

Environmental Economics

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EPFL ENAC LEUrE

ENV-471

Master semester 2 or 4

Exercises

OPTIMAL ABATEMENT

Optimal abatement with fixed cost

A company emits 100 units of pollution noted E_0 . The damage caused by E emissions is $D = 5E$ and the cost of avoiding them is $C = 80 + 0.1\Delta^2$, where Δ is the abatement effort ($\Delta = E_0 - E$).

- 1) How can it be explained that the damage is simply proportional to the emissions of this company?
- 2) Calculate the optimal level of abatement Δ^* and emissions E^* .
- 3) Should the company be required to make this effort? To answer, calculate the net gain to society if the company reduces its emissions to E^* . Explain your result.

Optimal abatement with fixed cost

- answer -

- 1) The company is only one small polluter among many; so, its emissions do not yet lead to increasing marginal damage.
- 2) $G(\Delta) = 5\Delta$; $G'(\Delta) = 5$; $C'(\Delta) = 0.2\Delta$.
 $G' = C'$ for $\Delta^* = 25$, so $E^* = 75$.
- 3) $G(\Delta^*) - C(\Delta^*) = 125 - 142.5 < 0$, so, the company should not be required to make this effort. This is due to its fixed cost.

