American Samoa

Priority Climate Action Plan

Prepared by
American Samoa Environmental Protection Agency

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Table of Contents

List of Figures

List of Tables

List of Appendices

Abbreviations

AS-EPA	American Samoa Environmental Protection Agency
ASPA	American Samoa Power Authority
ASG	American Samoa Government
ASTCA	American Samoa Telecommunications Authority
CAA	Clean Air Act
CFR	Code of Federal Regulations
CPRG	Climate Pollution Reduction Grant
EPA	U.S. Environmental Protection Agency
EV	Electric vehicle
GHG	Greenhouse Gas
GHGRP	Greenhouse Gas Reporting Program (40 CFR Part 98)
OAR	EPA Office of Air and Radiation
PM	Project Manager
PO	EPA Project Officer for Grant
POP	Period of Performance
POR	EPA Project Officer's Representative
PWP	Project Work Plan
QA	Quality Assurance
QAM	Quality Assurance Manager
QAPP	Quality Assurance Project Plan
QC	Quality Control
TL	Task Leader
USPHS	U.S. Public Health Service

Introduction

American Samoa, an unincorporated and unorganized territory of the United States administered by the U.S. Department of the Interior, comprises five volcanic islands and two coral atolls situated south of the equator. Its closest neighbor is the independent country of Western Samoa, accessible by a short 25-minute flight [1]. The principal islands include Tutuila, Aunu'u, and the Manu'a islands, consisting of Ta'u, Ofu, and Olosega, located approximately 65 miles east of Tutuila. Swains Island, with a population of less than 25, and Rose Atoll, an uninhabited atoll about 120 miles east of Tutuila, complete the territory [1]. As of April 1, 2020, the population of American Samoa stood at 49,710 [2], with the majority residing on the island of Tutuila.

American Samoa and the other US Pacific Island territories are historically underserved communities compared to the US mainland. These territories are among the most economically distressed communities in the US, with rates of people living under the poverty level nearly four times the rate of the rest of the nation [3]. American Samoa in particular has the lowest per capita income of any state, territory, or county, more comparable to Botswana or Panama than anywhere in the nation[3].

Climate change is already harming American Samoa. Its communities, particularly the most vulnerable are the least resourced to adapt or relocate and are most impacted by rising sea levels, stronger hurricanes, floods, drought, and extreme heat that are degrading the health and livelihoods of American Samoans[4].

American Samoa requires immediate and sustained investments to reduce greenhouse gas emissions and address climate change. Climate Pollution Reduction Grants are a transformational opportunity to fund pathways to clean technologies and invest in critical infrastructure to improve the quality of life for those who live, work, and play in American Samoa.

Climate Pollution Reduction Grants (CPRG) Overview

Section 60114 of the Inflation Reduction Act (IRA) appropriates $5 billion to EPA to develop and implement plans to reduce greenhouse gas (GHG) emissions. Through the CPRG program, EPA is seeking to achieve three broad objectives:

1. Tackle damaging climate pollution while supporting the creation of good jobs and lowering energy costs for families.
2. Accelerate work to address environmental injustice and empower community-driven solutions in overburdened neighborhoods; and
3. Deliver cleaner air by reducing harmful air pollution in places where people live, work, play, and go to school.

CPRG includes two phases. Phase 1 provides grants to develop plans to reduce GHGs, while Phase 2 provides funding to implement measures from the GHG reduction plans.

PCAP Overview

The first deliverable of the CPRG planning grant is the PCAP. The primary objective of the PCAP is to identify near-term, high-priority, implementation-ready measures to reduce GHG emissions, which can be submitted as projects under the implementation phase of CPRG.

The American Samoa PCAP is organized into the following sections to conform to the requirements and

guidelines outlined by EPA:

- GHG inventory
- Quantified GHG reduction measures
- A benefits analysis
- A review of authority to implement
- Workforce planning analysis

A Comprehensive Climate Action Plan (CCAP) will be completed following the PCAP. The CCAP provides the scope for more detailed modeling, technical analysis and community engagement, and will represent a detailed roadmap for decarbonizing American Samoa.

Eligible entities, whether they received planning grants in phase 1 or not, can apply to implement measures outlined in their Priority Climate Action Plans (PCAPs). Individual grants will range between $2 million and $500 million.

Approach to Developing the PCAP

The CPRG Leadership Team's approach to developing this PCAP includes:

- Identifying and involving important stakeholders
- Comprehending the greenhouse gas (GHG) emissions inventory
- Identifying strategies to diminish GHG emissions
- Prioritizing and choosing GHG reduction strategies
- Assessing the potential impacts of GHG reduction measures

Scope of the PCAP

American Samoa's five volcanic islands are situated in the South Pacific Ocean, approximately halfway between Hawaii and New Zealand, at around 14° S and 170° W. The total land area of the territory spans 76 square miles[5]. Additionally, there are two coral reefs within the territory: Rose Island and Swains Island, characterized by their low, tropical atolls.

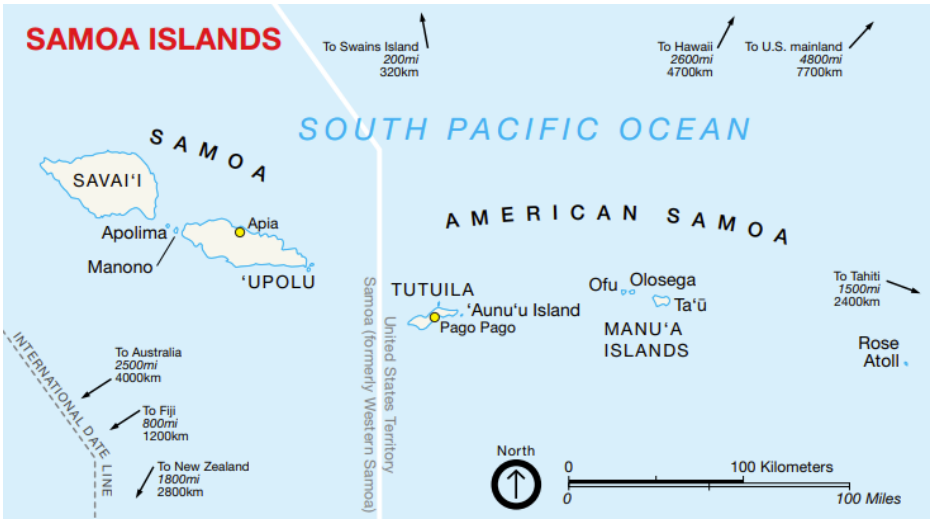


Figure 1. Map of American Samoa, Source: U.S. National Park Service[5]

This PCAP outlines GHG reduction measures slated for implementation on Tutuila, the largest island in American Samoa, comprising 69% (55 square miles) of the territory's land area and housing 97% of its population [1]. Tutuila's rugged, volcanic terrain defines its topography [5].

Figure 2. NASA Earth Observatory Image of Tutuila Island, American Samoa[6]

Territorial Organization and Considerations

Territorial PCAP Management and Development Team

American Samoa Environmental Protection Agency (AS-EPA)

- Alma Seu, Air Quality Branch Manager
- Alice Franco, CPRG Program Manager

American Samoa Power Authority (ASPA)

- Wallon Young, Executive Director
- Brian Thompson, ASPA Business & Finance Grants Division

American Samoa Telecommunications authority (ASTCA)

- Tofiga Liaiga, Grants & Compliance Division
- Edna Noga, Special Projects & Grants Specialist

Collaborations

National Renewable Energy Laboratory (NREL)

- Phillip Voss, Senior Project Leader
- Alicen Kandt, Senior Research Engineer
- Michael Young, Technical Project Manager

PCAP Coordination and Engagement

Interagency and Intergovernmental Coordination

Through a blend of in-person and virtual meetings, we engaged with various agencies such as the American Samoa Power Authority, American Samoa Telecommunications Authority, and the American Samoa Department of Port Administration to gather input on preliminary drafts of this document. These collaborative discussions facilitated the identification of the innovative measures listed within this PCAP, aimed at achieving effective and significant reductions in greenhouse gas emissions.

Public and Stakeholder Engagement

Gathering information is a crucial step in ensuring transparency and inclusivity in decision-making processes. As part of the stakeholder engagement strategy, preliminary PCAP plans were shared with the public through various channels, public websites, and social media platforms such as Facebook. Given its widespread usage and accessibility, Facebook plays a vital role in reaching a broad audience within the territory. By posting the PCAP publicly on the ASPA and ASTCA's web page and sharing it on Facebook, we invited diverse perspectives and encouraged community members to provide valuable feedback, suggestions, and concerns. Through online accessibility, stakeholders were able to easily participate, fostering collaboration in shaping this PCAP.

PCAP Elements

Greenhouse Gas (GHG) Inventory

This greenhouse gas inventory provides a narrative of methods used for the calculation of emissions within the territory. The greenhouse gas inventory details the methodologies employed to calculate emissions within the territory. It is structured according to priority sectors, namely Electricity Generation and Transportation. American Samoa's GHG Emissions Inventory was developed in partnership with the National Renewable Energy Laboratory (NREL), which offered technical support for this endeavor. The EPA's Local GHG Inventory Tool: Community Module facilitated the computation of emissions from various sectors using collected data and estimates for the selected inventory year of 2022.

Scope 1: Emissions from Electricity Generation
Scope 2: Emissions from Transportation

The specific calculation methodology for each of these sectors can be found in the GHG Emissions Inventory Methodology section of the appendix A.

Summary of Priority GHG Emissions Inventory

Priority sectors identified by American Samoa include Electricity Generation and Transportation, which align with American Samoa's priority actions for emissions reduction. Together, the territory's 2022 stationary and mobile combustion gross emissions consisted of 287,125 MT CO_2e (table 1). The GHG emissions estimated for these priority sectors are:

Table 1. Priority GHG Emissions

Emissions Source Category	Metric Tons of Carbon Dioxide Equivalent (MT CO_2e)	Percent of Total
Stationary Combustion (from ASPA Electricity Generation)	116,555	41%
Mobile Combustion (from road vehicles, marine transport, and aviation)	170,569	59%
Subtotal Gross Emissions of Priority Sectors for PCAP	**287,125**	

Scope 1: Emissions From Electricity Generation

Stationary Combustion

American Samoa is a remote island territory located in the South Pacific Ocean; this poses logistical challenges for accessing alternative energy sources. Currently, the territory depends on imported petroleum for nearly all its energy needs. In 2022 a total of 11,300,000 gallons of distillate fuel oil was used solely for energy generation, producing 116,555 MT CO_2e of greenhouse gas (table 2).

Table 2. Stationary Combustion and Energy Fuel Use for 2022

Stationary Combustion Emissions (MT CO_2e)				
Sector	**CO_2**	**CH_4**	**N_2O**	**Total**
Energy Generation	116,175	132	249	116,555
Fuel and Energy (MMBtu) Use				
	mcf	**gal**	**tons**	**Energy Use**

Total Stationary Combustion Energy Use	-	11,300,000	-	**1,567,202**

Stationary Combustion emissions from American Samoa Power Authority (ASPA) electricity generation can be disaggregated by customer class (i.e., consuming sector) as follows:

- Residential (37%): **43,125 MT CO_2e**
- Commercial (47%): **54,781 MT CO_2e**
- Industrial (16%): **18,649 MT CO_2e**

The percentages above represent ASPA-supplied electricity sales by end-use sector in 2022.

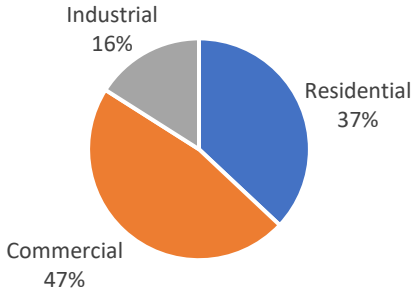


Figure 3. Energy Use by Consumer Sector

Combining the emissions estimates above with electricity sales data from ASPA, a grid average emissions factor can be derived as follows:

American Samoa Annual Average Grid Emissions Factor (2022)

- 116,555 MT CO_2e / 176,356 MWh = **0.66 MT CO_2e/MWh (1,457 lbs. CO_2e/MWh)**

For comparison and benchmarking, the American Samoa emissions factor is shown below with other comparable data points:

Table 3. Annual Emissions by Location

Geographic Location	Annual Average Grid Emissions Factor (lbs. CO_2e per MWh)
American Samoa	1,457
United States*	828
Hawaii*	1,464
Puerto Rico*	1,600
US Virgin Islands – Total**	2,154
US Virgin Islands – STT District**	2,046
US Virgin Islands – STX District**	2,311
Guam**	1,701
Commonwealth of the Northern Mariana Islands**	TBD

**Source: EPA eGRID 2022*

***Preliminary estimate calculated by NREL for EPA CPRG PCAP*

Stationary Combustion emissions have been determined based on the following:

Activity Data

- Fuel consumed by American Samoa Power Authority (ASPA) for power generation, averaged over FY2021 – FY2023:
  - 11,300,000 gallons of Distillate Fuel Oil

Data Source: NREL American Samoa Energy Baseline Report, Table 4 (via Pacific Energy)

Other notes/considerations:

- GHG emissions calculated from this activity data may not represent all electricity consumption in the territory. Only ASPA power generation is represented. Additional sources of emissions from electricity generation may include private/independent generators supplying electricity locally to homes, businesses, industry, hotels/resorts, etc. These other sources of electricity-based emissions data were not collected for the PCAP but should be quantified for more comprehensive GHG inventories in the future.

Scope 2: Emissions From Transportation

Mobile Combustion

Commercial transportation plays a pivotal role in GHG emissions. Its scale and potential for impactful interventions make it a key focus for these proposed emissions reduction efforts. By targeting this sector, we can achieve substantial emissions reductions while leveraging resources for innovation. Addressing GHG emissions in commercial transportation aligns with sustainability goals embraced by the territory and institutions globally.

Table 4 includes an inventory of American Samoa's net mobile emissions, gross mobile emissions, and energy use by fuel type, each offering valuable insights into the environmental impact of transportation activities. These metrics offer a comprehensive account of the environmental footprint associated with transportation and fuel choices within the territory.

Table 4. Mobile Emissions and Fuel Use for 2022

Net Mobile Emissions (CO_2e)				
Sector	**CO_2**	**CH_4**	**N_2O**	**TOTAL**
Commercial/Institutional	168,319.41	519.73	1,730.13	**170,569**
Gross Mobile CO_2 Emissions*				
Sector	**Gasoline**	**Diesel**	**Jet Fuel**	**TOTAL**
Commercial/Institutional	55,101	98,605	14,613	**168,319**
Mobile Energy Use by Fuel Type (MMBtu)				
Sector	**Gasoline**	**Diesel**	**Jet Fuel**	**TOTAL**
Commercial/Institutional	784,470	1,333,678	206,146	**2,324,294**

** CO_2 Emissions (MT) = Fuel use × kg CO_2/unit of fuel × MT/kg*

Quantifying Mobile Combustion emissions from road transportation ideally requires data representing the fuel consumption and vehicle miles traveled (VMT) for each type of vehicle operating on the roads within the geographic area of a community GHG inventory. However, this level of detail is typically difficult to obtain, and assumptions are needed to fill in the blanks. In the case of this GHG inventory for American Samoa, the estimates for road transportation emissions were based on actual fuel use data. The following assumptions were then made to support the quantification of GHG emissions estimates:

- Licensed Motor Vehicle data were reviewed and assumed to be primarily aligned with the EPA vehicle category "Light Truck (vans, pickup trucks, SUVs)" (average fuel efficiency of 18.5 MPG for gasoline, and 22.1 MPG for diesel)
- Gasoline and Diesel fuel use values were entered into the EPA Community Greenhouse Gas Inventory Tool
- VMT values were estimated by multiplying each fuel consumption value by the EPA-default fuel economy (miles per gallon) for the Light Truck vehicle type.

These assumptions may result in overcounting the VMT, which would cause methane (CH_4) and nitrous oxide (N_2O) emissions estimates to be abnormally high. However, carbon dioxide (CO_2) emissions – the primary greenhouse gas – are influenced only by the volume of fuel combusted. Therefore, the overall GHG emissions for the Mobile Combustion category are most sensitive to the fuel consumption data (i.e., gallons of gasoline, gallons of diesel).

Mobile Combustion emissions have been determined based on the following:

- Data sources:
    - Fuel consumption:
        - NREL American Samoa Energy Baseline Report, Table 4 (via Pacific Energy)
    - Vehicle registration:
        - American Samoa Statistical Yearbook 2022
- Other notes/considerations:
    - Several assumptions were made to quantify an estimate of GHG emissions from road transportation in American Samoa. More accurate estimates of emissions from road transportation could be achieved with actual vehicle mileage data (i.e., odometer readings).

GHG inventories usually cover both sources and sinks, which are processes that trap or absorb greenhouse gases (GHGs) for long periods, often thousands of years. Examples of GHG sinks may involve changes in land use, such as significant forest expansion. Additionally, human interventions like managing captured GHGs through geologic storage or redirecting them for industrial purposes can act as sinks. However, in American Samoa, neither of these activities nor any other active GHG sequestration methods are present, so there's no analysis of GHG sinks in this inventory.

GHG Reduction Measures

The following Priority GHG Reduction Measures are the focus of the American Samoa PCAP.

As indicated by the GHG inventory, power generation and commercial/institutional transportation are significant contributors to greenhouse gas emissions in the territory, making them key areas for emission reduction efforts. To address emissions from power generation, the focus will primarily be on transitioning from diesel generation to renewable energy sources.

Due to its remote location, American Samoa must generate all its electricity locally. Currently, Tutuila Island relies entirely on diesel generators for power, leading to heavy dependence on petroleum imports and significant pollution. Fortunately, American Samoa's proximity to the equator provides abundant solar resources suitable for both photovoltaic (PV) and solar thermal applications. Additionally, the region boasts ample wind resources, offering another promising renewable energy option for electricity generation. Further, these newly established renewable energy sources can also power vehicles. In the transportation sector, efforts will focus on replacing diesel and gasoline combustion vehicles with cleaner and more efficient alternatives, including electric and hybrid vehicles. These strategies aim to mitigate emissions and promote sustainable practices in both sectors.

American Samoa Power Authority (ASPA) Priority Actions

The American Samoa Power Authority (ASPA) identified 3 priority GHG emission reduction measures within the Electricity Generation and Transportation sectors for this PCAP.

1. Electricity Generation: Build a new electrical grid control center
2. Transportation: Replace work vehicle fleet with electric vehicles
3. Transportation: Install electric vehicle charging stations

ASPA Priority Action 1: New Electrical Grid Control Center

ASPA is currently undertaking a significant transition on Tutuila, its largest and most populous island, aiming to reduce its nearly 100% reliance on fossil fuels by establishing wind farm and solar plant. While funding for the solar and wind components has been secured, the effectiveness of this transition hinges on the implementation of a battery storage system. Such a system is crucial for storing excess energy generated during peak hours, ensuring a continuous power supply during off-peak periods like cloudy days or nights. This capability is essential for addressing the intermittency of renewable energy sources and maximizing their impact on the island's energy landscape.

Due to the increasing use of renewable energy, the growth in electricity demand, and the challenges in managing power plants on Tutuila, ASPA is planning to build a National Control Center (NCC). This center will help better manage the electricity grid on the island. The electricity grid needs to be carefully controlled to ensure a balance between power generation and demand and to keep the network stable. The NCC will serve as a centralized hub for coordinating and managing grid operations. It will improve efficiency and ensure the reliable control of the electric grid. As a Load Dispatch Center (LDC), the NCC will be responsible for predicting electricity demand, controlling power generation, and managing the flow of electricity from various sources to meet the demand. The NCC will control the Wind Farm, Solar PV Plant, waste-to-energy gasification plant, and the two diesel plants located at Satala and Tafuna. Remote control and monitoring of ASPA's Water and Wastewater plants will also be housed in the NCC.

Load dispatch is currently done manually by power plant operators at the two diesel plants at Tafuna and Satala. Load dispatch will be automated in the NCC due to challenges posed by highly intermittent renewable energy sources and the increased complexity of operating five (5) power plants simultaneously. The new LDC will improve the automation, necessary to enhance the reliability, stability, security, and efficiency of the power system.

Description

ASPA is requesting funding for the following three projects:

- Priority Action 1.A- Construction of an electrical grid control center, National Control Center (NCC), an energy management facility to support the addition of their new 42MW wind and 20MW Solar PV solar projects.
- Priority Action 1.B- Installation of a 40MWh of battery storage (BESS) for wind energy storage, and 12MWh BESS to support the solar energy storage.
- Priority Action 1.C- Installation of a new grid transmission line to run the power to and from the NCC.

Table 5. ASPA Priority Action 1

ASPA Priority Action 1	
Implementing agency	American Samoa Power Authority (ASPA)
Geographic location	Tafuna, on the island of Tutuila in American Samoa
Applicable Sector	Electricity Generation
Annual *estimated* GHG and criteria air pollutant emission reductions	20MW Solar PV + 12MWh BESS Project • 20,968 tons CO_2 42MW Wind + 40MWh BESS Project • 74,800 tons CO_2

ASPA Priority Action 2: Replace work vehicle fleet with electric vehicles

Switching to cleaner electric alternatives for work fleet vehicles in the territory brings substantial benefits, particularly in reducing greenhouse gas emissions. Electric vehicles significantly cut down on carbon emissions, promoting environmental sustainability, and combating climate change. This transition also contributes to energy independence and resilience, reducing reliance on imported fossil fuels. Embracing electric mobility is a pivotal step toward achieving GHG reduction targets and securing a greener, more sustainable future for American Samoa.

ASPA's fleet includes numerous vehicles equipped with older, outdated, and inefficient engines, which significantly contribute to pollution and greenhouse gas emissions. Given the remote location of the territory, acquiring newer vehicles is challenging, leading to a prevalence of older, less efficient ones. Replacing these vehicles with cleaner electric alternatives would greatly reduce current emission levels. Further, adoption of electric vehicles in the territory has been minimal, ASPA aims to normalize the use of electric vehicles (EVs) in the territory.

Description

ASPA plans to replace its fleet of gasoline and diesel heavy equipment with electrically powered vehicles. Transitioning to electric vehicles (EVs) can lead to savings of up to 40% compared to gasoline vehicles. Further, EVs produce no tailpipe pollutants, and the electricity supplied by the new solar and wind-powered plants will be free of air pollutants.

ASPA aims to substitute or integrate electric heavy equipment into its operations, including the following vehicles:

- 5 EV Bucket Trucks
- 7 EV Digger Derrik Battle Motors
- 3 EV Backhoes
- 5 EV Dump Trucks

Table 6. ASPA Priority Action 2

ASPA Priority Action 2	
Implementing agency	American Samoa Power Authority (ASPA)
Geographic location	American Samoa

Applicable Sector	Transportation
Annual estimated GHG and criteria air pollutant emission reductions	

ASPA Priority Action 3: Install Electric Vehicle Charging Stations

Electric vehicle (EV) charging stations play a crucial role in reducing the dependency on diesel generators for power generation. By facilitating the widespread adoption of EVs, these charging stations contribute to a significant decrease in the consumption of fossil fuels for transportation purposes. One of the primary advantages of EVs is their ability to utilize electricity from renewable sources, such as solar and wind power. When EVs charge at dedicated stations powered by renewable energy, they effectively eliminate the need to draw electricity from diesel generators, thus reducing greenhouse gas emissions and air pollution associated with diesel combustion. As American Samoa embraces electric mobility and invests in EV charging infrastructure, the territory makes significant steps towards achieving cleaner, more sustainable transportation systems while simultaneously reducing reliance on environmentally harmful diesel generators.

Description

The move from gasoline to electric vehicles in American Samoa has been slow at best. It is ASPA's view that the Government including ASPA should take the lead in promoting EVs and building American Samoa's charging station infrastructure.

To achieve this objective, ASPA plans to install charging infrastructure throughout the island of Tutuila to facilitate the rise of electric vehicles. To foster increased private adoption of electric vehicles, these will be strategically positioned in major areas such as public buildings, hotels, and recreation areas. Additionally, ASPA will install Electric Vehicle Charging Stations at government facilities.

Table 7. ASPA Priority Action 3

ASPA Priority Action 3	
Implementing agency	American Samoa Power Authority (ASPA)
Geographic location	Throughout the island of Tutuila
Applicable Sector	Transportation
Annual estimated GHG and criteria air pollutant emission reductions	

American Samoa Telecommunication Authority (ASTCA) Priority Actions

Subgrating funds to continue GHG emission reduction measures is an important strategy in encouraging environmental sustainability. ASPA will be allocating a portion of its resources to the American Samoa Telecommunication Authority (ASTCA), this approach will foster collaboration among government entities and innovation in combating climate change. Through this subgrant, the territory can implement tailored renewable energy projects that will ultimately contribute to a greener and more sustainable future for American Samoa.

ASTCA has identified 3 priority GHG reduction measures within the Electricity Generation and Transportation sectors for this PCAP.

1. Electricity Generation: Telecommunications Generator Replacement
2. Transportation: Replace work vehicle fleet with more efficient vehicles
3. Transportation: Create a van-pool

ASTCA Priority Action 1: Telecommunications Generator Replacement

Replacing old diesel generators with newer, more efficient models presents a significant opportunity for reducing GHG emissions and improving environmental sustainability. Older diesel generators often operate less efficiently, emitting higher levels of pollutants such as carbon dioxide (CO2), nitrogen oxides (NOx), and particulate matter (PM). Upgrading to newer, more efficient generators can significantly lower ASTCA's carbon footprint and contribute to cleaner air quality. Modern generators incorporate advanced technologies, such as cleaner combustion processes and emissions control systems, resulting in reduced emissions and higher energy efficiency.

Description

The ASTCA is considering the replacement of nine older generators located at the central office locations. These generators currently play a crucial role in supporting the telecommunications infrastructure during power outages. However, they are aging and becoming less reliable. With the projected rise in climate-related storms, these grid failures are anticipated to become more frequent and prolonged. The territory aims to replace them with newer, more efficient generators to ensure the continuous operation of their telecommunications services, particularly during power losses. This initiative aims to mitigate the impact of greenhouse gas emissions while ensuring affordable and dependable power supply for their operational requirements.

Table 8. ASTCA Priority Action 1

ASTCA Priority Action 1	
Implementing agency	American Samoa Telecommunications Authority (ASTCA)
Geographic location	*Central offices*
Applicable Sector	Electricity Generation
Annual estimated GHG and criteria air pollutant emission reductions	

ASTCA Priority Action 2: Replace Work Fleet Vehicles with Newer Cleaner Diesel, Hybrid, and/or Electric Vehicles

ASTCA's work fleet comprises many vehicles with older, outdated, and inefficient engines, contributing significantly to pollution and greenhouse gas emissions. Upgrading work fleet vehicles from older, outdated models to cleaner electric, hybrid, or newer low-emission alternatives presents a significant opportunity for reducing greenhouse gas (GHG) emissions. By adopting lower/zero-emission vehicles, ASTCA can combat climate change, enhance air quality, and align with sustainability goals while reducing its fleet's carbon footprint. Further, investing in cleaner transportation options not only reduces GHG emissions directly but also sets a positive example for other businesses and individuals, fostering broader adoption of environmentally friendly practices. Ultimately, replacing older fleet vehicles with

cleaner alternatives is a crucial step toward achieving GHG reduction goals and increasing territory sustainability.

Constructing a vehicle storage facility for the replacement fleet vehicles on the island of Tutuila is vital to safeguard vehicles from the elements. The harsh tropical climate, characterized by high humidity and salt-laden air, poses significant risks to vehicle integrity over time. Exposure to such conditions can lead to accelerated corrosion, paint damage, and deterioration of interior components. By shielding vehicles from environmental factors, the storage facility will safeguard their mechanical integrity, ensuring the fleet vehicle replacement investment remains impactful for many years.

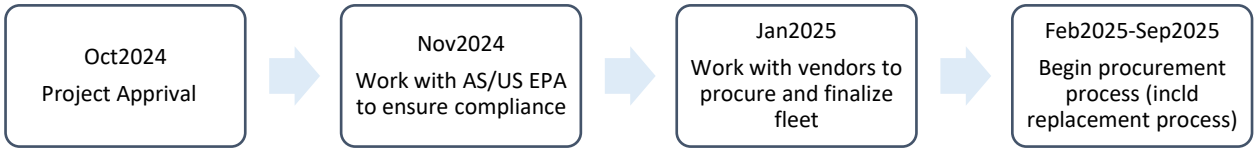
Description

ASTCA will invest in updated fleet vehicles. Replacing 30 of their older, less efficient vehicles with newer, more efficient options is a positive step towards improving ASTCA's fleet efficiency and reducing their environmental impact. Additionally, constructing a vehicle storage facility to protect the new vehicles from the corrosive tropical environment will ensure the longevity and proper maintenance of the vehicles.

Table 9. ASTCA Priority Action 2

ASTCA Priority Action 2	
Implementing agency	American Samoa Telecommunications Authority (ASTCA) and American Samoa Power Authority (ASPA)
Geographic location	Tafuna, on Tutuila Island in American Samoa
Applicable Sector	Transportation
Annual estimated GHG and criteria air pollutant emission reductions	

Implementation Schedule and Milestones: New fleet vehicles

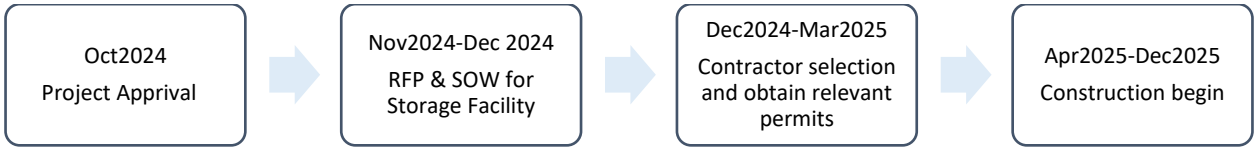


Metrics Tracking Progress:

- This fleet will be subject to ASTCA's vehicle maintenance plan which includes: a monthly fleet maintenance schedule, quarterly vehicle maintenance schedule, biannual vehicle maintenance schedule, and annual vehicle maintenance schedule. This will ensure energy and fuel efficiency.
- ASTCA will abide by AS Executive Order 03-2012, Sec1. "Prohibition of Older Motor Vehicle Imports" 1.01 Prohibited to import any vehicle to American Samoa that is more than ten years old.
- ASTC will adhere to AS Executive Order 03-2012, Sec2. "Government Vehicle Purchasing Policy for Hybrids and Super Cars."

- Quarterly tracking report to measure fuel consumption by newer vehicles compared to previous FY.

Implementation Schedule and Milestones: Vehicle storage facility



Metrics Tracking Progress:

- Securing proper permitting prior to groundbreaking
- Regular inspections to ensure building code compliant (phases)

Priority Action 3: Establish a Vanpool Program

Initiating a vanpool system is a pivotal strategy in reducing greenhouse gas (GHG) emissions and fostering sustainability for American Samoa. In the territory, residents often rely on older, less efficient vehicles due to limited access to newer models and the challenges of importing vehicles to remote locations. These older cars tend to have higher emissions and lower fuel efficiency, exacerbating environmental concerns in these already vulnerable ecosystems. Introducing a van pool system offers a sustainable solution to mitigate these issues. By consolidating transportation needs and promoting carpooling, a van pool can reduce the number of individual vehicles on the road, leading to significant reductions in greenhouse gas emissions and air pollution. Additionally, the van pool system provides a cost-effective and convenient alternative for island residents, addressing transportation challenges while contributing to a cleaner and more sustainable environment.

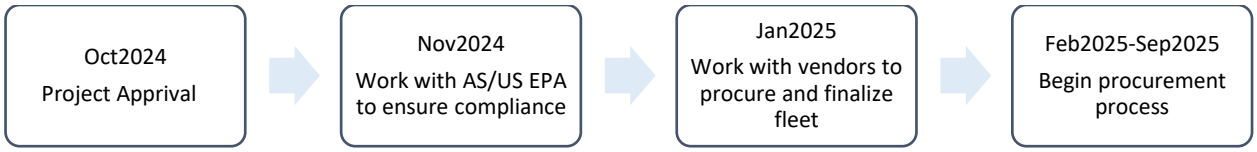
Description

ASTCA's aims to establish a vanpool for their employees. With the purchase of three minibuses, each serving the main regions of Tutuila, the largest and most populous island, ASTCA is expanding environmentally friendly transportation options.

Table 10. ASTCA Priority Action 3

ASTCA Priority Action 3	
Implementing agency	American Samoa Telecommunications Authority (ASTCA)
Geographic location	Tutuila island, American Samoa
Applicable Sector	Transportation
Annual estimated GHG and criteria air pollutant emission reductions	

Implementation Schedule and Milestones:



Metrics Tracking Progress:

- This fleet will be subject to ASTCA's vehicle maintenance plan which includes: a monthly fleet maintenance schedule, quarterly vehicle maintenance schedule, biannual vehicle maintenance schedule, and annual vehicle maintenance schedule. This will ensure energy and fuel efficiency.
- ASTCA will abide by AS Executive Order 03-2012, Sec1. "Prohibition of Older Motor Vehicle Imports" 1.01 Prohibited to import any vehicle to American Samoa that is more than ten years old.
- ASTC will adhere to AS Executive Order 03-2012, Sec2. "Government Vehicle Purchasing Policy for Hybrids and Super Cars."

Benefits Analysis

In our pursuit of combatting climate change, it's crucial to acknowledge the interconnected impact of greenhouse gas (GHG) emissions and co-pollutants like particulate matter (PM) and nitrogen oxides (NOx). This benefits analysis aims to assess the multifaceted benefits derived from reducing both GHGs and co-pollutants. By evaluating improvements in air quality, public health, and economic savings, we aim to provide a comprehensive understanding of the societal value of integrated mitigation efforts. This analysis underscores the importance of considering co-pollutants alongside GHGs in crafting effective and sustainable strategies for a healthier, more resilient future for the territory.

American Samoa Co-Pollutant Emissions Inventory

The entire territory of American Samoa is considered a Low-Income & Disadvantaged Community (LIDAC) by EPA. Much of the land area of the American Samoa Islands (approximately 75%) is uninhabitable due to extremely steep terrain with heavy vegetation growth. All population, and all industrial and commercial areas, are located along the coastal fringe and the small Tafuna-Leone plain. Population density and the density of structures are extremely high in all territorial areas. Crowding leads to poor air quality in most areas. Air quality is affected by vehicles, utility engine generators, and engine generators used to support businesses due to the lack of reliability of the power grid.

Diesel engines have long been integral to powering everything from trucks and buses to generators in American Samoa. These engines play a central role in the territory's essential transportation and commercial activities, yet their emissions pose significant challenges to public health and environmental sustainability. Within these emissions lie a complex mixture of hazardous air pollutants (HAPs), including volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), acetaldehyde, and 1,3-butadiene, known for their adverse health effects and environmental impacts such as contributing to the formation of ground-level ozone and smog. The combustion of diesel fuel releases a cocktail of criteria air pollutants (CAPs), including nitrogen oxides (NOx), sulfur dioxide (SO2), nitrogen dioxide (NO2), and carbon monoxide (CO). These emissions pose significant health risks, contributing to respiratory ailments, cardiovascular diseases, and even premature death. Further, diesel emissions are a

major source of fine particulate matter (PM) pollution, which can penetrate deep into the lungs and enter the bloodstream, exacerbating health issues and impairing air quality.

*Table 11. American Samoa Co-Pollutants**

Pollutant	Tons/year emissions (uncontrolled)
Nitrogen Oxides (NO_X)	1,251.8
Carbon Monoxide (CO)	4.7
Sulfur Dioxide (SO_2)	2.2
Particulate Matter (PM)	17.1
Particulate Matter (PM10)	17.1
Particulate Matter (PM2.5)	17.1
Volatile Organic Compounds (VOC/TOC)	0.6

**The analysis encompasses estimations of co-pollutants from 2022*

Prevalent co-pollutants in American Samoa include volatile organic compounds (VOCs), carbon monoxide (CO), particulate matter (PM10 and PM2.5), nitrogen oxides (NOx), and sulfur dioxide (SO2) (table 11). These substances accompany greenhouse gas emissions when fossil fuels are burned, or industrial processes occur. Co-pollutants pose risks to air quality, public health, and the environment, further highlighting the need for the mitigation efforts proposed in this PCAP.

Our proposal seeks to address this pressing issue through a comprehensive strategy aimed at reducing CAP and HAP emissions from diesel engines by replacing them with more efficient technologies and renewable sources of energy. This proposal represents a targeted approach to addressing diesel emissions, with the ultimate goal of fostering healthier communities and a more sustainable environment. Through strategic investments and collaborative efforts, these reduction measures will make significant strides toward mitigating the adverse impacts of diesel pollution and promoting a cleaner, healthier future for those in the territory.

ASPA Priority Action Benefits Analysis

ASPA Priority Action 1: New Wind and Solar National Control Center (NCC)

Direct benefits:

- Improved Grid Management: A control center enables real-time monitoring and control of the electrical grid, allowing operators to optimize grid performance, balance supply and demand, and maintain system stability.
- Enhanced Reliability: With advanced monitoring and predictive analytics capabilities, a control center can detect and mitigate potential grid disturbances or equipment failures proactively, minimizing downtime and enhancing grid reliability.
- Increased Efficiency: By optimizing grid operations, reducing transmission losses, and facilitating demand response programs, a control center improves overall energy efficiency and reduces energy waste.
- Grid Security: Enhances grid security by detecting and responding to cybersecurity threats, or natural disasters, ensuring the integrity and resilience of the electrical grid.

- Enhanced Integration of Renewable Energy: With sophisticated grid management capabilities, a control center facilitates the integration of renewable energy sources such as solar and wind power, optimizing their utilization while maintaining grid stability.

Indirect benefits:

- Economic Growth: A reliable and efficient electrical grid supported by a control center promotes economic growth by providing a stable and affordable energy supply, attracting investment, and supporting business operations and industrial development.
- Job Creation: The establishment and operation of a control center create job opportunities in areas such as grid management, cybersecurity, data analytics, and software development, contributing to employment growth and skills development.
- Environmental Sustainability: By enabling the integration of renewable energy sources and facilitating energy efficiency measures, a control center supports environmental sustainability goals, reducing greenhouse gas emissions and mitigating climate change.
- Grid Modernization: Implementing a control center is part of a broader grid modernization effort, fostering technological innovation, investment in infrastructure, and the adoption of smart grid technologies, which enhances grid resilience and prepares it for future challenges.
- Resilience and Disaster Preparedness: A control center enhances grid resilience and disaster preparedness by enabling rapid response and recovery efforts in the event of grid disruptions, natural disasters, or emergencies, ensuring continuity of essential services and protecting public safety.

ASPA Priority Action 2: Replace Territory Owned Fleet Vehicles with Electric Vehicles

Direct benefits:

- Cost Savings: lower fuel and maintenance expenses
- Fuel Savings: EVs are powered by electricity, which is often cheaper than gasoline or diesel fuel
- Environmental Impact: EVs produce zero tailpipe emissions, reducing air pollution and greenhouse gas emissions, thus contributing to improved air quality, and mitigating climate change.
- Energy Efficiency: Electric vehicles are more energy-efficient than traditional vehicles, converting a higher percentage of energy from the grid into motion, resulting in lower energy consumption per mile traveled.

Indirect benefits:

- Encourage EV use by demonstrating their viability.
- Energy Security: By reducing dependence on fossil fuels for transportation, the widespread adoption of EVs enhances energy security by diversifying the transportation fuel mix and reducing reliance on imported oil.
- Technological Innovation: The adoption of EVs spurs innovation in battery technology
- Economic Growth: Investing in EV manufacturing, charging infrastructure deployment, and related industries can stimulate economic growth, create jobs, and foster innovation in the clean energy sector, contributing to long-term economic prosperity.

ASPA Priority Action 3: Install Electric Vehicle Charging Stations

Direct benefits:

- Enhanced Compatibility: Upgraded charging stations may support a wider range of EV models and charging standards, ensuring compatibility with various vehicles, and reducing barriers to adoption.
- Increased Convenience: Installing charging stations provides electric vehicle (EV) owners with convenient access to charging infrastructure, enabling them to charge their vehicles at home, work, or public locations.
- Cost Savings: EV owners can save money on fuel costs by charging their vehicles with electricity, which is often cheaper than gasoline or diesel fuel. Installing charging stations facilitates these cost savings and encourages the adoption of electric vehicles.
- Revenue Generation: Charging station owners or operators can generate revenue through user fees, subscriptions, or partnerships with businesses, providing a potential source of income from EV charging services.
- Environmental Impact: By promoting the adoption of electric vehicles, installing charging stations contributes to reducing greenhouse gas emissions and air pollution, leading to improved environmental sustainability and public health.

Indirect benefits:

- Increased EV Adoption: Installing charging stations can encourage greater adoption of EVs by alleviating concerns about charging infrastructure availability, range anxiety, and charging times.
- Economic Growth: The installation of charging stations stimulates economic growth by creating jobs in manufacturing, installation, maintenance, and operation of charging infrastructure.
- Environmental Impact: Accelerating the transition to electric transportation through upgraded charging infrastructure reduces greenhouse gas emissions and air pollution, contributing to improved environmental sustainability and public health.
- Energy Resilience: Creating a charging infrastructure can contribute to energy resilience by supporting smart charging strategies, grid management, and demand response programs, enabling more efficient use of renewable energy resources and grid stability.
- Public Health: By reducing air pollution and greenhouse gas emissions associated with transportation, the widespread adoption of electric vehicles facilitated by charging infrastructure installation improves public health outcomes and reduces healthcare costs.

ASTCA Priority Action Benefits Analysis

ASTCA Priority Action 1: Telecommunications Generator Replacement

Direct benefits:

- Increased Reliability: Modern generators are designed to be more reliable and durable than older models, reducing the risk of breakdowns and downtime. This results in improved productivity and operational continuity for businesses and organizations.
- Improved Energy Efficiency: Newer generator models typically incorporate advanced technology and design features that enhance energy efficiency, leading to reduced fuel consumption and lower operating costs.
- Lower Maintenance Costs: Newer generators require less frequent maintenance and repairs compared to older, inefficient models.
- Reduced Emissions: Newer generator models often feature cleaner combustion technologies and emissions control systems, resulting in lower emissions of pollutants such as nitrogen oxides

(NOx), particulate matter (PM), and carbon monoxide (CO), thus contributing to improved air quality and environmental sustainability.

Indirect benefits:

- Enhanced Safety Features: Newer generator models may incorporate advanced safety features such as automatic shutdown systems, overload protection, and fault diagnostics, improving overall safety for operators and maintenance personnel.
- Improved Resilience: Upgrading to newer generator models enhances the resilience of critical infrastructure and facilities, ensuring reliable power supply during emergencies, blackouts, or natural disasters.

ASTCA Priority Action 2: Replace Territory Owned Fleet Vehicles with Newer Cleaner Diesel, Hybrid, and/or Electric Vehicles

Direct benefits:

- Fuel Efficiency: Hybrid vehicles combine a traditional internal combustion engine with an electric motor and battery, resulting in improved fuel efficiency compared to conventional vehicles. This leads to direct cost savings on fuel expenses for fleet operators.
- Emissions Reduction: Hybrid vehicles produce fewer emissions than traditional vehicles, resulting in reduced air pollution and greenhouse gas emissions. This contributes to improved air quality and environmental sustainability.
- Maintenance Cost Reduction: Hybrid vehicles often require less frequent maintenance compared to conventional vehicles.

Indirect benefits:

- Workforce development: Provide more diverse skillset/training for fleet vehicle mechanics and maintenance staff.
- Health Benefits: The reduction of tailpipe emissions from EVs leads to improved air quality.
- Energy Security: By reducing dependence on fossil fuels and improving fuel efficiency, the widespread adoption of hybrid vehicles enhances energy security and reduces reliance on imported oil, contributing to a more sustainable and resilient transportation sector.

Priority Action 3: Establish a Vanpool Program

Direct benefits:

- Cost Savings: Participants in a van-pool typically share transportation costs, resulting in significant savings compared to individual commuting expenses. These savings can include fuel, maintenance, insurance, and parking fees.
- Reduced Wear and Tear: Sharing the commute among multiple individuals distributes the wear and tear on vehicles, potentially extending their lifespan and reducing maintenance costs.
- Environmental Impact: By consolidating trips and reducing the number of single-occupancy vehicles on the road, van-pooling contributes to lower fuel consumption and emissions, thus reducing environmental pollution and mitigating climate change.

Indirect benefits:

- Traffic Congestion Mitigation: By reducing the number of vehicles on the road, van-pooling helps alleviate traffic congestion, benefiting not only participants but also the broader community by improving overall traffic flow.

Qualitative Benefits

This section further explains direct and indirect benefits from the GHG reduction measures proposed in this PCAP.

Air Quality and Public Health Improvements

Major improvements to air quality and public health can be realized in the territory by cutting emissions from electrical generation and transportation. Diesel Power generators and Diesel trucks and cars are routinely identified as main contributors to fine particulate NOx, black carbon, and VOC emissions. Diesel particulate is a main toxic risk in American Samoa with associated respiratory diseases such as chronic obstructive pulmonary disease (COPD), asthma, and lung cancer are linked to breathing in diesel exhaust[7]. Diesel exhaust also causes airway inflammation, allergies, and increases the risk of chronic bronchitis[8]. The particles and gases in diesel exhaust enter the circulatory system where the bloodstream sends the molecules throughout the body causing systemic health effects such as cardiovascular diseases, stroke, thrombosis, accelerated aging, and cancer[7].

Energy Cost Savings

Renewable and clean energy is cheaper than it has ever been and the construction of solar at community or utility scale makes it even more affordable. American Samoans face high electricity prices and frequent blackouts due to struggles to maintain the grid with aging generators and more frequent and stronger storms. The priority actions in this plan are designed to address both the reliability and the cost of energy.

Increased Climate Resilience

In American Samoa, climate mitigation and adaptation go hand in hand. Improving the reliability of energy, especially after disasters is a key priority. American Samoa has unreliable electric power, particularly after storms which are increasing in frequency and intensity due to climate change. The emission reduction efforts outlined in this proposal will increase the territory's resiliency with the support to anticipate, prepare for, adapt to, or recover from the effects of climate change through principles of smart, safe, and sustainable growth.

Jobs and Workforce Development

Increasing the number of training opportunities, jobs, and small business growth opportunities is a key goal of the PCAP. A selection of these jobs include:

- Driving and maintaining electric vehicles, buses, and heavy-duty trucks
- Planning, constructing, and operating increased electricity transmission.
- Designing, planning, constructing, installing, and maintaining solar farms.

Review of Authority to Implement

The recipients of the funding for the GHG reduction measures outlined in this PCAP are American Samoa government agencies. ASPA is a government-owned utility company in American Samoa that provides electricity to the residents and businesses in the territory. ASPA manages power generation, distribution, and maintenance of the electrical grid. Subgrant funding will be allocated to ASTCA, the government's telecommunications company who manages phone, internet, and other communication services within territory.

The American Samoa Power Authority (ASPA) Authority to Implement

American Samoa Power Authority, as a development-oriented public utility, possesses the power and authority to undertake GHG reduction-related actions due to its mandated role in serving the residents of American Samoa with essential services such as electricity, water, wastewater, and solid waste management. Operating under the legal framework established by the American Samoa Government, ASPA is driven by community service ideals and operates as a viable business entity. This legal mandate empowers ASPA to install, operate, and maintain the territory's utility infrastructure, which is essential for addressing climate-related challenges. Additionally, ASPA's governance structure, including its five-member board nominated by the Governor and confirmed by the Legislature, provides oversight and accountability, ensuring that climate-related actions align with the territory's priorities and needs. By striving to deliver high-quality services at affordable rates, ASPA contributes to the overall resilience and sustainability of American Samoa, making it well-positioned to undertake climate-related actions in collaboration with other stakeholders and government agencies.

American Samoa Telecommunications Authority (ASTCA) Authority to Implement

The American Samoa Telecommunications Authority possesses the power and authority to undertake GHG reduction actions due to its mandate established by the government of American Samoa. ASTCA's authority is rooted in legislation, regulations, and executive orders enacted by the American Samoa government, as outlined in the American Samoa Code Annotated (ASCA). This legal framework defines ASTCA's responsibilities, powers, and obligations in providing telecommunication services to the territory, including facilitating climate-related initiatives. Additionally, ASTCA's mission and goals focus on improving and maintaining telecommunication services, promoting economic development, and ensuring reliable communication, all of which are crucial for addressing climate challenges and enhancing resilience. ASTCA is also mandated to provide essential telecommunication services to the public, ensuring accessibility, affordability, and quality of service, which are essential components of any climate action plan. Further, ASTCA collaborates with various stakeholders, including government agencies and international partners, to achieve its goals, including those related to climate adaptation and mitigation. Under the oversight of the American Samoa government, ASTCA is held accountable through regular reporting, audits, and compliance assessments, ensuring that its activities align with its mandate, including climate-related initiatives.

Conclusion and Next Steps

American Samoa's Priority Climate Action Plan outlines urgently needed climate investments across the economy to benefit our most vulnerable communities. By pinpointing near-term climate implementation priorities and giving these the option to compete for federal implementation funding, this plan puts the Territory on a stronger footing to achieve a science-based carbon neutrality target and will help the U.S. meet its commitments under the Paris Agreement. It will also help meet the nation's Justice40 initiative goals by providing a range of benefits to American Samoa's low-income and disadvantaged communities that have historically had to shoulder the negative impacts of fossil fuel-powered transportation and industry. Importantly, American Samoa's statutory, regulatory, and policy framework supports a broad authority to take decisive and quick action to utilize federal funding received by the Territory.

American Samoa's next deliverable under the CPRG Program, the Comprehensive Climate Action Plan will build off the processes and ideas that underpin the PCAP, expanding on its stakeholder engagement and the scope of climate actions included. This holistic approach will be the Territory's next step under CPRG to address the global climate crisis.

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