



ACTIVITY 7

Building Initiative

COMPUTER APP

BedZED in Hackbridge, London, England, is a large-scale zero-carbon emissions community.



7: BUILDING INITIATIVE

GUIDING QUESTION

How can a decision-analysis tool help make group decisions?

INTRODUCTION

Energy generation from renewable resources instead of fossil fuels is crucial to reducing greenhouse gas emissions. Yet, there are other significant sources of greenhouse gas emissions, such as those from burning fossil fuels when making goods and services and those from transportation such as cars, trucks, and airplanes. Another big contributor to greenhouse gas emissions that is often overlooked are homes and buildings. About 37% of greenhouse gas emissions come from buildings, with 28% coming from building operations and 9% released during construction.

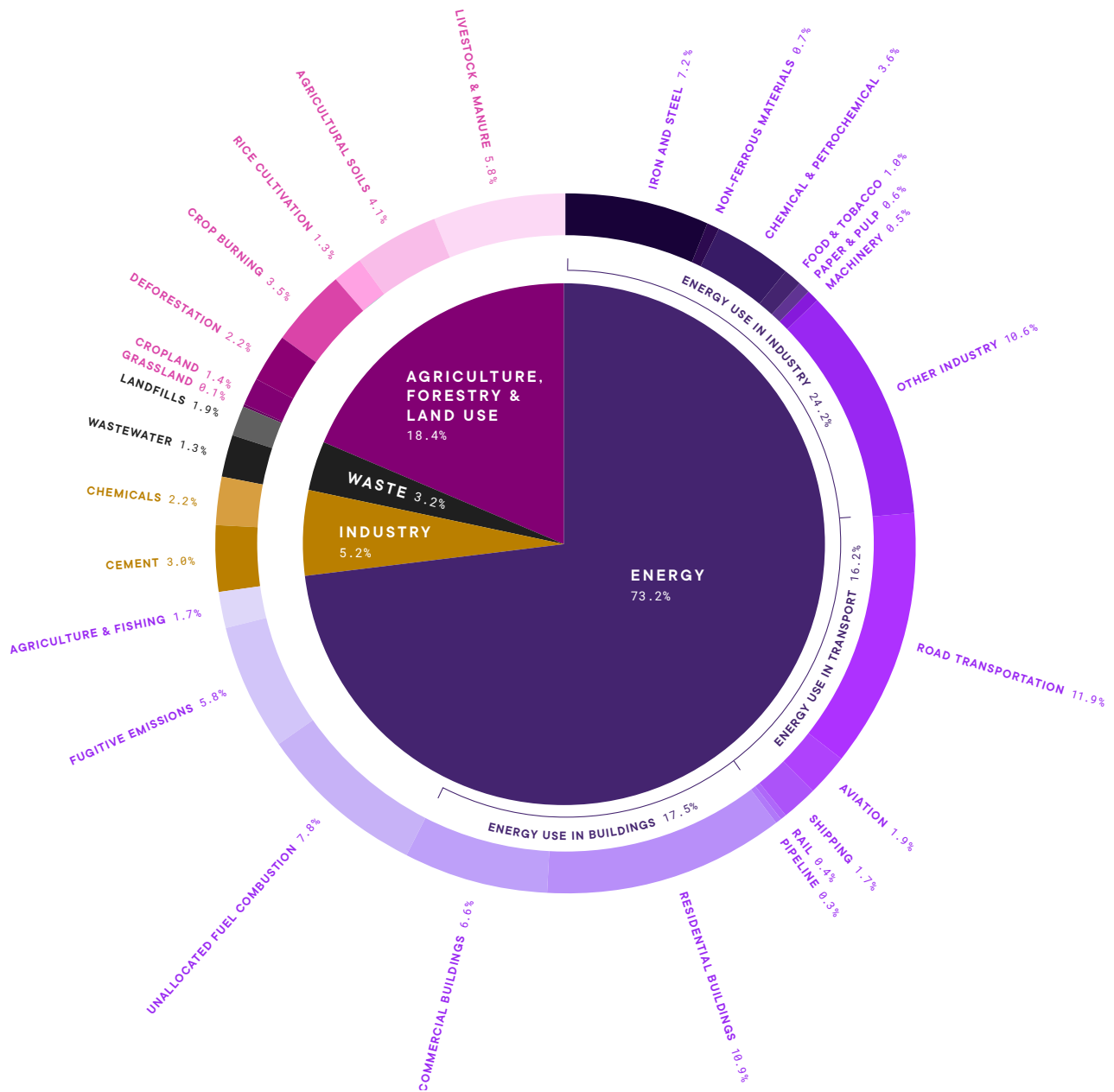
There are many different ways that energy consumption in buildings can be reduced. Effective strategies include reducing the amount of energy needed and installing a heating system that does not depend on fossil fuels. In this activity, you will act in the role of the Vanwick City Council who has decided to try to reduce greenhouse gas emissions from buildings in support of Project REV. To do this, you will use a tool in the form of an online app to inform your decision. This **decision-analysis tool** systematically breaks down a decision by mathematically weighing the facts and values related to the decision.

CONCEPTUAL
TOOLS



FIGURE 7.1
Global greenhouse gas emissions by sector
Our World in Data (2020)

This graph shows the percentage of greenhouse gas emissions released from running residential and commercial buildings. Additional emissions related to buildings are included in unallocated fuel combustion, iron and steel production, cement, transportation, and petrochemical manufacturing.



PROCEDURE

- 1 With your group, read the following scenario.

When the City Council asked for feedback about Project REV from its citizens, they discovered that many people realized that there is more to reducing greenhouse gas emissions than using renewable sources to generate electricity. They decided to support the Project REV efforts to reduce emissions by creating a concurrent plan to improve the energy efficiency of existing buildings and future construction in Vanwick. They came up with a final list of solutions but need to decide which one they should fund. As they consider their options, city leaders are looking for solutions that will prioritize the following values:

- *reduce greenhouse gas emissions,*
 - *have a positive, equitable impact on all residents, and*
 - *be cost-effective.*
- 2 Read the information on the Building Initiative Fact Sheets (A–D) provided by your teacher. As a class, review the information and discuss any clarifying questions.
 - 3 Assume that the City Council weighs the three values given in the scenario equally. Record the values, assign weights to the values, and record them in Table 1 of Student Sheet 7.1, “Building Initiative Information.”
 - 4 Reread each initiative and identify the facts for each option that relate to each value. Record them in Table 2 of Student Sheet 7.1. Then, use the facts to evaluate how well each option fulfills that value. Assign a rating with a scale from 0 (doesn’t fulfill this value at all) to 4 (fulfills this value perfectly). If there is more than one fact that relates to an option, just record the same value again in the left-hand column.

MATERIALS LIST

FOR EACH GROUP
OF FOUR STUDENTS

BUILDING INITIATIVE
FACT SHEETS (A–D)

FOR EACH PAIR
OF STUDENTS

COMPUTER WITH
INTERNET ACCESS

FOR EACH STUDENT

STUDENT SHEET 7.1
“Building Initiative
Information”

FIGURE 7.2
Portion of the Decision-Analysis Tool screen



- 5 Go to the Decision-Analysis Tool and fill out the information from Student Sheet 7.1 into the app.
 HINT: Choose “Add an Option” at the top of the screen before beginning.
- 6 Look at the points in the graph for each Initiative. Record the results from the app on your student sheet.
- 7 In your group, write a one-sentence decision together on behalf of the City Council to be posted on Vanwick’s social media account. Use the information you gained from the Decision-Analysis Tool to explain your reasoning.
- 8 Share your posts with your class.
- 9 Now imagine that the City Council prioritized one of the values over the other two. In your group, predict how the outcome will be different if the value weights are the following:
 - cost-effective 80
 - reducing greenhouse gases 10
 - positive, equitable impact 10
 Record your prediction in your science notebook.
- 10 Change the value weights in the Decision-Analysis Tool to correspond with Step 9. Record your results in your science notebook.
- 11 As a class, compare the decision with the values being evenly weighted to values made with different weights. Discuss how decisions are shaped by values even when relying on the same facts.

BUILD UNDERSTANDING

- ① Consider the initiatives proposed in this activity. If you were a resident of Vanwick making a recommendation for the City Council on Initiatives A–D, which initiative would you recommend? Explain your decision and include the following:
 - the relevant facts and stakeholder values and how they affected your decision,
 - the predicted outcome(s) of your decision,
 - any trade-offs involved in your decision.
- ② What factors might lead you to make a group decision that is different from the numerical result from the Decision-Analysis Tool?

CONNECTIONS TO EVERYDAY LIFE

- ③ Think about a significant decision that you must make in the near future. Use the Decision-Analysis Tool to evaluate your choices. Did the results of the Decision-Analysis Tool help you make the decision? Explain why or why not.

EXTENSION

Find out about an energy decision your town is considering. Do you think the app you used in this activity would be helpful in making that decision? Explain why or why not.

KEY SCIENTIFIC TERMS

decision-analysis tool