FLNG: A NATURAL SOLUTION

Grades 9–12

In this lesson, students will develop a problem statement based on several facts related to the exploration, drilling, and transport of natural gas. They will brainstorm possible solutions to their problem and consider how floating liquefied natural gas (FLNG) could be one of them.

Lesson Printable: Which Biofuel Is Best?

Objectives:

- Students will write a problem statement based on a series of facts about natural gas.
- Students will analyze facts and information related to floating liquefied natural gas (FLNG) and draw conclusions about how FLNG can be a solution to their problem.
- Students will illustrate the relationship between their problem and FLNG.

Alignment with National Standards: Science, Technology, Engineering, Math

Skills: Research and investigation, measurement, synthesis, reasonable prediction, data interpretation and analysis, design, evaluation

MATERIALS

- Internet access
- Printable, "Stranded Natural Gas? No Problem!" (PDF), one per student
- Index cards
- Art materials, dependent upon project selected

Time Required:

- Development of problem statement and possible solutions: 30–45 minutes
- Introduction to FLNG: 20–30 minutes
- Creation of project demonstrating how FLNG solves problem: 30–60 minutes (possible time outside of class)

(cont.)

DIRECTIONS

Part One

1. Write the words "stranded natural gas" on the board and ask students to guess what they think the term refers to, where they think the gas might be stranded, and why it presents a problem.
2. Divide students into small groups and distribute Part 1 of the printable, "Stranded Natural Gas? No Problem!" Read the directions, which ask each group to review the facts on the cards, show connections among at least five facts, create a problem statement based on those facts, and brainstorm related solutions. Encourage creativity on the solutions!
3. Have each group present the connections they made. Then ask them to introduce their problem statements and possible solutions to the class. Discuss the ideas. Do any common themes or ideas emerge? Do any ideas solve more than one of the problems presented? In which ideas would students be most likely to invest their own money and why?
4. Ask students if they are familiar with the term FLNG, which stands for Floating Liquefied Natural Gas. If so, have students share what they know. Explain that FLNG is a water-based liquefied natural gas operation that floats above an offshore natural gas field and essentially produces, liquefies, stores, and transfers liquid natural gas right at sea.
5. Distribute Part 2 of the printable, which shows visual representations of how natural gas is liquefied and an illustration of the Prelude FLNG project, currently being built. If time allows, show the online video, "Game Changer for Energy Industry," at www.shell.com/home/content/aboutshell/our_strategy/major_projects_2/prelude_flng/animation/. The video animates the Prelude FLNG project and its related technologies.
6. Ask students how FLNG could help to solve some of the problems they outlined at the beginning of the lesson. Guide students to think about:
   a. The lack of pipelines
   b. The economic viability of liquefying gas and then transporting by carriers
   c. The ability to tap into huge reserves of natural gas
   d. The reduced environmental footprint
7. Finally, ask students to connect their problem statement to one aspect of FLNG and to represent the problem and related solution either in written form or visually. This could be in the form of a paragraph, cartoon, poster, drawing, photograph, or video. They may need time to conduct additional research on liquefied natural gas, FLNG or the Prelude.

ADDITIONAL RESOURCES

- Shell: Prelude FLNG
  http://www.shell.com/home/content/aboutshell/our_strategy/major_projects_2/prelude_flng/overview/
- Shell: Game Changer for the Energy Industry
  http://www.shell.com/home/content/aboutshell/our_strategy/major_projects_2/prelude_flng/animation/
- U.S. Energy Information Administration, Energy in Brief: What role does liquefied natural gas play as an energy source for the United States?
  http://www.eia.gov/energy_in_brief/liquefied_natural_gas_lng.cfm
- Department of Energy Report: Liquefied Natural Gas: Understanding the basic facts
  http://www.fe.doe.gov/programs/oilgas/publications/lng/LNG_primerupd.pdf