


NPRE 498ESU
NPRE 498ESG
Energy Storage Systems
Spring 2021

| Number | Date Assigned | Due Date | Description | | | | | | | | | | | | | | |
|-------------|--|----------|---|---------|--|-----|--------|-------|-------|-------------|-------|---------|-------|-----------|-------|-------|-------|
| 1 | 1/25 | 2/1 | <p>Reading Assignment  Preface</p> <p>Written Assignment</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Country</th> <th style="text-align: center;">Energy consumption [kWe.hr / (capita.year)]</th> </tr> </thead> <tbody> <tr> <td>USA</td> <td style="text-align: center;">12,878</td> </tr> <tr> <td>Japan</td> <td style="text-align: center;">7,432</td> </tr> <tr> <td>Switzerland</td> <td style="text-align: center;">7,206</td> </tr> <tr> <td>Germany</td> <td style="text-align: center;">6,027</td> </tr> <tr> <td>Hong Kong</td> <td style="text-align: center;">4,847</td> </tr> <tr> <td>China</td> <td style="text-align: center;">1,899</td> </tr> </tbody> </table> <p>Using the table, estimate the needed <i>rated power</i> for a solar or wind energy installation to provide the power needs for a family of four in different countries, assuming the presence of a capability to store the energy in battery banks, an overall conversion efficiency of 30 percent, and an intermittence (capacity) factor of 40 percent for both wind and solar.</p> <p>Using a Ragone plot, compare the following energy storage options:</p> <ol style="list-style-type: none"> 1. Chemical storage using Li ion batteries, 2. Fuel cells using hydrogen as an energy carrier. | Country | Energy consumption [kWe.hr / (capita.year)] | USA | 12,878 | Japan | 7,432 | Switzerland | 7,206 | Germany | 6,027 | Hong Kong | 4,847 | China | 1,899 |
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| 2 | 1/27 | 2/8 | <p>Reading Assignment</p> <p>Written Assignment</p> | | | | | | | | | | | | | | |

Assignments Policy

Assignments will be turned in at the beginning of the class period, one week from the day they are assigned. The first five minutes of the class period will be devoted for turning in, and returning graded assignments. Late assignments will be assigned only a partial grade. Please try to submit them on time since once the assignments are graded and returned to the class, late assignments cannot be accepted any more.

If you are having difficulties with an assignment, you are encouraged to seek help from the teaching assistants (TAs) during their office hours. Questions may be emailed to TA's, but face-to-face interaction is more beneficial. Although you are encouraged to consult with each other if you are having difficulties, you are kindly expected to submit work that shows your individual effort. Please do not submit a copy of another person's work as your own. Copies of other people's assignments are not conducive to learning, and are unacceptable.

For further information, please read the detailed assignments guidelines.