ECE 333 - Spring 2017 - Homework 9

Assigned: April 24, 2017

Quiz date: April 27, 2017

Final Exam Date: 11 May 2017, 7-10:00 pm, Rm 1013, ECE Bldg

Reading:

Masters:
- Section 1.6 Financial Aspects (excluding sub-sections 1.6.5)
- Sections 6.4.1 – 6.4.3 PV Economics
- Section 7.9 Wind Turbine Economics
- Section 8.5 Hydroelectric Power
- Section 9.4 Demand Side Management
- Appendix A, Energy Economics Tutorial

Problems:

For Quiz 8 (27 Apr 17):

Masters: 7.13, 7.14

Special Problems:

1. The cost of fuel for a small power plant is currently $10,000 per year. The owners discount rate is 12% and fuel is projected to increase at 6% per year over the 30-yr life of the plant. What is the levelized cost of fuel?

2. Better windows for a building adds $3/ft² of window but saves $0.55/ft² per year in reduced heating, cooling and lighting costs. With a 12% discount rate:
   a. What is the net present value (NPV) of the better windows over a 30-year period with no escalation in the value of the annual savings?
   b. What is the internal rate of return (IRR) with no escalation rate?
   c. What is the NPV if the savings escalates at 7%/yr due to fuel savings?
   d. What is the IRR with that fuel escalation rate?

For Final Exam (11 May 17)

Masters: 8.8, 8.10, 8.11

Special Problem:

5.10 A photovoltaic system that generates 8000 kWh/yr costs $15,000. It is paid for with a 6%, 20-year loan.
   a. Ignoring any tax implications, what is the cost of electricity from the PV system?
   b. With local utility electricity costing $0.11/kWh, at what rate would that price have to escalate over the 20-year period in order for the levelized cost of utility electricity be the same as the cost of electricity from the PV system? Use Figure A.3 and assume the buyers discount rate is 15%.