# ECON4910 Environmental economics, Spring 2015

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**Lecture 8: Environmental R&D**

Updated March 16, 2015

Please bring lecture note and reading (see below) to lecture.

*Reading:*

Requate (2005): sections 2, 3.1 and 3.2

Hoel (2010): sections 1, 2, 4, 5.1, 5.2, 5.4, 6.1 and 6.2

**Outline of lecture**

Abatement costs can depend on technology, which in turn may depend on environmental policy.

1. Technology may change due to LbD or by R&D, our main focus is the latter
2. LbD: future abatement cost function depends on present level of abatement
   * Only a firm’s own future abatement cost function affected by own emissions, or spillovers to other firms?
   * If spillovers, what is implication for policy?
3. R&D: Endogenous technology raises several questions, including the five in Hoel, page 3
4. Model specification
   * R&D investment: Either - Or (Requate and Hoel section 6) or continuous (Hoel sections 3 and 4)?
   * Technology spillovers across firms (Hoel) or not (Requate)?
   * When and how is environmental policy set?
   * R&D by polluting firms (Hoel 4, 5.1, 5.2) or by specialized firms developing and selling technology (Hoel section 5.3 and 6)?
   * What types of policies considered? (In lecture: taxes and quotas)
5. The socially optimal level of R&D. Hoel Section 4
6. Does outcome (technology level) depend on choice of policy instrument? Requate3.1 and 3.2; Hoel 5.1 and 5.2
7. Implications for R&D policy; Hoel section 5.4
8. Non-competitive innovation sector. Hoel sections 6.1 (R&D for a regular good), 6.2 (environmental R&D with an emission tax) [and 6.3 (environmental R&D with quotas)]