

Teacher(s): Doug Horn	Unit Title: Energy Efficiency and Renewable Energy (EERE)
Subject: Physical, Env, and Social Sciences	Lesson Title: Energy Simulation Games
Grade Level(s): 9-12	Lesson Length: 1 hours (+ optional time outside class)
Date(s): 7/14/2014	

- **Learning Goal(s)**

By the end of this lesson, students will have a deeper understanding of Energy Management, Policy, and Decision Making.

- **Connection to Energy/ Renewable Energy**

In this assignment you will be using an energy simulation tool to examine the effects of energy decision making on economics, environment, and standard of living. You will do this on a local scale for a small imaginary municipality, You will model energy use patterns over a 150 year interval.

BACKGROUND INFORMATION:

Read the Powerpoint “Germany for NREL” which discusses Germany’s goal to become 75% sufficient with renewable energy. (see email attachment). The purpose of this assignment is to examine some of the challenges related to this goal in more detail.

- **Connection to Standards**

1. Physical Science

Energy exists in many forms such as mechanical, chemical, electrical, radiant, thermal, nuclear, that can be quantified and experimentally determined.

2. Life Science

Matter tends to be cycled within an ecosystem, while energy is transformed and eventually exits an ecosystem.

The size and persistence of populations depend on their interactions with each other and on the abiotic factors in an ecosystem.

3. Earth Systems Science

There are costs, benefits, and consequences of exploration, development, and consumption of renewable and nonrenewable resources.

- **Materials/Resources**

Computers with access to internet websites Electricity

- **Procedure**

You will be using an online game, called ELECTROCITY, to examine issues related to energy management for a small municipality. ElectroCity is an online computer game that lets players manage their own virtual towns and cities, while teaching players about energy, sustainability and environmental management. The game was developed by

Genesis Energy, a leading generator and retailer of energy in New Zealand. Genesis generates electricity from a range of sources including gas, coal, wind and water (But not nuclear power which is not allowed in New Zealand).

1. Go to: <http://www.electrocity.co.nz/HowToPlay/>
2. Read the instructions on HOW TO PLAY.
3. Start a new game, and give your town a name.
4. Continue playing the game by making changes to your city and clicking “next turn”. The game lasts for 150 turns.
5. At the end of the game, record your scores for: Energy management, Popularity, Population, Environment, and Overall Score
6. Click on the option to “Save and Show Off”.
Enter Your Name and Enter Teacher Code: KW19107
This will submit your results to your instructor.
7. If you would like to play the game more than once to improve your score you are welcome to do so either here at school or somewhere else.

- **Technology Integration**
Computer and Internet use.
- **Model/Guided Practice**
NA
- **Check for Understanding**

QUESTIONS FOR STUDENTS TO ANSWER:

1. Write a short paragraph reflecting on your experience managing the energy budget for your ElectroCity. What strategy did you adopt for development of your city? How did this affect your scores for the various areas? Did you find any aspects of the game to be particularly challenging, or surprising?
2. Write a short paragraph addressing the following two questions. Did you learn anything interesting about any of the energy technologies that you used during the simulations? Were there factors (pros or cons) that you had not previously considered or been aware of?
3. Write a short paragraph evaluating the stated goal of Costa Rica to be the world’s first carbon neutral country. Do you think that they will be able to achieve this goal? Will they be able to do it in the time that they aspire? What challenges do you think that they might face?

- **Independent Practice**

Students can play again at home to try and improve their score.

- **Assessment/Closure**

You could set a minimum cut-off score that students must achieve in order to “pass-out” of the task.

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