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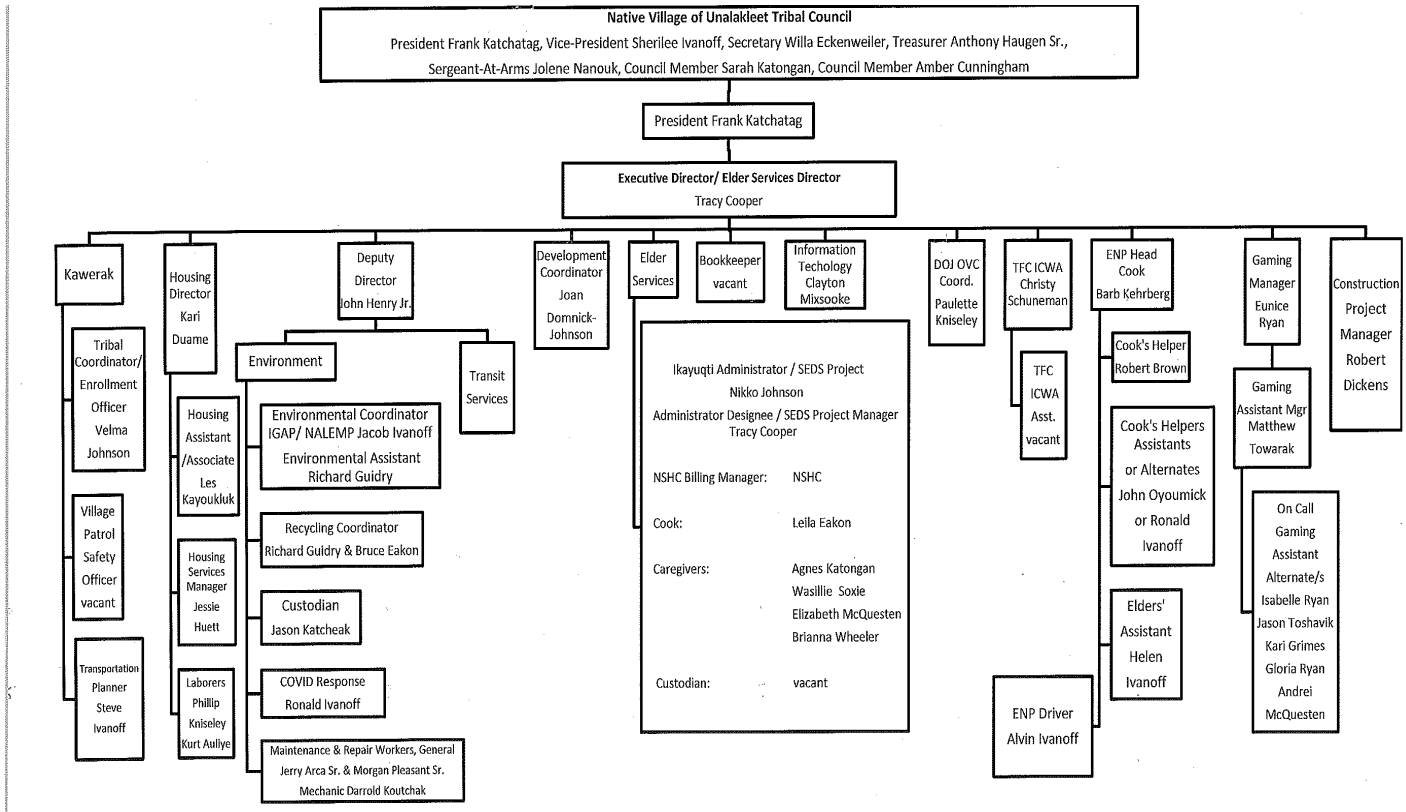
Native Village of Unalakleet
Priority Climate Action Plan

EPA's Climate Pollution Reduction Grant Program

To Be Submitted April 1, 2024

Acknowledgement

The Native Village of Unalakleet would like to acknowledge the Alaska Municipal League, Alaska Department of Environmental Conservation contractor, by providing the Greenhouse Gas emissions in the community of Unalakleet.



Native Village of Unalakleet Organizational Chart

2022 FORM_NVU_Organizational_Chart
4/20/15 VK

Executive Summary

Purpose and Scope

The Native Village of Unalakleet (NVU) has produce its Priority Climate Action Plan (PCAP) in accordance with the guidance of the Climate Pollution Reduction Grant (CPRG) program. The Native Village of Unalakleet's purpose in producing this plan is to enable participation in the Tribal Implementation of the CPRG Implementation Grant program.

The scope for the PCAP is focused on mitigation measures that are consistent with guidelines of the CPRG implementation NOFO, to ensure an opportunity for NVU to deliver benefits to the community members of Unalakleet. The NVU recognizes that a more substantial undertaking is ahead, in producing the Comprehensive Climate Action Plan (CCAP) over the coming year, and that this effort will require more detailed analysis and thorough review of opportunities climate pollution reduction.

Ultimately, the NVU has placed an emphasis on including in this initial round of planning mitigation measures that are readily available for implementation and ready to submit for the grant program. This effort has the most potential to result in real, tangible improvements for Unalakleet in the shortest amount of time possible.

Responsible Agency

The Native Village of Unalakleet (NVU) is the lead agency and is working with Alaska Municipal League (AML) and Unalakleet Valley Electric Cooperative (UVEC) to gather GHG emissions in Unalakleet. NVU's Project Manager is responsible for putting all the required documents and information gathered for the project.

Description of Unalakleet

Unalakleet is a rural northwestern Alaskan community. Located 148 miles southeast of Nome and 395 miles northwest of Anchorage, Unalakleet sits on the coast of the Norton Sound at the mouth of the Unalakleet River. Unalakleet is not accessible by any road system constructed to engineered standards and is isolated from any community hubs. Aircraft is the only mode of transportation to Unalakleet that can be used throughout the year. The community is equipped with two runways in a crosswind configuration. There are regular flights to Anchorage. Barges service the community during the summer months. Since Norton Sound is too shallow to accommodate deep draft vessels, freight must be lightered the last 1/2 mile to shore. Unalakleet's cash economy has fluctuated with the success of fishing. Compared to other rural communities, Unalakleet is relatively prosperous, but still falls short of the urban Alaska standard of living. The influence of western society has forced the area to make a transition from strictly subsistence to a subsistence economy supplemented by limited part-time and full-time jobs. While Unalakleet is less dependent upon a subsistence economy and becoming more dependent upon the cash economy, Unalakleet has successfully blended the elements of subsistence and

cash economies into a relatively stable and economically sensible balance. There is still a dire need for the subsistence activities as the goods in the stores are very expensive, making it almost impossible to rely solely on the goods of the stores. This is due to the cost of transporting the merchandise to the village.

Climate change poses a significant and increasing threat to the community members of Unalakleet, profoundly altering its delicate ecological balance. Rising temperatures, shifting sea ice patterns, and changing seasonal cycles are impacting the traditional ways of life, wildlife populations, and the natural landscapes of this area. These environmental shifts are not only a concern for the ecological health of the region but also for the cultural heritage and future sustainability of the communities that call this part of Alaska home. As the climate continues to change, the community of Unalakleet stands on the frontline of these transformations, facing challenges that require urgent attention and action to mitigate and adapt to the impacts of a warming planet.

In Unalakleet, the absence of a unified electrical grid means that the community typically relies on standalone diesel electric utilities. This reliance is intensified by the region's geographical isolation, which significantly restricts transportation options. As a result, fuel and goods can only be transported by air or during the brief ice-free periods for barges, leading to a substantial increase in the costs of goods and services, including energy. This isolation not only underscores the community’s vulnerability to logistic and economic fluctuations but also emphasizes the critical need for sustainable and resilient energy solutions.

Economic opportunities in Unalakleet are predominantly found in public services, health, and education sectors, complemented by seasonal work. Yet, the high energy costs associated with the reliance on diesel fuel for electricity and heating exacerbate the economic challenges faced by these communities. These costs diminish disposable income for residents, thereby hindering local economic development and contributing to a cycle of economic vulnerability.

Central to the climate action initiatives for the community of Unalakleet is a comprehensive suite of measures, thoughtfully curated to address the pressing challenges of climate change while unlocking the immense potential for sustainable growth within this unique environment. A crucial element of our strategic approach is the commitment to significantly reduce our dependence on diesel fuel for heating and electricity. This shift aims not only to decrease our carbon footprint but also to mitigate the economic vulnerabilities associated with high energy costs, which have long been a burden to our communities.

At the heart of our efforts is the championing of renewable energy technologies, with a specific focus on the integration of solar-battery and wind-battery systems alongside the existing diesel electric utilities. This innovative approach to creating hybrid energy systems is pivotal, promising a future where our community are powered by clean, renewable energy. Such systems are set to play a crucial role in reducing greenhouse gas (GHG) emissions and enhancing energy

security, all while tackling the logistical challenges of energy supply head-on in our remote settings.

Additionally, this plan places a strong emphasis on the importance of energy efficiency as a fundamental aspect of our climate action endeavors. By implementing a range of measures aimed at improving the energy efficiency of homes and community buildings, we anticipate a significant reduction in overall energy demand. These efforts, which include upgrading insulation, installing more efficient heating systems, and adopting energy-saving appliances, are expected to lead to considerable reductions in energy consumption and costs, further lessening our community's reliance on fossil fuels.

Introduction

CPRG Overview

From the Inflation Reduction Act, the EPA released a number of formula planning grants to states, municipalities, and tribes under the CPRG program. These grants fund the creation of three types of planning documents through 2025 – a Priority Climate Action Plan (PCAP), a Comprehensive Climate Action Plan (CCAP), and a Status Report.

The Native Village of Unalakleet chose to participate in the CPRG program to reduce the GHG emissions within the community and to help offset the high cost of fuel.

GHG Inventory

The baseline Greenhouse Gas (GHG) inventory for Unalakleet is data collected in 2022. The NVU used AML's GHG tool to gather the total GHG emissions in the community of Unalakleet. The sectors identified are the residential, commercial, industrial, and transportation. Below is a table identifying the quantities of each sector.

Sector	Baseline GHG Emissions by Sector (MTCO2e)
Residential Energy Consumption	2,178
Commercial Building Energy Consumption	1,377
Industrial Energy Consumption	
Total Emissions	3,555

GHG Emissions Projects

The Native Village of Unalakleet plans to focus on the integration of solar-battery and wind-battery systems alongside the existing diesel electric utilities. We also are planning to upgrade insulation, installing more efficient heating systems, and adopting energy-saving appliances along with installing solar panels on residential house and building a large solar field to offset the use of diesel generators for electricity.

GHG Reduction Target

Quantified GHG Reduction Measures

Measures refer to proposed projects, programs, and policies that would reduce greenhouse gas emissions if implemented. The strategy for selecting greenhouse gas (GHG) reduction measures is informed by data on the highest sources of GHG emissions. The rural, Tribal communities addressed in this plan are predominantly isolated, relying on independent microgrid electric utilities predominantly powered by diesel for both electricity generation and the bulk of heating requirements. Consequently, GHG mitigation strategies are focused on three key areas:

1. Residential Energy Consumption
2. Community Building & Commercial Building Energy Consumption
3. Electricity Generation & Distribution

The objective in concentrating on these areas is to decrease energy demand for heating and electricity, thereby lessening the reliance on diesel-generated electricity and fuel oil heating. Such initiatives not only aim to conserve energy but also significantly reduce GHG emissions, aligning with broader environmental sustainability goals.

Although these primary sectors do not encompass all sources of emissions within the community, they represent the largest contributors to GHG emissions, offer the most substantial opportunities for reductions, and are identified as the highest priority for emissions reduction efforts. Below, the plan outlines specific measures for each prioritized sector to achieve these goals.

Residential Energy Consumption

Residential energy consumption refers to the amount of energy used within households or residential buildings. This includes energy for various purposes such as heating, cooling, lighting, cooking, water heating, and running appliances and electronic devices. The type and amount of energy consumed in residential settings can vary widely depending on factors such as geographic location (homes in colder regions often consume more energy for heating), building characteristics (size, design, insulation, age of building), how efficient the household appliances are, and personal preference (thermostat setting). Monitoring and managing residential energy consumption is important for reducing environmental impact, controlling costs, and ensuring sustainable energy usage. Under this sector, the prime measure to reduce residential energy consumption is the reduction in energy usage for both heating and electrical needs, largely the recommendations are weatherization related energy efficiency.

Measure 1 PV Solar System

Community-scale solar projects in this plan are defined as high penetration, grid tied solar systems that generate electricity that flows through a meter to the utility grid. In remote Alaska, these systems are owned by the Utility or an Independent Power Producer that sells the solar generated power to the utility.

A Solar Screening analysis developed by the National Renewable Energy Lab concluded that there is a likelihood of high solar production predominantly from March through August, with a steep drop off in the shoulder months and little to no production in the winter. Solar PV production has been affirmed across the state and is now considered a commercially available and technically mature industry globally with continued growth across Alaska.

The size of solar PV systems can be described as high penetration and low penetration. Low penetration systems are smaller and displace a portion of a community's load when the PV panels are producing power. Low penetration systems do not have the capability to carry the entire load of a community.

High Penetration solar systems include PV panels for generating power and a battery system that will store and discharge power as required. These systems have the capability of shutting off diesel generators and supplying the entire load of a community for hours at a time.

High penetration community scale solar is uniquely tailored to provide a wide spectrum of community benefits, particularly in the areas of energy cost savings, climate resilience, and workforce development. Local generation of electricity at or near where it will be used can accelerate the deployment of reliable, renewable technologies and projects.

Methods for Quantifying the Measure

To identify utilities with opportunities to install community-scale solar PV systems to reduce diesel usage and reduce greenhouse gas emissions, the current community load data was extracted from the AEA FY2022 PCE Statistical Report.

Because high penetration solar has a stable resource and has proven to be easy to operate and maintain in remote communities, all communities are considered candidates for this technology.

A Helioscope model using the weather data from Unalakleet. Based on recent experience from the design of high penetration solar system in remote microgrids, a target displacement of 30% of the community load with solar and battery is an aggressive but achievable goal.

The inverter was sized to be able to manage the peak load from the community as reported in the 2022 PCE report, and the battery is sized at 1.3 times the peak load to account for typical battery degradation over the 15-year life of the battery. This battery size should carry the full load of the community during an outage for 1.5 to 2 hours depending on the load at the time of the outage,

greatly improving the energy resiliency of the community. The diesel gallons displaced were converted to MTCO2e of greenhouse gas emissions reduced.

Capital cost estimates were developed for each potential action based on the estimated sizes of the solar PV, battery, and inverter. Based on recent project experience of the contractor in remote Alaska, the installed cost of solar PV is $4000/kW, the battery installed cost is $1500/kWh, and the inverters' installed cost is $1000/kW. Capital costs were totaled and divided by the annual savings in diesel fuel usage to result in a simple payback metric.

Measure - Heat Pumps for Communities with High Levels of Renewable Energy

The proposed measure would displace heating oil with arctic heat pumps in communities that have high levels of renewable energy during the heating season. While this measure requires some feasibility work, it is a fair assumption that all residences in communities with high levels of renewable energy power generation are candidates for this technology with a goal to displace 75% of oil usage. Heat pumps would result in a 50% cost savings over the cost of heating oil. Capital cost for each household was based on recent experience with the installation of more than 100 heat pumps in Southeast Alaska, averaging $10,000 per residence.

Benefit Analysis

This section explores each of the measures that were laid out in the previous section and expands on the additional benefits of the measures if implemented including a list of additional benefits not captured elsewhere.

The implementation of the measures included in this PCAP are anticipated to have a broad range of benefits beyond GHG emission reductions. Emission reductions in the built Residential Energy and Commercial Facilities & Community Facilities sector are primarily due to reducing diesel fuel for building heating uses and electricity. Likewise, reductions in the Community-Scale Electricity Generation and Distribution sector are primarily improving efficiency of diesel power generation and distribution or integration of high penetration renewable energy, thereby reducing diesel fuel usage for electricity. While the benefits are difficult to quantify without specific activity and location information, some broad benefits are likely, based on regional patterns and activities. Diesel fuel combustion for building heat does not have a detectable or uniquely identifiable impact on criteria and toxics pollutant concentrations in our region. Instead, any benefit would primarily be identifiable as reductions in the overall emissions inventory. A reduction in diesel fuel consumed will reduce the fine particulate, NOx, black carbon, and VOC emissions and ambient concentrations near those activity locations.

Community-Scale Electricity Generation and Distribution:

This refers to the generation of electricity at a scale smaller than large industrial power plants, including generated and distributed energy from sources including diesel, solar, wind turbines, or microgrids. It typically serves the energy needs of a community, such as a neighborhood, town, or local area.

Residential Energy Consumption:

Residential energy consumption refers to the energy used by households for heating, cooling, lighting, appliances, and other domestic purposes. It includes the electricity, heating oil, and other energy sources consumed within individual homes.

Commercial Facilities & Community Facilities Energy Consumption:

This pertains to the energy consumption of public facilities, local businesses and non-industrial buildings, such as Tribal & City offices, schools, retail stores, restaurants, and other business establishments. Proposed measures include retrofits to reduce the energy used in these structures, primarily to reduce energy used for electricity and heating.

Authority to Implement

The Native Village of Unalakleet is the primary entity to provide authority to implement it with the approval of the Tribal Council.

Identification of Other Funding

The list below aims at identifying likely Federal, State and other funding sources that cover most of the proposed measures including energy efficiency, electric utility upgrades, and renewable energy integration.

FUNDING OPPORTUNITY ELIGIBLE PROJECTS

Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) Tribal Energy Program

- Various grants available for energy efficiency and renewable energy projects: https://www.nrel.gov/docs/fy13osti/54396.pdf http://www.energy.gov/indianenergy/office-indian-energy-policy-and-programs
- Eligible Projects: Biomass, energy efficiency, geothermal, hydropower, solar photovoltaics, solar water heat, wind, and other renewable energy projects.

Department of Energy Office of Indian Energy (DOE-OIE)

- Federal agencies provide grant, loan, and technical assistance programs to support Tribal energy projects: https://www.energy.gov/indianenergy/current-funding-opportunities
- Eligible Projects: Weatherization, technical assistance, economic development, community facilities, community water, energy audits, renewable energy development, and energy efficiency.

Department of Energy (DOE) – Other

- Grants available for energy efficiency, renewable energy, technical assistance, pilot projects, and Tribal government energy projects: https://www.energy.gov/energy-economy/funding-financing
- Eligible Projects: Weatherization, biomass, energy efficiency, geothermal, hydropower, solar photovoltaics, solar water heat, wind, other renewable energy projects, and education & outreach.

Denali Commission Grants

- Improve the effectiveness and efficiency of government services, to develop a well-trained labor force employed in a diversified and sustainable economy, and to build and

ensure the operation and maintenance of Alaska's basic infrastructure: https://www.denali.gov/grants/ https://www.denali.gov/funding-requests/

- Eligible Projects: Energy reliability, bulk fuel safety, infrastructure protection, transportation, sanitation, health facilities, housing, broadband, and economic development. 47 Bering Strait Region - Priority Climate Action Plan

Alaska Energy Authority (AEA)

- Supports the State's communities and energy infrastructure by administering grant funding programs and a loan program: http://www.akenergyauthority.org/What-We-Do/Grants-Loans AEA Renewable Energy Grant Fund: http://www.akenergyauthority.org/What-We-Do/Grants-Loans/Renewable-Energy-Fund
- Eligible Projects: Solar water heat, photovoltaics, landfill gas, wind, biomass, hydroelectric, geothermal electric, fuel cells, geothermal heat pumps, combined heat and power/cogeneration, hydrothermal, waste heat, transmission or distribution infrastructure, anaerobic digestion, tidal energy, wave energy, fuel cells using renewable fuels, and geothermal direct-use.

Alaska Housing Finance Corporation (AHFC)

- Financing for permanent energy-efficient improvements to public buildings owned by regional educational attendance areas, by the University of Alaska, by the state or by municipalities in the state: Alaska Energy Efficiency Revolving Loan Program: https://www.ahfc.us/efficiency/non-residential-buildings/energy-efficiency-revolving-loan-fund-aeerlp/
- Eligible Projects: Borrowers obtain an Investment Grade Audit as the basis for making cost-effective energy improvements, selecting from the list of energy efficiency measures identified.

USDA Rural Development

- High Energy Cost Grant: https://www.rd.usda.gov/factsheet/high-energy-cost-grants
- Eligible Projects: Funds may be used to acquire, construct, extend, upgrade, or otherwise improve energy generation, transmission, or distribution facilities and to establish fuel transport systems that are less expensive than road and rail.

Rasmuson Foundation

- Capital projects and technology upgrades for eligible Alaska organizations: Tier 1 Grants: https://www.rasmuson.org/grants/tier-1-grants/
- Eligible Projects: Capital projects, technology updates, capacity building, program expansion and creative works, including building construction/renovation/restoration, technology upgrades in community facilities, and capacity building grant support.

Housing and Urban Development (HUD)

- http://portal.hud.gov/hudportal/HUD?src=/topics/grants
- Eligible Projects: Energy efficiency and housing weatherization. 48 Bering Strait Region - Priority Climate Action Plan

Bureau of Indian Affairs (BIA)

- Energy and Mineral Development Program Grant (EMDP): https://www.bia.gov/service/grants/emdp/what-energy-and-mineral-development-program-emdp-grant
- Eligible Projects: Resource assessment, exploration studies, feasibility studies, market, studies, engineering studies, economic evaluation, and defining potential targets for development.

Bureau of Indian Affairs

- Tribal Energy Development Capacity Grant (TEDC): https://www.bia.gov/service/grants/tedc
- Eligible Projects: Developing the legal infrastructure to create any type of Tribal energy business. Establishing an energy focused corporation under Tribal or state incorporation codes. Establishing an energy-related Tribal business charter under federal law.

Bureau of Indian Education

- http://bie.edu/Programs/index.htm
- Eligible Projects: School energy programs.

The Honnold Foundation

- Grid Alternatives Tribal Program: https://www.honnoldfoundation.org/
- Eligible Projects: Unrestricted grant funding to organizations or projects that use solar energy to increase social and economic equity and reduce environmental impact.

USDA Rural Development

- Many various grants. Listed below. www.rd.usda.gov/ak
- Eligible Projects: Diverse eligible activities.

Bipartisan Infrastructure Law – Clean Energy & Power

1. Delivering Clean Power ($21.3 billion) 2.
2. Clean Energy Demonstrations ($21.5 billion) 3.
3. Energy Efficiency & Weatherization ($6.5 billion) 4.
4. Funding for Clean Energy Manufacturing & Workforce Development ($8.6 billion) https://www.whitehouse.gov/build/guidebook/

https://www.whitehouse.gov/wp-content/uploads/2022/05/BUILDING-A-BETTER-AMERICA-V2.pdf#page=152

- Eligible Projects: Delivering clean energy, clean energy demonstrations, energy efficiency, clean energy manufacturing and workforce. May be limited in ability to fund upgrades and improvements to existing diesel electric utility systems. This gap may better fit into an EPA Implementation grant. 49 Bering Strait Region - Priority Climate Action Plan

Bipartisan Infrastructure Law - Electric Vehicles, Buses and Ferries

1. National Electric Vehicle Infrastructure Formula Program ($5 billion)
2. Discretionary Grant Program for Charging and Fueling Infrastructure ($2.5 billion)
3. Clean School Bus Program ($5 billion)
4. Low- and No-Emission Transit Bus Program ($5.6 billion)
5. Electric or Low Emitting Ferry Program ($250 million)

- Eligible Projects: Building a network of electric vehicle chargers and supporting the transition to electrification across all types of vehicles is critical to reduce emissions and help to combat the climate crisis.

Workforce Planning Analysis

The Workforce Planning Analysis addresses the unique challenges and opportunities faced by the community. Our goal is to ensure that as many community members are employed with the project.

The primary objective of this analysis is to identify skills and training essential for the successful implementation of PCAP and CCAP measures. This includes understanding the specific needs for Electric Utility Upgrades, Building Energy Efficiency Retrofits, and High Penetration Renewable Energy Integration. By identifying these needs, we aim to develop targeted strategies for workforce development or by importing this labor to the community.

The Workforce Planning Analysis takes a cursory look at the distinct categories for the priority projects identified in the PCAP and CCAP. Priority Projects Identified in the PCAP & CCAP largely fall into a few distinct categories: 1) Electric Utility Upgrades; 2) Building Energy Efficiency Retrofits; 3) High Penetration Renewable Energy Integration.