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# 2024

# PRIORTY CLIMATE ACTION PLAN

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| Rev.1 5/1/2024 | |
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## Wampanoag Tribe of Gay Head (Aquinnah)

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# Acronyms & Definitions

| | |
|---|---|
| BIA | U.S. Bureau of Indian Affairs |
| CAP | Criteria air pollutants |
| CCAP | Comprehensive Climate Action Plan |
| $CH_4$ | Methane, a greenhouse gas pollutant |
| CLC | Cape Light Compact, JPE |
| $CO_2$ | Carbon Dioxide, a greenhouse gas pollutant |
| $CO_2e$ | Carbon Dioxide equivalent, "the number of metric tons of CO2 emissions with the same global warming potential as one metric ton of another greenhouse gas" |
| CPRG | Climate Pollution Reduction Grant |
| CVEO | Cape & Vineyard Electrification Offering |
| DOE | U.S. Department of Energy |
| EPA | U.S. Environmental Protection Agency |
| GHG | Greenhouse gas |
| HAP | Hazardous air pollutants |
| IRA | Inflation Reduction Act |
| kWh | Kilowatt hours, a measure of electricity: one kilowatt of power over one hour of time |
| MassDEP | Massachusetts Department of Environmental Protection |
| NEI | National Emissions Inventory |
| $N_2O$ | Nitrous Oxide, a greenhouse gas pollutant |
| NRD | Natural Resources Department |
| PCAP | Priority Climate Action Plan |
| QAPP | Quality Assurance Project Plan |
| RAP | Resilience and Affordability Plan |
| SCC | Sea Change Consulting |
| VP | Vineyard Power |
| WTGHA | Wampanoag Tribe of Gay Head (Aquinnah), also denoted as "The Tribe" within this document |

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# Executive Summary

Mitigating climate change has been identified as a top priority by the Wampanoag Tribe of Gay Head (Aquinnah) (WTGHA), as its impacts are disproportionately felt both as residents of an island, and as members of a Native American Tribe.[1] The purpose of the Priority Climate Action Plan (PCAP) is to identify near-term, high-priority, and implementation-ready measures that will analyze the Tribe's greenhouse gas (GHG) emission reductions and contribute to reducing the Tribes' GHG pollution. The PCAP is a prerequisite for applying to any EPA Climate Pollution Reduction Grant (CPRG) implementation grants.

The PCAP expands upon the Tribe's Climate Climate Adaptation Plan and elicited direct engagement with Tribal staff, leadership, and the greater community to refine priority measures.

The WTGHA is on the island of Noepe, also known as Martha's Vineyard. Being on an island means there is increased concern about the impacts of climate change. Our oceans are warming and becoming more acidic, contributing to habitat loss and impacting industries such as fishing; we're seeing more frequent and intense storms and flooding, leading to erosion of our beaches and dunes; sea levels are rising, causing destruction to both our built and natural environments.[2] These hazards are identified in the Tribe's Climate Adaptation Plan[3]. This geographic consideration underscores the importance and urgency of the Tribe to implement solutions, outlined in the PCAP, aimed at reducing carbon emissions and addressing climate change.

Tribal Departments and members identified the following GHG emission sources as priorities:

- Increasing energy efficiency, improving air quality, and reducing mold in all Tribal buildings; retrofitting buildings with energy efficient heating and cooling technology;
    - *Reduction measures*: Weatherize (i.e. insulate, air seal) all residential buildings and retrofit electric heat pump heating, cooling, and hot water systems.
    - *Authority to Implement*: Tribal Housing Authority, Tribal Council
- Deploying solar and battery storage projects on Tribal housing, Tribal buildings, and wherever feasible, to increase renewable energy production and resilience;
    - *Reduction measures*: Install solar on the Wampanoag Environmental Lab, Community Center, Administration Building, Wastewater Facility, and other available public spaces (i.e., parking lots), and install rooftop solar to match demand for all residential units.
    - *Authority to Implement*: Tribal Housing Authority, Tribal Council

All other GHG reduction measures, including carbon sequestration and nature-based actions will be explored in a Comprehensive Climate Action Place (CCAP) that will be developed through 2024.

1 "Climate Change and the Health of Indigenous Populations," Climate Change Impacts, accessed March 25, 2024, https://www.epa.gov/climateimpacts/climate-change-and-health-indigenous-populations.

2 "Climate Change on Martha's Vineyard," Martha's Vineyard Climate Action Plan, accessed March 25, 2024, https://www.thevineyardway.org/category/climate-change-on-martha-s-vineyard.

3 Wampanoag Tribe of Gay Head (Aquinnah) Natural Resources Department, "Climate Change Adaptation Plan" (Aquinnah: Martha's Vineyard, August 25, 2023).

To fund the deployment of these measures, the Tribe plans on applying for the EPA's CPRG Implementation grants, in addition to taking advantage of other local, state, and federal level grant programs.

# 1 Introduction

The Wampanoag People have lived on Noepe (Martha's Vineyard) for over 10,000 years. The Wampanoag had a "traditional economy based on fishing and agriculture," which has sustained Tribal life, preserved Tribal heritage, and shaped Tribal culture for generations.[4] Today, the Tribe manages 670 acres of ancestral land, mostly on the westernmost part of the island encompassed by the Town of Aquinnah.[5] 57% of Tribal land is wetlands, 29% is forested uplands, 7% is conservation land, 5% is developed land, and 2% of the land is designated for marine non-residential use.[5] The Wampanoag's land is almost entirely undeveloped, with 325 acres classified as "restricted from development."[5] The Aquinnah Cliffs, Herring Creek, and Common Lands (Cranberry Land) make up the restricted lands and are managed by the Tribe under the scope of natural resource conservation, sustenance, and cultural heritage.[5] The Trust Lands are an aggregate of 345 acres consisting of forest canopies, wetlands, and Tribal development. Finally, the Interior Lands denote the developed Tribal land, hosting 33 income-qualified Tribal Housing Authority units, the Tribal Community Center, the Tribal Administration Building, centralized wells, and a wastewater treatment facility. The WTGHA's land is within Dukes County, Massachusetts.

The Tribe is a sovereign nation and governed as such by the Tribal Council. The Tribal Council comprises eleven positions – Chairperson, Vice Chairperson, Secretary, Treasurer, and seven council members – elected by the membership, as well as the Chief and Medicine Man, who serve for life. The Council is the ultimate Tribal authority and holds all decision-making responsibility associated with the Tribe, its lands, its membership, and its operations. Below the Tribal Council there are 12 commissions, made up of Council members and general membership, which exist as preliminary entities in their respective jurisdictions to vet proposed activities and support the executive functions of the Council. These commissions include Historic Preservation, Budget and Finance, Education, Health, Social Services, Christiantown Cemetery, CEDS (Comprehensive Economic Strategy), Constitution/Election, Land Use, Membership, Personnel, and Veterans.

The Tribal Council and greater Tribal membership are further supported by Tribal departments, which effectuate the decisions of the Tribal Council, execute Tribal operations, and oversee programs and services. There are fourteen Tribal departments: Administration, Economic Development, Education, Finance, Health, Housing, Membership, Natural Resources, Office Management, Personnel, Planning, Social Services, and Tribal Historic Preservation.

The WTGHA membership and overall operations are relatively small. There are approximately 1,525 registered Tribal members. Approximately 300 of the 1,525 members live on Martha's Vineyard across

4 "Wampanoag History," Wampanoag Tribe of Gay Head (Aquinnah), accessed March 25, 2024, https://wampanoagtribe-nsn.gov/wampanoag-history.

5 Wampanoag Tribe of Gay Head (Aquinnah) Climate Change Adaptation Plan.

the six island municipalities, mostly in the Town of Aquinnah. There are 81 full time residents living on Tribal Lands in Tribal Housing.

Tribal facilities comprise the Administration Building, the Community Center, the Natural Resources Department (NRD) Laboratory, the Tribal Housing Office, 33 Tribal Housing units, the 636 State Road office, the 17 Old South Road residence, a wastewater facility, a water plant, a small informational kiosk, and a newly acquired mixed use building in New Bedford.[5]

The Tribal vehicle fleet consists of 12 vehicles. 10 are land vehicles. The remaining 2 are sea vehicles.

The Tribe, as a community, plays an active role addressing climate-change related issues. As stewards of Noepe land for hundreds of generations, a culture of living harmoniously with the land and all life it supports is integral to the Wampanoag identity. No more is this recently evidenced than by the Tribe's development and release of their Climate Change Adaptation Plan in 2023.

Therein, the Tribe identifies a series of actions to "mitigate, adapt to, and recover from the climate hazards" across Tribal departments and commissions. These include actionable items related to mitigating shoreline erosion, increasing research on sea level rise, reducing the Tribe's carbon footprint, improving air quality, encouraging food security and food sovereignty, and establishing a climate emergency management plan. Priorities listed in the Climate Change Adaptation Plan include:[6]

- Natural Resource Management: Evaluate and mitigate practices that damage eelgrass, protect and monitor herring and Herring Creek, research and develop plans for shellfish and scallop hatcheries/sanctuaries, reduce the spread of invasive species and pathogens in waterways.
- Tribal Lands: Monitoring and restoration of plant communities and wetlands.
- Housing: Increase affordable housing units, reduce flooding and improve air quality in existing units.
- Water Resources: Manage and protect WTGHA's tidal great ponds, address stormwater, nonpoint source, and runoff pollution, protect water quality and shorelines.
- Emergency Management: Ensure critical facilities are equipped for emergencies.
- Social Concerns and Community Amenities: Mitigate proximity to hazards and fuels, manage shellfish for the Tribe's sustenance and livelihoods.

The Climate Change Adaptation Plan was the "Tribe's first document solely dedicated to climate change."[7] It follows that the Tribe's subsequent steps to address climate change build from its adaptation goals to focus mitigation. Hence, the Tribe engaged EPA to participate in the Climate Pollution Reduction Grant (CPRG) process.

## 1.1 CPRG overview

A unique and unprecedented opportunity from EPA for states, municipalities, and tribes/territories, the CPRG program provides $5 billion in grants to states, local governments, tribes, and territories to develop and implement ambitious plans for reducing greenhouse gas emissions and other harmful air pollution. Authorized under Section 60114 of the Inflation Reduction Act, this two-phase program provides $250 million for noncompetitive planning grants (of which $134,500 was awarded to the Tribe) and approximately $4.6 billion for competitive implementation grants. The CPRG program is part of the Biden Administration's Justice40 initiative, which sets a goal that 40 percent of the benefits of certain

6 Wampanoag Tribe of Gay Head (Aquinnah) Climate Change Adaptation Plan.

7 Ibid

federal investments flow to disadvantaged communities that are "marginalized, underserved, and overburdened" by pollution. The two phases of the grant include two deliverables: the Priority Climate Action Plan (PCAP), and a Comprehensive Climate Action Plan (CCAP) along with ongoing status reports through 2027.

The purpose of the PCAP for the Tribe, as its design indicates, is to produce a plan to execute actionable measures that will enable the Tribe to achieve meaningful GHG reductions, improve air quality and living conditions for Tribal residents, secure Tribal-owned, local, renewable generation assets, and increase resilience.

## 1.2 PCAP Overview and Definitions

This PCAP offers a GHG inventory, identifies priority GHG reduction measures, and estimates the quantitative GHG reduction impacts of the priority measures. The PCAP then details a benefits analysis with regard to decreases in co-pollutants in relation to county-wide data, reviews the authority to implement, and identifies potential funding mechanisms for the priority measures.

Given the relatively small size of the Tribal population and operations on Martha's Vineyard, the availability of GHG emissions data from listed U.S. EPA resources are limited. Therefore, virtually all raw data collected for the PCAP can be categorized under the 'Fifth' Quality Rank level listed in the Tribal QAPP for the WTGHA.[8] This posed challenges throughout the GHG inventory process, as data collection required coordination across multiple Tribal departments while data availability and quality necessitated assumptions and the application of energy consumption averages for various subsectors. Details regarding data collection and GHG accounting are provided in Section 2.1.

Nevertheless, once collected and analyzed utilizing the EPA Community GHG Inventory Tool, the data indicates that Stationary Combustion and Electricity Use across Tribal operations are the most significant sources of GHG Emissions, excluding personal vehicle use.

See Figure 1 below for Net Emissions by Source and Gross Emissions by Source.

8 Wampanoag Tribe of Gay Head (Aquinnah) Natural Resources Department and Elizabeth Finn, "Quality Assurance Project Plan for The Wampanoag Tribe of Gay Head (Aquinnah)" (Aquinnah: Martha's Vineyard, October 20, 2023).

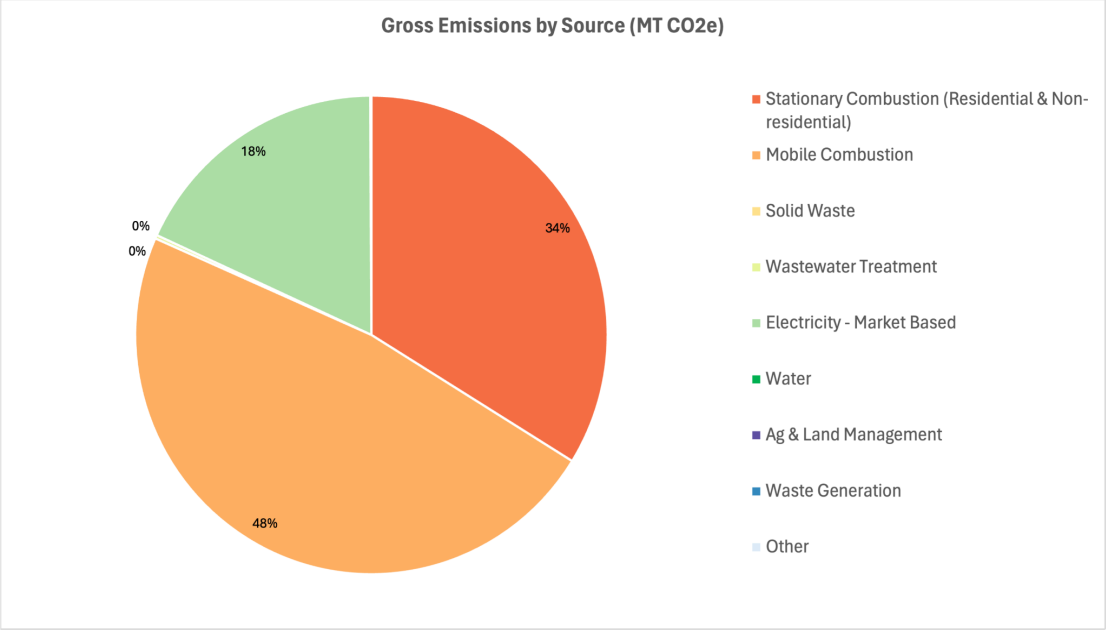


*Figure 1: Gross Emissions by Source (MT CO2e)*

It follows that the Tribe's most impactful GHG reduction measures will involve efforts to reduce Stationary Fuel Combustion and Electricity Use from carbon emitting generation sources. As such, the priority GHG reduction measures identified for this PCAP center energy efficiency work for most tribal buildings and the deployment of solar paired with battery storage. The proposed GHG reduction measures will reduce gross emissions by 240.2 MT $CO_2e$. See Table 1 below for a quantified summary of the GHG reduction measures. Calculations of quantified GHG emissions reductions are described further in Section 2.2.

*Table 1: Quantified Summary of GHG Reduction Measures*

| Source | Reduction Measure | GHG Emissions Reduced |
|---|---|---|
| Residential Buildings: Energy Efficiency and Electrification | Complete insulation and air sealing; install induction stovetops, heat pump hot water heaters, and air source heat pumps | 85.3 MT $CO_2e$ |
| Residential Buildings: Solar and Battery storage | Install solar arrays to match demand for all residential units; Pair solar with batteries for residential unit back up power | 96.0 MT $CO_2e$ |
| Non-Residential Buildings: Energy Efficiency and Electrification | Receive energy audits for all non-residential buildings, complete insulation and air sealing where recommended, replace fluorescent lighting, and install air source heat pumps and heat pump water heaters where appropriate | 27.3 MT $CO_2e$ |

| | | |
|---|---|---|
| Non-Residential Buildings: Solar | Install rooftop solar on Wampanoag Environmental Lab, Community Center, Administration Building, Wastewater Facility, and other available public space (i.e., parking lots) | 31.6 MT $CO_2e$ |

## 1.3 Approach to Developing the PCAP

The approach to developing this PCAP stemmed largely from the Tribe's established work towards climate mitigation in the form of a Climate Climate Adaptation Plan, and from direct engagement with Tribal staff, leadership, and the greater community to refine priority measures. Specifically, the Tribe's Climate Change Adaptation Plan lists the action to "reduce [the] tribal carbon footprint through reduced dependency on fossil fuels and increased use of renewable energy programming, and energy audit all tribal buildings."[9] In addition, the Climate Change Adaptation Plan sets a high priority action to "seek out funding and financing mechanisms to improve air quality and reduce mold in existing housing units."[10]

Statewide energy efficiency programming in Massachusetts is robust, and offers opportunities to reduce emissions by curtailing energy use while enhancing indoor air quality and mitigating mold.

To this end, and in advance of PCAP development, the Tribal Housing Department engaged Cape Light Compact, the regional administrator of statewide energy efficiency programming, to receive energy efficiency services for the Tribal Housing units and the Tribal Housing Office.

The GHG reduction measures included in this PCAP, therefore, are derived from this initial energy efficiency work and formalize plans to ensure energy efficiency services are provided to all Tribal Housing Units and Housing offices, as well as the remaining non-residential Tribal facilities.

In addition, the plan looks to install solar and battery storage to match demand for all Tribal Housing units, though it is still exploring the type of array to be deployed, and contemplates the possibility of solar and/or battery storage at the Tribal operations facilities.

Solar and battery storage deployment for Tribal Housing units are critical, high-priority actions. The proposed energy efficiency measures will ultimately transition the units to all-electric operations, reducing stationary fuels consumption but increasing overall electricity usage. Currently, there is no back-up generating capacity at any Tribal Housing units. This is significant for Elders, those with medical needs, and those with young children. Solar paired with battery storage addresses increased electricity usage with renewable generation and secures a renewable resilience option to support all-electric operations.

Rooftop solar deployment on non-residential buildings presents an effective use of space to secure renewable energy generation for facilities with greater electrical usage.

The PCAP development approach reaffirmed these identified priority measures in conversations with Tribal staff and Tribal leadership. Further, part of the overall PCAP/CCAP project approach includes a community outreach questionnaire that was disseminated to Tribal members and family living on Tribal property. Thequestionnaire was developed to "identify general perceptions about climate change, perceived impacts, priorities for mitigation action, and interest in learning more about ways to reduce GHG emissions." Thirty Tribal members responded to the survey, though twenty-four respondents fully completed it. While the survey will remain open to seek broader engagement and input into the CCAP,

9 Wampanoag Tribe of Gay Head (Aquinnah) Climate Change Adaptation Plan.

10 Ibid

some questions were targeted at informing the PCAP, and others provide valuable insights. The preliminary results demonstrate alignment from respondents' interests with the proposed priority measures identified in the PCAP.

- When asked to rank priorities for projects reducing GHG emissions, projects to increase energy efficiency ranked highest. Battery backup and solar storage projects were ranked second highest and carbon sequestration projects were ranked lowest.

Other findings includes:

- A high majority of respondents strongly agree (80%) or agree (13%) that climate change will impact Martha's Vineyard in the next 20 years; will affect them and/or their families a great deal; and is an urgent issue for the WTGHA.
- When asked to rank priorities for other future projects that support the reduction of GHG emissions interests were more closely distributed. Reducing solid waste and enabling local composting was ranked highest. The second highest ranking was converting the vehicle fleet to non-greenhouse gas emitting technology, followed by reducing water consumption by implementing water saving technology, and finally limiting greenhouse gas emissions generated from wastewater treatment.
- A high majority of respondents strongly agree (71%) or agree (25%) that the Tribe should act now to reduce contributions to climate change.

Agreement among Tribal staff, leadership, and participants within the Tribal community regarding priority reduction measures dovetailed with data from the GHG inventory. As indicated in Section 1.2, stationary fuels combustion and electricity use constitute the most significant Tribal GHG emissions sources. Energy efficiency, solar, and battery storage address both sources, can be deployed locally, and provide ownership opportunities for the Tribe.

Draft versions of the PCAP were circulated among Tribal staff, leadership, relevant commissions, and counsel for review, comments, and approval. Submission of this PCAP ultimately indicates agreement with the identified priorities and further validates the PCAP development approach.

### 1.4 Scope of the PCAP

The PCAP scope encompasses actionable reduction measures for facilities located on Tribal property within the geographical bounds of Tribal lands on Martha's Vineyard, as well as one additional mixed-use non-residential property in New Bedford.

# 2 PCAP elements

## 2.1 Greenhouse Gas (GHG) Inventory

The GHG emissions inventory covers sources in all Scopes (i.e. Scope 1, Scope 2, and Scope 3) for base year 2023. Scope 1 encompasses the Tribe's direct emissions from stationary fossil fuel consumption, mobile fossil fuel combustion, solid waste management, and wastewater treatment. Scope 2 describes electricity consumption (purchased from a third-party), an indirect emission source. Finally, Scope 3 describes all other indirect emissions, including agriculture & land management, forestry, waste generation, and water use.

Unless indicated otherwise, EPA's Community Greenhouse Gas Inventory Tool was used to calculate emissions by sector.

### 2.1.1 Scope 1 Emissions

#### *2.1.1.1 Stationary Combustion*

There are seven non-residential buildings and 33 residential units both on- and off-island. Tribal buildings are heated primarily with propane. The Administration Building heats with oil. The facility in New Bedford heats with natural gas. The Tribe collects data on stationary combustion from purchase records with their local vendor.

Total stationary fossil fuel emissions for 2023 were 131 MT $CO_2e$ from residential buildings and 53 MT $CO_2e$ from non-residential/institutional buildings for a total of 183.7 MT $CO_2$, 0.3 MT $CO_2e$ of methane, and 0.4 MT $CO_2e$ of nitrous oxide.

#### *2.1.1.2 Mobile Combustion*

The Tribe records fuel expenditure data by the total debited amount in each transaction (date of transaction included). However, no details about vehicle model and/or fuel price at the time are included. To determine mobile fossil fuel combustion emissions, the U.S. Energy Information Administration's (EIA) Gasoline and Diesel Fuel Update database was referenced to reconcile fuel price based on the transaction date.[11] To determine the gallons of vehicle fuel usage, the total debited amounts per purchase was divided by the relevant average price per commodity for New England within the applicable date range from EIA's database. It was determined that 214 gallons of Diesel and 265 gallons of Gasoline were purchased and consumed across all Tribal owned & operated vehicles in 2023.

Personal vehicle use from Tribal Housing residents, as well as Tribal employees commuting for work, was also considered for the GHG emission inventory. As reported by Tribal Housing, there are forty-nine personal vehicles on Tribal Land. Using the EPA Greenhouse Gas Equivalencies Calculator,[12] it is assumed that each vehicle travels approximately 11,500 miles a year. Averaging the MPG of passenger cars and light trucks on the GHG Inventory Tool, it is estimated that each personal vehicle consumes about 540 gallons of gasoline a year. In addition, there are twenty-two Tribal employees that commute to work five days per week. The Boston Region Metropolitan Planning Organization (MPO) reports that on Martha's Vineyard, the average miles per resident traveled for work is 10 miles for a total of 2,500 miles per year.[13] Each commuting employee vehicle is estimated to consume about 117 gallons of gasoline per year.

Emissions from all Tribal vehicles, personal vehicles and commuters is 259.5 MT of carbon dioxide, 0.1 MT $CO_2e$ of methane and 0.7 MT $CO_2e$ of nitrous oxide.

11 "Gasoline and Diesel Fuel Update," Gasoline and Diesel Fuel Update - U.S. Energy Information Administration (EIA), March 18, 2024, https://www.eia.gov/petroleum/gasdiesel/.

12 "Greenhouse Gas Equivalencies Calculator," Energy and the Environment, January 2024, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

13 Bill Kuttner et al., "Exploring the 2011 Massachusetts Travel Survey," MPO Travel Profiles, March 2017, http://www.ctps.org/data/html/studies/other/Travel_Modeling_101.htm.

#### *2.1.1.3 Solid Waste Management*

The Tribe has no solid waste facilities on its premises. Solid waste generated by Tribal residents and facilities is taken to a local landfill facility in Aquinnah operated by the Martha's Vineyard Regional Refuse District. No emissions related to Solid Waste Management are included in this inventory.

#### *2.1.1.4 Wastewater Treatment*

The Tribe operates a small aerobic wastewater facility, which treats wastewater from 33 Tribal Housing units, the Tribal Housing Office, and the Community Center. The wastewater facility is rated to process 18,000 gallons per day, but only processes approximately 2,500 gallons per day on average according to WTGHA data. Tribal operations are required to report monthly nitrogen concentration levels (mg N / L) from random flow samples to Massachusetts Department of Environmental Protection (Mass DEP). Monthly nitrogen concentration levels from Tribal operations were collected, converted to kg N/day, and inputted into the Community GHG Inventory Tool.

The Environmental Lab, 636 State Road, and 17 Old South Road are served by septic systems. The Administration Building is served by a Clivus composting toilet system, but, given its relatively small load, was considered a septic system for the purpose of the GHG inventory to align with the capabilities of the Community GHG Inventory Tool.

The mixed-use non-residential facility 1646 Purchase Street in New Bedford is connected to town sewer. Wastewater treatment emissions for this facility were not considered for the GHG inventory.

In 2023, 1.1 MT $CO_2e$ of methane and 0.2 MT $CO_2e$ of nitrous oxide were emitted from wastewater treatment based on 81 residents and five staff served by the wastewater facility, and 17 staff served by septic.[14, 15, 16]

### 2.1.2 Scope 2 Emissions: Electricity Use

Electricity use data for most Tribal facilities was collated from utility electrical bills. The WTGHA did not have access to all residential billing data for the base year, as some Tribal Housing residents are responsible for paying electricity costs. An average of 6,500 kWh/year, determined by available data for similar unit types, was applied to units where electrical use data was not available. The Tribe does not utilize any contractual arrangements for the purchase of electricity.

14 As stipulated by MassDEP, a flow of 55 gallons is the minimum flow required for residents. The Energy Star DataTrends Water Use Tracking Sheet indicates that the median office employee consumes 13 gallons/day in wastewater flow. The 22 staff were considered to produce the equivalent wastewater flow as five residents for the purposes of wastewater calculations.

15 "DataTrends: Water Use Tracking," Tools and Resources, accessed March 25, 2024, https://www.energystar.gov/buildings/tools-and-resources/datatrends-water-use-tracking.

16 "310 CMR 15.00: State Environmental Code, Title 5: Standard Requirements for the Siting, Construction, Inspection, Upgrade and Expansion of on-Site Sewage Treatment and Disposal Systems and for the Transport and Disposal of Septage" (Massachusetts Department of Environmental Protection, August 4, 2023).

In total, the Tribe used 399,195 kWh of electricity across all sectors in 2023, emitting 97.7 MT of carbon dioxide, 0.4 MT $CO_2e$ of methane , and 0.4 MT $CO_2e$ of nitrous oxide.

### 2.1.3 Scope 3 Emissions

#### *2.1.3.1 Water*

All facilities located on Martha's Vineyard source water from wells owned by the WTGHA. Emissions related to pumping well water on-island are accounted for in electricity consumption data (*2.1.2*). The 1646 Purchase Street property in New Bedford is the only facility that imports town water. Water consumption data for the New Bedford proper was not fully available, nor indicative of future use.[17] A measure of 75 gal/day/sqft, as stipulated by MassDEP, was used to estimate water use for the GHG inventory. The 1646 Purchase Street Property is 11,500 sqft. Total water use emissions amounted to 0.4 MT of carbon dioxide.

#### *2.1.3.2 Agriculture & Land Management*

The WTGHA has no large-scale agricultural and land management areas, thus no emissions were calculated for this sector.

#### *2.1.3.3 Urban Forestry*

The Tribe owns roughly 670 acres of land on Martha's Vineyard. To determine the percentage of urban area with tree cover, WTGHA land parcels were superimposed onto the MassGIS Prime Forest Land: Southeastern Massachusetts dataset in GIS.[18] Prime 1, Prime 2, Prime 3, Statewide Importance, Local Importance, and Unique Wetland (Atlantic White Cedar) forests were selected from the MassGIS dataset. The areas of overlap between the WTGHA lands and MassGIS dataset were identified and measured in acreage. A summation of the acreage from each overlapping area was used to calculate a total of 260.8 acres of urban forestry on Tribal Land, amounting to approximately 863 MT $CO_2e$ of carbon sequestered annually. See Figure 3 below for the overlap of WTGHA land and MassGIS data.

17 The 1646 Purchase Street property was recently acquired and is currently being retrofitted to accommodate general administration and health services for Tribal Members off island.

18 MassGIS (Bureau of Geographic Information), "MassGIS Data: Prime Forest Land," Mass.gov, January 2013, https://www.mass.gov/info-details/massgis-data-prime-forest-land.

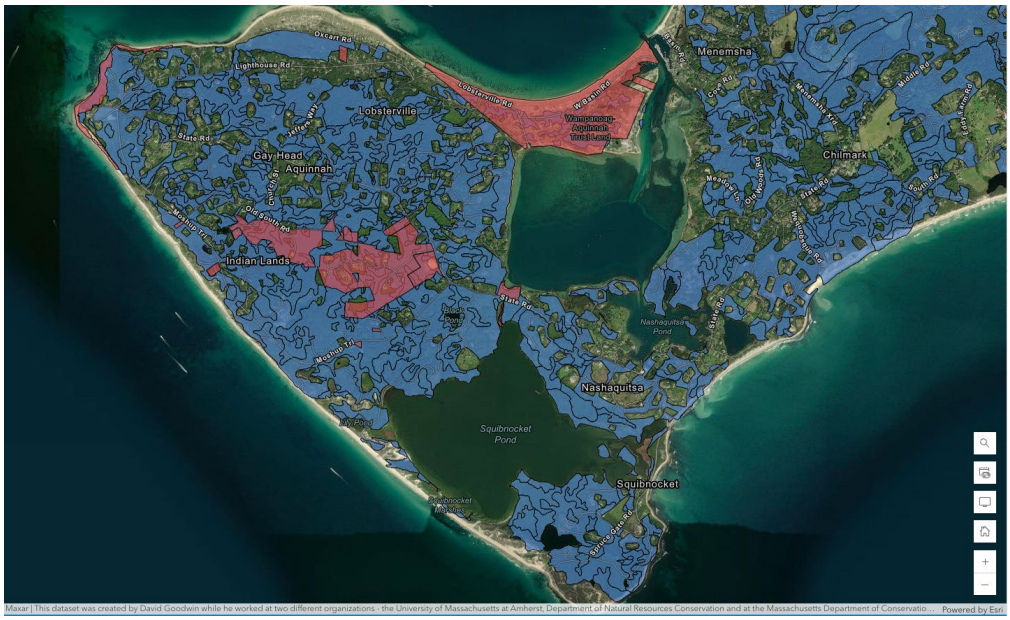


*Figure 2: Tree Cover on Wampanoag Tribe of Gay Head (Aquinnah) Land*

#### *2.1.3.4 Solid Waste Generation*

No solid waste generation data was collected nor analyzed as there are no landfills on Tribal land.

| Emissions by Source (MT $CO_2e$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Source** | **$CO_2$** | **$CH_4$** | **$N_2O$** | **HFCs** | **PFCs** | **$SF_6$** | **Total** | **Total** |
| Stationary Combustion | 183.65 | 0.27 | 0.41 | - | - | - | 184.34 | 34% |
| Mobile Combustion | 259.46 | 0.12 | 0.66 | - | - | - | 260.23 | 48% |
| Solid Waste | - | - | - | - | - | - | - | 0% |
| Wastewater Treatment | - | 1.10 | 0.19 | - | - | - | 1.29 | 0% |
| Electricity - Location Based | 97.66 | 0.37 | 0.43 | - | - | - | 98.46 | |
| *Electricity - Market Based (for informational purposes only)* | 97.66 | 0.37 | 0.43 | | | | 98.46 | 18% |
| Water | 0.43 | 0.00 | 0.00 | - | - | - | 0.44 | 0% |
| Ag & Land Management | - | - | - | | | | - | 0% |
| Urban Forestry | (863.00) | - | - | | | | (863.00) | -158% |
| Waste Generation | - | - | - | | | | - | 0% |
| **Total (Gross Emissions)** | **541.21** | **1.86** | **1.69** | **-** | **-** | **-** | **544.76** | **100%** |
| **Total (Net Emissions)** | **(321.79)** | **1.86** | **1.69** | **-** | **-** | **-** | **(318.24)** | **-58%** |

*Table 2: Greenhouse Gas Inventory, Emissions by Source (*MT $CO_2e$)

## *2.2* GHG Reduction Measures

### 2.2.1 Residential Buildings: Energy Efficiency and Electrification

The Tribe intends to receive energy efficiency and full electrification services for all Tribal Housing units. For residential buildings, energy efficiency and full electrification services generally refer to energy assessments, insulation upgrades, weather stripping, lighting replacements, conversion to heat pump heating & cooling and water heating technology,

installation of electric home appliances (cooktops, clothes dryers, etc.) and completing the necessary electrical service upgrades to accommodate all electric operations.

Achieving full electrification at all Tribal Housing units will eliminate virtually all residential propane use. Conversely, electricity usage will increase by approximately 170,000 kWh. The net impact on GHG emissions from residential energy efficiency and full electrification will result in a reduction of 85.2 MT of carbon dioxide, 0.01 $CO_2e$ of methane, and 0.1 MT $CO_2e$ of nitrous oxide.[19]

As of this writing, Tribal Housing has conducted extensive work with regional energy efficiency program administrator Cape Light Compact to implement energy efficiency and full electrification services for most Tribal Housing units. This work yielded heating load calculations[20] for varying Tribal Housing units, which were used in conjunction with the Massachusetts Technical Reference Manual for Estimating Savings from Energy Efficiency Measures to generate estimates for future Tribal Housing electricity use.[21]

19 The Tribal GHG Inventory Tool: Community Model was used to calculate GHG emissions.

20 RISE Engineering, lead vendor contracted by Cape Light Compact, provided documentation on heat load calculations.

21 Mass Save, "Massachusetts Technical Reference Manual" (Massachusetts, June 1, 2023).

| | |
|---|---|
| **Implementing agency** | Tribal Housing Authority |
| **Implementation milestones** | Receive energy assessments, secure funding, sign work contract, project start, project completion |
| **Location** | Wampanoag Tribe of Gay Head (Aquinnah) Reservation |
| **Estimated Cost** | $2.6 Million |
| **Funding sources** | CLC Income Eligible Energy Efficiency Program<br>CLC Cape & Vineyard Electrification Offering Program (CVEO)<br>US DOE Grid Resilience State and Tribal Formula Grants<br>US EPA CPRG Implementation Grant |
| **Estimated quantifiable GHG emissions reductions** | 85.3 MT $CO_2e$ |
| **Metrics for tracking progress** | Project plans, completion of weatherization work, installation of new HVAC systems, panel upgrades, service upgrades, final report on completed projects |
| **Applicable sector** | Residential |

*Table 3: Residential Buildings Energy Efficiency and Electrification*

### 2.2.2 Residential Buildings: Solar and Battery Projects

In addition to residential energy efficiency and electrification, the tribe intends to install 330 kW of ground mounted / canopy solar paired with 1 MWh of distributed battery storage to match residential electricity usage and provide resilience for all-electric Tribal Housing units. 330 kW of solar for housing units will produce approximately 390,000 kWh[22] of electricity annually, avoiding approximately 95.2 MT of carbon dioxide, 0.4 MT $CO_2e$ of methane, and 0.4 MT $CO_2e$ of nitrous oxide in GHG emissions.[23]

*Table 4: Residential Buildings Solar and Battery Projects*

| | |
|---|---|
| **Install Residential Solar and Battery** | 330 kW of solar, 1 MWh of battery storage |

22 The size of all residential and non-residential solar projects, as well as the approximate kWh generation, are based on arrays designed on Aurora, a solar modeling software. Total electricity generation simulated by the Aurora software was inputted into the GHG Inventory Tool. Results from the tool were used as the quantified GHG emissions *reductions*.

23 See note 20 for methodology.

| | |
|---|---|
| **Implementing agency** | Tribal Housing Authority, Tribal Council, Natural Resources Department, Land Use Commission |
| **Implementation milestones** | Determine optimal layout, solicit quotes, secure funding, execute contract, project start, project completion |
| **Location** | Wampanoag Tribe of Gay Head (Aquinnah) Reservation |
| **Estimated Cost** | $2.8 Million |
| **Funding sources** | CLC CVEO Program<br>US DOE Grid Resilience State and Tribal Formula Grants<br>VP RAP Funds<br>US BIA TEDC Grants<br>IRA Elective Pay<br>EPA CPRG Implementation Grant |
| **Estimated quantifiable GHG emissions reductions** | 96.0 MT $CO_2e$ |
| **Metrics for tracking progress** | Project completion, solar output and emissions avoided per year |
| **Applicable sector** | Residential |

### 2.2.3 Non-Residential Buildings: Energy Efficiency and Electrification

The Tribe intends to receive energy assessments at all non-residential buildings and complete recommended energy efficiency actions identified therein. Energy assessments for the Water department, Wastewater Facility, Community Center, Environmental Lab, and Administration building were received in March 2024. Recommendations for non-residential buildings included replacement of fluorescent light fixtures with LEDs, installation of insulation and weather sealing where applicable, installation of energy return ventilators, and mechanical system retrofits to displace fossil fuel heating. RISE Engineering, the contracted third party energy efficiency program lead vendor for Cape Light Compact, conducted the energy assessments and produced reports which indicated estimates of annual deliverable fuel and electricity savings if energy efficiency measures were implemented. Aggregate estimates of annual fuel savings amounted to approximately 904 gallons of oil, 2,895 gallons of propane, and 792 kWh of electricity. The estimated fuel and electricity savings were input into the GHG Inventory Tool to determine estimated GHG reductions, amounting to 27.3 MT of carbon dioxide and negligible amounts of methane and nitrous oxide avoided annually.

*Table 5: Non-Residential Energy Efficiency and Electrification*

| | |
|---|---|
| **Implementing agency** | Tribal Administration, Tribal Council, Natural Resources Department |
| **Implementation milestones** | Receiving energy assessment, reviewing proposed work, RFP for work if needed, signing work contract, project start, project completion |
| **Location** | Wampanoag Tribe of Gay Head Aquinnah Reservation and 636 State Road |
| **Estimated Cost** | $1.9 Million |
| **Funding sources** | Cape Light Compact (Mass Save energy efficiency program)<br>CPRG Implementation Grant |
| **Estimated quantifiable GHG emissions reductions** | 27.3 MT $CO_2e$ |
| **Metrics for tracking progress** | Project plans, completion of weatherization work, installation of new HVAC systems, final report on completed projects |
| **Applicable sector** | Commercial/Institutional |

### 2.2.4 Non-Residential Buildings: Solar

The Tribe has identified solar as a priority GHG reduction measure and intends to install a total of approximately 110 kW of rooftop solar to match electricity usage of the Wampanoag Environmental Lab, Community Center, Administration Building, and the Wastewater Facility. The Tribe also intends to install EV charging along with non-residential solar deployment. 110 kW of solar will produce approximately 128,000 kWh[24] of electricity annually, avoiding approximately 31.3 MT $CO_2e$ in carbon dioxide, 0.1 MT $CO_2e$ in methane, and 0.2 MT $CO_2e$ in nitrous oxide in GHG emissions per year.[25] The potential for incorporating batteries at non-residential buildings will be further explored in the CCAP.

*Table 6: Non-Residential Solar*

| | |
|---|---|
| **Install Non-Residential Solar** | 110 kW of rooftop solar across non-residential buildings |
| **Implementing agency** | Tribal Housing Authority, Land Use Commission, Historic Preservation, Natural Resources Department, Tribal Council |
| **Implementation milestones** | Solicit quotes, RFP release, select contractor, execute work contract, project start, project completion |

24 See note 23 describing methodologies on sizing solar arrays and estimating solar output generation.

25 See note 20 for methodology.

| | |
|---|---|
| **Location** | Wampanoag Tribe of Gay Head Aquinnah Reservation and Herring Creek Road |
| **Estimated Cost** | $880,000 |
| **Funding sources** | US BIA TEDC Grants<br>IRA Electivet Pay<br>EPA CPRG Implementation Grant |
| **Estimated quantifiable GHG emissions reductions** | 31.6 MT $CO_2e$ |
| **Metrics for tracking progress** | Project plans, installation of solar, final report on completed projects, yearly tracking of solar production |
| **Applicable sector** | Commercial/Institutional |

## 2.3 Benefits Analysis

EPA's 2020 National Emissions Inventory (NEI) was referenced to produce a baseline of criteria area pollutants (CAP) and hazardous air pollutants (HAP). County-level data for Dukes County, which encompasses Tribal Lands on Martha's VIneyard, was used, as no Tribal-specific data was available. In 2020, the NEI reports CAP emissions of 8,291.1 tons, HAP emissions of 260.2 tons, and CAP/HAP emissions of 0.1 tons across all sectors.[26]

According to the Benefits Analysis section of the EPA's Climate Pollution Reduction Grants Program: Technical Reference Document, Benefits Analyses: Co-Pollutant Impacts, "[t]ribes and territories are not expected to quantify co-pollutant impacts associated with non-industrial GHG reduction measures." [27]

A quantified benefits analysis on CAP and HAP co-pollutant emissions reductions is not included in the Tribe's PCAP, as no GHG reduction measures identified herein involve the industrial sector.

It is important, however, to weigh qualitative benefits of the proposed GHG reduction methods identified in the PCAP.

Energy efficiency and electrification work, including upgraded insulation, weather stripping, heat pump installation, and induction cooktop installation for Tribal Housing units will produce significant air quality improvements and overall health benefits. The Tribal Housing units are susceptible to mold growth. Proper insulation, dehumidification from heat pump operations, and air ventilation will reduce

26 United States Environmental Protection Agency, "Online 2020 NEI Data Retrieval Tool," updated August 14, 2023. https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data

27 United States Environmental Protection Agency, Office of Air and Radiation, "Climate Pollution Reduction Grants Program: Technical Reference Document, Benefits Analyses: Co-Pollutant Impacts," May 30, 2023. https://www.epa.gov/system/files/documents/2023-05/Technical_Reference_Doc_Copollutant_Assessment_FINAL_TO_POST.pdf

mold prevalence. Replacing propane cooking stoves with induction cooktops will eliminate indoor emissions.

The entire island, including the Tribe, receives resilience benefits from the operations of grid-connected utility diesel generators located at the Martha's Vineyard Airport, the Eversource (local utility) operations facility on Edgartown Vineyard Haven Road, and various mobile generators operated by Eversource to meet peak demand in the summer months. Deployment of solar and battery will enable local renewable energy generation and distributed energy storage discharge during peak demand hours, potentially relieving stress on the grid and reducing overall co-pollutants attributable to the Tribe's proportional draw of power generated by grid-connected diesel generators.

Finally, ownership of power generation assets and the ability to produce energy from the sun's power are sources of pride for the Tribe, which deliver sentimental value and align with the Tribe's cultural principals.

## 2.4 Review of Authority to Implement

As a sovereign nation which achieved federal recognition in 1987 by an act of the U.S. Congress, the WTGHA exercises explicit authority to implement projects pertaining to the facilities which it operates on Tribal Lands. Per section Article VII of the Constitution of the Wampanoag Tribe of Gay Head (Aquinnah), "the Tribal Council shall manage, control and administer the affairs of the Tribe and determine its policies and procedures."

The energy efficiency and electrification measures identified in this PCAP will ultimately be approved by the Tribal Council through the annual budget process. No further authority shall be required to implement energy efficiency and electrification measures as long as work completed complies with local and state building and electrical codes.

Of the 33 Tribal Housing units, five are privately owned. The Tribe will require permission from these five owners to conduct energy efficiency and electrification work at those properties.

Deployment of solar and battery storage requires approval from the Land Use Commission, the Historic Preservation Commission where applicable, and the Tribal Council.

In addition to the required intra-Tribal authority, the Tribe must also receive approval to interconnect solar and battery storage projects from Eversource and comply with local and state building and electrical codes.

It is important to note that while Eversource will interconnect planned Tribal solar and battery storage projects, the timeline on which Interconnection Service Agreements (ISAs) and notices to Proceed To Operate (PTO) will be issued is unclear for any solar projects with a nameplate capacity greater than 25 kW AC three-phase or 15 kW AC single-phase. Currently, a Capital Investment Projects (CIPs) proposal filed by Eversource under docket 22-55 is being reviewed by the Massachusetts Department of Public Utilities (DPU). Eversource filed 22-55 to propose a cost recovery method for CIPs to complete infrastructure upgrades at the eight substations in the Cape Group.[28] Eversource has assumed the position that it will not issue ISAs for any projects on Martha's Vineyard above the 25 kW AC three-phase or 15 kW AC single-phase thresholds until DPU issues a ruling regarding 22-55.

28 DPU 22-55, accessed March 25, 2024, https://eeaonline.eea.state.ma.us/DPU/Fileroom/dockets/bynumber/22-55.

Lastly, the Tribe will consider current and future Net Metering regulations as stipulated by the Massachusetts General Court under G.L. c.164, §139(f) and regulated by the DPU to determine its implementation timeline. Net Metering is a necessary mechanism for the Tribe to realize utility cost savings generated by solar deployment. In 2022, the Legislature expanded the Single Parcel Rule Exemption to enable unlimited Net Metering facilities on government-owned land parcels, "provided, however, that all facilities on the single parcel do not exceed an aggregate limit of 10 megawatts."[29] Despite the General Court's legislation, regulatory guidelines have yet to be released by the DPU, which shall constitute the governing interpretation of the expanded Single Parcel Rule Exemption. The DPU timeline regarding guidelines for the expanded Single Parcel Rule exemption remains uncertain.

## 2.5 Identification of Other Funding Mechanisms

The WTGHA intends to apply for the CPRG Tribes and Territories implementation grants to fund reduction measures identified in the PCAP.

In addition, the Tribe has identified the following funding mechanisms listed below for PCAP implementation.

1. Cape Light Compact Income Eligible energy efficiency programming will fund all energy assessment, insulation, weather sealing, mechanical upgrades, panel upgrades, and induction cooktop purchase/installations for 28 of 33 Tribal Housing units. The remaining 5 units may be covered if the owners agree to receive upgrades.

2. Cape Light Compact CVEO program to provide solar and battery storage for 6 units.

3. Cape Light Compact Government/Municipal energy efficiency programming to provide up to 100% incentives for non-residential energy efficiency and electrification measures.

4. Vineyard Power Development Fund Grants to help Tribe meet its solar and battery storage goals.

5. US BIA Tribal Energy Development Capacity Grant.

6. US DOE Grid Resilience State and Tribal Formula Grants.

7. US DOE Tribal Home Electrification and Appliance Rebates Program.

8. IRA Investment Tax Credit for Energy Property and Low-Income Communities Bonus Credit (30-50% Elective Pay for solar and battery storage costs).

29 "Section 139," General Law - Part I, Title XXII, Chapter 164, Section 139, accessed March 25, 2024, https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXXII/Chapter164/Section139.

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