Erik Hauptmeier, Manager of Technologies Power Networks and Storage, RWE Group Centre

- Understand the political landscape in Germany and how this has impacted storage developments
- Gain insight into the economic outlook for storage at different stages of the energy system
- Explore the technical development targets of adiabatic compressed air energy storage and address the continued growth of this technology

KEY DEVELOPMENTS FOR COLLABORATIVE ENERGY STORAGE SYSTEMS

15:10
CASE STUDY

ENERGY STORAGE FOR DISTRIBUTION NETWORKS

Ben Godfrey, Innovation and Low Carbon Networks Engineer, Western Power Distribution

- Address the challenges of deploying energy storage within distribution networks
- Explore the benefits of integrating power electronics on the network for expanded distribution and grid efficiency
- Consider collaborative devices versus standalone operation and the comparable benefits

15:35

HIGH-TEMPERATURE HEAT STORAGE SOLUTIONS FOR CONCENTRATING SOLAR POWER PLANTS AND INDUSTRIAL PROCESSES

Stefan Zunft, Head Of The Research Group for Thermal Components, German Aerospace Centre (DLR) Institute of Technical Thermodynamics

- Discover relevant storage technologies and their development status
- Gain an overview on recent storage applications that are impacting on the solar thermal market
- Explore ongoing developments on high-temperature heat storage for CSP and industrial processes

16:00

NETWORKING REFRESHMENT BREAK

FUTURE DEVELOPMENTS FOR ENERGY STORAGE

16:30
VIA VIDEO LINK

ENERGY STORAGE IN CALIFORNIA

Carla Peterman, CPUC Commissioner, The California Public Utilities Commission

- Gain insight into California's adopted energy storage procurement target of 1,325 MWs for its investor-owned utilities by 2020
- Consider the requirements to be cost-effective and targeted to optimise the grid, integrate renewable sources and reduce greenhouse gas emissions
- Understand what is expected at the State of California's first biennial solicitation, planned for December 2014

16:55

CASE STUDY

SMARTER NETWORK STORAGE (SNS) FOR DISTRIBUTION-CONNECTED STORAGE

Nick Heyward, Project Director, UK Power Networks

- Explore the developments of the Smarter Network Storage Project
- Understand the challenges and opportunities for distribution network-connected storage
- Gain insight into the planning, design and construction considerations for large-scale battery-storage with a case study from SNS

17:20

EXPLORE THE POTENTIAL USE OF STORAGE BY THE SYSTEM OPERATOR

Alice Etheridge, Energy Strategy and Policy, National Grid

- Understand how storage systems will help meet future electricity challenges
- Helping the systems operator build the business case for energy storage
- Gain insight into the latest findings from the National Grid on UK energy storage

17:45

CHAIR'S CLOSING REMARKS

Ian Arbon, Energy, Environment and Sustainability Group, Institution of Mechanical Engineers

18:00

END OF CONFERENCE

BOOKING FORM

CONFERENCE CODE:
C1413ABC

**ENERGY STORAGE:
AN INTEGRATED APPROACH**
23 SEPTEMBER 2014
BIRMINGHAM

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Do you have any special requirements?	

How did you hear about this event? Direct mail Website Colleague Other

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FEES AND CHARGES Please complete the appropriate box.

Registration fees include entry to the sessions, refreshments, lunch and a copy of the event proceedings.

	STANDARD RATE	VAT	TOTAL
Member, Institution of Mechanical Engineers	£300.00	£60.00	£360.00
Member, supporting organisation	£300.00	£60.00	£360.00
Non-member	£410.00	£82.00	£492.00
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Invoice charging (if applicable)	£10	£2	£12.00

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PLEASE INDICATE METHOD OF PAYMENT:

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VENUE

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**ENERGY STORAGE:
THE MISSING LINK
IN THE UK'S ENERGY
COMMITMENTS.**



UK GOVERNMENT NEEDS TO WORK WITH INDUSTRY TO PRODUCE A COMPREHENSIVE ENERGY STORAGE ROADMAP TO FULLY MAXIMISE OUR ENERGY UTILISATION POTENTIAL.

**TIM FOX
HEAD OF ENERGY AND ENVIRONMENT, INSTITUTION OF MECHANICAL ENGINEERS**

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GET INVOLVED

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