



GROUP EX#3 – Dam Evidence: Wind or Hydro? ENRG 3 – R – Introduction to Alternative Energy

CITY COLLEGE OF SAN FRANCISCO
DEPARTMENT OF ENGINEERING AND TECHNOLOGY

NAME: _____

DUE DATE: _____

An exercise in a multi-criteria weighted assessment of two alternative energy options.

You have been hired as sustainability consultants to do a sustainability assessment of a proposed wind farm and a proposed hydropower station. There are many methods for doing this type of assessment. You will use a method called *multi-criteria weighted assessment*. It is similar to a weighted average. In doing this assessment you will need to *critically* assess the pro's & con's of 2 different power stations. **Discuss within your group if you are uncertain / disagree about attributes. Eventually, work towards agreement for each attribute, weight, & score.**

PROCEDURE FOR PART 1

1. Review the list of attributes I have provided in **table 1**.
2. Decide on **at least ten** additional attributes that you think are important to consider for any energy facility. You may want to particularly consider the fundamentals of sustainability and the characteristics of the types of power being compared. Add your attributes to the **Table 1**.
3. Decide if each attribute in Table 1 is **positive** (a good thing) or **negative** (a bad thing)
 - a. If Positive, copy the attribute into **Table 2**.
 - b. If Negative, copy the attribute into **Table 3**.
 - c. Once every attribute has been placed in either Table 2 or 3, then go to the next step

PROCEDURE FOR PART 2

4. Evaluate **how important each attribute is to your vision of sustainability**. In **table 2 & 3** assign weights or "importance" values relative to the other attributes in the same table.
1 = least important, 5 = most important.
 - a. *For example*, if you do not believe global warming is a serious sustainability concern, then you might decide to rank the **importance** of GHG emissions = 1.
 - b. Once every attribute has been given an **importance ranking** between 1 and 5, move to the next step.

PROCEDURE FOR PART 3: READ THE ARTICLES

PROCEDURE FOR PART 4

5. For each attribute in **table 2 and 3**, determine how well the proposed plant scores for that attribute. **1 = a low score, 5 = a high score.**
 - a. A low score shows that an attribute is not really that strong for the proposed plant.
 - b. *For example*, without a doubt, hydropower is a capital intensive project. I think we all have to agree to give it a relatively **high** score for "High Initial Capital"
 - c. Once every attribute has been given a **score** between 1 and 5...

PROCEDURE FOR PART 5

6. For each attribute multiply the weight and the score, and put the result in the **calculated points** column for the appropriate power plant.
7. Add together all of the calculated points in **Table 2**. Put the answer in the **total points** boxes at the bottom of **table 2**
8. Add together all of the calculated points in **Table 3**. Put the answer in the **total points** boxes at the bottom of **table 3**
9. Compare the **positive** and **negative totals**. This is how your group has assessed the positive and negative sustainability aspects of each facility.
 - a. Discuss with in your group if you are happy with these results or not.
 - b. Discuss how you might change the assessment

TABLE 1: List of Sustainability Attributes (+ and -) of a Power Facility

ATTRIBUTE NAME	DESCRIPTION
Requires Impoundment	Frequently involves impoundment of large amounts of water with loss of habitat due to land inundation
Silt Build Up	If not properly designed and constructed can lead to silt buildup with shortened lifetime and/or reduced productivity
Variable output	Output can depend on weather, season, and politics
Dispatchable	
Aesthetics	Damages to view sheds or landscapes
Noise	Noise harms health of animals / humans who live near by
Low O&M	Low operating and maintenance costs
High Initial Capital	Requires large amounts of capital upfront to construct
Long lifetime	Typically greater than 50 years
Long lead time	May take years to propose, plan, & approve a project
Flood control	Multiuse dams provide electricity and flood control
FILL IN AT LEAST 10 MORE IMPORTANT ATTRIBUTES:	

