PAI 777
The Economics of Environmental Policy
Spring 2020

David Popp
426 Eggers Hall
office ph: 443-2482
dcpopp@maxwell.syr.edu

Office Hours:
Monday 10:00-11:30
Tuesday 10:00-noon
or by appointment

Course Description: This course provides an introduction into the principles of environmental economics, with a focus on policy applications. The principal problem in any economics course is how to best allocate scarce resources. This holds true for environmental economics as well. However, environmental resources differ from other goods that economists study in that there is usually no market for them. Thus, government policies are needed to maintain and improve environmental quality.

We begin by examining how economic incentives lead to environmental problems, and discussing various policies that address these problems. Because economic analysis requires information on both costs and benefits, we next discuss methods for valuing the benefits of environmental amenities. The course continues with applications to various policy issues, including energy and water resources and the environment in developing countries. We conclude with a discussion of the political economy of environmental issues.

Goals of the course: The main objective of this course is for you to learn how to think critically about issues relating to environmental economics. Upon completion of this course, you should be able to explain the economic rationale for government involvement in environmental issues, and be able to discuss what the impact of such involvement will be. In particular, it is hoped that the class will provide you with a better understanding of current issues relating to the environment.

Accomplishing these goals requires not only a mastery of the theory of environmental economics, but also an ability to apply these theories to real world issues. As such, much of the content of the course will apply the basic tools of environmental economics to current event issues.

Learning to apply economics to the real world takes practice. The assignments for this class are designed to get you thinking and writing using economic analysis. In addition, classroom discussion plays an important role in developing the skills to apply economic theory to the real world. Active participation in discussions, both in class and via e-mail (discussed below) is vital to success in this course. Don't be afraid to participate because you feel what you have to say isn't important or may not be correct. Many of the things we will discuss in this class have no right answers. Your opinions matter! In addition to in-class discussion, I will occasionally use the list to post follow-up questions to topics discussed in class. Please use this as another opportunity to express your opinions.

Prerequisites: The prerequisite for this course is PAI 723, Economics for Public Decisions, or an equivalent course in microeconomics. If you have any questions about whether or not you have taken an appropriate course, please see me as soon as possible.

Class Home Page: The home page for this class is:

https://dcpopp.expressions.syr.edu/pai777/

You can also connect to the home page through my personal home page, which can be found at:

https://dcpopp.expressions.syr.edu

The web site includes information about assignments and links to other useful economic sites. These links may be particularly useful as you work on your research paper.

E-mail: All students in the class are required to have an e-mail account and to check e-mail regularly. An e-mail discussion list will be set up for the class, to which you should subscribe. Information on how to subscribe is included below. Participation in a class e-mail discussion list makes up part of your class participation grade. In addition, I will occasionally make announcements about assignments and class material via the discussion list. Not subscribing is not an appropriate excuse for missing these announcements.

E-mail discussion group: I have set up an e-mail discussion group for the class. All students are expected to subscribe to the mailing list. You may use this list for any class related activities, such as asking questions, continuing discussions from class, and instigating new discussions. I will use the list to keep you informed about assignments, answer questions, and instigate discussion. When messages are sent to the list, all students subscribed to the list will get the message.

I have already subscribed students who pre-registered for the course. If you have not yet been subscribed, please send an e-mail to listserv@listserv.syr.edu with the following message:

SUB EnviEcon Jan Smith

Note that this is all that need be in the body of the message, and that it must be typed in exactly as written, except, of course, that you should replace your name for Jan Smith. When you sign up, you will receive a message with detailed instructions for participating in the mailing list. ***This message will ask that you reply, so as to confirm that you intended to join the list. It is important that you remember to reply, or else you will not be added to the list!***

A couple of technical notes: E-mails sent to the list are sent to EVERYONE who subscribes to the list. If you want to send a personal e-mail to a specific class member (or to me), use their e-mail address, not the list's address. The list is a good place to ask questions about class materials, because everyone can see the answer. It is not the way to let me know that you are going to miss class on Monday. For that you should send an e-mail to me personally. Also, I am considered the owner of this list. If you experience any problems, please e-mail me directly. My e-mail address is dcpopp@maxwell.syr.edu.

Reading: Two books are required for this class. They are:

1) *Environmental Economics: An Introduction*, 7th edition, by Barry C. Field & Martha K. Field
2) *Economics of the Environment: Selected Readings*, seventh edition, edited by Robert N. Stavins.

Both texts are available at the Orange Bookstore. Older editions of either text are fine. The Stavins book is a compilation of readings from various sources. Thus, older editions may not have all of the articles that the new edition includes. However, if you choose to buy a used older edition, you should be able to find these articles elsewhere. In addition to these readings, there are several additional articles intended to supplement the text. The class web site includes links to these articles. When possible, direct links to the articles are provided. The remainder are available through the course reserve system at the Syracuse University library – a link to Blackboard, where these items can be found, is included for these articles.

The readings in Stavins and the supplemental readings have two purposes: to expose you to influential work in environmental economics and to highlight the relevance of environmental economics to current events. The first goal is accomplished through journal articles written by professional economists. Many of these are contained in Stavins. At times, these articles may get quite technical. When that occurs, you are encouraged to focus on the main arguments and conclusions of the paper, and to simply browse through the technical parts. The second goal is met be several shorter articles taken from current events publications. Articles in the *Review of Environmental Economics and Policy* and *Journal of Economic Perspectives* are particularly useful, as they fall under both categories. These articles usually provide summaries of work done by professional economists on current events issues. You may also find it helpful to consult other articles in this journal for paper ideas. In addition, I would be happy to help any student find the appropriate readings to fit their interests.

In addition to required readings, the syllabus also includes optional articles. These are marked with an asterisk (*). They are not included on the on-line reading list, but should be available at the library, usually in electronic form. Optional articles provide more detail on selected topics, and may be helpful for your research papers. In particular, Ph.D. students should find the optional articles a useful way to increase their exposure to the economic literature in the field.

Grading: *Masters' Students*: Your grade in this course will be based on four take-home quizzes (16.5% each), and a research paper (34%). The first three take home quizzes will be handed out in class. Both the dates they are handed out and due are stated on the syllabus. These quizzes will focus on applications of the material discussed in class, and will be in the form of short problems or essay questions. The final take-home quiz will be available for you to sign out at your convenience during the final exam period.

Ph.D. Students: Ph.D. students may choose to complete the assignments for masters' students listed above, or to instead complete the following assignments designed to get you thinking about the research process. Ph.D. students should come talk to me as soon as possible to discuss which option is appropriate for them. Students choosing the Ph.D. option will not take the exams. Instead, these Ph.D. students will complete a referee report of a working paper in the field. This will be due by the end of the final exam period, on ***Wednesday, May 6***. In addition, the requirement for the research paper will be different, and will be divided into two parts:

- First, PhD students will complete a critical literature review (approximately 10 pages) on a topic of their interest related to the course. Students should meet with me to discuss both possible topics and to generate a list of relevant papers. The goal of the literature review is to get you thinking about potential research topics. This literature review is due on ***Wednesday, March 11***.
- Second, the final paper for Ph.D. students will be a research proposal. That is, in addition to identifying an interesting question, you should think about *how* you would go about answering the question. Note that, given the time constraints of a one-semester course, it is not necessary that you carry out the research. This will be due at our last class meeting on ***Monday, April 27***.

The grading for Ph.D. students choosing this option will be: the referee report (25%), the literature review (25%) and the research proposal (50%)

Finally, note that if you miss a class, it is your responsibility to find out if you missed any assignments or handouts. Not being present when an assignment was given out is **not** an acceptable excuse for missed or late work!

Research Paper: The major assignment for this class is a semester-long research paper on a topic of your choosing. The research paper will be due on the last day of class. It should be between 10 and 15 pages, double-spaced. I will hand out more details on the paper, including suggestions for topics, further into the course. The paper should apply the materials of the course to a public policy question. It should include a summary of the relevant theory that applies to your topic, and apply the theory to the problem to reach a conclusion. To make sure that you are on the right track, a one-page statement of your proposed research topic is due ***Wednesday, March 11***. In it, you should state the question that you wish to address, briefly describe why it is important, and propose the means by which you will analyze your proposed topic. The final paper will be due at our last class meeting on ***Monday, April 27.***

Academic Honesty: Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice. For more information about the policy, see http://class.syr.edu/academic-integrity/policy/. The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in course failure regardless of violation level.

Of particular importance in this class, while you are free to cite the views of others in your work, the final product must be *in your own words*, and any references to the works of others, whether directly quoted or merely paraphrased, must be cited.

Religious holidays*:* SU's religious observances policy, found at http://supolicies.syr.edu/emp_ben/religious_observance.htm, recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes. For fall and spring semesters, an online notification process is available through MySlice/Student Services/Enrollment/My Religious Observances from the first day of class until the end of the second week of class.

If you believe that you need accommodations for a disability, please contact the Office of Disability Services(ODS), *http://disabilityservices.syr.edu*, located in Room 309 of 804 University Avenue, or call (315) 443-4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Course Outline

I. Introduction

January 13 – What is Environmental Economics?

Reading: Field, Chapters 1 & 2
"The ethics gap," The Economist, December 2, 2000, p. 78.
Fullerton, Don and Robert N. Stavins, (1998) "How Economists See the Environment," *Nature*, 395, 433-434, reprinted in Readings.
Vascellaro, Jessica E., "Green Groups See Potent Tool in Economics," The Wall Street Journal, August 23, 2005.

II. Tools of Economic Analysis

January 15 – Market Failures

Reading: Field, Chapter 3 (review: optional)
Field, Chapter 4
Hardin, Garrett (1968), "The Tragedy of The Commons," *Science*, 162(3859), 1243-1248.
Ostrom, Elinor (2009), "A General Framework for Analyzing Sustainability of Social-Ecological Systems," *Science*, 325(5939), 419-422, reprinted in *Readings*.
Turkewitz, Julie, "This Land Is Your Land, and Yours, and Yours ....," *The New York Times*, September 29, 2017, A10.
"All the fish in the sea," *The Economist*, May 27, 2017, 22-24.
"A rising tide," *The Economist*, September 20, 2008, 97-98.
"Common sense," *The Economist*, September 14, 2019, 72.
*Frischman, Brett M., Alain Marciano, and Giovanni Battista Ramello (2019), "Tragedy of the Commons after 50 Years," *Journal of Economic Perspectives*, 33(4), 211-228.
*Stavins, Robert N. (2011), "The Problem of the Commons: Still Unsettled After 100 Years," *American Economic Review*, 101(1), 81-108, reprinted in *Readings*.

January 22 – Modeling Pollution

Reading: Field, Chapter 5
Eder, Steve, "One Apple Orchard. 5,000 Government Rules," *The New York Times*, December 28, 2017, A1.
Muller, Nicholas Z. and Robert Mendelsohn (2010), "Weighing the Value of a Ton of Pollution," *Regulation*, 33(2), 20-24.
Wald, Matthew L., "Fossil Fuels' Hidden Cost Is in Billions, Study Says," *The New York Times*, October 20, 2009, p. A16.

III. Government Intervention in Environmental Policy

January 27 – Should the Government Intervene?

Reading: Field, Chapters 9 & 10
Coase, Ronald (1960), "The Problem of Social Cost," *The Journal of Law and Economics*, 3, 1-44, reprinted in *Readings*.
Fowlie, Meredith (2019), "Only Who Should Prevent Forest Fires?" Energy Institute at Hass blog, November 13, 2018, https://energyathaas.wordpress.com/2019/02/04/only-who-should-prevent-forest-fires/.
Fuller, Thomas and Ivan Penn, "No Fires Yet, But California Is Paying Now," *The New York Times*, July 22, 2019, A1, A13.
*Banzhaf, H. Spencer, Timothy Fitzgerald, and Kurt Schneir (2013), "Nonregulatory Approaches to the Environment: Coasean and Pigouvian Perspectives," *Review of Environmental Economics and Policy*, 7(2), 238-258.

January 29 – Command and Control Policies for the Environment

Reading: Field, Chapter 11

Aldy, Joseph E. and William A. Pizer (2016), "Alternative Metrics for Comparing Domestic Climate Change Mitigation Efforts and the Emerging International Climate Policy Architecture," *Review of Environmental Economics and Policy*, 10(1), 3-24.

Stavins, Robert N. (2006), "Vintage-Differentiated Environmental Regulation," *Stanford Environmental Law Journal*, 25(1), 29-63.

Lipton, Eric, "E.P.A. Offers Lifeline to the dirtiest Coal Plants," *The New York Times*, August 25, 2018, A1.

"Awry in the sky," *The Economist*, December 16, 2017, 39-40.

*Auffhammer, Maximillian and Ryan Kellogg (2011), "Clearing the Air? The Effects of Gasoline Content Regulation on Air Quality," *American Economic Review*, 101(6), 2687-2722.

*Hubbell, Bryan J., Richard V. Crume, Dale M. Evarts, and Jeff M. Cohen (2010), "Policy Monitor: Regulation and Progress under the 1990 Clean Air Act Amendments," *Review of Environmental Economics and Policy*, 4(1), 122-138.

February 3 & 5 – Emissions Fees and Subsidies

Reading: Field, Chapter 12

Klenert, David, Linus Mattauch, Emmanuel Combet, Ottmar Edenhofer, Cameron Hepburn, Ryan Rafaty, and Nicholas Stern (2018), "Making carbon prices work for citizens," *Nature Climate Change*, 8, 669-677.

Marron, Donald, Eric Toder, and Lydia Austin (2015), "Taxing Carbon: What, Why, and How," Tax Policy Center.

Metcalf, Gilbert E. (2019), "The distributional impacts of U.S. Energy Policy," *Energy Policy*, 129, 926-929.

Davenport, Coral, "After Nobel, Economist Talks Climate Tax," *The New York Times*, October 14, 2018, A24.

Leonhardt, David, "The Problem With Putting a Price on the End of the World," *The New York Times Magazine*, April 9, 2019,

Plummer, Brad, "Outcomes Hazy for Countries that Tax Carbon Emissions," *The New York Times*, April 5, 2019, B1, B4.

Porter, Eduardo, "British Columbia's Carbon Tax Yields Real-World Lessons," *The New York Times*, March 2, 2016, B1, B9.

*Murray, Brian and Nicholas Rivers (2015), "British Columbia's revenue-neutral carbon tax: A review of the latest 'grand experiment' in environmental policy," *Energy Policy*, 86, 674-683.

*Parry, Ian W.H., Margaret Walls and Winston Harrington, (2007), "Automobile Externalities and Policies," *Journal of Economic Literature*, 45(2), 373-399.

*Pizer, William A. and Steven Sexton (2019), "Distributional Impacts of Energy Taxes," *Review of Environmental Economics and Policy*, 13(1), 104-123.

February 10 – Tradable Permits: theory

Reading: Field, Chapter 13

February 12 – Permit Trading Policy in Practice

Reading: Schmalensee, Richard and Robert Stavins (2017), "Lessons Learned from Three Decades of Experience with Cap-and-Trade," *Review of Environmental Economics and Policy*, 11(1), 59-79.

Perino, Grischa (2018), "New EU ETS Phase 4 rules temporarily puncture waterbed," Nature Climate Change, 8, 260-271.

Bradsher, Keith and Lisa Friedman, "China Plans Huge Market for Trading Pollution Credits," *The New York Times*, December 20, 2017, B1, B2.

Gillis, Justin, "In Price Tag on Carbon, Plans to Save the Planet," *The New York Times*, May 30, 2014, A1, A20-A21.

Plumer, Brad, "California's Ambitious Agenda to Cut Greenhouse Gas Emissions," *The New York Times*, July 27, 2017, A13.

Chen, Gabriel, Robert Stavins, Robert Stowe, and Richard Sweeney (2012), "The SO_2 Allowance Trading System and the Clean Air Act Amendments of 1990: Reflections on Twenty Years of Policy Innovation, Harvard Kennedy School Working Paper*.

*Ellerman, Denny, Claudio Marcantonini and Aleksandar Zaklan (2016), "The EU ETS: Eight Years and Counting," *Review of Environmental Economics and Policy*, 10(1), 89-107.

*Goulder, Lawrence H., Richard D. Morgenstern, Clayton Munnings, and Jeremy Schreifels (2017), "China's national carbon dioxide emission trading system," *Economics of Energy & Environmental Policy*, 6(2), 1-18.

Take-home quiz 1 handed out in class on Wednesday, February 12. Due in Class Wednesday, February 19.

February 17 – Policy Instrument Choice: Theory and Air Pollution

Reading: Goulder, Lawrence H. and Ian W.H. Parry (2008), "Instrument Choice in Environmental Policy," *Review of Environmental Economics and Policy*, 2(2), 152-174.

Pindyck, Robert S. (2007), "Uncertainty in Environmental Economics," Review of Environmental Economics and Policy, 1(1), 45-65.

"Tax or Trade," The Economist, February 16, 2002, p. 72.

*Fowlie, Meredith, Christopher R. Knittel, and Catherine Wolfram (2012), "Sacred Cars? Cost-effective Regulation of Stationary and Nonstationary Pollution Sources," *American Economic Journal: Economic Policy* 4(1), 98-126

*McKibbin, Warwick J. and Peter J. Wilcoxen, "The Role of Economics in Climate Change Policy," *Journal of Economic Perspectives*, vol. 16, Spring 2002, pp. 107-129, reprinted in *Readings*.

*Stavins, Robert (2019), "The Future of U.S. Carbon-Pricing Policy," *NBER Working Paper #25912*.

February 19 – Policy Instrument Choice: Water

Reading: Field, Chapter 14

Fisher-Vanden, Karen and Sheila Olmstead (2013), "Moving Pollution Trading from Air to Water: Potential, Problems, and Prognosis," *Journal of Economic Perspectives*, 27(1), 147-172, reprinted in *Readings*.

Kerr, Suzi, Suzie Greenhalgh, and Geoff Simmons 2015. "The Taupo Nitrogen Market: The World's Only Diffuse Source Trading Programme," *Moto Note #20*.

Barringer, Felicity, "A Plan to Curb Farm-to-Watershed Pollution of Chesapeake Bay," *The New York Times*, April 13, 2007, p. A10.

*Keiser, David A., Catherine L. Kling, and Joseph S. Shapiro (2019), "The low but uncertain measured benefits of US water quality policy," *PNAS* 116(12) 5262-5269.

*Keiser, David and Joseph S. Shapiro (2019), "US Water Pollution Regulation over the Past Half Century: Burning Waters to Crystal Springs?" *Journal of Economic Perspectives*, 33(4), 51-75.

February 24 – Federalism and Environmental Policy

Reading: "Federalism and Environmental Protection: Case Studies for Drinking Water and Ground-Level Ozone," Congressional Budget Office, November 1997. **You only need to read chapter 1, which covers the relevant theory**.

Adler, Jonathan H. (2004), "The Fable of Federal Environmental Regulation: Reconsidering the Federal Role in Environmental Protection," *Case Western Reserve Law Review*, 55: 93-113.

Shobe, William M. and Dallas Burtraw (2012), "Rethinking Environmental Federalism in a Warming World," *Climate Change Economics*, 3(4).

"The great divide," *The Economist*, June 29, 2019, 21-22.

Del Real, Jose A. "Lush Groves Everywhere, and Water Unsafe to Drink," *The New York Times*, May 22, 2019, A12.

Plumer, Brad and Nadja Popovich, "Poor Americans Exposed to Unsafe Water, study Shows," *The New York Times*, February 13, 2018, A10.

Sallee, James. "Waving Goodbye to the California Waiver?" Energy Institute Blog, UC Berkeley, September 23, 2019, https://energyathaas.wordpress.com/2019/09/23/waving-goodbye-to-the-california-waiver/.

February 26 – Behavioral Economics and Policy: Energy Efficiency

Reading: Gillingham, Kenneth and Karen Palmer (2014), "Bridging the Energy Efficiency Gap: Policy Insights from Economic Theory and Empirical Evidence," Review of Environmental Economics and Policy, 8(1), 18-38.

Journal of Policy Analysis and Management Point/Counterpoint on Internalities:

Allcott, Hunt and Cass R. Sunstein (2015), "Regulating Internalities," Journal of Policy Analysis and Management 34(3):698-705.

Mannix, Brian F. and Susan E. Dudley (2015), "The Limits of Irrationality as a Rationale for Regulation," Journal of Policy Analysis and Management 34(3):705-712.

Allcott, Hunt and Cass R. Sunstein (2015), "Counterpoint to Six Potential Arguments to 'Regulating Internalities'," Journal of Policy Analysis and Management 34(3):712-715.

Mannix, Brian F. and Susan E. Dudley (2015), "Please Don't Regulate My Internalities," Journal of Policy Analysis and Management 34(3):715-718.

"Nudges for nudgers," Nature Energy 3, 701.

Jack, Kelsey, "Do Monthly Bills Undermine the Impact of Carbon Pricing?" Our 2 Cents Blog, July 10, 2019, http://emlab.msi.ucsb.edu/news/blog/do-monthly-bills-undermine-impact-carbon-pricing.

Wolfram, Catherine. "Closing the Energy Efficiency Gap for Low-Income Households", Energy Institute Blog, UC Berkeley, October 21, 2019, https://energyathaas.wordpress.com/2019/10/21/closing-the-energy-efficiency-gap-for-low-income-households/.

*Davis, Lucas W., Alan Fuchs, and Paul Gertler (2014), "Cash for Coolers: Evaluating a Large-Scale Appliance Replacement Program in Mexico," American Economic Review: Economic Policy 6(4): 207-238.

IV. Valuing Environmental Benefits & Costs

March 2 – Revealed Preference Approaches

Reading: Field, Chapter 7, pp. 130-144.

"Analyzing Benefits," Chapter 7 in *Guidelines for Preparing Economic Analyses*, Environmental Protection Agency, December 2010, sec. 7.1-7.3.1.

Cameron, Trudy Ann (2010), "Euthanizing the Value of a Statistical Life," *Review of Environmental Economics and Policy*, 4(2), 161-178, reprinted in *Readings*.

Appelbaum, Binyamin, "A Life's Value? It May Depend on the Agency," *The New York Times*, February 17, 2011, A1, A3.

*Mendelsohn, Robert and Sheila Olmstead, "The Economic Valuation of Environmental Disamenities: Methods and Applications," *Annual Review of Environment and Resources*, 2009, pp. 325-347.

*Robinson, Lisa A. (2007), "How US Government Agencies Value Mortality Risk Reductions," *Review of Environmental Economics and Policy*, 1(2), 283-299.

March 4 – Stated Preference Techniques

Reading: Field, Chapter 7, pp. 144-152.

"Analyzing Benefits," Chapter 7 in *Guidelines for Preparing Economic Analyses*, Environmental Protection Agency, December 2010, sec. 7.3.2.

Bishop, Richard C. *et al*. (2017) "Putting a Value on injuries to natural assets: The BP oil spill," *Science* 356, 253-254.

Kling, Catherine L., Daniel J. Phaneuf, and Jinhua Zhao (2012), "From Exxon to BP: Has Some Number Become Better than No Number?" *Journal of Economic Perspectives*, 26(4), 3-26, reprinted in *Readings*.

*Johnston, Robert J, Kevin J. Boyle, Wiktor (Vic) Adamowicz, Jeff Bennett, Roy Brouwer, Trudy Ann Cameron, W. Michael Hanemann, Nick Hanley, Mandy Ryan, Riccardo Scarpa, Roger Tourangeau, and Christian A. Vossler. 2017. "Contemporary Guidance for Stated Preference Studies," *Journal of the Association of Environmental and Resource Economists*, 4(2): 319-405.

*Whittington, Dale (2010), "What Have We Learned from 20 Years of Stated Preference Research in Less-Developed Countries?" *Annual Review of Resource Economics*, 2, 209-236.

Take-home quiz 2 handed out in class on Wednesday, March 4. Due in Class Monday, March 9.

March 9 – Estimating Benefits

Reading: Ferraro, Paul J., Kathleen Lawlor, Katrina L. Mullan, and Subhrendu K. Patanayak, "Forest Figures: Ecosystem Services Valuation in Developing Countries," *Review of Environmental Economics and Policy*, Winter 2012, 6(1), pp. 20-44.

Keiser, David, Catherine Kling, and Daniel J. Phaneuf (2019), "The Social Cost of Water Pollution," *Resources*, issue 201, https://www.resourcesmag.org/archives/social-cost-water-pollution/.

Wichman, Casey J. (2017), "The Strategic Costs of Carbon Emissions: Global versus Domestic Policy Considerations," *Resources*, issue 195, https://www.resourcesmag.org/archives/the-strategic-costs-of-carbon-emissions-global-versus-domestic-policy-considerations/

Frakt, Austin "Pollution Takes Long-Term Economic Toll," *The New York Times*, November 28, 2018, A15.

Plummer, Brad, "Will Cleaner Cars Lead to More Traffic Deaths? Experts Have Doubts," *The New York Times*, August 3, 2018, A15.

"Are you being served?," *The Economist*, April 23, 2005, pp. 76-78.

"Calculating," *The Economist*, November 18, 2017, 25.

"Money can grow on trees," *The Economist*, September 25, 2010, S6-S7.

"The weather report," *The Economist*, January 18, 2014, 76.

*"Baseline," Chapter 5 in *Guidelines for Preparing Economic Analyses*, Environmental Protection Agency, December 2010.

*Dell, Melissa, Benjamin F. Jones and Benjamin A. Olkin (2012), "Temperature Shocks and Economic Growth: Evidence from the Last Half Century," *American Economic Journal: Macroeconomics*, 4(3), 66-95.

Statement of paper topics due in class Wednesday, March 11

March 11 – The Costs of Environmental Policies

Reading: Field, Chapter 8

Harrington, Winston, Richard D. Morgenstern, and Peter Nelson (2000), "On the Accuracy of Regulatory Cost Estimates," *Journal of Policy Analysis and Management*, 19(2), 297-322.

Smith, V. Kerry (2015), "Should Benefit-Cost Methods Take Account of High Unemployment? Symposium Introduction," *Review of Environmental Economics and Policy*, 9(2), 165-178.

Wald, Matthew L, "Solar Power Industry Falls Short of Hopes in Job Creation," *The New York Times*, October 26, 2011, F3.

*"Analyzing Costs," Chapter 8 in *Guidelines for Preparing Economic Analyses*, Environmental Protection Agency, December 2010.

*Walker, W. Reed (2013), "The transitional costs of sectoral reallocation: Evidence from the Clean Air Act and the Workforce," *Quarterly Journal of Economics*, 128(4), 1787-1835.

March 23 & 25 – Making Use of Value Measures – Benefit-Cost Analysis

Reading: Field, Chapter 6

"Analyzing Benefits," Chapter 7 in *Guidelines for Preparing Economic Analyses*, Environmental Protection Agency, December 2010, sec. 7.4-7.5.

Arrow, Kenneth *et al.* (1996), "Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?" *Science*, vol. 272, 221-222, reprinted in *Readings*.

Goulder, Lawrence H. and Robert N. Stavins (2002), "An eye on the future," *Nature*, 419, 673-674, reprinted in *Readings*.

Fowlie, Meredith (2018), "Air Pollution Co-Benefits Matter" Energy Institute at Hass blog, November 13, 2018, https://energyathaas.wordpress.com/2018/11/13/air-quality-matters/.

Krutillia, Kerry and John D. Graham. 2012. "Are Green Vehicles Worth the Extra Cost? The Case of Diesel-Electric hybrid Technology for Urban Delivery Vehicles," *Journal of Policy Analysis and Management*, 31(3): 501-532.

Oreskes, Naomi and Nicholas Stern, "Climate Change's Unknown Costs," *The New York Times*, October 26, 2019, A27.

Varian, Hal R., "Recalculating the Costs of Global Climate Change," *The New York Times*, December 14, 2006, p. C3.

Wilson, Richard and Crouch, E.A.C., "Risk Assessment and Comparisons: An Introduction," Science, vol. 236, pp. 267-270.

"Future lives matter," *The Economist*, December 8, 2018, 75.

"The uncertainty of genius," *The Economist*, September 7, 2019, 68.

"The rule of more," *The Economist*, February 18, 2012, 77.

*Drupp, Moritz A., Mark C. Freeman, Ben Groom, and Frikk Nesie (2018), "Discounting Disentangled," *American Economic Journal: Economic Policy*, 10(4), 109-134.

V. Energy and Water Resources

March 30 – Energy Pricing

Reading:

Perloff, Jeffrey M., "Exhaustible Resources," *Microeconomics: Fourth Edition*, pp. 562-568.

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Take home quiz 3 handed out in class on Wednesday, April 1. Due in Class Wednesday, April 8.

April 1 & 6– Alternative Energy Technologies

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VI. The Environment in Developing Countries

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VII. International Environmental Policies

April 20 – Policies to Promote Environmental Protection in Developing Countries

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April 22 – International Trade Agreements

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VIII. Political Economy

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RESEARCH PAPERS DUE IN CLASS MONDAY, APRIL 27

Final take-home quiz available from Thursday, April 30 to Wednesday, May 6