

The Challenges of Food-Energy-Water Data Collection in Remote Islanded Microgrids: Lessons Learned and Recommendations Moving Forward (GC31H-1365)

Authors:
Daisy Huang, University of Alaska Fairbanks, dhuang@alaska.edu
Jennifer I. Schmidt, University of Alaska Anchorage, jischmidt@alaska.edu
Erin Whitney, University of Alaska Fairbanks, erin.whitney@alaska.edu
William Schnabel, University of Alaska Fairbanks, weschnabel@alaska.edu
Henry Huntington, Huntington Consulting, henryphuntington@gmail.com
Rich Wies, University of Alaska Fairbanks, rwwies@alaska.edu
Srijan Aggarwal, University of Alaska Fairbanks, saggarwal@alaska.edu
Aaron D. Dotson, University of Alaska Anchorage, addotson@alaska.edu
Henry James Penn, University of Calgary, henry.penn@ucalgary.ca
Justus Karenzi, University of Alaska Fairbanks, jkarenzi@alaska.edu

Website:
<http://ine.uaf.edu/microfews/>

This project is funded by the National Science Foundation Award #1740075 InFEWS/T3: Coupling infrastructure improvements to food-energy-water system dynamics in small cold region communities: MicroFEWs.

A. Research Questions:

- 1) What are the direct and indirect linkages and feedbacks between **renewable energy generation** and the local drivers of **food, energy, and water (FEW) security** in Arctic and Subarctic communities?
- 2) To what extent can combinations of renewable energy generation and FEW-related infrastructure energy loads be optimized to **enhance FEW security** in Arctic and Subarctic communities?

B. Data Needed:

- Food, Energy, Water **Usage, Reliability, Needs**
- Current quantity, quality, reliability of **food**
- Current **energy** usage; seasonal variations, diurnal variations
- Current **heat** usage; quantity and type
- Current **water** usage
- Percentage of homes with **pipd water**

C. Data Challenges:

- **Poor availability of data**
- High **turnover** in power/water plant operators
- Privately owned **utilities reluctant to share data**, when available
- Flat usage fees for water (**no metering**)
- **Heat loads difficult to know** when not all sources of heat are metered (e.g., wood heat)
- **Food data is very diverse and difficult to collect systematically.**

D. Data Solutions:

- **Be patient and build relationships** to obtain **qualitative and survey data**.
- **Engage** key community members from all important groups (e.g., **Native elders, community leaders, utility operators**)
- Use **proxy data** when data is available from a **similar community**.
- **Gain trust and establish rapport**s to community members will allow you to **install your own metering systems**.
- **Report results back** to the community. The project should be a **two-way exchange**.
- Include room in your budget to **pay people who provide time and data**.

