3° Séance du Séminaire d'Economie d'Energie

Mercredi 13 mars 2013, 16h30-18h30

Ecole des Mines, 60 boulevard Saint-Michel, Paris

Investment in electricity network and generation in situation of risks (or in situation of unknown costs for the regulator)

1. Bert Willems, professor, TILEC&CenteR, Tilburg University, (NL)

Optimal regulation of network investments in a model with demand uncertainty and asymmetric information about investment costs.

2. Guy Meunier, chercheur INRA, ALISS et CECO-X

Risk aversion, input price risk and technology mix in an electricity market

Le séminaire se tiendra en Anglais

Summary of the two presentations

Bert Willems: Optimal regulation of network investments

In a Baron Meyerson type of model of regulation of a monopolist with unknown costs, we model the optimal regulation of capacity transmission investments in a model where demand follows a geometric Brownian motion and the regulated firm has private information about its capacity costs. In the optimal mechanism existing capacity is always used efficiently: prices for network access are equal to the short run marginal cost of transportation as long as there is spare capacity, and prices are above the marginal cost, when there is congestion. Capacity is expanded, whenever the price for capacity reaches a threshold value. This threshold value decreases with investment costs, and is higher than in the first best perfect information optimum. The network operator receives a fraction of the congestion rents to fund its investment costs and as an information rent.

Keywords: investment under uncertainty, asymmetric information, optimal contracts,

Guy Meunier:

"To address the time-variable nature of electricity demand, firms invest in several types of technology; baseload technologies are more efficient for frequent production, whereas peak technologies are employed for more sporadic production. In addition to this well-known variability of the electricity demand curve, electricity producers face numerous uncertainties with respect to costs of production. In particular, the prices of the fossil fuels and CO2 emissions are uncertain. These uncertainties are likely to influence the technology mix that is chosen to meet the variable demand, particularly if firms are risk averse. The presentation analyzes the effect of input price risk on the technology mix in an electricity market. It is assumed that risk averse firms can invest in two different technologies, a baseload technology and a peak technology. The variable cost of the peak technology is random, and the demand for electricity is variable but not risky. It is demonstrated that firms either under-invest or over-invest in the risky technology, but not both. In the latter situation, compared with a risk-neutral benchmark, the presence of risk aversion produces a greater total capacity and a lower quantity of the (risk-free) baseload technology. The influence of the cost structure and the variability of the demand influence the results."