MEI RESEARCH PROGRAMS

L E

Capabilities

- Energy network, system and market integration of renewable energy sources
- Distributed energy resources and smart grids
- Integrated energy networks and multi-energy systems
- Risk and resilience assessment of future energy systems
- Demand modelling using randomised control trials, big data and machine learning
- Retail energy markets and consumer behaviours control trials, big data and machine learning

Impact

- Modelling work commissioned by the Finkel Review
- AEMO demand and reserves forecasting using AMI data and machine learning approaches
- Modelling of electricity consumer behaviour for Billcap, Click Energy and Simply Energy
- Collaborations with AEMC and AER on power system resilience and reliability

Researchers

Prof. Lu Aye	Prof. Ross Garnaut	Prof. Brendon McNiven
Prof. James Bailey	Prof. Fiona Haines	A/Prof. Monica Minnegal
Prof. Howard Bondell	Prof. Glenn Hoetker	Dr. Reihana Mohideen
Prof. Michael Brear	A/Prof. William Ho	Prof. Nando Ochoa
A/Prof. David Byrne	Mr. Terence Jones	Dr. Behzad Rismanchi
Dr. Sangeetha Chandra-Shekeran	Prof. Chris Leckie	Prof. Prakash Singh
A/Prof. Robert Crawford	Prof. Pierluigi Mancarella	Prof. Kate Smith-Miles
Prof. Rob Evans	Prof. Chris Manzie	Prof. Doreen Thomas
Prof. John Freebairn	Dr. Leslie Martin	Dr. Maria Vrakopoulou

The Energy Materials Program assembles researchers working in materials science and engineering, and focuses on the discovery and optimisation of materials for energy applications. This includes materials for energy generation, storage, transport, and consumption such as hydrogen electrolysis, batteries, solar energy conversion and lighting.

Capabilities

- Energy materials design aided by theory and computation
- Developing next-generation catalysts for carbon dioxide reduction
- Novel materials and processes for gas separation and capture
- Graphene materials in low-energy electronics and energy storage
- Materials and device optimisation in thin film solar technologies

Impact

- Reduce energy consumption of separation processes for BHP, Masan and Ekos.
- Developing organic and earth-abundant inorganic thin film solar photovoltaic technologies for ACAP
- Improve performance and reduce cost of anode materials in batteries for the Future Battery Industries CRC in conjunction with industry partners including Syrah Resources and AnteoTech.
- Computational materials design for lightweight structural components in electric vehicles for Ford Motor Company.

Key

Dr. Christian Brandl	Prof. Sandra Kentish	Prof. Greg Qiao
Dr. James Bullock	Prof. Dan Li	Prof. Graham Schaffer
Dr. Daniel Creedon	Dr. Gang Li	A/Prof. Colin Scholes
Prof. Amanda Ellis	Dr. Wen Li	Dr. Peter Sherrell
Prof. George Franks	Dr. Tesfaye Molla	Prof. Trevor Smith
Prof. Ken Ghiggino	Prof. Paul Mulvaney	Ms. Jo Staines
Prof. David Jamieson	A/Prof. Kathryn Mumford	Dr. Wallace Wong
Dr. David Jones		

Hydrogen and Clean Fuels

The Hydrogen and Clean Fuels Program integrates research into production, distribution and use of hydrogen in the energy system. The program studies electrolysis and clean fuel production, as well as hydrogen and clean fuel distribution and use in industrial and transport applications.

Capabilities

- Process engineering and techno-economics of hydrogen production from renewables and fossil fuels with carbon capture and storage (CCS)
- Advanced gas turbine and reciprocating engine systems running on hydrogen and hydrogen-derived fuels
- Assessment of hydrogen integration into the natural gas network, including Power to Gas (P2G) concepts
- Catalysis and process engineering of converting hydrogen to clean liquid fuels
- Sub-surface storage of hydrogen

Impact

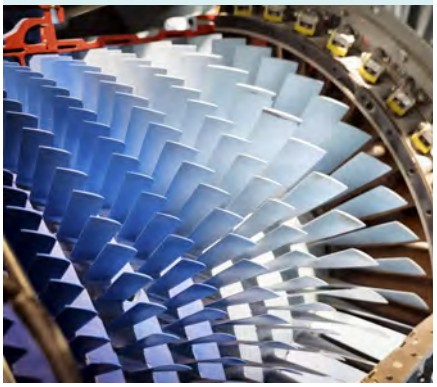
- Reciprocating engine research with hydrogen and synthesis gas fuelling for Caterpillar, Ford and other partners
- Support to the Council of Australian Government's (COAG) National Hydrogen Strategy
- Provision of expert advice to the Hydrogen Energy Supply Chain (HESC) Project
- Optimisation of integrated energy systems featuring hydrogen for the Future Fuels CRC and other partners

Key Researchers

Prof. Robin Batterham
Prof. Michael Brear
Dr. Robert Gordon
Dr. Eirini Goudeli
Prof. Ralf Haese
Prof. Sandra Kentish
Dr. Gang Li
Prof. Pierluigi Mancarella
Prof. Paul Mulvaney
A/Prof. Kathryn Mumford
Prof. Geoff Stevens
Dr. Mohsen Talei
A/Prof. Yi Yang

Power Generation and Transport

The Power Generation and Transport Program brings together researchers who investigate several forms of renewable and low emission power plants for stationary and mobile applications. This includes advanced wind, solar, gas turbine, reciprocating engine and energy storage technologies.



Capabilities

- Carbon Capture and Storage
- Conventional and alternative fuels and emissions chemistry
- Gas turbine, reciprocating engine, hybrid and electric powertrain dynamics and optimisation
- Wind turbines/farms, solar PV and energy storage dynamics and optimisation
- Low drag vehicles for land, sea and air
- Materials for advanced photovoltaics, displays, lighting, and high temperature applications
- Advanced computational methods and machine learning in energy applications

Impact

- Energy efficient lighting for CSIRO and partners
- Propulsion, engines and fuels for Ford, DST Group and MHI
- Improved aircraft engine aerodynamics for General Electric
- High temperature material for the Australian Defence Force
- Modelling of real-world, solar PV performance across Australia with AEMO
- Operational forecasting of wind and solar farm power generation with Meridian Energy Australia and others

Key Researchers

Prof. Robin Batterham
Prof. Michael Brear
Dr. James Bullock
Prof. George Franks
Dr. Robert Gordon
Dr. Eirini Goudeli
Prof. Lloyd Hollenberg
Dr. David Jones
Prof. Sandra Kentish
Dr. Patricia Lavieri
Prof. Dan Li
Prof. Chris Manzie
Prof. Jason Monty
Prof. Paul Mulvaney
A/Prof. Guillermo Narsilio
Dr. Behzad Rismanchi
Prof. Richard Sandberg
Prof. Geoff Stevens
Dr. Mohsen Talei
Dr. Claire Vincent
Prof. Rachel Webster
Dr. Wallace Wong
A/Prof. Yi Yang