***RUBRIC & INSTRUCTIONS VERSION***

**PLEASE USE THIS DOCUMENT FOR INSTRUCTIONS, TYPE YOUR RESPONSES INTO THE PURPLE AREAS IN THE FILE LABELED “STUDENT WORK”**

**Slow-thinking Decision-making Framework**

**Biofuels (40 points)**

**Plus the Group Collaborative Research and Evaluation Assignment (20 points)**

***SCIL 101 Biofuels Module Assessment Due: Monday Oct 3rd 2016 by 10 p.m. uploaded to Canvas (60 points)***

In this class you’ve read articles about this issue and you have had group and class discussions about biofuels. Now take some time to use the “Slow thinking framework: steps for high quality decision-making” to outline your thoughts about the issue. What you write in the “Student work” document should represent your own thinking, which may vary from the thinking of your group.

**1. Define the issue (2 points)**YOU define the problem, and work through the rest of this assignment in the context of your definition of the problem. What is the problem that needs to be solved?

*0 – student does not describe the issue*

*1 – student defines the issue or problem vaguely*

*2—student defines clearly and specifically the issue or problem,* ***and that is consistent with the criteria that they choose and the analysis they perform***

**2. Objectives/Evaluation Criteria**
*To help you think about possible criteria, ask yourself: how are you going to choose between these options? What are the important things to consider? What do you care about?* When coming up with criteria, you should “separate the ends from the means” by asking yourself “***why*** do I care about that?” multiple times until you can go no further and have found the “ends” or the fundamental thing that you care about. Below is a list of criteria that we came up with based on class responses:

1. Fewest greenhouse gas (CO2, e.g.) emissions.
2. Economic benefit to farmers & rural communities.
3. Preserve the health of natural resources (land, water, soil, biodiversity, air quality).
4. The fuel is renewable.
5. The fuel does not increase food prices world-wide.
6. Domestic source of energy.
7. Cheapest for people at the gas pump.

**Type the THREE criteria you will use in the first column of the analysis table in the “Student Work” file and assign weights to each criteria.** You may choose criteria from the above list OR write one of your own using the process of separating ends from means described above. Weight each criteria to represent ***how much*** you care about it. The sum of all the weights should equal 1.

**3. Options**

List or identify the possible alternative courses of action in considering the problem or issue. Below is a list of options that we’ve discussed in class. You may use one or more of the options below, modify these options, or create new options based on your ideas. **Identify at least FOUR distinctly different and viable options.**

1. **Status quo: gasoline and diesel are dominant** (corn ethanol is primary biofuel, biofuels are supposed to increase in volume over the next 20 years)
2. **Support second generation biofuels (corn stover, sorghum, switchgrass etc)** (by increasing federal government spending on research and development or subsidies for these fuels)
3. **Promote and subsidize electric cars and renewable energy** (homes and business would produce their own solar or wind energy to power vehicles)
4. **Municipal solid waste to fuel** (research and development money to develop turning garbage into fuel)
5. **Educate and motivate to drive less and fly less** (Effective approaches and incentives need to be determined.)

**Type the FOUR options you will use in the analysis table in the “Student Work” file.**

**4. Information [26 points total]**

*To help you think about this section, ask yourself: What additional information do you need to know about each option?*

**Step 1:** Decide on a metric for each criteria. If you are using a criteria of your own, you need to determine the metrics you will use to judge differences between options. Below are suggested metrics for each criteria:

|  |  |
| --- | --- |
| **Criteria** | **Metric** |
| 1. Fewest greenhouse gas (CO2, e.g.) emissions | CO2 equivalents/year (or other similar measurement) |
| 2. Economic benefit to farmers & rural communities | High, Medium or Low |
| 3. Preserve the health of natural resources (land, water, soil, biodiversity, air quality) | Yes/Somewhat/No |
| 4. Renewable | Yes/Somewhat/No |
| 5. Not hurting food prices world wide | Yes/Somewhat/No |
| 6. Domestic source of energy | Yes/Somewhat/No |
| 7. Cheapest for people at the gas pump | In dollars ($) |

**Step 2 (1 point):** Clarify the information known about each option with reference to specific criteria. You may use the collaborative research and evaluation homework assignments that were posted on the Canvas discussion board for any group in your lecture section. You may also do additional research on your own. **Assign a performance metric** for each option and type the results (example, high, medium or low) of your analysis under the column labeled “metric.”

*0 – no performance metrics are assigned, or the performance metrics are not clear.*

*0.5 – student assigns performance metrics inappropriately (using the wrong metric, for example).*

*1 –student assigns performance metrics appropriately (used the correct metric, for example).*

**Step 3 (1 point):** **Assign *performance scores*,** or a number from 1 to up to 4, with 1= the worst, and 4= the best performance for a given criteria. See the last page of the Group Collaborative Research & Evaluation for an example. Type these performance scores under the column labeled “performance score.”

*0 – no performance scores are assigned, or the scores are not clear.*

*0.5 – student assigns performance scores inappropriately.*

*1 –student assigns performance scores appropriately that align with the metric assigned to each option.*

**Step 4 (24 points):** For each criteria, **write a summary that explains *why*** you assigned the performance metric/performance scores that you did for each option. Describe what information you used when deciding what performance metric to assign to each option. You must refer specifically to any information used from class materials (or from materials outside of class), and ***you may use research conducted by other groups, but must write in your own words rather than in the words of groups on the discussion post.***

***Each criteria x option in the table is worth 2 points for a total of 24 points***

*0 (x 0)—the discussion of how well the option meets the criteria use just reiterates the overall scoring number or is extremely thin in its analysis. There are indications that the student simply copy/pasted from discussion posts on Canvas.*

*1 (x 12) — is not very detailed or vague in the reasons why an option meets the criteria. In general across criteria x options is missing discussion of significant tradeoffs in terms of at least one option.*

*2 (x 12)—student thoroughly discusses the option x criteria in their own words, including how well it does and does not meet the criteria. The discussion includes specific reasons why each criteria is or isn’t met using specific information in class our outside of class, and may mention areas where the student is uncertain whether the option meets the criteria and explains why. The overall performance scoring selected makes sense with the students’ analysis of how well the option meets the criteria.*

**5. Analysis of options based on the criteria (tradeoffs) (2 points)**

Multiply the weight of each criteria by the performance score of each option. Write the results of that multiplication in the cells as indicated in the columns for option 1.

Add up the weighted performance scores of each option and write the results of that addition in the bottom row of the table as indicated in the columns for option 1.

*0 – no total weighted performance scores are assigned, or the scores are not clear.*

*1 – student has a mistake in their math or inappropriately fills out the table.*

*2 –student does correct math and appropriately fills out the table.*

**6. Choice (2 points)**
A) Choose an “option” based on the analysis undertaken.

B) Why do you think this is the best option?

*0—the student does not provide reasoning for their choice, or the reasoning is weak, unclear and disconnected with the criteria and tradeoffs discussed above*

*1—the student provides reasoning for their choice that has some weak or unclear connections with the criteria and tradeoffs discussed above*

*2—the student provides clear and comprehensive reasoning for their choice that clearly links the choice with the criteria and tradeoffs discussed above*

**7. Review (4 points total)**

Reflect on your own decision-making process using these steps.

A) [2 points] What do you think of the decision you have made? How could you improve the way you made the decision?

*0—the student offers no reflection or what is offered demonstrates no thoughtfulness*

*1—the student offers some reflection of how the decision-making could be improved.*

*2—the student offers reflection that demonstrates thoughtfulness, including specific examples of how they could improve their decision*

B) [2 points] Do you think your decision is viable? Why or why not?

*0—the student offers no reflection or what is offered demonstrates no thoughtfulness*

*1—the student offers some reflection that demonstrates some understanding of the issue, but maintains that an option is viable without careful examination.*

*2—the student offers reflection that demonstrates a deep enough understanding of the issue to understand what is a viable option, or is thoughtful about what they don’t yet understand to determine what is viable.*

**8. Assigning resources (1 point)** See the “student work” file to answer this question.

*1 point- complete answer to the question, a total of $10 million allocated to one or more options.*

**9. Importance of issue (1 point)** See the “student work” file to answer this question.

*1- complete and thoughtful answer to the question ”why” and a rank given*

**10. Impact (1 point)** See the “student work” file to answer this question.

*1 – the action presented by the student is clearly related to the issue.*

**11. Your Actions (1 point)** See the “student work” file to answer this question.

*1 – complete and thoughtful answer to the question.*