Extreme Cold Climate Solar Aided Anerobic Digestion of Organic Waste for Pathogen Removal and Energy Production

United States / North America

PROJECT DESCRIPTION

Currently, there are approximately 3,300 homes across 30 villages in rural Alaska that lack water and sewer services, including flush toilets. Managing human waste in those communities poses significant public health and environmental challenges.

The U.S. Government is testing the feasibility of anaerobic digestion for sanitation in remote Alaskan communities where piped systems are not sustainable. Researchers are exploring the development of a solar augmented anaerobic digester to turn fecal matter, along with cardboard and other waste products from the community, into energy in the form of biomethane gas.

This has the potential to improve community health and reduce the methane generated by sewage lagoons by capturing it for use.

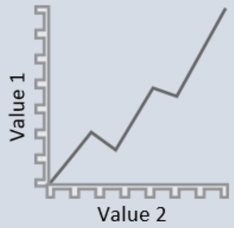
LEARN MORE

Could a seasonally frozen anaerobic digestor produce methane?

With solar augmentation, sub-arctic locations appear possible

Sanitation and energy needs in remote, cold locations

Frozen synthetic feces produced similar methane volumes to unfrozen, once thawed



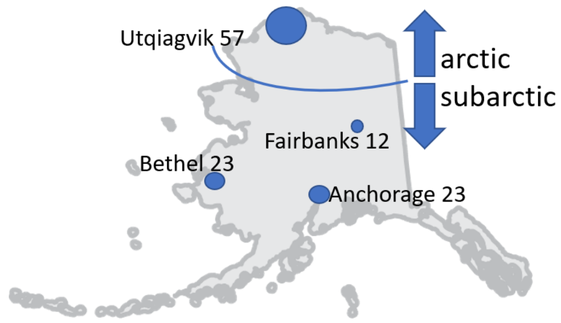
Solar thermal energy in summer months enough for subarctic AD, not arctic

PARTNERS INVOLVED IN PROJECT

- U.S. Environmental Protection Agency
- U.S. National Renewable Energy Lab
- Alaska Center for Energy and Power
- Alaska Department of Environmental Conservation
- Universidad Regional Amazónica Ikiam
- Simon Fraser University
- Danmarks Tekniske Universitet
- Washington State University
- Zender Associates

RESULTS ACHIEVED

- Laboratory scale testing was positive (e.g., methane was generated) and the results were published in the Journal of Renewable Energy.
- Construction of four digestors using readily available materials with different insulation is in progress in Fairbanks, Alaska.
- Results from this pilot scale are expected in 2026.



solar panels needed to digest