

BILKENT UNIVERSITY
Department of Economics
Econ 417 Environmental Economics, Spring 2016

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Earth scientists report that the surface temperature of our planet has warmed up by 0.9 degrees *Celsius* since the onset of the Industrial Revolution. It is warned that life on our planet will be threatened very seriously with unforeseeable adverse consequences if the warming of our planet's surface temperature exceeds 2⁰C. Thus, the scientific community set an ultimate target for limiting the rise in global temperature by this amount: 2⁰C! It is estimated that in order to maintain this target a maximum total of 450 ppm of CO₂ (parts per million molecules) ought to be allowed in our atmosphere. Our planet's atmosphere is estimated to hold 220 ppm of CO₂ on around the time of the industrial revolution. (Some argue that even the 2⁰C is a too high of a target and that our planet will not endure warming beyond 1.5⁰C, the companion of which is CO₂ concentration level of 350 ppm. Hence the movement: 350.org.)

Some claim that warming of our planet is actually a *natural episode* originating from the cyclical swings of the earth's axis by as much as 0.4 degrees at regular intervals spanning over 40,000 years. In case you had been subscribing to this claim, watch this: <http://www.bloomberg.com/graphics/2015-whats-warming-the-world/>

The total allowable emissions of CO₂ to contain the temperature rise at 2⁰C is calculated to be on the order of 2,900 Gigatons (1 Gg = 1 billion tons). This amount is referred to as the global *carbon budget*, and it is estimated that 1,900 Gt of this budget (65%) has already been spent since then. This leaves us a total available sum of 1,000 Gt of allowable CO₂ emissions to limit global warming at 2⁰C.

Detrimental human activity on the planet is not limited to gaseous emissions, but spread around solid and other forms of waste, soil and water pollution, as well as resource depletion. Issues, issues...

In this course we will deal with all these issues and will mainly try to address the essential elements of environmental abatement with the approach and policy instruments of an economist. We will study the threats and concerns; search over tools of mitigation against environmental "bads"; and study their effectiveness. Sure enough, none of these ideas and policy tools are to be treated in a vacuum, but will be placed into the historical/social context of global capitalism with all its institutions, markets, and dynamic patterns.

We will be mostly concerned with the determinants of the wealth of nations and also the appropriate national policies to achieve sustained and stable growth. We will regard the economic machine being in motion towards its long run (steady state) equilibrium, in all its giant complexity with many interrelated markets and different agents, classes and institutions. Four sets of issues will be addressed: we will:

- (i) examine the recent evidence on the stylized facts and empirical evidence on environmental pollution;

- (ii) study conventional tools of analysis of the arsenal of policy tools to address environmental bads;
- (iii) introduce and study the recent concepts of Environmental Kuznets Curve, the carbon budget; the Intended Nationally Determined Contributions (INDCs) against climate change, carbon pricing, ...;
- (iv) study alternative visions of environmental policy within the context of degrowth, sustainable development, and de-carbonization;

The course involves a fairly heavy reading load, the completion of which is essential to understanding the issues and controversies highlighted in the lectures. The lecture material will be complemented with various hand-outs relevant to the subject matter in due course. I will highlight some of the material as of secondary interest and regard as “optional reading” during the class.

Grading will be based upon: (i) a finite number of homeworks and opinion papers and effective classroom participation (50%); and a (ii) a Final Exam (50%) (*date to be scheduled by the Registrar's Office*). Note that late submissions of homeworks or opinion papers will not be accepted under any exception, and **no such submissions via e-mail attachments please!**

Participation to lectures is *not a must*, but is *highly recommended* given observed empirical regularities on the external economies of lecture attendance on your course performance as well as your overall happiness as a young economist. However, (and this is important):

- If you fail to submit less than half of the homeworks;

You will not be allowed to take the final exam and your grade will automatically be set as FZ

Readings:

The following texts will be followed closely, and it is advised that you purchase them:

Tom Tietenberg and Lynne Lewis (2015) *Environmental & Natural resource Economics*, 10th Edition, Pearson.

Robin Hahnel (2011) *Green Economics: Confronting the Ecological Crisis*, M.E. Sharpe

In addition we will discuss all the papers listed below (except marked as optional) in class. This is *not* an exhaustible list of the papers in the subject area, though it should be useful enough for a head start.

All the course material is available either through electronic downloadable form at *Bilkent Library electronic journals database*, or via electronic links provided. It is your responsibility to make your own copies.

Course Plan

Week 1

Hearing the Environment: Statement of the Problem(s)

Read: Tietenberg chp 1; Hahnel Chp 1

What is the Carbon Cycle? available at:

<http://carboncyclescience.us/what-is-carbon-cycle>

Week 2

Tools and Basic Concepts of An Environmental Economist

Read Tietenberg Chp 2 and 3

Institutions and Pollution Control Policy Instruments

Encyclopedia of Earth, Introduction to Ecological Economics, chp 4, available at:

<http://www.eoearth.org/view/article/150043/>

Week 3

Neoclassical Approach to Valuation of the Environment

Read: Tietenberg Chp 4

Ackerman, F., Heinzerling, L. (2002). "Pricing the priceless: Cost-benefit analysis of environmental protection". Working paper, The Georgetown Environmental Law and Policy Institute. Available at

<http://ase.tufts.edu/gdae/publications/C-B%20pamphlet%20final.pdf>

Measuring welfare & Well-Being

Encyclopedia of Earth, Introduction to Ecological Economics, chp 3

<http://www.eoearth.org/view/article/150042/>

Week 4

Neoclassical Approach to the Environment & Its Limitations

Read: Faber Malte (2007), *How to be an Ecological Economist?*, University of Heidelberg Discussion Paper Series No.454, available at:

<http://www.uni-heidelberg.de/md/awi/forschung/dp454.pdf>

Tietenberg Chp 5, 6, 7

Hardin, G. (1968) "The Tragedy of the Commons" *Science*, 162(3859): 1243-1248

Angus, I. (2008) "The Myth of The Tragedy of the Commons" *Monthly Review*, August.

Hardin on tragedy of commons on Youtube:

<https://www.youtube.com/watch?v=g8yOamWq3a0>

Ian Angus on tragedy of commons on Youtube

<https://www.youtube.com/watch?v=lwaNZgY9PCQ>

Week 5

The Unequal Distribution: Implications for the Environment

Read: Boyce, J.K. (1994). "Inequality as a cause for environmental degradation."

Ecological Economics, 11(3): 169-178. Available at

http://www.peri.umass.edu/fileadmin/pdf/published_study/PS1.pdf

The Environmental Kuznets Curve (EKC) Hypothesis:

Read: Soumyananda, D. (2004). "Environmental Kuznets curve hypothesis: a survey".

Ecological Economics 49(4): 431-455.

Stern, David (2004) "The Rise and Fall of the Environmental Kuznets Curve" *World Development*, 32(8): 1419-1439.

Tietenberg, Chp 19

Week 6

The Threat of Climate Change

Read: Tietenberg Chp 14 and 16

Storm, Servaas (2009) "Capitalism and Climate Change: Can the Invisible Hand Adjust the Natural Thermostat?" *Development & Change* 40(6): 1011-1038

Equity Climate Reference Calculator, Stockholm Environment Institute

<http://www.sei-international.org/equity-calculator>

Week 7

Algebra of Carbon Markets

Read: Hahnel, Chp 8, 9, 10

Lohmann, Larry (2011) "The Endless Algebra of Climate Markets" *Capitalism, Nature, Socialism* 22(4): 93-116

Week 8

Economics of 2C, COP21 Paris and Beyond

Read:

Voyvoda, Ebru and A. Erinc Yeldan (2015) "Low Carbon Development Pathways for Turkey" Istanbul Policy Center and WWF-Turkey, October. Available at:

https://yeldane.files.wordpress.com/2014/09/wwf-report_eng_2015.pdf

Turkey Official INDC Document:

http://www4.unfccc.int/submissions/INDC/Published%20Documents/Turkey/1/The_INDC_of_TURKEY_v.15.19.30.pdf

Lecture notes tbd

Week 9

Pathways of Transition to Renewables versus Fossil Fuels and the Nuclear Debate

Read: IAEA (2015) *Climate Change and Nuclear Power*

Acar Sevil and A. Erinc Yeldan (2016) "Environmental Impacts Of Coal Subsidies In Turkey: A General Equilibrium Analysis" *Energy Policy* forthcoming.

Available at: <http://www.sciencedirect.com/science/article/pii/S0301421515302172>

Energy: Nuclear Power, Encyclopedia of Earth, available at:

<http://www.eoearth.org/view/article/51cbee8c7896bb431f698a5c/?topic=51cbfc78f702fc2ba8129e5f>

Week 10

Degrowth versus Sustainable Development and Deep de-Carbonization

Read: Kallis, Giorgos (2011) "In Defence of Degrowth" *Ecological Economics* 70: 873-880

Foster Bellany (2011) "Capitalism and Degrowth: An Impossibility Theorem" *Monthly Review* available at:

<http://monthlyreview.org/2011/01/01/capitalism-and-degrowth-an-impossibility-theorem/>

Jeffrey Sachs (2010) *Sustainable Development*

Week 11

Long Waves and Sustainability Transitions

Read: Swilling, Mark (2013) "Economic Crisis, Long waves and the Sustainability Transition: An African Perspective" *Environmental Innovation and Societal Transitions*, 6: 96-115

Tietenberg, Chp 20 and 21

Week 12

Social Capital and Green Jobs

Neil Smith "Nature as Accumulation Strategy"

ILO (2013) "Sustainable Development, Decent Work and Green Jobs" Geneva.

Week 13

Final assessments

Lecture notes tbd