Instructor Information

- **Gernot Wagner**
- Email: gwagner@nyu.edu
- Office Address: Department of Environmental Studies, 285 Mercer Street, 10th floor.
- (Currently Virtual) Office Hours: Wednesdays, 2:30-4:30 p.m. Please sign up here. Alternatively, join me on a ~40-minute morning run. If none of these times work, please email me.

Course Information

- Class Meeting Times: Mondays & Wednesdays, 8:00-9:15 a.m.
- Class Location: 60 Fifth Ave, New York, NY 10011, Room 265.
- Please take a look at the footer of the syllabus. It indicates the syllabus version in the YYMMDD format (also reflected in the name of this PDF file). We will likely adjust the syllabus throughout the semester. Please make sure you work off the latest syllabus.

Course Prerequisites

Formally, the prerequisite is ENVST-UA 101 Environment and Society.

Informally, the main prerequisite is that we need to speak the same language. Please talk to me after the first class if you don’t meet the formal requirements, or if you have other questions or concerns.

Course Description

Economics—misguided market forces—is at the core of most environmental problems. Economics—guiding market forces in the right direction—is also fundamental to the solution.
In this course we develop some of the fundamental economic tools for environmental policy analysis and management: Economics 101 applied to environmental problems—often, though not exclusively, focused on climate change.

We will also go well beyond that initial Econ 101 take, narrowly defined. In fact, focusing exclusively on Econ 101 may sometimes be positively misleading.

For example, Econ 101 traditionally tells us to price each ton of carbon dioxide (CO₂) emitted into the atmosphere, and to get out of the way. Markets will take of the rest.

Not so fast.

Econ 102 tells us that not only is there a negative carbon spillover of economic activity, but also a positive learning-by-doing one. Installing the first rooftop solar panel is costly. The one hundredth is already cheaper. The millionth is a breeze. That goes for any individual roofer. It also goes for entire countries, and it is at the heart of policies from California’s Solar Initiative (formerly, its Million Solar Roofs Initiative) to Germany’s Energiewende (energy transition).

Then there’s Political Economy 101. Shouting “carbon tax” all day long will not make it so. In fact, subsidizing clean technologies may even be a necessary step to get a price on CO₂ passed in the first place.

We will discuss this and similar examples, applying Econ 101 (and 102) to the real world, keeping Political Economy 101—and real-world politics—in mind every step along the way.

Course and Learning Objectives

The course has three goals:

#1 build our environmental economic policy toolkit and know when to apply which tool;
#2 communicate the results of our analyses in plain English;
#3 make better-informed environmental policy decision, all while distinguishing between positive analyses and normative judgements.

Three problem sets and three brief (800-word) op-eds or policy memos will reinforce class discussions. The latter will also ask you to pick a side. Think Economist leader: crisp, logical, and always with a well-justified point of view.

Learning Assessment Table

<table>
<thead>
<tr>
<th>Course Objective Covered</th>
<th>Corresponding Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Three problem sets</td>
</tr>
<tr>
<td>#2 and #3</td>
<td>Three policy memos</td>
</tr>
</tbody>
</table>
## Required Readings

There are two required texts for the class: Nathaniel Keohane and Sheila Olmstead's *Markets and the Environment, Second Edition* (Island Press, 2016). As the book description says, “The authors provide a concise yet thorough introduction to the economic theory of environmental policy and natural resource management.” It is not a textbook, but it is a comprehensive, logical presentation we will use throughout the semester—and it does have graphs and tables. We will refer to it as “TEXT” throughout this syllabus.

The second is my own, *But will the planet notice? How Smart Economics Can Save the World* (Farrar, Strauss & Giroux/Hill & Wang, 2011). It also is decidedly not a textbook. It is a comprehensive introduction to fundamental economic thinking applied to environmental problems. And it tries to do so in a readable, fun way. Where TEXT has graphs and tables, it has cartoons. We will refer to it as “PLANET” throughout this syllabus.

There will be several other materials, ranging from lecture notes/slides to peer-reviewed academic papers to news articles, to brief excerpts from another book of mine, *Climate Shock* (Princeton, 2015), joint with the late Martin Weitzman. All of those will be available online via the course website.

Beginning with week 2 of the course, come prepared to class having done the readings for the day, including any lecture notes/slides. We will use class times to (briefly) review the most important concepts and then spend the bulk of the time discussing the merits and demerits of the tools and applying them to real-world situations.

Some might call that a “flipped classroom”: go through the fundamentals at home on your own time, then spend class time with hands-on exercises. We don’t quite go all the way. There will be problem sets and essays to do on your own. But we will generally focus class time on the *how* and *why*—including the *why not*—rather than just the *what*.

### Assessment Assignments and Evaluation

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem sets</td>
<td>Three problem sets, 5% each.</td>
<td>15%</td>
</tr>
<tr>
<td>Short essays</td>
<td>Three short essays, 5% each.</td>
<td>15%</td>
</tr>
</tbody>
</table>

You might call them “policy memos.” You might call them “op-eds.” Either way, these three short essays have a point of
view, they are well argued, and they come in at just around 800 words (sans bibliography). Make sure to use proper citations of materials, including those from the syllabus.

<table>
<thead>
<tr>
<th>Midterm exam</th>
<th>Exam with numerical problems and (brief) essay questions, mimicking the structure of the course—including problem sets and short essays.</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam</td>
<td>Exam with numerical problems and (brief) essay questions, mimicking the structure of the course—including problem sets and short essays.</td>
<td>40%</td>
</tr>
<tr>
<td>Participation</td>
<td>Actively engage with the readings and participate in class discussions.</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

All written assessments are individual. Discuss the topic with each other; join up in reading groups; come to office hours alone or in groups to discuss details; but submit your own, individual problem sets and essays.

Problem sets are due, electronically via the course website, by the beginning of class on September 22\textsuperscript{nd}, October 6\textsuperscript{th}, and November 3\textsuperscript{rd}. Essays are due via the course website by 10:00 p.m. on September 29\textsuperscript{th}, November 17\textsuperscript{th}, and December 1\textsuperscript{st}.

If you need more time, you will need to optimize in light of the following time-grade tradeoff: You will lose ½ point (out of a possible 5 for each assignment, problem set or essay) immediately, and another ½ point for each additional 24 hours the assignment is late.

To request a regrade on any assignment, send me an email with your full (scanned) assignment attached, explaining your request within 1 week of receiving the graded assignment. I will re-grade the entire assignment—grades may increase or decrease as a result.

Overview of the Semester

- **Topic 1:** How costly is climate change, and why does it matter? Aka How to think like a climate/environmental economist
  - *Dates:* September 8\textsuperscript{th} and September 13\textsuperscript{th}, 2021
  - *Tools/concepts:* Introduction to “the mother of all benefit-cost analyses”
- **Topic 2:** Why benefit-cost analysis *(should)* reign(s) supreme
  - *Dates:* September 15\textsuperscript{th} and 20\textsuperscript{th}, 2021 [note: shorter class on September 15\textsuperscript{th} due to 9 am live discussion of “The New Green Economics”]
  - *Tools/concepts:* Negative externalities, net-present value (NPV) analysis, BCA, and some alternative decision criteria
- **Topic 3:** How to calculate the benefits of environmental protection
  - *Date:* September 22\textsuperscript{nd}, 2021
- **Tools/concepts:** Revealed preference methods, stated preference (contingent valuation), benefit transfer, Value of a Statistical Life (VSL)
  - **Deliverable:** Problem set 1 due on September 22nd in class

- **Topic 4:** How far how fast on climate? Aka what’s the “optimal” carbon price?
  - **Date:** September 27th, 2021
  - **Tools/concepts:** Economic optimality, the limits of BCA

- **Topic 5:** Optimal extraction of non-renewable resources
  - **Dates:** September 29th, 2021 and October 4th, 2021
  - **Tool/concept:** Hotelling Rule
  - **Deliverable:** Essay 1 due by 10:00 p.m. on September 29th via Course website

- **Topic 6:** Renewable resources & common property problems
  - **Date:** October 6th
  - **Tools/concepts:** Public goods, tragedy of the commons
  - **Deliverable:** Problem set 2 due on October 6th in class

- **In-class midterm review and MIDTERM EXAM**
  - **Date:** October 12th, 2021 (“legislative Monday”): Midterm Review
  - **Date:** October 13th, 2021: MIDTERM EXAM

- **Topic 7:** Economics of pollution control
  - **Dates:** October 18th and 20th, 2021
  - **Tools/concepts:** Negative externalities, efficiency, cost-effectiveness, domestic instrument choice (under certainty)

- **Topic 8:** Prices vs. Quantities
  - **Dates:** October 25th and 27th, 2021
  - **Tool/concept:** Instrument choice under uncertainty; experience with economic policy instruments

- **Topic 9:** Prices vs. Subsidies
  - **Dates:** November 1st and 3rd, 2021
  - **Tool/concept:** Positive learning-by-doing externalities
  - **Deliverable:** Problem set 3 due on November 3rd in class

- **Topic 10:** Global (warming) problem, global solution
  - **Date:** November 8th and 15th, 2021 [note: (likely) no class on Wednesday, November 10th, due to COP attendance]
  - **Tool/concept:** International policy choice, game theory of climate negotiations

- **Topic 11:** Limits to growth? Aka Mind versus Matter
  - **Dates:** November 17th and 22nd, 2021
  - **Tool/concept:** Sustainability, green accounting, technology progress
  - **Deliverable:** Essay 2 due by 10:00 p.m. on November 17th via Course website

- **Topic 12:** What could possibly go wrong? Aka The Three Horsemen of the Climate Policy Apocalypse: Rebound, Spatial & Temporal Leakage
  - **Dates:** November 29th and December 1st, 2021
  - **Tool/concept:** Rebound effect, spatial leakage, Green Paradox (temporal leakage)

- **Topic 13:** How to make the planet notice Aka Economic thinking applied to environmental problems
Detailed Course Overview

“TEXT” here will refer to: Keohane, Nathaniel and Sheila Olmstead, *Markets and the Environment, Second Edition*, Island Press, 2016. (Not this is the second edition, considerably updated from the first.)

“PLANET” here will refer to: Wagner, Gernot, *But will the planet notice? How Smart Economics Can Save the World*, Farrar, Strauss & Giroux/Hill & Wang, 2011. (Page number are equal across hardcover and paperback editions.)

**TOPIC 1: How costly is climate change, and why does it matter? Aka How to think like a climate/environmental economist**

Readings

2. TEXT, pp. 11-34, 80-90: Chapter 2 "Economic Efficiency and Environmental Protection" and Chapter 5 "Market Failures in the Environmental Realm", the first two subsections: “Externalities” and "Public Goods."
3. PLANET, pp. 3-14: Preface “Doing Good.”

Recommended Reading


**TOPIC 2: Why benefit-cost analysis (should) reign(s) supreme**

Readings

1. *Please make sure you review last week’s readings, especially if you didn’t do so already before the first class.*
2. TEXT, pp. 35-68: Chapter 3 "The Benefits and Costs of Environmental Protection."

---

1 Recommended readings are typically academic, oft-technical papers that aren’t required but good to have taken a look at. Coase’s essay is not, in fact, technical. It surely is a classic, though.

Recommended Readings


TOPIC 3: How to calculate the benefits of environmental protection

Readings

1. TEXT, pp. 48-53: (re-read) Chapter 3’s subsection on “Evaluating the Benefits”
2. Slides for lectures 5, 6, and 7 from Rob Stavins’s introductory environmental economics class

Recommended Readings


TOPIC 4: How far how fast on climate? Aka what’s the “optimal” carbon price?

Readings


Recommended Readings


---

2 See Acknowledgments section below.

**TOPIC 5: Optimal extraction of non-renewable resources**

**Readings**

1. TEXT, pp. 99-112: Chapter 6, “Managing Stocks: Natural Resources as Capital Assets”
2. Covert, Thomas, Michael Greenstone and Christopher R. Knittel. "Will We Ever Stop Using Fossil Fuels?" *Journal of Economic Perspectives* 30(1), 2016:

**Recommended Reading**


**TOPIC 6: Renewable resources & common property problems**

**Readings**

2. PLANET, pp. 79-101: “Fewer Fish, More Dough”

**Recommended Reading**

1. TEXT, pp. 184-189: Chapter 9’s subsection on “Market-based instruments for managing natural resources.”

**TOPIC 7: Economics of pollution control**

**Readings**

1. TEXT, pp. 138-161 and 166: Chapter 8, “Principles of Market-Based Environmental Policy,” except for subsection on “Setting Prices versus Setting Quantities”
2. TEXT, pp. 167-198: Chapter 9, “The Case for Market-Based Instruments in the Real World” (Note that pp. 184-189, “Market-based instruments for managing natural resources” covers renewable resources, from week 6.)

**Recommended Reading**

TOPIC 8: Prices vs. Quantities

Readings
1. TEXT, pp. 162-166: Chapter 8’s subsection on “Setting Prices versus Setting Quantities”
2. PLANET, pp. 102-125: Chapter 5, “Curious Company Kept”

Recommended Readings

TOPIC 9: Prices vs. Subsidies

Readings
1. PLANET, pp. 174-183: Chapter 8, “Bright Idea”

Recommended Readings

TOPIC 10: Global (warming) problem, global solution

Readings
3. Fabre, Adrien and Gernot Wagner, “Risky geoengineering option can make ambitious climate mitigation agreement more likely,” NYU Wagner Research paper (9 December 2019).

Recommended Readings

TOPIC 11: Limits to growth? Aka Mind versus Matter

Readings
1. TEXT, pp. 231-253: Chapter 11: “Sustainability and Economic Growth”
2. PLANET, pp. 125-150: Chapter 6, “Mind versus Matter”

Recommended Reading


Readings

Recommended Reading
TOPIC 13: How to make the planet notice Aka Economic thinking applied to environmental problems

Readings

Course website
All announcements, resources, and assignments will be delivered through the Brightspace course website site.

Diversity
I intend that students from diverse backgrounds and perspectives are well served by this course, that your learning needs are addressed, and that the diversity that you bring to class is viewed as a resource, strength, and benefit. I aim to present materials and activities that respect diversity. I encourage your suggestions around course materials and approaches that will better serve this goal. I am continuously learning about diverse perspectives and identities. If something communicated in class (by anyone) made you feel uncomfortable, please reach out to me (either in person or electronically) or provide anonymous feedback. Also reach out to me and let me know ways to improve the effectiveness of the course for you or for other students or student groups.

Academic Integrity
Plagiarism results in failure in the class and referral to your academic dean. It includes: copying sentences or fragments from any source without quotes and references; not citing a source used in your papers; citing internet information without proper citation; presenting someone else’s work as your own; or inadvertently copying verbatim from any source. More detail can be found at http://cas.nyu.edu/page/academicintegrity. NYU offers academic support and tutoring at the University Learning Center: http://www.nyu.edu/cas/ulc; (212) 998-8085.

Moses Center for Students with Disabilities at NYU
New York University is committed to providing equal educational opportunity and participation for students of all abilities. If you have a disability, or think you have a disability, please visit the Moses Center for Students with Disabilities (CSD) website and click on the Reasonable Accommodations and How to Register tab, or call or email CSD at (212) 998-4980 or mosecsd@nyu.edu for information. Students who are requesting academic accommodations
are strongly advised to reach out to the Moses Center as early as possible in the semester for assistance. If you have already been approved for accommodations through the Moses Center, please meet with me so we can develop an implementation plan together.

NYU’s Calendar Policy on Religious Holidays

NYU’s Calendar Policy on Religious Holidays states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. Please notify me in advance of religious holidays that might coincide with exams to schedule mutually acceptable alternatives.

Acknowledgments

This syllabus is primarily based on the structure and content of three sets of classes:

First, Rob Stavins’ introductory environmental economics class, now titled “economics of climate change and environmental policy,” a version of which he has taught at Harvard Kennedy School for over two decades. His class is extremely well-structured, logical, and comprehensive. It’s based around building the tools—the hammer.

Second, the late, great Marty Weitzman’s various advanced environmental economics classes. His classes jumped from topic to topic, building tools along the way—sometimes literally right then and there during lecture. Where Rob’s class introduced structure and predictability, Marty focused on teaching nimbleness, flexibility, and creativity in approaching various topics. His primary focus was always the question and problem itself—the tool came later. His focus: the nail.

Third, parts of this class have evolved from climate and energy economics and policy classes I have taught at various institutions, including Columbia, NYU Stern, and Harvard. Its first incarnation was largely based on Snorre Kverndokk and Knut Einar Rosendahl’s Energy Economics class taught at Johns Hopkins in Spring 2009 and has benefited greatly from Richard Zeckhauser’s Analytic Frameworks for Policy class at Harvard, as well as from his mentorship and guidance over the years. Prior iterations have also taken some cues from Bill Hogan’s Energy Policy Analysis class at Harvard, Paul Joskow’s former Energy Economics class at MIT, Erin Mansur’s former Energy Economics & the Environment class at Yale, and Jim Stock’s U.S. Energy Revolution and its Implications seminar at Harvard, and valuable feedback from, among others, Joe Aldy, Ken Gillingham, Matt Kahn, Katherine Rittenhouse, Steve Salant, Rob Stavins, Thomas Sterner, Marty Weitzman, Matthew Zaragoza-Watkins, participants in an OurEnergyPolicy.org discussion forum, and students at Columbia, Harvard, and NYU who have taken versions of this course in the past. Thank you to all.

Anything seems off? Please let me know.