**Lesson 8: How Can Changes in the Electricity Sector Reduce Carbon Emissions?**

# Part 1: Introduction to Project Drawdown

# Introduction: Watch Drawdown Roadmap Unit 5 <https://www.youtube.com/embed/xSvQYMH3FJw?start=28&end=258>

# 1. For this exercise, we will be using information from Project Drawdown which “reviews and analyzes practices and technologies that can reduce greenhouse gas concentrations in Earth’s atmosphere and also are currently available, growing in scale, financially viable, able to have a net positive impact, and quantifiable.” Their goal is to show how we can ‘draw down’ carbon emissions and then ‘draw down’ the amount of carbon dioxide we have already added into the atmosphere. Which of the five criteria in bold above, do you think is the most important in choosing the best solutions to reduce climate change? Why?

# currently available

# growing in scale

# financially viable

# able to have a net positive impact

# quantifiable

2. In this lesson you are going to focus on reducing carbon emissions that are associated with the **Electricity Sector.** Your teacher will provide you with a table of 19 solutions which you will analyse. Details about the solutions can be found at <https://drawdown.org/solutions/table-of-solutions>. There is a lot of information provided, perhaps more than you need. Let’s look at one example, **Green and Cool Roofs**. <https://drawdown.org/solutions/green-and-cool-roofs>

1. Look at the **Heading**, **Introduction,** and the first two paragraphs of the **Discussion.** Compare **green roofs** and **cool roofs**. How are they similar? How are they different?
2. Look at the three data ranges to the right on the webpage. What is the average value of each, rounded to the nearest power of ten? What do these numbers represent?
3. Look at the **Co-benefits**. What are they?

3. The solutions for reducing carbon emissions associated with the electricity sector can be divided into three main strategies. The first is to generate ‘green’ electricity using processes that don’t emit carbon dioxide. The second is to reduce the need for electricity, through more efficient use of electrical energy. The third is to electrify devices that traditionally use fossil fuels. This last strategy will increase electricity use, but will reduce fossil fuel use if the first strategy has been implemented. Look at the table provided and highlight the names in the first column with the appropriate colour according to which strategy they fit in.

**Part 2: Preparing the Data Table using Spreadsheet Tools**

1. It will be useful to know the total values for the first three columns. Use a formula to calculate these numbers and enter them in a new row at the bottom.

2. It will be useful to know the cost and savings per amount of CO2 removed. Use a spreadsheet formula to calculate these values for the fifth and sixth columns.

3. It will be useful to know which strategies are really good or really poor in each of the five columns. Highlight the best few in green and the worst few in red for each measurement using **conditional formatting**. Note: ‘A few’ can be anywhere from 3 to 5.

**Part 3: Examining and Comparing the Costs of the Different Solutions**

1. Three of the solutions are especially important because the “Initial Cost”, as defined by Project Drawdown, is negative! They have defined “Initial Cost” to be how much you will need to spend on the hardware and installation over the thirty year period (2020-2050). These three solutions will cost less to purchase and install than the traditional technologies they replace.

1. What are these three solutions and what is each being compared to?
2. In 2018 LED lights cost ten times as much as incandescent lights; $10 vs. $1. To convince people to switch, the Ontario government gave purchasers a $3 rebate if they bought an LED bulb. They don’t give these rebates anymore. Why? Do an internet search to find out how the costs compare now. What are the other benefits of LED lights?
3. In 2018 electric cars cost around $36,000 compared to $18,000 for a comparable gas-powered car. To convince people to switch, the Ontario government gave a rebate $10,000 to people who bought an electric car. The Ontario government doesn’t give these rebates anymore, but the federal government gives a $5,000 rebate. Do an internet search to find out how the costs compare now. What are the other benefits of electric cars?
4. According to Project Drawdown, a large solar farm will be cheaper than a gas-powered plant in the future. In fact, it is already the case! Find a quote from a source online that confirms this. Make sure you look for a source that is up-to-date.
5. Instead of looking at “Initial Costs”, you could look at what will save money in the long run, from 2020-2050. Which four solutions from the table will save the most money over the thirty years?
6. Many critics of solutions to climate change say that the solutions will cost too much and that they will destroy the economy. Does this table of data support that argument? Explain.