

# Regional Wood Industry Opportunities

Biomass & Value-Added Products

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**Prepared For:**  
The Kuskokwim  
Corporation

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## Executive Summary

This report is a high level, practical technical and economic assessment exploring opportunities, challenges and next steps toward creating a biomass and timber product-based sub-regional economy for the middle Kuskokwim River. This report considers the quantity and quality of the region’s wood resources to recommend viable value-added processing, namely processed logs for housing construction and biomass fuel products. This report recommends specific biomass heating projects for further development and identifies opportunities for technical and economic support for developing wood heating projects and value-added processing opportunities.

With over 950,000 acres of land, 60% of which is forested, The Kuskokwim Corporation (TKC) is the majority owner of wood resources in the region with an important opportunity for regional business development through the production of value-added products and wood heating fuels. The demand for wood products is growing and the social impact of a strong wood products industry is powerful. Wood products jobs pay high wages and develop skills that are highly marketable. These seasonally diverse jobs fit into the modern subsistence way of life. Removal of hazardous fuels reduces wildfire risk and provides a local fuel to reduce the import of heating fuels. TKC could lead the development of a regional forest products industry by partnering with existing businesses and supporting the creation of new businesses.

The following chart summarizes the recommendations to allow TKC to lead this business development opportunity.

### Summary of Recommendations

Focus Area	Action	Impacted Area
Forest Resources	<ul style="list-style-type: none"> <li>Update Forest Stewardship Plan in 2023</li> <li>Monitor Carbon Credit baseline inventory and market opportunities</li> <li>Continue to implement recommendations of 2013 Stewardship Plan</li> </ul>	<ul style="list-style-type: none"> <li>Region-wide</li> <li>Region-wide</li> <li>Region-wide</li> </ul>
Forest Resources and Value-Added Products	<ul style="list-style-type: none"> <li>Conduct resource assessment and economic viability assessment for future sawlog and firewood timber sales</li> </ul>	<ul style="list-style-type: none"> <li>Region-wide</li> </ul>
Value-Added Products	<ul style="list-style-type: none"> <li>Support the replication and expansion of the cabin-kit business and regional capacity development through the Wood Innovations Grant and other possible funding opportunities.</li> </ul>	<ul style="list-style-type: none"> <li>Region-wide</li> </ul>
Value-Added Products & Wood Heating Systems	<ul style="list-style-type: none"> <li>Encourage individuals to obtain TKC’s commercial firewood permits</li> <li>Assist Tribes and community organizations to obtain proper equipment and permits for large scale wood harvest endeavors. Encourage business feasibility development.</li> </ul>	<ul style="list-style-type: none"> <li>All communities where resource availability, local interest and capacity intersect</li> </ul>

<p>Wood Heating Systems</p>	<ul style="list-style-type: none"> <li>• Facilitate discussions with the YKHC and KSD about wood heating systems at their facilities.</li> <li>• Apply for Prefeasibility Studies for interested entities through the AWEDTG.</li> <li>• Investigate TKC ownership of wood fueled heat utilities to sell heat to community buildings.</li> <li>• Apply for Wood Innovations Grants for the design of wood heating systems (with strong community support)</li> <li>• Develop or update Hazard Mitigation Plans through FEMA</li> <li>• Pursue funding for Firewise and Wildland Fire Mitigation plans through FEMA or BIA Tribal Resilience</li> <li>• Develop a Community Wildland Fire Protection Plan through State Forestry</li> </ul>	<ul style="list-style-type: none"> <li>• Chuathbaluk, Lower Kalskag, Aniak, Crooked Creek, Sleetmute</li> <li>• Chuathbaluk, Lower Kalskag, Aniak, Stony River</li> <li>• Region-wide</li>   <li>• Upper Kalskag and Aniak Schools</li>   <li>• Crooked Creek, Stony River, Upper and Lower Kalskag, Red Devil, Sleetmute, Aniak</li> <li>• Aniak, Lower Kalskag, Upper Kalskag, Sleetmute</li>   <li>• Chuathbaluk</li> </ul>
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## Introduction

Alaska contains 126 million acres of forest, approximately one third of the state's area. This forest varies by location from temperate rain forests in Southeast to spruce forests in the Interior. The Kuskokwim Corporation (TKC) owns over 950,000 acres of surface estate in the middle Kuskokwim River region, 60% of which is forested, and shareholders consider these lands their most important asset.

This report is a high level, practical technical and economic assessment exploring opportunities, challenges and next steps toward creating a biomass and timber product-based sub-regional economy in the Middle Kuskokwim River and beyond. This report considers the quantity and quality of the region's wood resources to recommend viable value-added processing, namely processed logs for housing construction and biomass fuel products. This report recommends specific biomass heating projects for further development and identifies opportunities for technical and economic support for developing wood heating projects and value-added processing opportunities.

This report was developed by the DeerStone Consulting team and Priscilla Morris, Wood Biomass & Forest Stewardship Coordinator for the United States Forest Service with input from conversations with Clare Doig, consulting forester for TKC and Napaimute Enterprises; Will Putnam, Tanana Chiefs Conference Forestry Director; Mark Leary and Stan Kelley from Napaimute Enterprises, LLC; and Nathan Lojewski, Forestry Manager at Chugachmuit.

This report is divided into five sections: an Executive Summary of recommendations, a Wood Resource Summary, Biomass Heating Systems, Value-Added Wood Products, and Funding Opportunities for Forestry, Biomass, and Value-Added Products.

## Wood Resource Summary

The Forest Stewardship Program is a cooperative federal and state service that assists private landowners with forest planning and on-the-ground field work. The intent is to assist the active management of forest resources, to keep lands productive for present and future owners, and increase economic and environmental benefits. TKC completed a Forest Stewardship Plan in 2013 that mapped a total area of 1,108,280 acres of TKC, State of Alaska, and Federal lands. This acreage includes river and lake acreage. Approximately 60% of these lands mapped were identified as forestlands almost evenly split between coniferous forest, mixed deciduous-conifer forest, and hardwood forest. The remaining 40% of TKC lands are comprised of lands typed as tall-low shrub, dwarf shrub, herbaceous, aquatic, non-vascular, and other non-vegetated land cover types. It was noted that there is a lot of decay in the older timber in the region<sup>1</sup>. The following map provides an overview of the TKC lands. Detailed maps of the forest types can be found in the Forest Stewardship Plan.

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<sup>1</sup> Source: TKC Forest Stewardship Plan - 2013

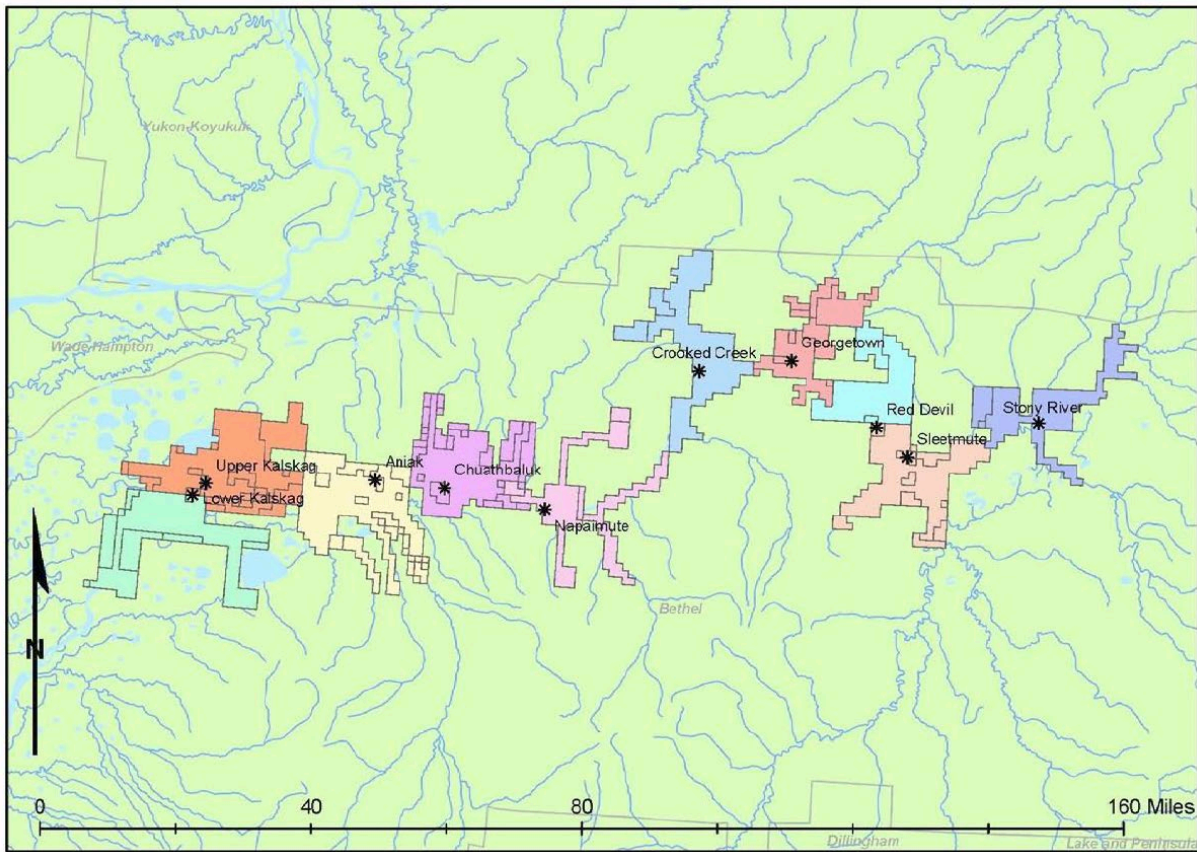


Figure 1: Overview Map of TKC Lands - from 2013 Forest Stewardship Plan

The best timber resources are located closest to the river, and there is not a large quantity of timber outside of TKC ownership. There are two small areas of State of Alaska land on the river, but there is not enough total volume of timber resources to make a timber sale worthwhile. There is no Federal land on the river. TKC has the best forest resource by far in the areas downriver of Stony River. There are great wood resources upriver of Stony River, but it is too remote for a viable commercial operation.

The following table from the 2013 Forest Stewardship Plan summarizes the forest resource that was identified adjacent to each of the TKC communities:

<b>Woody Biomass Availability within 5 miles of Villages</b>			
<b>Community</b>	<b>Estimated usable cubic feet (tree trunks)</b>	<b>Estimated dry tons (tree trunks)</b>	<b>Estimated Cords</b>
Stony River	78,482,906	64,727,333	872,032
Sleetmute	157,697,069	2,362,809	1,752,190
Red Devil	95,711,742	1,339,102	1,063,464
Georgetown	76,374,366	627,699	848,604
Crooked Creek	59,273,417	63,573,939	658,594
Napaimute	31,300,383	427,346	347,782
Chuathbaluk	73,671,189	368,963	818,569
Aniak	111,143,270	2,151,656	1,234,925
Upper Kalskag	69,818,116	22,630,554	775,757
Lower Kalskag	57,187,237	764,304	635,414
<b>Total</b>	<b>810,659,695</b>	<b>158,973,705</b>	<b>9,007,331</b>

Post timber harvest, the grass *Calamagrostis* has proven to impede natural reforestation. The grass is outcompeting trees sprouting through natural regeneration, and the forest are not reaching the required stems per acre required post-harvest through the State of Alaska Forest Practices Act. Harvest areas on TKC lands will require assistance to achieve the regeneration goals. TKC’s currently permitted commercial wood harvesting requires operators to comply with the Alaska Forest Practices and Resources Act reforestation requirements – which can be natural regeneration, artificial reforestation (planting) or a combination thereof. This can be accomplished through scarifying the soil to aid tree growth or planting trees and controlling the *Calamagrostis* growth. If wood harvests are to continue over the long term, it will be very important to consider re-forestation techniques to facilitate re-growth after initial harvest.

Sealaska, Ahtna Regional Corporation, and other regional and village corporations have recently invested some of their lands in the California Carbon Credit Market. This program started in 2013 and became the country’s first economy-wide [carbon market](https://www.scientificamerican.com/article/california-reveals-terms-cap-and-trade/)<sup>2</sup>. The program sets a declining cap on greenhouse gas emissions that emitters such as oil refineries, power plants and manufacturers can meet by buying and trading carbon credits or updating their facilities. Alaska forests register their lands in this carbon market and are paid for managing the lands to capture carbon.

<sup>2</sup> <https://www.scientificamerican.com/article/california-reveals-terms-cap-and-trade/>

Registering forests for carbon credits doesn't mean the trees can't be logged or cut down for other developments. Landowners that register projects in California's "improved forestry management" category can get credits for storing more carbon in their forests with techniques including waiting more time between harvesting timber, increasing forest productivity by removing dead or diseased trees, or planting more trees.

In order to participate in this carbon credit market, a baseline inventory must be in place. The baseline inventory for the Interior regions of Alaska is in progress and will be completed in the next one to two years. Additionally, landowners have to show that they are protecting timber from harvest and managing their resource for carbon capture.

TKC has reviewed the Carbon Credit Market through the years and has examined the potential opportunity's applicability to its lands. A 2019 study found that although this land area is quite large, there is a lack of an existing timber market outside of firewood and small-scale removals, therefore there is not currently a viable forest carbon opportunity. At the time of the study, TKC's land was outside of the eligible ARB-compliance program area, so available voluntary carbon protocols were utilized. The voluntary protocol generated credits by comparing the current forest management to a hypothetical alternative scenario in which the objective is to maximize the NPV via the sale of the timber assets. This 'baseline' scenario requires an existing timber market to prove the timber could be removed and sold at a profit, and additionally would require other landowners in the region to be acting in a way similar to this alternate scenario as evidence of the potential harvest capacity. With the current market being very limited and no neighboring properties conducting meaningful harvesting, the ability for the project to generate credits is very small.

California is currently reviewing their Carbon Credit Market and will be making modifications to the program. It is recommended that TKC continue to monitor the baseline forest inventory work in the Interior and monitor the regulatory modifications to the California Carbon Credit Market to evaluate the potential benefits of participating in this opportunity.

The conclusions and recommendations from the 2013 Forest Stewardship Plan are still relevant today. They include:

1. Monitor the previous year's harvest unit from the Napaimute Enterprises timber sale annually for regeneration and scarification needs and evaluate browse and other habitat considerations. After each annual harvest, check the unit for proper utilization of the trees harvested and acceptable post-harvest ground conditions.
2. Identify areas adjacent to Stony River, Sleetmute, Red Devil, Chuathbaluk, Aniak, Upper Kalskag and Lower Kalskag for harvest of wood biomass (cord wood or firewood) fuel for community wood energy projects if there is community interest in wood heating systems.
3. Work with the State of Alaska Division of Forestry to develop Community Wildfire Protection Plans for all communities, including Firewise implementation.
4. Engage the USDA Forest Service's State and Private Forestry Forest Health Program together with the State of Alaska Division of Forestry to conduct aerial detection surveys to monitor for insect or disease outbreaks. Often there is no reasonable response other than to monitor the condition; however, in circumstances such as an outbreak of spruce



bark beetles, it may be beneficial to plan timber harvests in the affected area to eliminate the host material containing the bark beetles.

5. Work with Napaimute Enterprises for future timber sales in units adjacent to the current (2013 & 2017) timber sale area near Lower Kalskag as needed and appropriate.

### ***Wood Resource Recommendations***

- Forest Stewardship Plans should be updated every 10 years. TKC should start the process to update their plan in 2023.
- Monitor the baseline forest inventory work in the Interior and monitor the regulatory modifications to the California Carbon Credit Market to evaluate the potential benefits of participating in this opportunity.
- Continue to implement the recommendations from the 2013 Forest Stewardship Plan.

## **Biomass Heating Systems**

### ***Biomass Heating Basics***

Biomass is any organic matter from plants or animals that is used as a fuel to produce heat or electricity. Woody biomass is typically a byproduct of manufacturing or forest management activities such as wildfire risk reduction and forest health restoration that can be used for fuel. There are many biomass products that come from forests, ranging from freshly cut logs to ground wood compressed into biobricks.

Communities in Alaska have had success in utilizing locally harvested wood to meet the heating needs in community buildings. In addition to reducing the cost of heating, these projects create local part-time jobs for the operation and maintenance of the heating systems and create small businesses that harvest and sell wood to the building owners.

Biomass heating projects also provide benefits to the local forest. Wood that is harvested to create fuel breaks to reduce the risk of wildland fires and thinning from forest health initiatives now have a use in local wood boilers. Sawmills can sell their waste sawdust and slab for biomass fuel. Without wood heating boilers, forest wastes are burned in open piles, greatly increasing the air pollution in the surrounding areas.

The type of biomass fuel that is used for a heating project is based on local resource availability, the size of the buildings to be heated, and the community goals and values. There are three technologies for wood heating systems that have proven to be effective in Alaska: cordwood, chips, and pellets. The following paragraphs give a brief description of these technologies.

Cordwood comes from trees that are cut, bucked into length, split, and dried. When selecting a cordwood boiler, look for clean burning, high efficiency systems from well-known companies and speak with other users of the boilers to learn about maintenance requirements and customer satisfaction. Typically, cordwood boilers cost less than boilers that burn other forms of biomass. However, the operation of the boiler is more labor-intensive. Logs must be split, stored, and dried. The boiler will need to be manually stoked with the cordwood on a daily basis and the ash has to be removed from the combustion chamber every few days. Cordwood

systems usually create 2 or more part-time jobs in a community for boiler operation and maintenance and the harvest of the wood fuel. Currently, Alaska has over 50 cordwood systems heating community buildings.

Wood chips are made from whole trees or sawmill slab that are run through a chipper or a grinder, resulting in postage stamp-sized pieces of wood. Wood chip heating systems have some upfront costs that cordwood systems do not, including the chipper and a storage unit to hold the chips. However, the labor requirements for operating the boiler are lower. Chips are fed into a boiler automatically with auger conveyors, eliminating the need for daily manual stoking. Chip biomass boilers are suitable for large heating loads, usually more than 10,000 square feet, but smaller systems have recently been introduced in the market. There are four large-scale chip heating systems operational in Alaska and one small-scale chip boiler operating in Mentasta.

Pellets are a highly processed wood-based fuel, and are manufactured from a variety of biomass products such as sawdust, lumber mill scrap, and trees determined unsuitable for lumber. Their uniform, small shape allows pellets to work well in automated feeding systems and smaller size boilers. Because the pellet is a manufactured product, they are the most expensive biomass fuel. They are only available from a pellet plant and require a dry storage location. On the other hand, pellets contain more energy in the same volume than other biomass fuels. Pellet systems also tend to be highly automated, requiring less labor for operations and maintenance. Pellet systems are available in a wide range of sizes, designed to heat buildings ranging from 1,000 square feet to those over 100,000 square feet. In Alaska, the only large-scale manufacturer of pellets is located in North Pole and shipping costs to remote communities has not proved to be economically viable. A number of small communities have investigated the development of small-scale pellet mills. The economic viability of these plants has also been challenging. The minimum requirements for an economically viable pellet manufacturing system are very inexpensive electrical power, a close proximity to customers, an inexpensive and consistent wood supply, and, due to the complexity of the pellet making equipment, a highly skilled workforce.

Another important consideration for selecting the best type of biofuel for a specific application is the size of buildings to be heated. Typical heating oil systems are sized to meet the heating demand on the coldest day of the year. Biomass boilers cannot be sized this way because they cannot modulate their output as quickly as fossil fuel boilers. A biomass boiler operating at the low end of its operating range burns less efficiently and can have higher emissions. It is best to size the biomass boiler to deliver approximately 80% of the heating load on the coldest day and use your existing heating system as a backup.

Biomass systems should always have a backup heating source. These backup boilers will run on the coldest days to meet peak heat load requirements for the building, and during times when the biomass boiler is offline for maintenance. In most biomass projects in Alaska, the existing heating system is left in place as a backup for the biomass system.

It should be noted that the operation and maintenance of wood heating systems require significantly more commitment than operating an oil boiler. Most system owners find that the wood supply is an ongoing challenge to find dependable harvesters. Communities with wood heating systems that struggle do so because there is no one who is interested in supplying

wood and/or operating and maintaining the boiler. The communities that are most successful pay a fair rate for the wood fuel and train multiple operators to manage their boiler system.

### ***Biomass Project Development Process***

A biomass system can be an economic development driver for the local economy. Money that was being paid to buy imported fuel can be transferred to paying local people to supply a local wood heating fuel. In addition to harvesting and processing woody biomass, biomass boilers also require people to operate and maintain the systems – all jobs that keep money circulating in the local economy. It should be noted that TKC’s Board of Directors would need to closely examine any other large scale timber harvest operations prior to permitting if more community and commercial buildings in the region were considering biomass systems.

If a community is interested in potentially installing a wood heating system in one or multiple community buildings, the Alaska Wood Energy Development Task Group (AWEDTG) ([alaskawoodenergy.com](http://alaskawoodenergy.com)) is available to help navigate the project development process. The Alaska Wood Energy Development Task Group consists of a coalition of federal and state agencies, Tribal organizations, and other not-for-profit organizations that have signed a Memorandum of Understanding to explore opportunities to increase the utilization of wood for energy and biofuels production in Alaska. These biomass experts will assist through the process to assess the project feasibility, educate the community on the realities of owning a wood heating system, help find funding resources, and provide technical support for the design and construction of the project.

The first step is to answer two very simple questions:

- Is there a potential wood resource near your community?
- Do you have community buildings whose owners would be interested in heating with local wood?

A rule of thumb in Alaska is that community facilities need to use a minimum of 2,500 gallons per year of heating fuel or spend more than \$25,000 per building annually for heat to potentially justify a wood heating project.

If a community can answer yes to both of these questions, a Statement of Interest can be submitted to the AWEDTG to request a prefeasibility study to explore the feasibility of heating facilities with high-efficiency, low-emission, wood-fired systems. This program is funded by the United States Forest Service and the Alaska Energy Authority, and the goal is to identify cost-effective heating projects that will displace fossil fuels with sustainable wood and/or wood residues. Eligible applicants include all non-federal government entities (including State, municipal and tribal governments), schools, not-for-profit organizations and commercial enterprises in Alaska. Federal facilities may be considered for inclusion as part of a district energy system if applied for by an eligible applicant.

More information can be found at:

<https://www.alaskawoodenergy.com/sites/alaskawoodenergy.com/files/NEW%20AWEDTG%20outreach%20letter.pdf>

Once a community is selected for a prefeasibility study, a consultant will travel to the community to collect information for buildings that could be heated with wood. They will assess the technical and economic viability of a project and present a report to the community leaders. The consultant will also conduct an informational meeting while they are in the community to start the educational process for potential project champions, a person or persons that will be the driving force to wood heating project to success.

The key components of the prefeasibility study are:

- Local resource availability – is there local wood available for the entire life of a wood heating project, who owns the land, and can the wood be delivered to the boiler for a reasonable cost?
- Technology options – chips, cordwood, pellets – what is the best fit for your community?
- Economic viability – will the biomass project save you money over the cost of heating oil?

Once a prefeasibility study has been completed, it is up to the potential project owners to decide if they are interested in pursuing a project, if they are ready to commit to supplying wood for a heating system, and if they are willing to operate and maintain the boiler. It is recommended that potential owners talk to other communities that have systems like the one they are considering or even visit an operating facility. The AWEDTG can help facilitate tours of operating systems.

### ***Biomass System Design***

The next step in the wood heating system development process is the engineering design and permitting. A design can cost anywhere from \$30,000 to over \$100,000 depending on the number of buildings and size of the boiler. The most important factors are to hire an engineering firm with experience in biomass systems and involve the future operators and mechanics in the design process.

Designing a biomass heating system is very different from designing a fuel oil heating system. Biomass boilers do not respond to load changes as quickly as a fuel oil system, so there are special design specifications that must be considered. Biomass systems that are designed by inexperienced engineers are usually grossly oversized and have significant operational issues. Engineering firms should be selected based on their experience with wood heating systems and references should be thoroughly checked to understand their past performance on similar projects. The AWEDTG provides technical support for vendor selection and design reviews to assist in the procurement of a well-designed system.

The only permitting required for a small-scale biomass project in Alaska is fire marshal approval of the final design. This should be part of the engineering design contract.

The engineering firm should also work closely with the community project team to define the operations and logistics plans during their design process. Transporting fuel from the forest to the boiler is the most difficult part of every operations plan. The project team should have a detailed plan in place before construction begins. Here are some business models that have been successful in Alaska for supply fuel:

- Develop a supplier that can acquire and deliver biomass that has already been processed. This is the best option for ease of operations, liability, and reliability. This is a business development opportunity for community members.
- Develop a supplier to acquire and deliver wood in log form for your team to process into cordwood or chips. In this case, your organization will need to handle training employees; coordinating delivery, processing, and burning; and liability issues. For example, cordwood needs to be delivered, cut and split, and dried before it can be burned. Employees working with chain saws and moving logs should have proper training and equipment. This model can also result in small business development within the community.
- Acquire and deliver your own biomass. This is the most labor-intensive option. In addition to handling transportation and processing, your team will need to consider harvest permits and reforestation. The operations plan will need to ensure all employees are properly trained and equipped, and your team should consult your insurance company to ensure your plan covers all necessary activities.

- If you live on a major river, like the Kuskokwim, you may be able to collect enough biomass from driftwood to sustain a biomass boiler. You'll need to do an assessment of driftwood before deciding on this option.

During the design process, it is very important to start building the community capacity for the operation and maintenance of the biomass boiler. As mentioned earlier, identifying the operation and maintenance support early in the process allows these employees to participate in the design reviews and add their input into the final design. This the best way to build community capability and support for the new system. Projects with community support and engaged employees are much more likely to succeed in the long-term.

### ***Biomass System Construction***

The final step of the biomass development project is the construction and commissioning of the system. Once the biomass design is complete and approved by the community project team and funding is secured, construction can commence. It is recommended to select a construction firm that has experience in biomass installations. It is also important to include the boiler manufacturer in the training of the operator and mechanics and the final commissioning of the system.

### ***Programs to Support Biomass Heating Project Development***

The following programs have funded the design and construction of biomass projects in Alaska.

1. The Wood Innovations Grants funding through the United States Forest Service supports traditional wood utilization projects, expands wood energy markets, and promotes using wood as a construction material in commercial buildings. These grants and cooperative agreements support the nationwide challenge of disposing of hazardous fuels and other wood residues from the National Forest System and other forest lands in a manner that supports wood products and wood energy markets.

The Forest Service supports proposals that significantly stimulate or expand wood products and wood energy markets that support the long-term management of National Forest System and other forest lands. The 2021 Request for Proposals focuses on the following priorities:

- Reduce hazardous fuels and improve forest health on National Forest System and other forest lands
  - Reduce costs of forest management on all land types
  - Promote economic and environmental health of communities
2. The Denali Commission, in partnership with the United States Forest Service and Alaska Energy Authority, has been providing construction funding for the last couple of years to biomass heating projects in need of small amounts of funding to complete construction projects. This is a funding source intended to fulfill shortfalls in construction funding.
  3. Biomass projects have also received design and construction funding through the State of Alaska Renewable Energy Funds, USDA's High Energy Cost Grant Program, DOE Office of Indian Energy, and HUD Community Development Block Grants program.

## **Wood Stove Heating Opportunities**

In smaller communities without community buildings that meet the minimum fuel usage for a larger system, residential and small community building wood stove changeout programs could benefit the residents. Beginning in 2021, consumers buying highly efficient wood or pellet stoves, or larger residential biomass heating systems will be able to claim a 26% tax credit that is uncapped and based on the full cost (purchase and installation) of the unit. The credit will remain at 26% through this year and next, and then step down to 22% in 2023.

TKC could commit various levels of support for changeout programs, from coordinating bulk purchases and bulk shipping to communities to providing economic incentives for changeout programs. High Efficiency wood stoves cost between \$2,000 and \$5,000 depending on the manufacturer and the size of the unit. Shipping an individual stove to a remote community costs between \$800 and \$1,500 shipping from Anchorage. Bulk purchase of stoves can reduce the price from 10% to 20%, depending on the volume. Bulk shipping from Anchorage can be as low as \$6,000 for a container of 60 to 70 stoves, making the shipping cost per stove as low as \$85 per stove<sup>3</sup>.

## **TKC Community Specific Opportunities and Recommendations**

The following section discusses specific wood heating opportunities and recommendations for each TKC community based on community buildings, forest resources, and previous work.

### **Aniak**

In 2017 Coffman Engineers performed a preliminary biomass feasibility assessment for the Kuspuk School District to determine the technical and economic viability of biomass heating systems at the Aniak High School in Aniak, Alaska. The study evaluated a Garn style cordwood boiler system that would supply the majority of heat to the school.

The proposed wood boiler would be located in a detached module and heating pipes would connect to a new heat exchanger in the school's mechanical room. The existing heating oil boiler would still supplement heat in the school on colder days during the heating season.

The estimated capital cost to complete this project was \$459,000 and the cordwood system was estimated to displace about 11,500 gallons of fuel oil annually using about 75 cords of wood. Due to the low price of heating oil at \$2.60/gal, the benefit to cost ratio for this high school was less than 1.0 and therefore the cordwood boiler system at the school was not economically justified at the time of the study.

However, the benefit to cost ratio hinges on the relative cost of heating oil as compared to cordwood. When the cost of fuel oil reaches approximately \$5.00 per gallon the benefit to cost ratio should be reevaluated. The cost of heating fuel during the winter of 2021 reached these levels, so Aniak should consider project implementation. For the successful implementation of this project, it will also be essential that a local wood harvester is identified who can reliably provide the required cordwood fuel year after year. At this time Napaimute Enterprises does not have the capacity to supply cordwood for this project.

Since this study was completed, the Kuspuk School District has received funding to add a new addition to the High School to provide facilities for the Elementary School. The existing Auntie Mary Nicoli Elementary School will no longer be used by the school district but might be converted into a regional training facility by TKC. These changes would qualify for an update to the prefeasibility study. It is

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<sup>3</sup> Source – conversation with Alaska Fireplace – 907-892-7131

recommended that the Kuspuk School District, if interested in biomass heating, submit a Statement of Interest for an updated prefeasibility study to the AWEDTG.

Aniak has additional buildings including the clinic and community offices that might also be suitable for wood heating systems. If there is community interest, a separate no-cost prefeasibility study or a joint application with the Kuspuk School District could be requested through the AWEDTG.

Aniak completed a Hazard Mitigation Plan through FEMA in 2015. This plan expired in 2020. It is recommended that Aniak update their Hazard Mitigation Plan and consider Wildland Fire Mitigation as a priority. FEMA funding could be used to develop Community Wildfire Projection Plans and to create fire breaks to protect the community from wildland fire. Wildfire mitigation activities are a good source for inexpensive wood fuel for biomass heating systems.

### ***Chuathbaluk***

Within Chuathbaluk, the Crow Village Sam School is a pre-kindergarten through 12<sup>th</sup> grade school with approximately 10,000 square feet of heated area. The school is part of the Kuspuk School District. The school parcel also contains the school power plant, a Head Start program, shop, and senior housing. The community also has the 400-square foot Marie Kameroff Health Clinic and various office buildings that could be suitable for the installation of wood heating systems. Both the school and clinic are considered critical infrastructure. According to the 2013 Forest Stewardship Plan, there is a sufficient wood resource for supporting small-scale community wood heating.

Chuathbaluk also has a Hazardous Mitigation Plan submitted in 2017 which reflects that Firewise activities are considered a priority for the community.

If there is community interest to investigate the opportunity for using local wood resources to heat community buildings, it is recommended that the community and/or the school district apply for a no-cost prefeasibility study through the Alaska Wood Energy Development Task Group. It is also recommended that Chuathbaluk apply for the development of a Community Wildfire Protection Plan including Firewise implementation through the FEMA Hazard Mitigation Grant Program. See program links in the last section of this document.

### ***Crooked Creek***

Crooked Creek has a 9,000 square foot school and various office buildings that could be suitable for the installation of wood heating systems. Recent forest fires near the community could provide an excellent source of dry firewood depending on the condition of the burn areas. If there is community interest to investigate wood heating opportunities, the condition of the wood in the burns near the community should be checked to verify that the wood quality is sufficient for firewood. It is also recommended that the community or school district apply for a no-cost prefeasibility study through the Alaska Wood Energy Development Task Group.

The community could also pursue the installation of new high efficiency residential wood stoves or wood boilers through the current federal tax incentive or potentially, participation in a regional wood stove changeout program.

Crooked Creek has not developed a Hazard Mitigation Plan through FEMA. Hazard mitigation planning reduces loss of life and property by minimizing the impact of disasters and provides funding to help mitigate the risks. It is recommended that Crooked Creek contact FEMA to begin the process of creating a Hazard Mitigation Plan.

<https://www.fema.gov/emergency-managers/risk-management/hazard-mitigation-planning/create-hazard-plan>

## **Georgetown**

In the Forest Stewardship Plan completed in 2013, no significant wood harvest areas were identified near Georgetown. Additionally, there are currently no large-scale community buildings in this village with few year-round residents. The Native Village of Georgetown is in the process of completing a new community building and is planning other community structures. The timeline for completion of these is unclear. The most appropriate approach for wood heating systems is the installation of new high efficiency residential wood stoves or wood boilers through the current federal tax incentive or potentially, participation in a regional wood stove changeout program. Because of the limited wood availability, driftwood might be a viable option to supplement local harvest for the fuel supply for wood stoves.

## **Lower Kalskag**

Lower Kalskag has a grouping of three buildings that include the elementary school, library, and school storage that could be suitable for the installation of wood heating systems. According to the 2013 Forest Stewardship Plan, there is a sufficient wood resource for supporting small-scale community wood heating.

If there is interest from the Kuspuk School District to investigate the opportunity for using local wood resources to heat these buildings, it is recommended that the community and/or the school district apply for a no-cost prefeasibility study through the Alaska Wood Energy Development Task Group.

Lower Kalskag also has a Hazard Mitigation Plan submitted in 2013. These plans expire after 5 years. It is recommended that Lower Kalskag update their Hazard Mitigation Plan and consider Wildland Fire Mitigation as a priority. FEMA funding could be used to develop Community Wildfire Projection Plans and to create fire breaks to protect the community from wildland fire. Wildfire mitigation activities are a good source for inexpensive wood fuel for biomass heating systems.

## **Upper Kalskag**

In 2017 Coffman Engineers performed a preliminary biomass feasibility assessment for the Kuspuk School District to determine the technical and economic viability of biomass heating systems at the George Morgan Sr. High School in Kalskag, Alaska. The study evaluated a Garn style cordwood boiler system that would supply the majority of heat to the school.

The proposed wood boiler would be located in a detached module and heating pipes would connect to a new heat exchanger in the school's mechanical room. The existing heating oil boiler would still supplement heat in the school during colder days during the heating season.

The estimated capital cost to complete this project was \$457,000 and the cordwood system was estimated to displace about 11,000 gallons of fuel oil annually using about 70 cords of wood. Due to the low price of heating oil at \$2.60/gal, the benefit to cost ratio for this high school was less than 1.0 and therefore the cordwood boiler system at the school was not economically justified at the time of the study.

However, the benefit to cost ratio hinges on the relative cost of heating oil as compared to cordwood. When the cost of fuel oil reaches approximately \$5.00 per gallon the benefit to cost ratio should be reevaluated. The cost of heating fuel during the winter of 2021 reached these levels, so the Upper Kalskag should consider project implementation. For the successful implementation of this project, it will also be essential that a local wood harvester is identified who can reliably provide the required cordwood fuel year after year. At this time Napaimute Enterprises does not have the capacity to supply cordwood for this project.



If there is community and school district interest to develop this project to be ready to respond when heating oil prices rebound, it is recommended that the School District apply for a Wood Innovations Grant from the USFS to complete the design of the wood heating system for the George Morgan Senior High School.

Upper Kalskag completed a Hazard Mitigation Plan through FEMA in 2013. These plans expire after 5 years. It is recommended that Upper Kalskag update their Hazard Mitigation Plan and consider Wildland Fire Mitigation as a priority. FEMA funding could be used to develop Community Wildfire Projection Plans and to create fire breaks to protect the community from wildland fire. Wildfire mitigation activities are a good source for inexpensive wood fuel for biomass heating systems.

### ***Napaimute***

With a population of less than 10 (current population reported as 2) and no large-scale community buildings, the most appropriate approach for wood heating systems is the installation of new high efficiency residential wood stoves/wood boilers through the current federal tax incentive or potentially, a regional wood stove changeout program. Residential wood heating appliances can support the development of small, local businesses that supply cordwood to residential users.

### ***Red Devil***

With a population of less than 25 and no large-scale community buildings, the most appropriate approach for wood heating systems is the installation of new high efficiency residential wood stoves or wood boilers through the current federal tax incentive or potentially, a regional wood stove changeout program. Residential wood heating appliances can support the development of small, local businesses that supply cordwood to residential users.

Red Devil completed a Hazard Mitigation Plan through FEMA in 2007. These plans expire after 5 years. It is recommended that Red Devil update their Hazard Mitigation Plan.

### ***Sleetmute***

Sleetmute has a number of buildings that could be viable for wood heating systems, including the school which is part of the Kuspuk School District, clinic, water treatment plant, and various offices. According to the 2013 Forest Stewardship Plan, there is a sufficient wood resource for supporting small-scale community wood heating.

If there is interest from the Kuspuk School District or other community building owners to investigate the opportunity for using local wood resources to heat these buildings, it is recommended that the community and/or the school district apply for a no-cost prefeasibility study through the Alaska Wood Energy Development Task Group.

Sleetmute created a Hazardous Mitigation Plan in 2014 and wildfire mitigation and Firewise activities are considered a priority for the community. These plans expire after 5 years, so it is recommended that Sleetmute update their Hazard Mitigation Plan and consider developing a Community Wildfire Protection Plan including Firewise implementation through the FEMA Hazard Mitigation Grant Program.

### ***Stony River***

With a population of about 40 people, Stony River's most likely opportunity for buildings with large enough heating loads to support biomass heating systems are the school and the Water Treatment Plant. Our records show that the school is about 7,000 square foot. If heating fuel usages in either

facility are above 2,500 gallons annually, it is recommended that the community and school district apply for a no-cost prefeasibility study through the Alaska Wood Energy Development Task Group.

Stony River has not developed a Hazard Mitigation Plan through FEMA. Hazard mitigation planning reduces loss of life and property by minimizing the impact of disasters and provides funding to help mitigate the risks. It is recommended that Stony River contact FEMA to begin the process of creating a Hazard Mitigation Plan.

## **Region-Wide Biomass Opportunities for TKC**

Because TKC is the largest landowner in the region, their active involvement is required to support the development of a local wood-based economy. Additionally, the Kuspuk School District (KSD) and the Yukon Kuskokwim Health Corporation (YKHC) are the owners of the buildings with the largest heating loads in the TKC communities, and their facilities have the best opportunities for viable local wood heating systems. However, both KSD and YKHC have important missions that are not in any way related to managing wood heating systems. KSD's mission is to educate children in 9 communities in the TKC region. YKHC administers a comprehensive healthcare delivery system for 58 rural communities in southwest Alaska.

This intersection of economic and mission-driven incentives creates an opportunity for partnerships between TKC and the KSD and YKHC. TKC could develop, operate and maintain biomass heating systems that sell heat to the owners of the buildings with large heating loads in the communities, specifically the schools and the clinics. This third party heat utility concept has been successfully implemented across the United States, and there are also examples of successful heat utilities in Alaska. Many of the diesel power plant heat recovery systems sell heat to water treatment plants, clinics and schools. A Heat Sales Agreement defines the cost of the heat and the line of demarcation for maintenance responsibilities.

Many small-scale wood heating systems purchase wood from local suppliers that operate part-time wood harvest businesses. A supplier might supply 5 to 20 cords of wood each year, and a wood heating system might have 5 to 10 of these suppliers. These small businesses usually are manual operators that fell and process trees with chainsaws and use snow machines and sleds to transfer their wood. These small businesses fit well with subsistence lifestyles and can spread the economic benefits of wood heating systems across multiple community members.

Because the wood supply is one of the most challenging parts of owning and operating a wood heating system, TKC has the opportunity to play a large role in developing a stable supply of wood and developing small businesses in their communities. For a very small investment, TKC could provide basic tools and training to stand-up small wood harvest businesses in their communities. For less than \$1,000 per business, TKC could supply a chainsaw with the required maintenance tools, safety equipment including protective chaps, hardhats, gloves, and ear protection, and partner with State of Alaska Division of Forestry to offer training workshops. Small wood splitters can be purchased for less than \$1500. Participants could also 'pay-back' the investment in the business start-up by delivering cords of wood to local wood heating systems or to elders for home heating. TKC could also work with the new harvesters on identifying wood harvest areas within TKC landholdings and provide harvest permits. This concept has proven to be an effective entry-level business development opportunity for remote communities and subsistence lifestyles elsewhere in Alaska.

### ***Region Wide Biomass Recommendations for TKC***

1. Facilitate discussions with the YKHC and KSD about interest in wood heating systems at their facilities.
2. Apply for Prefeasibility Studies for interested entities through the AWEDTG.

3. Investigate TKC ownership of wood fueled heat utilities to sell heat to community buildings.
4. Consider supporting the development, outfitting, and training of small wood harvest businesses in the TKC region.
5. If there is strong community and school district support and a project champion, apply for Wood Innovations Grants for the design of wood heating systems in the schools of Upper Kalskag and Aniak.
6. Develop or update Hazard Mitigation Plans through FEMA.
7. Develop a Community Wildland Fire Protection Plan through State Forestry in Chuathbaluk.

## **Value Added Wood Products Opportunities**

With over 950,000 acres of land, 60% of which is forested, the TKC wood resources of the region offer an important regional business development opportunity through the production of value-added products. Value-added wood products are defined as specialty products that have been manufactured from a raw log. By processing harvested logs, the value of the product is more than the original log, and local jobs are created in producing the specialty products.

The challenges for value-added wood products are very similar to the biomass challenges discussed in the above sections: the need for a consistent supply of logs that meet the quality specifications for the wood products, the proper equipment to process the logs into finished products, a thoughtful business plan, and a trained and reliable workforce. The TKC region has small sawmills operating in many of their communities, and a steady demand for wood products that can support small business development. Unfortunately, the USFS or the State of Alaska Division of Forestry does not maintain an inventory of sawmills in interior Alaska for specific outreach.

This section of the report will use a case study of the largest processing operation in the TKC region to illustrate the challenges and opportunities for value-added products business development.

### ***Napaimute Enterprises, LLC Case Study***

The TKC region is in an advantageous position with the existing, sizeable wood harvest and processing business of Napaimute Enterprises, LLC (NE). This is an established business that has been operating in its current location since 2013. The business consists of a sawmill located on 10 acres of TKC leased land three miles downriver from Lower Kalskag. NE has three full-time employees and three to four seasonal workers for wood harvesting and processing. There are seasonal positions for a sawmill operator, a harvester operator, a skidder operator, and a helper that are filled each year.

Wood for the NE business comes from a 10-year, 400-acre timber sale with TKC. The timber sale is located downriver of Lower Kalskag and is adjacent to the leased site of the sawmill. This timber sale has been harvested since 2013 and the obligation is expected to be paid in full by 2023. NE will most likely continue to harvest firewood from this site beyond 2023.

The sawmill currently supplies two products to the broader Calista Region: firewood and log cabin kits.

## **NE Firewood Business**

Napaimute Enterprises began their value-added processing business by harvesting, bundling, and transporting firewood downriver to Bethel and surrounding communities that have limited wood supplies available locally. Firewood is offered in two configurations – supersacks of about ½ cord of firewood and bundles of 6-10 foot logs that are the equivalent of about 1.5 cords of wood. Both product configurations can be handled with a fork truck. The log length bundles are for customers who want to cut and split the logs on their own and are sized to fit on the sleds that are used to move the wood in the region. These sleds hold about ¾ of a cord so log length bundles are usually shared between two customers. NE currently produces about 200 bags per year and sells the bags for approximately \$600. About 100 log-length bundles are produced every year and sell for about \$800. Product is limited by processing capability of the sawmill.

Each year NE sells out of firewood in January or February. However, in 2020 CARES Act funding was used to help supplement heating costs and purchasing firewood was an eligible use. NE sold out by December because of this increased demand. Mark Leary, Director of NE, is confident that he could sell two to three times more firewood if he could produce the product. The demand for firewood in the Calista region is driven by wood fueled steam bathing in addition to some home heating. The use of wood is an important cultural and public health consideration.

Utilization of NE produced firewood within TKC's region is limited. Napaimute has been able to expand their business to many communities downriver from the TKC region by developing a simple order and delivery system. Wood is purchased over the phone with a credit card, and it is then delivered to a "pick-up" site, where the wood is dropped off with a tag indicating the name of the purchaser. The purchaser travels to the pick-up site to receive their firewood using an honor system. Napaimute has many customers that they have never met in person. It should also be noted that this relatively high price for wood is viable in and around Bethel because there are limited trees or other alternatives, whereas upriver, such as in the TKC region, wood is more readily available and prices are lower.

## **NE Cabin Kit Business**

NE harvests sawlog timber for the manufacture of 3-sided logs for cabin kits. There are currently three cabin designs: a 12' by 16' cabin with a deck, a 16' by 24' one room house, and a 24' by 40' family house. The prices for the kits range from about \$10,500 to \$27,500. The cabin kits are sold unassembled. The largest model uses about 12,000 board feet of timber.

The current cabin kit business has the capacity to make 2 to 3 kits per year, but demand for the kits is significantly higher. For example, the Kuspuk school district is interested in purchasing a kit for their cultural camp, which would increase the awareness of the product. CARES Act funding is also expected to increase the demand for the kits. In a region where there is a shortage of affordable housing, locally manufactured cabin kits are filling a public health need.

Because the cabin kits only include the necessary logs for the structure of the home, TKC has applied for a grant from the USFS that would specify all of the needed materials to completely outfit the cabin kits, including doors, windows, interior walls, electrical, plumbing, etc. The grant application also includes certifying the kits as approved HUD housing and the development of a training plan for local crews to build the homes. If this grant application is

successful, it is expected that the demand for the cabin kits will skyrocket and fill a much needed niche for local affordable housing that can be funded through the HUD program.

The current limitation for the cabin kit business is the availability of sawlogs on the current timber sale site. The logs need to be a minimum of eight feet long and a minimum of 9 inches in diameter and must be straight. If more quality sawlogs were available, NE could keep their sawmill running longer and increase the annual build of cabin kits. Mark Leary feels that the current timber sale cannot supply the proper quality of sawlogs for the cabin kits. Large trees are needed for the kits, and most of the large sawlogs have already been harvested.

### **Barge Business**

In 2019 NE expanded their business to include a Landing Craft Mechanized (LCM) business to provide barge services for the communities on the Kuskokwim River. This barge was funded through an Economic Development Association grant. It will operate the full season in 2021 and will be used to deliver firewood and meet other community needs. The team is focusing on expanding backhaul opportunities. They have a contract with Donlin Gold, LLC for backhaul of equipment and waste and are applying for a grant to support backhaul of household waste from the communities. They are also investigating leasing a larger barge.

According to NE, owning their own barge has increased the business flexibility as they are no longer dependent on the barge companies' schedules and availability. They are able to move the wood products when they want and where they want. The ice road to Bethel is also critical for wintertime deliveries. The ice road construction and maintenance were partially funded by the State of Alaska in 2021.

In addition to struggling with wood supply and processing capability, NE is not turning a profit. The business seems to be driven by altruistic goals and they are trying to keep their costs low while providing quality products to the region's consumers. Unfortunately, the business is struggling to break even. The business is currently focusing on a two-year plan to become financially stable. Without long-term profitability, it is difficult to envision this effort continuing without ongoing dependence on grants or other outside funding.

### ***Region-Wide Value-Added Business Considerations***

As demonstrated in the NE case study, there are many challenges to value-added wood product businesses in the TKC region. These businesses are competing with imported wood products that are produced in large manufacturing facilities, usually outside of Alaska, that have very low manufacturing costs. Shipping to the TKC region adds significantly to the cost of these products, so there is opportunity for local business development in small niche markets requiring wood less than 12" in diameter.

A successful wood products business requires more than just a sawmill. Business development requires research and planning to understand the wood supply, quality specifications, product pricing, supply and delivery logistics, and market demand. A business feasibility plan should start with an analysis of the important decision of the location of the sawmill.

The wood products business should consider a sawmill location that will reduce the cost of raw materials, labor needs, and transportation to the consumer. There is no ideal location that will meet all three of these requirements, but a business feasibility study can compare costs to

determine if a location has potential for a sustainable business plan. By locating a sawmill near a community, employees could go home at night, and the cost associated with a remote work camp are avoided. Also, maintenance resources are more readily available, and the shipping logistics are less complicated when located near a community. Unfortunately, if the local wood resource is not ideal for value added products, shipping of raw logs from a remote harvest site will challenge the business viability. The analysis should consider the balance of the cost of raw material supply with the cost of the sawmill operation and shipment of final product to the market.

The timber supply of the proper quantity and quality to meet business demands is the most urgent priority. Any business feasibility study should include a timber resource assessment to understand the long-term viability and quality of the wood supply. This includes the availability, species, size, and quality of the wood resource, but also includes the plans for transporting the logs from the harvest site to the location of the sawmill. As the majority landowner in the region, TKC could consider supporting current and future businesses interested in developing similar products by conducting a resource assessment that will identify locations of suitable sawlogs for future timber sales and assist in the evaluation of the harvest and shipping costs.

In addition to log availability, financial sustainability is a challenge for small value-added wood product businesses and should be evaluated in a business feasibility study. This includes a detailed financial analysis that considers the production and maintenance cost including labor and benefits, equipment, material, insurance, and other administrative costs. This analysis should include pricing of the products, transportation costs, and any required marketing. The business feasibility study should recommend staffing levels and skills required to meet the predicted product demand and allow for business growth. Finally, the business feasibility should recommend all of the equipment required to safely operate and maintain the wood products mill.

Logistics are always going to be a challenge for wood harvest and processing due to the harsh environment and limited infrastructure in the TKC region. Remote businesses deal with additional logistics that businesses on a road system would never encounter. For example, the entrance to a harvest site may have a steep bank from the river. To access the site with harvest equipment, the team would first have to build a bridge to get up the slope just to access the wood harvest site. Because of this reality, value-added product businesses in the region will always be economically challenged to compete outside of the region.

A feasibility study is critically important in the development of value-added product businesses and should realistically address the economic challenges of doing business in a remote location. Experienced foresters must be involved in the development process to understand the quality of wood required and the realities of the harvest and processing. TKC should encourage all harvest permit applicants to share their business feasibility studies prior to awarding harvest permits.

### ***Other value-added wood product opportunities considered***

In preparation for this report, the project team considered opportunities for additional value-added products that are not currently produced in the TKC region.

Long-term opportunities investigated included the manufacture of roof trusses, plywood, dimensional lumber, and other commodity-grade products. In all cases, the wood resource in the TKC region is not of the quality and quantity to support these businesses. Given current growing conditions and lack of capacity to implement more intensive silvicultural practices on timber lands in many regions of Alaska, wood resources have been largely left unmanaged. Unmanaged forests go through a natural progression of competition and survival from external environmental factors that influence the form of the tree as well as the wood quality. Issues such as windthrow/wind damage, invasive species, competition for resources and geographic location all influence a tree's physical wood characteristics. Damaged trees from wind and other factors often do not grow straight and the wood fibers themselves do not respond well to formal sawing and drying processes needed to turn trees into value-added wood products. Doing a resource assessment sheds light on the proportion of trees within a given area that would be well suited for value added production and what proportion would be better off utilized as firewood or biomass. Having a detailed understanding of this proportion and its availability will better inform the current effort to expand existing markets and infrastructure. Having an intimate knowledge of the timber/wood capacity in the manufacturing process will also better inform what value-added products would be attractive to produce.

Commodity products are price sensitive, and the TKC area cannot compete with large-scale integrated sawmills in the lower 48 and Canada. Additionally, dimensional lumber requires stamping and grading of the products, and Alaska does not have an inspector in the state. Periodic inspections would require flying an inspector in from the Lower 48, increasing the cost of an operation. This alone would make the supply of dimensional lumber noncompetitive.

Long term opportunities that could provide potential business growth include producing materials from small diameter trees that do not require structural grading such as housing interior products and home furnishings for the cabin kits. High quality cabinetry and furniture could be produced from the wood resources on TKC land, and this type of value-added product does not require grading. A business with access to a planer could produce cabinetry, flooring, ceiling panels, and furniture. This is recommended as the biggest potential opportunity for business expansion within the region.

### ***Value-Added Wood Product Development Recommendations***

As discussed in the biomass section of this report, TKC has a major role to play in the development of a sub-regional wood products industry. TKC is the major landowner and any entity considering business development will have to involve TKC in their plans. TKC leadership has the ability to insist that all harvesting activities must protect the land above all else.

To support current and future value-added wood processors, TKC has an opportunity to develop local small-scale wood harvesters that could supply raw logs to the mills in the region and removed one of the largest hurdles to the development of the wood products industry. This model could be used to support both firewood processors and sawmills in the region and allow the mills to focus on manufacturing value-added products.

There are thousands of acres of trees burned in wildfires that could be harvested for firewood. Specifically, large amounts of wood are located across the river from Aniak and surrounding Crooked Creek. The burn areas have excellent trees for firewood that could meet the large

demand for firewood from the region. Small businesses could be developed where local harvesters supply raw logs to firewood processors who would cut and split the wood and ship the firewood to the end user. This could be an opportunity to develop small harvest operations in multiple communities and could supply logs to existing firewood processors and support the development of additional firewood processors throughout the region.

Working with Clare Doig, many pockets of mature timber containing high quality sawlogs that need to be harvested between Aniak and Kalskag were identified. There are many forest health reasons to harvest the mature trees before they start losing their value. For example, heavy windstorms damaged approximately 50% of the mature trees in one area of TKC land.

From a logistical standpoint, if community harvesters could provide high quality logs and lower quality firewood logs, barges could be used to transport these raw materials to local sawmills. Another option is to float the logs on the river. This option requires more investigation because it is more complicated, could require permitting, and potentially is more expensive.

TKC could take an active role in the small business development of permitted wood harvesters. Just as with the harvest opportunities for wood heating systems, for a very small investment, TKC could provide basic tools and training to stand-up small wood harvest businesses in their communities. For less than \$1,000 per business, TKC could supply a chainsaw with the required maintenance tools, safety equipment including protective chaps, hardhats, gloves, safety glasses, and ear protection, and partner with State of Alaska Division of Forestry to host training workshops. Participants could ‘pay-back’ TKC’s investment in the business start-up by delivering cords of wood or sawlogs to sawmills, local wood heating systems or to elders for home heating. TKC could also work with the new harvesters on identifying wood harvest areas within TKC landholdings and provide harvest permits. This concept has proven to be an effective entry-level business development opportunity for remote communities and subsistence lifestyles. The City of Tanana used this model to kick-start small firewood harvest businesses.

TKC has recently received a United States Forest Service Wood Innovations Grant to design and specify all of the necessary materials to fully construct the cabin kits into finished homes, qualify the NE cabin kits as approved HUD Housing, and develop a training program for local housing construction crews. If this project is successful, the demand for the cabin kits will dramatically increase, along with the demand for sawlogs and dependable employees.

With the recent price increases in heating fuels and wood products, the TKC region has opportunities for rapid wood products business development. To be successful, processors and sawmill operators will need partners. The demand for wood products is growing and the social impact of a strong wood products industry is powerful. Wood products jobs pay high wages and develop skills that are highly marketable. These jobs also fit into the modern subsistence lifestyle. Removal of hazardous fuels reduces wildfire risk and provides a local fuel to reduce the import of heating fuels.

Summary of Value-Added Wood Product Recommendations:

1. Conduct a resource assessment to identify timber sales for economically viable sawlog and firewood supplies.



2. Consider supporting the development, outfitting, and training of small wood harvest businesses in the TKC region to supply sawlogs to NE or other tribally owned mills and firewood to current and future processors.
3. Support the expansion of the cabin-kit business and regional capacity development through the Wood Innovations Grant.

## **Funding Opportunities for Forestry, Biomass, and Value-Added Wood Products**

THE WOOD INNOVATIONS AND COMMUNITY ENERGY GRANT funding through the United States Forest Service supports traditional wood utilization projects, expands wood energy markets, and promotes using wood as a construction material in commercial buildings. These grants and cooperative agreements support the nationwide challenge of disposing of hazardous fuels and other wood residues from the National Forest System and other forest lands in a manner that supports wood products and wood energy markets.

The Forest Service supports proposals that significantly stimulate or expand wood products and wood energy markets that support the long-term management of National Forest System and other forest lands. <https://www.fs.usda.gov/science-technology/energy-forest-products/wood-innovations-grants>

DEPARTMENT OF ENERGY – OFFICE OF INDIAN ENERGY – The mission of the Office of Indian Energy Policy and Programs is to maximize the development and deployment of energy solutions for the benefit of American Indians and Alaska Natives. The Office delivers programs that promote Indian tribal energy development, efficiency, and use; reduce or stabilize Indian tribal energy costs; strengthen Indian tribal energy infrastructure; and electrify Indian land, housing, and businesses. Energy Infrastructure Deployment on Tribal Lands is an annual funding opportunity offered by DOE-OIE that has supported several biomass energy projects throughout Alaska. More information is available at:

<https://www.energy.gov/indianenergy/past-funding-opportunities>

THE DENALI COMMISSION in partnership with the United States Forest Service and Alaska Energy Authority has been providing construction funding for the last couple of years to biomass heating projects in need of small amounts of funding to complete construction projects. This is a funding source intended to fulfill shortfalls in construction funding for energy projects.

THE NATURAL RESOURCE CONSERVATION SERVICE (NRCS) (formerly known as the Soil Conservation Service) provides grant funding for activities such as site preparation, planting, precommercial thinning, pruning, slashing, wildlife habitat improvement, road maintenance, gate installation and posting of property signs. The two programs administered by the NRCS are the Environmental Quality Incentives Program (EQUIP) and the Wildlife Habitat Incentives Program (WHIP).

ALASKA FARM SERVICE AGENCY (FSA) has the Biomass Crop Assistance Program (BCAP) which provides grant funding assistance for the growing and delivery of wood biomass fuel crops to certified biomass facilities.

FEMA HAZARD MITIGATION GRANTS - FEMA's Hazard Mitigation Grant Program provides funding to state, local, tribal and territorial governments so they can rebuild in a way that reduces, or mitigates, future disaster losses in their communities. This grant funding is available after a presidentially declared disaster. To be eligible, a community must have developed a Hazard Mitigation Plan through FEMA. This funding can be used for Wildfire Mitigation and the development of Community Wildfire Protection Plans.

<https://www.fema.gov/grants/mitigation>

BUREAU OF INDIAN AFFAIRS TRIBAL RESILIENCE GRANTS - The Bureau of Indian Affairs (BIA) Tribal Resilience Program provides federal aid for building climate change resilience through leadership engagement and capacity building to federally-recognized Tribal Nations and Alaska Native villages. This funding opportunity can be used for the development of Community Wildfire Protection Plans and hazardous fuels harvest plans. More information can be found at <https://www.bia.gov/bia/ots/tribal-climate-resilience-program>

WILDLAND URBAN INTERFACE - The State of Alaska Division of Forestry is the jurisdictional agency for the wildfire prevention and suppression program in the Middle Kuskokwim Area. The Division of Forestry has a program to assist communities in conducting wildfire prevention activities, such as clearing fire breaks in areas where high hazard fuels (such as black spruce stands) exist in proximity to community infrastructure. The Firewise Alaska Program provides information that individuals and groups can use for preparation in advance of wildland fire season, as well as actions to take in the event of a wildfire. The Division of Forestry also provides assistance and funding to communities to develop Community Wildfire Protection Plans and to perform insect infestation or disease monitoring. More information can be found at <http://forestry.alaska.gov/fire/cwpp/wuigrants>

CONSERVATION INNOVATION GRANT - The Natural Resource Conservation Service (NRCS) provides Conservation Innovation Grants (CIG), a voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging Federal investment in environmental enhancement and protection, in conjunction with agricultural production. CIG projects are expected to lead to the transfer of conservation technologies, management systems, and innovative approaches into NRCS policy, technical manuals, guides, and references, or to the private sector. CIG funds projects targeting innovative on the ground conservation, including pilot projects and field demonstrations.

For more information, see:

[http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb1082287.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1082287.pdf)

WILDLIFE HABITAT INCENTIVES PROGRAM (WHIP) - NRCS administers WHIP to provide both technical assistance and up to 75 percent cost share assistance to establish and improve fish and wildlife habitat. WHIP cost-share agreements between NRCS and the participant generally last from one year after the last conservation practice is implemented but not more than 10 years from the date the agreement is signed. More information is available at:

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/whip/>

ENVIRONMENTAL QUALITY INCENTIVES PROGRAM - The Environmental Quality Incentives Program (EQIP) is a voluntary program that provides financial and technical assistance to

agricultural producers through contracts up to a maximum term of ten years in length. These contracts provide financial assistance to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland. In addition, a purpose of EQIP is to help producers meet Federal, State, Tribal and local environmental regulations. More information is available at:

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/>

USDA HIGH ENERGY COST GRANT PROGRAM - The U.S. Department of Agriculture (USDA) offers an ongoing grant program for the improvement of electricity generation, transmission, and distribution facilities in rural communities. This program began in 2000. Eligibility is limited to projects in communities that have average home energy costs at least 275% above the national average. If energy services are offered from TKC lands, they may be eligible for this grant program. Eligible activities include:

- Electric generation, transmission, and distribution facilities;
- Natural gas or petroleum storage or distribution facilities;
- Renewable energy facilities used for on-grid or off-grid electric power generation, water or space heating, or process heating and power;
- Backup up or emergency power generation or energy storage equipment; and
- Weatherization of residential and community property, or other energy efficiency or conservation programs.

More information is available at: <http://www.rurdev.usda.gov/Home.html>

USDA RURAL ENERGY FOR AMERICA PROGRAM (REAP) - REAP competitive grants and loan guarantees for energy efficiency improvements and renewable energy systems. These incentives are available to agricultural producers and rural small businesses to purchase renewable energy systems and to make energy efficiency improvements. Woody biomass systems are an eligible technology. Funding is also available to conduct relevant feasibility studies, with approximately 2% of total funding being available for feasibility studies. Additionally, funding is available for Loan Guarantees. These grants are limited to 25% of a proposed project's cost, and a loan guarantee may not exceed \$25 million. The combined amount of a grant and loan guarantee may not exceed 75% of the project's cost.

More information is available at: [http://www.rurdev.usda.gov/LP\\_BusinessPrograms.html](http://www.rurdev.usda.gov/LP_BusinessPrograms.html)

BUSINESS ENERGY INVESTMENT TAX CREDIT AND PRODUCTION TAX CREDIT - Federal Tax Credits are available to corporations that place certain renewable energy technologies in service. In general, the original use of the equipment must begin with the taxpayer, or the system must be constructed by the taxpayer. The equipment must also meet any performance and quality standards in effect at the time the equipment is acquired. The energy property must be operational in the year in which the credit is first taken. More information is available at: [www.irs.gov](http://www.irs.gov).

USDA BIOMASS CROP ASSISTANCE PROGRAM - The Biomass Crop Assistance Program (BCAP) provides financial assistance to owners and operators of agricultural and non-industrial private

forest land who wish to establish, produce, and deliver biomass feedstocks. BCAP provides two categories of assistance:

- Matching payments may be available for the delivery of eligible material to qualified biomass conversion facilities by eligible material owners. Qualified biomass conversion facilities produce heat, power, biobased products, or advanced biofuels from biomass feedstocks.
- Establishment and annual payments may be available to certain producers who enter into contracts with the Commodity Credit Corporation (CCC) to produce eligible biomass crops on contract acres within BCAP project areas.

More information is available at:

[www.fsa.usda.gov/FSA/webapp?area=home&subject=ener&topic=bcap](http://www.fsa.usda.gov/FSA/webapp?area=home&subject=ener&topic=bcap)

USDS RURAL DEVELOPMENT VALUE ADDED PRODUCER GRANT - The Value-Added Producer Grant (VAPG) program helps agricultural producers, including forest products, enter into value-added activities related to the processing and marketing of new products. The goals of this program are to generate new products, create and expand marketing opportunities and increase producer income. <https://www.rd.usda.gov/programs-services/value-added-producer-grants>

COVID 19 ECONOMIC RELIEF - The Treasury Department, the Office of Fiscal Service, and the Internal Revenue Service (IRS) provided three rounds of direct relief payments during the various phases of the COVID-19 crisis. Payments from the third round continue to go out to Americans across the country. There are potentially significant funds available for economic development.