

Seminar in Recent Developments in Environmental Economics HS 2026

Armin Schmutzler

Department of Economics
Blümlisalpstrasse 10, 8006 Zürich
<https://www.econ.uzh.ch/en/people/faculty/schmutzler.html>

This Version: August, 2026, minor updates likely!

1 Overview

This course addresses research at the frontier of environmental economics. We draw on theoretical and empirical contributions, with a focus on policy conclusions. The goal of the course is to equip students to design and critique environmental policy using economic theory and the latest empirical evidence.

The overarching question of the seminar is: What can and should be done to reduce fossil fuel consumption of households, firms and other institutions? To address this question, we will deal with three related issues, each corresponding to one of the three blocks of the seminar.

The first block will focus on policies that are designed to affect household behavior. For instance, governments in many different countries use subsidies and tax exemptions to induce households to buy electric vehicles or to purchase solar vehicles. Many studies have attempted to identify the effects of such policies, using a variety of theoretical and empirical approaches. We will discuss several of these studies in the seminar.

The second block deals with complementary strategies to affect consumer behavior. A large experimental literature has asked how consumers can be nudged towards environmentally friendly behavior, for instance, by providing relevant information. Such strategies may be particularly relevant as more coercive environmental policies are facing increasing resistance. The goal of this block is to understand how such nudges can be successfully designed and how large their potential is.

The third block deals with the role of artificial intelligence. AI is associated with high energy costs, but may also have substantial potential as a tool to reduce greenhouse gas

emissions. Both effects are undisputed in principle, but their relative sizes are unclear. We discuss recent papers trying to measure cost and benefits.

The introductory lecture in the first week will give a more detailed overview of the topics we will treat. The remainder of the course will mainly consist of three half-day blocks, one on each topic. We will have several student presentations followed by a policy discussion on the topic. Students within each of these topics will coordinate a joint presentation on the legal and policy background, as well as a critique and policy suggestions based on the literature. There will then be a wider discussion, to which all students will actively contribute.

2 Target Group

The course is open to all master students in economics and related fields. Students who attended an environmental economics class at the bachelor or master level will be particularly well-prepared. Nevertheless, the course will also be accessible to students who have not had such a class but have a sound knowledge of microeconomic models and standard empirical methods, for instance, those treated in the obligatory master courses at UZH.

3 Schedule

Date	Time	Room	Topic
Thu, Sept 17, 2026	14:00-16:00		Introduction
Fri, Oct 30, 2026	12:00-18:00		Adoption of EVs and PV
Sat, Oct 31, 2026	08:00-14:00		Green Nudges
Fri, Nov 6, 2026	12:00-18:00		Artificial Intelligence and the Environment

4 Administrative Issues

4.1 Application

The number of participants is limited. Please see the course catalogue (03SE22MO0234) for details on how to apply via the new module booking tool.

4.2 Assignment of Topics

The assignment of the topics will be communicated in the introductory lecture on September 17, 2026. If any of the papers in Sections 5.2.1-5.2.3 (student presentations) look appealing to you, please state this in the application form (up to three suggestions). There is no guarantee that any of these choices will be assigned.

4.3 Paper Presentations

The papers for student presentations are divided into three topics; a preliminary literature list for each topic is given in Sections 5.2.1-5.2.3, respectively. Each student presentation should be approximately 40 minutes long, followed by time for discussion. The presentation should contain the following parts:

- Introduction with a motivation, a brief preview of main insights and a discussion of the relation to previous literature
- A short description of relevant institutional details and the data used in the analysis
- Explanation of the empirical approach
- Statement of the main results
- Explanation of whether and why the main result makes sense (main intuition)
- Brief summary and evaluation of the paper

It is helpful to have a final slide with suggestions for discussion. For instance, you might ask: Which assumptions are critical? What are the limitations of the arguments? Is the empirical analysis convincing?

4.4 Submission of Slides

The slides for the paper presentation have to be submitted **one week before the presentation** by E-Mail to daphne.rutnam@econ.uzh.ch. The slides will be uploaded on OLAT.

4.5 Policy Discussion

After the paper presentations, we will have a policy discussion on the topic. The focus of the discussion will be on policies that have recently been implemented or advocated. We will critique the policies and discuss alternatives, based on the theoretical and empirical literature. Note that critique does not have to be negative - you may want to point out the consistency of the implemented policy with the conclusions of a paper. The policy discussion will begin with a joint presentation by the students who presented a paper in that topic. We will then move to a wider discussion.

4.5.1 Joint Presentation

As a group, you will prepare a joint presentation on the policy discussion surrounding the topic of your paper. The presentation should be 30 minutes in total. In the first half of the joint presentation, you should present a summary of the legal and policy background. Section 5.3 contains useful sources as a starting point, but it is a critical task for you to find further material. The background summary should be accessible to your classmates

who may not be familiar with these policies. We suggest spending 15 minutes on the background. The second half of the joint presentation should focus on critiquing policy and providing policy suggestions, based on the presentation papers. You may also want to draw on economic theory. There is no need to present lengthy summaries of each of the presentation papers - the focus should be on how the papers contribute to the policy discussion.

Each group should meet to discuss the joint presentation together with the teaching assistant. The preliminary date for these meetings is the afternoon of Friday October 9, 2026. Please get in touch with daphne.rutnam@econ.uzh.ch if you already know that you cannot attend on this date.

4.5.2 Written Summary

You will have to hand in a short summary (around 3 pages with reasonable formatting) of the policy discussion. This should be written **individually**. You should outline the legal and policy background of the topic, using the material given. You should focus on critiquing policy using your knowledge of economic theory, and the student presentation papers for that topic. You should also make policy suggestions based on the theoretical and empirical literature. You may also point to future avenues for policy-relevant research in this topic.

The written summary has to be submitted **one day before the presentation** by E-Mail to daphne.rutnam@econ.uzh.ch.

4.6 ECTS and Grading

The course is worth 3 ECTS points. Presence in all sessions is required. The grade will be based on the paper presentation (60%), the policy discussion (this includes the submitted written summary and the joint presentation) (20%), and contributions to the discussions throughout the course (20%).

5 Literature

This section contains some general reference, a preliminary list of papers for the student presentations, and the policy material on which the policy discussions will be based.

5.1 General Material

5.1.1 Introductory Lectures

5.2 Student Presentations

5.2.1 Adoption of Electric Vehicles and PV Installation

- Bradt, J. T., & Pinter, F. (2025). Complementarities and optimal targeting of technology subsidies. Working paper.
- Hughes, J. E., & Podolefsky, M. (2015). Getting green with solar subsidies: Evidence from the California Solar Initiative. *Journal of the Association of Environmental and Resource Economists*, 2(2).
- Cerruti, D., Filippini, M., & Savelsberg, J. (2024). Adoption of battery electric vehicles: The role of government incentives and solar PV (Economics Working Paper Series 23/388). ETH Zürich.
- Clinton, B. C., & Steinberg, D. C. (2019). Providing the spark: Impact of financial incentives on battery electric vehicle adoption. *Journal of Environmental Economics and Management*, 98, Article 102255.
- von Ditzfurth, J., & Rausch, S. (2026). How cost-effective were subsidies for solar energy in Germany?
- Gillingham, K. T., Ovaere, M., & Weber, S. M. (2025). Carbon policy and the emissions implications of electric vehicles. *Journal of the Association of Environmental and Resource Economists*, 12(2).
- Lyu, X. (2023). Are electric cars and solar panels complements? *Journal of the Association of Environmental and Resource Economists*, 10(4).
- Muehlegger, E., & Rapson, D. S. (2022). Subsidizing low- and middle-income adoption of electric vehicles: Quasi-experimental evidence from California. *Journal of Public Economics*, 216, Article 104604.
- Haan, P., Santonja, A., & Zaklan, A. (2025). Effectiveness and heterogeneous effects of purchase grants for electric vehicles. *Environmental & Resource Economics*, 88(1), 185–223.

5.2.2 Green Nudges

- Allcott, H. (2011). Social norms and energy conservation. *Journal of Public Economics*, 95(9–10), 1082–1095.
- Allcott, H., & Rogers, T. (2014). The short-run and long-run effects of behavioral interventions: Experimental evidence from energy conservation. *American Economic Review*, 104(10), 3003–3037.

- Andor, M. A., Gerster, A., Peters, J., & Schmidt, C. M. (2020). Social norms and energy conservation beyond the US. *Journal of Environmental Economics and Management*, 103, Article 102351.
- Bonan, J., Cattaneo, C., d’Adda, G., Galliera, A., & Tavoni, M. (2024). Widening the scope: The direct and spillover effects of nudging water efficiency in the presence of other behavioral interventions. *Journal of Environmental Economics and Management*, 127, Article 103037.
- Brandon, A., Ferraro, P. J., List, J. A., Metcalfe, R. D., Price, M. K., & Rundhammer, F. (2026). Do the effects of nudges persist? Theory and evidence from 38 natural field experiments. *Review of Economic Studies*, forthcoming.
- Costa, D. L., & Kahn, M. E. (2013). Energy conservation “nudges” and environmentalist ideology: Evidence from a randomized residential electricity field experiment. *Journal of the European Economic Association*, 11(3), 680–702.
- Goetz, A., Mayr, H., & Schubert, R. (2024). One thing leads to another: Evidence on the scope and persistence of behavioral spillovers. *Journal of Public Economics*, 236, Article 105166.

5.2.3 Artificial Intelligence

- Abitbol, M., Aghion, P., Antonin, C., Barrage, L., & Lengereau, B. (2026). Green AI in industry: Quasi-experimental evidence from the water treatment sector (CEPR Discussion Paper No. DP21576). Centre for Economic Policy Research.
- Bonfiglioli, A., Crinò, R., Filomena, M., & Gancia, G. (2025). Data, power and emissions: The environmental cost of AI (CEPR Discussion Paper No. DP20686). Centre for Economic Policy Research.
- de Vries, A. (2023). The growing energy footprint of artificial intelligence. *Joule*, 7(10), 2191–2194.
- Kaack, L. H., Donti, P. L., Strubell, E., Kamiya, G., Creutzig, F., & Rolnick, D. (2022). Aligning artificial intelligence with climate change mitigation. *Nature Climate Change*, 12(6), 518–527.
- Knittel, C. R., Senga, J. R. L., & Wang, S. (2025). Flexible data centers and the grid: Lower costs, higher emissions? (NBER Working Paper No. 34065). National Bureau of Economic Research.
- Luo, K., Wang, F., & Chen, X. (2025). Impact of artificial intelligence on energy efficiency in Chinese enterprises. *International Review of Economics and Finance*, 103, Article 104541.
- Metcalfe, R. D., Schein, A., Simpson, C. R., & Sun, Y. (2026). AI in charge: Large-scale experimental evidence on electric vehicle charging demand (NBER Working Paper No. 34709). National Bureau of Economic Research.
- Muller, N. Z. (2026). Measuring the impact of data centers in the United States economy: Monetary damage from air pollution and greenhouse gas emissions (NBER Working Paper No. 35100). National Bureau of Economic Research.

5.3 Policy Material

5.3.1 EV and PV Adoption:

- <https://transport.ec.europa.eu/transport-themes/clean-transport/clean-and-energy-efficient-vehicles/green-propulsion-transport>
- <https://energy.ec.europa.eu/topics/renewable-energy/solar-energy/european-solar-charter>

5.3.2 Green Nudges:

- <https://eur-lex.europa.eu/eli/reg/2017/1369/oj/eng> (Overview)
- <https://energy-efficient-products.ec.europa.eu/ecodesign-and-energy-label/understanding-energy-label>
- <https://energy-efficient-products.ec.europa.eu/product-list/standby-networked-standby-and-mode>
- <https://energy-efficient-products.ec.europa.eu/product-list/washing-machines>

5.3.3 Artificial Intelligence:

- <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52026DC0501>: (Strategic Roadmap for Digitalisation and AI in the Energy Sector)
- <https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficiency-targets-directive-and-rules/energy-efficiency-directive>
- Stern, N., Romani, M., Pierfederici, R., Braun, M., Barraclough, D., Lingeswaran, S., Weirich-Benet, E., & Niemann, N. (2025). Green and intelligent: The role of AI in the climate transition. *npj Climate Action*, 4, Article 56.