



ACEP
Alaska Center for Energy and Power

UTILITY STUDENT INTERNSHIP

SUMMER 2021

FINAL REPORT

CASES PARTNERSHIP - SEGA

RYAN BICKFORD

ALASKA CENTER FOR ENERGY AND POWER

UNIVERSITY OF ALASKA FAIRBANKS

FAIRBANKS, ALASKA 99775

08/06/2021



TABLE OF CONTENTS

Introduction	3
Purpose	4
Methodology	4
Results and Discussion	5
Conclusions	8
Acknowledgments	8
References	9

INTRODUCTION

There are a plethora of unique northern communities around the world that experience a diverse range of environmental threats including harsh winters, climate change, unstable fuel costs, lack of transportation, and many other factors. Many of these communities have been reliant on fossil fuels for their energy needs; unsustainable energy sources often with unreliable costs. Significant diesel price fluctuations can cause the cost of electricity in these



communities to skyrocket, and in Alaska, it makes them even more reliant on the Power Cost Equalization Program, which subsidizes the high cost of power in rural Alaskan communities. The need for energy security isn't just about comfort, it's essential for creating a sustainable rural community.

The [Community Appropriate Sustainable Energy Security \(CASES\)](#) Partnership is an international research initiative involving northern and Indigenous communities as well as public and private sectors with project partners in Canada, Sweden, Norway, and the United States (Alaska). The goal of the CASES Partnership is to reimagine energy security in northern and Indigenous communities by co-creating and brokering knowledge, understanding, and capacity to design, implement and manage renewable energy systems. This partnership will create a platform for the sharing of knowledge so that not all communities have to experience the same challenges or recreate solutions.

The community in the spotlight for this project is Galena. Galena is located on the Yukon River, just 80 miles south of the Arctic Circle in Alaska. The goal of this project is to create a community energy profile for Galena. This project is primarily led by Diane Hirshberg, [Institute of Social and Economic Research](#) (University of Alaska Anchorage), and Tim Kalke, [Sustainable Energy for Galena, Alaska](#) (SEGA.)

PURPOSE

Phase 1 of the CASES Partnership project involves assessing existing community energy systems as a baseline and creating a community energy profile as a planning resource. A community energy profile identifies preexisting community efforts as well as areas for improvement. It includes current energy systems, energy costs, and potential renewable resources and technologies. It also highlights how residents in the community want to move forward with regard to their energy systems. It allows communities to plan their energy future while reducing their vulnerability to energy insecurity.

METHODOLOGY

A community energy profile involves extensive research, data analysis, and community member interviews. Social and behavioral research training was required to conduct qualitative research in the form of interviews and focus groups. [Questions](#) were chosen for the interviews from a questionnaire bank listed in the [CASES data collection template](#) provided by the University of Saskatchewan. Questions that were deemed to be useful and insightful were selected. A Powerpoint presentation was also created to be utilized during the Galena leadership meeting, the members of which would also serve as a focus group. The presentation and focus group meeting will take place later this year after data from the individual interviews have been analyzed.

The first several weeks of the internship were spent on mandatory training for conducting interviews and familiarizing myself with the MS Excel datasheet created by Ilya Turchaninov, a previous Alaska Center for Energy and Power (ACEP) intern working on this project. Subsequently, a data collection plan was assembled along with a draft presentation for Galena's leadership. The presentation explains Galena's energy history and contains many key statistics that help convey its energy story. It also serves as a more detailed introduction to the CASES Partnership and its objectives.

RESULTS AND DISCUSSION

The interviews were conducted with individuals who represent Galena's leadership in local and tribal government as well as community roles. These positions included the current and a former Mayor of Galena, Louden Tribal Council Chief and a Council Member, Galena City School District Superintendent, Galena City Manager, and various other community members who are regional and community leaders. The interviews took place in many locations, such as a back porch, construction site, truck cab, and everywhere in between. In total, there were 10 interviews in 9 different locations.

The results from the interviews revealed some priorities and concerns held by the community. With the high electricity cost and harsh winters, many families have created their own solutions with home efficiency, insulation, and less expensive heating methods. Despite these improvements, there are still obstacles to reducing vulnerability to energy insecurity. One of the biggest obstacles being reliance on imported diesel fuel.

When asked how their homes are heated, most interviewees reported that their home heating came from a combination of sources. Many had both primary and secondary sources that often ran simultaneously during the winter. It was noted that electric heaters or wood stoves alone couldn't provide enough heat during the coldest months, so both were required despite most homes being well insulated. In addition to the extra insulation, LED lights, solar panels, and other home efficiency methods have been added, but affording electricity can still be an issue for some.

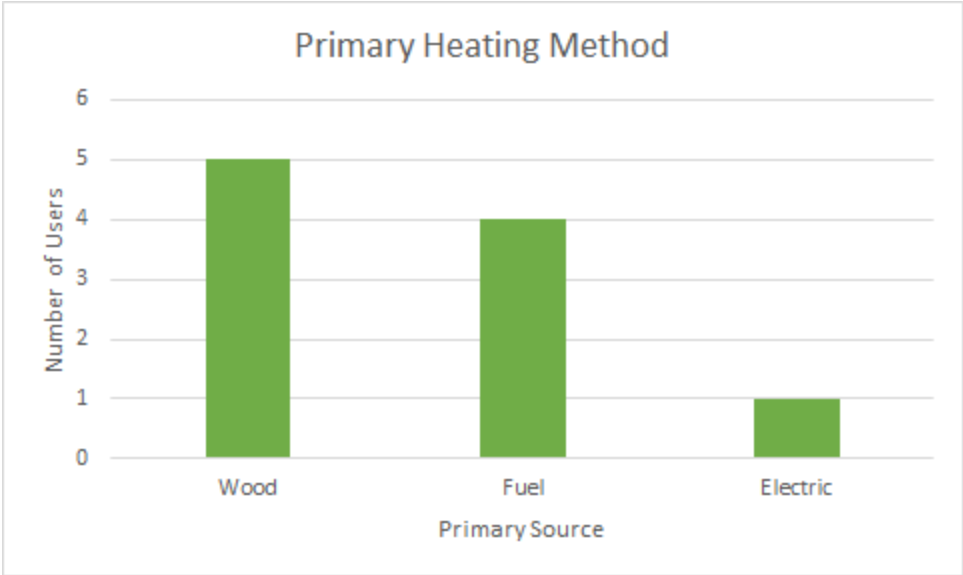


Figure 1

Wood stoves were the most common primary heating source, followed by heating fuels and electricity. Many households use both wood stoves and electric heaters in combination to provide enough heat. Although infrequent, power outages can be a concern without having a secondary source of heat. Many interview participants stated that power outages only lasted a few hours, and occurred several times per year. Galena is currently undergoing



power plant upgrades so there have been scheduled outages, but during the summer, a few hours without electricity hasn't been a concern for heating.

When discussing the energy priorities for the community, several responses were given. The most common responses were to reduce the cost of electricity and to install more solar energy systems. Several respondents suggested that energy savings would provide funding for new economic and educational opportunities. Many acknowledged the importance of the existing Solar Committee that is evaluating the potential implementation of a 1 Mega Watt (MW) solar array, although some said that this should only be the beginning. Another common priority for the community is to increase the efficiency of homes, community facilities, and community utilities.

Community concerns relating to energy were also discussed. One concern is the potential of disrupting their diesel fuel supply by introducing alternate energy sources. It should be noted that Galena is located at the end of a long supply chain, with many moving parts and thus there are concerns with potential delays upstream. The graph below shows a trend of unstable electricity costs, largely due to the fluctuating price of diesel.

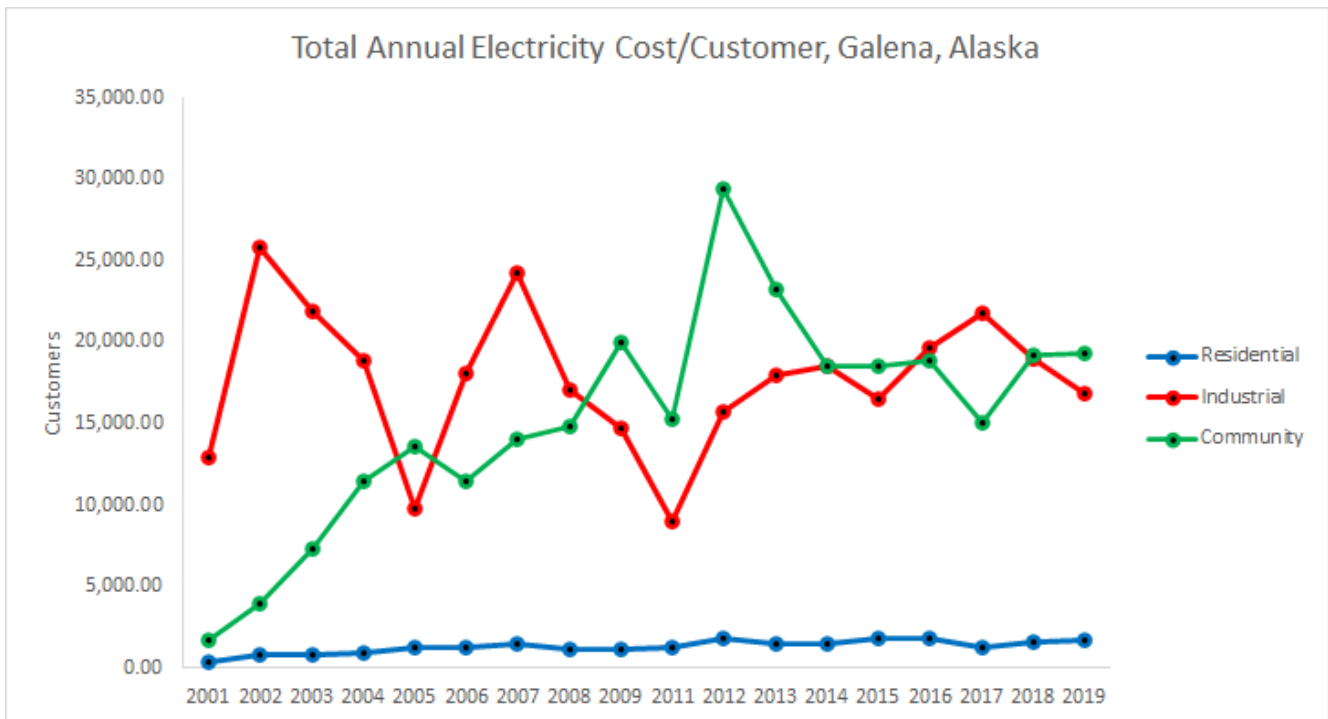


Figure 2

The water supply within the community is also a major concern. Water is expensive, and unsafe for drinking. The plant utilizes a single filter system but has plans to install a triple filter system soon. Once this is installed, the focus should be on reducing costs.

An additional concern relates to how excess heat from the power plant is currently used to heat the community swimming pool. The concern is that by increasing the efficiency of the power plant, a new solution to heat the pool will need to be implemented.

CONCLUSIONS

While a detailed and realistic community energy plan remains a priority for Galena, interviews with community representatives revealed current priorities, concerns, and efforts currently underway. There is a priority for cheaper electricity which could provide an array of new economic and educational opportunities. A decrease in electricity cost could also make water, food, and heat more affordable. Concerns regarding the future of Galena are very important when building an energy plan. The concern that Galena is not currently prepared for an interruption in the diesel fuel supply is an issue for future study and analysis. Achieving energy security is no easy task, but finding ways to address these concerns can be the first step. Many residents of Galena believe that constructing more solar energy systems could be a key solution to producing sustainable local electricity, but the question of how to do this affordably still remains. The results of this project will contribute to the development of Galena's energy future.

ACKNOWLEDGMENTS

I would like to extend my deepest gratitude to ACEP, especially Heike Merkel and Patty Eagan, for creating an extremely valuable internship experience and for their dedicated assistance and leadership. I am extremely grateful to my project team and mentors: Diane Hirshberg and Tim Kalke, whose expertise and guidance was vital to the success of this internship. I would also like to give tremendous thanks to the Office of Naval Research for

funding this project. The skills and knowledge I've collected through this internship program will undoubtedly give me an edge throughout my life and career.

This project would not have been possible without the individuals who participated in the interviews. I would like to thank Phil Koontz, James Merriner, Jake Pogrebinsky, Stephen Gregory, Russ Sweetsir, Jennal Burget, Ed Pitka, Shanda Huntington, Brad Scotton, and Charlie Green. These participants donated their time, knowledge, and experiences in order to help complete this project.

REFERENCES

Power Cost Equalization Program: Statistical Report (FY2020), Alaska Energy Authority, 2021,

<http://www.akenergyauthority.org/Portals/0/About/Board%20Meetings/Documents/2020/FY20%20PCE%20Statistical%20Report%20-%20Community%20Version.pdf>

Turchaninov, I. (2020). *CASES_Template_Galena*. Alaska Center for Energy and Power.