

# Grass to Gas: Making Renewable Natural Gas

*A teacher professional development workshop*

[Apply now!](#) >

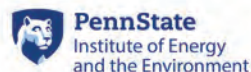
July 8-12, 2024

118 Chambers Building, University Park, PA 16802

Making Renewable Natural Gas is a week-long professional development workshop for secondary life science, agriculture, engineering, and chemistry teachers in collaboration with science education faculty from the Center for Science and the Schools (CSATS) and research scientists from the Penn State and Iowa State's [Grass2Gas](#) Project. Teachers will learn how scientists and engineers design systems and solve problems related to generating methane from anaerobic digestion. Teachers will work with the G2G team to work on hands-on activities using the practices of scientists and engineers to learn disciplinary core ideas in the Next Generation Science Standards and Pennsylvania STEELS Standards. The workshop will include field trips and time to reflect on how to use new lessons as a way to replace existing parts of your curriculum.

## Participant Benefits:

- A \$1,000 stipend for participating
- Classroom supplies
- Lodging and meals included. Travel reimbursement up to \$900
- Act 48 credit is available upon request.



This publication is available in alternative media on request. Penn State encourages qualified persons with disabilities to participate in its programs and activities. If you anticipate needing any type of accommodation or have questions about the physical access provided, please contact [kathyhill@psu.edu](mailto:kathyhill@psu.edu) in advance of your participation or visit. Penn State is an equal opportunity, affirmative action employer, and is committed to providing employment opportunities to all qualified applicants without regard to race, color, religion, age, sex, sexual orientation, gender identity, national origin, disability or protected veteran status. UBR EDU 24-76

# Academic Standards

## Next Generation Science Standards:

- **HS-ESS3-2** Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
- **HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
- **HS-PS3-3** Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy
- **HS-ETS1-1** Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants

## Keystone Eligible Content:

- **BIO.A.2.2.2** Describe how biological macromolecules form from monomers.
- **BIO.A.2.3.2** Explain how factors such as pH, temperature, and concentration levels can affect enzyme function.
- **BIO.B.4.2.3** Describe how matter recycles through and ecosystem (i.e., water cycle, carbon cycle, oxygen cycle, and nitrogen cycle).

## PA STEELS Standards (Updated PA Science and Technology Standards):

- **3.1.6-8.G** Develop a model to describe how food is rearranged through chemical reactions forming new molecules and/or release energy as this matter moves through an organism
- **3.1.9-12.J** Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions
- **3.1.9-12.P** Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
- **3.2.9-12.R** Evaluate or refine a technological solution that reduces the impact of human activities on natural systems
- **3.4.9-12.E** Plan and conduct an investigation utilizing environmental data about a local environmental issue
- **3.4.9-12 C** Analyze and interpret how issues, trends, technologies, and policies impact watersheds and water resources