

Energy and Resource Economics (IKT3610)
Study questions (2)
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1. Two firms can control emissions by doing abatement. Yet, abatement is costly and the two firms' abatement cost functions are as follows: $TC_1 = 50 + 100q_1^2$, $TC_2 = 25 + 50q_2^2$, where q_1 and q_2 are the amount of abatement done by the first and second firm, respectively. With no environmental policy, each firm would be emitting 20 units of emissions, hence, a total of 40 units for both firms.
 - a- Compute the cost-effective allocation of abatement if the new total amount of emissions needs to be 19 units (or a total reduction of 21 units of emissions is necessary).
 - b- Suppose that firm 1 and firm 2 are assigned 9 and 10 units of allowances, respectively, and are allowed to buy and sell permits from each other. Each permit allows them to emit one unit of emissions. Will plants be willing to buy and sell to each other? Which firm will sell them? How many permits will be sold? How much will they sell for?
 - c- Depict these results using a figure.
 - d- Assume that the environmental authority wants to reach its objective (a total reduction of 21 units of emissions) by using an emissions charge system. What should be the per-unit charge of pollution/emissions?
 - e- How much revenue would the control authority collect?
 - f- While environmental taxes and auctioned allowances raise revenue, cap-and-trade (aka, emissions trading) programs that gift the allowances to users free of charge (aka, grandfathering) do not. Does this difference matter?