U.S. DEPARTMENT OF
ENERGY

Office of
ENERGY EFFICIENCY &
RENEWABLE ENERGY

Municipal Solid Waste-to-Energy: Traditional Ecology and Environmental Justice

Bioenergy Research and Education Bridge (BRIDGES) Program Case Study Fact Sheet



According to the Environmental Protection Agency (EPA) we generate 292.4 million tons of trash in one year and 146.1 million tons of trash end up in landfills. *Image from Idaho National Laboratory.*

Sustainable Solutions for a Waste-to-Biofuels Challenge

Students will be introduced to the challenges of managing municipal solid waste, opportunities for turning these products into usable energy sources, and exciting careers in the bioenergy field.

Students will explore the challenges associated with any community designing a sustainable waste management strategy, and the unique challenges experienced by an over-burdened and underserved community. Students will focus on the ways that science and technology can inform potential solutions while being culturally responsive.

In this case study, students will be introduced to the Shoshone-Bannock Tribes, located on the Fort Hall Indian Reservation in southeastern Idaho.[1] Like many communities, the Tribes face the challenge of identifying sustainable practices to deal with their municipal solid waste (MSW), also known as landfill waste.

Students will assume the role of a chemical engineer at Idaho National Laboratory, who will assist the Tribal Youth Council in exploring sustainable solutions for managing waste streams while applying principles of environmental justice.

Activity Highlights

- Eligible students and instructors will receive a classroom kit with waste stream samples and other hands-on learning materials.
- Students will practice essential skills in synthesizing information, analyzing data, and communicating ideas.
- Materials are designed with scientists and industry professionals.
- Students will learn about bioenergy-related career paths.



BRIDGES Content Advisors

- Energy and Environment Science and Technology Department, Idaho National Laboratory
- U.S. Department of Energy (DOE) Bioenergy Technologies Office (BETO)
- DOE's BETO BRIDGES National Review Board

Learning Goals

- Explain the economic, logistical, and scientific challenges of managing community waste streams.
- Describe how environmental justice plays a role in underserved and over-burdened communities.
- Explain how scientists can embrace traditional Ways of Knowing to enhance their research.
- Gain experience using primary sources for research.
- Analyze datasets on MSW chemical and physical composition.
- Describe how MSW materials are processed for conversion into biofuels and coproducts.
- Describe the role and necessary skills for a chemical engineer working in the bioenergy industry.

Classroom Implementation

- Designed for use in high school, community college, technical institute, or university courses.
- Requires approximately 3 hours to complete.
- Students will need computers with internet access.
- Can be taught in-person or online asynchronously.
- All instructional materials for students and instructors are provided.

About the BRIDGES Program

The Bioenergy Research and Education Bridge (BRIDGES) is an education and workforce development program designed to assist educators in teaching bioenergy topics to prepare a national bioenergy workforce. Funded by the U.S. Department of Energy (DOE) Bioenergy Technologies Office (BETO), the BRIDGES Program includes real-world case studies and scenarios with expertise from education and community partners as well as industry and government partners.

More Information

For questions about BRIDGES or if you are interested in partnering, please email Bioenergy_Bridges@ee.doe.gov. ■

Bioenergy Research and Education BRIDGES
U.S. Department of Energy Bioenergy Technologies Office

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BIOENERGY TECHNOLOGIES OFFICE

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For more information, visit: energy.gov/eere/bioenergy/bioenergy-research-and-education-bridge-program

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[1] The Shoshone-Bannock Tribes is a federally recognized sovereign nation located in southeast Idaho. The use of the term "municipal solid waste" or "MSW" in this study is intended only to mirror commonly used descriptions for household trash products and is not intended to infringe in any way on the Tribes' sovereignty. www.sbtribes.com

Collage photos from the National Renewable Energy Laboratory, the Algae Foundation, and Unsplash.