



THE UNIVERSITY OF
MELBOURNE

Melbourne
Energy Institute

Energy Systems Short Course

9 July – 26 July 2025



Melbourne Energy Institute

Energy Systems Short Course

Learn skills in analysing the financial, technical, and environmental performance of energy projects.

The Energy Systems Short Course teaches skills in energy investment decision making. The course centres on practical, hands-on modelling exercises. Participants develop their own spreadsheet models, and learn how to answer questions such as:

- Is a proposed wind farm or gas turbine a good investment?
- What is the probability that it will earn a commercial rate of return?
- What is the best financing structure for the project?
- How do you handle project risk and uncertainty?

Topics covered

- The fundamentals of finance
- The Levelised Cost of Electricity (LCOE)
- Sensitivity analyses of financial investment models
- Tools for financial analysis under uncertainty
- Problem-based learning based on investment case studies

Course delivery

All classes in the Energy Systems Short Course will be scheduled outside of business hours. Students are expected to attend in person at the University of Melbourne campus in Parkville, Victoria.

Prerequisites

There are no prerequisites for entry into the Short Course. However, participants should have a basic understanding of financial and commercial principles.

Cost

Participation in the Short Course is free of charge for University of Melbourne graduate students, and is open to partner organisations and the public for a fee of \$5,000 (excluding GST) per place. A certificate of completion will be issued to participants with an attendance rate of 90% or higher.

Location

Location, directions, and instructions for attending campus will be provided to successful candidates in the days preceding the course.

How to apply

Applicants are requested to click **APPLY NOW** and complete the form. Applications close at **11:59pm on 23rd May 2025**. Successful candidates will be notified via email.

→ [Apply now](#)



Course details

Course outline of modules

Module 1: Introduction and basics of investment decision making and company financing

Module 2: Financing – capital, debt and equity, cost of capital, discounted free cash flow, NPV, Internal Rate of Return, and Capital Asset Pricing Model

Module 3: Investment analysis of electricity generation technologies, now and in the future

Module 4: Unconventional natural gas extraction technology

Module 5: Financial analysis through Real Option Value (ROV)

Please note: Students are expected to attend in person.

Course schedule

Date/time	Module	Topic
Wednesday 9 July 6:00pm - 9:00pm	Module 1	Lecture: Introduction and basics of investment decision making and company financing. Tutorial: Evaluation of selected company balance sheets and profit and loss statements.
Thursday 10 July 6:00pm - 9:00pm	Module 2	Lecture: Financing – capital, debt and equity, cost of capital, discounted free cash flow, NPV, Internal Rate of Return, and Capital Asset Pricing Model. Tutorial: Investment in sustainable energy generation from wastewater.
Saturday 12 July 9:00am - 12:00pm <i>Lunch break</i> 1:00pm - 4:00pm	Module 3	Lecture: Investment analysis of electricity generation technologies, now and in the future. Determination of a range of Levelised Costs of Electricity (LCOE) for these technologies, including renewables and other low-carbon methods for electricity generation, including the effects of externalities, taxes, and incentives. Tutorial : Detailed investment evaluation of several electricity generation technologies. Students self-organise into working/breakout groups to evaluate a selection of these technologies, including: • Coal fired HELE super-critical investment, with and without CCS, and gas-fired generation technologies. • Solar PV with alternatives: battery storage, solar thermal, or gas-fired backup. • Wind generation from wind data and turbine characteristics, including offshore wind. • Hydro generation, including Snowy 2.0 and other proposed pumped-hydro projects. • Nuclear power, including Small Modular Reactors. • Analysis of Australia's net zero emissions by 2060 by Net Zero Australia, including estimated total cost and LCOE as a function of quantum, costs and investment rate of return.
Wednesday 16 July 6:00pm - 9:00pm	Module 3 (cont.)	Tutorial: Finalisation of analyses followed by feedback presentations from each tutorial group.
Thursday 17 July 6:00pm - 9:00pm	Module 4	Lecture: Unconventional natural gas extraction technology – introduction and preliminary information.
Saturday 19 July 9:00am - 12:00pm <i>Lunch break</i> 1:00pm - 4:00pm	Module 4 (cont.)	Tutorial: Analysis of unconventional natural gas investment in both USA and Australia. Tutorial groups work on different aspects of the investment decision-making process: • Drilling and extraction, well and field gas flow, financial data, environmental and social risks. • Focus on Australia and in particular on proposed new shale gas extraction (e.g. In the Northern Territory).
Wednesday 23 July 6:00pm - 9:00pm	Module 4 (cont.)	Tutorial: Finalisation of analyses followed by feedback presentations from each tutorial group.
Thursday 24 July 6:00pm - 9:00pm	Module 5	Lecture: Financial analysis through Real Option Value (ROV) - introduction.
Saturday 26 July 9:00am - 12:00pm <i>Lunch break</i> 1:00pm - 4:00pm	Module 5 (cont.)	Tutorial: Analysis through ROV of future sustainable hydrogen production through Wind and Solar PV electrolytic electricity generation ('green' hydrogen), and hydrogen production from natural gas coupled to CCS ('blue' hydrogen). Finalisation and presentation of the results on an 'Options Space Diagram'



About the presenters



Dr John Burgess

Presenter and Convenor

Dr. John Burgess is a chemical engineer with extensive industrial and research experience. This includes a long and distinguished career at BHP, where he rose to senior executive level. He was also recently the Chair of the CSIRO Energy Advisory Committee for a number of years.

John is an Honorary Professorial Fellow at the University of Melbourne, an Adjunct Professor at the University of Queensland, and a Fellow of the Academy of Technological Sciences and Engineering (ATSE).

John has been teaching the Energy Systems Short Course since it began in 2018.



Jonathan Anderson

Co-convenor

Mr. Jonathan Anderson is a Sustainability Manager with Keolis Downer, and former Senior Engineer with international engineering consultancy Arup.

He has extensive experience across renewable energy generation and storage, water and wastewater management, mining, waste, agribusiness, freight and logistics, and process automation.

Jonathan was a student of the 2018 Energy Systems Short Course, and has assisted Dr. Burgess with teaching the course since 2020.

Contact

For further information, please contact the Melbourne Energy Institute at mei-info@unimelb.edu.au or visit energy.unimelb.edu.au/study/short-course.



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Contact us

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