INTERACTIVE ENERGY & CLIMATE SIM GAME WORKSHEET

Stakeholder Group: _____

Number of People: _____

Link to instruction video: http://climate.llnl.gov/media/intro-video.mov
Link to simulation game: https://climatesim.llnl.gov/
LLNL's Climate & Carbon Center: http://climate.llnl.gov/
Steps2STEM website: http://steps2stem.github.io/

For each Stage

1.) Select a single person to be your representative. They will announce your choices later. Write their name below.

Representative: _____

2.) Look at the screen. Fill in the information below.

Stage #: _____

Budget: _____

Carbon Emission: _____

3.) Review the guidelines sheet (last sheet in this packet). For all stages other than Stage 1, there will have been some random change to your input parameters. Keep that change in mind!
As a group, decide how much of each power source and carbon capture devices you would like to purchase. The cost of item is on the screen. Keep in mind you need to meet the desired energy demand for BOTH transportation and electricity while remaining within budget and limiting carbon emission.
Record your decisions below. (3 mins)

Biomass: _____

Wind: _____

Solar: _____

Natural Gas: _____

Coal: _____

Petroleum: _____

Nuclear: _____

CO2 Capture: _____

4.) Have the representative from your group announce your group's suggestions and why you choose them to the other groups. If you are in Carbon Cycle Scientists

Group, Civilian Group 1, or Civilian Group 2, have your representative will give your group worksheet to the Power Company's representative. (5 min)

5.) **Power Company Group ONLY**: Review the Carbon Cycle Scientists Group, Civilians Group 1, and Civilian Group 2 suggestions. Decide if you would like to make changes to your selections. If so, revise recorded decisions in 2.). Give the other groups their worksheets. (1 min)

6.) **Power Company Group ONLY**: On by one, read your final decisions in 2.), to the workshop volunteer at the screen. The workshop volunteer will input final decision into simulation game. Pay close attention to the bars indicating carbon emission, transportation output, and electricity output.

7.) Answer the following questions.

What are your Carbon emission? _____

Did you meet the transportation output goal? _____

Did you meeting the electricity output goal? _____

Did you stay on budget? _____

The workshop volunteer will click "next stage." Pay attention to what the game indicates. It will spin a wheel for a random change in parameters. This will have an effect on costs, carbon emission, and/or energy output.

What was the random change? _____

8.) Next the game will give you an idea of what the net effect your selected energy profile has on global temperature and ecosystem.
Answer the following questions.

What was the average global temp change? _____

What the effect on the global ecosystem? _____

_____

_____

9.) If you passed to the next Stage, start back at 1.) and repeat. If you need another worksheet, please ask one of the workshop volunteers.

INTERACTIVE ENERGY & CLIMATE SIM GAME GUIDELINES

Here are a few helpful hints for helping you chose your energy profile! Make sure you look at the screen for cost of each item.
These guidelines are based off of Stage 1. Between each stage, a random change generated by the game may affect these guidelines.

Biomass:

1 unit will increase both transportation and electrical output by approximately the same amount
1 unit will not increase carbon emission

Wind:

1 unit will increase electrical output only
1 unit will not increase carbon emission

Solar:

1 unit will increase electrical output only
1 unit will not increase carbon emission

Natural Gas:

1 unit will increase electrical output more than transportation output
1 unit will increase carbon emission by 0.3

Coal:

1 unit will increase electrical output only
1 unit will increase carbon emission by 0.5

Petroleum:

1 unit will increase transportation output more than energy output
1 unit will increase carbon emission by 0.2

Nuclear:

1 unit will increase electrical output only
1 unit will not increase carbon emission

CO2 Capture:

1 unit will not affect transportation or electrical output
1 unit will decrease carbon emission by 0.5

Group: Power Company
Role: Final selection decision
Goal: Want to meet energy demand in the most economical way while still keeping ALL groups happy.

Group: Carbon Cycle Scientists
Role: Act as subject matter experts
Goal: Voice scientific opinion on what energy profile should be selected considering the effects on carbon emissions. Want to meet energy demand but keep carbon emissions as low are reasonably possible.

Group: Civilian Group 1
Role: Customer of Power Company Group
Goal: In general power, energy consumers will have a variety of different opinions on what type of energy profile their power provider should have. As a group, you can take whichever stance of the energy profile you like. Want to meet energy demands at a cost that is affordable to customers while keeping in mind your opinions of different energy sources.

Group: Civilian Group 2
Role: Customer of Power Company Group
Goal: In general power, energy consumers will have a variety of different opinions on what type of energy profile their power provider should have. As a group, you can take whichever stance of the energy profile you like. Want to meet energy demands at a cost that is affordable to customers while keeping in mind your opinions of different energy sources.