

## Problem Question

### The Current Situation

Right now, the power plants in PA make about 225 terawatt-hours (TWh) of electricity each year. A TWh is a measure of electricity use. One TWh is a lot of electricity. In comparison, an average household in PA uses less than 0.001% of one TWh of electricity per year.

### The Future Situation

PA will need more electricity in 25 years than the power plants it has now can make. The power plants in PA will need to make about 285 TWh of electricity each year to keep up with demand. So, new plants will need to be built. These new power plants will make the additional 60 TWh of electricity that PA needs each year.

**The original plan was to build the following power plants in PA: 6 coal power plants (in which the CO<sub>2</sub> is released into the air), 4 natural gas power plants, 3 nuclear power plants and 1 wind farm.** But, suppose that the U.S. Congress has just passed a law to reduce the CO<sub>2</sub> released by power plants built in the future. As a result of this law, the State of PA must change some of the power plant types that will be built here over the next 25 years. These power plants will collectively need to release 50% less CO<sub>2</sub> than the original plan. **A different combination of power plants will need to be built.** Imagine that the Governor of Pennsylvania has asked you to serve on a Citizen's Advisory Panel **to give advice on how many of each plant type should be built in PA.**

### Your Task

Your job is to use the computer tool to provide this advice. You will **build a combination of new power plants** that you think is the best. The combination must **make 60 TWh of electricity per year, but release 50% of the CO<sub>2</sub> that would have been released using the original plan.**

### Power Plant Types

The computer tool allows you to build:

- 5 types of coal plants: (a) Coal Plants, (b) Coal plants with equipment that captures the CO<sub>2</sub> (so it won't be released to the air), (c) Coal-and-Biomass plant (uses coal that is mixed with materials made from wood chips and farm crops), (d) Coal-to-Gas plants (plants that turn coal into gas before making electricity), and (e) Coal-to-Gas plants with equipment that captures the CO<sub>2</sub> (so it won't be released to the air).
- 4 other plant types: (a) Natural gas plants, (b) Nuclear plants, (c) Solar cell power, and (d) Wind power

An additional option that could reduce the number of new plants that have to be built is:

- Energy efficiency or using less electricity (such as using more efficient appliances or insulating buildings). If we use less electricity, fewer plants need to be built.

1. Use the computer tool to create your own combination.
2. Once you have created a combination, save it by hitting the "Review and Save" button. Give your combination a name.
3. Create 2 more combinations that you may want to consider. Save each of them using a different name.
4. When you have saved 3 combinations you like, hit the "compare" button. Compare the combinations and decide which one you would want to tell the Governor to build in PA in the next 25 years.