ACTIVITY 8

Stakeholder Recommendation

INVESTIGATION

Land-use decisions impact many stakeholders, including farmers.

8: STAKEHOLDER RECOMMENDATION

GUIDING QUESTION

How can facts and values inform planning for the future?

INTRODUCTION

When considering a new renewable energy system, an important factor in planning can be how the land in the area will be used for power generation. Every electrical power generation site takes up space, but renewable energy can be especially land intensive. For the same amount of energy, wind and solar electricity generation requires 10 times as much land as a fossil fuel power plant. Plus, wind and solar generation must be located where the resource availability is best, unlike fossil fuels that can be transported from a more convenient place after it has been extracted from the land. On the other hand, fossil fuel extraction can devastate the land from which it is drawn and requires energy to do so. An important part of planning a renewable energy project such as Project REV is taking into consideration how stakeholders feel about where electrical power generation sites are located.

In this activity, you will get information about solar and wind power, along with the possible locations for generation in Vanwick. Your role is to identify the generation sites that will help accomplish the goals of Project REV, using the tools you have learned. This will include taking into account your stakeholders' perspectives and balancing the trade-offs of the choices.

CONCEPTUAL TOOLS

WEAVING FACTS & VALUES IN DECISION-MAKING

GROUP DECISION-MAKING

PROCEDURE

1 Read the following scenario.

Project REV has identified nine locations in Vanwick that are possible sites for solar and wind generation. In order to generate enough power, multiple sites will need to be used. Now, the City Council is soliciting feedback from its residents about the type and location of the generation to include in their final plan.

The city of Vanwick is looking for places to add electrical power generation.

MATERIALS LIST

FOR EACH GROUP OF FOUR STUDENTS

- SITE SURVEY CARDS (9)
- STAKEHOLDER CARD

FOR EACH PAIR OF STUDENTS

- COMPUTER WITH INTERNET ACCESS

FOR EACH STUDENT

- STUDENT SHEET 8.1 "Vanwick Site Map: Stakeholder"

2 Read the following background information about solar and wind power generation.

SOLAR POWER

Rooftop solar power systems usually provide around 5 kW for a typical household. A rooftop solar system on a large commercial building, which has more area than a typical household rooftop, can generate over 100 kW–1 MW.

Solar Plants typically provide around 10–500 MW (the largest single plant in the world is over 1,000 MW).

Greenhouse gases

Since light is transformed directly into electrical power, greenhouse gases are not released during operation.

Location

- For large solar plants, the area needs to be big, open, and flat. There needs to be additional space between the panel rows.
- Rooftop solar systems work best with uncomplicated rooflines and panels that face south to capture sunlight.

Impacts

- Solar panels have no moving parts, so they are silent. Other activities can be used with panels so the land can be used for multiple purposes, such as animal grazing, rotating crops, sheltering parking garages, and more.
- There are natural resources and energy, usually supplied by fossil fuels, that are required to build the panels. There are some electronics in the panel, so disposal is important, and there are currently limited recycling options.

Jobs

Solar power systems require a lot of workers to install the site, but since there are no moving parts, it does not need as many permanent workers as wind power.

Electricity costs

- For private small solar installations, there are minimal electric bills because power is generated on site. The initial cost of rooftop solar is usually recovered in about 5 years by savings on electric bills.
- For large-scale solar plants, the cost to the consumer depends on the utility company in charge of service. For Vanwick, costs are predicted to stay about the same.

WIND POWER

Small wind turbines, sometimes called microturbines, range in size but typically provide around 10–100 kW.

Large utility-size wind turbines can generate up to 8 MW.

Greenhouse gases

Since wind turbines directly turn the shaft of a generator, no greenhouse gases are released during operation.

Location

- Large wind turbines are placed on top of hills with towers up to 150 m (490 ft) and are 90 m (295 ft) wide. They are placed about 0.8 km (½ mile) apart. They are often visible over 20 km (12 miles) away.
- Small wind turbines need to be mounted on secure towers, either on roofs or in fields that are 9 m (30 ft) above objects and people.

Impacts

- Wind turbines make a "swishing" noise as they turn that can be heard up to a mile away.
- There are natural resources and energy, usually supplied by fossil fuels, that are used to build the wind turbines. The towers are made mostly of metal, which is easily recyclable. The blades are made of fiberglass, which currently has some reuses but has limited recyclability.

Jobs

A lot of workers are needed to install wind turbines. Since there are custom pieces and moving parts, turbine installation requires some educated and highly paid workers compared to solar. The maintenance of wind turbines is ongoing because parts wear out, so that provides more permanent jobs than solar.

Electricity costs

- For private small wind turbines, there are minimal electric bills because power is generated on site. The initial cost of a small turbine is usually recovered in about 5–10 years by savings on electric bills.
- For large-scale wind turbines, the cost to the consumer depends on the utility company that is in charge of service. For Vanwick, costs are predicted to stay about the same.

3 Your teacher will provide your group with a stakeholder card. Review the values and their weights on the card that relate to choosing a generation site.

4 With your group, review the 9 Site Survey cards and match the descriptions to their locations on Student Sheet 8.1, "Vanwick Site Map: Stakeholder."

5 Compare the values and their weights of your stakeholder to the possible generation at each location.

6 Use the Decision-Analysis Tool to analyze the locations that your stakeholder will support. Use the values on the Stakeholder card and choose up to five sites as options. Use the facts about solar and wind and the description of each site to evaluate the values with a rating.

HINT: You may want to use the tool more than once or swap in locations to analyze more than five sites.

7 In your science notebook, record your results from the Decision-Analysis Tool.

8 With your group, use Student Sheet 8.1 to select the locations, type of electrical generation, and amount of generation your stakeholder supports. Circle or highlight the locations on the student sheet. Record your reasoning at the bottom of the student sheet. Remember, this recommendation is based on the perspective of your stakeholder.

BUILD UNDERSTANDING

① How did creating the plan to meet the values of your stakeholder, instead of for yourself, impact the plan you made?

② What trade-offs did you make in choosing the locations for your recommendation?

③ Imagine that two different stakeholder groups decided to join together to make a single group decision. What are some ways they could go about it?

CONNECTIONS TO EVERYDAY LIFE

④ Describe an experience in which you and someone else had the same facts about a situation but had different values about it. Explain how facts and values resulted in different decisions and outcomes.