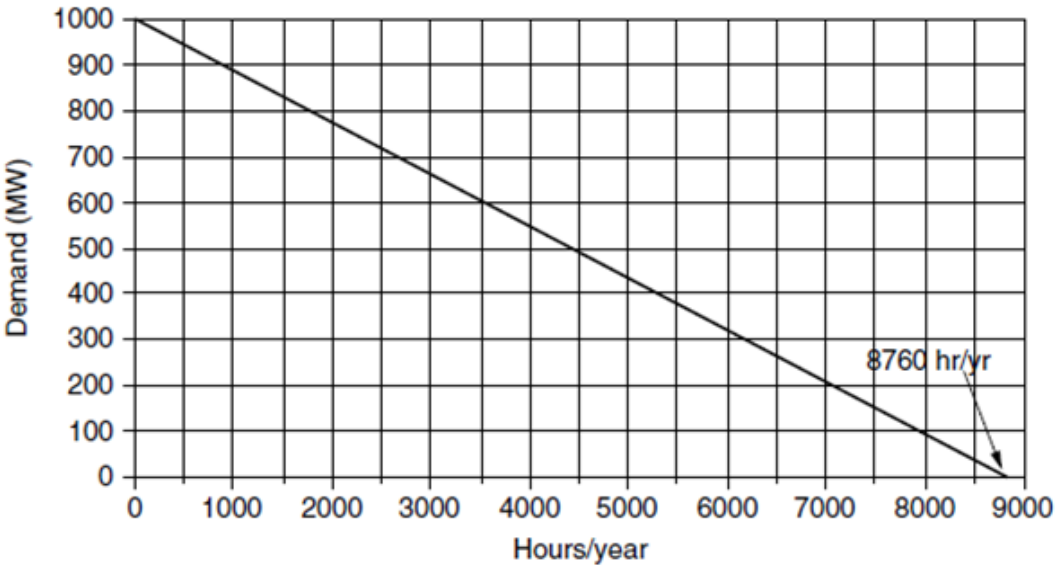
EECE325 Fundamentals of Energy Systems
Spring 2022 Dr. Charles Kim

Homework 4 (100 points) - Electricity Cost in Generation Mix

A. INSTRUCTION
(a) Due: 8:00pm Wed Mar 16
(b) Scoring Rubric for each power plant and the total combined generation:
- 25 Correct answer with detailed calculation
- 15 Partially correct answer with detailed calculation
- 10 Correct answer without detailed calculation
- 0 Partially correct answer without detailed calculation

(c) Submission extension: granted upon request

B. PROBLEM
A utility company has the following very simplified load duration curve.



To serve the customers, the company runs 3 power plants: 500 MW coal-steam to cover the base load, 300 MW combined-cycle for the intermediate load, and 200 MW gas turbine for the peak load. The cost parameters of the power plants are as shown below. The fixed charge rate (FCR) for the capital cost is 0.16 per year.

Generation Type	**Capital Cost ($/kW)**	**Heat Rate (Btu/kWh)**	**Fuel Cost ($/M Btu)**	**Variable Costs ($/kWh)**
Coal-Steam	1,400	9,700	1.50	0.0043
Combined-Cycle	600	7,700	4.50	0.0037
Gas Turbine	600	9,100	4.50	0.0050

Fill out the table below. Show your works.

Generation Type	**CF**	**Annualized Fixed Cost ($/Yr)**	**Annualized Variable Cost ($/Yr)**	**Total Annualized Cost ($/yr)**	**Annual Generation (kWh/yr)**	**Electricity Cost ($/kWh)**
Coal-Steam						
Combined-Cycle						
Gas Turbine						
Overall Company						