CPET 581 Smart Grid & Energy Management
Homework 2

Assigned Date: September 6, 2013
Hand-in requirement and Due Date:

- Copy all questions, and use Excel or Minitab 16 (available from IPFW Book store), and Microsoft Word to prepare your homework 2.
- Submit your hw2.docs file and Excel Spreadsheet file or Minitab 16 programs as attachments to Prof. Lin lin@ipfw.edu, September 13, Friday, before 5:00 PM

1. Define the following terms: kW, kWh, generation capacity, net generation, green house emission.
2. A large university campus had a peak demand of 38 MW and purchased 12 million kWh of electrical energy in a month. The electric utility bills the university at the rate of $8.50 per kW of peak demand during the month, plus 2.8cent per kWh. Calculate the total campus electric bill for the month. {Hint: Bill = (Demand x Rate of demand)+ (Energy used * Rate)}
3. Create PI charts using Excel Spreadsheet to show the following table that recreated from "The Future of Electricity Generation", Electric Power Supply Association (ESA), http://www.epsa.org/documents/industry/EPSA_Power_On_brochure_FINAL.pdf

The Recreated % U.S. Electricity Generated from Competitive Suppliers Based on the Report listed above.

Power Generation Type	**% of U.S. Electricity Generated from Competitive Suppliers** (power generators + power marketers) – 40% of installed generating capacity in the U.S.	**% of U.S. Electricity Provided**
Coal-fired generation	35% (35%* 0.4 = 14%)	49%
Natural gas generation	32% (32% * 0.4 = 12.8%)	20%
Nuclear power (zero carbon emission)	25% (25% * 0.4 = 10%)	19%
Renewable Solar, Wind, Geothermal, Biomass	4% (4% * 0.4 = 1.6%)	2%
Hydropower	2% (2% * 0.4 = 0.8%)	7%
Total	98% (39.2%)	97%

4. View the Video "The Big Picture of IM&, Part 2: Electricity's Journey on How does I&M generate and deliver the power to your home or business" 2012/6/12, http://wn.com/i&m_power_system; then use your own words to describe how the I&M generate and deliver the power.
5. Go to I&M Electric Power web site, then prepare (A) a table to show I&M's Customer populations, Transmission & distribution lines, Generation (coal-fired, nuclear, hydro etc.), largest customers, and whole sale customers. (B) From the facts sheet, prepare a Excel spreadsheet that show a PI chart of their generation capacity from all Coal-fired, nuclear, wind, hydro etc.
   (C) Prepare another PI chart to show the power consumed by Residential, largest Customers, Whole Sale customers, etc.
6. Repeat Question 6-81 discussed in Lecture 4, obtain additional net electricity consumption data of the U.S. from 1980-2012 from Energy Information Administration (www.eia.gov). Enter data into

Minitab 16 or Excel Spreadsheet. Question (A) Construct a time series plot of the data 1980-2012. Question (B) Construct and Interpret a Stem-and-Leaf display of these data.