GD311-15 The Energy Trilemma

26/27

Department
Global Sustainable Development
Level
Undergraduate Level 3
Module leader
Jonathan Clarke
Credit value
15
Module duration
10 weeks
Assessment
100% coursework
Study location
University of Warwick main campus, Coventry

Description

Introductory description

Global energy markets are in a period of dramatic transition. The emergence of shale gas, mostly notably in the US, has been disruptive to the industry, leading to falling oil prices. This has challenged the long-time dominant position of international oil companies (e.g. BP, Shell, ExxonMobil) in the petroleum sector. Natural gas has emerged as a potentially important 'bridging fuel' to a low carbon future, with several leading national economiesincluding China, making the switch from carbon-intensive oil and coal to this 'lower-carbon' alternative. Away from oil and gas, renewable energy sources are becoming increasingly cost competitive and are gaining societal and governmental support.
The energy transition alters the global dynamics of energy security, with some countries finding their energy independence challenged, whilst others enjoy the economic growth that is inherently linked to energy abundance. A similar distinction can be made between populations with regards to energy equity: the accessibility and affordability of energy, and as with energy security this too is in a state of flux due to changing market conditions. These three dimensions — sustainability, energy security and energy equity constitute an 'energy trilemma'; the focus of this module.

Module aims

The module addresses the challenges posed by the trilemma to national, regional and local economies, and in developing, emerging and developed economic contexts. In addition to the

trilemma's aforementioned dimensions, the module will also consider concerns of energy efficiency, 'green growth', sustainable energy governance and cooperation, and technology and infrastructure. In this regard, the module will broaden the student's knowledge and understanding of the key issues around the UN's Sustainable Development Goal 7.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

The module is structured across five distinct themes, each of which is allocated two seminars. Reading materials will be provided to the students ahead of each seminar in support of a problem-focussed and participative approach to the topic in the weekly seminars. Lectures will provide further context in those weeks that require it.
GLOBAL ENERGY AND THE ENERGY TRANSITION

1. Global energy and sustainability
2. Energy trilemma indifferent economic contexts
   ENERGY EQUITY AND SECURITY
3. Energy security
4. Energy equity
   ENERGY EFFICIENCY
5. Energy efficiency
6. Group poster presentation
   SUSTAINABLE ENERGY GOVERNANCE AND COOPERATION
7. Sustainable energy governance
8. International cooperation and development programmes
   INNOVATION AND INFRASTRUCTURE
9. Technological challenges in sustainability
10. Green innovation and green growth

Learning outcomes

By the end of the module, students should be able to:

- Upon completion of the module, students will be able to identify the leading issues around energy security, equity and sustainability across different economic and geographical contexts.
- Upon completion of the module, students will be able to critically analyse the differing approaches of national and regional governments in managing energy resources and pursuing sustainable energy futures.
- Upon completion of the module, students will be able to demonstrate a deep understanding of the significance of energy to economic growth and societal well-being.
- Upon completion of the module, students will be able to appreciate the value of engagement between universities, governments, industry, non-government organisations and communities in developing sustainable energy solutions.
- Upon completion of the module, students will be able to illustrate an understanding of the

critical role of technology and innovation to sustainable energy futures.
- Upon completion of the module, students will be able to demonstrate further development of their research skills.
- Upon completion of the module, students will be able to critically analyse and synthesise academic findings and industry research into clear and concise outputs that are tailored for several different audiences.

Research element

Research skills are embedded into the teaching strategy of the module. Students are expected to read and critically analyse scholarly papers written from a variety of perspectives and develop their resarch skills.

Interdisciplinary

This is an optional module on the Global Sustainable Development course which adopts an interdisciplinary approach spanning the arts, humanities, social and natural sciences fields in order to engage with the major global challenges facing contemporary society, explore these 'big problems,' from a variety of perspectives and consider a range of possible solutions. Specifically, this module aims to equip students with advanced knowledge of various cross-disciplinary theories and empirical evidence on the determinants of inequalities, its consequences, and people’s attitudes to them.

International

This is an optional module on the Global Sustainable Development course which offers a unique trans-disciplinary and international learning experience that allows students to achieve breadth and depth of knowledge.

Subject specific skills

Ability to:
critically assess and analyse sustainability issues that need to be addressed, including real-life examples
use and apply established frameworks and methodologies for analysing the impact(s) of a behaviour or process
generate and evaluate different models of sustainable development to assess their likely impact
actively implement or contribute to changes that promote sustainable development within the scope of own learning experience
engage with real-life problems relevant to sustainable development
use historical knowledge and an understanding of the consequences of past actions to envision how futures may be shaped
identify the importance of empowering individuals and organisations to work together to create new knowledge
employ leadership for sustainable development by challenging assumptions and negotiating alternatives to unsustainable current practices

identify the opportunities to support and develop a progressive and resilient culture that encourages citizens, professions and institutions to put learning into practice

Transferable skills

Written communication skills
Oral communication skills
Working with others
Problem solving
Information technology
Numeracy
Research across various disciplines
Peer review

Study

Study time

Type	Required
Lectures	6 sessions of 1 hour (4%)
Seminars	8 sessions of 2 hours (11%)
Private study	128 hours (85%)
Total	150 hours

Private study description

Reading and preparation for lectures, seminars and assessments.

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A4

	Weighting	Study time	Eligible for self-certification
Assessment component			
Energy Project	45%		Yes (extension)
Students will write a short article, based upon academic research for dissemination to a non-academic audience, as published in the Conversation or Economist.			
Reassessment component is the same			
Assessment component			
Article for Non-Academic Audience Group Poster Presentation	30%		Yes (extension)
Reassessment component is the same			
Assessment component			
Group Poster Presentation	25%		No
Reassessment component			
Individual Assessment of National Energy System			Yes (extension)
While the group assess a national energy system using the trilemma, this reassessment asks the student to do this individually.			

Feedback on assessment

All feedback will be provided electronically via Tabula. Individual face-to-face feedback sessions will be offered to each student. Moodie will be used to discuss the topics outside of the contact hours.

Availability

There is currently no information about the courses for which this module is core or optional.