SYSTEM CONTROL OPERATOR

STUDENT NAME: **CLASS:** **DATE:**

NEWSFLASH! The governor has declared that all energy consumed in your state must be 100% clean and carbon-free by 2050. And the deadline is fast approaching. To jumpstart this, your community was selected to be the first one to transition to 100% renewable energy. But what kind of **electric energy system** would it take to do that? This is what your team will uncover …

Hello, **System Control Operator**. It's a good thing we have you on the front lines. The community will be counting on you to monitor the electric transmission system and keep the power on. And with your knowledge of load and voltage conditions, your team will be able to plan a reliable energy system.

To make sure your energy system is reliable, consider researching the following:

- Begin your research by checking out the info and video at: http://intotheoutdoors.org/topics/**maintaining-the-flow-of-electrons/**
- What are the benefits to being connected to the national electric grid? _____
  _____
  _____
- What is the Midcontinent Independent System Operator (MISO)? _____
  _____
  _____
- What is a watt? What is a kilo-watt hour? _____
  _____
  _____
- What does the "load" mean? _____
  _____
  _____
- In America, the average daily consumption of electricity is 12.2 kilowatt-hours per person. Calculate the average load for your community by multiplying the average above by the population of your community to determine the demand your generation sources must meet. _____
- How do you predict your community's load will fluctuate throughout the day? Graph your predictions on a separate sheet of paper. _____
  _____
  _____

- Will your generation source create enough energy to supply your community's demand? Consult your Power Engineer and Electrical Planning Engineer. _____
  _____
  _____
- How will the load affect the voltage and the equipment? _____
  _____
  _____
- What other variables can affect or damage the equipment and interrupt power to your community? _____
  _____
  _____
- What personnel and technology will you need on stand-by to repair and maintain the equipment? Include these in your energy system diorama. _____
  _____
  _____

Next, discuss your findings with your team members and plan out an electrical energy system that will generate and deliver renewable, safe, efficient, reliable power to your community. As a group, use all of your discoveries to design and craft a diorama of your energy system on top of a sheet of cardboard. First, paint an aerial view of your landscape on the cardboard. Then let your inner genius out and construct your electrical energy system on the landscape. You may mold clay or use construction paper to build houses and transmission equipment … or even glue in natural resources like sticks, pebbles, moss, grasses, or sand to recreate the landscape. Your team will pitch your renewable energy system diorama to the class with supporting research. The group who receives most of the community's support wins the challenge!