

Alaska Bulk Fuel Aggregation Study

Appendix C: Literature Review

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ALASKA
ENERGY
AUTHORITY



Purpose

The Alaska Bulk Fuel Aggregation Study seeks to answer the question: “can aggregating some or all aspects of bulk fuel facilities improve facility lifespan, limit or prevent spills, and save money that could be reinvested in capital improvement projects, thereby lessening the investment burden by state and federal agencies?”

This literature review brings together summaries of existing plans, studies, and reports related to bulk fuel infrastructure planning, best practices, lessons learned, and new ideas to better understand the landscape of barriers and contributors to aggregation solutions. Included with these document summaries is an inventory of bulk fuel support programs that are available in Alaska today.

This literature review, along with other study inputs, will inform the development of aggregation models that could work in Alaska by providing background information on what has been tried, what has been successful, and what lessons have been learned.

Methodology

The sources used in this literature review were identified through research, Study Advisory Group discussions, stakeholder interviews, and discussions with the Study project team. Criteria for inclusion in this summary was discussed with the project team and include sources that are from Alaska and similar environments (e.g., climate, remoteness), provide an example of aggregation or highlights key barriers / contributors related to aggregation, and highlight programs that enable bulk fuel aggregation or consolidation. Sources 10 years old or older were not included in this document summary. Various other sources were reviewed in the research and that full list can be found in the appendix.

How To Review These Summaries

- Section one of this document summary provides summaries, key takeaways, and highlights from regional, community, and energy planning resources from around Alaska. Energy plans and / or investment in energy infrastructure remain priorities across rural Alaska. These summaries highlight the priorities, goals, and implementation strategies documented in these plans from the last ten years.

- Section two summarizes recent and current bulk fuel initiatives that include some form of consolidation or aggregation in their program design. These are shared to avoid duplication of existing programs and as examples for lessons learned and best practices.
- Section three consists of a collection of articles, studies, and policy frameworks that enable and support aggregation of resources in the energy sector. Some are related to bulk fuel and others are focused on integrating renewable energy sources alongside diesel to reduce energy costs. These resources also offer relevant examples to learn from as aggregation solutions are modeled.

Key Takeaways

- **Communities and regions across Alaska have been planning for and working on solutions to reduce the cost of energy for years.** Many energy planning documents include the development of collaborative initiatives (e.g., electric cooperatives, shared maintenance programs) and both creative and practical solutions to improve efficiency and resilience of energy infrastructure (e.g., education for consumers, training programs, developing renewables).
- **Existing bulk fuel programs and initiatives provide both a foundation for developing new and combining existing resources as well as insight into what might work and what to avoid for rural Alaska.** Pulling from existing programs designed to address individual challenges can offer a good starting point for considering consolidation in other aspects of bulk fuel. These also offer examples for leadership and potentially funding models and how collaborative groups have come together to support these solutions.
- **Looking beyond Alaska and outside of bulk fuel to explore ideas and opportunities in policy, research, and new technologies offer insights for aggregation solutions.** Policy frameworks that enable / incentivize aggregation, development of renewable energy to supplement diesel-reliant systems, and more accessible and flexible funding structures have the potential to provide support to an aggregation model for rural Alaska.

Documents List

The list of documents, reports, and studies below are summarized in this literature review. The table lists references in chronological order by Publication Date, with newest first. A longer list of resources was referenced during research but not included in the summary. They are websites with data sources or market information, sources that duplicate information already included, or reports that are more than ten years old. This full list is included in the Appendix.

Title	Source	Publication Date
Southeast Alaska 2030 Economic Plan (CEDS) 2025-2030	Southeast Conference	February 2025
Sustainable energy transition of Greenland	Science Direct	January 2024
Alaska Statewide CEDS, 2022-2027	UA Center for Economic Development	2022
Critical pathways to renewable energy transitions in remote Alaska communities	Science Direct	September 2022

Northwest Arctic Regional Energy Plan	Northwest Arctic Borough	April 2022
Tanana Chiefs Conference CEDS, 2022-2026	Tanana Chiefs Conference	March 2022
Northwest Borough Comprehensive Plan	Northwest Arctic Borough	November 2021
The Kuskokwim Corporation Region-wide Energy Efficiency Planning	The Kuskokwim Corporation	June 2021
Bering Strait CEDS, 2019-2024	Kawerak	2019
Arctic Connections: Scotland's Arctic Policy Framework	Scottish Government	September 2019
Northwest Arctic Borough CEDS, 2019-2023	Northwest Arctic Borough	August 2019
Alaska Affordable Energy Strategy	Alaska Energy Authority	January 2017
Aleutian & Pribilof Islands Regional Energy Plan	Alaska Energy Authority	2015
Bering Strait Regional Energy Plan	Alaska Energy Authority	2015
Bristol Bay Regional Energy Plan	Alaska Energy Authority	2015
Strategic Energy Planning Guide	Denali Commission	June 2015
State Certification Standards for Alaska's Facility Maintenance Technicians	Denali Commission	August 2013
Bulk Fuel Upgrade Program	Alaska Energy Authority	No date
Rural Alaska Fuel Services	Rural Alaska Fuel Services	No date
Bulk Fuel Revolving Loan Program	Alaska Department of Community and Regional Affairs	No date

I. Regional Planning Resources

Strategic Energy Planning, Denali Commission (June 2015)

Summary

The Strategic Energy Planning Guide for Rural Alaska Communities gathered input from federal, state, Tribal, and nonprofit energy partners to help villages build understanding of local energy use, set long-term goals, and prioritize energy projects. It emphasizes a planning approach that is community-driven and includes technical experts as well as regional, state, and federal partners. It serves as a comprehensive “how to” guide for communities to create a plan to reduce energy costs by identifying and prioritizing projects that improve efficiency. The Community Energy Profiles

template at the end of the document helps community's develop a clear record of their energy use, identify gaps in data, and prioritize projects to improve efficiency.

Key Takeaways and Highlights

- Rural Alaska communities are burdened by high fuel costs, the highest per capita in the US.
- Communities across Alaska are implementing creative solutions – the successful plans began with community-driven planning process that brings in federal, state, and regional energy partners.
- The process to develop a Strategic Energy Plan consists of the following components:
 - Compiling the Community Energy Profile (Figure 1)
 - Prioritizing a list of energy projects and activities
 - Drafting the Strategic Energy Plan
- This resource offers a process, guidance, and tools relevant to regional aggregation planning. It offers a method to take stock of what the region's needs and assets are and outlines an approach to collaborate around efficiency goals and project prioritization while involving technical experts and energy partners with decision-making power.

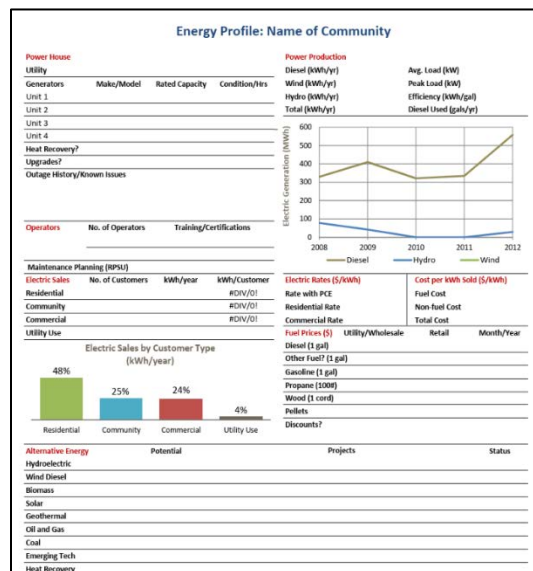


FIGURE 1. COMMUNITY ENERGY PROFILE.
(SOURCE: STRATEGIC ENERGY PLANNING GUIDE)

Regional Energy Plans

Regional energy plans are strategic documents that outline how the region plans to meet its energy needs. Using both quantitative and qualitative data collection and analysis, these plans identify local energy sources, infrastructure requirements, and priorities for developing a sustainable and reliable energy system while highlighting the unique characteristics of the region. These factors and the current conditions summary inform future energy development decisions, including where to invest capital and what energy mix (renewables and fossil fuels) is most cost effective.

NOTE: Most of the Rural Regional Energy Plans are from 2015-2016 and have not been updated. Two notable exceptions, The Northwest Arctic Regional Energy Plan (2022) and The Kuskokwim Corporation Region-Wide Energy Efficiency Planning (2021), have more recent updates and more thorough summaries are provided below.

Northwest Arctic Regional Energy Plan 2022, Northwest Arctic Borough

Highlights

- The plan recommends reducing the cost of home heating by developing regional purchasing strategies to consolidate fuel needs in multiple communities into unified, high-volume fuel purchases.
- It also recommends the combination of alternative and renewable energy (and storage) technologies. Deering, Kotzebue, and Buckland have installed solar-wind-battery-diesel hybrid systems that are promising in their ability to reduce energy costs for the consumer.
- It is typical for communities in the Northwest Arctic Borough to have multiple bulk fuel storage systems that are owned and operated by multiple entities: local utility, School District, and local fuel distributor for homes and businesses. These facilities purchase fuel at different rates, have different use patterns, different operations and maintenance practices, and different economic incentive structures, for example:
 - o Utilities add a “fuel surcharge” to their base rate and pass fuel costs through to consumers.
 - o School Districts have fixed energy budgets so as fuel prices change, their ability to meet other needs in the schools is impacted.

Example: Deering, Alaska

“From April through September 2020, for example, Deering powered its community exclusively from renewable energy and batteries, with no diesel inputs, for 21% of the time.”

Example: Kotzebue, Alaska

“The large-scale wind and solar systems, combined with batteries and diesel generators, are saving over 250,000 gallons of diesel fuel annually ... and thousands of gallons of heating fuel no longer needed at the Maniilaq hospital.”

Source: Northwest Arctic Regional Energy Plan

TKC Region-Wide Energy Efficiency Planning (2021), DeerStone Consulting and The Kuskokwim Corporation

Overview

In 2021, The Kuskokwim Corporation (TKC) published Community Energy Action Plans (CEAP) for 10 member villages. The CEAPs identify energy projects and priorities to reduce long-term energy costs and dependence on fossil fuel. The process included reviewing previous community and regional energy goals, current energy costs, and relevant past or current project development documents, as well as interviews with community energy leaders. The reports analyze opportunities and recommendations to inform and prioritize community energy project development decisions.

The CEAPs were funded through a US Department of Energy – Office of Indian Energy technical assistance grant awarded to TKC on behalf of member villages. Collaborators included Alaska Native Health Consortium (ANTHC) and the Cold Climate Housing Research Center (CCHRC).

Highlights

- CEAPs for Aniak, Chuathbaluk, Crooked Creek, Lower Kalskag, Red Devil, Sleetmute, Stony River, and Upper Kalskag include a recommendation for TKC to collaborate with electricity providers to update key equipment like switchgear, digital engine controls, and telecommunications systems.

- CEAPs for Chuathbaluk, Crooked Creek, and Red Devil call for collaboration between TKC and Middle Kuskokwim Electric Cooperative (MKEC) to pursue funding for a replacement generator set, additional maintenance, and distribution system upgrades.
- CEAPs for Aniak, Chuathbaluk, Crooked Creek, Lower Kalskag, Red Devil, Sleetmute, Stony River, and Upper Kalskag include a recommendation to prepare the power system for high penetration renewables.

NOTE: For this literature review, regional plans that are ten or more years old have been condensed to brief summaries with relevant information as shown below (in alphabetical order):

Aleutian & Pribilof Islands Regional Energy Plan (2015), Alaska Energy Authority

Highlights

- Includes an action to “assess feasibility of forming a bulk fuel cooperative in the region among interested communities and regional organizations” to lower costs by bidding on higher volumes and reducing administrative costs.
- Includes a strategy to “develop local energy generation” which includes actions for exploring and integrating various energy sources, both fuel and alternatives.
- One project listed includes centralizing fuel storage and leveraging an inter-island ferry for distribution.

Bering Strait Regional Energy Plan (2015), Alaska Energy Authority

Highlights

- One of the goals under Energy Management includes establishing “energy champions” in each village that would come together to coordinate regional energy projects.
- The plan identifies lack of collaboration of funding sources as a challenge and recommends creating a funding database for collocation of funding sources for energy projects.

Bristol Bay Regional Energy Plan (2015), Alaska Energy Authority

Highlights

- Bulk fuel collaboration actions include advancing a cooperative purchasing structure with interested communities to increase competition and decrease costs of bulk fuel. The plan also indicates that “significant interest in bulk fuel purchasing groups” was identified through previous outreach and work in the region (see Figure 2).
- A bulk fuel depot in Williamsport was also considered as a hub for the region.
- A resource potential analysis was conducted at the community level that estimates savings potential from new, community- or utility-scale energy projects and examines the potential for building scale projects for biomass, energy efficiency, and solar (Appendix E in the Plan).

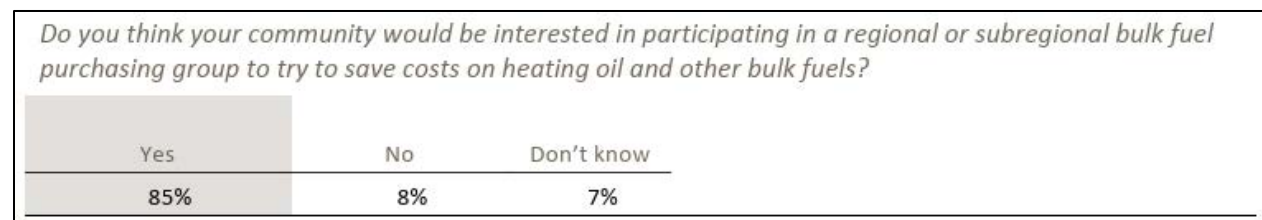


FIGURE 2. BRISTOL BAY RESIDENT INTEREST IN BULK FUEL PURCHASING GROUP (DEC 2013 VILLAGE LEADERSHIP WORKSHOP). (SOURCE: BRISTOL BAY REGIONAL ENERGY PLAN)

Comprehensive Economic Development Strategies (CEDS) and Regional Comprehensive Plans

Regional CEDS guide and coordinate economic development efforts and set forth an economic resilience vision and strategies for the region they serve. The process to develop a CEDS is collaborative between the public and private sectors, and includes baselining economic conditions, identifying strengths and weaknesses, setting goals, and developing strategies to improve the local economy.

Comprehensive plans outline a community's vision for future growth and development and guides land use, infrastructure, and policy decisions. The process to develop comprehensive plans is typically led by planning or community development offices and involves robust public outreach and input. The final plan includes priority focus areas, goals, objectives and implementation strategies.

Comprehensive Plans and CEDS from around Alaska were reviewed for goals, objectives, and strategies related to fuel, power, energy, and / or utilities, and to aggregation, consolidation, and collaboration around infrastructure and / or utilities. The Statewide CEDS is listed first, and regional CEDS and Comprehensive Plans are grouped by region.

Alaska Statewide CEDS, 2022-2027 (draft), University of Alaska Center for Economic Development

Relevant Goals, Objectives, and / or Strategies

- Emphasizes the value of the Power Cost Equalization (see “Power Cost Equalization” box on right for description) program subsidies that reduce the cost of power in remote communities.

Bering Straits CEDS, 2025-2030, Kawerak, Inc

Relevant Goals, Objectives, and / or Strategies

- Goal #3: Promote economic stability by creating, maintaining, and upgrading infrastructure and regional collaboration to adequately meet our current and anticipated needs.
 - Objective 3.1: Improve and increase access to utility infrastructure.
 - This objective includes supporting utilities and municipalities with pricing and management.
 - Objective 3.3: Explore the feasibility of regional governance model to capture the benefits of resource development projects.
- Goal #4: Decrease the cost of energy.
 - Objective 4.1: Conduct ongoing energy audits on community and commercial buildings throughout the region.

Power Cost Equalization (PCE)

PCE provides economic assistance to rural communities and residents where the cost of electricity can be three to five times higher than urban communities. This subsidy lowers electricity rates paid in these communities to be more in line with urban rates (Anchorage, Fairbanks, Juneau).

The PCE program is administered by the Alaska Energy Authority (AEA) and the Regulatory Commission of Alaska (RCA). It serves 82,000 Alaskans in 193 communities that are largely reliant on diesel fuel for power generation. It is funded by earnings in the PCE Endowment Fund.

- o Objective 4.2: Improve energy efficiency of homes and buildings.
- o Objective 4.3: Explore and evaluate feasibility of alternative energy projects and energy upgrade projects.
 - This includes funding for the Bering Strait Regional Energy Plan 2025 update and Energy Steering Committee.
- o Objective 4.4: Increase local knowledge of community energy systems and ways to reduce the costs of energy use (residents and utilities).

The Bering Straits CEDS catalogs energy infrastructure in each of the villages in the Borough, including tank farm capacity, in their Local Economic Development Priorities (LEDP) for each of the 18 Tribes in the region. Relevant notes are detailed below:

- **AVEC communities:** Brevig Mission, Elim, Gambell, Koyuk, Savoogna, Shaktoolik, Shishmaref, Stebbins, St. Michael, Teller, Wales
- **NSEDC Bulk Fuel Purchasing Program:** Brevig Mission, Gambell Native Corporation, Golovin, Koyuk Native Corporation, Native Village of Savoogna, Stebbins, St. Michael, Unalakleet (gas and heating oil), Wales Native Store
- **BIA Bulk Fuel Purchasing Program:** Teller
- **Unalakleet Valley Electric Cooperative:** Unalakleet
- **Communities that currently blend renewables and diesel:** Brevig Mission (solar and wind), Gambell (wind), Nome (wind), Savoonga (wind), Shaktoolik (wind), Stebbins (wind), St. Michael (wind), Unalakleet (wind), Wales (wind)
 - o **Communities exploring adding renewables:** Elim (geothermal), Koyuk
- **Communities with energy projects as priorities:** Council (“energy programs”), Gambell (#1 “housing and renewable energy”), Golovin (#12 “alternative energy”), Shaktoolik (#2 “bulk fuel storage facility / power plant”), Shishmaref (#5 alternative energy development), St. Michael (#1 “local bulk fuel”), Teller (#4 “tank farm”) and Mary’s Igloo (#2 bulk fuel improvements), Wales (#1 “address bulk fuel issues”, #13 “new power plant / wind solar energy”)

Northwest Arctic Borough CEDS, 2019-2023

Relevant Goals, Objectives, and / or Strategies

- Goal A: Develop the critical utilities, transportation, energy, and housing infrastructure to lower cost burdens and adapt to climate change while preserving subsistence resources. Improved infrastructure will increase economic development investment; attract new business opportunities; grow, attract, and retain labor force; protect communities from the effects of climate change; and promote sustainability.
 - o Priority objective 1: Enact regional energy plan to reduce costs, increase capacity for bulk fuel storage, improve and increase energy efficiency, and support innovative approaches to alternative energy where feasible. Actions relevant to aggregation include:
 - Create a business plan for energy efficiency co-op.
 - Create joint action agency for co-op and use organization to support energy infrastructure build out.
 - Create co-ops or MOAs to buy fuel together and collaborate in funding approach with partners.
 - o See page 5 for a summary of the Northwest Arctic Regional Energy Plan, 2022.

Northwest Arctic Borough Comprehensive Plan 2030 (2021), NWAB Planning Department

Relevant Goals, Objectives, and / or Strategies

- Community Facilities, Infrastructure, and Housing Goal A: Invest in renewable energy, promote energy efficiency, and reduce reliance on imported fuels.
 - Energy Goal 13: Create business plan for an energy efficiency cooperative and establish a joint action agency for supporting energy infrastructure buildout and bulk fuel purchasing.
 - Develop adequate fuel storage in communities, including expanding and repairing tank farms where appropriate.

Tanana Chiefs Conference CEDS 2022-2026 and Economic Recovery Plan,

Relevant Goals, Objectives, and / or Strategies

- Strategy 4: Support the development of energy-efficient improvements and alternative energy systems by creating Community Energy Action Plans for each TCC community.
- Strategy 6: Form regional purchasing groups to conduct bulk fuel purchases to increase purchasing power and help lower fuel prices.
 - Actions include a process to consider and set up a regional or subregional maintenance group(s).
- Strategy 10: Transition smaller standalone electric utilities to electric consortia.
 - Actions include forming a collaborative utility model like ARUC to improve operations and maintenance and to enable a quicker transition to renewable energy generation.

Southeast Alaska 2030 Economic (Plan 2025), Southeast Conference

Relevant Goals, Objectives, and / or Strategies

- The priority objective in the Energy Sector for the Southeast Region is to “reduce energy costs and increase deployment of renewables.” It calls for public/private partnerships that connect utilities, technology providers, and other energy companies with all levels of government. The emphasis is on deployment of renewable energy but does not leave other energy sources and fuels out.
- “Objective #5: Continue to support PCE for rural communities” advocates for reducing costs for rural Southeast communities reliant on diesel fuel.

II. Past and Ongoing Alaska Bulk Fuel Initiatives

The programs and initiatives summarized below are included as examples of efforts to streamline, consolidate, or aggregate aspects of bulk fuel infrastructure or operations. Each serves as an example of what has been tried and what is in practice now, and some program summaries share lessons learned or best practices for consideration.

Alaska Energy Authority: Bulk Fuel Upgrade Program

The [Bulk Fuel Upgrade Program](#) offers financial and technical assistance to support maintenance and improvement of tank farms. Many facilities are operating with tanks that were built before current national standards and regulations were developed. Despite their age, existing tanks are

often able to be redeployed after being repainted and / or repaired. The Alaska Energy Authority has been focusing on maintenance and repairs to sustain the tank farms until tanks can be replaced, repairs focus on fixing or replacing piping, pumps, valves, and other components that are nearing the end of their useful life. As of July 2025, 174 projects had been completed, 145 of those were funded with the Denali Commission, and \$187,259,738 of federal and state funding has been deployed since 2001 under this program.

Rural Alaska Fuel Services (RAFS)

[RAFS](#) is a non-profit organization that provides operations and maintenance services to rural Alaska bulk fuel storage facilities. Their teams work with operators to maintain facilities and provide training in multiple aspects of tank farm operations. Their services include:

- **Facility inspections:** in-depth, comprehensive inspections to help operators remain in compliance with regulations, prevent spills, and identify priority maintenance issues.
- **Training:** a variety of required and optional training programs for operators and staff. These range from Hazardous Waste Operations and Emergency Response (HAZWOPER), confined space entry, first aid, CPR, spill drills, and tank farm security.
- **Maintenance:** preventative and deferred maintenance services are offered through RAFs, but they also offer training in best practices and required maintenance projects.
- **Facilities and Operations:** RAFS technicians are fully trained and experienced in a wide range of tank farm operations and support their clients in a variety of needed services, including all of the above as well as tank demolition and spill cleanup.
- **Facility Management and Administration:** RAFS also offers back-office support services such as business planning and analysis, credit and collection assistance, financial review, and budget pricing.

Bulk Fuel Revolving Loan Program

The Alaska Department of Community and Regional Affairs administers a [Bulk Fuel Revolving Loan program](#) to assist with purchasing fuel to generate power or supply the public with fuel for use in rural communities. Borrowers are municipalities, unincorporated villages (population under 2,000), or private individuals or companies operating in such a community. Loans are short-term (typically nine months to one year), interest rates are kept low (0% for first-time borrowers, 4% for subsequent loans, but interest rates may be reduced for recurring customers), and there are no fees to apply for or receive a loan.

State Certification Standards for Alaska's Facility Maintenance Technicians

In 2012, the Denali commission began the Rural Alaska Maintenance Partnership (RAMP) to increase the number of trained facility maintenance staff throughout Alaska in an effort to prolong the life and energy efficiency of infrastructure investments across rural Alaska. Estimates showed that operational costs increased by as much as 30% when facilities were not properly maintained. Lack of training coupled with harsh environmental conditions, remote locations, inadequate telecommunications, and funding shortfalls resulted in delayed repairs, energy inefficiency,

facilities breakdown, and infrastructure loss. A cross-functional group of stakeholders, representing workforce development agencies, housing authorities, tank farm operators and owners, state and Tribal agencies, and others, came together to develop and support the implementation of the RAMP initiative.

- RAMP’s Mission: “to create a self-sustaining facility and operations maintenance system that develops the capacity of rural Alaskans to operate and maintain their infrastructure in a manner that protects and enhances the health, safety, and sustainability of rural communities and their residents.”
- The RAMP initiative focuses on two main workstreams:
 - An industry standard certification for building or facility maintenance technicians (FMTS) by coordinating with training centers in Alaska, led by the Rural Alaska Maintenance Partnership Training (RAMP-T) subcommittee.
 - Creation of a business model where regional entities could recruit and hire local maintenance workers and build a sustainable training program for workers.

The report offers recommendations for the certification standards and delivery model. Relevant recommendations are summarized below:

- Certification standards:
 - Focus operations training on energy and resource efficiency of facility systems.
 - FMT certification should become the standard for new hires.
 - The training program should include basic skill requirements as well (e.g., basic computer skills, reading comprehension, and mathematics).
 - Offer various levels of training to serve entry-level technicians and provide for the advancement of existing staff into higher-level positions and responsibilities (the report recommends three levels).
- Delivery model:
 - The training program needs to consider challenges such as remoteness, numerous disconnected communities, small statewide population, and the distance to training facilities.
 - A mixture of classroom and hands-on training is best for new technicians.
 - The recommended approach for training programs includes leveraging the capacity of larger institutions to offer a wider variety of training programs annually and setting up cooperative training agreements with smaller institutions to expand the reach of training programs.

III. Policy Frameworks, Renewables, and Research

The articles, studies, and policy frameworks shared below include examples of supporting initiatives or policies that contribute to aggregation in the energy sector. Some are directly related to bulk fuel and others are focused on renewable energy development to offset reliance on diesel. These resources are meant to offer ideas and broader perspective (e.g., international programs, collaboration with the public sector, integration of renewable energy programs) as aggregation solutions are considered.

Critical Pathways to Renewable Energy Transitions in Remote Alaska Communities: A Comparative Analysis, Science Direct – Abstract Only (September 2022)

Study Purpose

Disparities in the uptake of community renewable energy (CRE) projects have been particularly obvious in the circumpolar north. Alaska has been identified as an emerging leader in the path toward better CRE development – this article explores why some remote communities develop renewable energy projects and others do not.

Key Takeaway

- The study found that the absence of large subsidies for renewables, limited / lacking community capacity, and challenges to consolidating resources across communities were barriers to successful implementation of renewable energy projects.

Alaska Affordable Energy Strategy: A Framework for Consumer Energy Sustainability Outside of the Railbelt (2017), Alaska Energy Authority

Purpose

The Alaska Energy Authority was tasked to develop recommendations to improve energy affordability in communities not along the railbelt.

Highlights and Key Takeaways

- Communities purchasing fuel only purchase 1-2 times per year, so the retail price does not respond quickly to the commodity price. This means that it is not as easy for remote tank farms operators to choose strategic times to buy fuel based on market activity.
- The study identified two communities where bulk fuel was an effective energy strategy: the upper Kuskokwim and Lower Yukon.
- Utilities and communities have seen cost savings from economies of scale when utility management functions are consolidated.
- Best practices, support services, and technical assistance are helpful in mitigating risks; specific recommendations include staging approach to funding, clear pre-construction study requirements, and using qualified and experienced personnel.
- The study recognized the declining availability of grants and subsidies and suggests a consolidation of funding options into a centralized support system consisting of loan-based financing, incentives (example below), technical assistance, loan loss reserves, and other tools.
 - The specific recommendation is to create a “Community Energy Fund for Alaska (CEFA)” that can deploy these blended financing packages to public and private entities for development of energy projects.
 - One loan program incentive recommendation includes partial annual reimbursements for meeting performance and reporting standards.
 - Leverage the Alaska Affordable Energy Fund

- This study also advocates for the consolidation of state support and education as the current environment is spread between multiple agencies and is heavily reliant on complex collaboration and coordination. Targeted energy policy and a state entity with consolidation and management authority would create efficiencies.
- Increase and clarify the state's role by mandating that the state help communities reduce energy costs could result in better ability to help communities identify, plan, and secure necessary financing for power generation efficiency, lower line losses, fuel storage, incorporation of renewable energy, residential and non-residential energy efficiency, and improve management, maintenance, and operations. Example levers:
 - o Grant RCA siting authority over generation and transmission for economically regulated utilities.
 - o Enact 1% per year fuel reduction target for utilities until cost-effective efficiency gains have been realized (account for load growth by using % of fuel per residential customer as the metric).

Arctic Connections: Scotland's Arctic Policy Framework, Scottish Government (2019)

About

The Arctic Policy Framework provides a platform for policy and knowledge exchange between the Scottish Government and its Arctic partners. Its goal is to encourage collaboration and partnership opportunities across Arctic communities. The Policy Framework considers Education, Research, and Innovation; Cultural Ties; Rural Connections; Climate Change, Environment, and Clean Energy; and Sustainable Economic Development.

The Scottish government has been working with communities and utilities to develop legislation and policy roadmaps that more specifically consider the remote conditions in which its people live. The two examples noted in the Policy Framework are:

- **Fuel Poverty Act:** set a target that by 2040 no household in Scotland is in fuel poverty. It accomplishes this through energy efficiency programs and the deployment of technologies that consider the unique challenges island communities face from remoteness, weather, and housing stock.
- **Islands Act:** requires policies, strategies, and services be "island-proofed" where implementation is likely to have different impacts on island communities relative to mainland communities and requires the Government to develop a National Island Plan to improve outcomes for island communities.

Sustainable Energy Transition of Greenland, Science Direct (January 2024)

Study Purpose

This study examines scenarios for integration of renewable energy sources into Greenland's power generation system, and particularly in remote areas that rely on diesel-powered energy generation. Like Alaska, Greenland's energy system is heavily reliant on diesel fuel, making it very vulnerable to oil prices.

Key Takeaways

- One source referenced in the study analyzed the costs of hybrid power sources in Qaanaaq (settlement in Western Greenland with a population less than 1,000). Scenarios included solar-diesel, solar-battery-diesel, and solar-battery-hydrogen-diesel systems were analyzed. Incorporating solar and battery models were found to offer savings and build resilience to oil price changes.
- Aggregating diesel and renewable energy sources were found to reduce electricity costs in all scenarios when compared to business-as-usual scenario.
- The article cautions about the high cost of building this infrastructure leading to initial energy price increases, but layering in a carbon tax, subsidies for renewables, and direct loans from the government aid the transition and achieve lower costs.
- Additional feasibility analyses have been conducted, including in Kotzebue where integrating wind energy was found to be more beneficial than hydro or solar.

Carbon Tax

According to the [Tax Foundation](#), a “carbon tax” assigns a cost to greenhouse gas emissions in the form of a tax. Revenues from a carbon tax are often reinvested into the development of additional energy savings solutions, infrastructure, or other needs.

List of Relevant Documents (compiled summer 2025)

Document Title	Source Publisher / Author		Publication Year	Broad Geography	Specific Regions Covered	Yes / No + Agg. Type	Yes / No + Type	Yes / No	Yes / No	Yes / No
Title	Source	Document Type	Year	Geography	Region	Aggregation Examples	Case Studies	Recommendations?	Data Sources?	Other Resources?
Reports and Publications										
Strategic Energy Planning Guide	Denali Commission	Planning	2015	Alaska	Statewide	No	Yes, Energy Planning		Yes	Yes
Rural Bulk Fuel Facilities: Operators Handbook	Alaska Energy Authority	Background	2018	Alaska						
Bulk Fuel Energy and Assessment	Alaska Energy Authority	Existing Conditions	2024	Alaska						
						Yes - financing, regulatory process				
Energy for a Sustainable Alaska: Rural Energy Conundrum	Commonwealth North	Multiple	2012	Alaska	Statewide		No	Yes	Yes	Yes
Alaska Affordable Energy Strategy	Alaska Energy Authority	Planning	2017	Alaska	Statewide	Yes - financing, regulatory	No	Yes	No	No
Provincial and Territorial Energy Profiles	Canada Energy Regulator		2024	Canada						
Energy Fact Book 2023-2024	Natural Resources Canada		2023	Canada						
Market Snapshot: Clean Energy Projects in Remote Indigenous and Northern Communities	Canada Energy Regulator	Case Study	2023	Canada	Northern Territories	No	Yes, renewables	Yes	No	Yes
Investing in Indigenous community infrastructure	Indigenous Services Canada			Canada						
Market Snapshots	Canada Energy Regulator	Existing Conditions	Multiple	Canada	National	No	No	No	Yes	Yes
Canadian Center for Energy Information	Canadian Center for Energy Information			Canada						
Sustainable energy transition of Greenland and its prospects as a potential Arctic e-fuel ar	Science Direct	Multiple	2024	Greenland	National	Yes - renewables integration	Yes - community examples	Yes	Yes	Yes
Critical pathways to renewable energy transitions in remote Alaska communities: a comp	Science Direct	Case Study	2022	Alaska	Statewide	Yes - pooling resources	Yes	Yes	Yes	Yes
Availability and Feasibility of Renewable Resources for Electricity Generation in the Arctic	Sustainability Journal	Case Study	2021	Multiple	International	Yes - renewables integration	Yes	Yes	Yes	Yes
The Obligation of Ownership is Leadership A Roadmap to Alaska's Transportation and Ene	Commonwealth North		2011	Alaska						
Solar Photovoltaic (PV) and Diesel/PV Hybrid System Training Workshop	Deerstone Consulting		2016	Alaska						
Clean Energy in Rural Alaska: The Good, the Bad, the Ugly	Deerstone Consulting		2015	Alaska						
Energy & Infrastructure Funding in Rural Alaska Barriers & Potential Solutions	Deerstone Consulting	Multiple	2023	Alaska	Statewide	Yes - funding applications	No	Yes	No	Yes
Anchorage Energy Landscape and Opportunities Landscape	Deerstone Consulting		2017	Alaska						
Sustainable Energy in Remote Indonesian Grids: Accelerating Project Development	Deerstone Consulting		2015	Indonesia						
Sustainable Energy for Remote Indonesian Grids: Strategies to Accelerate Nationwide Dep	Deerstone Consulting		2016	Indonesia						
City of Homer Climate Action Plan Implementation Project Final Report	Deerstone Consulting		2009	Alaska						
A partial solution to rural Alaska energy challenges	Anchorage Daily News / Deerstone	Existing Conditions	2016	Alaska	Statewide	No	Yes - PCE	Yes	No	Yes
Comprehensive Economic Development Strategies										
Southeast Conference's CEDS 2021-2025, April 2024 Update	Southeast Conference	Planning	2024	Alaska	Southeast	No	No	Yes	Yes	Yes
Alaska Statewide CEDS, 2022-2027	UA Center for Economic Development	Planning	2022	Alaska	Statewide	No	No	No	Yes	Yes
Northwest Arctic Borough CEDS, 2019-2023	Northwest Arctic Borough	Planning	2019	Alaska	NWAB	No	No	Yes	Yes	Yes
Bering Straights CEDS, 2019-2024	Kawerak	Planning	2019	Alaska	Bering Straits	Yes - AVEC/NSEDC commur	No	No	Yes	Yes
Fairbanks North Star Borough CEDS, 2022-2027	Fairbanks North Star Borough	Planning	2022	Alaska	FNSB	No	No	No	Yes	Yes
Copper River Census Area CEDS, 2024-2029	Copper Valley Development Association		2024	Alaska						
Kenai Peninsula CEDS, 2021-2026	Kenai Peninsula Economic Development District		2022	Alaska						
Energy Plans										
Rural Energy Plans, Multiple Regions	Alaska Energy Authority		2016	Alaska						
Aleutian & Pribilof Islands Regional Energy Plan	Alaska Energy Authority	Planning	2015	Alaska	Aleutians	No	No	Yes	Yes	Yes
Bering Strait Regional Energy Plan	Alaska Energy Authority	Planning	2015	Alaska	Bering Strait	No	No	Yes	Yes	Yes
Bristol Bay Regional Energy Plan	Alaska Energy Authority	Planning	2015	Alaska	Bristol Bay	No	No	Yes	Yes	Yes
Northwest Regional Energy Plan	Northwest Arctic Borough		2022	Alaska	NWAB	Yes - renewables integration	Yes - Deering, Buckland	Yes	Yes	Yes
Utility and Other Cooperatives										
Alaska Village Electric Cooperative	AVEC Homepage and Org Docs	Case Study	2025	Alaska	Western	Yes - coop	Yes	No	Yes	Yes
Inside Passage Electric Cooperative	IPEC Homepage and Org Docs	Case Study	2025	Alaska	Southeast	Yes - coop	Yes	No	No	Yes
Alaska Native Industries Cooperative Association	ANICA Homepage	Case Study	2023	Alaska	Statewide	Yes - coop	Yes	No	No	Yes
Northwest Municipal Conference	NWMC Homepage	Case Study	2025	Illinois	Chicago suburbs	Yes - purchasing	Yes	No	No	Yes
Franklin Regional Council of Governments	FRCOG Homepage	Case Study	2025	Massachusetts	Franklin County	Yes - resource aggregation	Yes	No	No	Yes