



Australian
National
University

ENERGY CHANGE
INSTITUTE



Energy Essentials for Professionals Program

Monday 15 – Friday 18 June 2020

TIME: 10:00AM TO 11:30AM
LOCATION: ZOOM MEETING
CONTACT: DR IGOR SKRYABIN, COURSE CONVENOR
igor.skryabin@anu.edu.au

PROGRAM

Overview

Australia is in the middle of a major energy transformation – we are leading the world in the per capita installation rate for solar and wind energy. New technologies for energy generation and energy storage continue to revolutionise the electricity sector.

We've tailored this course for professionals across government and industry who are interested in the energy transition and who seek an overview of the latest trends in energy technology, economics and policy.

Participants are expected from a range of backgrounds and will benefit from the diversity of disciplines covered. This is an essential feature of the course, as the energy transformation will impact all sectors of our economy and society.

Monday 15 June

10:00-10:10 Introduction

Dr Igor Skryabin, Energy Change Institute

10:00-11:30 Session 1 – Introduction - Economics of low-carbon energy

Associate Professor Paul Burke, Crawford School of Public Policy

This session will introduce and explore a number of economic mechanisms for promoting the uptake of low-carbon energy, including emissions pricing, emissions trading, green certificate schemes, and reverse auction mechanisms. Focus will be given to approaches used in Australia's National Electricity Market.

Tuesday 16 June

10:00-11:30 Session 2 - Variable Renewable Energy Sources/ Electrification

Associate Professor Matthew Stocks, Research School of Electrical, Energy and Materials Engineering

Australia is currently leading the world with its rate of renewable electricity deployment which is enabling rapid decreases in emissions in the electricity sector. This session will initially focus on levelized cost of energy which is the standard method of comparing the cost of different generation technologies across their lifetime. We will then discuss the technologies behind wind and solar power generation and the resources that drive them. The session will then close by touching on the other sectors that can reduce emissions through leveraging a renewable dominated electricity system.

Wednesday 17 June

10:00-11:30 Session 3 - Hydrogen as energy vector

Professor Kylie Catchpole, Research School of Electrical, Energy and Materials Engineering

Hydrogen has emerged as an important potential strategy for decarbonizing many sectors of the economy, as well as providing the possibility for a new type of energy export. In this session we will discuss the opportunities around hydrogen, with a focus on the range of applications, the effect of efficiency and capacity factor, and the various generation, storage and transportation options. We will also look at the implications of these factors, along with existing trends, and how they might influence the future of hydrogen.

Thursday 18 June

10:00-11:00 Session 4 - Energy Futures and Energy Security

Professor Ken Baldwin, Director, ANU Energy Change Institute

The world is undergoing a fundamental transformation over the next few decades in the way it creates and uses energy as we move to decarbonise the global economy. Australia is leading in this massive transition as it installs renewable energy at a faster per capita rate than any other major economy. The energy transition represents a paradigm shift in the way in which energy integrates with society more than it ever did in a centralised power system, as we move towards disseminated generation, storage and demand response which increasingly resembles an 'internet of energy'. This has enormous implications for energy security at a global, national and community levels, the outcomes for which will be examined in this presentation.

11:00-11:30 Panel Discussion

All lecturers

The course will conclude with a panel discussion consisting of course lecturers.

BIOGRAPHIES



Dr Igor Skryabin

Igor Skryabin, course convener, is the Research and Business Development Manager for the ANU Energy Change Institute. Dr Skryabin's career has spanned both industry and academia. His experience includes research and commercialisation of, energy technologies and the development of energy market financial mechanisms.

Dr Skryabin contributed to 100+ research papers and is an inventor of more than 35 patents and industrial designs. In the 2010 review of Australian solar patents, Griffith Hack a major Australia intellectual property firm, identified Dr Skryabin as the second-most cited Australian inventor. At ANU Dr Skryabin was instrumental in establishing of the Master of Energy Change programme. He is a founding Board member of the Australian Photovoltaic Institute and of the APEC Sustainable Energy Centre in China.



Associate Professor Paul Burke

Paul Burke is an economist at the Australian National University's Crawford School of Public Policy. He works on the economics of energy, the environment, and developing countries. Paul is a key team member of the ANU Grand Challenge: *Zero-Carbon Energy for the Asia-Pacific*. Paul is a frequent contributor to Australian discussions on economic approaches to environmental challenges, and has won a College prize for his teaching excellence. He is currently carrying out research on the energy sectors of Australia, Indonesia, China, and India.



Associate Professor Matthew Stocks

Dr Matthew Stocks is an Associate Professor in the Research School of Electrical, Energy and Materials Engineering. He has more than 25 years research and development experience in renewable energy technologies, including 10 years commercialising the ANU invented SLIVER cell. His current research efforts focus on integrating high amounts of renewable energy in Australia's electricity network, including developing an atlas of potential pumped hydro sites in Australia and the importance of the electric vehicles in the low carbon transition. He was part of the RE100 team which won the 2018 Eureka Prize for Environmental Science.



Professor Kylie Catchpole

Professor Kylie Catchpole is at the Research School of Electrical, Energy and Materials Engineering at the Australian National University. Her research interests are in nanotechnology and new materials for solar cell and solar fuel applications, as well as the broader energy transition. She has a physics degree from the ANU, winning a University Medal, and a PhD from the ANU. She was a Post-doctoral Fellow at the University of New South Wales, and the FOM Institute for Atomic and Molecular Physics, Amsterdam. She has published over 100 papers, which have been cited over 10,600 times to date. Her work on plasmonic solar cells has been featured in the news sections of *Science* magazine and *The Economist*, and in 2010 her work on nanophotonic light trapping was listed as one of *MIT Technology Review's* '10 most important emerging technologies'. In 2011 she was an episode winner on ABC TV's 'New Inventors' as well as many other media stories. In 2015 she was awarded the John Booker medal in engineering science from the Australian Academy of Science.



Professor Ken Baldwin

Professor Ken Baldwin is the inaugural Director of the Energy Change Institute at the ANU, and Director of the ANU ECI Grand Challenge: *Zero-Carbon Energy for the Asia-Pacific*.

He has held the following appointments:

- Project Steering Committee for the Australian Energy Technology Assessment, Bureau of Resources and Energy Economics (2011-2013)
- Board of the South East Region of Renewable Energy Excellence (SERREE, from 2014)
- Socio-Economic Modelling Advisory Committee of the South Australian Nuclear Fuel Cycle Royal Commission (2015-2017)
- Chair, Energy Cluster of the Australia-Indonesia Centre (2015-2018)
- Chair, Energy Research Institutes Council for Australia (ERICA, 2018-2019)
- Steering Committee for the CSIRO Hydrogen Research, Development and Demonstration Report (2019)
- ACOLA Steering Committee for the Australian Energy Transition Research Plan (2019-2020).

Professor Baldwin is an inaugural ANU Public Policy Fellow, and winner of the 2004 Australian Government Eureka Prize for Promoting Understanding of Science, for his role in initiating and championing “Science meets Parliament”.

In 2007, Professor Baldwin was awarded the W.H. Beattie Steele Medal, the highest honour of the Australian Optical Society. In 2010 he was awarded the Barry Inglis Medal by the National Measurement Institute for excellence in precision measurement.

Professor Baldwin is a Fellow of the American Physical Society, the Institute of Physics (UK), the Optical Society of America and the Australian Institute of Physics.