

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

**Homework #1
Due in class on Tuesday, September 16, 2008**

Please read the two newspaper articles available on the course website on 1) wind power in Cape Cod, and 2) urban sprawl. Next, provide short answers to the following 8 questions.

The following table applies to questions 1 and 2. Suppose a community's TOTAL WILLINGNESS TO PAY for groundwater and the local utility's TOTAL COST of producing groundwater is given by:

Quantity (# of units produced)	Total Willingness to Pay (\$)	Total Costs (\$)
0	\$0	\$0
1	\$24	\$11
2	\$46	\$24
3	\$65	\$38
4	\$82	\$54
5	\$97	\$72
6	\$110	\$92
7	\$121	\$114
8	\$130	\$138

1. Many water utilities in the United States use the **average cost** of producing water to set their price. For example, if the average cost of producing 2 units of water equals \$12 / unit, then \$12 / unit is the price the utility charges. How many units will the utility produce if they follow average-cost pricing? Graphically depict this outcome using continuous supply and demand graphs.

2. Will the average-cost pricing scheme presented above result in an **efficient** allocation of groundwater? Show your work.

3. Suppose a clean lake is considered a public good for residents, and two lakeshore residents are interested in reducing water pollution into their lake. The TOTAL WILLINGNESS TO PAY for reducing water pollution is as follows:

Units of Pollution Reduced	Total Willingness to Pay (citizen A)	Total Willingness to Pay (citizen B)
1	\$15	\$5
2	\$25	\$7
3	\$30	\$8

If the cost of pollution reduction is \$11 per unit, how much pollution will be voluntarily cleaned up (i.e. the free market solution)? What is the efficient amount of pollution to clean up?

Questions 4-5 refer to reading #1.

4. What is likely the main reason for the local opposition to the Nantucket windfarm?

- The private cost of the windfarm to locals, in terms of ruined scenery, exceeds the benefit they obtain in lower energy bills.
- The private cost of the windfarm to locals, in terms of the death of migrating birds hitting the windmill blades, exceeds the benefit they obtain in lower energy bills.
- The locals are concerned that the windmills will affect tern nesting grounds

5. Using economic logic, explain why Robert Kennedy Jr., a well known environmental advocate who generally favors wind energy, is against the Nantucket wind farm.

Questions 6 – 7 refer to reading #2.

6. According to Tom Spellmire, what externality is produced by farms? Is this a positive or negative externality? Who benefits or loses from this externality?

7. A common approach to reducing urban sprawl is for *privately-owned* land trusts to purchase parcels of land and preserve them as open space. Will this approach lead to an efficient amount of open space? (Hint: focus on the benefits provided by open space to residents).

8. Suppose that you wake up after a week of sleep and you have to decide how many hours you will study for your test. You only have ten hours before the test. The next chart shows the points you get for the hours studied (knowledge) and the point you lose for being tired (concentration loss).

Hour	Knowledge	Concentration Loss
1	15	2
2	29	4
3	42	6
4	54	8
5	65	10
6	74	12
7	82	14
8	89	16
9	95	18
10	100	20

- a) Calculate Marginal benefit and marginal cost for each hour.
- b) What's the marginal benefit and the marginal cost of studying each extra hour?
- c) How many hours will you study? (Be careful).