

# 30387 CLIMATE CHANGE ECONOMICS 2016-2018

Course Director: Valentina Bosetti

## 1. Course Objectives

Climate change is by and large an economic problem. It is a global, intertemporal externality and it represents a major challenge for economists. This course examines the key role of economic activities as a driver of climate change and how economic tools can be used to investigate this problem and to design climate policies. In order to deal with the problem of climate change the student will have to rethink some key economic concepts like efficiency, externality, intertemporal decision making under uncertainty and welfare aggregation, from a new and more applied perspective.

The student will also familiarize with key tools for climate change and long term energy policy making: integrated assessment models. The general mechanism of these tools will be learned through applications like the role of innovation in the energy sector, game theory and the (in)stability of international climate agreements, and how the inclusion of uncertainty affects optimal policies and investment decisions.

## 2. Course prerequisites

Basis of Microeconomics

## 3. Course Content Summary

- Introduction to the Climate Change challenge
- Integrated Assessment models
- Making Decisions about the Environment (Cost Benefit and Cost Effective Analysis)
- Who is the social planner? (Inter-temporal and social aggregation issues)
- Modeling Technological Change (The Innovation Externality and Assessing the Costs)
- Valuation Methods (Valuing the Market and non-Market Benefits)
- Environmental Policy Making
- International Environmental Agreements

Readings with STAR\* are compulsory

Date	Class #	Room	Topic	Content / Readings
Wed 7/Feb/2018	1	23	Introduction to course, Basic Science	<a href="#">A short Video</a> <a href="#">Primo Levi, Carbon</a>  * <a href="#">Nordhaus, W., 2012 Why the Global Warming Skeptics Are Wrong, The New York Review of Books from the March 22, 2012 issue</a>  * <a href="#">The Conversion of a Climate-Change Skeptic</a>

				<p><a href="#">By RICHARD A. MULLER, The New York Times , Published: July 28, 2012</a></p> <p><a href="http://www.nationalgeographic.com/climate-change/special-issue/">http://www.nationalgeographic.com/climate-change/special-issue/</a>  <a href="http://www.rollingstone.com/topic/climate-change">http://www.rollingstone.com/topic/climate-change</a></p>
Thu 8/Feb/2018	2	23	Basic Climate Change Science	<p><a href="#">Hansen J., L. Nazarenko, R. Ruedy et al., 2005, Earth's Energy Imbalance: Confirmation and Implications, Science 308, 14</a></p> <p><a href="#">*IPCC 5th Assessment Report. Technical Summary, Working Group 1.</a>          (If the link does not work go to <a href="http://www.climatechange2013.org/">http://www.climatechange2013.org/</a> and click on the summary for policy makers)</p> <p><a href="http://news.stanford.edu/news/2015/september/global-warming-hiatus-091715.html">http://news.stanford.edu/news/2015/september/global-warming-hiatus-091715.html</a></p>
Wed 14/Feb/2018	3	23	Basic facts on Emissions	<p><a href="#">*IPCC 5th Assessment Report. Summary for Policy Maker, Working Group 3.</a></p> <p>(If the link does not work go to <a href="http://mitigation2014.org/">http://mitigation2014.org/</a> and click on the summary for policy makers)</p> <p><a href="http://coolclimate.berkeley.edu/carboncalculator">http://coolclimate.berkeley.edu/carboncalculator</a></p> <p>IEA, <a href="#">Energy, Climate Change and the Environment</a></p>
Thu 15/Feb/2018	4	23	Basic notions: Social Choice	<p>*Ch 3 and Ch 4 Kolstad (2000), Environmental Economics, Oxford University Press</p> <p><a href="#">*Don Fullerton and Robert Stavins, "How Economists See the Environment," Nature, 395:6701 (1998).</a></p> <p><a href="#">Garrett Hardin, "The Tragedy of the Commons," Science, 162:1243-48 (1968).</a></p>
Wed 21/Feb/2018	5	23	Basic notions: Social Choice /2	<p>*Ch 3 and Ch 4 Kolstad (2000), Environmental Economics, Oxford University Press</p> <p><a href="#">*Don Fullerton and Robert Stavins, "How Economists See the Environment," Nature,</a></p>

				<p><a href="#">395:6701 (1998).</a></p> <p><a href="#">Garrett Hardin, "The Tragedy of the Commons," Science, 162:1243-48 (1968).</a></p>
Thu 22/Feb/2018	6	23	Basic Notions: Efficiency Externalities Property Rights	<p>*Ch 4-5 Kolstad (2000), Environmental Economics, Oxford University Press</p> <p><a href="#">Garrett Hardin, "The Tragedy of the Commons," Science, 162:1243-48 (1968).</a></p> <p>*<a href="#">Fracking and Coase Theorem</a></p> <p>*<a href="#">The true cost of a burger</a></p> <p><a href="#">Freakonomics: Not-So-Free Ride</a> By STEPHEN J. DUBNER and STEFRI D. LEVITT The New York Times Published: April 20, 2008</p> <p>Kahneman et al, 1990, <a href="#">Experimental Test of the Endowment effect and the Coase Theorem</a>, the Journal of Political economy</p>
Mon 28/Feb/2018	7	23	Making Decisions about Climate Change/1	<p>*Ch 4 (section III) and Ch 6 Kolstad (2000), Environmental Economics, Oxford University Press</p> <p>*<a href="#">Chapters 2.4 and 2.6 of IPCC 4<sup>th</sup> AR Climate Change 2007: Working Group III: Mitigation of Climate Change</a></p> <p>*<a href="#">Nordhaus, Economic aspects of global warming in a post- Copenhagen environment, PNAS, 2010</a></p> <p>Schelling, T. (1995), "Intergenerational discounting", Energy Policy 23, 395-401.</p> <p>"Cost-Benefit Analysis: An Ethical Critique." by SteFri Kelman, from AEI Journal on Government and Society Regulation (1981) PP. 33—40.</p> <p>Kirman, Alan P, 1992. "Whom or What Does the Representative Individual Represent?," Journal of Economic Perspectives, American Economic Association, vol. 6(2), pages 117-36, Spring.</p> <p><a href="#">Paul Krugman, Building a Green Economy, The</a></p>

				<a href="#">New York Times, April 7, 2010</a>
Wed 01/Mar/2018	8	23	Making Decisions about Climate Change/2	Continuation
Wed 7/Mar/2018	9	23	Evaluating Climate Change Benefits (Valuing the Market and non- Market Benefits)	*Ch 15-18 6 Kolstad (2000), Environmental Economics, Oxford University Press  *Tol R.S.J., 1995, The Damage Costs of Climate Change Toward More Comprehensive Calculations, Environmental and Resource Economics 5, 353-374.  *Discussion of <a href="#">Burke, Hsiang, and Miguel (2015)</a>  Stern, Nicholas (2007), The economics of climate change – The Stern Review, Cambridge University Press, Cambridge.
Thu 8/Mar/2018	10	23	Speaking in Public	David Calhan, professional actor and public speaking coach, will guide you towards better performances in public speaking (in particular presentation of Assignment 1) so that you are able to convey all the beautiful things that you are learning to the rest of the world.
Wed 14/Mar/2018	11	23	Evaluating Climate Change Mitigation Costs	* <a href="#">Ch 6 WGIII IPCC AR5 (6.3.4, 6.3.5, 6.5)</a>  Clarke, L. et al., 2009. International climate policy architectures: Overview of the EMF 22 International Scenarios. Energy Economics, pagg.S64–S81.
Thu 15/Mar/2018	12	23	Mitigation Technologies	*Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies S. Pacala and R. Socolow, Science, 2004.  <a href="http://cmi.princeton.edu/wedges/">http://cmi.princeton.edu/wedges/</a>
Decide Topic for Assignments, Groups and Hand-in VIDEO PITCH				
Wed 04/Apr/2018	13	23	Putting everything together: Integrated Assessment Modeling	* <a href="#">Nordhaus, William D., Integrated Economic and Climate Modeling (December 9, 2011).</a> <a href="#">Cowles Foundation Discussion Paper No. 1839.</a>

			(IAM)	<p><a href="#">Paul Krugman, Building a Green Economy, The New York Times, April 7, 2010</a></p> <p>TED: <a href="#">Al Gore on Climate Change</a></p>
Thu 05/Apr/2018	14	23	Environmental Policy Instruments I	<p>*Ch 6 Ch 11-12, Ch 14 Ch 17 Kolstad (2000), Environmental Economics, Oxford University Press</p> <p><a href="#">Congestion Charge</a>  <a href="#">Mercury Regulation</a>  <a href="#">Ireland Carbon tax</a></p> <p>Energy Subsidy Readings  A policy tool: Plastic Bans, a TED <a href="#">here</a>  Slide set and Handouts</p>
Wed 11/Apr/2018	15	23	Environmental Policy Instruments II	<p>*Ch 6 Ch 11-12, Ch 14 Ch 17 Kolstad (2000), Environmental Economics, Oxford University Press</p> <p>*Emissions trading: Cheap and dirty, Financial Times, By Joshua Chaffin</p> <p><a href="#">Fishing Quotas</a></p>
Thu 12/Apr/2018	16	23	Environmental Policy Instruments III	Continuation
Wed 18/Apr/2018	17	23	Environmental Policy Instruments IV	Continuation
Thu 19/Apr/2018	18	23	International Cooperation	<p>*Lecture Notes</p> <p><a href="http://www.robertstavinsblog.org/">http://www.robertstavinsblog.org/</a></p> <p>Ch 1 and Ch 4 Barrett, S. 2003. Environment and Statecraft. Oxford Oxfordshire: Oxford University Press</p> <p>Barrett , S. (1994), "Self-Enforcing International Environmental Agreements", Oxford Economic Papers, Vol. 46, pp. 878-894.</p>
Thu 26/Apr/2018	19	12	Enacting Negotiations	<p>SIMULATION OF CLIMATE NEGOTIATIONS</p> <p><a href="https://www.climateinteractive.org/programs/world-climate/">https://www.climateinteractive.org/programs/world-climate/</a></p>

Wed 2/May/2018	20	31	Students Presentation and Discussion of Assignments	
<b>Hand – in Assignment 2 (VIDEO) by 1<sup>st</sup> of May</b>				
Thu 03/May/2018	21	31	Students Presentation and Discussion of Assignments	
Wed 09/May/2018	22	12	Students Presentation and Discussion of Assignments	
Thu 10/May/2018	23	31	Students Presentation and Discussion of Assignments	
<b>Fri 11/May/2018</b> <b>NEW!!</b>	24	12	Videos	Award for Best Videos!
<b>Hand – in Assignment 1 (WRITTEN MEMO) by 11 of May</b>				

#### 4. Textbooks

Kolstad “Environmental Economics”

Please also see the list above and the slide deck.

#### 5. Detailed description of the assessment methods

##### **For Attending Students**

Voluntary Assignment 1 (Short Memo)	40%
Voluntary Assignment 2 (Video)	30%
Final exam (Shorter version)	30%

Or

##### **For Everyone**

Final exam	100%
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Class Active Participation Prize (1 point) to the top 5 Students

The Final Exam is written and compulsory. It is required to have a minimum of 18/30 in the final written exam to pass.

All above requirements expire within the Academic year. If you do the voluntary assignments, you will have to stick to that option throughout.

What does it mean to be an attending student? I run in class exercises throughout the course. In addition, I take presences during the last 5 classes, when groups present their work. Finally, you will have to hand in, by mid-term, a short video pitch that will be used to help you improving your presentations skills (more on this in the HOW TO SPEAK IN PUBLIC section).

**BClicker:** I will use BClicker at the beginning of each class to give you the opportunity to test your understanding of the previous class and allow me to go over concepts and ideas that were not clear.

For the assignments you may work in a team of three (or four, depending on how many students enroll). You will be given the possibility to enroll to a group through BBOARD.

**HOW TO SPEAK IN PUBLIC:** On the 8<sup>th</sup> of March a professional actor and public speaking coach (David Calhan) will come to class to provide you with an amazing interactive tutorial on how to present in front of a public. The short video pitch that you will hand by mid term will allow him to give you personalized feedback and help you get prepared to the final presentation of the memo in front of the class. This video pitch will not be graded, but has the purpose to give you constructive feedback on presentation skills. You may prepare this video pitch (max 1 minute) with your other team's members. At least one person will have to appear (full person or medium close-up) on the screen. You can pick any slide that I have presented in class as material for your video pitch.

**ASSIGNMENT 1. Memo:** You will choose a topic (I will have to approve). You will work on a brief written policy memo and you will present it in class during the last days of class. Active participation to other teams' presentations is compulsory.

Deadline: Submission of memo by the last day of class (no exceptions). Presentations calendar will be posted later in the year, but it will be one of the last days of class.

Detailed information on how to write the memo and how to make the presentation and examples will be provided during class and are available on BBoard.

**ASSIGNMENT 2. Video:** You will choose a topic (I will have to approve). This is not the 1 minute video pitch that will instead only be used to give you feedback on presentation skills, so you can decide to be on the video or, instead, to use any other technique (animation, voice-over ppt, etc.). You will produce a one/two minutes video explaining a key concept that we have covered during the course. You may decide on the style of the video freely. You don't need any special equipment – you can use your cell phone for this if you wish. You will be graded on (1) effectiveness of your presentation; (2) correctness and completeness of your presentation; (3) the overall pedagogic effectiveness of your video; (4) complexity of the concept you decided to present.

You will constructively comment and vote videos done by other teams using BBoard.

There will be a prize assigned to the best video.

Detailed information and examples on video will be provided during class.

Deadline: Submission of video, at the latest, 10 days before the last day of class, 1<sup>st</sup> of May (no exceptions).

## **MORE ON BBOARD!**

### **6. Assessment methods**

The Final Exam is written.