



## **Effect of Probability Models and Loss Functions on Decisions in Emission Control Problems**

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This paper addresses the issue of emissions control and the decision to address changes in the European regulatory framework. The study extends beyond a simple cost-benefit analysis by conducting a Bayesian decision analysis to assess at what level of penalty relative to the cost of filters an optimum decision can be reached. The following questions are addressed here: (i) What is the sensitivity of a decision on the assumptions of probability models, which are used to describe exceedance of pollution limits in samples; (ii) what is the influence of the shape of the loss function on the decision process; (iii) what is the effect of the length of a sampling record on the decision; and (iv) at what level of cost collection of additional information improves the decision. Our analysis finds that depending on the type of loss functions the binomial and Poisson probability models do not necessarily result in the same conclusions; the shape of the loss function influences strongly the decision to proceed into emission control measures and hence it can be used by public regulatory agencies as an instrument of environmental policy; the length of a sampling record increases the weight of the penalty relative to the cost of new technologies; and finally, there is a limit in the amount of information beyond which improvement in the decision-making becomes marginal.