ECO 2118
INTRODUCTION TO ENVIRONMENTAL AND RESOURCE ECONOMICS

ASSIGNMENT #1

DUE: WEDNESDAY, SEPTEMBER 25, 2013 (IN CLASS)

INSTRUCTIONS
Please complete the following assignment which contains three multi-part questions. Answer all parts of each question. Groups of up to four people can work together on the assignment (group work is not mandatory). If you choose to work in a group, submit a single set of answers with all group members' names listed. Remember: only the best two out of three assignment scores count towards your final grade.

QUESTION 1 – AGGREGATING INDIVIDUAL DEMAND CURVES AND CONSUMER SURPLUS

There are two individuals in a market with the following demand functions:

$$\text{Individual 1: } q_{1D} = 480 - 8P_D$$

$$\text{Individual 2: } q_{2D} = 1000 - 10P_D$$

1.1 Draw the aggregate market demand curve. Label all relevant points including the kink (the point where the line segments meet). *{5 Marks}*

1.2 Assume that the price in this market is $30. Calculate the total consumer surplus. *{5 Marks}*

1.3 A third person enters the market. Her demand function equals: $q_{3D} = 90 - 6P_D$. Re-draw the market demand function. *{3 Marks}*

1.4 Assume the price in the market remains at $30. How much does aggregate consumer surplus change by adding this third individual? *{2 Marks}*

1.5 Provide a brief description of what consumer surplus is and why economists calculate and care about it. *{5 Marks}*

QUESTION 2 – WIND POWER AND RENEWABLE ELECTRICITY IN ONTARIO

In 2009, the Government of Ontario tabled the Ontario's *Green Energy and Green Economy Act*. Contained in this legislation was a provision related to "feed-in tariffs" (FiTs) for renewable electricity generation (wind power). The Government of Ontario introduced this policy as it believed that the social benefits from renewable electricity generation were greater than the private demand for that renewable electricity.

2.1 Do some research and write a short *analysis* of Ontario's feed-in tariff (FiT) policy. For example:

- How do FiTs work?
- Is the FiT program an effective policy?
- What are its stated goals?
- Will the program achieve its goals and is it the best policy to obtain this outcome?

Limit responses to 300 words *or less* and be sure to cite all sources (do not include references in the word count). *{10 Marks}*

2.2 Bullfrog Power (bullfrogpower.com) is an electricity provider that enables households and businesses to "reduce [their] environmental impact, support the development of new renewable generation in Canada and help to create a cleaner world for today and tomorrow." Bullfrog Power operates in Ontario (and several other provinces) and works by charging account holders a premium of approximately 3 cents per kWh on their electricity bills (current off-peak Hydro Ottawa rate is 6.7 cents per KWh) in order to ensure that some proportion of the electricity consumed by the account holder is generated by renewable sources such as wind turbines. Subscribers to Bullfrog Power's service do not receive any benefit other than the knowledge that they are contributing to an environmental public good (e.g., subscribers' electricity service is not more reliable, etc.).

- State and explain which economic principle appears to fail in this circumstance.
- Write a short paragraph hypothesizing why some individuals are willing to pay an additional fee for their electricity. What is the relationship between your hypothesis and conventional supply and demand behaviour?

Limit responses to 300 words *or less* and be sure to cite all sources (do not include references in the word count). *{10 Marks}*

QUESTION 3 – USING THE PROBABILITIES FROM THE PREDICTION MARKET

Economists (and others) often use to the term "expected value" to refer to an average, specifically a weighted average.

For example, let's say someone offered to pay $100 if and only if you rolled a six (6) with a single role of a (fair) six sided die. We would calculate the expected value of this offer as:

$$\frac{1}{6}\cdot\$0+\frac{1}{6}\cdot\$0+\frac{1}{6}\cdot\$0+\frac{1}{6}\cdot\$0+\frac{1}{6}\cdot\$0+\frac{1}{6}\cdot\$100=\$16.67$$

where 1/6 is the *probability* of rolling a one (1) while $0 is the payoff associated with that outcome. Similarly, the probability of rolling a two (2) is one in six (1/6) and the payoff from that outcome is $0 and so on. Once we add together these potential outcomes (probability times payoff), we obtain the expected value or average outcome which equals $16.67.

3.1 A question on wind power was posted in the prediction market. Based on current prices, retrieve the probabilities for each option and calculate the expected outcome of this question. *{5 Marks}* Relevant information for this question:

- Be sure to indicate the date and time that you retrieved the market prices and make sure these prices are clearly stated on your answer sheet.
- Remember that a price of, say, $10 implies a probability of 10% or 0.1.
- For the end points of the distribution – < 450,000 and > 600,000 – use 450,000 and 600,000 to do the calculations.
- For all other intervals, use the mid-point – e.g., the mid-point in the interval 450,000-474,999 is 462,500 (round up to the nearest integer).

3.2 Describe a trade that you have made or will make on this question. Did you go short or long? Why did you make this choice? What information did you use? Where did you find this information? Are there any information sources that you intend to follow as the market progresses? How did the probabilities change when you traded? Limit responses to 250 words or less. *{5 Marks}*