



Module Specification

Energy: Systems, Trends and Policies

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Part 1: Information

Module title: Energy: Systems, Trends and Policies

Module code: UBGLR1-30-1

Level: Level 4

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Geography & Environmental Mgmt

Partner institutions: Global College of Engineering and Technology (GCET)

Delivery locations: Global College of Engineering and Technology (GCET)

Field: Geography and Environmental Management

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

Features: Not applicable

Educational aims: This module introduces students to key terms and concepts associated with energy and outlines past, present and future trends relating to the generation, conversion, distribution, storage and use of energy. It identifies the

spatial scales across which energy systems operate, and the policies and initiatives that have been introduced across the globe to help deliver a zero-carbon future.

Outline syllabus: The module is structured in three parts.

The first introduces students to key terms and concepts relating to energy. It presents the key functions of an energy system, and draws out key stages involving the generation, conversion, distribution, storage and use of energy. Students are introduced to the key drivers of energy demand, namely those relating to heating, cooling, electricity and mobility. The module outlines the complexity of a typical energy system, with each element having its own goals, management structures, and set of resources. The module outlines how energy systems are evolving, and draws out key principles relating to energy conservation, energy efficiency and the use of renewable energy. As part of this, the module considers the various spatial scales at which an energy system operates across, and the need for interdisciplinary working and the innovative application of information and communications technology. The module considers the type of stakeholders that are involved within an energy system, from policy makers and decision takers, to service providers and end-consumers. Reference will be given to the growing emphasis for making energy systems more integrated, for instance by using excess heat from industry to heat and cool buildings. The module will also refer to pressures for making energy systems more distributed (using local, regional, national and international networks), flexible (on-demand, service driven) and smart (dynamic, and automatically controlled). It will outline the importance of whole system thinking and draw out some of the factors that can shape an energy system, such as population growth and the rise of new and disruptive technologies.

The second part of the module will draw out some of the emerging trends relating to the generation, distribution and use of energy, and showcase a selection of policies, tools and incentives that are being used to create a decarbonised world. This part of the module will take a global view and use case studies taken from around the world. The module will consider these trends by theme and will consider such things as the use of low carbon hydrogen, the push for greener buildings, and the growing investments occurring in carbon capture, usage and storage. Reference will also be

given to key mobility trends, such as the global acceleration in the use of zero emission vehicles, the ongoing promotion of green and active travel, the pursuit of green shipping, and research and development in the use of sustainable aviation fuels and zero-emission aircraft. The module will consider the types of steps that are being taken to diversify energy generation away from hydro-carbon use, with the module offering introductory insights to key renewable energy technologies, such as solar and wind power.

The third part of the module will be focused towards a defined country and will revisit some of the trends outlined through part two via this national lens. It will allow students to develop an understanding of national energy use and demand (including the identification of spatial variations), and the form and location of strategic infrastructure relating to energy generation, supply and storage. In addition to identifying existing resources, the module will also identify recent and future infrastructure projects.

Part 3: Teaching and learning methods

Teaching and learning methods: Lectures will develop a systematic understanding of the module's topics, while seminars and studio sessions will provide an opportunity for both discussion and reflection. The use of carefully selected case studies will form an important spine to the module, with relevant stakeholders being invited to contribute where appropriate. Alongside this scheduled learning, students will be expected to engage with directed reading (accessible via the online list), prepare for seminar activities, and complete formative and summative assessment.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Define key terms and concepts relating to energy, including the elements, synergies and complexities that are found within energy systems.

MO2 Identify past and future trends relating to the generation, conversion, distribution and use of energy across the world.

MO3 Articulate the policies, tools and incentives that are being used globally to help transition towards a decarbonised world, and the varying spatial scales and domains across which this action is focused.

MO4 Acknowledge how energy demand and use can vary geographically over national space, and articulate key national trends, policies and ambitions for the generation, conversion, supply, storage and use of energy.

MO5 Identify the form and spatial positioning of energy infrastructure within a defined national context, and to synthesise future trends, and suitable locations, for transforming the generation, conversion, supply and storage of energy.

Hours to be allocated: 300

Contact hours:

Face-to-face learning = 228 hours

Total = 300

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link

<https://rl.talis.com/3/uwe/lists/741DEE1D-F0BA-9018-C259-4EEF96CD29FD.html>

Part 4: Assessment

Assessment strategy: Examination - an unseen examination that will require students to write an essay, and answer a series of short questions, about some of the key concepts and theories that underpin the module. Prompts will be given in class with respect to developing exam technique while example questions will be made available to offer formative support.

Poster - an individual poster that offers analysis concerning the changing nature of energy use and generation, a synthesis of current policy, and offer insight about the energy transitions being sought. Mapping should be used to identify the positioning of strategic energy infrastructure, both existing and where future investment is being spatially directed (for instance, by identifying the areas most suited to wind or solar

power generation). Students will be given support to develop their skills in visual communication, data analysis and digital mapping (including the use and application Geographical Information Systems).

Resit Examination - students shall undertake an examination in the same format as the first attempt, which may contain different topic questions.

Resit Poster - a similar brief to that described above, which may include an adjusted topic choice.

Assessment components:

Poster (First Sit)

Description: Individual Poster (single A1)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO4, MO5

Examination (First Sit)

Description: Unseen Exam (2 hours)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Poster (Resit)

Description: Individual Poster (single A1)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO4, MO5

Examination (Resit)

Description: Unseen Exam (2 hours)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Energy Technology and Management {Foundation} [GCET] BSc (Hons) 2022-23