

**AAE / Econ / Env. St. 343**  
**Environmental Economics**

**Homework #2**  
**Due in class on Tuesday, 9/23/08**

Please read the following outside articles posted on the course website (next to the homework download) for this assignment:

Reading #1: Landry, C.J., and C. Peck. 1998. "Dealing for Water." *Montana Farmer-Stockman*, December. (Subtitle: Western states are creating water markets without compromising the prior appropriation doctrine.)

Reading #2: Barringer, F., and K. Galbraith. 2008. "States Aim to Cut Gases by Making Polluters Pay." *The New York Times*, September 16.

Short answers please. Questions 1 and 2 refer to the first reading: "Dealing for Water".

1. Explain why the "Dealing for Water" article illustrates the Coase Theorem result. Be sure to discuss how property rights to water are defined and how this affects the applicability of the Coase Theorem.
2. The article refers to Trout Unlimited, which is a non-profit organization representing recreational anglers. What role does Trout Unlimited play in making the Coase Theorem feasible?

The following information applies to questions 3 through 5. Two firms can control pollution with the following marginal abatement costs:  $MAC_1 = \$150q_1$ ,  $MAC_2 = \$100q_2$ , where  $q_1$  and  $q_2$  are, respectively, the amount of pollution reduced by the first and second firms. Assume that with no control at all, each firm would be emitting 10 units of pollution, or a total of 20 units for both firms. Suppose that the government sets a pollution goal of 10 units of total pollution.

3. Suppose the government wants to achieve the pollution goal at least-cost by taxing pollution. What tax rate should be set? What is the final allocation of pollution reduction?
4. Suppose the government wants to achieve the pollution goal by distributing a total of 10 tradable permits to the two firms, where each firm is initially allocated 5 permits. After trading, what is the equilibrium permit price and allocation of permits to the two firms? Does the equilibrium permit price and allocation of permits depend on the initial allocation? Explain.
5. Now consider the incentives for the firms to innovate. Suppose that the two firms are regulated with the permit system and have traded to the final distribution that you identified in question #4. Further, suppose that by innovating, the second firm can reduce

its costs from  $MAC_2 = \$100q_2$  to  $MAC_2^I = \$80q_2$ . If the second firm innovates, how many permits will it be able to sell to the first firm? How much is the second firm willing to pay for the innovation? Show your work.

Questions 6 and 7 refer to the second reading: "States Aim to Cut Gases by Making Polluters Pay" published this week in The New York Times.

6. In the article, Milo Sjardin, head of the North America division of New Carbon Finance, claims that the price of CO<sub>2</sub> permits in the RGGI program is "not going to be high, not for the foreseeable future." Using a simple graph with different marginal abatement cost curves for two firms, illustrate the relationship between the government's choice of a pollution "cap" (e.g. total allowable pollution) and the equilibrium permit price. What is your intuition?

7. In the article, it's stated that the RGGI program will initially allocate permits with an auction, where each permit is sold to the highest bidder. An alternative way to initially allocate permits would be for the government to simply give each firm the same number of permits. Given a fixed number of total pollution permits, would the equilibrium allocation of permits after trading differ between the above two initial allocations of permits? According to the article, what is the relationship between the auction approach and other renewable energy programs in the participating states? Explain.