EV7108 Energy Provision Module Specification

Module Title: Energy Provision	**Module Code: EV7108** **Level: 7** **Credit: 15** **ECTS credit: 7.5**	**Module Leader**: Bryce Gilroy Scott
Pre-requisite: none	**Pre-cursor: none**	
Co-requisite: none	**Excluded combinations: none**	**Suitable for incoming study abroad?** N
Location of delivery: CAT and online – blended delivery		

Summary of module for applicants:

This module aims to enable students to:

Critically discuss energy provision from the perspective of transformational sustainable adaptation taking a holistic approach to assess energy technologies situated within a larger socio-economic perspective. The technological, economic, environmental, political framework of energy provision technologies with be explored.

Synthesise an informed understanding of the wider environmental and social benefits and limitations of existing and potential technologies and energy reduction policies, to transform the current energy provision systems to those that are equitable, environmentally benign and potentially regenerative.

Develop a critical appreciation of the balance of energy generation and energy use reduction requirements and how energy distribution constraints, storage, supply and demand management, efficiency improvements, market drivers, planning processes, governmental policy and financial support mechanisms, can affect the uptake of sustainable energy technologies. Identify technological constraints and opportunities of the wider grid infrastructure and management options, maintenance needs, associated carbon emissions, environmental and life-cycle impacts on developing sustainable energy provision systems at national, regional and local scales.

Main topics of study:

- The module will discuss energy provision from the perspective of transformational sustainable adaptation taking a holistic approach to assess each technology
- Technological, economic, environmental, political and socio-cultural aspects of energy provision technologies, with the focus on renewable and low carbon technologies such as:
    - · Wind
    - · Photovoltaic
    - · Solar thermal, Heat Pumps and District heating
    - · Hydro, marine and tidal
    - · Biomass and Biofuels
    - · Nuclear
    - · Distribution and storage technologies

This module will be able to demonstrate at least one of the following examples/ exposures

Live, applied project **- [X]**
Company/engagement visits **– [X]**
Company/industry sector endorsement/badging/sponsorship/award ☐

Learning Outcomes for the module

Where a LO meets one of the UEL core competencies, please put a code next to the LO that links to the competence.

- *Digital Proficiency - Code = (DP)*
- *Industry Connections - Code = (IC)*
- *Social & Emotional Intelligence - Code = (SEI)*
- *Physical Intelligence - Code = (PI)*
- *Cultural Intelligence - Code = (CI)*
- *Community Connections & UEL Give Back - Code = (CC)*
- *Cognitive Intelligence – Code = (COI)*
- *Enterprise and Entrepreneurship (EE)*

At the end of this module, students will be able to:

Knowledge

1. Form a synthesis of the benefits and limitations (e.g. intermittency) of transforming energy provision systems under a regenerative ethos; *(COI)*

2. Select, explain and evaluate current research related to sustainable energy provision; *(COI)*

Thinking skills

3. Critically appraise the environmental, social and political implications of installation at local, regional and global scale; *(COI) (SEI)*

4. Appropriately evaluate the wider advantages and disadvantages to eco-systems, mitigation planning, societal systems and landscapes, when assessing the utilization of sustainable energy provision technologies; *(COI)*

Subject-based practical skills

5. Contextualise and appreciate the influences of social, political and environmental attitudes on low environmentally impacting energy provision and the influence these have on energy related planning processes; *(COI)*

6. Systematically analyse renewable (i.e. the wind, tides, sun) or sustainable (e.g. biomass) energy resources availability in relation to demand trends and critically appraise utilising these sources of energy locally or at distance through grid networks; *(COI)*

Skills for life and work

7. Evaluate the ethical dilemmas when problem solving and decision making, in the context of energy provision according to the requirements of a regenerative ethos; *(COI) (SEI) (CI) (IC)*

8. Effectively communicate (written and oral) to a team, peer or a wider audience. *(DP)*

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:
For students studying onsite and by distance learning:

The factual content of the module is taught through lectures, seminars, practical workshops, presentations, demonstrations, tutorials, online discussion threads. Throughout this process an active exchange of views and opinions is encouraged. Students have access to MS Teams where they can access recorded and written support material, meet with their peers and tutors to discuss any academic inquiry or issue. Both theoretical and practical aspects are covered both onsite and through interactive sessions on Teams.

For distance learning (DL) students, learning will be supported through streamed and recorded Internet-based lectures (of the onsite lectures), situation related practical exercises, seminars and tutorials.

Lectures onsite and through MS Teams highlight key concepts, models and frameworks, and integrate additional resources (such as journal articles and online videos). They encourage deep learning through the use of self-assessment questions which encourage students to engage with the topic and integrate understanding of new subjects and skills.

There is a formative learning element to the module to allow the students to receive critical feedback on their work without the pressure of marked assessment.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
1. Critique of Paper (2,000 words max.)	65%	**1,2,3,4,5,6,7,8**
2. Individual Presentation, 15 minutes (1,000 word equivalent)	35%	**1,2,3,4,5,6,7,8**

Reading and resources for the module:
These must be up to date and presented in correct Harvard format unless a Professional Body specifically requires a different format
Core

Peake, S. (Ed) (2017) *Renewable Energy: Power for a Sustainable Future.* 4th edition. Oxford University Press, Oxford.

MacKay, D. J. C., (2009) *Sustainable Energy - Without the Hot Air.* Cambridge: UIT.

(* http://www.withouthotair.com)

Twidell, J. and Weir, T. (2015) *Renewable Energy Resources.* 3rd edition. Taylor and Francis, Oxford. (and erratum-download)

Recommended

Bickerstaff, K, Walker, G. Bulkeley, H. (2013) *Energy Justice in a Changing Climate: Social Equity and low carbon energy.* Palgrave Macmillan, New York.

Bombaerta, G., et al. (Eds.) (2020) *Energy Justice Across Borders.* Springer Open, Cham, Switzerland. (* *available as an open access pdf download*)

Harvey, L. D. D., (2010) *Energy and the New Reality 1: Energy-Efficiency and the Demand for Energy Services*. Routledge. London, UK.

Harvey, L. D. D., (2010) *Energy and the New Reality 2: Carbon-Free Energy Supply*. Routledge. London, UK.

Jenkins, K. E. H., Hopkins, D. (2018) Transitions in Energy Efficiency and Demand: The Emergence, Diffusion and Impact of Low-Carbon Innovation. Earthscan, Routledge. Oxford, UK.
(* *available as an open access pdf download*)

Sørensen, B. (2017) *Renewable Energy: Physics, Engineering, Environmental Impacts, Economics and Planning*. 5th edition. London, United Kingdom: Academic Press.

Provide evidence of how this module will be able to demonstrate at least one of the following examples/ exposures

Live, applied project

External academics and industry professionals were brought into the module curriculum to provide lectures and informal Q&A sessions on their current projects. Projects discussed in 2021 were: Environmental Justice – Ethics of Windfarms in Mexico and UK; Geo-Engineering.

2021 external contributors were:

- Dr. Karen Parkhill: academic (U York)
- Dr. Arianna Kantun: academic (U York / Mexico)

The teaching site for the Graduate School of the Environment (GSE) is a large test and demonstration facility for sustainable innovation and demonstration. Attending students will have seminars and practicals taught onsite. Frequently these sessions are recorded and included on the online curriculum for offsite students.

Previous to the Covid restrictions, attending onsite students would also visit renewable site installations in the local area (wind farm, hydro-electric system).

Company/engagement visits

External academics and professionals were brought into the module curriculum to provide lectures and informal Q&A sessions. Topics covered in 2021 were: Energy Policy, Community Energy; Hydrogen for Heating; Smart Grids and Storage; Public Attitudes to Energy System Transformation; Energy Access in Africa; Environmental Impact Assessments; PV and Future Developments.

2021 external contributors were*:*

- Chris Twinn (FRSA HonFCIBSE MEI Ceng): Private sector – Twinn Sustainability Innovations, UK.
- Dr. Mark Hinnells: academic (U Oxford) & private sector – Susenco, UK.

- Rod Edwards: Private sector – Dulas Ltd., UK.
- Marvin Tumusiime: Private sector – Program Manager, New Energy Nexus – Uganda.
- Mike Phillips: Private sector - Dulas Ltd., UK.

As well as offering expert teaching, external contributors are also important to enhance employability by introducing the students to potential avenues of employment in the area of sustainability in energy provision.

Company/industry sector endorsement/badging/sponsorship/award *N/A*

Indicative learning and teaching time **(10 hrs per credit):**	**Activity**
1. Student/tutor interaction:	Lectures, seminars, tutorials, presentations, practicals / demonstrations **30 hours**
2. Student self learning and research time:	Seminar reading and preparation, assignment preparation, background reading, and research activities. **120 hours**
Total hours:	**150 hours**

For office use only. (Not required for Programme Handbook)

Assessment Pattern for Unistats KIS (Key Information Sets)	**Weighting:**
Coursework *(written assignment, dissertation, portfolio, project output)*	
Practical Exam *(oral assessment, presentation, practical skills assessment)*	
Written Exam	

HECoS Code:	
UEL Department:	