



# ENVS6115

## Climate Change, Energy and our Future

Session 2, Infrequent attendance, North Ryde 2020

*Department of Earth and Environmental Sciences*

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#### **Disclaimer**

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

#### **Notice**

As part of [Phase 3 of our return to campus plan](#), most units will now run tutorials, seminars and other small group learning activities on campus for the second half-year, while keeping an online version available for those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face and online activities for your unit, please go to [timetable viewer](#). To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

## General Information

### Unit convenor and teaching staff

Convener

Yingjie Yang

[yingjie.yang@mq.edu.au](mailto:yingjie.yang@mq.edu.au)

Contact via 02 9850 8414

Room 121, 12 Wally's walk

Lecturer

Lesley Hughes

[lesley.hughes@mq.edu.au](mailto:lesley.hughes@mq.edu.au)

Contact via 02 9850 8195

Lecturer

Simon George

[simon.george@mq.edu.au](mailto:simon.george@mq.edu.au)

Contact via 02 98504424

Room 329, 12 Wally's Walk

Lecturer

Paul Beggs

[paul.beggs@mq.edu.au](mailto:paul.beggs@mq.edu.au)

Contact via 02 9850 8399

Room 413, 12 Wally's Walk

### Credit points

10

### Prerequisites

Admission to MEnv or GradDipEnv or GradCertEnv or MSusDev or GradDipSusDev or GradCertSusDev or MScInnovationEnvSc or MScInnovationGeologyGeophys or MEngEnvSafetyEng

### Corequisites

### Co-badged status

ENVS6115

### Unit description

Climate change is one of the most serious challenges facing humanity now and into the future. This topical unit explores key aspects of climate change including the underlying science and the role of human activity, the impacts, and adaptation and mitigation solutions. The unit examines the climate system, current observations and future projections of climate change, and the significance of sectoral and regional climate risks to natural and human systems. The unit also provides an in-depth examination of the role of energy in the climate change issue, from fossil fuel use as a major driver of climate change, to renewable energy as a fundamental solution to this crisis. The unit will empower students to engage in informed discussion about this issue

## 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:

**ULO1:** Demonstrate an informed, holistic world view of the climate change issue, including the ability to differentiate natural climate variability from global warming.

**ULO2:** Demonstrate knowledge of the fundamental physical mechanisms driving climate variability and climate change.

**ULO3:** Describe the links between fossil fuels, agriculture, population growth and climate change, and the present and future impacts on physical, biological and human systems.

**ULO4:** Explain the role of government, community and industry in determining climate change policy, including adaptation and mitigation options such as renewable energy.

**ULO5:** Assess the validity of information from a range of sources, including scientific communications and popular media.

## General Assessment Information

### Assessment Criteria

Assessment at Macquarie University is standards-based, as outlined in the [Assessment Policy](#). This means that your work will be assessed against clear criteria, and these criteria (e.g. in a rubric) will be made available when the assessment tasks are released to you on iLearn.

### Submission of Assessments

All assessments must be submitted online through [Turnitin](#) unless otherwise indicated. Links for the submission of each assessment will be available on [iLearn](#).

You should always check that you have uploaded the correct file. If you have a problem, please

email the Unit Convenor with your correct file. You must also keep a copy of your assessments until the end of semester in case there is a problem with your submission. It is your responsibility to ensure that you can provide a copy of your assessment if requested.

### **Marking of Assessments**

Assignments will usually be marked through Turnitin with grades provided through Gradebook on iLearn. Please do not submit your assessments via email or in hard copy unless requested (e.g. a sketch or drawing).

We aim to return your assessment grades and feedback within two to three weeks of the date that you submitted it. We appreciate your patience and will advise you through iLearn when your marked assessments and feedback are available for viewing.

### **Penalties for Late Assessments**

The penalty for late submission of assessments in this unit is **ten percent (10 %) of the assessment value per day**, calculated from the due time and date. This means that if the assignment is worth a total of 30 marks (or 30 % of the unit) you will lose 3 marks for each day it is late. This is a hefty penalty designed to make you aware of the importance of organising yourself around assessment due dates. The penalty will be applied over weekdays and weekends unless you have been granted an extension prior to the due date.

### **Extensions for Assessments**

To obtain an extension for an assessment task, you will need to follow the formal process as outlined in the [Special Consideration Policy](#), and you must provide appropriate supporting evidence (e.g. medical certificate - see advice for [Special Consideration](#) requests). The final decision regarding the granting of an extension lies with the unit convenor. Permission for extensions must be sought **before the due date** unless there are exceptional circumstances. Please let us know of problems in advance or as soon as possible, not after the event. We are likely to be much more sympathetic and able to accommodate your circumstance if you follow this advice.

### **Exams**

Details of exam conditions and timetables can be found on the [Exams and Results](#) portal. The draft exam timetable will be released approximately eight weeks before the commencement of the exams. The final exam timetable will be published 4 weeks before commencement. All students (including exchange students) are expected to present themselves for the exam at the time and place designated in the exam timetable. Note this may include weekends.

For unavoidable disruptions during exams, you should apply for [Special Consideration](#) as soon as possible. If a Supplementary Examination is granted as a result of the Special Consideration process, the exam time will be scheduled after the conclusion of the official examination period and you will receive an individual notification prior to the exam with the exact date and time of the Supplementary Examination. You will only be allowed one opportunity to sit the Supplementary Exam as outlined in the [Special Consideration Policy](#).

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">ReadinGame quiz</a>	10%	No	Week 13
<a href="#">Final Exam</a>	40%	No	TBA
<a href="#">Research report</a>	30%	No	Week 10
<a href="#">Weekly assessment of knowledge on lectures and/or practical/tutorial tasks</a>	20%	No	Weekly

### ReadinGame quiz

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 15 hours

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, and involves you being able to ask a question related on the week’s 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 week’s 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 people’s 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 based on questions derived from the ReadinGAME.

On successful completion you will be able to:

- Demonstrate knowledge of the fundamental physical mechanisms driving climate variability and climate change.
- Describe the links between fossil fuels, agriculture, population growth and climate change, and the present and future impacts on physical, biological and human systems.
- Explain the role of government, community and industry in determining climate change policy, including adaptation and mitigation options such as renewable energy.

## Final Exam

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **TBA**

Weighting: **40%**

Final exam on material from lectures, assignment and practicals/tutorials.

On successful completion you will be able to:

- Demonstrate an informed, holistic world view of the climate change issue, including the ability to differentiate natural climate variability from global warming.
- Demonstrate knowledge of the fundamental physical mechanisms driving climate variability and climate change.
- Describe the links between fossil fuels, agriculture, population growth and climate change, and the present and future impacts on physical, biological and human systems.
- Explain the role of government, community and industry in determining climate change policy, including adaptation and mitigation options such as renewable energy.
- Assess the validity of information from a range of sources, including scientific communications and popular media.

## Research report

Assessment Type <sup>1</sup>: Report

Indicative Time on Task <sup>2</sup>: 30 hours

Due: **Week 10**

Weighting: **30%**

You will write a report on an aspect of climate change and energy usage.

On successful completion you will be able to:

- Demonstrate an informed, holistic world view of the climate change issue, including the ability to differentiate natural climate variability from global warming.
- Demonstrate knowledge of the fundamental physical mechanisms driving climate variability and climate change.
- Describe the links between fossil fuels, agriculture, population growth and climate change, and the present and future impacts on physical, biological and human systems.
- Explain the role of government, community and industry in determining climate change policy, including adaptation and mitigation options such as renewable energy.
- Assess the validity of information from a range of sources, including scientific

communications and popular media.

## Weekly assessment of knowledge on lectures and/or practical/tutorial tasks

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **Weekly**

Weighting: **20%**

Short quizzes or tests will be used on a weekly basis to maintain everyone's engagement with the unit content. Some weeks this will be on lecture content, some weeks on practical/tutorial content, sometimes on both.

On successful completion you will be able to:

- Demonstrate knowledge of the fundamental physical mechanisms driving climate variability and climate change.
- Describe the links between fossil fuels, agriculture, population growth and climate change, and the present and future impacts on physical, biological and human systems.
- Explain the role of government, community and industry in determining climate change policy, including adaptation and mitigation options such as renewable energy.

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<sup>1</sup> If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

<sup>2</sup> Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

## Delivery and Resources

### Unit iLearn

This unit has an iLearn page that can be accessed through [ilearn.mq.edu.au](http://ilearn.mq.edu.au). It contains important information and other materials relating to the unit, including details and links for assessments.

### Communication

The unit iLearn is the primary way that we communicate with you. Please check it regularly for announcements and posts. You are encouraged to use the Discussion Board on iLearn to post questions and generate discussion with other students. Please only email the convenor with private matters – all other questions should be posted on iLearn.

## Unit Organisation

This unit is delivered in weekly topics. There are two lectures and a practical each week. The organization of these is outlined in a detailed unit schedule which is available on [iLearn](#).

## Classes

The class timetable for this unit can be found through the [Timetable](#) portal. If you take in this unit as an external student, you need to enrol in a specific online practical class. All lectures and practicals will be delivered online for the external offering.

## Workload

The expected workload for this 10-credit point unit is 150 hours of activity.

## Recommended Materials

The primary recommended materials for this unit will be the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) and other recent IPCC reports (available from <https://www.ipcc.ch/>) and published research papers, books, and chapters relevant to each lecture topic.

## Technology Used and Required

This unit will use iLearn and Echo360. See the [Instructions on how to log in to iLearn](#) and the [iLearn quick guides for students](#) which will help you:

- [Getting started](#) - Find out how to navigate and familiarise yourself with the iLearn environment
- [Activities](#) - Learn how to effectively complete the activities required of you in iLearn
- [Assignments and Gradebook](#) - Find out how to submit assessments and view your grades using iLearn
- [Online study tips](#) - Studying online is a unique experience, learn how to navigate it here
- [Discussion forums](#) - Explore the different types, and features of discussion forums in iLearn
- [Lecture recordings](#) - Find out how to access lectures online, as well as the features available to you

## Unit Schedule

ENV52115: Climate Change, Energy and our Future, Semester 2 2020				
Module	Week	Date	Lecture number and title	Tutorial/practical
Introduction	1	29-Jul	1. Climate Change: what's the big deal and why should we care? (LH)	Unit organisation and introduction to ENV52115 (YY, convenor)
			2. The historical context: what can we learn? (LH)	



What Got Us Here: Fossil Fuels and the Carbon Cycle	2	5-Aug	3. Conventional Hydrocarbons: Oil and Gas (SG)	The uses of crude oil in our civilisation: past, present, and future (SG)
			4. Conventional Hydrocarbons: Coal (SG)	
	3	12-Aug	5. Unconventional Hydrocarbons: Coal seam gas, shale gas, underground coal gasification (SG)	Future sources of gas in Australia (SG)
			6. Unconventional Hydrocarbons: Shale (tight) oil, oil shale, and tar sands (SG)	
Physical climate science	4	19-Aug	7. The Carbon Cycle (SG)	Human perception and change denial? (Cas)
			8. Introduction to the atmospheric climate system and variability (PB)	
	5	26-Aug	9. Drivers of climate change (PB)	How to lie with statistics? (YY)
10. Climate change projections and modelling (PB)				
Impacts of climate change	6	2-Sep	11. Causes and impacts of sea level rise (PB)	International Climate Negotiations (Cas)
			12. Impact on health (PB)	
	7	9-Sep	13. Impact on natural ecosystems (LH)	Ecosystem change practical (Cas)
14. Impact on water security (LH)				
Semester break				
Adaptation to climate change	8	30-Sep	15. Impact on food security (LH)	Pollen and people (PB)
			16. Impact on communities and tourism (LH)	
Adaptation to climate change	9	7-Oct	17. The international context: implications for Australia (LH)	Future climate change where you live (PB)
			18. Preventing vs coping with climate change: mitigation and adaptation synergies and tradeoffs (LH)	
Mitigation of climate change	10	14-Oct	19. Solar Energy (YY)	Rare Earth Elements for renewable energy (Cas)
			20. Other Renewable Energy solutions (YY)	
	11	21-Oct	21. Nuclear Energy (YY)	Fukushima (YY)
			22. Biomass and Biofuel (YY)	
	12	28-Oct	23. Extreme solutions: geoengineering (YY)	Geoengineering practical (YY)
			24. Sequestration of carbon on land (PB)	
13	4-Nov	25. CO <sub>2</sub> Geosequestration; carbon capture and storage (SG)	Revision/exam preparation (YY, convenor)	
		26. Sustainability and the future of our civilisation (YY)		
Lecturers: LH = Lesley Hughes; SG = Simon George; PB = Paul Beggs; YY = Yingjie Yang; Cas: Casual staff.				

## 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.*)

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 \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

## 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](https://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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](https://mq.edu.au/learningskills)) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

## 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](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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/](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.