ECE 333 Green Electric Energy

Fall 2017
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Homework 7

Quiz Date: Thursday, November 30, 2017 during class

The quiz is based on the following material: Lecture 15, Lecture 16, Lecture 17, and the problems in Homework 7.

Problem 1: 6.3 (part c) from the textbook.

Problem 2: The PV system for a Daggett (*CA*) house is designed to generate roughly 5,000 kWh annually. The key cost components are:

component	*costs*(*$*)
PVs	4.20/*W* (*DC*)
inverter	1.20/*W* (*DC*)
tracker	400 + 100/m^2
installation	4,100

We assume the PVs have a 15 *%* efficiency and the inverter efficiency is 80 *%*.

a. **Calculate** the the costs of a fixed array with a -15 ° tilt angle

b. **Calculate** the costs of an array with a single – axis tracker

c. **State** whether you would like to invest in a fixed array with a -15 ° tilt angle or in an array with a single – axis tracker, **provide** the rationale for your reason.

Problem 3: Circle the correct answer for each statement below –either **True** or **False** or **a.**, **b.**, **c**., **d.**, or **e.**

i. The global cumulative *PV* capacity at the end of 2016 is:

a. 30.6 GW **b.** 150 GW **c.** 306.5 GW

d. 450 GW **e.** 650 GW

ii. Approximately 33 *%* of the world's total *PV* capacity makes Europe the world's leading region in terms of cumulative installed capacity at the end of 2016.

True_____ **False** _____

iii. Germany has the highest cumulative *PV* capacity at the end of 2016.

True_____ **False** _____

iv. The *US* state with the largest *PV* capacity additions in 2016 is:

a. Texas **b.** California **c.** Nevada

d. New York **e.** North Carolina

v. The world's largest *PV* plant is located in Potsdam, Germany.

True_____ **False** _____

vi. The payment foregone by the net metered solar owners are pushing the distribution utilities to shift the collection of the electricity infrastructure to the non-solar-owner customers.

True_____ **False** _____

vii. Residential and commercial *PV* system installations reduce the amount of electricity such customers purchase from the local utility.

True_____ **False** _____

viii. China is the country that has the largest share in *PV* manufacturing in 2014.

True_____ **False** _____

ix. Parabolic trough *CSP* technology employs heliostats collectors with dual–axis trackers to concentrate *DNI* onto a central receiver.

True_____ **False** _____

x. *US* is the leading nation in total installed *CSP* capacity at the end of 2016.

True_____ **False** _____

xi. The *US* state that has the highest cumulative *CSP* capacity at the end of 2016 is:

a. Illinois **b.** Texas **c.** Michigan
d. California **e.** Maine

xii. CSP with TES decreases the range of CSP LCOE for parabolic trough CSP.

True_____ **False** _____