

AAE / ECON / Env. St. 343
Environmental Economics

Homework #7
Due in class on Tuesday, December 2, 2008

Provide short answers to the questions below. Required reading available on the course website:

Appenzeller, Tim. 2004. "The End of Cheap Oil." *National Geographic*, Jun, v.205 (6): 80-100.

The following 4 questions relate to the required reading.

1. According to the article, how is China expected to affect future oil demand? What will happen to the marginal user cost of oil? What about the current price of oil?
2. In the 1970s, Middle East countries enacted an oil embargo. In 1978, the revolution in Iran had an impact on that country's oil exports. Explain the effects of these two events on world oil prices and oil consumption in the late 1970s and early 1980s.
3. Why did the price of oil drop in the mid 1980s and how is this price change related to events discussed in question #2?
4. Explain why people disagree about the amount of oil left in the world? What factors drive perceptions of the expected size of future economic reserves?

Consider how a market will allocate a fixed non-renewable resource over time. Suppose demand for the resource is given by $p=50-q$, where p is price and q is quantity. Further, suppose that marginal extraction costs are constant at \$35/unit, the discount rate is 10%, and the total resource stock is 4 units.

5. Using the market allocation of this resource, calculate the consumer and producer surplus for all periods in which the resource is extracted. Show your work.
6. How could investment ensure that this market allocation satisfies the sustainability criterion of fairness across time periods? What are the primary assumptions for investment to yield sustainability?

Suppose there is a pollutant which affects two countries. The benefits of reducing this pollutant are equal to 25 if both countries reduce, 10 if one country reduces, and 0 if neither country reduces. The costs of reducing the pollutant are equal to 20. These numbers apply to both countries.

7. Set up this problem in a game theoretic format and show that this is a Prisoner's Dilemma.
8. Suppose you are called on to solve the Prisoner's Dilemma. Propose a tax on these two countries that would lead to both countries reducing their output of the pollutant.