Study Questions to Accompany International Energy Markets

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Chapter 6. Deregulation-Privatization Electricity Sector

6.1 Many countries are restructuring their electricity industries.

6.1a Find one new country that has or is privatizing its electrical sector. Brief outline the privatization.

6.1b Try to determine which of the models from Shuttleworth and Hunt or from Tenenbaum, Lock and Barker the new model most closely resembles.

6.1c What sort of dispatch is being used or considered?

6.2 Many countries are opening up their power sectors to private investment leading to a boom in electricity projects. Find an example of one such recent project.

6.3 What is the maximum possible efficiency of a light water reactor that inputs steam at 1000 degrees F and outputs cooling water at 100 degrees F?

Read the technology box at http://dahl.mines.edu/tech0501.pdf to answer this question.

Input temp		
1000	F1	
Output temp		
100	F2	
T1 in K = 5/9(F1-32) + 273 =		810.7778
T2 in K = 5/9(F2-32) + 273 =		310.7778
Efficiency =		
1-T2/T1=		0.616692

6.4 A typical 1000 MW light water reactor creates about 3 cubic meters of waste every three years. Compute what this implies about how much nuclear waste the average American would generate in 70 years with and without reprocessing. Indicate all the assumptions have to make to do your computation.

6.5 A trade organization for the US electric power industry is the Edison Electric Institute at www.eei.org. Go to this address and find out what companies belong to this trade group. Try to find 10 other electricity links.

6.6 Suppose that during a peak period forecasted demand is 150 and the bids are:

_ National Power bids $0.06 per kWh for 80 kW

_ Power Gen bids $0.065 per kWh for 30 kW

_ Scottish Power bids $0.07 per kWh for 50 kW

_ EdF bids $0.075 per kWh for 10 kW

_ National Grid bids $0.08 per kWh for 50 kW

There is a transmission constraint of 65 kW from National Power to the market.

6.6a How should the ISO dispatch for this set of bids? Write the dispatch amount next to the bids above. Put zero if they are not dispatched.

6.6b What is System marginal price (SMP) for this set of bids and forecasted consumption?

6.6c Suppose for the next hour, there is a 5% probability of a 10 kW short fall and a 1% probability of a 15 kW short fall. The loss of output from a 10 kW shortfall is estimated at $15, and the loss of output from a 15 kW shortfall is estimated at $25. What is the expected value of lost load (E(VOLL))?

6.6d If 140 of the 150 dispatched power is taken what is CC for this market?

6.6e The 10 units that were dispatched and not taken also have to be paid. If they are paid at the system marginal price plus the capacity charge, what is the uplift charge/per kWh.

6.6f What is the Pool System Price (PSP)?

6.7 Regulated utilities that must charge average rather than marginal costs sometimes undertake demand side management programs to reduce peak loads and improve load factors. Such activities include free energy audits to advise customers on how to reduce loads, information on energy saving possibilities, loans, subsidies and rebates for energy efficient lighting, appliances and motors.

6.7a Explain why a utility would encourage customers to consume less electricity under average cost pricing?

6.7b What do you think will happen to demand side management programs if a utility is deregulated and moves to marginal cost pricing?

6.8 If the market interest rate on a bond of similar risk is 8% and the bond holders marginal tax rate is 25%, what interest rate would you expect the tax free bond to pay? Why?

6.9 Suppose the loss of load probability is 3% for a 10 kWh short fall and 2% for a 20 kWh short fall. The value of a 10 kWh load loss is estimated to be 200 and the value of a load loss of 20 kWh is 400. If the total kilowatt hours consumed is 140, what is the capacity charge per kwh.

6.10 The table at http://dahl.mines.edu/T0604.xlsx contains information for countries electricity sectors. Find one new country or update the information for one country that has or is privatizing its electrical sector and note the following information.

6.10a Indicate when the privatization was initiated.

6.10b Try to determine which of the models from Shuttleworth and Hunt the new model most closely resembles.

6.10c What sort of dispatch is being used or considered?

6.11 Hunt and Shuttleworth present four different models for the electricity sector. Briefly compare and contrast the four models.

6.12 California's electricity restructuring in the late 1990's and early 2000's went radically wrong. Outline what happened in the California's market at that time. Indicate what you think was the biggest policy mistake the regulators made and suggest a better policy.

6.13 The text includes deregulation experiences for 4 countries. Compare and contrast these four experiences. Be sure to include which model from Hunt and Shuttleworth each country has as its goal, the type of price regulation if any they are most in favor of, which segments of the industry.