

# Knowing Energy: The Electricity Grid

Energy Revealed

Answer Key

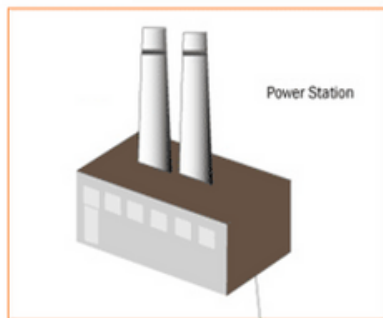
Level 1-2: Grades 3-8

Level 3-4: Grades 9-12

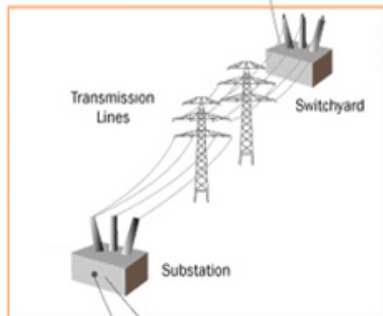


## Level 1 Questions/Activities:

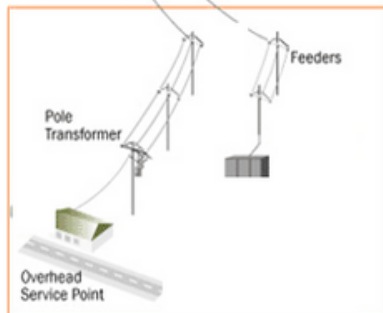
1. Based on what you have learned in the videos, label the diagram provided with the various parts of the electrical grid.



Label:  
Distribution



Label:  
Transmission



Label:  
Distribution

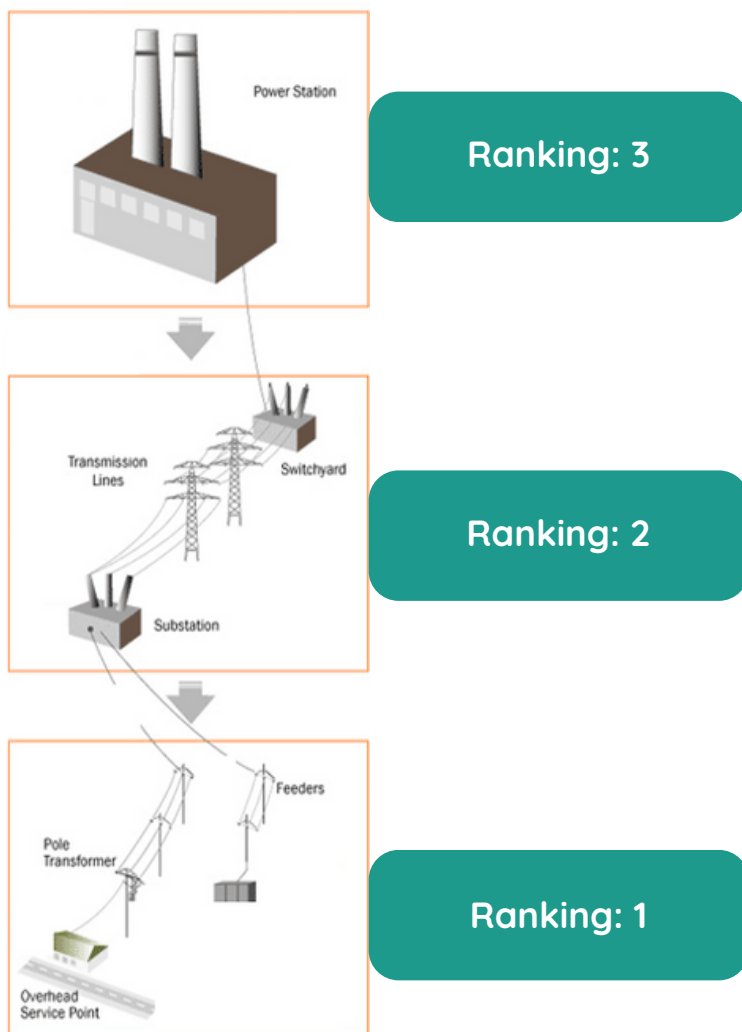
2. Find three ways to reduce the waste in your house so that the generators do not need to provide as much power to you.

Top ways: turn anything off, turn anything down, get rid of things, reducing time things are used, new windows doors or insulation, appliance maintenance.

### Level 2 Questions/Activities:

- **Note:** Complete level 1 questions/activities first if you haven't already done so.

1. Identify the three areas in the system in the diagram where energy is lost, rank them 1, 2, or 3, with 3 being the largest losses.



2. Find three ways to increase the efficiency of things in your house to also reduce the power and losses in the grid.

Top ways: LED lights, energy-efficient appliances, change air filters, smart thermostats.

### Level 3 Questions/Activities:

- **Note:** Complete levels 1-2 questions/activities first if you haven't already done so.

#### 1. From your electricity bill in the previous exercise find where the transmission loss factor is on your bill, what is that value?

This is found usually on the second page of the bill, in table form (see video).

#### 2. How much do these losses cost you in dollars, using the average price of electricity?

Multiply the difference by the average cost, cost will depend on location and pricing structure in the location (Ontario is 11.9 cents per kWh all day).

#### 3. On the day you complete this assignment, research what the electrical grid mix is for your geographic location (grid mix is the different sources of fuel used to generate electricity like hydropower and natural gas, etc.).

In Ontario this info is available at:

 <https://ieso.ca/en/Learn/Ontario-Supply-Mix/Ontario-Energy-Capacity>

Other areas will have similar sites.

### Level 4 Questions/Activities:

- **Note:** Complete levels 1-3 questions/activities first if you haven't already done so.

#### 1. To complete your three steps to energy efficiency, propose a project to do on your home that optimizes the supply (i.e., solar). Pretend the cost does not matter for this and have fun explaining why you chose this project.

Anything goes here!

#### 2. If you were to save 500 kWh in a month on your electricity bill, given the grid mix in your area, find the emissions factor to see how many tonnes of CO<sub>2</sub> you saved.

Ontario's Factor is approx. 0.0004 tonnes CO<sub>2</sub> per kWh, each area will be different, Quebec, BC and Ontario will be a lower number than the rest of the country since they do not use as many fossil fuels to generate electricity. Factors change all the time depending on the mix, so if there aren't any outliers the numbers should be good. So, 500 kWh x 0.0004 tonnes/kWh = 0.2 tonnes CO<sub>2</sub>.