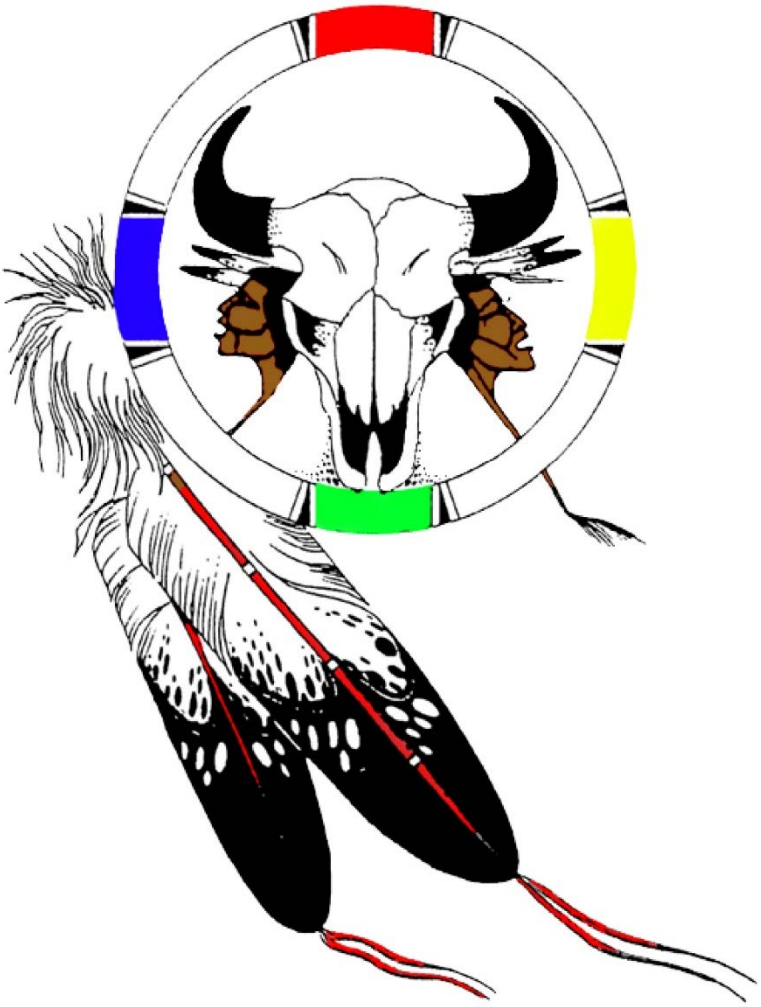
Northern Arapaho Tribe
Priority Climate Action Plan

Submitted: March 1, 2024
Revised: March 20, 2024



Prepared for:
U.S. Environmental Protection Agency
Climate Pollution Reduction Grant Program

Prepared By:
The Northern Arapaho Tribe
in conjunction with
The Sheward Partnership
sustainability consultant.

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1.1 INTRODUCTION

The Northern Arapaho Tribe is a federally recognized Tribe. They are one of four groups of Arapaho who originally occupied the headwaters of the Arkansas and Platte Rivers. The Northern Arapaho speak a variation of the Algonquin language and are that people's most southwest extension. Culturally, they are Plains Indians, but socially and historically distinct. The Treaty of 1868 left the Northern Arapaho without a land base, so they were placed with the Eastern Shoshone in west central Wyoming, on the Wind River Reservation which they occupy to this day.

The Northern Arapaho Tribe is witnessing the impacts of climate change throughout their land. They have lived with significant and increasing fluctuations in weather patterns that have caused periods of drought as well as flooding, wildfires, and changes to the local ecosystems. The Tribe is committed to addressing the man-made causes of climate change and finding strategies to minimize their own impacts.

In 2014 the Tribe established the Natural Resources Office to protect the natural environment and environmental health of the Tribal members and all Reservation residents. NANRO will help manage the Tribe's climate impact reduction measures and plans to hire a full time Project Manager to coordinate all future grant related activities and report to the EPA.

1.2 TRIBAL HISTORY

The Arapaho Tribe originated in areas that are now Minnesota and Manitoba, having settled there approximately 3,000 years ago. European contact destabilized the Native American relationships, territories, allegiances, and rivalries beginning in the 1500's. Alliances, disputes, and trade relationships between rival tribes (and their French fur trapper allies) pushed the Arapaho westward, re-settling in and around present-day Wyoming. In the early 1700's the Arapaho began using horses and became more nomadic, working their way south and expanding into a large area encompassing parts of present-day Montana, Wyoming, Nebraska, Colorado, Oklahoma, and Kansas.

The Tribe continued to expand its territory southward through the early 1800's. The Arapaho divided into Northern and Southern Arapaho and became closely allied with the Cheyenne. After signing the Treaty of 1851, the Arapaho and Cheyenne shared land encompassing one-sixth of Wyoming, one-quarter of Colorado and parts of western Kansas and Nebraska.

Continual and increasing European immigration led to increased tensions. The 1864 Sand Creek Massacre was a flashpoint. Years of war followed. In 1868 The Arapaho signed The Treaty of Fort Laramie leading to a brief period without open warfare between the Arapaho and the US military. This ended with the Great Sioux War of 1876-1877. The Arapaho were not aggressors in the conflict, though many of their closely allied Tribes were, internal differences lead to a decentralization of Arapaho leadership. "Within native nations, such unfulfilled treaties caused discord and bred factionalism."[1] This continued violence, the eradication of large bison herds, and increased pressure from European settlers spurred on by gold and silver exploration led to the eventual surrender of the northern plains Indians.

This lived experience is not unique to the Arapaho Tribe; it is common for most Tribal communities. The Arapaho are not historically tied to the land they now occupy, and functioned as a displaced, moving nation for much of the last 500 years. On the Wind River Reservation, the Tribe has sought to balance environmental stewardship with development of the economic resources they have available to them.

1.3 PCAP OVERVIEW

The following Priority Climate Action Plan (PCAP) includes the required elements of a Green House Gas (GHG) Inventory, Priority GHG Reduction Measures, Benefits Analysis, GHG reduction estimates, and Review of Authority to Implement.

The GHG inventory is focused solely on Tribal government assets and their available data sources. The Inventory purposely omits private residences, with the exception of tribal owned housing. The Northern Arapaho also live in an Environmental Justice Disadvantaged Community as identified by the EPA. The data available from the Tribal Government and the team's discussions with Tribal members led to the following Priority GHG Reduction Measures. A more thorough list of possible emissions reduction and potential carbon sequestration projects will be included with the Comprehensive Climate Action Plan (CCAP).

As these projects move forward the Tribe will continue to study other possible funding sources and focus more directly on workforce planning with a goal to increase in-house expertise on climate and GHG issues. This study will be included in the CCAP report (under this grant) and hopefully its measures can be made reality through the Phase 2 CPRG implementation grants.

1.4 PCAP APPROACH

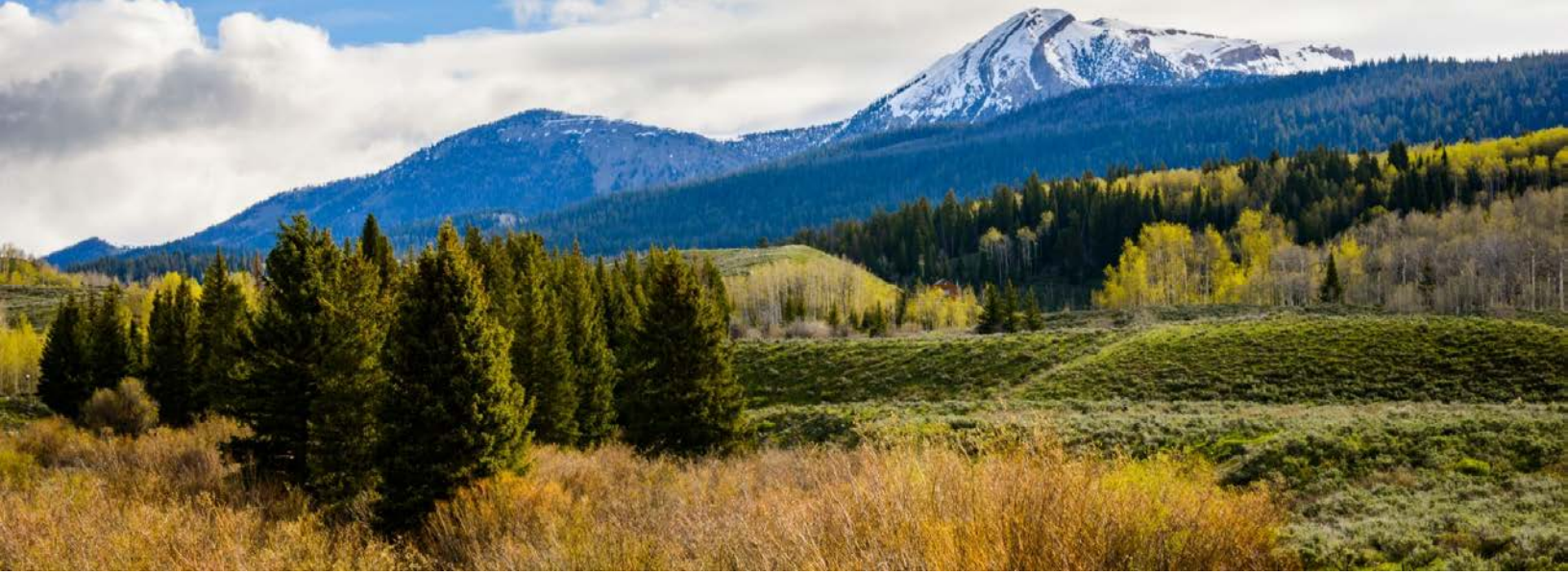
Northern Arapaho leadership and constituents worked with The Sheward Partnership (TSP), Philadelphia, PA, and Ziontz Chestnut, Seatle, WA, for sustainability and law consulting respectively to prepare the GHG Inventory and the selection and analysis of GHG reduction measures.

NANRO and TSP coordinated data collection from the Tribal agencies and suppliers most closely tied to the bulk of the Tribe's GHG emissions. NANRO, with support from Tribal leadership, sought voluntary disclosure of data from non-governmental entities with relevant information.

[1] Ned Blackhawk, *The Rediscovery of America: Native Peoples and the Unmaking of U.S. History* (New Haven: Yale University Press, 2023), 307

NANRO worked with key stakeholders from Tribal and federal agencies and existing outside consultants and advisers to oversee and coordinate overall development of the PCAP. These key stakeholders convened an in-person work session in Riverton, WY, on February 27, 2024 to review the PCAP and CPRG process and discuss Priority Actions.

The NANRO Project Manager will utilize the support of the consultants as needed in developing the CCAP and potential GHG reduction measures. It is the Tribe's goal to ensure the Tribal community is fully engaged and consulted throughout this process. The Tribe will engage the broader public (emphasizing Tribal members, on and off reservation, and non-member residents on the Reservation) through public meetings (in person and virtual) and opportunities for comment. The CCAP will summarize and, where appropriate, incorporate and respond to the feedback received.



2.1 TRIBAL PCAP MANAGEMENT AND DEVELOPMENT TEAM

Northern Arapaho Natural Resources Office (NANRO)
- Dean Goggles, Environmental Director
- Steve Babits, Environmental Scientist

Tribal Leadership
- Arapaho Business Council
  - Lloyd Goggles, Chairman
- Northern Arapaho Tribe, Procurement
  - Patricia Underwood
- Northern Arapaho Tribal Housing
  - W. Patrick Goggles
  - Darrell O'Neal Sr.
  - Jody Jorgenson

Other Tribal Entities
- Wind River Casino
  - Jenni Wildcat
- Wind River Cares
  - Aaron Brannan Sr.
  - Gary Holt
- Wind River Internet
  - Patrick Adam Lawson
- Arapaho Ranch
  - Shawn Nichols
  - Sanford Friday

2.2 COLLABORATIONS

Ziontz Chestnut Law Firm
- Brian Chestnut, Partner
- Liliana Elliott, Associate Attorney

The Sheward Partnership, Sustainability Consultants
- David Mazzocco, Senior Sustainability Project Manager
- Grey Fowles, Building Science Manager
- Bradley Gay, Architect, Sustainability Project Manager

3.1 GHG INVENTORY

The Sheward Partnership collected data provided by the Northern Arapaho Tribal government and entered that data into the Community Greenhouse Gas Inventory Tool (CGGIT) provided by the EPA. The data and subsequent calculations are divided into three scopes.

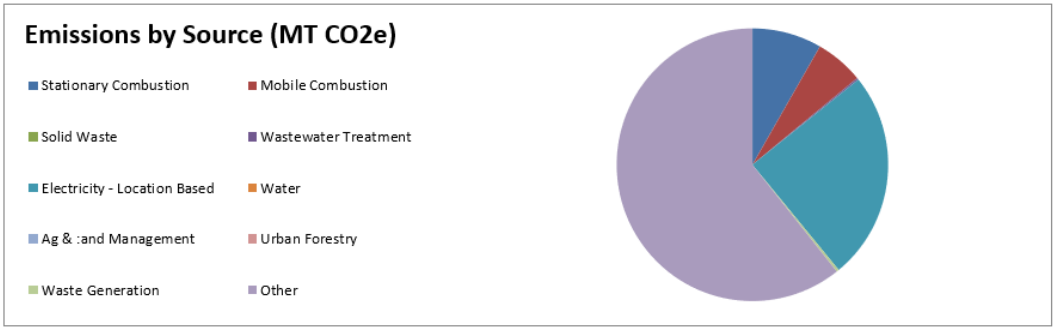
Scope 1: all the direct emissions made on-site and controlled by the Tribal government.

Scope 2: all indirect emissions purchased from external sources by the Tribal government.

Scope 3: all other emissions associated with the Tribal government.

The results of the study show that collectively the Tribal government is estimated to have emitted 21,639 metric tonnes of carbon dioxide equivalent (CO_2e) in the calendar year of 2022. For context, this is equivalent to the CO_2e of 1,990 average American homes, 9,327 barrels of oil, 3,981 passenger vehicles, or 113 railcars of coal.

The majority of the CO_2e emissions were from 4 main sources: livestock 61%, electricity 25%, natural gas heating 8%, and vehicles 6%. Solid waste and wastewater treatment combined account for less than 1% of overall CO_2e.



Scope 1 Emissions

Building Natural Gas Emissions:

The Tribal government has 36 buildings that have natural gas connections, all serviced by Black Hills Energy. The 2022 energy bills for each building measured in ccf (hundred cubic feet) have been converted to mcf (thousand cubic feet) and included in the calculator. The total natural gas usage for 2022 was 33,807 mcf which produced 1,794 MT CO_2e of greenhouse gas.

Vehicle Emissions:

Accounting for the total annual miles driven by the Tribal government in an official capacity within the reservation boundary for the year 2022 is impossible. Several factors prevent an accurate accounting including:

- Annual mileage is not recorded for each vehicle.
- Vehicles are driven outside the reservation boundaries.
- Vehicles are driven after hours in non-official capacities.
- Some vehicles are no longer operational but may still be included in the tribal vehicle rosters.

To complete the vehicle emissions calculations a statistical analysis was made to estimate the total vehicle miles traveled. A list of 230 "official use" Tribal vehicles was compiled from various Tribal entities. Of the 230 vehicles, 21 of them were excluded from the study for the following reasons.

- 2 are construction vehicles in which there was no way to accurately account for the mileage.
- 1 aircraft with no mileage reported.
- 4 are Teslas and do not have direct emissions.
- 1 snowmobile with no mileage reported.
- 3 are vehicles that are 2023 models and were not active for the 2022 year.
- 10 are vehicles with no known model year.

The mileage for each of the included vehicles is estimated using the following methodology.

- The Wyoming Department of Transportation's average vehicle mileage for 2022 was calculated as 16,997 miles[2].
- All vehicles with a model year of 2016 or newer are attributed 16,997 miles.
- All vehicles with model years older than 2016 use the following formula to estimate the annual mileage:

$$Estimated\ Annual\ Mileage = \frac{16{,}997\ miles}{(2016 - vehicle\ model\ year)}$$

- The result shows an average vehicle mileage for the included vehicles is 11,723 miles for the year 2022.

The fuel type for each vehicle is estimated using the following methodology.

[2] https://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Management_Services/Fact%20Book/wyoming-transportation-facts-2021-2022

- All heavy-duty vehicles were assumed to be using diesel
- All passenger cars, light trucks, vans, and SUVs were assumed to be gasoline.

The total annual estimated miles driven for the year 2022 was 2,450,055 miles which produced emissions of 1,246 MT CO_2e.

It is recommended that the Tribal government keeps track of the annual mileage for each vehicle. This will reduce some of the potential errors in the statistical estimation in the future.

Wastewater Emissions:

The CGGIT wastewater calculates CO_2e based on the number of people using 5 different wastewater system types – the Northern Arapaho Tribal buildings utilize only 2 of these types: open pit systems, which are considered aerobic treatment facilities, and septic systems. The calculation appears to assume that any person entered as a value into one of the system types is using that system 24/7/365. However, the scope of this study only includes the Tribal government's impact. The following calculation is used to go from the total Tribal population listed in the Control Sheet of the CGGIT to the number of Tribal government employees that would be equivalent to using the wastewater system 24/7/365.

10633	Tribal population provided by the Tribe
60%	% of the population in the workforce (estimation)
6380	Updated Population Total
53%	Employment rate[3]
3828	Updated Population Total
45.6%	The state of Wyoming document says that nationally 45.6 percent of jobs held by Native American residents on reservations are with a local, tribal, state, or federal government.[4]
1746	Updated Population Total
40%	% of those workers that work for the Tribe (estimation)
698	Total Employees
24%	% of the time that an employee is working (40-hour week)
166	**Total 24/7/365 Equivalent Employees**

The 166 people are distributed to the two different wastewater system types located on the reservation: open pit systems (7.5 people) and septic systems (158.5 people).

The total annual estimated metric tonnes of CO_2e from wastewater is 43.79.

[3] https://doe.state.wy.us/lmi/1199/a2.htm
[4] https://doe.state.wy.us/lmi/1199/a2.htm

Scope 2 Emissions

Building Electrical Emissions:

The Tribal government has 61 buildings that have electrical connections, 39 of those are serviced by High Plains Power, and 22 are serviced by Rocky Mountain Power. The total electrical usage for 2022 was 10,138 MW which produced 5,362.7 MT CO_2e of greenhouse gas.

The Wind River Reservation sits at the overlap of 2 eGRID subregions: the Northwest Power Pool (NWPP) and Rocky Mountain Power Area (RMPA) Subregions. There is no clear designation between the grids based on each building's zip code. For the purposes of the inventory, the team assumed power is via the RMPA. This eGRID Subregion produces 1,166.15 CO_2e per MWh as provided by the EPA and built into the CGGIT calculator. Note, the NWPP eGRID produces 638.34 CO_2e per MWh, thus depending on which grid the tool utilizes has a large impact on overall emissions.

The team conducted research to determine a more specific CO_2e per MWh for both High Plains Power and Rocky Mountain Power, however, they could not find any documentation online that lists all the specific values for CO_2, CH_4, and N_2O. If the utilities provides this data, the Tribe will update the 1,166.15 CO_2e per MWh in future revisions and the CCAP.

Scope 3 Emissions

Solid Waste Emissions:

The solid waste for the tribal government for 2022 is reported as 1,930 tons. The resulting emissions of CO_2e is 64.84 metric tonnes. This is based on 74.1 CO_2e per metric tonne of solid waste[5].

Livestock Emissions:

The Tribal government runs a herd of 4,300 cows annually with an estimated 3,655 calves for part of the year. The estimated annual CH_4 production for each cow is 200 pounds, and 30 pounds for each calf[6].

The Tribe also has a herd of 96 horses with 4.34 kg of annual CH_4 production per horse.

The resulting annual livestock CH_4 production is 440.56 metric tonnes which is equivalent to 13,255.8 metric tonnes of CO_2e.

[5]https://sustainable.stanford.edu/sites/g/files/sbiybj26701/files/media/file/scope_3_emissions_from_waste_march_2023.pdf

[6] https://www.epa.gov/snep/agriculture-and-aquaculture-food-thought

Total Northern Arapaho Tribe Emissions (MT CO2e)								
	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total MT CO_2e	Percent of Total
Scope 1	3,034.32	48.24	0.90	-	-	-	3,083.45	14%
Scope 2 - Location Based	5,329.14	14.03	19.50	-	-	-	5,362.67	25%
Scope 2 - Market Based (for informational purposes only)	5,329.14	14.03	19.50				5,362.67	
Scope 3	-	-	-	-	-	-	-	0%
Total Gross Emissions	**8,363.45**	**13,255.80**	**20.39**	**-**	**-**	**-**	**21,639.65**	**39%**
Total Net Emissions	**8,363.45**	**13,255.80**	**20.39**	**-**	**-**	**-**	**21,639.65**	**39%**

Emissions by Source (MT CO_2e)								
Source	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total	Percent of
Stationary Combustion	1,788.58	4.45	0.90	-	-	-	1,793.92	8%
Mobile Combustion	1,245.74	-	-	-	-	-	1,245.74	6%
Solid Waste	-	-	-	-	-	-	-	0%
Wastewater Treatment	-	43.79	-	-	-	-	43.79	0%
Electricity - Location Based	5,329.14	14.03	19.50	-	-	-	5,362.67	25%
Electricity - Market Based (for informational purposes only)	5,329.14	14.03	19.50				5,362.67	
Water	-	-	-	-	-	-	-	0%
Ag & Land Management	-	-	-				-	0%
Urban Forestry	-	-	-				-	0%
Waste Generation	-	64.85	-				64.85	0%
Other	-	13,128.67	-	-	-	-	13,128.67	61%
Total (Gross Emissions)	**8,363.45**	**13,255.80**	**20.39**	**-**	**-**	**-**	**21,639.65**	**100%**
Total (Net Emissions)	**8,363.45**	**13,255.80**	**20.39**	**-**	**-**	**-**	**21,639.65**	**100%**

3.2 GHG REDUCTION MEASURES AND BENEFITS ANALYSIS

The following Priority GHG Reduction Measures are the focus of the Northern Arapaho Tribe's PCAP.

The GHG inventory shows that, partly due to the EPA PCAP accounting guidelines, the majority of the Tribe's GHG emissions are from the thousands of cattle on the Arapaho Ranch. The inventory also only includes tribal owned buildings with available utility (energy use) information. This results in an under representation of the GHG emissions from private and Tribal owned homes on the reservation, and a proportional overemphasis on the methane emissions from the livestock. The Tribe will investigate possible options to reduce methane emissions from their organic grass-fed beef cattle.

The following four Priority GHG Reduction Measures focus on the non-agricultural GHG emissions. Of the non-agricultural GHG emissions 64% are from building electricity use, 21% are from building fossil fuel use, and 15% are from vehicle emissions. (Note that the Priority Action Items are organized so that each includes a discussion of EPA recommended content specific to that action item. Benefits, GHG reductions, and workforce development are listed for each item individually.)

The Tribe's selected measures respond directly to the issues identified in the GHG inventory and discussed during Tribal stakeholder meetings.

Priority Action 1: Community-Scale Renewable Energy with Microgrid Distribution and Storage

Description: As noted above, currently the Northern Arapaho Tribe is assumed to depend on electricity provided by the RMPA Subregion generated by 72% fossil fuel and destructive energy sources[7]. The Tribe is interested in large scale photovoltaic arrays (PV) to minimize their GHG and ecological impact and provide affordable, reliable power for their needs.

This PV installation will be combined with a reservation scale electrical microgrid. A microgrid is a local energy network that can operate independently or in parallel with the main power grid.

This microgrid and renewable energy generation project will offer some measure of energy independence, increasing resiliency, and reduced periods without basic utility needs. This is a direct public health issue. Power outages on the reservation quickly become dangerous due to the below average quality housing and the demanding Wyoming climate. Therefore, the Tribe has identified the deployment of renewable energy with storage and a microgrid distribution system located near a neighborhood on the Reservation, such as Beavercreek, as a productive solution to offset GHG emissions. The Northern Arapaho Tribe and its members on the Wind River Reservation live in an Environmental Justice Disadvantaged Community as identified by the EPA.

There are a range of regulatory and coordination issues the Northern Arapaho Tribe and their consultant team will navigate to build, own, and operate microgrids. These include:

- Environmental permitting to assess the existing conditions and suitability of a given site to house energy facilities.
- Archaeological and historic preservation studies and approvals will be undertaken to ensure cultural sites are avoided and respected.
- Electric utility interconnection studies to ensure the new energy generation does not have a negative impact on existing grid services.

Projects: The Priority Action can be subdivided into the following projects:

- Photovoltaic modules
  - ground mounting system,
  - transformers / inverters
  - meters panels fuses
- Storage and support
  - battery storage
  - backup generators
- Microgrid
  - distribution infrastructure
  - NWPP grid connection

Costs: The microgrid has not yet been designed, so the scope is unknown, but a rough cost estimate would be $30M.

[7] https://www.epa.gov/egrid/power-profiler#/RMPA

Schedule: Immediate. Begin as soon as is possible following the award of federal funding, ideally the CPRG Implementation grant. Design and procurement will take 2 years. Construction will take 2-3 years.

Work Force Development: The micro grid installation and interconnections will involve years of specialized construction teams working on the reservation. There will be many temporary workers on site who will all require support services (food, housing, etc.) during their time on the reservation.

The PV project construction requires laborers, specialized subcontractors, and trained electricians (following a 5-year apprenticeship) that may directly support Tribal members.

Both the microgrid and the PV array will require ongoing operations and maintenance staff. The current expectation is that multiple full time, permanent jobs will be created on the reservation, and that they will be a mix of administrative and field positions.

Benefits Analysis:

Direct GHG benefits:

- Create renewable energy sources
- Reduce GHG impacts of electricity use

Co-benefits:

- Reduction in pollutant emissions other than GHG from burning fossil fuels, including Sulfur Dioxide (SO2), Nitrogen Oxides (NOX), Particulate Matter (PM),and Mercury (Hg).
- Reduce public health risks from power outages
- Provide resilient, local, affordable power systems
- Create construction jobs
- Workforce training in the emerging green energy tech sector
- Lower utility bills of impoverished community

GHG Reduction Estimate: The Priority Action produces a directly quantifiable reduction in high GHG grid supplied electricity by replacement with established renewable energy technology. Every watt produced by the PV array will replace a watt of power from grid sources.

The scope of the PV array has not yet been decided. Assuming a nominal size of 5 MV, the annual offset would be approximately 11,350 metric tonnes of CO_2 equivalent every year it operates.

Summary Table:

Description	Build new, resilient renewable energy based microgrid electrical infrastructure
Implementing Agency	Northern Arapaho Natural Resource Office
Benefits	Reduced GHG emissions / reduction of fossil fuel use Decreased energy bills Eliminate health risks from utility outages and exposure to extreme outside temperatures

Estimated GHG Reductions	11,350 $MTCO_2E$ annually for 30 years 340,500 $MTCO_2E$ total
Estimated Cost	$ 30 million
Estimated $ / $MTCO_2E$	$88 / $MTCO_2E$
Progress Metrics	Permitting in place Energy produced

Priority Action 2: Create New DOE "Zero Energy Ready" Level Homes for Tribal Members

Description: Based on the current GHG inventory 85% of the Tribe's non-agricultural $C0_2e$ emissions are from building electricity and heating needs. Reducing building energy use is the Tribe's highest priority.

The Northern Arapaho Tribe manages affordable housing for Tribal members via the Northern Arapaho Tribal Housing. Residents, however, are responsible for their utility bills. The Tribe proposed developing new, highly insulated, high-performance, affordable homes for tribal members. These new homes and community buildings will approach "net zero" levels of energy use, meaning that no GHG or $C0_2e$ emissions are necessary for their year-round operation.

The PCAP GHG Inventory does not include private homes, however, increased energy efficiency brings a net benefit to the Tribal community. Many of the Northern Arapaho buildings on the Wind River Reservation do not adequately protect their occupants from the long, harsh Wyoming winters, potential major storm events, or internal pollution sources (cooking and other appliances, finish materials, mold, etc.). This is both an energy use issue and a critical public health issue. The Northern Arapaho Tribe, and its members on the Wind River Reservation, are identified by the EPA as an Environmental Justice Disadvantaged Community.

The home designs would respond to the specific needs of the Northen Arapaho in several ways, including but not limited to:

- Unique tribal needs would be considered to create housing types that allow for multi-generational families to share a safe, healthy, warm home. Aging-in-place and universal accessibility guidelines will be considered.
- Climate-specific, high performance, easily built building envelopes will be designed to provide the most economically feasible response to the demands of the Wind River area climate.
- Reduced utility bills.
- High efficiency, non-fossil-fuel heating and ventilation systems will be used to minimize energy use. The design will follow Passive House (PHIUS) strategies and recommendations, reducing energy use by up to 85%[8].
- Increased indoor-air-quality. The design team plans to use a continuously operating heat-recovery ventilation system with high MERV filtration to reduce indoor pollutants and increase

[8] https://www.phius.org/passive-building/what-passive-building/passive-building-principles

available fresh air. Much of the Wind River Reservation has asthma rates above the 95th percentile nationally, per the EPAs EJ Screen.

- Increased resiliency. Highly insulated, low energy use buildings can more easily "ride out" power failures during inclement weather by minimizing heat energy losses to the exterior. This is a major public health issue on the reservation throughout the long winter season.)
- Construction methods for combining the advantages of prefabrication with site specificity will be explored. Creating long-term, skilled, on-reservation jobs is a priority. This project may provide a toe-hold in the burgeoning pre-fabricated building industry.

The Tribal leadership has identified a significant need for new energy efficient housing on the reservation. The predominate need is multi-generational family housing, designed to comfortably include a large 3-generational family, with both large gathering spaces and separate private areas. The Tribe has identified a clear need for this type of home for both those in need of financial assistance, and to retain young professionals on the Reservation. The other type of housing needed is for young students and professionals with smaller families. These units should be smaller, and in denser developments, close to the Wind River College.

Projects: The Priority Action can be subdivided into the following projects:

- Site Development
  - Site clearing and preparation
  - Roads / driveways
  - Utilities
- Multi-generational Zero Energy Ready Homes
  - Structure
  - Enclosure
  - Finishes
  - Equipment and Appliances

Costs: The project as described will exceed $25 million dollars. Low-income housing development, and the infrastructure projects may be eligible for HUD grants and other funding outside of the CPRG Implementation Grant.

Schedule**:** Immediate. Tribal Council would need to pass a resolution authorizing the private entity, or federal program, to begin development on the Reservation. The Tribe plans to begin the design phase as soon as is possible following award of federal funding, ideally the CPRG Implementation grant.

The process will begin with a programming phase to ensure that the housing design responds to the unique cultural and climatic needs of the Northern Arapaho, rather than being a typical subsidized housing solution. The design and documentation phase will last approximately 9 months. Bidding, contract negotiation, procurement and mobilization will take at least 3 months, and construction should be expected to last 18 months or more.

Work Force Development: The construction of multiple residences, apartments, community buildings, and supporting infrastructure will provide employment opportunities on the Reservation for skilled craftsman, and unskilled labor. The inclusion of apprenticeship or training programs in the construction trades will be a priority in the selection of the construction management team.

Benefits Analysis:

Direct GHG benefits:

- Eliminate fossil fuel usage for new homes (DOE Zero Energy Ready Homes)
- Reduce inefficient electrical usage, deploy high efficiency electrical HVAC systems and appliances

Co-benefits:

- Increase community health through improved resiliency, and less dependence on existing grid power
- Increase community health through improved indoor air quality
- Create construction jobs
- Workforce training in emerging technologies
- Provide non-traditional, multi-generational housing opportunities
- Provide new, desirable housing within the community
- Lower utility bills of impoverished community

GHG Reductions / Metrics: The proposed new homes and social service offices will be fossil fuel free, with air source heat pump heating systems, and all high-efficiency electric appliances. Estimating the GHG reduction measures for the totality of this undertaking is difficult to quantify for many reasons, including individual privacy rights. During the design phase the team will use advanced building science calculations to estimate both (1) the energy use of the proposed design, and (2) that of a typical existing home, quantifying the annual electrical and fossil fuel savings of the proposed design, and its GHG reduction.

Summary Table:

Description	Build new energy efficient, climate responsive housing to meet needs of Northern Arapaho Tribal members.
Implementing Agency	Northern Arapaho Natural Resource Office Northern Arapaho Tribal Housing
Benefits	Reduced GHG emissions per household / elimination of fossil fuel use Decreased energy bills Increased community health (exposure, asthma, etc.)
Estimated GHG Reductions	TBD
Estimated Cost	Phase 1: more than $25 million
Estimated $ / MTCO$_2$E	TBD
Progress Metrics	Number of units built and occupied Building Energy Use

Priority Action 3: Weatherization of All Existing Homes on The Reservation, Electrification of Systems

Description: As discussed in the description of Priority Action 2, adequate, safe, warm homes are a major public health issue on the Reservation.

The Tribe owns and administers 255 low-income housing units. They estimate there are approximately 600 other privately owned Northern Arapaho residences. Community members have stated that some of the houses are not insulated.

Every single family would benefit from a home inspection focused on improving the buildings insulation, air sealing, and water proofing systems. These measures will be the priority. The homes' existing heating systems (furnace and water heater) will also be evaluated. Residences with sub-standard, inefficient, or antiquated systems will be considered for equipment replacement. The Tribe will promote adoption of air source heat pump heating systems and high efficiency electrical appliances. (This Action item is symbiotic with the electrical service improvements suggested in Priority Action 2.)

The Tribe will manage follow-up action on priority issues, assuring completion and quality.

Projects: The Priority Action can be subdivided into the following projects:

- Weatherization and Heating system Inspections
  - Individual on-site evaluations
  - Report of findings
  - Recommendations
- Inspections
- Installation
- Verification

Costs: Based on available estimates and recognizing that weatherization needs will vary widely from house to house, an estimate of $30,000 per house for inspection, weatherization, and air source heat pump installation is reasonable.

There are approximately 850 Northern Arapaho residences on the Reservation, so the total project cost will be approximately $25.5 million.

There are multiple possible funding sources for home weatherization available grants and rebates ranging from Federal HUD programs to local utility providers. The team will research and identify these in the development of the CCAP report.

Schedule: Immediate. Begin home inspections as soon as is possible following award of federal funding, ideally the CPRG Implementation grant. Begin improvements as quickly as possible thereafter.

Work Force Development: Home weatherization tasks will provide employment opportunities for trained home inspectors and for skilled tradespeople to implement the recommended updates.

Benefits Analysis:

Direct GHG benefits:

- Reduce inefficient electrical usage, deploy high efficiency electrical HVAC systems and appliances

- Reduce propane / natural gas usage

Co-benefits:

- Increase community health through improved interior temperature regulation
- Increase community health through improved indoor air quality
- Create construction jobs
- Workforce training in emerging technologies
- Reduce utility bills of impoverished community

GHG Reduction Estimate: The metric used by the Tribe to measure the success of this action will be the total number of residential units that have been inspected and improved. All homeowners who consent to an inspection should have one.

More quantitatively, with the property owner's permission the Tribe will track residential energy use before and after the weatherization / electrification items have been implemented.

Summary Table:

Description	Inspect and upgrade existing reservation housing as needed Provide high efficiency air source heat pumps and upgraded appliances where necessary
Implementing Agency	Northern Arapaho Natural Resource Office Northern Arapaho Tribal Housing
Benefits	Reduced GHG emissions per household / reduction of fossil fuel use Decreased energy bills Increased community health (exposure, asthma, etc.)
Estimated GHG Reductions	TBD
Estimated Cost	$25.5 million
Estimated $ / $MTCO_2E$	TBD
Progress Metrics	Number of homes inspected Number of homes with completed weatherization / electrification measures installed Energy use tracking metrics (before / after) for selected residences.

Priority Action 4: Replace Tribal Owned Fleet Vehicles with Hybrid and Electric Vehicles

Description: Based on the current GHG inventory, 15% of the Tribe's non-agrarian emissions are due to car and truck usage. The Wind River Reservation is a remote, low-density area requiring significant travel times.

The Tribal government is interested in phasing in electric, hybrid, and potentially biodiesel or compressed-natural gas / methane fleet vehicles. (Large trucks may not be available as electric / hybrids,

but propane, compressed natural gas, or biodiesel may be feasible.) The Tribe will add electrical charging infrastructure at public buildings, supporting further private adoption of electrical vehicles.

The Tribe planned to buy at least 10 fleet vehicles in 2024 but cannot afford to replace their 230 vehicle fleet more rapidly without assistance. The Tribe's fleet consists of 16 passenger cars and 160 light trucks (vans, standard sized pickups, SUVs), and 33 "heavy duty vehicles". For the current PCAP heavy duty vehicles have been excluded from the replacement action.

The tribal government can then sell former fleet vehicles to community members in need of safe, reliable transportation, providing additional economic and quality-of-life benefits to the community.

Projects:

Car fleet replacement
Truck Fleet replacement
Charging stations

Costs:

New EV or Hybrid car: $45,000[9]
New standard size hybrid pickup truck: $65,000[10]
Charging Stations: $2,000 each

Total Fleet vehicle replacement: $11.1 Million

Charging stations (assuming 16): $32,000

Note that some fleet vehicles are replaced by the Tribe every year and the above costs are for the total vehicle cost to replace the entire inventory, NOT just the premium to move from a standard vehicle to an EV / Hybrid. This premium, depending on vehicle model selected, is decreasing as EVs and Hybrids become more common.

Schedule: Ongoing as fleet vehicles require replacement.

Work Force Development: The installation and maintenance of EV charging stations will create employment opportunities. The update of fleet vehicles to established hybrid and emerging EV technologies will help the existing maintenance and mechanical staff remain competitive.

Benefits Analysis:

Direct benefits:

- Reduce GHG emissions due to gasoline use.

Co-benefits:

- Reduction in pollutant emissions other than GHG from burning fossil fuels, such as nitrogen dioxide, hydrocarbons, benzene, and formaldehyde.
- Provide more diverse skillset / training for fleet vehicle mechanics and maintenance staff.
- Provide public infrastructure for alternative fuel vehicles.

[9] Subaru Solterra AWS (electric) $45,000; or Toyota Rav4 Prime (hybrid) AWD $44,000 38/94 MPG

[10] Ford F-150 Hybrid $68,000 25 mpg; or Toyota Tundra Hybrid $58,000 20/24 mpg

- Provide save affordable used vehicles to community members as fleet vehicles are replaced.
- Encourage EV use by demonstrating their viability

GHG Reductions / Metrics: The baseline assumption in the EPA GHG inventory tool are that passenger cars use 24.1 MPG gasoline and light trucks use 18.5 MPG. If the passenger cars owned and operated by the Tribe are replaced with electric vehicles, and they are powered by onsite renewable sources then their functional emissions will be zero. If the light trucks are replaced with hybrid trucks using currently available technology, they can be expected to average around 22 MPG. (The Tribe will consider fully electric light trucks depending on the expected use of each vehicle.) These assumptions result in an annual projected savings of 23,912 gallons of gasoline and 212.6 $MTCO_2e$ annually.

Summary Table:

Description	Replace existing gasoline fleet vehicles with electric and hybrid vehicles
Implementing Agency	Northern Arapaho Tribal Council Northern Arapaho Natural Resource Office
Benefits	Reduced GHG emissions from Tribal owned Vehicles Increased EV infrastructure to incentivize private adoption
Estimated GHG Reductions	212.6 $MTCO_2e$ annually 2,126.0 $MTCO_2e$ total over ten year expected life.
Estimated Cost	$11.1 Million
Estimated $ / $MTCO_2E$	$5,231 $ / $MTCO_2E$
Progress Metrics	Number of vehicles purchased Number of charging stations installed

3.3 REVIEW OF AUTHORITY TO IMPLEMENT

The Northern Arapaho Natural Resources Office (NANRO), the grantee on behalf of the Northern Arapaho Tribe, has the authority, "with the consent of the Northern Arapaho Business Council, to apply for an receive financial assistance from the federal or Tribal governments for the purpose of promoting and protecting the quality of the environment[11]." This affords NANRO broad authority to carry out environmentally beneficial actions on the Wind River Reservation for the benefit of the Northern Arapaho tribal members. Where NANRO may require additional authorities to carry out a specific GHG reduction measure, the Northern Arapaho Business Council would need to pass a resolution authorizing the action, or actions, to implement the GHG reduction measure. The Northern Arapaho Business Council was included in the development of the PCAP and helped develop the GHG reduction measures through key stakeholders' meetings, so it is reasonable to assume that the Council would pass resolutions to carry out these measures as many of them were identified at the Council's direction.

Additionally, as a sovereign, federal Indian Tribe the Northern Arapaho Tribe has broad authority to enact, community-beneficial actions on the Wind River Reservation. The Northern Arapaho Tribal Code affords many governmental departments the authority to carry out the specific GHG reduction measures identified in this PCAP. Where a project occurs within the Wind River Reservation for the benefit of the Northern Arapaho tribal members the Tribe, its Council, and its governmental departments have broad authority to carry out these measures.

<u>Priority Action 1: Community-Scale Renewable Energy With Microgrid Distribution and Storage</u>

As a federally recognized Indian Tribe with broad, sovereign authorities, the Northern Arapaho Tribe is positioned to authorize and carry out all GHG reduction measures including those that would require the construction of a renewable energy project. For substantial electrical projects, the Tribe would follow the authorities provided in the agreement between the Tribe and the United States, titled the Tribal Licensing Agreement. Should the Tribe deploy a microgrid within the Wind River Reservation, the Tribe has the authority to authorize and regulate the deployment and would adhere to all existing or new national standards, including the National Environmental Policy Act.

<u>Priority Action 2: Create New Energy Efficient Housing and Community Building Prototypes and Priority Action 3: Weatherization of All Existing Homes on The Reservation</u>

Residential: The Northern Arapaho Code, Title 4: Housing, provides for the creation of the Northern Arapaho Housing Authority. The Housing Authority retains the power to carry out actions to "alleviate the acute shortage of decent, safe, and sanitary dwellings of persons of low income" and to provide "employment opportunities through the construction" of low-income dwellings on the Wind River Reservation for the benefit of Northern Arapaho tribal members. N.A.C. Title 4, Sec. 102 (a-c). To achieve these goals, the Housing Authority may enter into agreements with private partners and carry out the requirements of federal grant assistance. The Housing Authority follows the International Building Code to set the standards for building practices on the Wind River Reservation. Therefore, the Northern Arapaho Tribe, through its Housing Authority, possesses the authority to execute all aspects of a green, efficient housing project on the Wind River Reservation.

[11] Northern Arapaho Constitution Title 19, Chp. 1(f).

Community Structures: The Northern Arapaho Business Council has the authority to enter into agreements and contracts with private entities to build community improvements on the Wind River Reservation for the benefit of the Northern Arapaho Tribal members. To begin a project of this nature, the Council would need to pass a resolution authorizing the private entity, or federal program, to begin development on the Reservation. Given the Council's involvement in the development of this GHG reduction measure, it is likely that the Council would execute this resolution and resolutions can be passed quickly by the Council. The Tribe follows the International Building Code and would apply these standards to all construction on the Wind River Reservation.

Priority Action 4: Replace Tribal Owned Fleet Vehicles with Hybrid and Electric Vehicles

Within the Wind River Reservation, for Northern Arapaho operated facilities and agencies, the Northern Arapaho Tribe has the authority to carry out the implementation of mobile source vehicle improvements to lower GHG emissions. The Northern Arapaho Tribe, through the Northern Arapaho Business Council and Northern Arapaho Natural Resources Office, has broad authority to provide its employees with mobile vehicles to carry out the responsibilities of employment. The Northern Arapaho Tribe has a traffic code that provides additional authorities and regulations that would authorize and guide the implementation of this specific GHG reduction measure. For substantial electrical projects, for example if the Tribe were to deploy mobile source charging stations on the Reservation, the Tribe would follow the authorities provided in the agreement between the Tribe and the United States, titled the Tribal Licensing Agreement.