Teacher(s): Woodward	**Unit Title:** Solar/Renewable Energy.
Subject: Engineering	**Lesson Title:** ElectroCity
Grade Level(s): 9-10	**Lesson Length:** 1 day (50 Minutes)
Date(s): 07/17/14	

- **Learning Goal(s)** [What should students know, understand, or be able to do as a result of this lab or activity.]

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

  Students will be able to discuss Energy management in the context of urban planning.

- **Energy Connection** [How is this lesson connected to energy or renewable energy concepts.]

  In this assignment you will be energy simulation tools to examine the effects of energy decision making on economics, environment, and standard of living.
  You will do this first on a local scale for a small imaginary municipality over a 100 year interval.

- **Connection to Standards** [List local, state, and/or national standards addressed by this lab or activity.]

- **Materials and Resources** [List materials, handouts, and any other resources needed to complete this lab or activity.]
   Computer

- **Procedure** [List all necessary steps for the lab or activity.]
  In part one 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
  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: [Insert teacher code]
  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.

- **Technology Integration** [List and/or describe the technology that will be used and how it will be integrated into the lesson.]

- **Modeling & Guided Practice** [List and/or describe any modeling or guided practice]

- **Checks for Understanding** [Identify when and how checks for understanding will be done.]
  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?
  Did you learn anything interesting about any of the energy technologies that you used during the simulation? Were there factors (pros or cons) that you had not previously considered or been aware of?

  2. Replay ELECTROCITY, Making a note of the prices to see and buy a share of coal and gas every five turns, and place your values into and excel sheet. Point out the global max and min for each resource, and calculate the profit for purchasing a share at each turn.

- **Independent Practice** [List and/or describe any work students will be asked to do independently to reinforce the learnings associated with this lesson.]

- Replay ELECTROCITY, Making a note of the prices to see and buy a share of coal and gas every five turns, and place your values into and excel sheet. Point out the global max and min for each resource, and calculate the profit for purchasing a share at each turn.

- **Assessment & Closure** [Describe how this lesson will be brought to a close and how student understanding will be assessed.]

  Discuss a strategy to maximize profits within the two markets (gas and coal) provided in the game. This strategy MUST NOT BE PREDICTIVE.

  Where could these new assets be spent?

  Use this new strategy and replay the game a final time, recording the markets, purchase amounts and purchase points, selling amount and selling point.