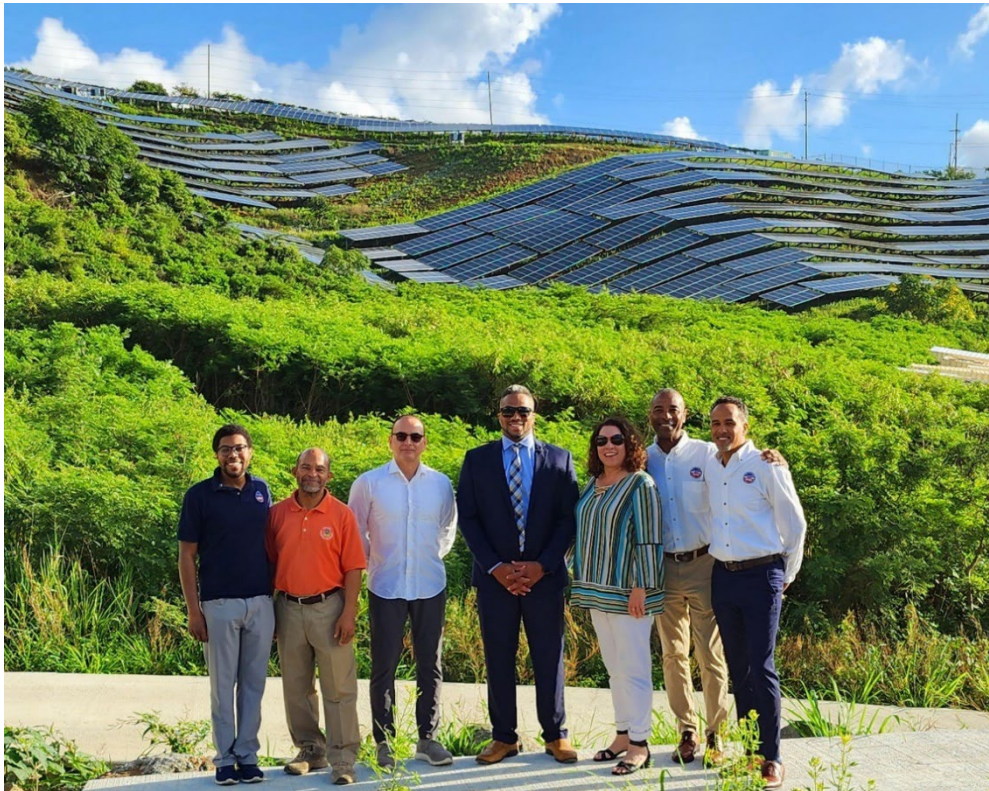




VIEO IRA CPRGGP Priority Climate Action Plan (PCAP)

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Definitions:

Act 7075: A USVI Regulatory Policy; Requirements: In July 2009, the Virgin Islands (USVI) passed Act 7075. Among other provisions, the legislation establishes that the "peak demanded generating capacity" of the Virgin Islands Water and Power Authority* must be from renewables according to the following schedule:

- 20% by January 1, 2015
- 25% by January 1, 2020
- 30% by January 1, 2025

Adaptation: The terminology adaptation means the ability of natural or human systems to adjust to the effect of any changes. In this case climate change includes global warming and its effects.

Alternative Energy: The alternative energy are other forms of energy from non-fossil fuel sources.

Carbon Dioxide: It is the principal greenhouse gas emission produced by the burning of fossil fuels.

Climate Change: Climate changes are attributed directly and indirectly to human activity that alters the composition of the atmosphere. These changes altered the temperature of the planet having directly affects in environment. The definition of this terminology has variation on their significance.

Comprehensive Climate Action Plan (CCAP): narrative report that provides an overview of grantees' significant GHG sources/sinks and sectors, establishes near-term and long-term GHG emissions reduction goals, and provides strategies and identifies measures that address the highest priority sector to help the grantees meet those goals.

Department of Planning and Natural Resources (DPNR): The DPNR is the agency in the US Virgin Islands responsible to protect, conserve, and manage the natural resources of the island.

Department of Transportation (DOT): DOT it is the agency in charge of the transportation sector in the United States including territories.

Distributed Energy Resources (DER's): A DER is a small-scale unit of power generation that operates locally and is connected to a larger power grid at the distribution level. DERs include solar panels, small natural gas-fueled generators, electric vehicles, and controllable

loads, such as HVAC systems and electric water heaters. An important distinction of a DER is that the energy it produces is often consumed close to the source.

Energy Efficiency and Conservation Block Grant Program BIL (EECBG-BIL): The EECBG-BIL Program is designed to assist states, local governments, and Tribes in implementing strategies to reduce energy use, to reduce fossil fuel emissions, and to improve energy efficiency.

Emissions: The emissions are the release of greenhouse gases in a period.

Energy Efficiency: Means the ratio of energy in a conversion process or a system of energy input.

Environmental Protection Agency (EPA): It is the United States Federal Agency in charge of the protection of the environment. This includes states as well as territories and tribes.

Federal Emergency Management (FEMA): FEMA is the federal government agency in charge of assisting states and territories before, during and after disasters.

GHG Inventory: It is an inventory report that measures in tons of carbon dioxide equivalent (CO₂e) per year. This inventory includes information of the emissions of carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (PFCs) and others. The GHG Inventory includes the sector responsible for the emissions and other recommendations to reduce these.

Global Warming: Global warming is the increase in the planet's temperature. Global warming is a reaction to climate change. The effects of global warming are sea level rise, extreme weather, amongst others.

Global Warming Potential (GWP): Conversion factor used to compare all greenhouse gas emissions to carbon dioxide equivalent units. The GWP represents the combined effect of the differing times these gases remain in the atmosphere and their relative effectiveness in absorbing outgoing thermal infrared radiation.

Greenhouse gases (GHG): GHG are the gases responsible for the changes in the atmosphere that cause climate change. These gases are carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (PFCs). The CO₂e emissions represent the amount of GHGs emissions and shall be calculated pursuant to federal regulations.

Local Greenhouse Gas Inventory Tool (LGGIT): EPA's Local Greenhouse Gas Inventory Tool was developed to help communities across the United States to evaluate their greenhouse gas emissions. Use this tool to compile a greenhouse gas (GHG) inventory for your entire community or for local government operations.

Liquefied Petroleum Gas (LPG) is a fuel gas containing a flammable mixture of hydrocarbon gases, specifically propane, n-butane, and isobutane. It can sometimes contain propylene, butylene, and isobutene.

Low-Income Disadvantaged Communities (LIDAC): communities with residents that have low incomes, limited access to resources, and disproportionate exposure to environmental or climate burdens. Although the Inflation Reduction Act does not formally define LIDACs, EPA strongly recommends grantees use the Climate and Economic Justice Screening Tool (<https://screeningtool.geoplatform.gov/>).

Metric Tons of Carbon Dioxide Equivalent emissions (MT CO₂e): The metric tons are the measure used in the GHG gas emissions inventory.

Mitigation: Mitigation refers to the measures and initiatives focused on reducing or eliminating any greenhouse gas emissions.

The North American Board of Certified Energy Practitioners (NABCEP): NABCEP is the most respected, well-established, and widely recognized certification organization for professionals in the field of renewable energy. NABCEP offers certifications and credentials

for skilled professionals, specialists and those new to working in the areas of photovoltaics, solar heating, and small wind technologies.

Net Energy Billing (NEB): The primary goal of the NEB program is to provide access to the energy-saving benefits of Distributed Energy Resources to grid-connected customers while ensuring VIWAPA maintains cost recovery for its fixed assets across the grid. The NEB program was developed as a balanced compromise between the Utility and individuals who are interested in installing DER's (such as solar, battery storage, and wind) on their homes or places of business.

Net Energy Metering (NEM): Net metering allows residential and commercial customers who generate their own electricity from solar power to sell the electricity they aren't using back into the grid.

The National Renewable Energy Laboratory (NREL): The National Renewable Energy Laboratory (NREL) is transforming energy through research, development, commercialization, and deployment of renewable energy and energy efficiency technologies.

Power Purchase Agreement (PPA): A PPA is a contract between a government agency and a private utility company. The private company agrees to produce electricity, or some other power source, for the government agency over a long period of time.

Priority Climate Action Plan (PCAP): a narrative report that includes GHG emissions inventory, LIDAC analysis, and measures to reduce emissions.

Renewable Energy: Renewable energy is the energy obtained from solar, ocean thermal, energy, wind, hydro, biomass, and any other not derived from fossil fuel.

State Energy Program (SEP): The State Energy Program (SEP) provides grants to states and directs funding to state energy offices from technology programs in DOE's Office of Energy Efficiency and Renewable Energy. States use grants to address their energy priorities and program funding to adopt emerging renewable energy and energy efficiency technologies.

Vision 2040: USVI vision of prosperity for all, published 2020. Specifically, Goal 6; Renewable sources of energy will represent 75% of the total energy consumption, up from the 1% that it currently represents by 2040.

VIWAPA or WAPA: The Virgin Islands Water and Power Authority, a semi-public organization that serves as the only water and power utility in the VI.

Weatherization Assistance Program (WAP): The Weatherization Assistance Program (WAP) enables low-income families to permanently reduce their energy bills by making their homes more energy efficient. Funds are used to improve the energy performance of dwellings of needy families using the most advanced technologies and testing protocols available in the housing industry. The U.S. Department of Energy (DOE) provides funding to states, U.S. overseas territories, and Indian tribal governments, which manage the day-to-day details of the program.

Weatherization Assistance Program Bipartisan Infrastructure Law (WAPBIL): The WAPBIL grants aim to expand the impact of DOE's existing residential weatherization programs by utilizing leveraged resources and enhanced community partnerships to perform deep energy retrofits of low-income residential buildings and empower local community representation within the energy workforce.

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1 Executive Summary:

The vulnerability of islands like the US. Virgin Islands to the impacts of climate change, including increased temperatures, sea level rise, and more intense hurricanes, necessitates robust mitigation, adaptation, and resilience measures.

The VIEO establishes strategies such as promoting renewable energy adoption, implementing mitigation and adaptation policies, and enhancing citizen engagement. It prioritizes initiatives like energy efficiency in buildings, waste reduction, and promoting low-carbon transportation options. Additionally, it emphasizes education on climate change resilience. These measures will counteract the effects of climate change within the USVI along with mitigation, adaptation, and resiliency efforts going forward. The reduction measures presented in this PCAP are representative of the current and near-term solutions through a wide range of initiatives and grant funding opportunities. The PCAP reduction measures can and will be increased as additional funding opportunities become available and the CCAP will assist with quantifying those in more detail. Very notable funding opportunities that will drastically increase the landscape of the reduction measures are the CPRG Implementation opportunities and the Solar for All grant.

The VIEO has been heavily pushing the adoption of Renewable Energy within the territory on a utility scale, as well as encouraging the adoption on a consumer level. The VI Water and Power authority (WAPA) is the sole utility provider, and they are currently in the process of additional options for distributed power generation and storage solutions through solar and wind Power Purchase Agreements (PPA's), as well as other means of increasing efficiency from a generation standpoint. Additionally on a consumer level, we have worked with The Department of Planning and Natural Resources (DPNR) and WAPA to implement an interconnection agreement program to help facilitate utility buy back rates under one umbrella program called the Net Energy Billing (NEB) program. We have detailed data on all solar systems installed in the territory and would be able to utilize this data to help identify our current landscape and how it has positively impacted our emissions from lowered load profiles. By quantifying this data to represent the emissions impact, we can clearly identify goals for the PCAP and CCAP.

Furthermore, to support emission reduction efforts, the Environmental Protection Agency offers the Climate Reduction Pollution Implementation Grant. The VIEO is pursuing the opportunity in obtaining and utilizing this grant to utilize the findings of the Priority Climate Action Plan (PCAP) and Comprehensive Climate Action Plan (CCAP) results. This plan focuses on reducing climate pollution, particularly in vulnerable and low-income communities.

The planning phase of the CPRG program, which the VIEO is undertaking, involves utilizing the USVI Greenhouse Gas Emission Inventory Reports of 2019 and the data collected from The National Renewable Energy Laboratory (NREL) in 2024. These reports highlight major emission sources, including the energy sector, energy efficiency, and the transportation sector, informing the development of targeted mitigation measures.

In summary, through VIEO initiatives, collaborative efforts, and strategic planning, the US Virgin Islands is actively addressing the challenges posed by climate change, aiming for a more sustainable and resilient future for all its inhabitants.

2 Introduction

The VIEO supports the efforts of the EPA in the development of a Priority Climate Action Plan (PCAP) and Comprehensive Climate Change Action Plan (CCAP) under the Climate Pollution Reduction Grant (CPRG). These documents aim to address the challenges posed by climate change and promote sustainable development across the US Virgin Islands. The PCAP includes priority measures to reduce greenhouse gas emissions.

2.1 CPRG overview

The CPRG's purpose is to decrease greenhouse gas (GHG) emissions. This grant is funded through the EPA for the purpose of reducing the effects of climate change and global warming through research and investigation of territory wide GHG inventory. The VIEO has chosen to participate in this award and plans as the historical data is not readily available and this information and tools used would provide future beneficial resources.

USVI residents paid the average electricity price of about forty-one cents per kWh in early 2022, almost three times higher than the U.S. average power price of 15 cents per kWh. However, there is already momentum for renewable power deployment in the region, driven by the Islands' high electricity costs, tropical climate, concentrated populations, and political will to make change. The USVI is looking to address the energy equity disparity by lowering the barriers to investment of renewable energy sources for those with the highest energy burden.

2.2 PCAP Overview and Definitions

- The GHG Inventory is the instrument used to account for GHG emission within the USVI. This inventory includes greenhouse gases CO₂ from commercial and industrial gross emissions and net emissions.
- The GHG emission projections are an estimate of the emissions based in different scenarios. This includes the years from 2020 through 2030.
- The VIEO has reduction targets of 75% renewably generated electricity by 2040 (Vision 2040).
- Priority measures to be implemented by the results of the PCAP are to decrease GHG emissions are identified in the energy sector, energy efficiency, and the transportation sector.
- The low income and disadvantaged communities (LIDAC) benefit analysis included risks and impacts of GHG emissions to the territory of the USVI. All USVI communities are designated disadvantaged per Justice40 guidance.
- The VIEO has direct authority to implement these changes as granted by the Executive office of the Government of the US Virgin Islands.

2.3 Approach to Developing the PCAP

In the initial effort of developing the VI PCAP The VIEO reviewed the areas of focus within the territory that are directly impacting the reduction of GHG emissions. The three key areas of focus were the Energy sector (residential and utility scale), Transportation sector and Energy Efficiency efforts.

The USVI is currently operating under ACT 7075 and VISION 2040 as a guiding light for many emissions related efforts within the territory. Additionally, the VIEO is tasked with the creation of a Comprehensive Strategic Energy Plan that will bolster the territories efforts to reduce our carbon footprint and move the territory into a more sustainable future.

Throughout the development process of the PCAP the VIEO engaged with public and private partners for the collection of data and benchmarking for the VI GHG inventory. NREL was key in providing support in the generation of the GHG inventory data for the VIEO PCAP with data provided by the VI Bureau of Motor Vehicles (BMV), VI Division of Finance and The VI Water and Power Authority. The Benchmarking effort allowed the VIEO to look at the current state of GHG emissions within the territory and how current/future efforts will positively impact the reduction into the future.

There are currently a wide range of direct grant activities as well as the organic adoption of renewable energy technologies impacting the landscape of the USVI emissions profile. The administrative processes utilized to support reduction measure processes are inherently in place as most of the reduction measures are directly tied to federal grant funding and have very specific reporting and measurement requirements. Territorial GHG reduction goals and targets will be finalized in the CCAP.

The PCAP is a priority plan with the intention of the CCAP being far more detailed and complete with all sectors to be considered.

2.4 Scope of the PCAP

The US Virgin Islands has a population of 87,146 persons as of the 2020 census between the three main islands within the territory. The PCAP is designed to cover the GHG emissions profile of all islands and the efforts the VI can take to positively impact the emissions landscape in the VI. There are two main power generation plants set between the St. Croix and the St. Thomas/St. John District with a wide range of planned programs catered to the territory as a whole and individual districts/islands depending on the measure. The PCAP is designed to explain the areas that can be prioritized by the VI with a benchmark to assist with noting the impacts to be made while the CCAP is in development.

Below are basic statistics of the Population number by island as well as a diagram showing the social vulnerability by island. It is important to note that depending on the tool used to determine a disadvantaged community it is either the entirety of the VI that qualifies as disadvantaged or specific regions. The VIEO is actively engaging in activities to ensure the reduction measures shown within this plan are equitably available to our community.

Table 1: Census Estimate of the Resident Population of the USVI by District

Census Estimate of the Resident Population of the USVI by District	
District	2020 US Census Population
St. Thomas	42,261
St. Croix	41,004
St. John	3,881

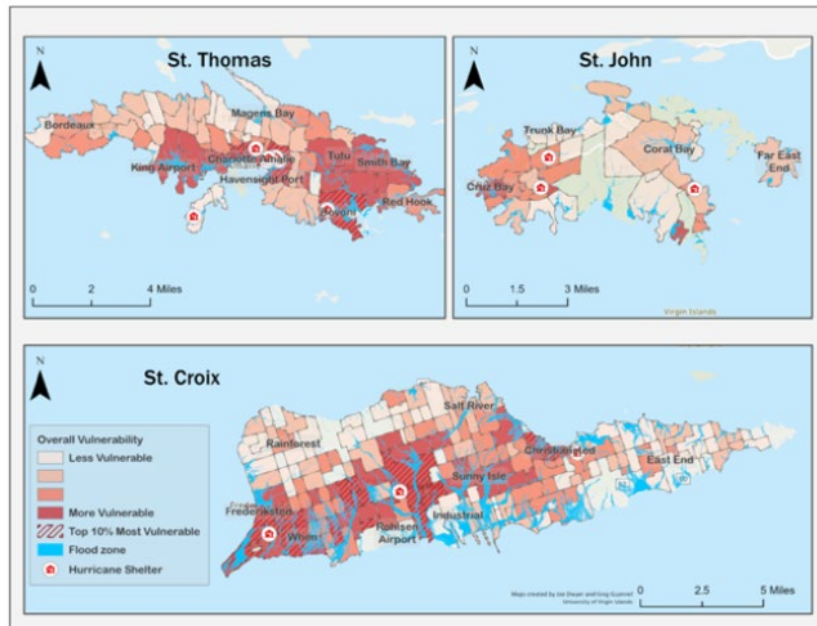


Image 1: Social Vulnerability of USVI Population

3 Tribal/Territorial Organization and Considerations

Special Considerations for Tribal/Territorial Entities

Supply chain issues and climate vulnerability, particularly in relation to hurricane vulnerability, are crucial factors that must be considered in the planning of a Priority Climate Action Plan for the Virgin Islands Energy Office.

Supply chain issues can impact the availability and reliability of essential resources needed for the implementation of climate action initiatives. Disruptions in the supply chain, caused by extreme weather events like hurricanes, can lead to delays in the delivery of equipment, materials, and resources necessary for climate resilience projects. Therefore, it is important for the Virgin Islands Energy Office to assess and address potential supply chain vulnerabilities in their planning process to ensure the successful implementation of their climate action plan.

Additionally, considering the climate vulnerability of the Virgin Islands to hurricanes, it is imperative for the Priority Climate Action Plan to incorporate measures that enhance resilience and preparedness for such extreme weather events. This may include investing in infrastructure that can withstand hurricane impacts, developing emergency response plans, and implementing renewable energy solutions that are more resilient to disruptions caused by hurricanes.

By integrating strategies to address supply chain issues and climate vulnerability, the Virgin Islands Energy Office can enhance the effectiveness and sustainability of their Priority Climate Action Plan, ultimately contributing to the overall resilience of the region in the face of climate change challenges.

4 PCAP elements

4.1 Greenhouse Gas (GHG) Inventory

Priority sectors identified by USVI include Electricity Generation and Road Transportation, which align with the priority actions for emissions reduction (utility scale solar, energy efficiency rebate programs for buildings sector, and alternative fuel options for transportation). The GHG emissions estimated for these priority sectors are:

Table 2. Summary of Priority GHG Emissions Inventory

Emissions Source Category	Metric Tons of Carbon Dioxide Equivalent (MT CO ₂ e)	Percent of Total
Stationary Combustion (from VIWAPA Electricity Generation 2022)	637,224	69%
Mobile Combustion (from road vehicles registered April 2023)	285,000	31%
Subtotal of Priority Sectors for PCAP	922,224	

Commentary on PCAP GHG Emissions Inventory Results

Stationary Combustion emissions from VIWAPA electricity generation can be disaggregated by district as follows:

- St. Thomas / St. John (Randolph Harley Power Plant)
 - o No. 2 Distillate Fuel Oil: **167,998 MT CO₂e**
 - o LPG: **190,065 MT CO₂e**
 - o STT District Subtotal: **358,062 MT CO₂e**
- St. Croix (Richmond Power Plant)
 - o No. 2 Distillate Fuel Oil: **45,777 MT CO₂e**
 - o LPG: **233,385 MT CO₂e**
 - o STX District Subtotal: **279,161 MT CO₂e**

Combining the emissions estimates above with electricity sales data from VIWAPA, district-level grid average emissions factors can be derived as follows:

- STT District Annual Average Grid Emissions Factor (2022)
 - o $358,062 \text{ MT CO}_2\text{e} / 385,761 \text{ MWh} = \mathbf{0.93 \text{ MT CO}_2\text{e/MWh} (2,046 \text{ lbs. CO}_2\text{e/MWh)}$
- STX District Annual Average Grid Emissions Factor (2022)
 - o $279,161 \text{ MT CO}_2\text{e} / 266,355 \text{ MWh} = \mathbf{1.05 \text{ MT CO}_2\text{e/MWh} (2,311 \text{ lbs. CO}_2\text{e/MWh)}$
- VIWAPA Overall Annual Average Grid Emissions Factor (2022)
 - o $637,224 \text{ MT CO}_2\text{e} / 652,116 \text{ MWh} = \mathbf{0.98 \text{ MT CO}_2\text{e/MWh} (2,154 \text{ lbs. CO}_2\text{e/MWh)}$

For comparison and benchmarking, USVI emissions factors are shown below with other comparable data points:

Table 3. USVI Emissions Factors Comparison

Geographic Location	Annual Average Grid Emissions Factor (lbs. CO ₂ e per MWh)
US Virgin Islands (Total VIWAPA)	2,154
US Virgin Islands – STT District	2,046
US Virgin Islands – STX District	2,311
United States*	828
Hawaii*	1,464
Puerto Rico*	1,600
Guam**	1,682
American Samoa**	1,457
Commonwealth of the Northern Mariana Islands**	TBD

*Source: EPA eGRID 2022

**Preliminary estimate calculated by NREL for EPA CPRG PCAP

Table 4. Description of sectors and subsectors in the U.S. Virgin Islands.

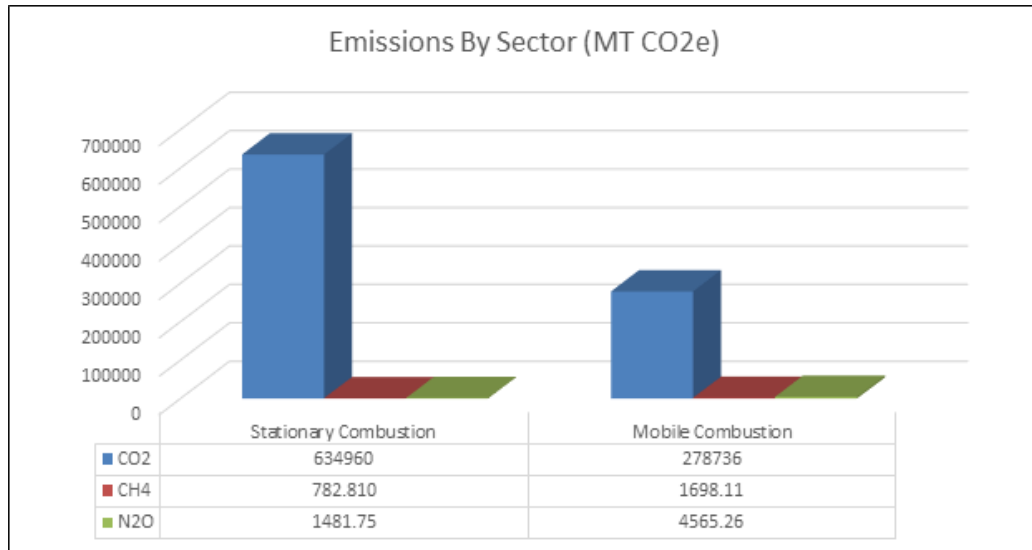
Sector	Subsectors	Greenhouse Gases	Description of Emissions
Power supply	Coal-, gas-, and oil-fired generation	CO ₂ , CH ₄ , N ₂ O, SF ₆	Fossil fuel combustion for power generation.
Industrial processes and product use	Cement production, semi-conductor manufacturing, and ozone-depleting substitutes use	CO ₂ , N ₂ O, HFCs, PFCs, SF ₆	Emissions from manufacturing processes Excludes emissions from industrial fuel combustion.
Transportation	On-road gasoline, on-road and off-road diesel, and jet fuel consumption	CO ₂ , CH ₄ , N ₂ O	Fossil fuel combustion from mobile combustion.
Waste management	Solid waste management and wastewater management	CO ₂ , CH ₄ , N ₂ O	Emissions from solid and liquid waste management systems.

We were unable to include Industrial processes and product use and waste management in our primary calculations. We did not have access to the necessary information for those calculations. However, the VIEO plans to include them in our Comprehensive Climate Action Plan (CCAP) with more measures to reduce related emissions.

The US Virgin Islands’ greenhouse gas emissions totaled 922,204 Metric Tons CO₂e in 2022

using the EPA’s Local Greenhouse Gas Inventory Tool (LGGIT) tool. Of these emissions, 69% were from stationary combustion for electricity and 31% were from mobile combustion for transportation.

Figure 1. Emissions by Sector and Type (MT CO2e)



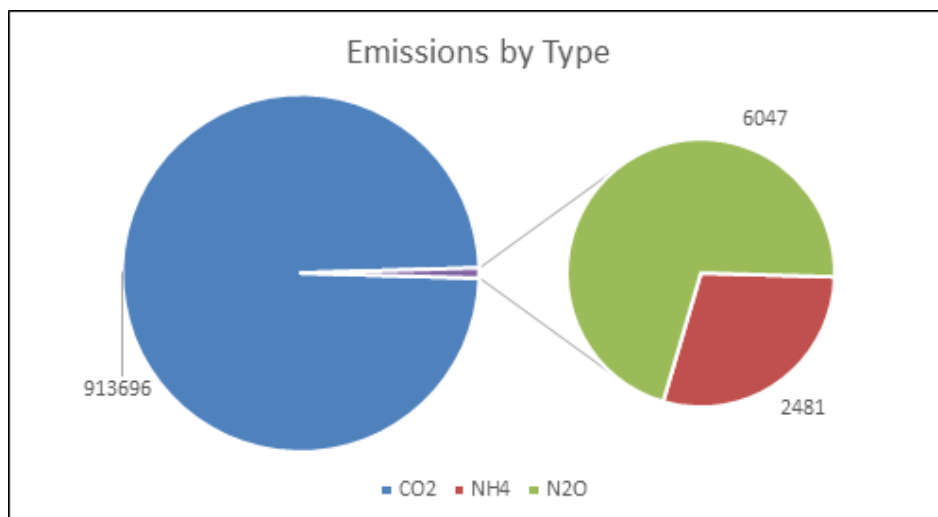
The sectors with the most GHG emissions are:

1. Power Supply
2. Transportation

We expect the sector with the third largest emissions to be waste management, although we were not able to include that sector in our analysis for this PCAP.

Figure 1 shows the emission by gases, in which carbon dioxide is the most emitted with 99 percent of total emissions. Methane and nitrous oxide accounted for only 1 percent of total emissions.

Figure 1: 2021 Emissions by Type (MT CO2e)



4.2 GHG Reduction Measures

The reduction measures that directly impact the GHG emissions landscape in the VI are a combination of current programs, initiatives, and electrification trends in the VI that directly affect the emissions profile within the territory. The USVI is currently operating under ACT 7075 and VISION 2040 as a guiding light for many emissions related efforts within the territory. Additionally, the VIEO is tasked with the creation of a Comprehensive Strategic Energy Plan that will bolster the territories efforts to reduce our carbon footprint and move the territory into a more sustainable future. Through the partnership with NREL we have established a benchmark to assist with quantifying our impact through the reduction measures in place currently, in design and on the horizon. The VIEO under the Office of the Governor does currently have authority over most if not all the forementioned measures. While some measures are collaborative efforts between agencies, the VIEO is directly involved in all. The PCAP reduction measures can and will be increased as additional funding opportunities become available and the CCAP will assist with quantifying those in more detail. Very notable funding opportunities that will drastically increase the landscape of the reduction measures are the CPRG Implementation opportunities and the Solar for All grant.

Energy Sector - Residential

- **Net Energy Billing interconnection program**
 - Since the inception of the Net Energy Billing program in 2020, a total of 12.2 MW of grid-tied solar systems have been registered with the utility with a median system size of 7.4 kW. 6 MW of grid-tied solar were installed in 2023 alone over 450 systems. Based on the increased investment and activity in this industry, and without a clear plan from the utility to lower electricity rates, there is unlikely to be a slowdown in solar PV adoption within the next 5 years. The trends seen from the tracking of PV adoptions shows a direct avoidance of CO₂e emissions of 1739 metric tons since 2020 with an additional 732 metric tons avoidance per year moving forward (CCAP will provide detail trends analysis)
 - In the mid-2000s the Net Energy Metering (NEM) Program put 15 MW of rooftop solar on the grid. This program facilitated 2,138 metric tons of avoided CO₂ equivalent emissions.
 - Solar + Financing is an upcoming program created by the VIEO to provide low interest rate loans for 80-100 homes to provide a PV system size average of 4kw with 13 kwh battery storage. This program is funded by State Energy Program (SEP) grant funds and is a collaboration between the VIEO, VI EDA and VI WAPA. It is anticipated that the systems created by this program will impact the NEB values in the years 2024 and 2025.

Energy Sector – Utility Scale

- Energy Efficiency & Microgrid implementation

The departure from centralized fossil fuel energy systems to a renewably powered distributed energy mix will play a critical role in reducing greenhouse gas emissions. This will be achieved by diversifying energy sources and moving renewable generation closer to the point of demand. The territory has several strategic Micro-Grid projects that are underway and in the pipeline that seeks to be a catalyst for this transition.

- **WAPA – FEMA Funded Micro-Grid**

- The Virgin Islands Water and Power Authority's (WAPA) plan to develop an 18-megawatt (MW) microgrid, complete with a 10MW/20 MWh battery storage system, for the west end of St. Croix, US Virgin Islands. When completed, the 18 MW generated by the microgrid will be coupled with four megawatts of renewable energy produced by the solar facility at Spanish Town to represent 50% of the daily power generation by renewables produced on St. Croix.

- **WAPA – Solar & Wind PPAs**

- The Virgin Islands Water & Power Authority is positioned as an off-taker of energy from several Utility-Scale Solar farms both deployed and under development. Currently there are two functional grid-tied Utility solar farms of 4MWac and 5WMac on St. Croix and St. Thomas respectively. These farms currently play a role in offsetting the peak demand from the centralized generation at certain points throughout the day. However, these solar farms are not supported by energy storage, as a result the offset in emissions reductions are limited by the throttling of thermal generation due to the intermittency of solar. By comparison, the portfolio of 46 MW of planned Solar PPAs and 30 MW of Wind that are scheduled to be deployed will include energy storage and therefore will form the renewable energy generation exported to the grid which result in highly predictable generation cost and emission offsets.

- **St. Croix Education Complex – Emergency Shelter Micro-Grid**

- The system comprises of a 168 kW Solar plus 220 kWh battery micro-grid at the St. Croix Educational Complex. The micro-grid will enable the Educational Complex's emergency hurricane shelter to function reliably during extended grid outages and significantly reduce the use of fossil fuel generators that have proven difficult to maintain and costly to fuel. Additionally, under blue-sky conditions the solar micro-grid will aid in offsetting approximately \$7,500 per month in utility costs as well as provide 10-12 Tons of CO2 reduction per month.

- **Energy Efficient Generation Transformation**
 - Water and Power Authority (WAPA), as the regulated public utility responsible for providing electricity to Virgin Islanders, plays a critical role in working towards filling that unmet need. As such, most of the CDBG-DR electrical grid funds are going towards a WAPA-managed project, the **Richmond Estate Generating facility** on St. Croix. WAPA's Strategic Transformation Plan identifies system improvements to promote a reduction in the reliance upon fuel oil as the primary source of energy in the Territory, particularly in the third theme of its plan, Generation Section Transformation. The proposed project consists of installing new power generation up to a capacity of **40 MW at the Estate Richmond Power Plant (ERPP)** facility on St. Croix. The project plan also includes a proposed **10 MW/20 MWh (2-hour) Battery Energy Storage System (BESS)** and other equipment needed to facilitate new generation use. This project will provide far-reaching benefits to all ratepayers in the target area of the St. Croix District through installation of more affordable, efficient, and reliable power generation technology. The planned project will reduce the cost of electricity production and will allow for improved coordination between system load and the dispatch of generation resources to minimize unnecessary use of fuel. The combined effects of lower base electricity costs improved operational efficiency and reduced air pollution will help to ensure the security, health, and welfare of all US Virgin Islanders.

Energy Efficiency Sector

The Weatherization Assistance Program (WAP) is currently in progress with an estimated average yearly energy savings of \$372.00 per weatherized household. The WAP program is managed and implemented through the VIEO and covers all islands within the territory. All reporting for the WAP program follows standard DOE protocols and estimated savings are based on the anticipated measures to be installed. The average annual utility bill is \$1,884 equating to roughly 20% reduction in usage which allows us to estimate the GHG avoidances through kwh saved from the \$0.43/kwh utility rate. PY 2023 projections are for 147 homes to be weatherized under our standard annual WAP funding and with 333 units expected through June of 2026 through Weatherization Assistance Program Bipartisan Infrastructure Law (WAPBIL) funding. Additionally we expect fifty-five units per year moving forward from our standard annual DOE WAP grant funding. The WAP program is estimated to save 254,000 kwh equating to 177 Metric Tons of CO₂e avoided.

HOME energy rebates programs are still in the preliminary stages of development, but we have an estimated combined grant funding allotment of \$51,172,560 which is estimated to impact just over 4,000 homes throughout the territory. The Home Energy Rebate programs are part of the State and Community Energy Programs division under the DOE and the two separate focus areas: Home Efficiency Rebates and Home Electrification & Appliance Rebates. These

programs have a mandated energy savings requirement of 20% which is used in our estimated calculations of minimum CO₂e emissions avoidance. These programs require energy audits to confirm estimated savings from measures implemented through the grant and the reporting structure follows standard DOE protocols for tracking purposes. The estimated savings of 1,750 mwh equates to an estimated avoidance of 1,229 metric tons of CO₂e emissions.

Transportation Sector

- **The Equitable E-Mobility Rebate Program** is a direct result of funding through the Bi-Partisan Infrastructure Law State Energy Program. The program is effective for purchases made on or after April 1st, 2023, and it aims to incentivize the adoption of electric vehicles (EVs) and electric bicycles (e-bikes) by offering substantial rebates to residents of the US Virgin Islands. The Equitable E-Mobility Rebate Program is a strategic effort by the Virgin Islands Energy Office to accelerate the transition to clean and sustainable transportation options, contributing to a reduction in carbon emissions and promoting a healthier environment. By providing substantial rebates for both new and used electric vehicles we aim to make sustainable mobility options accessible to a broader range of residents. This program anticipates the addition of 60 EV into the registered vehicles within the territory, which would represent a 25% increase in electric vehicle penetration locally.
- **GVI GO Fleet Electrification** efforts are a collaboration between the VIEO, the VI Department of Property and Procurement and the VI Department of Public works. Since its inception the GVI has been successful in introducing EV light duty fleet vehicles to a range of GVI agencies and more recently passenger vans for the DPW public transportation fleet. The VIEO has used DOI Energizing Insular Communities grant funds to accelerate the GO Fleet initiatives. GO Fleet activities include vehicles procurement, maintenance support and training support for the EV transition within the territory.
- **Government Funded Level 2 & Battery Integrated DC Fast Chargers**
The GVI supports the adoption of EVs and sees the transition to EVs as an undertaking to help the territory reduce overall costs, improve operational efficiency, enhance its sustainability and resiliency efforts, and provide the public benefit of reduced tailpipe emissions. EVs can also enhance resiliency benefits, which is of specific relevance to USVI—not only can EVs represent mobile emergency power sources, but they can also help relieve the stress of gas-station refueling logistics, providing needed time to focus on recovery efforts. These benefits align well with the territory’s 20-year economic development plan (Vision 2040), as well as the 2009 Virgin Islands Legislative Act 7075, which directs all government departments to acquire the most efficient alternative-fuel vehicles for its fleet. The overall outcome of this measure will be the successful deployment of a public Level 2 EVSE & DC Fast Charging network that is supported by co-located renewable energy.

Industrial & Commercial Building Sector

The Virgin Islands accounts for a relatively small geographical footprint; however, a significant amount of industrial and larger scale commercial hospitality operations contributes significantly to the GHG emissions that are difficult to quantify. Historic utility challenges have pushed industrial and commercial operations to create a network of distributed fossil fuel micro-grids at these sites across the territory. While the load shift away from the utility has reduced the GHG of the Utility's profile due to reduced demand for centralized generation, industrial and commercial facilities continue to be major GHG emitters due to their on-site generation that is not monitored as closely as the utility assets. The measures in this section will seek to develop programs that support the industrial sector transition away from site-based fossil fuel generation by enabling access to renewable energy that benefits both the industrial and commercial entities in parallel with the providing benefits to the entire grid. Installation of renewable energy and energy storage systems on commercial & industrial facilities is an example of a GHG reduction measure as is the development of targeted incentives for installation of renewable energy and energy storage systems on commercial buildings and industrial facilities.

The VIEO has been provided federal funds by the USDOE Energy Efficiency and Conservation Block Grant Program BIL (EECBG-BIL) program to support government facility assessments for the integration of solar plus storage, which will assist in holistic scoping needs of subsequent implementation projects.

Industrial Process & Waste Sector

Despite the small geographic footprint industrial processes, primarily on the islands of St. Croix and waste management across the territory present bolstered GHG emissions profiles as referenced in table 4. Over the years the island of St. Croix has accommodated a network of high-volume production distilleries that are still in operation today. Additionally, St. Croix has housed, at one point, the 8th largest the crude oil refinery in the world. While the traditional refining operation is not currently in service the vast industrial facility is equipped to return to service and represents a significant GHG emitter if returned to its original operational format. Additionally, municipal solid waste management on remote isolated islands presents an inherent GHG emissions and logistical challenges. The Virgin Islands is committed to pursuing measures that mitigate the GHG emission profiles of existing industrial processes and infrastructure. Strategically leveraging existing industrial infrastructure and process capabilities to produce renewable fuels and manage existing waste streams through energy conversion are key measures to the Virgin Islands can explore.

4.3 Benefits Analysis

Table 2. Existing Distributed Solar

<u>Greenhouse Gas Equivalencies Calculator US EPA</u>			
Solar Savings Calculator			
Measure	MW-DC	KWH saved	Metric Tons CO2e avoided
Energy Sector - Residential			
NEM		3,059,793	2138
Current Residential Solar (NEB)		2,488,632	1739
* increase/year		1,047,600	732

This analysis was completed with the use of the VIEO solar savings calculator ([VIEO SSC](#)) developed in partnership with LBNL (Lawrence Berkeley National Laboratory).

A monthly utility bill of \$323.50 (taken from the average bill for all applicants of the VIEO Solar Plus Financing Pilot Program) is assumed to make these calculations possible. This, along with the median system size facilitates the calculation of avoided grid draw (not considering battery storage). This average avoided grid draw is then multiplied by the number of registered grid-tied PV systems in total, or the number of systems added per year.

Table 5. Utility Scale Solar Plus Storage and Energy Efficient Generation

<u>Avoided Emissions and Generation Tool (AVERT) US EPA</u>			
Energy Sector - Utility Scale	MW-DC	Metric Tons CO2 Avoided	
STX Generation Transition - 40mw 50% efficiency increase			
Midland	5		
Centerline Road	17		
East End	16		
Hesselberg	13		
Eastern Portion	0		
Adventureland	21		
Total	72	98,760	

Table 6. EV Transition

<u>Avoided Emissions and Generation Tool (AVERT) US EPA</u>			
Transportation	light duty- EV	Passenger Van	Metric Tons CO2 avoided
EV Transition	76	3	642

The calculations for the planned microgrids and EV rebate programs were done using AVERT, the EPA’s Avoided Emissions and Generation Tool.

The Midwest region was referenced as it includes the SERC Midwest eGrid subregion. This region has a high per MWh emissions rate relative to other subregions, similar to the Virgin Islands. In the tool we entered the total size of planned microgrids (72MW) and the total number of vehicles for which we can offer rebates. We also included the acquisition of 14 light duty vehicles and 3 passenger vans funded through the Energizing Insular Communities DOI Grant. The results displayed are from the annual emissions changes including vehicles for the entire region.

Table 7. Weatherization/EE Programs

Energy Efficiency	Estimated savings	Annual KWH saved/unit	Units	Timeline	Total KWH saved	Metric Tons CO2e avoided
HOMES	20%	438	4017	≈2033	1,759,665	1229
WAP	20%	438	580	Jun-26	254,040	177

The WAP program estimates savings of 254,000 kwh equating to 177 Metric Tons of CO2e avoided.

Table 8. Industrial & Building Sector

The benefits analysis used to demonstrate the Industrial & Commercial sector measure include the modeling of a network of 72 MWdc Solar PV arrays that would produce, on average, 270 MWh of energy daily and displace current distributed fossil fuel generation. This model represents 135 MWh of clean energy being produced across a network industrial and commercial site co-located DERs instead of burning fossil fuels. The calculations below are based on the impact forecast of strategically sited Industrial and Commercial building Solar integration. The GHG offset calculations were based on technical assessments conducted by subject matter experts in the field in order to scope project scale and leveraging tools similar to AVERT, the EPA’s Avoided Emissions and Generation Tool to calculate GHG reduction impacts.

Emission Profile of Standard Industrial & Commercial Building Fossil Fuel Generation

Emission	lbs / MWh	Daily GHG PHRT (LBS)	Annual GHG PHRT (LBS)	Annual GHG PHRT (TONS)
NOX	2.5	2,878	1,050,543	525
CO	5	5,756	2,101,086	1,051
VOC	4.3	4,951	1,806,934	903
CO2	817	940,596	343,317,452	171,659

Solar PV Emissions Offset

Solar PV 12 MW
Daily MWh 54 MWh

Emission	Daily Offset (Lbs)	Annual Offset (Lbs)	Annual Offset (Tons)
NOX	135	49,275	25
CO	270	98,550	49
VOC	232	84,753	42
CO2	44,118	16,103,070	8,052

Years 2025 thru 2030 Tons	Years 2025 thru 2050 Tons
148	641
296	1,281
254	1,102
48,309	209,340

Solar PV Emissions Offset

Solar PV 60 MW
Daily MWh 270 MWh

Emission	Daily Offset (Lbs)	Annual Offset (Lbs)	Annual Offset (Tons)
NOX	675	246,375	123
CO	1,350	492,750	246
VOC	1,161	423,765	212
CO2	220,590	80,515,350	40,258

Years 2025 thru 2030 Tons	Years 2025 thru 2050 Tons
739	3,203
1,478	6,406
1,271	5,509
241,546	1,046,700

Solar PV Emissions Offset

Solar PV 72 MW

Daily MW 324 MWh

Emission	Daily Offset (Lbs)	Annual Offset (Lbs)	Annual Offset (Tons)
NOX	810	295,650	148
CO	1,620	591,300	296
VOC	1,393	508,518	254
CO2	264,708	96,618,420	48,309

Table. 9 Industrial Process & Waste Secto

Total GHG Reduction for calendar year 2025 through 2030:	21,378 tons
Total GHG Reduction for calendar year 2025 through calendar year 2050	119,283 tons

Solid Waste Management presents a significant challenge to GHG emissions in the territory. Methane accounts for approximately 16 percent of global emissions and is more than 28 times as potent as carbon dioxide at trapping heat in the atmosphere. To reduce these GHG emissions for the USVI, establishing waste to energy measures that divert methane emissions from landfills and other sources while producing renewable energy.

Estimated GHG reduction from this measure: The potential to convert 100-150 tons of organic waste per day from the VI Waste Management Authority’s municipal collection was modeled by subject matter experts within the field to forecast the potential impacts.

4.4 Review of Authority to Implement

The VIEO has direct authority to implement these changes as granted by the Executive office of the Government of the US Virgin Islands. The VIEO, under the Office of the Governor and through Grant Funding, has the authority to create project scopes and execute those plans.

4.5 Identification of Other Funding Mechanisms

1. Environmental Protection Agency (EPA): EPA offers funding opportunities for projects related to greenhouse gas emission reduction such as the Climate Pollution Reduction Grant.
2. Department of Energy (DOE): The Department of Energy offers funding opportunities for clean energy initiatives that could include renewable energy, efficient upgrades, carbon capture, and other technologies with the purpose of reducing greenhouse gas emissions. The VIEO currently seeks and obtains funding from the DOE through WAP, SCEP, SEP, Home grants, and SERC opportunities.
3. Department of Transportation: The Department of Transportation offers funding for multiple transportation initiatives focused on decreasing the use of motor vehicles. This program is focused on public transportation, pedestrian walkways, bike, and other transportation use, and more. Examples include the complete streets and safety streets for all.
4. Department of Agriculture (USDA): The Department of Agriculture has multiple funding sources related to renewable energy projects, sustainability in farming, conservation, and more with the purpose of reducing greenhouse gas emissions.
5. Department of Housing and Urban Development (HUD): The Department of Housing and Urban Development offers funding opportunities for projects related to sustainable housing and community development projects. This project includes green infrastructure and energy efficiency with the purpose of reducing greenhouse gas emissions.

6. Federal Management Agency (FEMA): The Federal Management Agency has multiple funding resources focused on net zero project for GHG emissions through FEMA’s Hazard Mitigation Grant Program (HMGP), Hazard Mitigation Grant Program Post Fire, Pre-Disaster Mitigation (PMD), Building Infrastructure and Communities (BRIC), and Public Assurances Programs (PA).

7. DOI: Energizing Insular Communities: The Energizing Insular Communities (EIC) program (formerly called the Empowering Insular Communities program) provides grant funding for energy strategies that reduce the cost of electricity and reduce dependence on foreign fuels. This program is intended to support the Secretary’s priority to utilize our natural resources by ensuring American energy is available to meet security and economic needs.

4.6 Workforce Planning

The VIEO continues to offer strong career development opportunities through the installation of solar PV, battery storage, and smart grid implementation. VIEO has valuable multi-sector partnerships for technical assistance. Workforce development (WFD), including contractor training, adult education, and support services, will be partially funded through the expanded State Energy Program under the Bipartisan Infrastructure Law (SEP BIL). The USVI Department of Labor (DOL) will support workforce development, while non-profit partners will assist in education and outreach. Other technical assistance will include an updated list of contractors with their associated certifications such as The North American Board of Certified Energy Practitioners (NABCEP) will be the minimum threshold for addition to the list), online solar insurance resources (i.e., trusted providers, FAQs). The VIEO currently has WFD planned in the following areas:

1. Training for Residential Energy Contractors
 - a. Residential Electrician
 - b. Foundations of Plumbing
 - c. HVAC Certified Technician
2. Energy Auditor Training
 - a. Commercial Energy Auditors
 - b. Residential Energy Auditors
3. State Energy Program BIL funds
 - a. Electric Vehicle Training Certification
 - b. EV Collision Repair Certification
 - c. Renewable Energy Workforce Development – Solar PV
 - i. Associate Credential
 - ii. Design specialist certification
 - iii. Installation professional certification
 - iv. System inspector certification
 - v. Commissioning & Maintenance Specialist Certification
 - vi. Installer specialist certification

5 Next Steps

The VIEO is actively working towards reduction measures across all programs and is in the process of identifying a key partner for the development of the territorial CCAP.