CPET 581 Smart Grid & Energy Management
Homework 7

Assigned Date: Oct. 25, 2013, Due Friday Nov. 1, 2013, before 5 PM.
Hand-in requirement and Due Date:

- Submit your **hw7-part-1.docs** file as email attachment to Prof. Lin lin@ipfw.edu
- Submit the team's "**System Design Report- III**", and prepare to make the team's presentation.

Part 1 (Individual Assignment) – Study all the Oct. 25 Lecture references and

1. Define Demand-side management, Demand response, net metering, Time-of-use rate, real-time pricing
2. Define AMI (advanced metering infrastructure), smart meter, Home Area Network
3. Explain the relationship between demand response, AMI or smart metering, and smart grid technologies.
4. Search Internet and report findings on the utility companies that implemented demand response and net metering.
5. Search Internet and report findings on (A) definitions of Smart meter data and analytics, (B) MDM (Meter data management), and (C) the companies that offer products or services to address the needs in this area.

Part 2 (Team-based) EV & Plug-in EV Charging Station Development Project – System Design Report III

(A) Prepare a meeting minute for team meeting on Oct. 25; (a summary on discussion and follow-up items should be added)
(B) Team member roles assignment: Greg – General Manager, Ryan – Co-General Manager of Marketing & Sales, Bob – Manager of System Hardware, Peter – Manager of System Software
(C) Design a diagram that shows all major components of the conceptual new EV & Plug-In EV Charging station which should include the following subsystems (NOT SHOWN in Hw 6)
    a. Charging System Hardware system, with proper specification such as Charging Capacity (kWH), Voltage, Current, Level of Charging, etc
    b. Power sources including, utility, power source, solar power rating, wind power, etc
    c. Smart Grid Communication subsystem AMI, communication protocols, etc
    d. User interface and service fee payment methods
    e. Other features
(D) Add Charging Station Selection and Recommendation (using the format as shown in CPET 575's lecture on "Design Evaluation of Alternatives"), http://www.etcs.ipfw.edu/~lin/CPET575_MangOfTech/2012F/Lectures/DesignEvaluationAlternatives-8-30-2012.pdf
(E) Add team's discussion and consideration of solar power subsystem design consideration with roof-top solar panel on the charging station's parking space.
(F) Add team's discussion and consideration on wind power (vertical axis wind turbine, box type) on the top of the Helmke library
(G) Investigate and elaborate the values added with texting to smartphone, and email charging completion message, and other green energy promotion messages (considering Google texting support)
(H) Revise the Ethernet and Embedded PC on the top of Charging station electronics, also the WiFi features.

(I) Prepare an estimate overall cost of the system: subsystems or modules, construction costs, others

(J) Refine team project subtasks assignment (use either Microsoft Project or Excel Spreadsheet); each team member should also create a set of needed subtasks assignment, and give a status of the progress

(K) Prepare a Report in PPT file for team discussion

References

[1] Hope at last? California offers net metering compromise, http://www.smartgridnews.com/artman/publish/Business_Policy_Regulation/Hope-at-last-California-offers-net-metering-compromise-6096.html/

a. California Assemly Bill (AB) 327

[2] Has Austin Energy figured out a valid net metering solution? Aug. 28, 2013, http://www.smartgridnews.com/artman/publish/Technologies_DG_Renewables/Has-Austin-Energy-figured-out-a-valid-net-metering-solution-5993.html

[3] Smart Meters and Net Metering for PV Solar Customer, San Diego Gas & Electric, http://www.sdge.com/residential/about-smart-meters/smart-meters-and-net-metering