



GEOS251

Geopolitics: The Science of Climate, Energy and our Future

S1 Day 2019

Dept of Earth and Environmental Sciences

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Disclaimer

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General Information

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12 WALLY'S WALK, ROOM 3.29

Credit points

3

Prerequisites

12cp at 100 level or above

Corequisites

Co-badged status

Unit description

Any newspaper you pick up today is guaranteed to have a story in it about global warming or energy security; famines; super-storms; mining magnates; conflict over diminishing resources or the death of the Great Barrier Reef; renewable energy; nuclear energy; the Paris Accord or acid rain. These all represent key aspects of the single greatest issue facing global society today: climate change. This topical unit explores both the science and politics behind climate change. We examine the links between population growth, fossil fuel use, agriculture and changing climate within the context of Earth's history. This is contrasted against an investigation of the political and economic drivers of continued fossil fuel use, including an examination of the ongoing debate regarding resource security and how this has influenced pivotal policy decisions and recent historical events, such as the war in Iraq. The social and environmental consequences of such fossil fuel use will be considered, including the risks posed by rising sea levels, increasingly severe natural disasters and potential changes to atmospheric circulation such as a weakening of the Asian Monsoon. Finally, solutions to the climate crisis will be proposed. We will assess the efficacy of geopolitical approaches, such as the IPCC and the Paris Accord, as well as technological solutions, including the rise of renewable energy.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

An understanding of the links between fossil fuels, agriculture, population growth and climate.

Appreciation for the role and necessity for government, community and industry in determining policy.

An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries.

Assess the validity of information from a range of sources, including scientific communication and popular media.

Communicate the findings of individual and group driven research through scientific writing and discussions.

Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1	10%	No	25/03/2019
Assignment 2a	5%	No	12/04/2019
Assignment 2b	25%	No	27/05/2019
ReadinGame Quiz	10%	No	Week 13
Practicals	10%	No	Throughout semester
Final exam	40%	No	TBA

Assignment 1

Due: **25/03/2019**

Weighting: **10%**

Explain what unconventional hydrocarbons are AND how they have changed the fossil fuel market over the last decade.

On successful completion you will be able to:

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- Assess the validity of information from a range of sources, including scientific communication and popular media.
- Communicate the findings of individual and group driven research through scientific writing and discussions.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Assignment 2a

Due: **12/04/2019**

Weighting: **5%**

The extraction and use of energy resources and anthropogenic impacts on climate are controversial topics that garner much attention in the news media. Chose an energy resource or climate debate that interests you and evaluate it, considering benefits and issues for all stakeholders.

A 250 word proposal explaining what you want to research and why it is relevant.

On successful completion you will be able to:

- An understanding of the links between fossil fuels, agriculture, population growth and climate.
- Appreciation for the role and necessity for government, community and industry in determining policy.
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries.
- Assess the validity of information from a range of sources, including scientific communication and popular media.
- Communicate the findings of individual and group driven research through scientific writing and discussions.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Assignment 2b

Due: **27/05/2019**

Weighting: **25%**

The extraction and use of energy resources and anthropogenic impacts on climate are controversial topics that garner much attention in the news media. Chose an energy resource or climate debate that interests you and evaluate it, considering benefits and issues for all stakeholders.

Once your proposal has been approved by the unit convenor you may proceed with the full 2500 word assignment, which is due by the 27th May.

On successful completion you will be able to:

- An understanding of the links between fossil fuels, agriculture, population growth and climate.
- Appreciation for the role and necessity for government, community and industry in determining policy.
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries.
- Assess the validity of information from a range of sources, including scientific communication and popular media.
- Communicate the findings of individual and group driven research through scientific writing and discussions.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

ReadinGame Quiz

Due: **Week 13**

Weighting: **10%**

We will be using a custom designed and built, online learning tool; "The ReadinGAME". This game is designed to operate on a calendar week cycle (from Sunday to Sunday), and involves you being able to ask a question related on the weeks material from the readings and lectures. You will then be able to answer questions posed by other students, and most importantly, you will not only be able to score points for correctly answering the questions, but you will also be able to comment and discuss the questions, and rate whether they are good/not so good questions etc.

Importantly, in the process you will be learning and reinforcing the weeks material as well as

having a lot of fun- it can be quite addictive.

To play, follow the link in iLearn, and simply ask a question relevant to the weeks material. You will then be able to play, by answering other questions and watching how your score accumulates. You will also be able to give feedback on other peoples questions and monitor your performance. There are multiple scoring paths, and different types of scores to achieve, depending on your interests.

At the end of the semester, there will be a quiz worth 10% of question derived from the ReadinGAME.

On successful completion you will be able to:

- An understanding of the links between fossil fuels, agriculture, population growth and climate.
- Appreciation for the role and necessity for government, community and industry in determining policy.
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries.
- Assess the validity of information from a range of sources, including scientific communication and popular media.

Practicals

Due: **Throughout semester**

Weighting: **10%**

Two practicals will be chosen at random for marking - 5% each.

On successful completion you will be able to:

- Appreciation for the role and necessity for government, community and industry in determining policy.
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries.
- Assess the validity of information from a range of sources, including scientific communication and popular media.
- Communicate the findings of individual and group driven research through scientific writing and discussions.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Final exam

Due: **TBA**

Weighting: **40%**

Final exam on material from lectures, assignments and pracs.

On successful completion you will be able to:

- An understanding of the links between fossil fuels, agriculture, population growth and climate.
- Appreciation for the role and necessity for government, community and industry in determining policy.
- Assess the validity of information from a range of sources, including scientific communication and popular media.

Delivery and Resources

Delivery is via lectures, which are recorded. Quizzes and assignments can be done online through iLearn, and all assignments may be submitted through iLearn or emailed directly to the lecturer. Attendance at tutorials/practicals is compulsory for internal students.

Unit Schedule

Module	Wk	Date (Mondays)	Lecture number and title	Tutorial (alternates)
			Monday 1-3 PM 6 Eastern Rd, 316 Tutorial Rm (attend both)	Monday 4-5 PM Monday 5-6 PM 11 Wally's Walk, 240 Lab
Introduction	1	25 th Feb	1. Introduction to GEOS251 (SG) 2. Historical perspectives on climate and energy (SG)	Energy and climate in the media (SG)
The Fossil Fuel Industry	2	4 th March	<i>Conventional Hydrocarbons</i> 3. Oil and Gas (SG) 4. Coal (SG)	The uses and role of crude oil in our civilisation: past, present, and future (SG)
	3	11 th March	<i>Unconventional Hydrocarbons:</i> 5. Coal seam gas, shale gas, underground coal gasification (SG) 6. Shale (tight) oil, oil shale, and tar sands (SG)	Discussion on the future sources of gas in Australia (SG)

	4	18 th March	7. CO ₂ Geosequestration / CCS: Carbon dioxide underground injection and storage (SG) 8. Supply and Demand/Energy Security/Peak Oil (SG)	Peak Oil discussion forum (SG)
	5	25 th March	9. Conflicts over energy resources (YY) 10. Strategic commodities (YY)	Deepwater Oil drilling (YY)
	6	1 st April	11. Environmental/social/ cultural impacts of fossil fuels (CF) 12. Air Pollution (CF)	Air pollution (CF)
Changing Climate	7	8 th April	<i>Climate Change</i> – 13. Geological Record (CF) 14. Anthropogenic climate change (CF)	Records of climate change (CF)
	Semester Break 13 th -28 th April			
	8	29 th April	15. Climate change impacts (CF) 16. Social consequences of climate change (CF)	Impacts of Sea Level Rise I (CF)
	9	6 th May	17. Economic costs of climate change (CF) 18. Climate change adaptation (CF)	Impacts of Sea Level Rise II (CF)
Solutions	10	13 th May	19. Nuclear Energy I (YY) 20. Nuclear Energy II (YY)	Fukushima Nuclear Accident (YY)
	11	20 th May	21. Alternative Energy I (YY) 22. Alternative Energy II (YY)	Australia's Future Energy Mix (YY)
	12	27 th May	23. Sustainable Development I (SO'R) 24. Sustainable Development II (SO'R)	Sustainable choices (SO'R)
	13	3 rd June	25. The Future (SO'R) 26. TBC	Revision (YY)

YY = Yingjie Yang; SG = Simon George; SO'R = Sue O'Reilly; CF=Christopher Firth

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and

Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries.
- Communicate the findings of individual and group driven research through scientific writing and discussions.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to

demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries.
- Assess the validity of information from a range of sources, including scientific communication and popular media.
- Communicate the findings of individual and group driven research through scientific writing and discussions.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Assessment tasks

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- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals
- Final exam

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcomes

- Appreciation for the role and necessity for government, community and industry in determining policy.
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries.
- Assess the validity of information from a range of sources, including scientific communication and popular media.

- Communicate the findings of individual and group driven research through scientific writing and discussions.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals
- Final exam

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- An understanding of the links between fossil fuels, agriculture, population growth and climate.
- Appreciation for the role and necessity for government, community and industry in determining policy.
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries.
- Assess the validity of information from a range of sources, including scientific communication and popular media.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Assessment tasks

- Assignment 1
- Assignment 2a

- Assignment 2b
- ReadinGame Quiz
- Practicals
- Final exam

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- An understanding of the links between fossil fuels, agriculture, population growth and climate.
- Appreciation for the role and necessity for government, community and industry in determining policy.
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries.
- Assess the validity of information from a range of sources, including scientific communication and popular media.
- Communicate the findings of individual and group driven research through scientific writing and discussions.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals
- Final exam

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and

they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Appreciation for the role and necessity for government, community and industry in determining policy.
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries.
- Assess the validity of information from a range of sources, including scientific communication and popular media.
- Communicate the findings of individual and group driven research through scientific writing and discussions.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Assess the validity of information from a range of sources, including scientific communication and popular media.
- Communicate the findings of individual and group driven research through scientific writing and discussions.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals
- Final exam

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- Appreciation for the role and necessity for government, community and industry in determining policy.
- Assess the validity of information from a range of sources, including scientific communication and popular media.
- Communicate the findings of individual and group driven research through scientific writing and discussions.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- An understanding of the links between fossil fuels, agriculture, population growth and climate.
- Appreciation for the role and necessity for government, community and industry in determining policy.
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries.
- Communicate the findings of individual and group driven research through scientific writing and discussions.
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process.

Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b

Changes from Previous Offering

Some lecture/tutorial content will be given by different staff compared to 2018.