

ENV-723

**Models for applied environmental economics**

Vöhringer Frank

Cursus	Sem.	Type
Civil & Environmental Engineering		Opt.

Language of teaching	English
Credits	1
Session	
Exam	Oral presentation
Workload	30h
<b>Hours</b>	<b>13</b>
Courses	13
<b>Number of positions</b>	

**Frequency**

Every 2 years

**Remark**

Next time: Spring 2025, Min. 5 persons

**Summary**

Mainly based on the discussion of peer reviewed academic papers, the course introduces non economists to the main types of applied models used in environmental economic analysis: linear programming, partial and general equilibrium, game theory, and agent based models.

**Content**

For each type of applied environmental economic model, there is a brief general introduction, followed by a discussion of a peer-reviewed academic paper on an applied topic using that type of model.

Families of models presented and discussed:

- Linear programming (paper topic: acidification; model features in paper: spatial)
- Partial equilibrium (paper topic: timber industry and wildlife conservation; model features in paper: integrated assessment)
- Computable general equilibrium (paper topic: carbon taxes; model features in paper: multi-regional)
- Game-theoretic (paper topic: climate negotiations; model features in paper: cooperation)
- Agent-based (paper topic: adoption of residential photovoltaics; model features in paper: spatial, bounded rationality)

**Keywords**

environmental economics  
economic modeling

**Learning Prerequisites****Required courses**

Some prior familiarity in applied modeling of any kind or in economics is an advantage, but not a formal prerequisite.

**Recommended courses**

ENV-610 Ecological Economics or  
ENV-724 Climate Economics for Engineers

**Learning Outcomes**

By the end of the course, the student must be able to:

- to understand the differences between simulation and optimisation models
- to describe the main characteristics of each model type
- to discuss the main merits and limitations of each modeling approach
- to recognize attributes of well written papers

## Resources

### Bibliography

Cofala, J. et al. (2004) : Cost-effective control of SO<sub>2</sub> emissions in Asia, Journal of Environmental Management 72, 149-161.

Nalle, D.J. et al. (2004): Modeling joint production of wildlife and timber, Journal of Environmental Economics and Management 48, 997-1017.

Beck, M. et al. (2015): Carbon tax and revenue recycling: Impacts on households in British Columbia, Resource and Energy Economics 41, 40-69.

Carraro, C. et al. (2006): Optimal transfers and participation decisions in international environmental agreements, The Review of International Organizations 1, 379-396.

Rai, V. and S.A. Robinson (2015): Agent-based modeling of energy technology adoption: Empirical integration of social, behavioral, economic, and environmental factors, Environmental Modelling & Software 70, 163-177.

### Ressources en bibliothèque

- [Optimal transfers and participation decisions in international environmental agreements](#), In: The Review of International Organizations
- [Carbon tax and revenue recycling: Impacts on households in British Columbia](#), In: Resource and Energy Economics
- [Agent-based modeling of energy technology adoption: Empirical integration of social, behavioral, economic, and environmental factors](#), In: Environmental Modelling & Software
- [Cost-effective control of SO<sub>2</sub> emissions](#). In: Asia, Journal of Environmental Management 72, 149-161
- [Modeling joint production of wildlife and timber](#), In: Journal of Environmental Economics and Management

### Moodle Link

- <https://go.epfl.ch/ENV-723>