Climate Action Plan for: The Suquamish Tribe of the Port Madison Indian Reservation

Prepared by:

The Suquamish Tribe Climate Adaptation Workgroup

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Coordinating Entities:

Coordinating Organizations including, Washington State University, Indianola Beach Improvement Club, Suquamish Advisory Committee, Nature Conservancy, and the University of Washington

Coordinating Agencies including, EPA (Environmental Protection Agency), WA State Dept. of Ecology, WA State Dept. of Transportation, Kitsap County, US Housing and Urban Development, Kitsap Conservation District, Puget Sound Energy, Kitsap Public Works, Kitsap Public Health

Partner Tribes, Coalitions, Commissions including, Affiliated Tribes of Northwest Indians, Northwest Indian Fish Commission, Port Gamble Tribe, Jamestown S'Klallam Tribe, Squaxin Island Tribe

Table of Contents

List of Figures

List of Tables

Table 9 – Projected Co-Pollutant Benefits from Measure 4 based on data from the EPA AVERT tool.

Table 10 – A summary of the main co-pollutant benefits from the priority measures.

Definitions

- Climate Change: any significant change in measures of climate (such as temperature, precipitation, or wind) including but not limited to duration, intensity, and timing lasting for an extended period of time (decades or longer). Climate change may result from natural factors and processes and from human activities that change the atmosphere's composition and land surface.
- Greenhouse Gas (GHG): any gas that absorbs infrared radiation in the atmosphere; examples include carbon dioxide, methane, nitrous oxide, ozone, and water vapor.
- Climate adaptation: actions in response to actual or expected climate change and its effects, that lessen harm or exploit beneficial opportunities. It includes reducing the vulnerability of people, places, and ecosystems to the impacts of climate change.
- Climate Mitigation: actions that reduce the levels of greenhouse gases in the atmosphere; includes reducing emissions of greenhouse gases and enhancing sinks (things that absorb more greenhouse gases than they emit). Examples of the former include switching to renewable energy sources and implementing energy efficiency measures and examples of the latter include reforestation.
- Climate Resilience: ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to absorb stress and change.
- Climate vulnerability: the susceptibility of a system to harm from climate change impacts. It is a function of how sensitive the system is to climate and the adaptive capacity of the system to respond to such changes. Generally, systems that are sensitive to climate and less able to adapt to changes are considered vulnerable to climate change impacts.

Acronyms

CCAP- Comprehensive Climate Action Plan

CH4- Methane

CKA- Chief Kitsap Academy

CO2 - Carbon Dioxide

CO_2e- Carbon dioxide equivalent

CPRG- Climate Pollution Reduction Grant

DOE-IE- Department of Energy's Office of Indian Energy

EIA- US Energy Information Administration

EPA- Environmental Protection Agency

EPA AVERT- AVoided Emissions and geneRation Tool

EV- Electric Vehicles

GHG- Greenhouse Gas

HOAC- House of Awakened Culture

HRS- Hours

KPHD- Kitsap Public Health District

kWh- Kilowatt-hour

Lb- Pound

MT- Metric tons

MWh- Megawatt hour

NOx- Nitrous Oxide

N2O- Nitrous Oxide

NREL- National Renewable Energy Laboratory

PCAP- Priority Climate Action Plan

PME- Port Madison Enterprise

PMIR- Port Madison Indian Reservation

PM25 - Particulate Matter, 25 microns.

PSE- Puget Sound Energy

PV- Photovoltaic

QAPP- Quality Assurance Project Plan

SO- Sulfur Oxide

STCAW- Suquamish Tribe Climate Adaption Workgroup

TA- Tribal technical assistance program

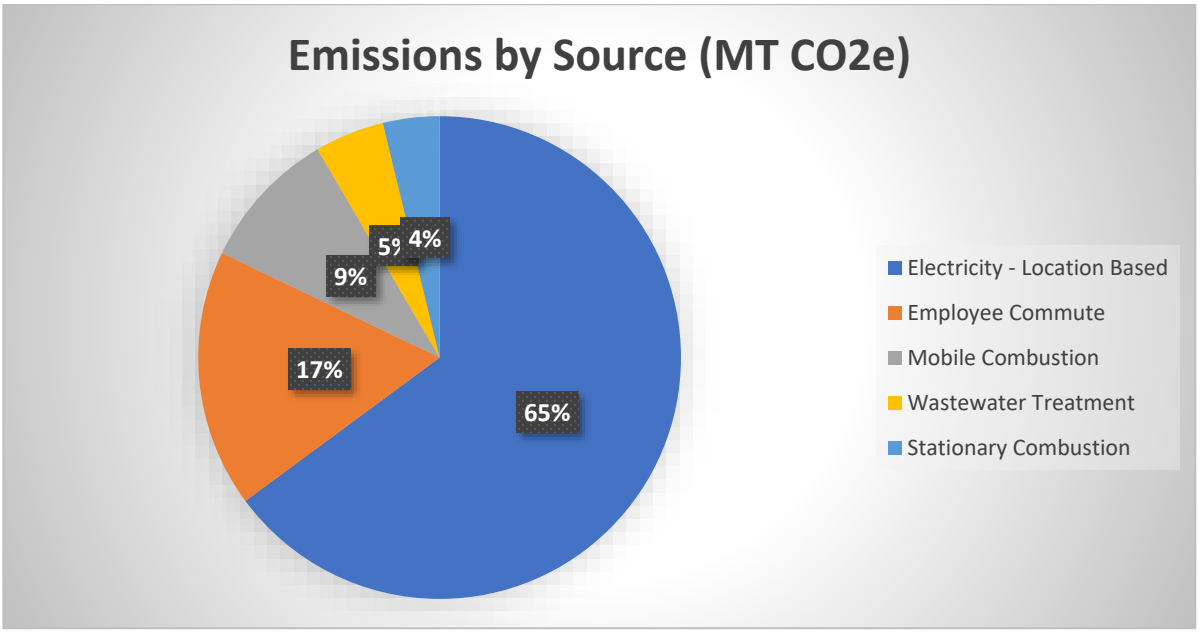
VOC - Volatile Organic Compound

Executive Summary

The information in this Priority Climate Action Plan (PCAP) serves as a foundation for the development of the first Comprehensive Climate Action Plan for the Port Madison Indian Reservation (PMIR) and the Suquamish Tribe's membership.

This PCAP is the collaborative effort of several internal and external agencies to explore the ways in which the Suquamish Tribe can better prepare for the effects of current and future climate change impacts. In 2023, the Suquamish Tribe Community Climate Workgroup (STCAW) was formed to provide diverse perspectives and collaboration to gather the necessary data and build community support for the implementation of the PCAP. The workgroup includes representatives of the Elders Council, Youth Council, Fisheries Committee, the Cultural Co-op and staff from the departments of Community Development, Maintenance, Administration, Natural Resources, Education, Wellness Center, and Emergency Management. STCAW utilized internal tracking systems, community outreach, and support from multiple external organizations, entities, and partnering tribes to create the GHG inventory found in this PCAP. The PCAP builds on the Tribe's Multi-Hazard Mitigation Plan, the 2022 Suquamish PV Analysis conducted by the National Renewable Energy Lab, the CPRG (Climate Pollution Reduction Grant), and the QAPP (Quality Assurance Project Plans). Information gathered by the workgroup and CPRG QAPP will be used in the eventual creation of the Comprehensive Climate Action Plan (CCAP).

This PCAP relies on data from lands and facilities owned and operated by the Tribal government and in the future will be expanded to include Port Madison Enterprise (PME) a Suquamish Tribal enterprise, and potentially neighboring municipalities. Data on greenhouse gas sources were provided by Puget Sound Energy, Kitsap Public Health District, Kitsap Public Works, as well as many departments within the Suquamish Tribe. Based on this data, a greenhouse gas inventory was developed to focus measures on sectors with the greatest potential to reduce greenhouse gas emissions. This greenhouse gas inventory tool will be continually updated to incorporate emissions reductions and new data sources. Emissions by sector are shown in the Figure and Table below.



Source	CO2	CH4	N2O	Total	Percent of Total
Electricity Usage - PSE	2807	7	9	2824	65%

Employee Commute	751	-	-	751	17%
Government Fleet	410	0	0	410	9%
Wastewater Treatment	-	203	0	203	5%
Propane, Gas for equip.	164	0	0	165	4%
Forest Sequestration	-12164	-	-	-12164	-279%
Total (Gross Emissions)	4133	210	10	4353	100%
Total (Net Emissions)	-8031	210	10	-7811	-179%

Electricity usage is the greatest source of greenhouse gas emissions for the Suquamish Tribe and many of the measures below are targeted towards improved efficiencies. Employee commuting and transportation contribute a significant amount of greenhouse gas emissions and a switch to cleaner transportation options is crucial. Emissions from propane are another significant source of greenhouse gas emissions. The majority of propane emissions come from the tribal community center (House of Awakened Culture). Efforts to increase the efficiency of this important building will reduce emissions. Lastly, it is important to note that the extensive forests present on the Port Madison Indian Reservation sequester a significant amount of carbon.

For the past decade, the Suquamish Tribe's climate change efforts have primarily been focused on ecosystem resilience and fisheries management. The Tribe is engaged in many efforts to protect and restore natural habitats and help them become resilient to climate and development change. The Tribe has also worked to build climate change awareness and reduce GHG emissions to a limited extent by including climate change curriculum in secondary education, installation of solar panel demonstration projects at the Fitness Center and High School, assessing the feasibility of solar on government buildings, and a limited purchase of hybrid vehicles. The PMIR is in a rural area with relatively low density so efforts to significantly enhance public transportation are challenging. Actions to reduce the number of trips and distances traveled would greatly reduce GHG emissions. Plans to partner with surrounding municipalities to reduce GHG transportation emissions are being explored. If enacted, they will be included in the Comprehensive Climate Action Plan.

As part of the development of the PCAP, the Tribe has worked to determine priority measures that not only work to reduce current greenhouse gas emission, but also make the community more climate resilient. After careful consideration, the priority measures below were determined:

- The development of a fully subsidized ductless heat pump program for tribal members.
- Improvements to current tribal buildings to ensure their energy efficiency. Tribal buildings include tribal administration, education, and the rentals and homes owned by the Suquamish tribe and managed by the community development department.
- Installation of solar panels and battery storage on Tribal Government Buildings
- The electrification of the tribal fleet.
- The creation of an electric car share program.

Based on projections described in the following documents, the Suquamish tribe anticipates that these measures in combination can reduce greenhouse gas emissions by over 2,000 metric tons per year.

Projected Greenhouse Gas Reductions from Priority Measures

Measure 1 – Heat Pumps in Tribal Homes	*1,230 MT CO_2e*
Measure 2 – Energy Efficient Improvements in Tribal Buildings	*138 MT CO_2e*
Measure 3 – Solar Energy on Tribal Government Buildings	*457 MT CO_2e*
Measure 4 – Switching the Fleet to EV	*180 MT CO_2e*
Measure 5 – EV Ride Share Program	*Uncertain*
Total Emissions Reductions	*2,005 MT CO_2e*

In addition to reductions in greenhouse gas emissions, the EPA AVERT tool was utilized to calculate the reductions in other contaminants that can pose a significant public health concern. This is of particular importance to medically vulnerable tribal members.

	SO_x	***NO_x***	***PM 2.5***	***VOC***
Measure 1 – Heat Pumps in Tribal Homes	*470*	*880*	*100*	*30*
Measure 2 – Energy Efficient Improvements in Tribal Buildings	*-*	*-*	*-*	*-*
Measure 3 – Solar Energy on Tribal Government Buildings	*960*	*1780*	*200*	*60*
Measure 4 – Switching the Fleet to EV	*-*	*590*	*-*	*400*
Measure 5 – EV Ride Share Program	*-*	*-*	*-*	*-*
Total Emissions Reductions	*1,430*	*3,250*	*300*	*490*

The authority to implement greenhouse gas reduction measures is a crucial component of ensuring successful implementation. For some of these measures the authority is vested in the Suquamish tribal Government. Other measures will require partnership with tribal members when we collaborate to weatherize their homes. To further this mission, the climate resilience program is planning a significant outreach and education effort. Additional partnerships with other agencies (e.g. PSE) are being developed to ensure successful application of these measures.

In order to effectively meet the needs of the Tribe's various priority measures, a number of alternative funding sources will be utilized.

After the completion of the PCAP, the Tribe will begin to focus on community wide education and reduction of greenhouse gas emissions. The Tribe aims to ensure that its members are better equipped to face upcoming environmental challenges and reduce their climate vulnerability.

1 Introduction

The Suquamish Tribe Background: History and Culture

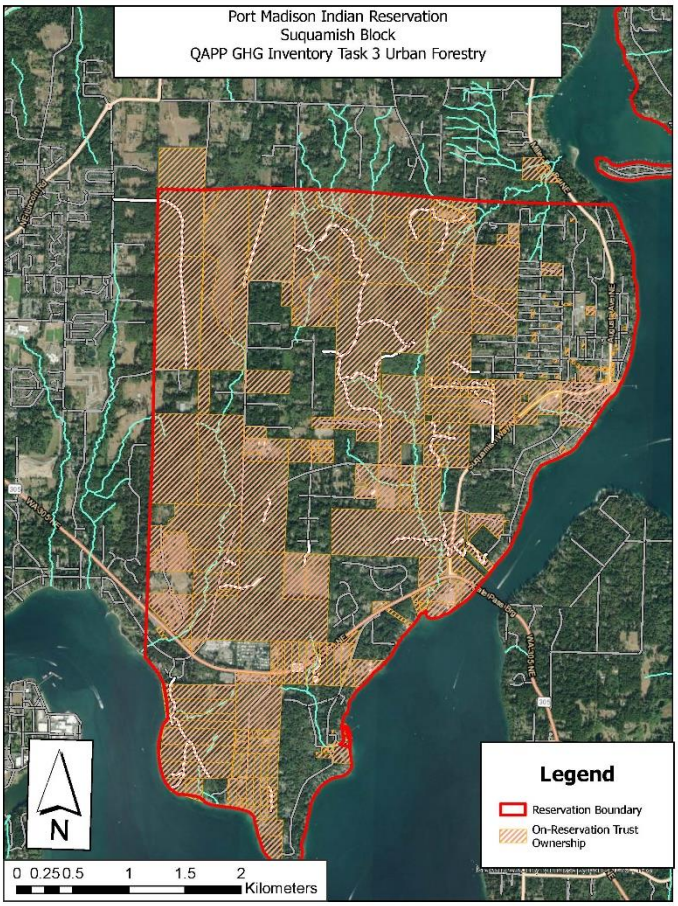


Figure 1 – A map indicating the outline of the Port Madison Indian Reservation and the locations of trust land within the Suquamish block. Like many tribes, the lands within the reservation are checkerboarded and separated.

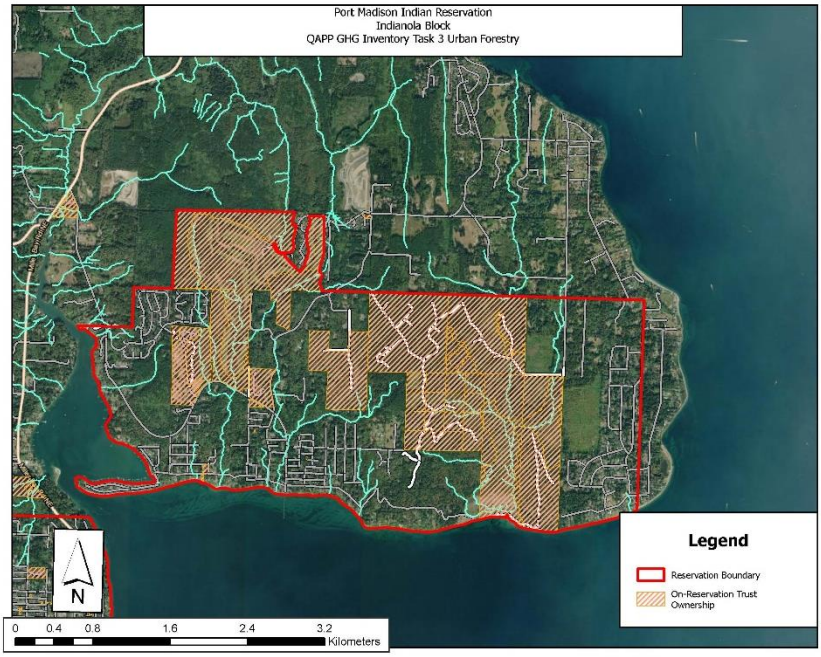


Figure 2 - A map indicating the outline of the Port Madison Indian Reservation and the locations of trust land within the Indianola block. Like many tribes, the lands within the reservation are checkerboarded and separated.

The Suquamish name comes from the traditional Lushootseed phrase for “people of the clear salt water.” The Tribe has roughly 1,200 enrolled citizens, half of whom reside on our Reservation, which is located west of Seattle, WA, across the Puget Sound. The Reservation is located on the Kitsap Peninsula in Washington State and consists of 7,657 acres of trust land including 12 miles of Puget Sound shoreline.

This land and marine ecosystems are integral to the Suquamish way of life, with the Tribe relying on the Puget Sound fish, shellfish, and nearby traditional plants, and land game for our economic, nutritional, and cultural needs. The Suquamish became expert boatsmen largely to follow the path of migrating salmon to the rivers and streams of their birth.

According to archaeological evidence and oral history, we have continually occupied the land where our current reservation is located, and beyond, for thousands of years. Stories from our ancestors show that the salmon people, the orca, and our people are relatives, and we have treated other species with respect even as we have relied on each other since time immemorial.

The Treaty of Point Elliott, signed by our ancestral leaders, Chief Seattle in 1855, guaranteed our tribe, and others, the right to fish in all the places we had traditionally fished, including in waters that extend far beyond our reservation boundaries. The Suquamish usual and accustomed areas includes large parts of Western Washington from the Canadian border to the tip of Vashon Island. This treaty right was upheld 50 years ago by US District Court Judge Hugo Boldt, and subsequent rulings have established that the right to fish also included the right to clean and productive habitats that can sustain fisheries.

Today, despite depletion of fish stocks from overfishing, industrial pollution, fish blockages, and development, salmon and shellfish are still harvested for commercial, subsistence and ceremonial

purposes. Around 20 percent of the Tribe's members help support their families by earning income from the harvest of fish and shellfish. The proceeds from the Tribe's geoduck clam harvests support our elders' programs and provide employment to tribal divers.

Seven generations since Chief Seattle signed the Treaty of Point Elliott, following decades of efforts to protect our fishing rights and to preserve the habitat and fish runs of this region, we now face additional crises. The Suquamish Tribe is experiencing firsthand the effects of climate change on the Kitsap Peninsula and throughout the region, especially the disastrous duo impact on marine ecosystems caused by warming waters and ocean acidification.

With climate change threatening the survival of our way of life, the Suquamish Tribe has set out to identify current greenhouse gas (GHG) emissions and develop reduction strategies to protect and preserve the natural environments for current and future generations.

Why the Suquamish Tribe is invested in climate change:

Native American communities around the world are already seeing and experiencing the impacts of climate change on their daily lives. Due to their reliance on the surrounding environment, community members are concerned about the potential impacts that climate change can have on their way of life. Below is a list of climate change concerns posed by the Suquamish community.

1. **Threat to Traditional Ways of Life**: The Suquamish rely on traditional practices like hunting, fishing, and gathering for food, medicine, and cultural activities. Changes in climate can disrupt these practices by altering the habitats and behaviors of animals and plants they depend on. In addition, the Tribe is working to regain its historical knowledge and connection to Plant Medicines. Climate change impacts to those plant medicine resources will impede those efforts.
2. **Impact on Sacred Sites and Cultural Resources**: The Suquamish have long been residents of the coastal Puget Sound. Rising sea levels, erosion, and extreme weather events can damage, destroy, and make sites that are sacred or culturally significant inaccessible.
3. **Impacts on Treaty Rights:** The Suquamish Tribes' treaty right to hunt, fish, and gather spreads from the Fraser River in Canada to the northern tip of Vashon Island. Clam harvest alone provides $700,000 in income to tribal members. Intertidal clams are vulnerable to extreme heat events and the beaches are threatened by sea level rise. The salmon fishery averages over $500,000 per year in income to tribal fishers and in some years over a million dollars in revenue. The Tribe operates two salmon hatching and rearing facilities (hatcheries) and two delayed release net pens. In these facilities over 2 million chum salmon, 2 million Chinook salmon and approximately 1.5 million coho salmon are released to support treaty rights to harvest. Hatchery and natural salmon survival can be impacted by stream temperature and the timing and quantity of rainfall events in the small streams they return to spawn in.
4. **Water Scarcity and Quality Issues**: Many communities already face challenges with water availability and quality. Climate change can exacerbate these issues, affecting both the quantity and quality of water resources and the health of fish bearing streams. The Suquamish Tribe operates two salmon hatcheries to support their treaty right to harvest salmon. The water supply at these locations and others has decreased due to rapid development and shifts in precipitation patterns.

5. **Health Risks**: The Suquamish community faces increased health risks due to climate change. This includes a higher incidence of heat-related illnesses, respiratory problems due to poor air quality from smoke from summer wildfires and wood burning stoves in winter, and the spread of vector-borne diseases. It is also expected that invasive nonnative plants, insects, and other species will expand their range. Our Tribe's incidence of Chronic health conditions has improved as the Tribe regained access to native foods. Climate change threatens the supply of healthy food supply.
6. **Economic Impact**: The Suquamish Tribe is vulnerable to economic impacts from changing environmental conditions because of our reliance on natural resources. (*See impacts on Treaty rights above for a snapshot of the economic impact*)
7. **Displacement and Relocation**: The Suquamish Tribe has experienced detrimental impacts at some buildings at high tide. We are beginning to address the relocation of structures in the bank or near bank areas.
8. **Impacts on Wildlife and Biodiversity**: Climate change can lead to shifts in ecosystems and biodiversity, affecting species that are important for the economic, nutritional, cultural, and spiritual practices of Native American communities. For example, several recent marine heat waves 'blobs' were formed off the northwest coast that caused modifications to ocean upwelling, and the amount and quality of food supply (zooplankton), resulting in a collapse of some salmon populations which starved in the ocean.
9. **Increased Vulnerability to Natural Disasters:** The Suquamish reservation is in a mixed forest-urban interface. The reservation area is increasingly vulnerable to wildfires, floods, and other natural disasters exacerbated by climate change.
10. **Inadequate Infrastructure and Resources**: Existing infrastructure in the Suquamish community may not be equipped to handle the increased stresses due to climate change, and resources for adaptation and mitigation may be limited.
11. **Behavioral Health Impacts**: The stress from experiencing or anticipating climate-related disasters can adversely impact mental health and well-being of our tribal members.
12. **Spiritual Health**: Treaty Rights were established in 1855, but the Suquamish people had been relying on the Puget Sound and Salish Sea for subsistence, culture, spirituality, and general way of life for thousands of years. Hunting and gathering in their usual and accustomed territory provided nutritional, spiritual, ceremonial, social, and economic resources. The decrease in salmon also threatens the Southern Resident Killer Whale J, K, and L pods. Suquamish Tribal Chairman, Leonard Forsman states that, "orca whales are vital to our culture and spirituality as we are the first people on the Puget Sound. They act as sentinels observing our behavior and its impacts on the health of our waters."
13. **Other Impacts**: Switching from wood stoves, a traditional way of heating our living spaces, to more efficient systems, such as heat pumps will affect them culturally, spiritually, and emotionally.

Addressing these challenges will require immense collaborative efforts from tribal governments, federal agencies, and other stakeholders and requires a focus on sustainable resource management, infrastructure improvements, and cultural preservation.

1.1 CPRG Overview

A Comprehensive Climate Action Plan (CCAP) will be created to guide ongoing actions to reduce GHG emissions and increase the Tribe's resilience to future challenges by, 1) increasing the Tribe's energy independence, 2) future-proofing tribal infrastructure, and 3) taking actions to protect and restore ecosystems and help them become resilient to climate and development impacts. This PCAP outlines how the Tribe is starting down that path.

1.2 PCAP Overview and Definitions

This PCAP includes a focused list of near-term, high-priority, implementation-ready measures to reduce GHG pollution and an analysis of GHG emissions reductions that would be achieved through implementation. A list of definitions is included in the beginning of this plan. The methods used in the GHG inventory are in the Suquamish GHG assessment QAPP (Appendix 1). The Suquamish Tribe has prioritized GHG reduction measures that will achieve GHG reduction goals and provide benefits to Suquamish community members. Installation of residential heat pumps to replace wood or propane stoves as the primary home heating source will reduce GHG emissions, improve indoor and outdoor air quality, and provide cooling during heat waves. Installing solar panels on rooftops of government buildings will reduce the use of electricity from a utility that utilizes some fossil fuels to produce the electricity they supply. In addition, it will enable the Tribe to generate electricity to maintain critical functions outlined in the Multi Hazard Management Plan. Switching over the tribal fleet to electric will significantly reduce greenhouse gas emissions and developing an EV ride share program will have the co-benefits of providing transportation to tribal members without vehicles and encourage EV adoption.

The Tribal Council has authority to install solar panels on government building rooftops and the rooftops of houses within their extensive housing program. The authority to install heat pumps lies with the Department of Community Development within the Suquamish Tribe and with individual tribal member homeowners. Outreach materials will be developed to explain the benefits of heat pumps to increase participation in the program.

1.3 Approach to Developing the PCAP

PCAP development was initiated by forming a steering committee of the STCAW comprised of Directors of programs or their surrogates likely to be the most impacted by climate change and whose programs can impact the largest reductions. This included representatives of Health and Wellness Departments, Community Development, Fisheries, Natural Resources, Cultural Resources, and the Tribal Administration. This team continues to meet bi-weekly to coordinate the development of the CCAP and all climate-change related programs. Many departments were unsure how they would be impacted by climate change. The initial focus of the steering committee was on education efforts centered around discussing how climate change resilience and adaptation planning encompasses multiple departments. To further this, the committee had a guest presentation from a UW professor discussing the impacts of climate change. The steering committee was also tapped into when there were specific data requests for the greenhouse gas inventory and to discuss the feasibility of some of the proposed greenhouse gas reduction approaches.

The Suquamish tribal members are the most important stakeholders in this process. To establish the framework for a community-driven approach, the steering committee collected community feedback through multiple forms of outreach strategies. A virtual survey was distributed to gather community member's "Climate Change Story." In addition, staff interviewed tribal members of various ages to

gather oral accounts of how they have experienced climate change in their lifetime as well as ways they hope the Suquamish Tribal Government can address these changes. Further efforts to engage the community in a two-way dialogue are proposed for development of the Comprehensive Climate Action Plan.

Developing the greenhouse gas inventory required a significant amount of cross-departmental and outside stakeholder coordination. Through this process, we established partnerships with Puget Sound Energy, Kitsap Public Works, and Kitsap Public Health. These partnering organizations have been crucial to providing data on emissions related to our operations and for partnering on greenhouse gas reductions. Puget Sound Energy continues to partner with the Tribe on electric cars, heat pumps, solar panels, micro-grids, and dispersed energy systems.

The greenhouse gas inventory was conducted by the Director of Natural Resources for the Suquamish Tribe. The Director has extensive experience managing databases, vetting data, and calculating mass balances. The GHG inventory is based on resources available on the CPRG website, discussions with our EPA coordinator partnering stakeholders, and data from operations, with assumptions and limitations documented. In this process, data gaps and data collection limitations were discovered. Systems will be developed to track this data in the future. We feel confident that most greenhouse gas emission sectors are presented in a robust and accurate manner in this inventory. This tool will continue to be utilized and updated as the Tribe works to meet their goals.

Measures to reduce greenhouse gas emissions were based on the sources indicated in the inventory and the community's needs. As described below, these measures were selected based on their efficacy and potential for adoption to benefit the Tribal Community. Priority measures were determined through guidance from the Executive Director and Tribal Council to both result in significant GHG emission reduction and provide optimum benefits to the Tribal Community. Emissions reduction estimates were principally based on numbers provided in the GHG inventory, reasonable assumptions on the adoption of the program, and official numbers on GHG reductions provided by federal agencies, academic institutions, and non-profits. Further information is provided for each sector below.

1.4 Scope of the PCAP

The PCAP is focused on the activities and emissions under the control of the Suquamish Tribal Government. The Tribal Government’s jurisdiction encompasses the boundaries of the Port Madison Indian Reservation (Figure 1 and 2). However, the scope of their programs extends to tribal members living in the county and the expansive usual and accustomed areas guaranteed under the treaty of Point Elliott. Timelines were determined based principally on the directed goals of Tribal leadership and the Tribal community with a focus on executive orders and goals established by the State of Washington as well as feasibility of these approaches based on discussions with the Tribe’s Executive Director, elected Tribal Council, and the STCAW.

3. PCAP elements

3.1 Greenhouse Gas (GHG) Inventory

Scope

The scope of the GHG inventory in this phase is focused on the activities of the Suquamish Tribal Government and the land held in trust within the Port Madison Indian Reservation. Some of the activities provided by the Suquamish Tribe include schools, childcare facilities, multiple salmon

hatcheries, a seafood plant and retail store, and housing for tribal members. Additionally, the Tribal government provides other services that will generate GHG emissions including the tribal assistance program, where utility bills are paid for elders in Kitsap County. The Tribe paid the utility bills of over 100 tribal members in 2023. The Suquamish Tribal Government has provided over 220 homes including active rentals, and mutual home ownership programs. There is a large amount of overlap between government activities and the livelihood of its citizens. Reductions in GHG emissions for Tribal Government operations are closely coupled to the community. In some circumstances (i.e., electricity), data was gathered on the electricity usage of tribal citizens, while in other circumstances (i.e., propane, mobile combustion) only the activities of the Government were included. Priority measures are expected to focus on both the Government and tribal community. Specific aspects of the scope will be outlined in each sector in the following paragraphs.

The base year was chosen as the prior year (2023) because it is beyond the covid pandemic and is likely representative of a typical year in terms of commuting, in-person school, and other factors affected by the pandemic. Additionally, the Tribe has made gains in making sure that all their departments are staffed in 2023. Lastly, the previous year's data was the easiest to access with confidence in its accuracy.

Data Collection and Greenhouse Gas Accounting Method

All data was entered into the EPA Tribal GHG Inventory Tool: Government Operations Module with a few modifications outlined in the following paragraphs. Data collection methods are also described thoroughly in each section below.

Mobile Combustion

The Tribal Government operates 87 vehicles in the fleet that are leased and/or operated through a contract with Enterprise. Odometer readings and fuel usage (i.e. gallons, cost) are tracked within an Enterprise database each time the vehicle is refueled or serviced. Almost all the refueling takes place at the gas station adjacent to the tribal administrative offices that is owned and operated by Port Madison Enterprises, the commercial arm of the Suquamish tribe. The Enterprise database was queried to determine mileage and gasoline usage for each of these vehicles by Finance staff. For nine of these vehicles there were mileage records in 2023 but no fuel usage reported by the Enterprise query. In these circumstances fuel consumption was determined by dividing the mileage from the Enterprise system by average miles per gallon for the make and model of the vehicle based on information from www.fueleconomy.gov. For six of these vehicles there was no mileage reported in the Enterprise database in 2023 but fuel usage (gallons) was reported. These are vehicles that were only filled up once in 2023, so there was no odometer difference to calculate. These vehicles with little mileage were excluded. For two of the vehicles, the database output only generated fuel cost. This was converted to gallons by using the average local gas prices from a search of AAA online.

The Suquamish Tribal Police Department has 21 land vehicles, all of which are not within the Enterprise system. For these vehicles, the only source of data we have is the cost of refueling from fuel purchase orders in our financial accounting system. These purchase orders do not report the specific vehicle that is being refueled so there are limitations in the data and the fuel usage for the entire Police Department is reported in the aggregate. Fuel usage was calculated as the miles per gallon of the Police Department's standard vehicle (Chevy Tahoe; 16 MPG) which makes up half the fleet and gas prices supplied by AAA. Limitations to this data result from fluctuating gas prices, variations in miles per gallon of different vehicles, as well as variance in vehicle usage (e.g., idling, highway, city).

The Treaty Protection Division consists of the Shellfish, Finfish, and Natural Resources programs. These programs also operate boats in support of the treaty rights of the Tribe to fish in their usual and accustomed areas. Boat gasoline usage and expenditures were provided based on records kept by the regular supplier of boat fuel for this department (Port of Kingston). Data provided by Port of Kingston sometimes consisted of gallons and in other refueling only expenditures were reported. Missing fuel prices were determined as the average of the closest two dates. The Suquamish Police Department operates boats in support of fisheries enforcement and other activities. The only fuel records available for police boat fuel usage were based on a query of the accounting system to determine expenditures. Cost of fuel was converted to gallons based the average gas prices provided by Port of Kingston, our main supplier in 2023.

This exercise has revealed that the systems in place where data is available (e.g. Enterprise mileage, financial accounting data) are not sufficient to give an exact greenhouse gas emissions estimate. Based on this, the tribe is committed to developing systems to further track greenhouse gas emissions including detailed databases and publicly available dashboards.

Electricity Use

The Suquamish Tribe partnered with Puget Sound Energy (PSE) to determine the electricity usage of different departments and programs in 2023. Emissions per kWh were based on the PSE 2022 Greenhouse Gas Inventory (https://www.pse.com/en/about-us/Sustainability). Additional sources of data on utility expenditures were provided by the Finance Department based on bills received and paid to PSE, the Human Services Department provided information on the Elders Assistance Program, and the Department of Community Development provided information on housing and land held within trust on the reservation. PSE queried their database to provide actual 2023 electrical usage (kWh) and addresses for all buildings and facilities labelled with the tag of Suquamish in their system. This dataset includes non-overlapping energy usage for Tribal Administration buildings, the museum, a portion of the housing program, the fish hatchery, as well as all energy usage within the Suquamish census block.

The query of the PSE database for all operations with the label ‘Suquamish’ was incomplete and follow-up was necessary to include only land within the jurisdiction of the Suquamish Tribe, as opposed to the entire census block. The land within the PMIR is a checkerboard with some land held by tribal members in trust where the government has interest, and fee simple land not held in trust to the Tribe. The data provided by PSE on the Suquamish census block includes the utility bills of all operations within this census block. To narrow down the dataset, Community Development staff utilized our ArcGIS database to provide PSE with the list of addresses of trust land within the reservation. This allowed the greenhouse gas inventory to include all the electricity-based carbon emissions from every tribal citizen living within PMIR on trust land.

To decipher the greenhouse gas footprint at a more granular level than data provided by PSE, further methods were utilized. Information on the addresses within the Tribal Elders Assistance Program was provided by the Human Services Department and supplied to PSE. This is a program where the utility bills of all eligible tribal elders within Kitsap County are paid for by the Tribe. Additionally, a list of addresses for utility bills paid for by the Tribe (i.e., government buildings, hatchery, housing, education, etc.) was provided to PSE and the resulting energy usage was returned. There is overlap in some of these data requests, so the data is carefully presented below to prevent double-counting energy usage while still being able to outline the greenhouse gas emissions of different programs. The data provided by PSE

was in an aggregated format with a limited ability to determine utility costs by building and department. As outlined in priorities below, it will be important to target greenhouse gas reductions to inefficient buildings. The only source of this finer-scale level data was expenditures provided by our financial accounting system. This dataset allows for a comparison on expenditures of individual facilities without specifying actual greenhouse gas emissions. This financial data is provided below with the assumption that utility rates and fees are relatively consistent between these adjacent buildings and operations.

Stationary Combustion

Stationary combustion for the Suquamish Tribe consists of propane usage for buildings and includes gas used for pumps, generators, and yard equipment for the hatchery operations and maintenance equipment used to maintain the grounds of government facilities. Gasoline usage was determined by querying the financial accounting system for expenditures. Dollar values were converted to gallons using average gas prices based on methods described above in mobile combustion. One limitation of the dataset is that it only includes the operations of the Tribe's two hatcheries as well as the operations of the Maintenance Department. While these are expected to be the two largest sources of stationary gasoline it is not a comprehensive dataset. Further work is necessary to include data from other departments.

The second source of stationary combustion includes propane usage for a variety of buildings operated by the Suquamish Tribal Government. This includes some of the education buildings as well as the House of Awakened Culture (HOAC), a community center for the Tribe. In contrast to the PSE data, we were not able to determine propane usage for tribal members on trust land within the PMIR, only for government operations. To compile this data, financial records of expenditures to the propane companies were collected. Each of these three companies was reached by phone to determine the propane gallons used by the Suquamish tribe in 2023.

Solid Waste

The Suquamish Tribe does not operate any landfills. Due to data constraints on the amount and type of waste generated, the greenhouse gas emissions of the solid waste sector were not included in the GHG inventory.

Wastewater

Wastewater greenhouse gas emissions were provided in partnership with Kitsap Public Works (sewer) and Kitsap Public Health District (septic). Based on these discussions the type of wastewater treatment was described as activated sludge with no denitrification/nitrification step. Although beyond the scope of the dataset it is important to note that methane emissions from consolidated sludge decomposition are burned and the heat is used to generate electricity. Therefore, the emissions described here are likely an overestimate.

Similarly to the PSE dataset, the Kitsap Public Health District (KPHD) was provided with a list of addresses that included government buildings and the households of tribal citizens living on trust land. Data provided on the number of households and buildings on septic and sewer was provided by KPHD. Based on advice from KPHD, the households served by septic and sewer were converted to population by multiplying by 2.5, which is the average for household population in Kitsap County. Some of the Tribal Government buildings are also on septic systems. To determine the population served by septic in these government buildings the number of employees working in each building was multiplied by assumptions on the number of waking hours and the number of weekday work hours using the following equation:

$\sum_i^n e_i \frac{W_e}{W_a}$, = *# of government employees on septic* where n is the government buildings on septic, e_i is the number of employees working in the building, W_e is the hours in the week an employee is in the office (8 hrs, 5 days per week), and W_a is the number of active waking hours in a week when restrooms are normally used (6 hrs per weekday; 15 hrs per weekend day).

While this is an estimate with a lot of assumptions it should give emissions values broadly representative of the septic outputs in comparison to other sources.

Employee Commute

Data on employee commuting was provided by a survey sent out to all employees of the Tribal Government. This survey encompassed all questions required for the EPA GHG inventory including commute type, vehicle MPG, commute distance, and frequency. We received responses from 30% (118) of the 401 employees of the Tribal Government. Like many organizations some individuals are on a hybrid work from home and in the office schedule. The work from home percentage was calculated by dividing the number of commuting days by the number of workdays in a month.

Agriculture & Land Management

Beyond the forestry land management outlined below the Suquamish tribe did not operate agricultural or land management operations in 2023.

Water Use

The Suquamish Tribe does not import water, so no emissions were calculated on the EPA spreadsheet.

Urban Forestry

The carbon sequestered by the urban forests on trust land within the reservation boundary were calculated by staff within the Forestry Department. The PMIR is generally a rural reservation with large blocks of contiguous forested land, and many allotments that have no development or land clearing. ArcGIS Pro mapping with imagery was used to produce maps of the PMIR, which was divided into two separate blocks (Indianola, Suquamish blocks). Trust properties within each block of the PMIR were delineated based on existing updated datasets to determine the total area of trust land. Tree cover within trust properties was digitized using ArcGIS pro based on visual determination, existing knowledge of the landscape, and expertise by the Forestry Program Manager. Areas that were harvested but replanted were included as tree cover, whereas properties with sparse tree cover that have been harvested and converted for development were not included as tree cover. Percent cover was calculated using the following equation:

$\sum_{i=1}^{i=2} \frac{(km^2\ of\ area\ i)(\%tree\ cover\ of\ area\ i)}{\sum_{i=1}^{i=2} km^2\ i}$ = *Tree Cover (%),* where i=2 encompassing the Indianola and Suquamish block, $km^2\ of\ area\ i$ is the measured area of trust land within PMIR boundaries of each block, $\%tree\ cover\ of\ area\ i$ is the ArcGIS estimated area of tree cover for area i, and the denominator $\sum_{i=1}^{i=2} km^2\ i$ is the total combined area of the 2 blocks.

The two blocks are shown below in Figure 3 and 4.

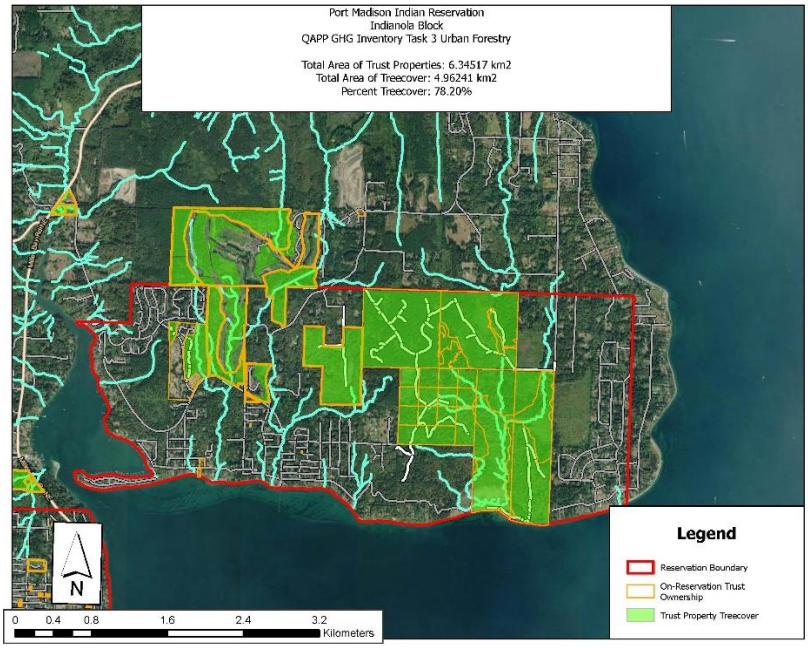


Figure 3 - A map indicating the outline of the forest cover for the Indianola block of the Port Madison Indian Reservation.

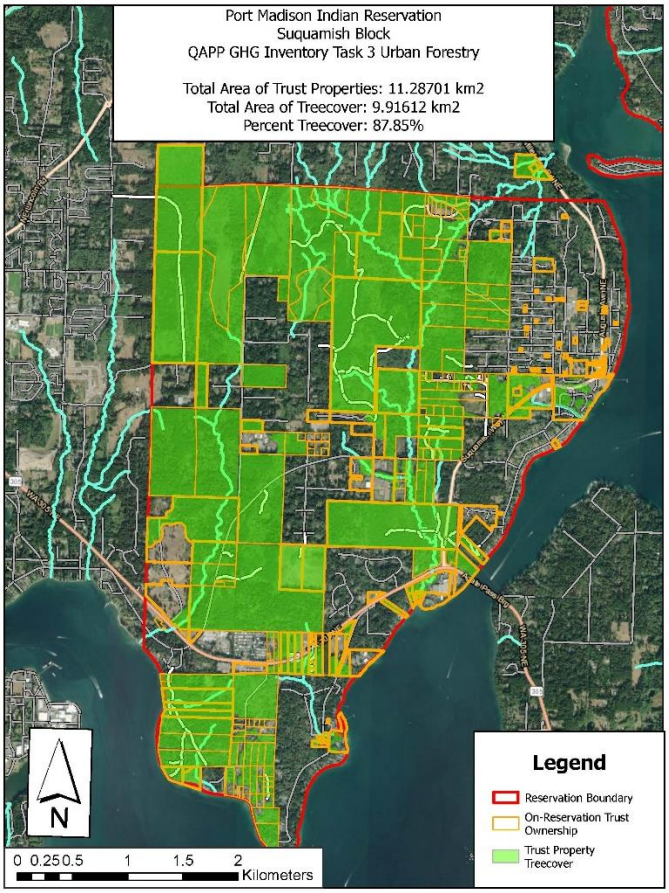


Figure 4 - A map indicating the outline of the forest cover for the Suquamish block of the Port Madison Indian Reservation.

GHG emission results by sector and gas

Greenhouse gas emissions data will be presented below by sector, department, and sometimes at the facility level. As outlined in Figure 5 and Table 1 below, overall emissions were the highest in the electricity sector which made up 65% of emissions (2,824 MT CO_2 e), followed by the employee commute sector which made up 17% (751 MT CO_2 e), the mobile combustion sector (9%) (410 MT CO_2 e), and 5% of emissions from stationary combustion (165 MT CO_2 e).

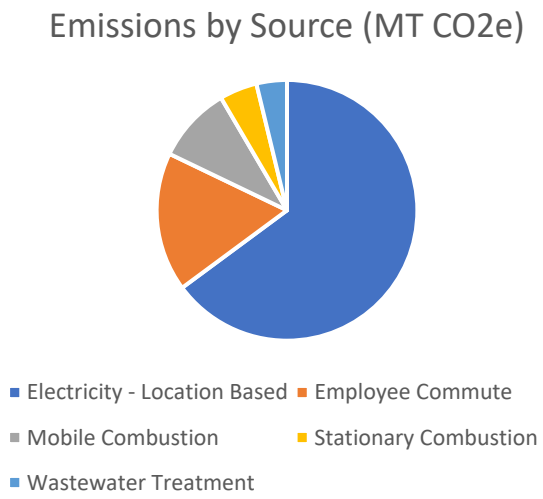


Figure 5 – A chart indicating the percentage of greenhouse gas emissions by sector.

Notably, the urban forestry sector (Table 1) *sequesters* approximately 12,164 MT CO_2 e which is greater than all measured greenhouse *sources* combined. It is important to note that the electricity sector includes data on Tribal Government buildings as well as tribal community members, whereas the mobile combustion sector only includes Tribal Government-related transportation. It will be important in the future to gather data on the transportation habits and ensuing greenhouse gas emissions of the tribal community to tailor reduction measures.

Table 1 – A table of greenhouse gas emissions by sector.

Source	CO2	CH4	N2O	Total	Percent of Total
Electricity - Location Based	2807	7	9	2824	65%
Employee Commute	751	-	-	751	17%
Mobile Combustion	410	0	0	410	9%
Wastewater Treatment	-	203	0	203	5%
Stationary Combustion	164	0	0	165	4%
Urban Forestry	-12164	-	-	-12164	-279%
Total (Gross Emissions)	4133	210	10	4353	100%
Total (Net Emissions)	-8031	210	10	-7811	-179%

Underneath the umbrella of Tribal Administration, the Administration buildings encompass 13% of total emissions, and the tribal citizens produce 45% of the greenhouse gases for a combined total of 58%. The

other departments with significant emissions include Community Development (8%), the Police (5%), Treaty Protection (4%), the Cultural Resources Department (3%), as well as the Education Department (3%) and the Early Learning Center (2%). Explanations of these emissions are offered below in each section.

Table 2 – A table of the total greenhouse gas emissions by department.

Department	Total (MT CO2e)	Percent of Total
Administration		
Admin. Buildings	619	14.21%
Tribal Community	2205	50.65%
Total Admin	2824	64.87%
Community Development	363	8.34%
Police	209	4.80%
Treaty Protection	160	3.68%
Cultural	129	2.96%
Education	115	2.64%
Early Learning Center	105	2.41%
Tribal Gaming	85	1.94%
Human Services	73	1.68%
Maintenance	60	1.38%
Wellness	48	1.10%
Finance	33	0.76%
Tribal Child Welfare	28	0.65%
Youth	27	0.61%
Health Clinic	25	0.58%
Information Technology	21	0.49%
Courts	20	0.46%
Tribal Council	18	0.41%
Emergency Management	11	0.24%
Total	4353	

Mobile Combustion

Mobile combustion is 9% of the total emissions within the scope of this greenhouse gas inventory. Greenhouse gas emissions in the mobile combustion sector includes emissions from vehicles, boats, and heavy equipment that is used directly in the operations of the Tribal Government. Emissions from employee commuting are included in the appropriate section below. Currently there is no data available on the emissions from community transportation needs. Department level data for mobile combustion is presented in Figure 6 and Table 3.

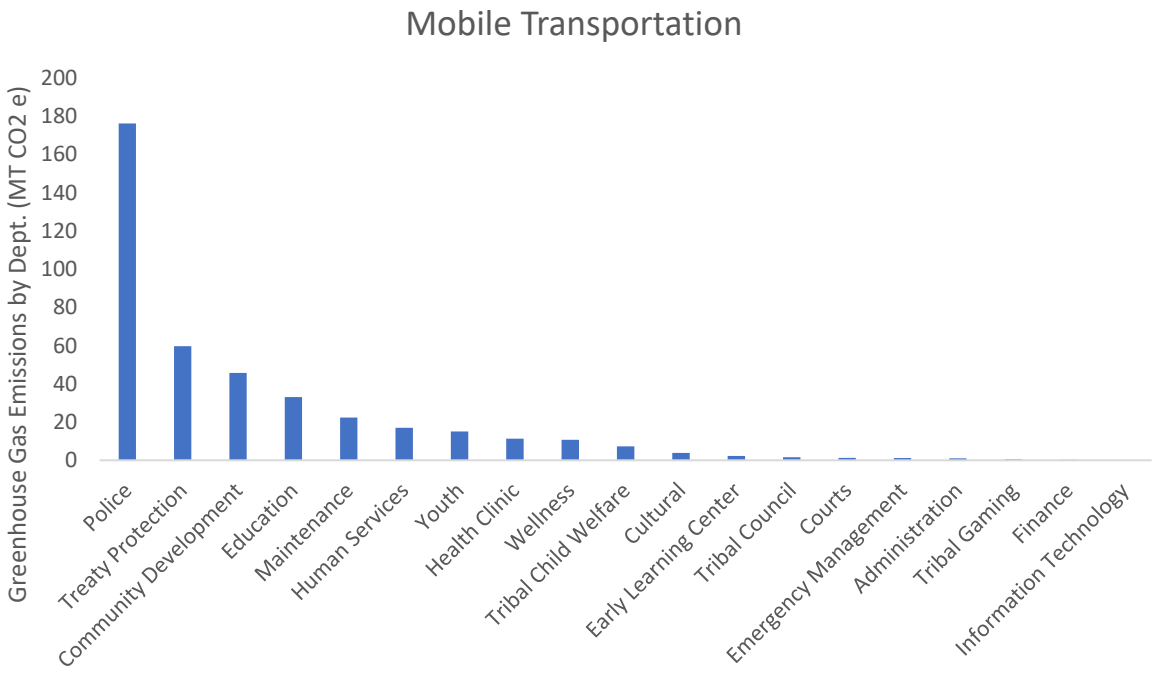


Figure 6 – A chart of the greenhouse gas emissions in the mobile transportation sector by department.

The majority (43%) of the emissions result from the Police Department's transportation. In addition to patrolling the reservation, there are also fisheries enforcement boats that patrol the expansive usual and accustomed areas of the Suquamish Tribe. The Treaty Protection division emits (15%) of the greenhouse gases. This division incorporates the Fisheries Department and the Natural Resources Department. Both departments involve a significant amount of fieldwork and monitoring throughout the Tribe's usual and accustomed area. Maintenance and Community Development emit 5% and 11% of the mobile transportation emissions respectively. The Suquamish Tribe operates several buildings and has a robust tribal housing program supported by these two departments. The transportation needs of the Education Department represent 8% of the mobile combustion emissions for the Tribe. Efforts to reduce greenhouse gas emissions from mobile combustion related to government operations as well as community transportation needs can make significant impacts on climate-related pollution.

Table 3 – A table of mobile combustion emissions by department

	CO2	CH4	N2O	TOTAL	% Of Total
Police	176.15	0.00	0.00	176.15	42.92%
Treaty Protection	59.65	0.00	0.00	59.65	14.54%
Community Development	45.72	0.00	0.00	45.72	11.14%
Education	33.05	0.00	0.00	33.05	8.05%
Maintenance	22.31	0.00	0.00	22.31	5.44%
Human Services	17.00	0.00	0.00	17.00	4.14%
Youth	15.06	0.00	0.00	15.06	3.67%

Health Clinic	11.35	0.00	0.00	11.35	2.76%
Wellness	10.70	0.00	0.00	10.70	2.61%
Tribal Child Welfare	7.29	0.00	0.00	7.29	1.78%
Cultural	3.88	0.00	0.00	3.88	0.95%
Early Learning Center	2.29	0.00	0.00	2.29	0.56%
Tribal Council	1.60	0.00	0.00	1.60	0.39%
Courts	1.28	0.00	0.00	1.28	0.31%
Emergency Management	1.18	0.00	0.00	1.18	0.29%
Administration	1.00	0.00	0.00	1.00	0.24%
Tribal Gaming	0.53	0.00	0.00	0.53	0.13%
Finance	0.23	0.00	0.00	0.23	0.06%
Information Technology	0.12	0.00	0.00	0.12	0.03%
Total Mobile Emissions	410.38	0.00	0.00	410.38	

Electricity Use

Electricity use is the most significant source (65%; 2,824 MT CO_2) of greenhouse gases in the inventory. In evaluating electricity use it is more appropriate to present results on the building and program level as opposed to the department level. The largest source of greenhouse gas emissions in this sector is related to the emissions associated with the tribal community (Table 4).

Table 4 – A table of selected programs within the Suquamish Tribe that have significant electricity related greenhouse gas emissions.

Category	CO2	CH4	N2O	Total
Tribal community	2082	5	7	2094
Administration buildings	346	1	1	348
Elders Assistance Program	524	1	2	527
Housing Program	262	1	1	264

Relatedly, the Elders Assistance Program where utility bills are paid for elders and the robust housing program of the Department of Community Development emit significant amounts of greenhouse gases. Based on utility bills paid for by the Tribe's Finance Department, emissions related data can be presented at a finer program and facility-related scale (Figure 7). The results presented in this figure will assist in targeted greenhouse gas reductions by improving building efficiency and HVAC systems.

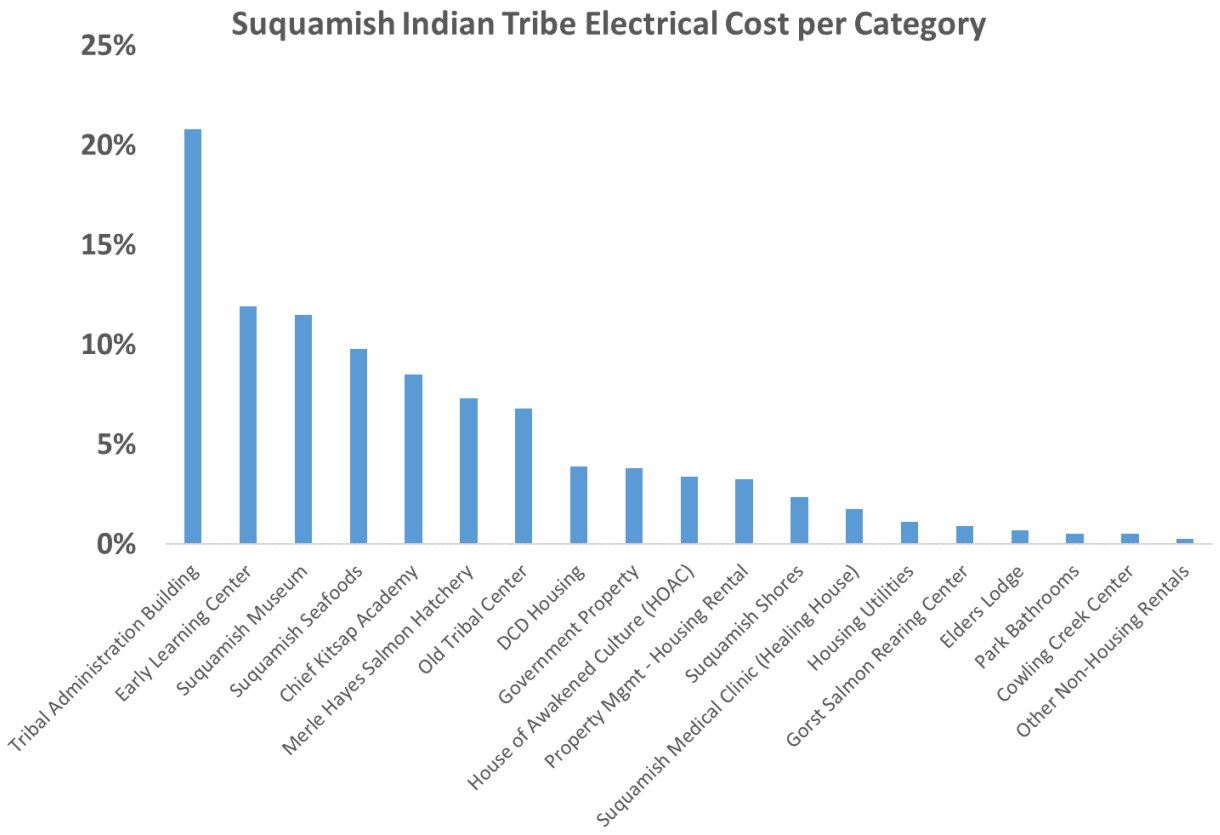


Figure 7 – A figure indicating the percentage of electricity usage by facility and program based on utility bills.

Stationary Combustion

Stationary combustion comprises 4% of total emissions in this inventory. The majority (93%) is propane used primarily for heating buildings including tribal housing, the HOAC, and education-related buildings. The HOAC alone uses 98% of the propane. The remaining emissions in this sector are related to portable gas purchases to operate generators, lawnmowers, etc.

Wastewater

Wastewater is treated either by septic or a county-level sewer system and comprises 5% of total emissions. This is an overestimate for the following reasons. Many of the methane emissions after activated sludge treatment are combusted and the energy gained powers some of the facility. Additionally, it was indicated by Kitsap Public works that their nitrogen discharges were lower than standard treatment, although the data was not provided in time for this report. New data on these emissions will be added to the greenhouse gas inventory as provided.

Employee Commute

Emissions related to employee commuting are the second largest source of greenhouse gas emissions documented in this greenhouse gas inventory (17%). The average one-way commuting distance for tribal employees is approximately 16 miles and employees worked from home 14% of the time. Biking and walking to work only comprised 2-3% of total commutes and based on the responses in the survey

public transit is not used (Table 5). Approximately 17% of commuters were in a carpool. Overall, 87% of employees use traditional fuel. The average gasoline efficiency of employee vehicles is 24 miles per gallon. There is limited adoption of electric and hybrid vehicles. The PMIR is in a rural area and many employees commute long distances where public transportation is limited. Efforts to encourage and incentivize employees to adopt electric and hybrid vehicles can reduce greenhouse gas emissions.

Table 5 - A table of the commute type based on the employee commuter survey.

Commute Type	
Traditional Fuel	87%
Hybrid	8%
Electric	3%
Walk & Bike	2%

Urban Forestry

The PMIR is a heavily forested reservation with 84% forest cover on trust land within the reservation boundaries. According to this greenhouse gas inventory, the forests on the reservation sequester almost three times the greenhouse gases released that are documented in this inventory. These forests are an important sink for greenhouse gases. Because so much of the PMIR is forested, there is little room for improvements in this sector to sequester more greenhouse gases. Nevertheless, management of intact forests provides an important ecosystem service.

3.2 GHG Reduction Measures

The reduction of greenhouse gases will happen through direct and indirect actions. Climate mitigation strategies are being designed and implemented to develop programs that reduce tribal greenhouse gas emissions. Priority GHG Reduction programs are outlined below:

Measure 1: Installing fully subsidized ductless heat pumps for Elders (phase 1), followed by a needs-based expansion to the broader tribal community within Kitsap County (phase 2).	**Implementing agency**	The Suquamish Tribe
	Implementation schedule	May 2024-September 2025 (Phase 1) September 2025- May 2029 (Phase 2)
	Implementation milestones	Tribal Council approval, contractor selection, installation start, installation completion
	Geographic location	The Suquamish Tribal land
	Funding sources	Climate Commitment Act Funds, Home Electrification and Appliance Rebate Program, Tribal Home Electrification and Appliance Rebates Program, CPRG Implementation funds.

	Metrics tracking	Annual savings, ductless heat pumps installed, greenhouse gas emissions reduced utilizing the greenhouse gas inventory.
	Cost (optional)	approximately $652,400 for ductless heat pump installation (Phase 1) Weatherization Services TBD TBD (Phase 2)
	Annual estimated GHG and criteria air pollutant emission reductions	1,230 MT CO_2 e
	Applicable sector	Electricity generation and consumption
	Implementation authority	The Suquamish Tribe and individual tribal homeowners. The program will be extended to a significant number of houses owned by the tribe but not to rentals owned by non-tribal members.

Electricity generation is the largest documented source of greenhouse gas emissions from tribal operations, encompassing 65% of total greenhouse gas emissions (Table 1). Stationary combustion in the form of propane is used in tribal government buildings (4% of emissions, table 1) and in the homes of an unknown number of community members. The Elder's Assistance Program is a program to pay the utility bills of over 100 elders in Kitsap County. This program alone produces 527 MT CO_2 e. Reducing the greenhouse gases in this sector by improving the efficiency of HVAC systems, as well as providing air conditioning for tribal elders and the community will benefit the climate resilience of the tribe and significantly reduce greenhouse gases.

Measure 1 is to provide fully subsidized ductless heat pumps to our community members living within the reservation boundaries. The Suquamish Tribe has 56 elders that currently live on the reservation and more within Kitsap County, these elders will be the primary focus of Phase 1* of the ductless heat pump program. The Human Services Department currently subsidizes the utility bills of over 100 tribal members throughout Kitsap County. Community outreach will be conducted to provide education and evaluate the interest level of elders in participating in this program. One of the first steps of our community outreach program is to install ductless heat pumps in one or more of the homes owned by the tribe and managed by the Department of Community Development. These will serve as showcase homes to demonstrate the utility of ductless heat pumps and provide buy in for our tribal member partners.

Next, the Climate Division will solicit bids following our procurement policy to determine the best candidate. Once a candidate has been selected, home evaluations will be conducted to determine which homes are eligible for ductless heat pump installation. Once installation has been completed, the Suquamish Tribe will subsidize all routine care and maintenance for program recipients. These

installations will significantly improve home-owner's comfort levels, reduce emissions, improve indoor and outdoor air quality, and lower bills. According to the Department of Energy, ductless heat pumps have the potential reduce electricity use by up to 50% compared to furnaces and baseboard heaters, and depending what heating equipment participants are upgrading from, save up to 7.6 tons of carbon emissions per year. Energy usage reductions were calculated by determining the average kWh usage of tribal homes. PSE provided aggregate energy usage based on actual meter readings for the 449 homes that are on trust land within PMIR boundaries. This was used to calculate a per-home energy usage. With a goal of 254 homes for Phase 1 (54 Elders) and Phase 2 (200 Homes), an estimated 55% of electricity usage due to HVAC systems Energy.gov, and 50% reduction resulting from heat pumps (the Department of Energy) an estimate of the kWh reduced can be calculated. Greenhouse gas emissions reductions were calculated by using the EPA AVERT tool. Depending on the size of each elder's home, the climate, and how energy efficient the rest of the home is, installation of a ductless heat pump also has the potential to save an average of over $500 per year. Designing, producing, installing, and maintaining energy-efficient heat pumps also helps support job creation.

To enhance the benefits of this program, weatherization services will also be provided to each impacted home. Each home will be evaluated to determine whether improvements, such as installations or caulking, are needed to reduce air leakage and make the home more energy efficient.

This program will also support workforce development. As part of the bid process, candidates will be required to allow interested tribal members to shadow their installations and receive onsite experience. The Tribe will also provide free training opportunities for tribal members to become certified in ductless heat pump installations and maintenance and Building Analyst training.

*After Phase 1 of the Ductless Heat Pump Program is completed, it will be opened to the remaining tribal members who live within Kitsap County. Within the areas of Suquamish, Poulsbo and Indianola there are 201 tribal members (excluding elders) who are eligible for a home evaluation. On a first come, first serve basis, these remaining members will follow the steps outlined above in rounds of 50 households each. The goal of Phase 2 is for these installations to be completed by a tribal member who has participated in the workforce development program mentioned above.

Measure 2: Providing improvement to Tribal buildings to make properties more energy efficient. Tribal buildings include tribal administration, education, and the rentals and homes owned by the Suquamish tribe and managed by the community development department.	**Implementing agency**	The Suquamish Tribe
	Implementation schedule	June 2024- July 2025
	Implementation milestones	Tribal Council approval, contractor selection, site evaluation, renovation start, renovation completion.
	Geographic location	The Suquamish Tribe tribal land
	Funding sources	CCA funds, CPRG Implementation funds.
	Metrics tracking	Number of homes and buildings with energy audits completed, number of buildings with efficiency concerns fixed, greenhouse gas emissions

		reduced as measured by the greenhouse gas inventory.
	Cost (optional)	TBD
	Annual estimated GHG and criteria air pollutant emission reductions	138 MT CO_2 e for HOAC propane replacement with Heat Pump, Increased gains from other buildings.
	Applicable sector	Electricity
	Implementation authority	The Suquamish Tribe

Improvements to energy efficiency can reduce greenhouse gas emissions of tribal buildings related to administration, education, fisheries, and the extensive community development housing program. The tribe owns and operates over 200 homes that house tribal members, which are managed through the community development program. Measure 2 focuses additional efforts on the stationary combustion and electricity generation of tribally owned and operated buildings. Heating and cooling of buildings accounts for a substantial portion of the Suquamish Tribe's annual greenhouse gas emissions. Research is currently being conducted in partnership with the University of Washington to determine the efficiency of several tribal buildings, including the House of Awakened Culture (HOAC) and the Suquamish Museum (Figure 7). The museum building encompasses 12% of electricity consumption in the tribal government. The HOAC is an important cultural center and long-house building, which consumes 3% of the tribe's electricity needs as well as 97% of propane use. There is existing funding and plans to modify this building to serve as an emergency center to increase climate resilience and ensure the safety of the Suquamish community. Emissions reductions in this sector were primarily calculated based on switching the HOAC from a propane system to more efficient HVAC systems. The US Energy Information Administration (EIA) indicates that one gallon of propane contains 27 kWh for heating. The HOAC consumed 23,985 gallons of propane in 2023. The US Energy Information Administration indicates that 12.68 lbs of CO_2 are released per gallon of propane. Based on a study by the Rocky Mountain Institute switching a gas furnace to a heat pump on average will reduce greenhouse gas emissions in Washington state by 52%. Greenhouse gas reductions were calculated as the emissions reductions from converting the HOAC from a gas furnace to a heat pump. Expected reductions through improved efficiency of smaller buildings are likely to increase this estimate.

This research, accompanied by further studies, will be utilized to determine which building decarbonization strategies are most suited for each building. Strategies include, but are not limited to, replacement of current heating and cooling systems, improvements to building's installation, and retrofitting buildings with energy efficient fixtures. These improvements will improve building efficiency, reduce associated costs, and significantly reduce tribal emissions. Beyond emissions reductions, improving the energy-efficiency of buildings can lead to reductions in air pollution leading to public health benefits, cost savings from reduced energy use, indoor air quality improvements, increased comfort in cold and warm seasons, and job creation.

	Implementing agency	The Suquamish Tribe
	Implementation schedule	January 2026-December 2029

Measure 3: Installation of solar panels and solar charging on tribal buildings	**Implementation milestones**	Tribal Council approval, secure funding, contractor selection, installation start, installation completion
	Geographic location	The Suquamish Tribe tribal land
	Funding sources	EPA, CCA, DOE, PSE
	Metrics tracking	kWh production, greenhouse gases reduced as determined by the greenhouse gas inventory
	Cost (optional)	$2,700,000.
	Annual estimated GHG and criteria air pollutant emission reductions	364 MT of CO_2
	Applicable sector	Electricity
	Implementation authority	The Suquamish Tribe

Measure 3 focuses on installing solar panels on rooftops of Tribal Government buildings. In 2022, the Suquamish Tribe commissioned the National Renewable Energy Lab to conduct a solar energy feasibility study for roof-top solar installation on government buildings. The study identified a total PV capacity of 1,109 kW_{dc} that could be installed on suitable south-facing roof surfaces. The estimated first year total output of these arrays is roughly 1,064,000 kWh per year. This is approximately 75% total 2020 Tribal government consumption, which was 1,427,285 kWh for all buildings. The total estimated capital cost of putting solar PV systems on each suitable building identified in the analysis was $2,765,000. With support from Puget Sound Energy, the Suquamish Tribe installed small solar panel arrays at the Fitness Center and at Chief Kitsap Academy, a secondary school operated by the Suquamish Tribe. In total, 42.6 kW of production was installed and to date, 57 MWh of electricity has been produced. These sites were chosen to promote public awarenesses of the benefits of solar power. Concepts around sustainability and alternative energy production are being incorporated into several courses at CKA to increase interest in these emerging career options.

The Suquamish Tribe is currently evaluating several other tribal buildings for their potential as solar panel and solar battery charging locations. For example, in partnership with the University of Washington, feasibility studies are currently being conducted for the Museum and the HOAC. Additionally, in conversation with PSE the Suquamish Tribe is discussing coupling solar panel installation with significant battery storage. In high density applications (e.g. HOAC, Administration, Housing developments), the solar-battery systems have the potential to serve as microgrids and/or distributed energy resources to improve the Tribe's energy independence and climate resilience. Whereas distributed energy systems will be more applicable for individual households, and isolated buildings. Greenhouse gas reduction estimates were based on the greenhouse gas inventory, the NREL (National Renewable Energy Laboratory) solar study, and estimates from the EPA AVERT tool.

This program will have a significant focus on workforce development in partnership with Human Services as outlined below in section 3.6. This department has an existing workforce development program and the solar program and ductless heat pump programs will be coordinated with workforce development.

Measure 4: Electrification of tribal fleet and facilitating the transition to electric vehicles for employees and the community.	**Implementing agency**	The Suquamish Tribe
	Implementation schedule	January 2025-December 2029
	Implementation milestones	Tribal Council approval, contract discussions with Enterprise, reduction of current fleet, installation of chargers, transition to EV
	Geographic location	The Suquamish Tribal land
	Funding sources	Climate Pollution Reduction Grant- Implementation for Tribes, Washington State Department of Commerce- Tribal Clean Energy, Puget Sound Energy, EPA Clean School Bus Rebate Program
	Metrics tracking	Number of fleet vehicles electrified, number and type of EV chargers installed, and greenhouse gas emissions reductions as calculated by the greenhouse gas inventory.
	Cost (optional)	TBD
	Annual estimated GHG and criteria air pollutant emission reductions	180 MT CO_2 e
	Applicable sector	Mobile transportation
	Implementation authority	The Suquamish Tribe

Greenhouse gas emission from employee commuting and the fleet of vehicles operated by the Suquamish Tribe are responsible for 27% of total greenhouse gas emissions combined. Additionally, these vehicles contribute to high levels of pollutants such as fine particulate matter and nitrogen oxides and toxic air pollutants such as diesel particulate matter that contribute to the public health challenge for nearby communities. The Suquamish Tribe is located in a rural area which presents challenges for public transit adoption, and bike/walk to work programs. The emissions associated with the tribal community were not included in the greenhouse gas inventory. Due to limited access to grocery stores and other services on PMIR, these emissions are likely to be sizeable. Measure 4 aims to reduce these pollutants by decreasing the number of internal combustion engine vehicles and replacing them with electric vehicles. The Tribe currently utilizes Enterprise to rent and manage the majority of the vehicles in our fleet. Working with them we will terminate and amend existing contracts to decrease the number of unnecessary vehicles and shift many of the remaining vehicles to electric. Additionally, we will secure funding to place DC Fast chargers to operate the fleet. Due to particular agency needs, such as hauling heavy loads, not all vehicles will be eligible.

Greenhouse gas emissions reductions were determined using the AVERT tool based on current number of ICE vehicles (109) and a goal to reduce the fleet to 65 vehicles and convert them to EVs. Additionally, this includes 4 electric school buses.

Measure 5: Creation of an electric car-share program for tribal members.	**Implementing agency**	The Suquamish Tribe
	Implementation schedule	Beginning in July
	Implementation milestones	Tribal Council approval, selection of vehicle, marketing, implementation
	Geographic location	The Suquamish Tribal land
	Funding sources	State of WA CCA funds, CPRG infrastructure
	Metrics tracking	Number of total and unique trips, mileage travelled. Participants will complete a survey to estimate frequency of EV use.
	Cost (optional)	TBD
	Annual estimated GHG and criteria air pollutant emission reductions	X x MT CO_2 e; additional undocumented emissions reductions should occur from adoption of EV vehicles after utilizing the ride-share.
	Applicable sector	Electricity generation and consumption
	Implementation authority	The Suquamish Tribe

Measure 5 focuses on providing education and opportunity for our tribal members through an electric car share program. Facilitating the adoption of electric vehicles among employees and the tribal community is a significant challenge. Only 8% of employees drive hybrid vehicles, and 3% drive electric vehicles (Table 5). There are legitimate concerns about the limited number and types of vehicles, as well as the charging infrastructure and range anxiety. It is likely that the charging times, range, and vehicle technology will continue to improve, and the Suquamish Tribe is planning to be at the forefront of electric vehicle adoption. To meet goals set by the State of WA to phase out gas vehicles by 2035, charging infrastructure needs to significantly improve and the switch to electric vehicles needs to be demystified. To achieve these goals the Tribe is in the process of securing funding to place EV chargers at various public buildings, gas stations, etc. and even convert school buses to electric. Interestingly, the school buses will be 2-way vehicles that will be able to serve as a battery powered generator for the schools during outages.

One electric vehicle will be housed at the Tribal Administration Building and available for community members and staff to check out and rent at no cost. After providing their driver's license and registering for an allotted period, participants will be able to utilize this vehicle for a variety of daily activities. Such

as getting to and from work, running errands, or even picking up their children from school. This program will aim to dispel many of the concerns that community members currently have regarding electric vehicles and provide a useful service to those tribal members without access to a vehicle. Participants will experience the benefits of an electric vehicle without paying the high upfront costs, leading to an increased likelihood that they will purchase their own electric vehicles in the future. Due to the rural nature of the PMIR, this car share program will also allow many of our community members the opportunity to run their day-to-day errands without the need to exert unnecessary emissions. To increase participation and comprehension of the car share program, assigned staff members will provide technical support and education to participants. Emissions reductions for this program are difficult to estimate because it is uncertain the mileage that will be driven. Additionally, one significant benefit from this program will result from broader adoption of EV vehicles, after some of the concerns are alleviated from the ride-share program.

It was challenging to quantify the exact greenhouse gas emissions reductions for this program with any degree of certainty, thus we have not attempted to quantify it in the above chart. However, the intangible benefits of encouraging EV adoption among the tribal community are anticipated to be extremely significant. As part of this measure, we will determine through data collected the utility of this approach. This will be compiled based on actual miles traveled and surveys on the potential for adoption of an EV vehicle.

Table 6 – Projected Greenhouse Gas Reductions from Priority Measures

Measure 1 – Heat Pumps in Tribal Homes	*1,230 MT CO_2e*
Measure 2 – Energy Efficient Improvements in Tribal Buildings	*138 MT CO_2e*
Measure 3 – Solar Energy on Tribal Government Buildings	*457 MT CO_2e*
Measure 4 – Switching the Fleet to EV	*180 MT CO_2e*
Measure 5 – EV Ride Share Program	*Uncertain*
Total Emissions Reductions	*2,005 MT CO_2e*

3.3 Benefits Analysis

Co-pollutant benefits are provided for each measure using the EPA AVERT web tool. As with the greenhouse gas inventory the base year was 2023. Data supplied to the AVERT web tool is based on sources documented in the greenhouse gas inventory as well as details provided below for each measure.

Measure 1

Measure 1 is expected to reduce atmospheric pollutant loading by reducing the annual energy usage of the tribal community. Energy usage reductions were calculated using methods described in Section 3.2 above and the information was entered into the AVERT too.

Table 7 – Projected Co-Pollutant Benefits from Measure 1 based on data from the EPA AVERT tool.

	Original	Post Change	Change
Generation (MWh)	117,886,750	117,885,530	-1,230
Total Emissions from Fossil Generation Fleet			

SO2 (lb)	72,180,720	72,180,240	-470
NOX (lb)	109,484,910	109,484,030	-880
Ozone Season Nox	45,473,740	45,473,330	-410
CO2 (tons)	89,446,980	89,446,150	-830
PM2.5 (lb)	10,667,880	10,667,780	-100
VOCs (lb)	2,970,160	2,970,130	-30
NH3 (lb)	2,585,230	2,585,200	-30
AVERT-derived Emission Rates:	**Average Fossil**		**Marginal Fossil**
SO2 (lb/MWh)	0.612		0.384
NOX (lb/MWh)	0.929		0.713
Ozone Season Nox	0.931		0.787
CO2 (tons/MWh)	0.759		0.676
PM2.5 (lb/MWh)	0.09		0.078
VOCs (lb/MWh)	0.025		0.024
NH3 (lb/MWh)	0.022		0.025

Measure 2

The co-pollutant emissions factors were difficult to find for this metric. The major change in measure 2 is switching the HOAC from propane to a more efficient heat pump system. Although CO_2 emissions would certainly be reduced, it is uncertain if there will be other benefits to other atmospheric pollutants. Additionally, the uncertain nature of the buildings which would undergo efficiency improvements would make this metric difficult to quantify. The greenhouse gas emissions reductions were quantified using methods as described above in Section 3.2 (138 metric tons).

Measure 3

According to a NREL study done for Suquamish Tribal buildings completed in 2022 and described previously, the tribe has the capacity to generate 1,064,000 kWh per year from solar on tribal government buildings as described in Section 3.2. Based on these inputs the AVERT model was used to calculate emission reductions.

Table 8 – Projected Co-Pollutant Benefits from Measure 2 based on data from the EPA AVERT tool.

	Original	**Post Change**	**Change**
Generation (MWh)	117,886,750	117,884,310	-2,450
Total Emissions from Fossil Generation Fleet			
SO2 (lb)	72,180,720	72,179,760	-960
NOX (lb)	109,484,910	109,483,130	-1,780
Ozone Season Nox	45,473,740	45,472,710	-1,030
CO2 (tons)	89,446,980	89,445,320	-1,670
PM2.5 (lb)	10,667,880	10,667,680	-200
VOCs (lb)	2,970,160	2,970,110	-60
NH3 (lb)	2,585,230	2,585,170	-60
AVERT-derived Emission Rates:	**Average Fossil**		**Marginal Fossil**
SO2 (lb/MWh)	0.612		0.393
NOX (lb/MWh)	0.929		0.726

Ozone Season Nox	0.931	0.796
CO2 (tons/MWh)	0.759	0.682
PM2.5 (lb/MWh)	0.090	0.080
VOCs (lb/MWh)	0.025	0.024
NH3 (lb/MWh)	0.022	0.025

Measure 4

Measure 4 will reduce the combustion of gasoline and diesel in internal combustion engines and replace the fleet with electric vehicles. Currently there are 109 vehicles in the Suquamish fleet. There are currently plans to reduce the fleet and manage the vehicles on an as-needed basis. Inputs to the AVERT model were generated based on transitioning 109 ICE vehicles to 65 EVs and replacement of school buses as described above under Section 3.2.

Table 9 – Projected Pollutant Benefits from Measure 4. Shown in the table below are net emissions reductions from transitioning the tribal fleet from 109 vehicles to 65 vehicles and 4 school buses. Data is based on the EPA AVERT tool.

Table 9 – Projected Co-Pollutant Benefits from Measure 4 based on data from the EPA AVERT tool.

	EV-induced Power Plant Emissions	Internal Combustion Engine Replacement Emissions	Net EV Reduction
Generation (MWh)	220		
Total Emissions from Fossil Fuel Fleet			
SO2 (lb)	80	-	-
NOX (lb)	160	-750	-590
CO2 (tons)	150	-330	-180
PM2.5 (lb)	20	-20	0
VOCs (lb)	10	-410	-400
NH3 (lb)	10	-70	-60

Measure 5

We were unable to directly quantify either the greenhouse gas reductions or the other pollutants reduced from this program as described in Measure 5 previously.

A summary of the main pollutants reduced for all measures is shown below in Table 10.

Table 10 – A summary of the main co-pollutant benefits from the priority measures.

	SO_x	NO_x	PM 2.5	VOC
Measure 1 – Heat Pumps in Tribal Homes	*470*	*880*	*100*	*30*
Measure 2 – Energy Efficient Improvements in Tribal Buildings	-	-	-	-
Measure 3 – Solar Energy on Tribal Government Buildings	*960*	*1780*	*200*	*60*
Measure 4 – Switching the Fleet to EV	-	*590*	-	*400*

Measure 5 – EV Ride Share Program	-	-	-	-
Total Emissions Reductions	*1,430*	*3,250*	*300*	*490*

3.4 Review of Authority to Implement

The Suquamish tribe is a sovereign government with direct authority over the PMIR. This authority is vested in the elected Tribal Council. Significant activities on the reservation require Tribal Council approval via Tribal Council Resolution. This approval is subsequent to approval by the Finance Director, Legal Director, and the Executive Director of the Suquamish Tribe.

The property within the boundary of the PMIR forms a *checkerboard* reservation with two large sub-blocks (i.e. Suquamish, Indianola). Throughout the reservation boundaries there are properties in trust status and fee status. Activities which influence *trust* land are managed by the Suquamish Tribal Government. GHG emissions reductions projects that bypass, or impact *fee* lands would need permission from the owner. A significant portion of the housing is owned by the government and managed by the Department of Community development.

The roads within the reservation are managed by outside government agencies (i.e. Washington Dept. Of Transportation, Kitsap County) and the electrical utility is owned and managed by Puget Sound Energy. Any activities involving infrastructure crossing roads or electrical infrastructure would require permissions and partnerships with the agencies.

Measure 1 will initially be focused on tribal elders living on trust land and the homes owned by the government and operated by the Suquamish Tribe. Many of the elders live in subsidized housing. Authority to implement for housing owned by the Suquamish Government is vested in the Tribal Government. Authority to implement for homeowners living on trust land is also vested in the allotment owners themselves. The most significant milestone will be the outreach and education program to encourage adoption of heat pumps. This will include demonstration homes and community events. Although these efforts will be ongoing, this effort is the climate change program's first priority and should be initiated before the end of the year.

Authority to implement measure 2 will be similar in nature to Measure 1. Authority for the large Tribal Government buildings, and homes owned by the Tribe, is vested in the Tribal Council and Executive Director. Individual homeowners will require permission. The outreach and education efforts will be coupled with Measure 1 above.

Authority to implement measure 3 and 4 rests solely with the Suquamish Tribal Government. These are both ongoing programs and authority has already been granted by tribal council and the executive director.

Authority to implement measure 5 also is vested in the Suquamish Tribal Government. Although this will likely require a partnership with Puget sound energy as well as an EV installer. Insurance concerns will have to be taken into account as well.

3.5 Identification of Other Funding Mechanisms

To achieve the various outlines goals of the PCAP, the Suquamish Tribe must not rely exclusively on the funding of the Climate Reduction Policy Grant (CRPG). Additional anticipated funding mechanisms are included below:

- Climate Pollution Reduction Grants Program: Implementation Grants General Competition. Due April 1, 2024. $2million-$5,000,000. POP 2024-2029
- Climate Pollution Reduction Grants Program: Implementation Grants Competition for Tribes and Territories. Due May 1, 2024. $1,000,000-$25,000,000. POP 2024-2029
- Clean Energy Technology Deployment on Tribal Lands- 2024 No deadline yet. $2,000,000
- Washington State Electric Vehicle Charging Program- Granted- 1,080,000. Project includes DCFC at two locations for the public and Level two charging at 6 locations for workforce charging.
- Grid Resilience Formula Grant- $148,054 Award + $148,054 match from PSE + 15% Match Suquamish Tribe, solar batteries at CKA
- Home Electrification and Appliance Rebates Program for Tribes- $334,754. Ductless heat pumps
- PSE Green Power Solar- Approximately $300,000. Has put solar on the Friends and Family Center 2021, the Carving Shed at Chief Kitsap Academy (CKA) 2022. Will put solar on the Tribal Administration building in 2024. Partially funds solar at the Early Learning Center. This project timeline is TBD.
- Solar Plus Storage for Resilient Communities- $192,000 awarded for planning for back up battery storage at HOAC and the Admin building.
- Climate Commitment Act- These are on the spreadsheet (Lines 1-3) and TBD
- Healthy Environment for All Act Capacity Grant Program- on the Spreadsheet. This grant funds a HEAL Act Program Manager to help facilitate communication with local, state and federal agencies regarding the tribe's disproportionate health impacts due to the effects of climate change
- Inatai Fund for Sovereign Nations- $150,000 over 3 years. TBD
- Energy Efficiency and Conservation Block Grant- $10,440. Level 2 chargers

4 Next Steps

Implementation of the actions outlined in this PCAP will start with continued learning by staff and the community to gain a shared understanding of the options and limitations of each of the carbon reduction measures. Recommendations on which measures to be implemented when, where, and by whom, will be based on that knowledge. A Community Engagement position will be created to facilitate community involvement in the recommendations, ensuring an effective and expeditious process. The information collected on each measure and the strengths and vulnerabilities of the community will be stored in a GIS-based information system with public access to appropriate materials.

Climate change impacts all sectors of the Suquamish Tribe and the environment it is an integral part of. A variety of types of information are required to design effective adaptation actions, including the types of impacts, how and when they might emerge, the vulnerabilities of each tribal sector to each impact and the resources available and required to respond to potential impacts. Gathering that information is an ongoing process, and the information will be used to guide the many decisions required to adapt to climate change. Awareness of potential impacts is needed to identify vulnerability, so an early step will

be to disseminate information through school, workshops, social media and other opportunities. Workgroups comprising staff and tribal members involved in different community sectors will be established to facilitate the back and forth required to inform and receive community feedback. Once gathered, climate change impact and vulnerability data will be used to develop potential strategies and actions to include in the CCAP. In addition, as members of the tribal community learn about climate change impacts, how to identify vulnerabilities, and about the resources available to mitigate those vulnerabilities, tribal members will be better equipped to identify and adopt climate solutions that address their specific needs.

5 Appendix

Appendix 1: Climate Pollution Reduction Grants Program: Tribal Quality Assurance Project Plans – EPA Approved, Feb 2024. Found at the following link.

Appendix 2: Sherralyn Sneezer, NREL Suquamish PV analysis, 2022. Produced with support from the Department of Energy's Office of Indian Energy (DOE-IE) tribal technical assistance (TA) program. Found at the following link.