



Priority Climate Action Plan

CLEAN AIR COALITION

SARASOTA-MANATEE REGION

March 2024

North Port – Sarasota – Bradenton MSA



Sarasota County, on behalf of the North Port-Sarasota-Bradenton, Florida MSA

ACKNOWLEDGMENTS

The Sarasota-Manatee Region acknowledges the support of its partners and the consulting team for providing valuable support and capacity towards the Priority Climate Action Plan (PCAP).

Sarasota County (Lead Agency)

Sara Kane, Project Manager, Sarasota County

Alia Garrett, Engagement Specialist, Sarasota County

Agency Partners

City of North Port, City of Sarasota, City of Venice, City of Bradenton, Manatee County, City of Holmes Beach, Town of Longboat Key, Sarasota-Manatee Metropolitan Planning Organization, Tampa Bay Regional Planning Council.

Consulting Team

Catherine Prince, WSP

Sean Copland, WSP

Rebecca Frohning, WSP

Rebecca Holzwarth, WSP

Rebecca Vanderbeck, WSP

Daren Chatham, WSP

Alice Lovegrove, WSP

Bakai Ruslanbek Uulu, WSP

Keith Ponitz, WSP

Nina Mantegna, WSP

Fabian Campos, WSP

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This project has been funded wholly or partially by the United States Environmental Protection Agency (EPA) under assistance agreement 5D-02D57523-0 to Sarasota County. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.



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DEFINITIONS AND ACRONYMS

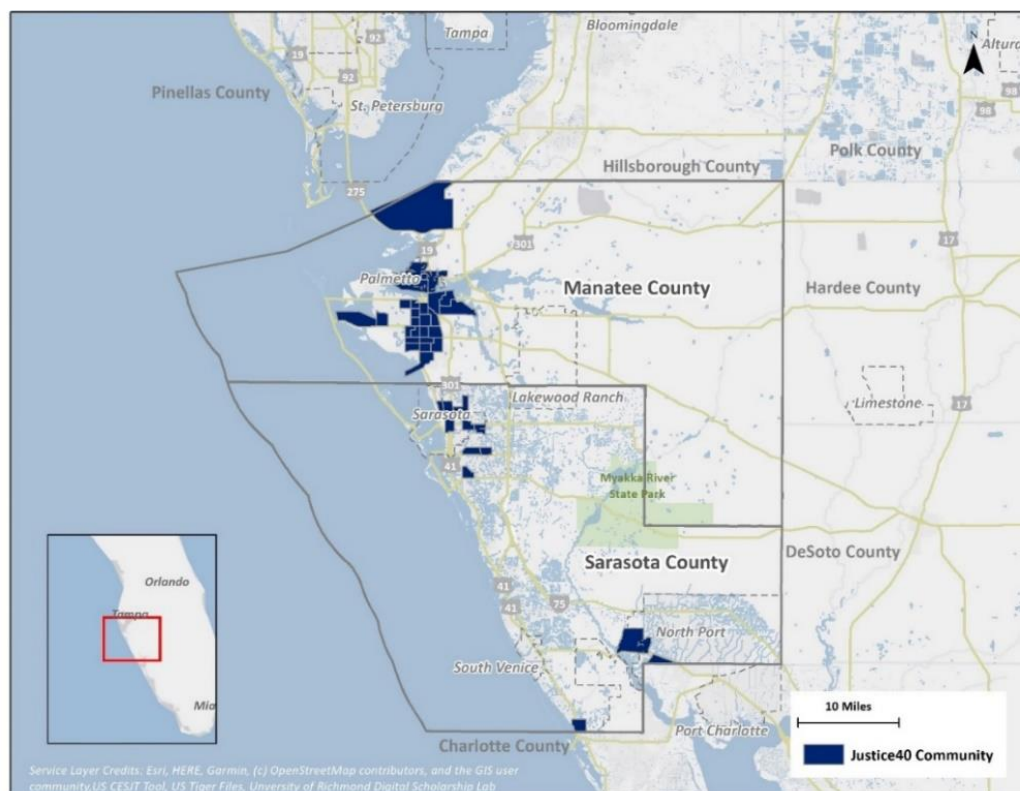
BEBR	Bureau of Economic and Business Research
CBO	Community Based Organization
CCAP	Comprehensive Climate Action Plan
CEJST	Climate and Economic Justice Screening Tool
CH₄	Methane
CO₂	Carbon Dioxide
CPRG	Climate Pollution Reduction Grants
EJ Screen	Environmental Justice Screening Tool
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse Gas
GWP	Global Warming Potentials
ICLEI	International Council for Local Environmental Initiatives
IPCC	International Panel on Climate Change
IRA	Inflation Reduction Act
LEED	Leadership in Energy and Environmental Design
LIDAC	Low-Income and Disadvantaged Communities
MSA	Metropolitan Statistical Area
MT CO_{2e}	Metric Tons of Carbon Dioxide Equivalent
N₂O	Nitrous Oxide
NPSB	North Port-Sarasota-Bradenton
PACE	Property Assessed Clean Energy
PCAP	Priority Climate Action Plan
PV	Solar Photovoltaics
SHA	Sarasota Housing Authority
USGBC	U.S. Green Building Council
VMT	Vehicle Miles Traveled
NREL	National Renewable Energy Laboratory

EXECUTIVE SUMMARY

The Priority Climate Action Plan identifies priority, short-implementation greenhouse gas reduction measures with benefits to low-income and disadvantaged communities and the region.

Sarasota County is the lead agency and grantee of the North Port – Sarasota - Bradenton, Florida Metropolitan Statistical Area (MSA), EPA Climate Pollution Reduction Grant (CPRG). The development of the Priority Climate Action Plan (PCAP) integrates existing sustainability plans, implementation programs, regional priorities, as well as community priorities identified during engagement.

FIGURE ES-1. Sarasota-Manatee region MSA and the low-income and disadvantaged communities (Justice 40)



The existing plans that were reviewed include Sarasota County and City of Sarasota’s climate vulnerability assessments, Sarasota County and City of Sarasota’s sustainability assessments, City of Venice vulnerability assessment and resilience plan, Sarasota-Manatee MPO 2045 Long Range Transportation Plan, and Sarasota County Post Disaster Redevelopment Plan. The regional effort to develop the PCAP was rebranded as ‘Clean Air Coalition Sarasota-Manatee Region’.

Regional priorities were identified through inter-agency coordination and include need for 1) community-wide cooling centers that can serve as local resilience hubs, 2) renewable energy for water and sewer facilities, school, community centers and municipal buildings, 3) methane recovery from landfills, and 4) decarbonization of the bus (schools and transit) fleet.

The PCAP identified the low income and disadvantaged communities (LIDAC) and analyzed the socioeconomics of the area in comparison to the region. Community engagement sessions were specifically calibrated to LIDAC areas. Community priorities were identified through workshops with community-based organizations with a history of working with low-income and disadvantaged communities and through a community-wide survey.



The top challenges identified were 1) high energy costs, 2) exposure to extreme heat, and 3) lack of access to reliable, convenient, safe, and affordable public transportation or mobility options.


GHG emissions inventory for the North Port-Sarasota-Bradenton Metropolitan Statistical Area was assembled and divided by key economic sectors. The top GHG emission or air pollution contributors in the region are:

Transportation and mobile sources– 49%, Residential energy – 21%, and Commercial energy – 19%.




The prioritized GHG reduction measures in the Sarasota-Manatee region and the corresponding LIDAC benefits analysis are noted below. The implementation authority for each of these measures is with Sarasota and Manatee Counties and the cities in the region under the provisions of the Florida State statutes. Additional information is provided in the document.

RESIDENTIAL BUILDINGS



Measure	2025-2030 Potential GHG Reduction (MTCO ₂ /yr)	2025-2050 Potential GHG Reduction (MTCO ₂ /yr)	LIDAC Benefits. Annual Household Savings
 #1 Residential Renewable Energy	3,849.15	46,617	\$2,175
 #2 Residential Energy Efficiency	8,738.25	105,829.95	\$266

Measure	2025-2030 Potential GHG Reduction (MTCO ₂ /yr)	2025-2050 Potential GHG Reduction (MTCO ₂ /yr)	LIDAC Benefits. Annual Household Savings
 #3 Residential Building Enclosure Upgrades	5,489.24	66,480.79	\$167.06
#3 Residential Buildings Window, Door, and Skylight Replacement	1,568.35	18,994.51	\$159.13

COMMERCIAL (AGENCY-OWNED FACILITIES)

Measure	2025-2030 Potential GHG Reduction (MTCO ₂ /yr)	2025-2050 Potential GHG Reduction (MTCO ₂ /yr)	LIDAC Benefits and Co-benefits
 #4 Facilities Renewable Energy	4,626	56,022	<ul style="list-style-type: none"> ▪ Workforce improvements ▪ Improved community resilience ▪ Improved air quality ▪ Improved public health ▪ Improved resilience ▪ Potential savings in the agency-owned utility cost passed to end users
 #5 Facilities Energy Efficiency	3,330.60	40,337.19	<ul style="list-style-type: none"> ▪ Improved community resilience ▪ Improved community connectivity ▪ Improved public health ▪ Potential savings in the agency-owned utility cost passed to end users
 #6 Facilities Building Enclosure Upgrades	504.65	6,111.82	<ul style="list-style-type: none"> ▪ Improved community resilience ▪ Improved air quality ▪ Improved public health ▪ Potential savings in the agency-owned utility cost passed to end users

TRANSPORTATION

Measure	2025-2030 Potential GHG Reduction (MTCO ₂ /yr)	2025-2050 Potential GHG Reduction (MTCO ₂ /yr)	LIDAC Benefits and Co-benefits
 <p>#7 Reduce Roadway Miles Traveled</p>	4,626	56,022	<ul style="list-style-type: none"> Workforce improvements Improved community resilience Improved air quality Improved public health Improved resilience Potential savings in the agency-owned utility cost passed to end users
 <p>#8 Decarbonize Lawn Equipment</p>	3,330.60	40,337.19	<ul style="list-style-type: none"> Improved community resilience Improved community connectivity Improved public health Potential savings in the agency-owned utility cost passed to end users
 <p>#9 Decarbonize Agency Fleet</p>	504.65	6,111.82	<ul style="list-style-type: none"> Improved community resilience Improved air quality Improved public health Potential savings in the agency-owned utility cost passed to end users

The next phase is developing the Comprehensive Climate Action Plan (CCAP) through an extensive community and agency stakeholder engagement. Community engagement will focus on continuing to engage with community-based organizations, utilizing pop-up events to bring engagement where the community already gathers, and conducting interactive in-person workshops. Engagement with the jurisdiction within the Sarasota-Manatee County region will continue through the development of CCAP to ensure it includes the long-term clear air strategy for the region while building consensus.

The CCAP will be followed by a Status Report in November 2027 that includes tracking over a four-year period.

1 | INTRODUCTION

The Priority Climate Action Plan (PCAP) for the Sarasota-Manatee region represents an evolution in ongoing climate planning initiatives. The PCAP underscores the intricate linkages between sustainability and equity, emphasizing a community-wide approach to improving air quality, mobility, urban greening, and more to enhance the overall quality of life for all.

While the U.S. has made tremendous strides in improving air quality since 1990, far too many Americans are still exposed to toxic air pollutants, particularly in urbanized areas and communities near industrial facilities or major transportation facilities. Though the Sarasota-Manatee region has worked diligently to improve air quality and mitigate growing levels of asthma, more frequent and severe wildfires, increasing temperatures, and stronger and more frequent storms have further impacted the region. In October 2023, Sarasota County skies were hazy and air quality levels were deemed unhealthy due to smoke from Canadian wildfires. As these types of events become more common, the region is committed to investing into the communities that are experiencing health impacts by actively reducing harmful pollutants.

The U.S. Environmental Protection Agency (EPA) Climate Pollution Reduction Grant (CPRG) provides an opportunity to respond to the region’s urgent need for climate action by working closely with local governments, and partners in the Sarasota-Manatee region. The CPRG grant allows the region to develop comprehensive plans to reduce greenhouse gas (GHG) emissions and mitigate other harmful air pollutants. The Sarasota-Manatee region recognizes the importance of heeding the experiences of those most adversely affected by climate pollution, including individuals already dealing with challenges like hunger, poverty, extreme heat, and other related issues. By prioritizing the voices of those experiencing firsthand the impacts of climate pollutants, the region seeks comprehensive solutions encompassing a broad landscape of understanding and practices.

The EPA’s CPRG program authorized under Section 60114 of the Inflation Reduction Act provides \$5 billion in grants to states, local governments, tribes, and territories to develop and implement plans for reducing greenhouse gas (GHG) emissions and other harmful air pollution. Sarasota County, on behalf of the North Port-Sarasota-Bradenton MSA region received a \$1M grant from the EPA’s CPRG program to develop this Priority Climate Action Plan (PCAP) and a Comprehensive Climate Action Plan (CCAP). City of North Port, City of Venice, City of Sarasota, City of Holmes Beach, and Manatee County submitted Notice of Intent to Participate letter to Sarasota County as the implementing agency responsible for moving this project forward.

The CPRG program provided planning grants to develop a PCAP that incorporates a variety of measures to reduce GHG emissions from six key sectors (electricity generation, industry, transportation, buildings, agriculture, natural and working lands, and waste management). The planning grant requires two major deliverables: the PCAP due in March 2024 followed by a CCAP in November 2025.

The PCAP includes near-term, implementation-ready, priority GHG reduction measures. The PCAP comprises a GHG inventory, quantified GHG reduction measures, a low-income and disadvantaged communities' benefits analysis, and a review of authority to implement the measures. Entities that received the planning grant and submitted the PCAP will qualify for approximately \$4.6 billion for competitive implementation grants for GHG reduction programs, policies, projects, and measures identified in a PCAP developed under a CPRG planning grant in April 2024.

The PCAP commitment is not just a grant requirement to our region but also aligns with our core values of placing equity and community engagement at the forefront of programs, projects, and initiatives. This includes creating economic opportunities for disadvantaged and low-income communities and planning for job opportunities and workforce development.

The CCAP will outline the scope for more detailed modeling, technical analysis, and community engagement and will be a detailed roadmap for decarbonizing the region. The CCAP will be followed by a Status Report with tracking metrics over four years in November 2027.

1.1 REGIONAL COLLABORATION

Sarasota County takes great pride in its rich history of collaboration and commitment to fostering long-term sustainability through strategic partnerships. Recognizing the complexity of addressing climate action and resilience, Sarasota County has embraced a holistic approach that involves collaborating with various sectors, including nonprofit organizations, business associations, and advocacy groups. These partnerships are integral components of the region’s comprehensive efforts to tackle environmental challenges and build a resilient future. Below we share some of the noteworthy partnerships that have played a pivotal role in advancing the region's commitment to climate action. For the PCAP the regional collaboration was branded as ‘Clean-Air Coalition Sarasota-Manatee Region’.



For this EPA CPRG regional collaboration, the Sarasota-Manatee Region branded this collation as ‘Clean-Air Coalition.’

[Sarasota-Manatee Climate Council¹](#) serves as a facilitated network of experts and practitioners addressing climate change issues in the region. Sarasota County staff actively engaged in the education and outreach intergovernmental climate working groups, overseeing projects such as a survey tool for evaluating climate education and a grant funded initiative producing educational videos featuring local climate change examples.

In addition, Sarasota County, Manatee County, the City of Sarasota, and the City of Bradenton participate as member government organizations in the Tampa Bay Regional Resiliency Coalition. They participate in the steering committee and help implement the Regional Resiliency Action Plan (RRAP).



The region has been collaborating on Climate Action through the Climate Council Sarasota-Manatee.

¹ <https://www.scienceandenvironment.org/project/climatecouncil/>

Sarasota County’s active participation in the Florida Sustainability Directors Network (FSDN) fosters accelerated knowledge sharing among local government sustainability professionals statewide, reinforcing the regional network and contributing to a more resilient future. As a member of the Science and Environmental Council, a non-profit consortium of 38 environmental organizations in Sarasota and Manatee Counties, Sarasota County collaborates to initiate impactful projects that leverage the community’s collective strength. Sarasota County’s involvement in the Resilient Florida Working Group further emphasizes its commitment to collaboration, conducting meetings with regional jurisdictions to gather diverse stakeholder input and connect staff across the state for an impactful partnership.



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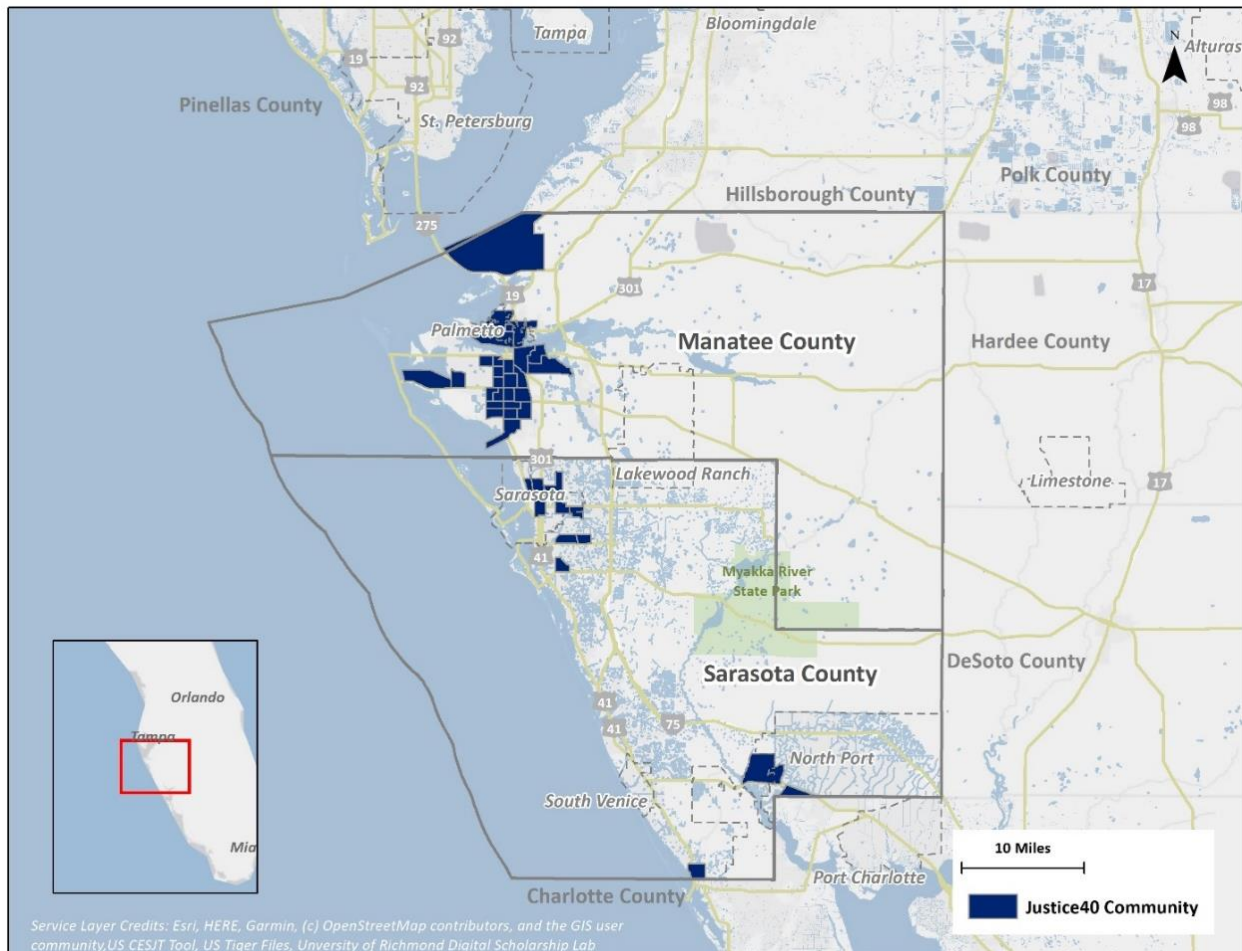
The Sarasota Manatee region continually collaborates with the Tampa Bay Regional Resiliency Coalition for both Climate Action and Resilience.

1.2 LOW INCOME AND DISADVANTAGED COMMUNITIES IN THE REGION

Low income and Disadvantaged Communities (LIDAC) are identified by the Environmental Protection Agency’s (EPA) Climate and Economic Screening Tool (CESJT) that are overburdened and endure disproportionate air quality impacts, poverty, and more. LIDACs, or Justice40 Communities in this study, include communities that are historically communities of color and have been excluded in decision-making processes. The map below shows the census tracts identified as LIDAC communities.

The Sarasota-Manatee region have prioritized involving historically low-income and disadvantaged communities (LIDACs) in the Priority Climate Action Plan (PCAP) process.

FIGURE 1-1. Justice40 Communities, or LIDAC areas within the Sarasota-Manatee region MSA.

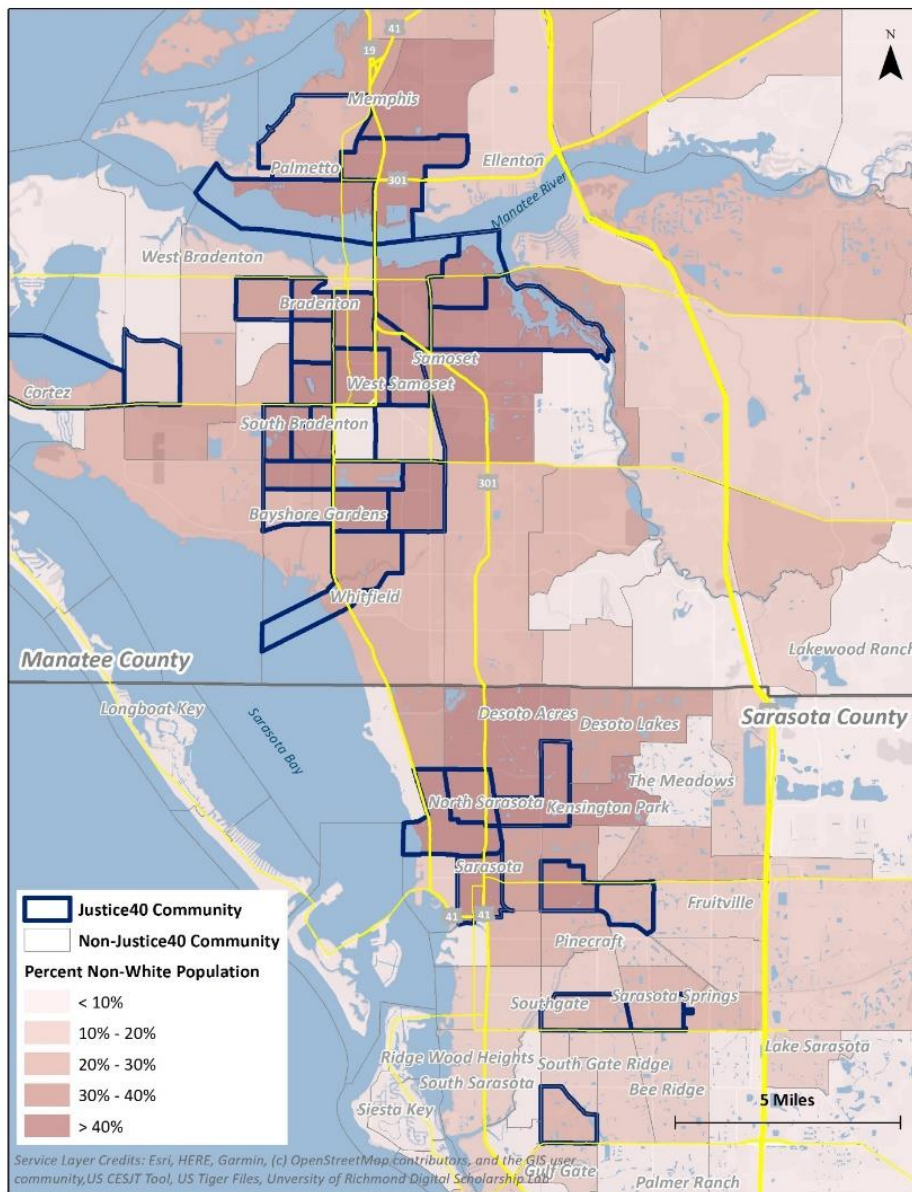


Chapter 2 | **Low Income and Disadvantaged** Communities analyses the disproportionate burdens on the LIDAC communities compared to the region. Chapter 3 | **Engagement** discusses the emphasis on

engagement and outreach strategies, and **Chapter 5 | GHG Reduction Measures** presents the benefits and co-benefits within the prioritized GHG reduction measures.

The Sarasota-Manatee region has undertaken purposeful community outreach initiatives to actively contribute to a future where environmental stewardship and social equity are fundamental to the collective progress of LIDAC communities. Engagement and outreach plans for these communities are detailed in **Chapter 3 | Engagement**. LIDACs in the Sarasota and Manatee region have a higher concentration of people of color, lower incomes, and encounter more air pollution as compared to others in the region.

FIGURE 1-2. Justice40 communities or LIDAC areas have a higher concentration of people of color in the community, showing how areas with higher concentrations of people of color also endure higher air pollution.



1.3 APPROACH TO DEVELOPING THE SARASOTA-MANATEE REGION PCAP

The PCAP lays out a strategic roadmap to identify, assess, and mitigate major sources of climate and air pollution. The plan's overarching goals are to understand the region's current emissions, set goals for the future, and take specific actions to reduce these emissions and improve community livelihood. Beyond just reducing climate pollution, the PCAP is also focused on actions that can benefit our community, particularly those who need it most. The PCAP reflects the marginalized voices in the community, and their insights, principles, and perspectives are vital components of the plan.

The development of the PCAP began with assembling the GHG inventory for the Sarasota-Manatee region detailed in **Chapter 2 | GHG Inventory**. The GHG reduction measures selected focused on the top three GHG emitting sectors – transportation, residential buildings, and commercial buildings. The team identified these measures through review of existing climate action and sustainability plans, projects identified by the implementing agencies, and feedback from the community engagement process that indicates these three categories of measures are of utmost priority to the region. The LIDAC benefits were analyzed for the identified GHG reduction measures. The GHG reduction measures were prioritized based on the community priorities, ability to implement, benefits to the low-income and vulnerable communities, and cost-effectiveness. **Chapter 2 | GHG Reduction Measures with LIDAC Benefits** further details the prioritization methodology. All the identified measures can be implemented by Sarasota and Manatee Counties and cities in the region and have implementing authority.

1.3.1 EXISTING CLIMATE ACTION PLANS

The PCAP builds on the excellent work already being carried out by cities, counties, and partners in the region. A summary of the following documents is provided below to provide context for the scope and elements of the PCAP:

- City of Sarasota Climate Vulnerability Assessment and Adaptation Plan
- City of Sarasota Community-wide Greenhouse Gas Report
- City of Venice Resilience Plan
- City of North Port Comprehensive Plan
- City of North Port Strategic Vision 2022-2025
- Sarasota County Sustainability Assessment Report
- Sarasota/Manatee Metropolitan Planning Organization's 2045 Long Range Transportation Plan
- Sarasota County Vulnerability Assessment
- Sarasota County Post-Disaster Redevelopment Planning

CITY OF SARASOTA CLIMATE VULNERABILITY ASSESSMENT AND ADAPTATION PLAN

The City of Sarasota Climate Vulnerability Assessment and Adaptation Plan evaluates climate threats to public infrastructure to understand how sea-level rise (SLR), storm surge, extreme precipitation, and extreme heat might impact the City's transportation network, stormwater and wastewater systems, water supply, public lands, and critical buildings. The plan includes goals to incorporate heat/drought tolerant species into landscape pallets, utilize sustainable design standards (e.g., Envision), and establish a city resiliency fund to acquire public lands for climate mitigation and expansion of urban green space. The plan notes that as climate change makes progressively greater impacts on the region, a community that protects its infrastructure to ensure the resiliency of public services will have a competitive advantage.

CITY OF SARASOTA COMMUNITY-WIDE GREENHOUSE GAS REPORT

The City of Sarasota Community-wide Greenhouse Gas Report summarizes the GHG emissions from 2003 to 2018 and reflects the quantity and source of energy used. GHG inventory reports for 2003, 2007, 2015, and 2018 were included. The reports are based on a combination of direct data and estimates for data following local government GHG inventory protocols. The report mentions a long-term goal of 100% renewable, zero-emission energy sources by 2045 and a short-term goal of 100% renewable, zero-emissions energy for municipal operations by 2030. The city significantly reduced emissions between 2007 and 2015, largely due to installing a new methane capture system at the local landfill and improvements in vehicle fuel economy.

CITY OF VENICE RESILIENCE PLAN

The City of Venice Resilience Plan looks to understand the vulnerabilities to coastal flooding and proactively develop strategies for a more resilient community. This study includes actionable steps to plan and implement projects that reduce vulnerability and mitigate flood risks. The plan serves as the first of a multi-phased effort to increase the City's resilience to flooding and storm events. Flood mitigation goals listed in the plan include strategies to elevate structures and utilities, utilize temporary flood barriers, and install flood gates to prevent water intrusion into facilities.

CITY OF NORTH PORT COMPREHENSIVE PLAN

The City of North Port Comprehensive Plan outlines the City's long-term vision with a 25-year horizon. Each element of the comprehensive plan contains goals supported by policies and objectives. The comprehensive plan included objectives to align future growth and development to enhance environmental assets, maximize the use of potable water facilities, and maximize the use of sanitary wastewater facilities. The plan also includes objectives to increase the protection and enhancement of critical water resources, biologically productive flora and fauna, and wildlife habitats. The plan highlights an intent to manage and conserve natural resources in partnership with utilities properly.

CITY OF NORTH PORT STRATEGIC VISION 2022-2025

The City of North Port's Strategic Vision identifies key indicators to guide city services, projects, and programs and define the city's planning efforts. Strategic pillars in the plan include Good Governance, Safe Community, Quality of Life, Infrastructure and Facilities Integrity, Environmental Resiliency and

Sustainability, and Economic Development and Growth Management. Strategies include maintaining freshwater storage capabilities, ensuring the reliability and capability of public water and water reclamation services, and pursuing green infrastructure and development standards. The plan mentions that all new and/or redeveloped public facilities should reflect Leadership in Energy and Environmental Design (LEED)-like standards.

SARASOTA COUNTY SUSTAINABILITY ASSESSMENT REPORT

The Sarasota County Sustainability Assessment Report provides background data for various sustainability-related areas. The report incorporates the results of the community conversations and input received to reflect the brainstorming and priorities of participants in the events and surveys. Topics include the natural environment, water, sustainable economic development, energy, built environment, transportation, health and social equity, food, and waste. Specific goals include protecting areas, conserving natural habitats, and restoring threatened habitats. The report highlights sustainable agriculture integration into future developments, increasing local aquaculture production, and the sustainable harvesting of native seafood. The report recommends updating a sea-level rise overlay for planning decisions over the next 50-100 years, managing climate change, sea level rise risk, and improving resilience to changing conditions.

SARASOTA-MANATEE METROPOLITAN PLANNING ORGANIZATION'S 2045 LONG-RANGE TRANSPORTATION PLAN (LRTP)

The Metropolitan Planning Organization (MPO) 2045 LRTP supports the development of future transportation facilities in Sarasota and Manatee County. The LRTP considers all transportation modes (roads, bicycles, pedestrians, trails, transit, parking, railroads, and airports). LRTP updates occur every 5 years to update performance measures, maintain consistency with the community's vision for the transportation network, and build on state and federal guiding factors. The vision and goals set the context for funding and prioritizing transportation improvements through 2045. The plan goals include safeguarding critical habitat, wetlands, endangered species, green infrastructure, energy conservation, natural redevelopment, restoring forested areas, and preserving existing wetlands. Other goals include improving the resiliency and reliability of the transportation system and reducing or mitigating stormwater impacts of surface transportation. The plan calls for a more robust vulnerability mitigation analysis for regional assets and infrastructure.

SARASOTA COUNTY CLIMATE VULNERABILITY ASSESSMENT

In June 2022, Sarasota County received a Resilient Florida grant from the FDEP. The Sarasota County Vulnerability Assessment and Resiliency Plan Project (Project) will conduct a comprehensive Vulnerability Assessment (VA) pursuant to Section 380.093, Florida Statutes for Sarasota County. The Project **will include a VA, Adaptation Plan, resiliency plan, and draft comprehensive plan to comply with the Peril of Flood statute.** The VA will research and analyze existing work, acquire background data, perform a gap analysis, and complete a VA report. The adaptation and resiliency plan process will develop a critical and regionally significant asset inventory, complete an adaptation plan that will have a detailed list of adaptation strategies and projects ranked and ready for implementation, and conduct outreach meetings

to present the results of the studies. Staff are conducting meetings with the cities in the county and internally with other departments to plan and coordinate resilient work. Sarasota County contracted Taylor Engineering to complete a baseline coastal analysis and vulnerability assessment for the County's coastal barrier islands. The project was conducted in partnership the Florida Department of Environmental Protection (FDEP) with the Resilient Coastline Program grant funding and completed in June 2021.

Sarasota County has finalized a "Sea Level Rise (SLR) Vulnerability Assessment Report." It looks at high and low sea level rise scenarios for 2030, 2050 and 2100. The report includes an analysis of county assets and has scenario maps for infrastructure. It also has recommendations to continue this work and looks at policies that will help our county plan for future sea level rise.

SARASOTA COUNTY COMPREHENSIVE PLAN UPDATE ON SEA LEVEL RISE

In the 2016 update to the Sarasota County Comprehensive Plan, commissioners added a policy to address sea level rise, which encouraged planning, sharing information, and collaborating with others in the region.

Environment Policy 4.7.2 - The county and private sector may consider sea level rise information in planning and design of infrastructure and development. The county shall provide to the public and private sector nationally accepted and current data to inform decisions and suggest possible options on infrastructure and development decisions. The county may support regional collaboration on sea level rise, including efforts to identify funding opportunities and to implement possible adaptation measures to reduce vulnerabilities were deemed necessary and feasible.

SARASOTA COUNTY POST DISASTER REDEVELOPMENT PLAN

The Sarasota County [Post Disaster Redevelopment Plan](https://www.scgov.net/government/planning-and-development-services/planning-and-zoning/-folder-225#docan17066_11681_7055)² (PDRP) includes planning, infrastructure restoration and mitigation, Environmental preservation and restoration, governance and financial management and implementation plan. Also, it includes analysis of sea level rise and precipitation changes that could result from climate change.

SARASOTA COUNTY, FLORIDA DEPARTMENT OF HEALTH, DISASTER RESILIENCY

The Florida Department of Health (DOH) in Sarasota County embarked upon a multi-faceted project to increase our community's disaster resiliency by identifying the emergency transportation and communication needs of our residents with Access and Functional Needs (AFN) and determining strategies that would mitigate the identified challenges, in 2015. The program was funded by competitive grants from the CDC's Building Resilience Against Climate Effects (BRACE) program and the National Association of County and City Health Officials (NACCHO) Medical Reserve Corps Challenge Awards. In addition to the all-hazards approach, DOH-Sarasota's focus included AFNs residing in areas prone to storm surge and potentially catastrophic inland flooding in the event of impacts from a major tropical system or prolonged rain event.

² https://www.scgov.net/government/planning-and-development-services/planning-and-zoning/-folder-225#docan17066_11681_7055

1.3.2 EXISTING POLICIES AND PROGRAMS

Sarasota and Manatee Counties are committed to sustainability in their operations and the community. Both counties are committed to sustainability efforts that reduce greenhouse gas emissions, create a healthy environment for the community, and increase the financial sustainability by reducing utility costs. Below are some climate-related policies and projects, organized by topic; additional policies, projects, and information can be found on the jurisdiction websites³.

BUILDINGS AND FACILITIES (RESIDENTIAL AND COMMERCIAL)

Americans spend nearly 90% of their time indoors, and as such, deserve high-quality spaces that are clean and healthy. The following programs and policies highlight the region’s commitment to our residents, commercial property owners, and tenants.

Green Buildings

Sarasota County’s commitment to tracking and reducing facility emissions has been recognized several times. Sarasota County was designated a Gold-level “Green Local Government” by the Florida Green Building Coalition in 2008 and again in 2015 and is currently the second-highest scoring county in the state. Sarasota County also received a GOLD Leadership in Energy and Environmental Design (LEED) certification for Cities and Communities.



Sustainability Resolution #02-119

Establishes the county Sustainability program and implements policies, guidelines, goals, and strategic actions to promote sustainability.

Green Building Resolution #2005-048

Provides for design, construction, management, renovation, and maintenance of county facilities by green building standards. Establishes green building incentives for the private sector.

³ Sarasota County webpage at <https://www.scgov.net/government/sustainability/sustainability>; Manatee County website https://www.mymanatee.org/departments/property_management/sustainability/sustainability

2030 Challenge Resolution (amended) #2024-016

Directs that new county-led construction projects aim to reduce fossil fuel greenhouse gas-emitting energy needed to operate and should consider and improve the life cycle operating costs.

Sarasota County has several other policies and resolutions⁴ including Community Energy Use and Green House Gas Emissions #2010-243.

Energy Efficiency Programs

Since 2010, Sarasota County Sustainability has received approximately \$7.5 million in grant funding to complete sustainability and resilience projects. Much of the funding has supported community energy and water efficiency projects.

- The [Energy Upgrade Program](#) began in 2012 as an educational program to promote residential energy efficiency strategies. In 2016, the program shifted its focus to promote energy equity, specifically targeting low-income residents with educational programs and materials to help reduce their utility costs. In 2018, a volunteer training program was introduced to boost the program's ability to reach more families facing financial hardship. This initiative includes in-home upgrades and retrofits at public housing units to implement cost-saving strategies. Since 2012, 6,300 families have been reached and 200 public housing units have been upgraded. The energy-saving kits are funded by the Department of Energy, and the program expanded in 2020 with support from the Charles and Margery Barancik Foundation. In 2021, a grant from the Florida Department of Agriculture and Consumer Services further expanded the program by funding a rebates for energy-efficient appliances and HVAC systems for affordable housing providers.
- The [Partners for Green Places program](#) grant provided 16 non-profits with energy audits, detailed Energy Roadmap reports, and funding to implement energy and water efficiency strategies identified. A companion program provides combined grant and loan funding for solar photovoltaic installations on a subset of those non-profits.
- [Property-Assessed Clean Energy \(PACE\)](#) financing was enabled by Sarasota County in 2018. PACE providers can offer financing for private property improvements related to renewable energy, energy efficiency, and hurricane hardening through assessments levied on property taxes.

Renewable Energy on County Facilities

Multiple county buildings have adopted solar photovoltaic (PV) technology, highlighting a commitment to sustainable energy and a reduction in carbon footprint. The success of these installations has led to plans for expanding solar PV systems on additional county buildings, reinforcing a proactive shift toward clean and renewable energy sources within the community.

⁴ Sarasota County's existing climate action policies and programs can be found at <https://www.scgov.net/government/sustainability/sustainability>

TRANSPORTATION

Electric Vehicles

Sarasota County has been a pioneer in Electric Vehicles (EVs), demonstrating leadership through resolutions, charging station installations, integrating electric vehicles into the county fleet, and educational programs since 2005.



Sarasota County Plug-in Electric Vehicle

NATURAL RESOURCES

Sarasota County's Environmentally Sensitive Lands Protection Program (ESLPP) has protected over 35,000 acres of land through land purchases and conservation easements. These protected areas allow for natural flood mitigation, migration of species due to climate change impacts, and expansion of existing parks to meet growing population needs.

2 | LOW INCOME AND DISADVANTAGED COMMUNITIES

LIDAC are areas identified by the Environmental Protection Agency’s (EPA) Climate and Economic Screening Tool (CESJT) as communities that are overburdened and endure disproportionate air quality impacts, poverty, and more. LIDACs include historical communities of color that have been excluded in decision-making processes and endured a legacy of policies that lead to inequitable outcomes.

This PCAP prioritizes equitable GHG reductions, driving public health improvements, economic development, job creation, community resilience, and energy-efficient housing in low-income and disadvantaged communities (LIDAC).

The PCAP identified LIDACs, gathered comprehensive socioeconomic data, and strategically formulated plans to optimize the creation of high-paying jobs within the region and detailed in this chapter. The priority measures identified community burdens and potential solutions to alleviating socio-economic and environmental inequities. The Sarasota-Manatee regions commitment to fostering economic growth and equity is exemplified in the GHG reduction measures prioritization and the (LIDAC) benefits analysis indicated in **Chapter 5 | GHG Reduction Measures with lidac benefits and co-benefits.**

2.1 CLIMATE IMPACTS AND RISKS

This PCAP prioritizes equitable GHG reductions, driving public health improvements, economic development, job creation, community resilience, and energy-efficient housing in low-income and disadvantaged communities. Climate risks to the LIDAC areas are:

- **Racial and community effects on heat illness:** Race can play a role in heat-related illness. Overall, Black people have been found to have increased vulnerability to heat illness likely due to higher rates of diabetes and other health issues that exacerbate heat-related illness.⁵
- **Historical impacts of flooding on mental health:** Floods are unique climate events because of their extended length and avoidable detrimental impact compared to other natural hazards. Floods have resulted in significant increases in depression and anxiety among adults, as well as increased aggression and stress in children after a flood has ended.⁶ This phenomenon can be tied to negative mental health effects due to a struggle to cope with changes in infrastructure and way of life after a flood.

⁵ Gronlund, C. (2014, July). Racial and socioeconomic disparities in heat-related health effects and their mechanisms: a review. *Current Epidemiology Reports*, 165-173.

⁶ Stanke, C., Murray, V., Amlôt, R., Nurse, J., & Williams, R. (2012, May). The effects of flooding on mental health: Outcomes and recommendations from a review of the literature. *PLoS currents*.

- **Air quality effects:** Continued long-term exposure to poor air quality environments can be detrimental for a person’s health. Low-income communities and communities of color bear a disproportionate burden of air pollution due to their likely proximity to poor air quality environments and are also more likely to have health conditions that are exacerbated by exposure to poor air quality.⁷

2.2 IDENTIFIED LOW-INCOME AND DISADVANTAGED COMMUNITIES

EPA’s Climate and Economic Justice Screening Tool (CEJST) is used to compile the census tracts in Sarasota and Manatee counties that are identified as disadvantaged. CPRG Benefits Analysis: Low Income and Disadvantaged Communities guidance defines low-income and disadvantaged communities as any census tract that is considered disadvantaged in the CEJST tool.

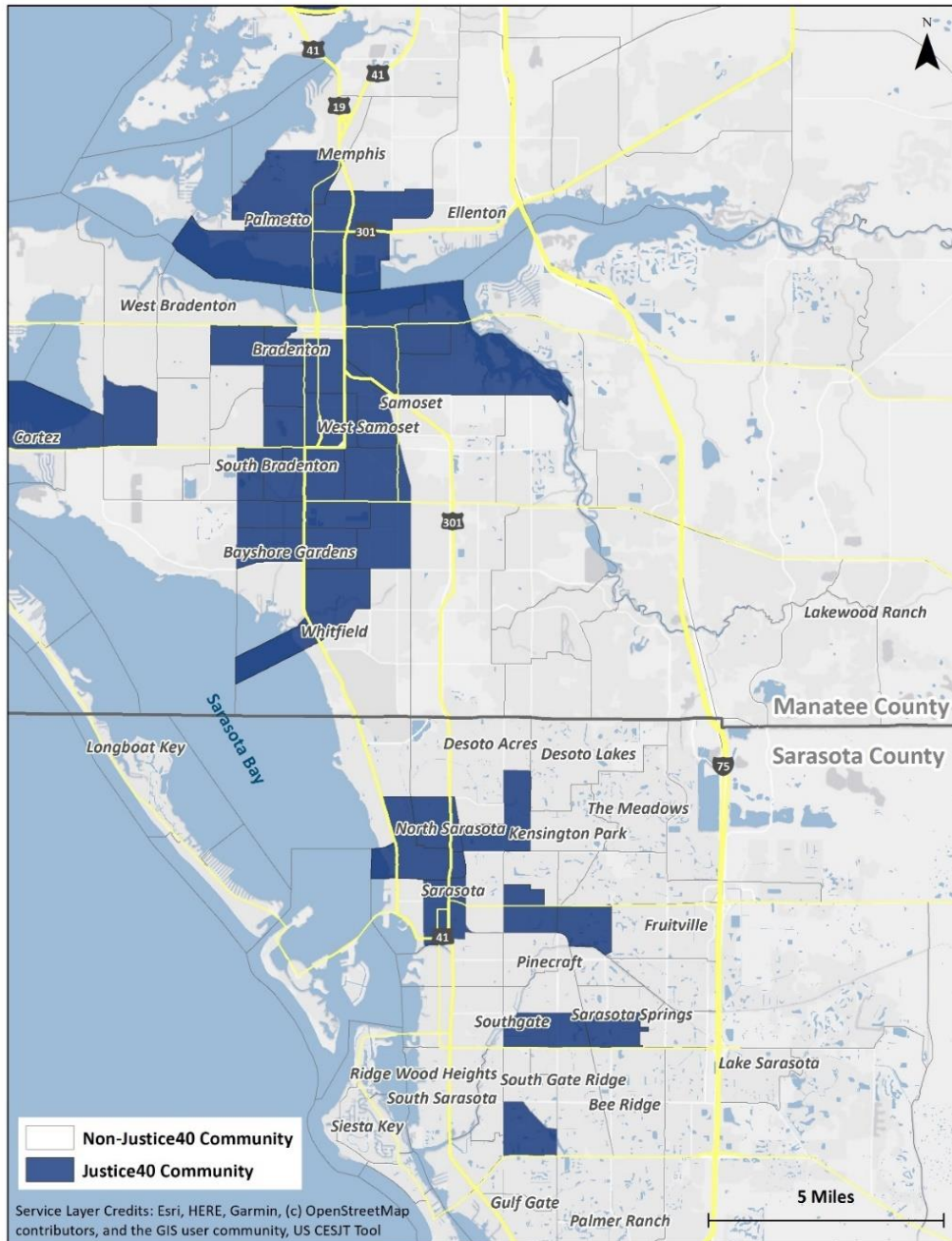
The CEJST tool defines a census tract as disadvantaged if that census tract is at or above 65th percentile for low income in the United States and at or above 90th percentile for different burden categories in the United States. **Table 2-1** outlines the definitions of different burden categories. The full list of disadvantaged census tracts, based on CEJST in the Sarasota-Manatee region, is included in the Appendix.

TABLE 2-1. Disadvantaged Burden Definitions

Burden Category	Community Definition
Climate Change	At or above the 90th percentile of expected agriculture loss rate, expected building loss rate, expected population loss rate, projected flood risk, or projected wildfire risk
Energy	At or above the 90th percentile for energy cost or PM2.5 in the air
Health	At or above the 90th percentile for asthma, diabetes, heart disease, or low life expectancy
Housing	Have experienced historic underinvestment or are at or above the 90th percentile for housing cost or lack of green space or lack of indoor plumbing or lead paint
Legacy Pollution	Have at least one abandoned mine land or formerly used defense sites, or are at or above the 90th percentile for proximity to hazardous waste facilities, proximity to Superfund sites, or proximity to Risk Management Plan (RMP) facilities
Transportation	At or above the 90th percentile of diesel particulate matter exposure, transportation barriers, or traffic proximity and volume
Waste and wastewater	At or above the 90th percentile for underground storage tanks and releases or wastewater discharge
Workforce Development	At or above the 90th percentile for linguistic isolation or low median income or poverty or unemployment, and more than 10% of people aged 25 years or older have an education level less than a high school diploma

⁷ Hajat, A., Hsia, C., & O’Neill, M. (2015). Socioeconomic Disparities and Air Pollution Exposure: A Global Review. *HHS Author Manuscripts*, 440-450.

FIGURE 2-1. Low-Income and Disadvantaged Communities Census Tracts within the Sarasota-Manatee Region

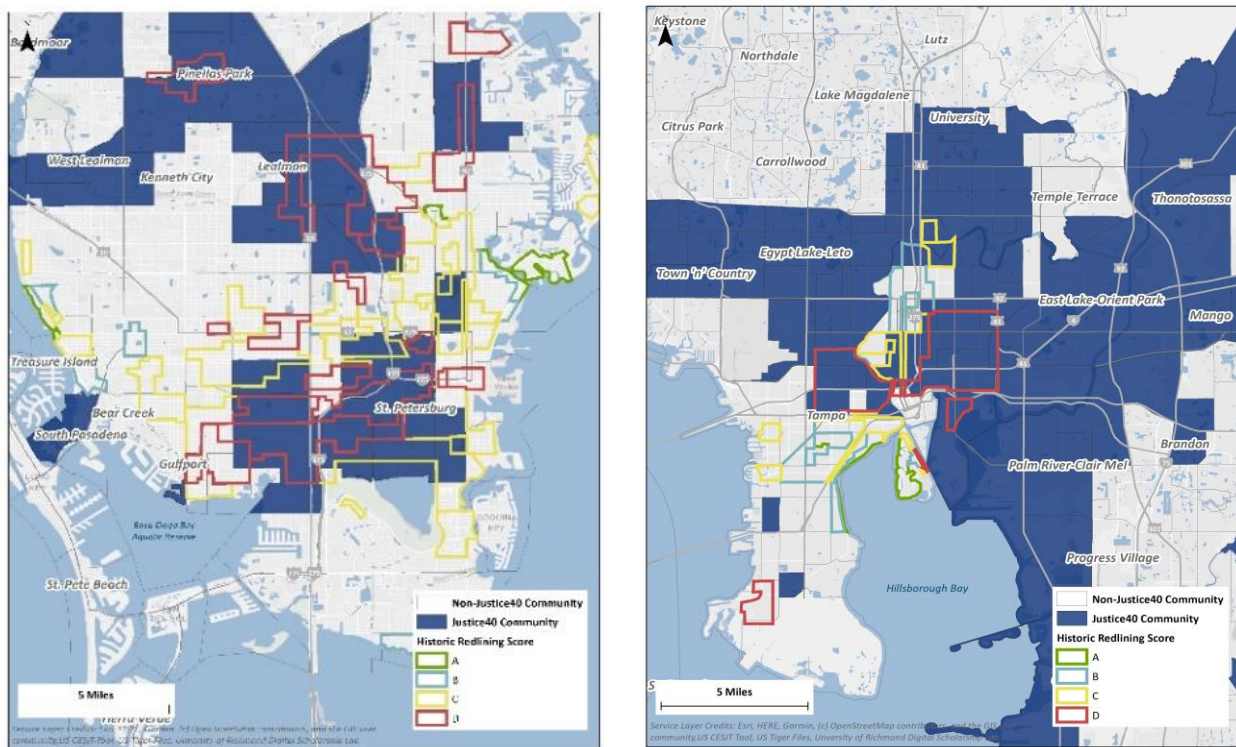


Source: Climate and Economic Justice Screening Tool, version 1.0 released on November 22, 2022.

Redlining was a term used by the Homeowners Loan Corp and Federal Housing Administration to indicate where it was safe to insure mortgages. Anywhere that people of color lived were colored red indicating that these communities were too risky to insure mortgages.

This pattern of disinvestment led to a legacy of inequities that are reflected today in Justice40, LIDAC communities. Communities that were redlined tend to be Justice40 communities and tend to have more people of color and are overburdened by patterns of injustice. For instance, the maps below show historical redlining in Tampa and St. Petersburg and LIDACs, or Justice40 Communities (Figure 2-2), as well as Justice40 Communities in Sarasota and percent people of color.

FIGURE 2-2. Redlining in Tampa and St Petersburg



The region has undertaken purposeful community outreach initiatives to actively contribute to a future where environmental stewardship and social equity are fundamental to the collective progress of LIDAC communities as detailed in **Chapter 3|Engagement**.

Identifying the community’s most vulnerable characteristics across the region for low-income communities helps to identify priority GHG reduction measures that maximizes benefits and co-benefits to the LIDACs.

LIDAC census tracts, how they are burdened as defined and identified by the CEJST tool, and the frequency of the burden are shown in **Table 2-2**. These burden measures are organized by the frequency of how often each burden measure is identified as being disproportionately high in low-income census tracts. Sarasota-Manatee region’s highest frequency burden measures are flood, diabetes, heart disease, and leaky storage tanks.

Maps of each of the top burdens in the Sarasota-Manatee region are in **Figure 2-4**, **Figure 2-5**, and **Figure 2-6**.

TABLE 2-2. Burden Measures by Frequency of Burden in the Sarasota-Manatee region

Burden	Burden Measure	Frequency of Burden	Burden	Burden Measure	Frequency of Burden
Climate Change	Agriculture	0	Legacy Pollution	Plumbing	0
	Building	0		Lead Paint	0
	Population	1		Hazardous Waste	0
	Flood*	11	Superfund Site	0	
	Wildfire	1	Risk Management Plan	4	
Energy	Energy	0	Transportation	Diesel	0
	PM2.5	0		Barriers	0
Health	Asthma	1		Traffic	0
	Diabetes*	12	Waste	Leaky Storage Tanks*	18
	Heart Disease*	22		Wastewater	4
	Life Expectancy	4	Workforce	Linguistic Isolation	4
Housing	Housing Cost	3		Low Income	4
	Green Space	0		Poverty	4

*Indicates highest burden on the community

FIGURE 2-3. Flood Burden of the Sarasota-Manatee Region

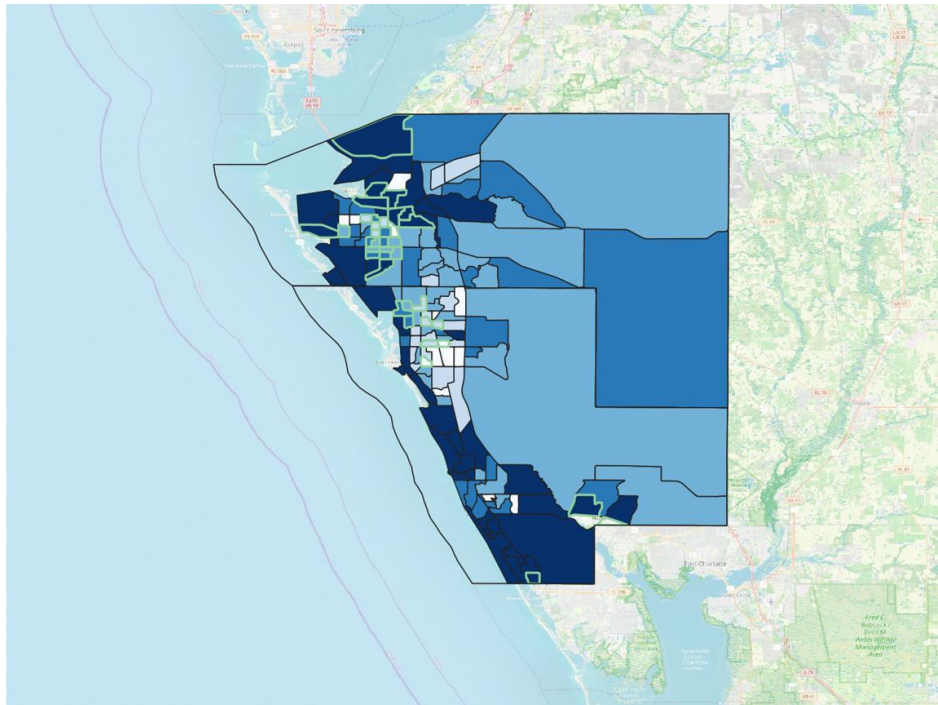
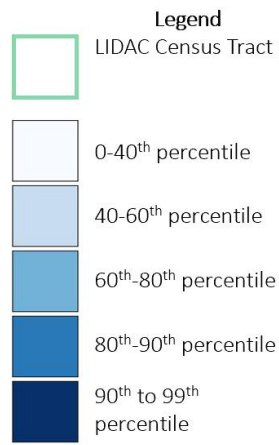


FIGURE 2-4. Diabetes Burden for the Sarasota-Manatee Region

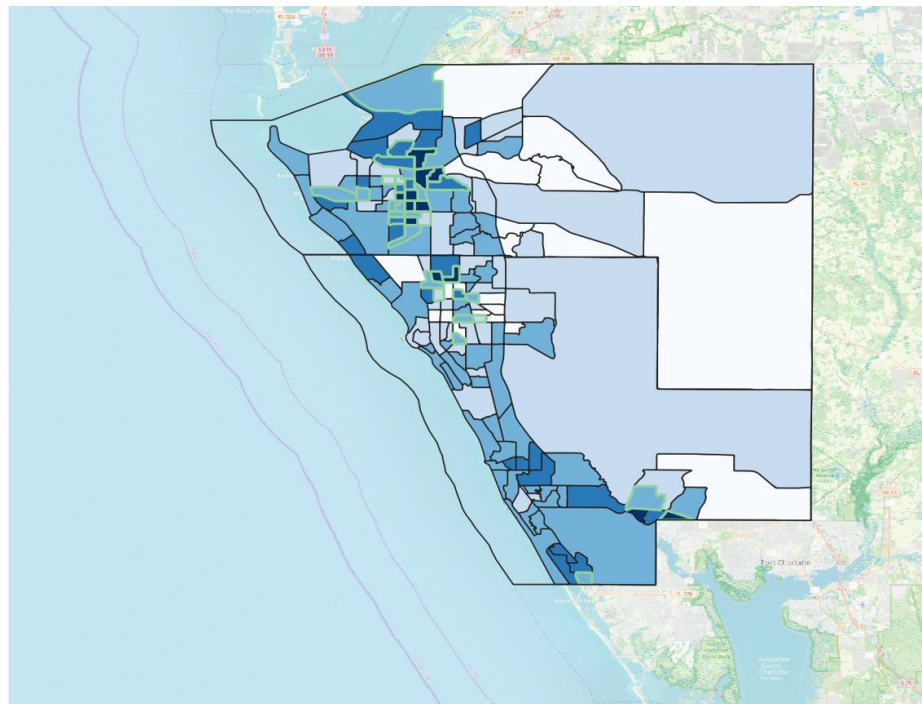
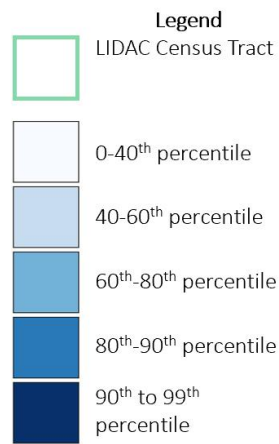


FIGURE 2-5. Heart Disease Burden for the Sarasota-Manatee Region

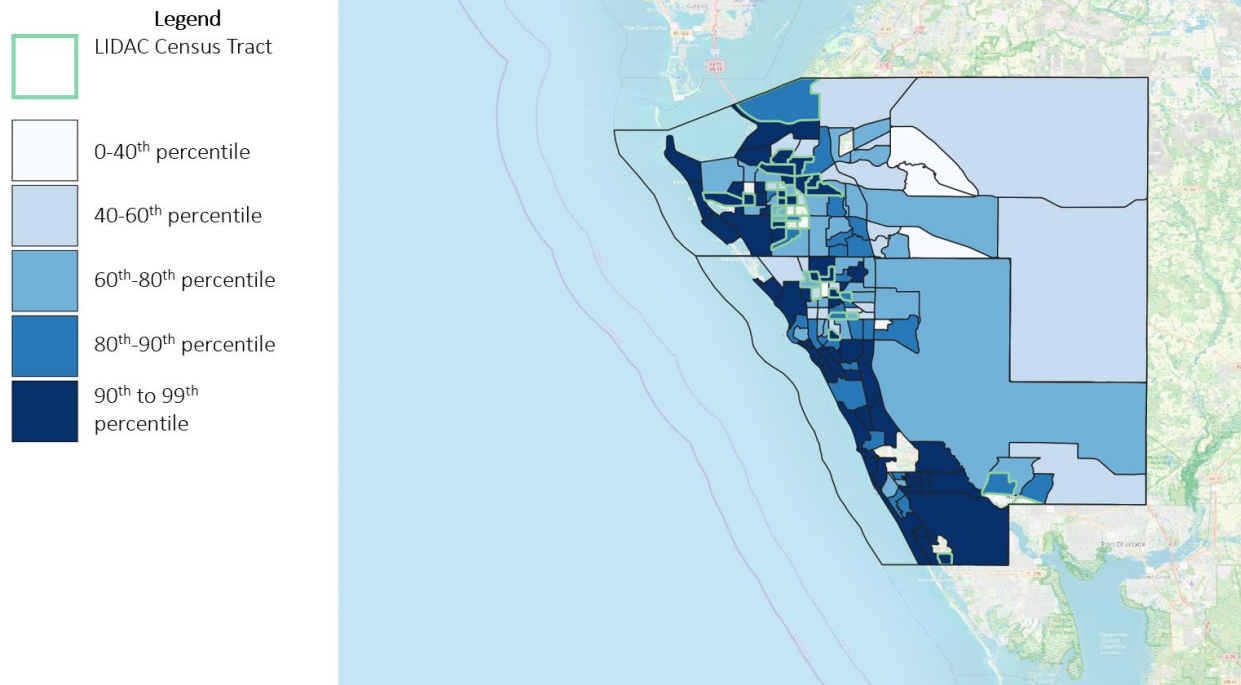
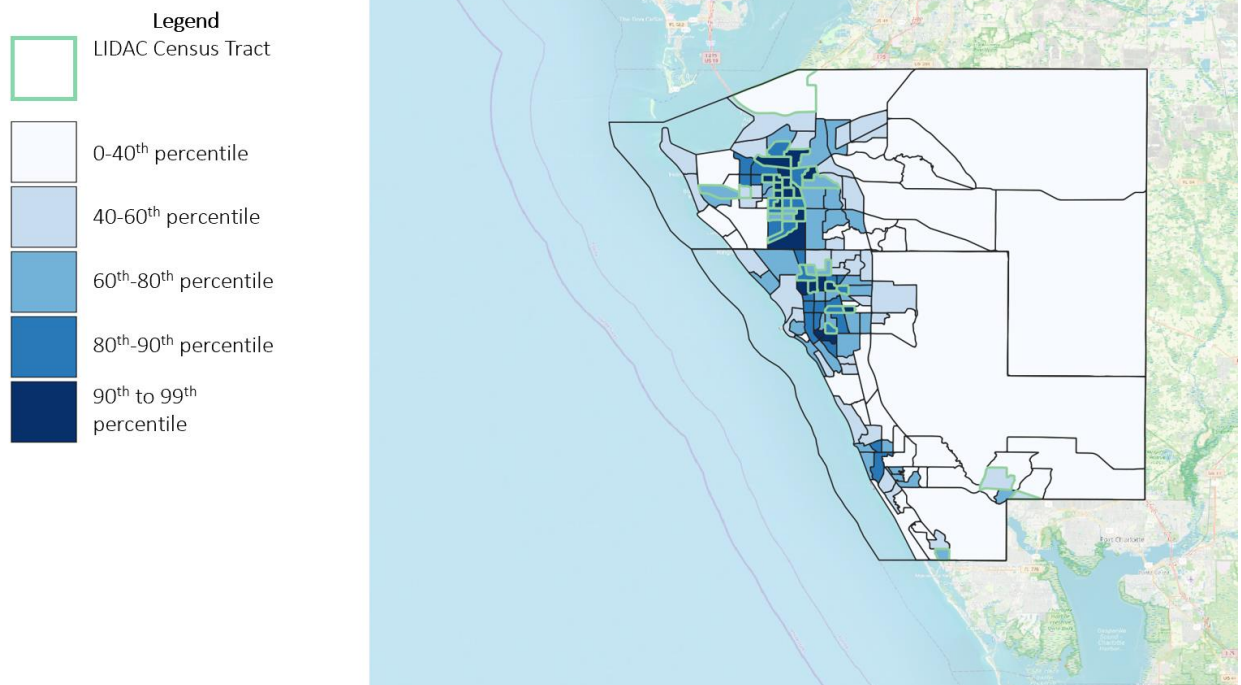


FIGURE 2-6 Leaky Storage Tanks Burden for the Sarasota-Manatee Region

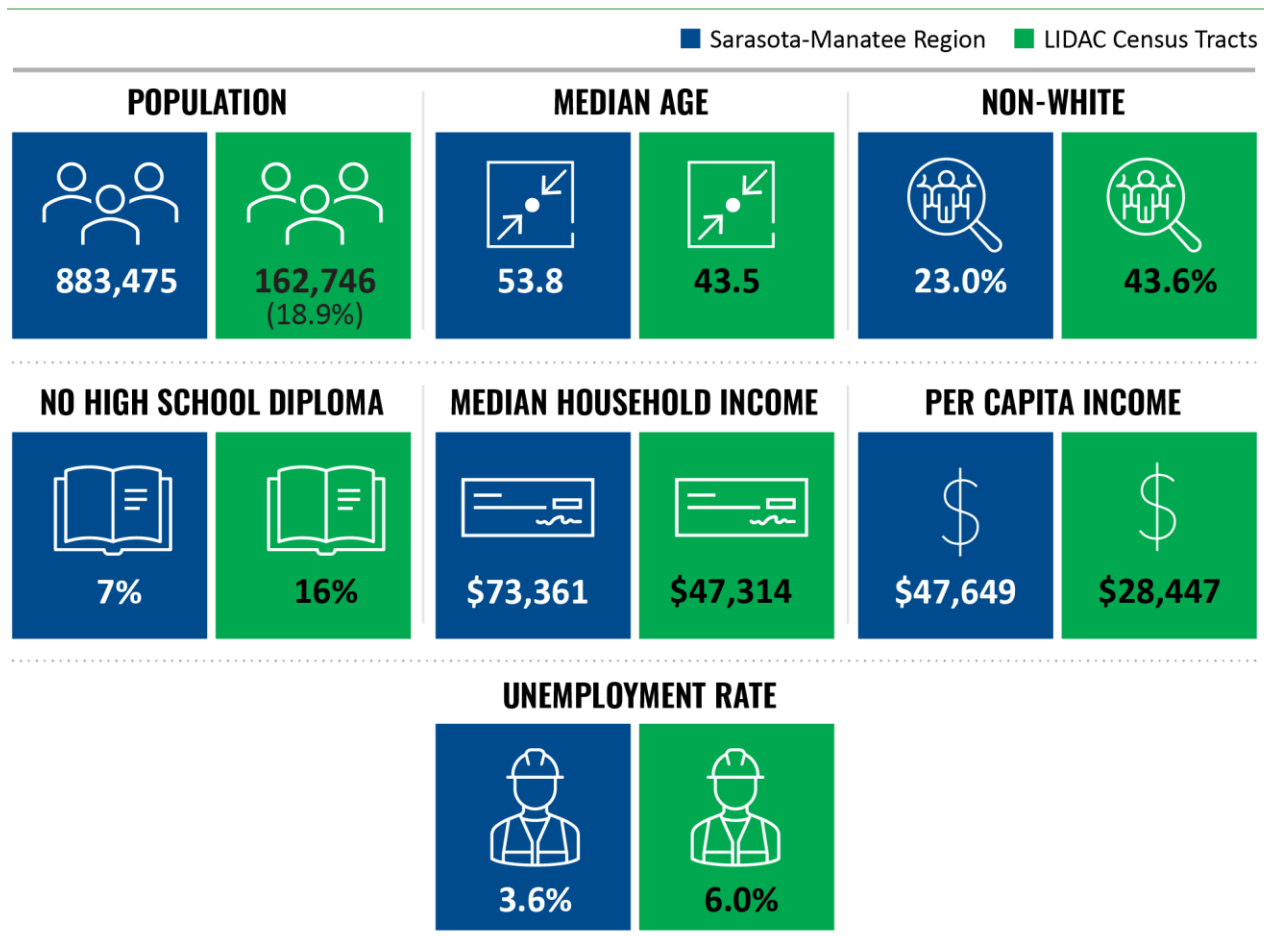


2.3 SOCIOECONOMIC SUMMARY

Approximately 19 percent of the Sarasota-Manatee region population lives within a low-income and disadvantaged communities (LIDAC) census tract. The socioeconomic information comparing the statistics within the LIDAC census tracts, and the Sarasota-Manatee region are indicated in **Figure 2-7**.

Communities in LIDAC census tracts are significantly more likely to lack a high school diploma, experience higher unemployment rates, and identify as non-white compared to the Sarasota-Manatee region overall.

FIGURE 2-7. Socioeconomic Analysis of the region compared to the LIDAC census tracts.

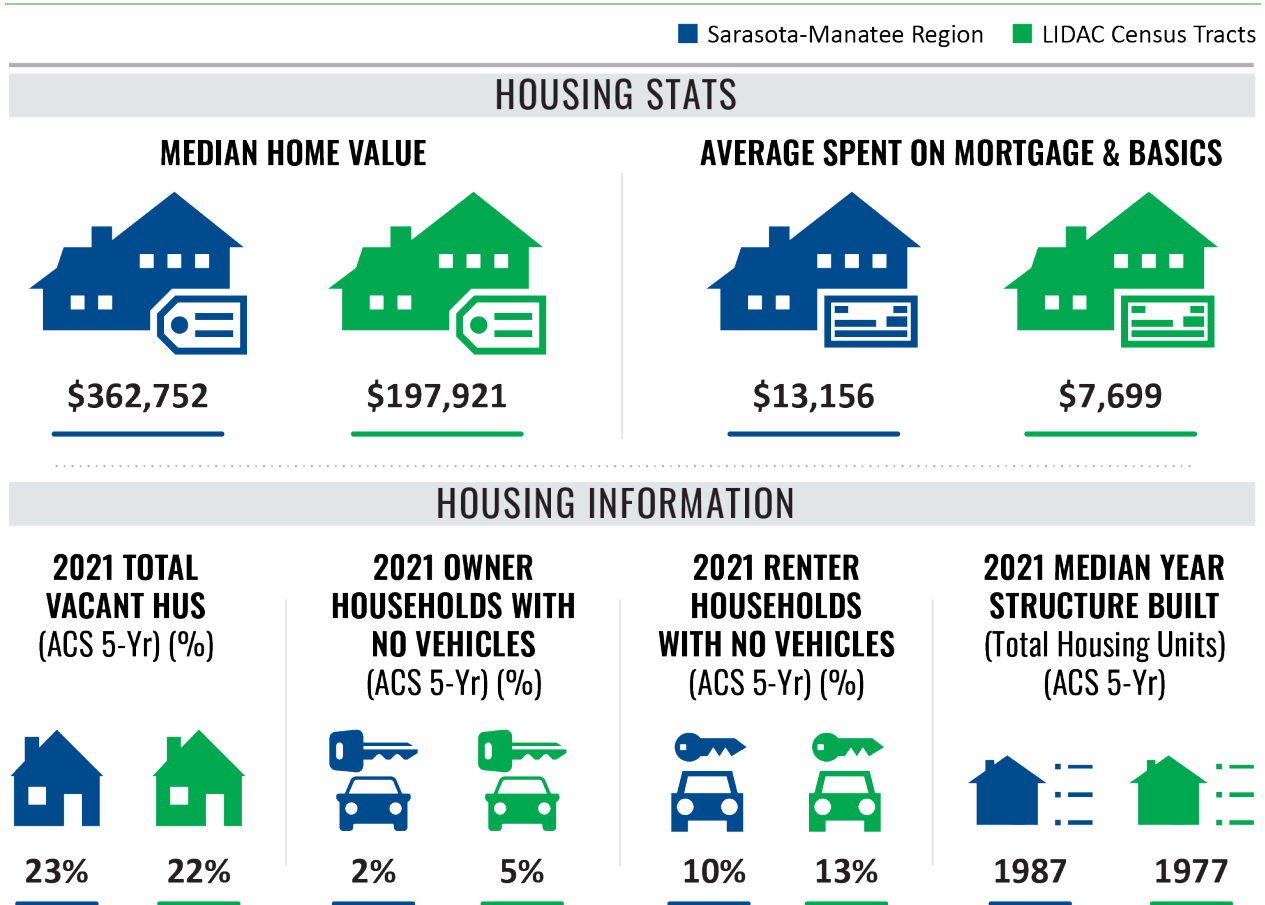


Source: This infographic contains data provided by Esri (2023), Esri-U.S. Bureau of Labor Statistics (2023), American Community Survey (2017-2021).

Residents in LIDAC census tracts have lower homeownership rates compared to the region. However, for those who do own their homes, the median value is roughly half of the regional median, and these houses tend to be on average 10 years older.

Approximately a quarter of renters in the region, including those in LIDAC census tracts, spend more than half their gross income on rent. The Housing Stats Summary for the region and a breakdown of each of the counties can be found in the Appendix.

FIGURE 2-8. Housing Statistics indicate that the LIDAC census tracts have significantly higher renter-occupied housing, and the average money spent on housing is approximately half.

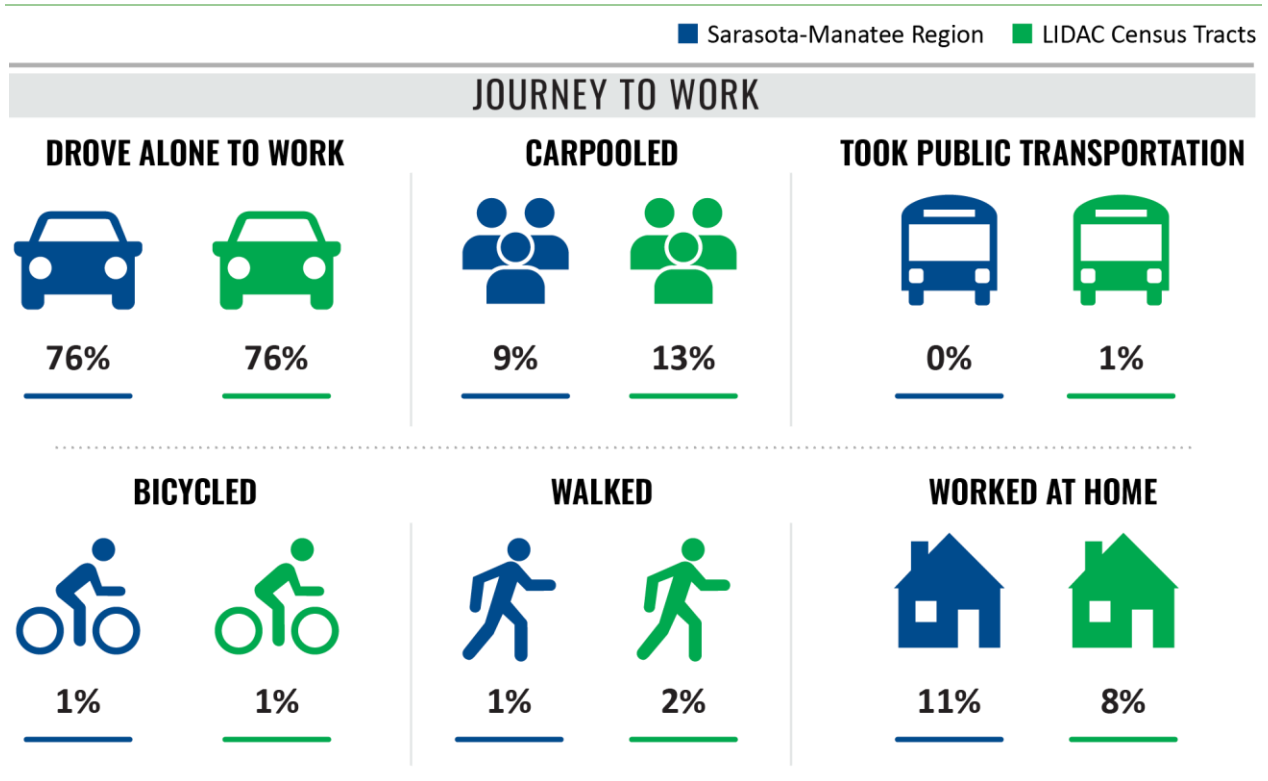


Source: This infographic contains data provided by Esri (2023), Esri-U.S. Bureau of Labor Statistics (2023), American Community Survey (2017-2021). Contract Rent is represented in per month numbers, and Mortgage numbers are represented annually.

Communities in LIDAC census tracts have lower car ownership than the region overall. LIDAC census tract residents are more likely to rely on public transit and active transportation for commuting to work.

The commuting and work-related travel indicates people living in the LIDAC census tracts carpooled, used public transportation, and walked more compared to others in the region.

FIGURE 2-9. Summary of how people in the region compared to those in the LIDAC commute.



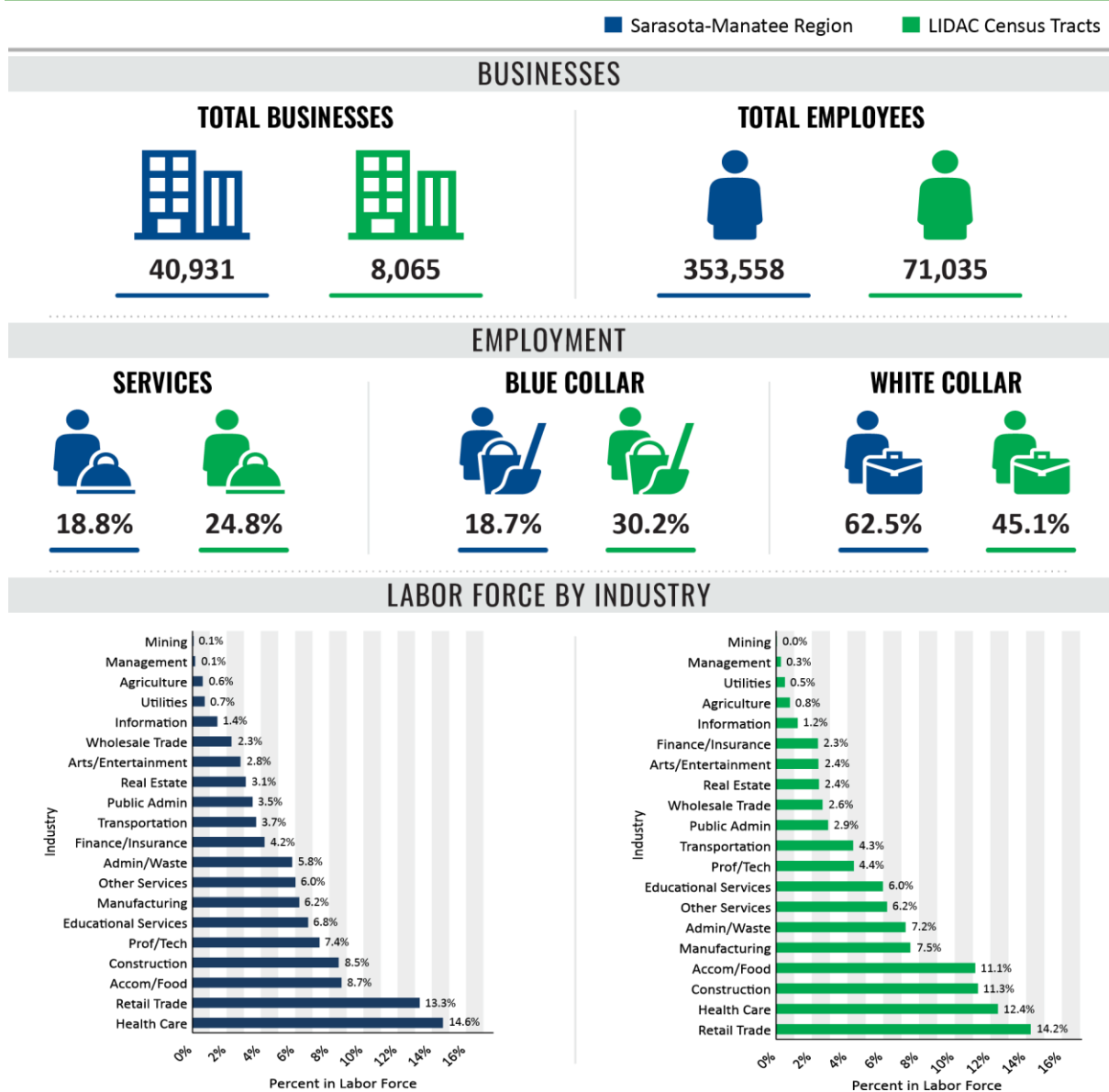
Source: American Community Survey (2017-2021).

2.4 WORKFORCE PLANNING

When implementing the priority reduction measures, the Sarasota-Manatee Region will develop strategies to maximize the development of good paying jobs in the region, prioritizing development of jobs within LIDAC communities. This section summarizes information on existing workforce conditions in the region.

Residents in LIDAC tracts are more likely to work in the service industry or a blue-collar job.

FIGURE 2-10. Current Workforce comparison between the region and the LIDAC census tracts.

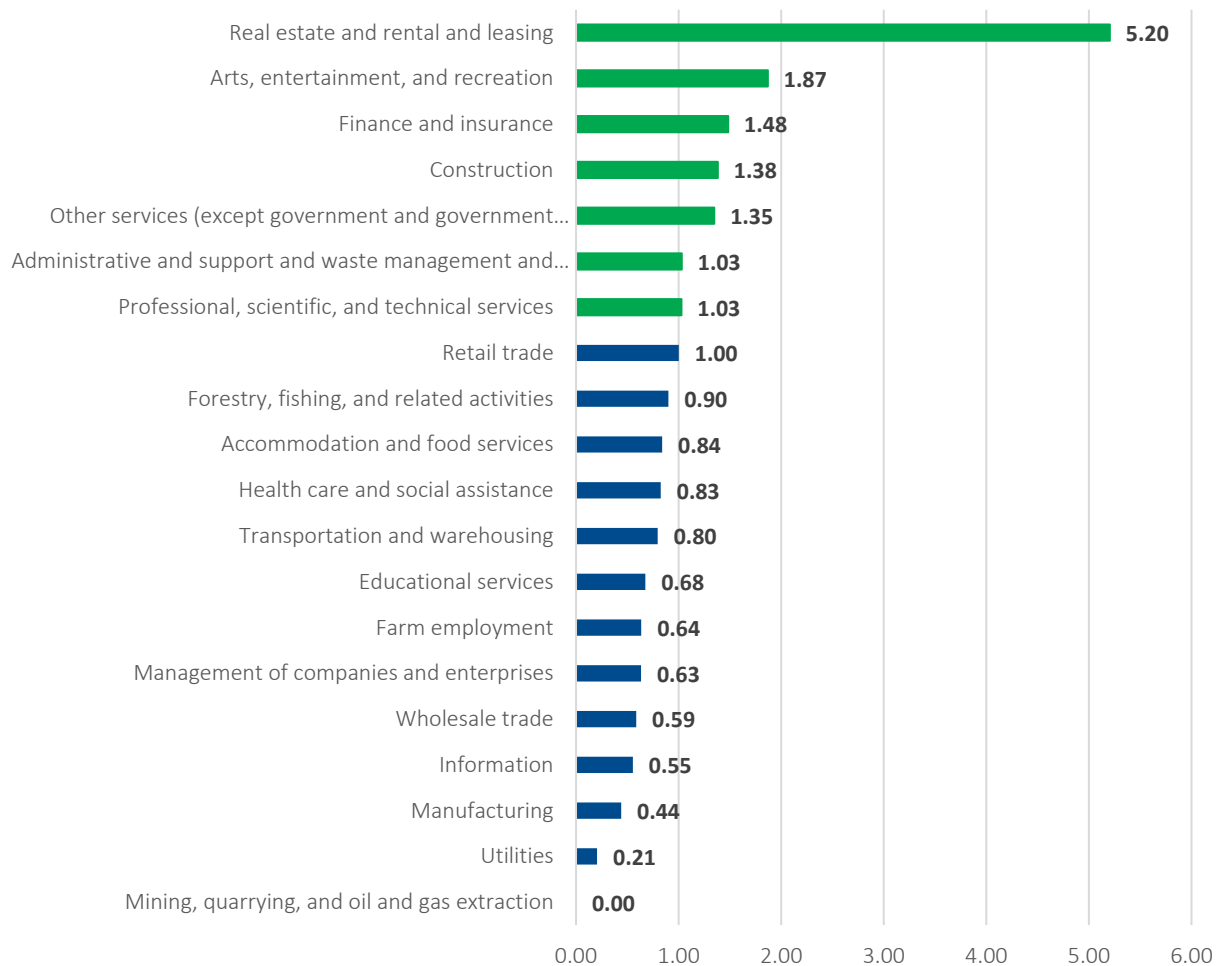


Source: This infographic contains data provided by Esri (2023), Esri-Data Axle (2023), American Community Survey (2017-2021).

A location quotient identifies regional economic specialization and helps explain how local economy differs from the national average. A location quotient of 1.0 represents the national employment share of that industry. Any industry with a higher location quotient indicates a higher competitiveness in that industry. **Figure 2-11** demonstrates the location quotients of industries in the Sarasota-Manatee region.

The Sarasota-Manatee region is most competitive in real estate and rental leasing, arts, entertainment and recreation, finance and insurance, construction, and professional, scientific, and technical services.

FIGURE 2-11. Sarasota and Manatee Region's Economic Competitiveness by Industry compared to the national average in the year 2022 (green indicates higher competitiveness than national employment).



3| ENGAGEMENT

Engaging authentically is the core value of community engagement. To build the trust within the historically disenfranchised communities, the region reached out to trusted community leaders who have lived and worked in the communities.

In the Sarasota Manatee region, community engagement is critical to 1) understand the strategies that will benefit the community's daily lives and their long-term outlook, and to 2) get feedback on measures that may create disbenefits to a community that is already disproportionately impacted by air pollution. To kick-start the community engagement, the region engaged with community-based organizations and community leaders.

Engagement with the agency stakeholders was important to gather information from an implementor's perspective and illuminate challenges with implementation. The team also facilitated interagency coordination to hear from agencies conducting similar work and identify ways to reduce redundancies while maximizing equity impacts.

Central to stakeholder and community engagement is transparency and accountability of project progress outcomes, engagement opportunities.

The team developed a dedicated project webpage to share project updates. The one-stop project webpage provides all the project information and upcoming opportunities to engage and contribute.

3.1 DEDICATED PROJECT WEBPAGE

The team developed a dedicated project webpage⁸ to send residents PCAP project updates. The website, launched on February 1, 2024, used a single, cohesive branding, 'Clear-Air Coalition. Sarasota- Manatee County,' to avoid project confusion in the community. The single branding also helped formalize and familiarize residents with ongoing PCAP project efforts. The team used the website to provide updates about engagement opportunities and post presentation and recordings for stakeholders who could not attend meetings. The website allows stakeholders to access the most up-to-date project information and provide feedback about the project. The website will also include additional information throughout the CCAP about engagement opportunities, project updates, and will host the finalized PCAP report.

⁸ Dedicated project webpage <https://scmc-pollutionreduction.com> will serve as the collaboration platform for community members and agency stakeholders.

FIGURE 3-1. The dedicated project website holds project updates and engagement opportunities.

The screenshot displays the project website for the Sarasota-Manatee Region Climate Pollution Reduction Plan. The main page features the organization's logo, navigation links for 'About', 'Engage', 'Contact Us', and 'English', and a large image of a waterfront scene at sunset. The 'THE PLAN' section explains the goal of reducing greenhouse gas emissions and lists grant funding from the EPA. An engagement page titled 'HOW TO ENGAGE' includes a 'We Need Your Input' survey link, an upcoming community workshop on February 15, 2024, and a list of partner organizations: North Port, Venice, City of Sarasota, Manatee County, and the State of Florida.

3.2 UNDERSTANDING COMMUNITY PRIORITIES

Recognizing that meaningful community engagement is critical to achieving more equitable outcomes, municipalities in the Sarasota-Manatee region prioritized involvement from LIDAC areas in the PCAP process.

The region has engaged with the communities through annual workshops and the PCAP engagement is a continuation of these efforts. For example, Sarasota County organizes the [Annual Sustainable Communities Workshop](#), an educational opportunity provided to residents covering climate strategies. The sustainability program also hosts classes on energy and water efficiency, solar technologies for adults and youth, green living, climate solutions, electric vehicles, and green building strategies.

3.2.1 STAKEHOLDER MAPPING

Trusted community-based organizations (CBOs) representative of community stakeholders was identified throughout the Sarasota and Manatee region, emphasizing the LIDAC communities. The trusted leaders, also referred to as project champions, were contacted before engaging with the communities.

TABLE 3-1. List of Stakeholders by Category

Community-Based Organizations	Number of Organizations Identified
Neighborhood Associations in EJ Communities	6
Non-profit partners	17
Business Associations	7
Community Advocacy Organizations	6

3.2.2 IDENTIFYING COMMUNITY PRIORITIES

ENGAGING COMMUNITY-BASED ORGANIZATIONS

The region engaged with community-based organizations, leaders, and members of LIDACs to ensure that their existing needs and desired outcomes are reflected in the PCAP. This ongoing engagement aims to foster a spirit of mutual trust and collaboration, ensuring accurate and transparent information sharing with members. The approach also helps create a process for feedback and early risk mitigation, anticipating conflicts, and engaging in early conflict resolution to address challenges from the onset of the project. The overarching goal is to identify the existing needs and desired outcomes of LIDACs, recognizing the unique knowledge they bring to the project. Meeting locations were chosen based on accessibility and connectivity, and as virtual meetings were held to accommodate diverse schedules. Discussions covered CPRG program details, near-term challenges, climate concerns, and prioritizing communities affected by pollution and economic inequality.

On February 16, 2024, Sarasota County and the project team led a virtual CBO workshop with community leaders of Sarasota and Manatee Counties to introduce the CPRG opportunity. The virtual workshop included a facilitated discussion about community priorities for the project and included opportunities for the team to hear how to improve overall community engagement with historically underserved communities. The workshop included breakout sessions focused on Transportation and Solid Waste Management, Renewable Energy, Energy Efficiency, and Community Engagement. Each breakout session allowed participants to share feedback on the respective topic while also creating opportunities to share additional comments about how to engage communities. The following includes an overview of each of the breakout sessions:

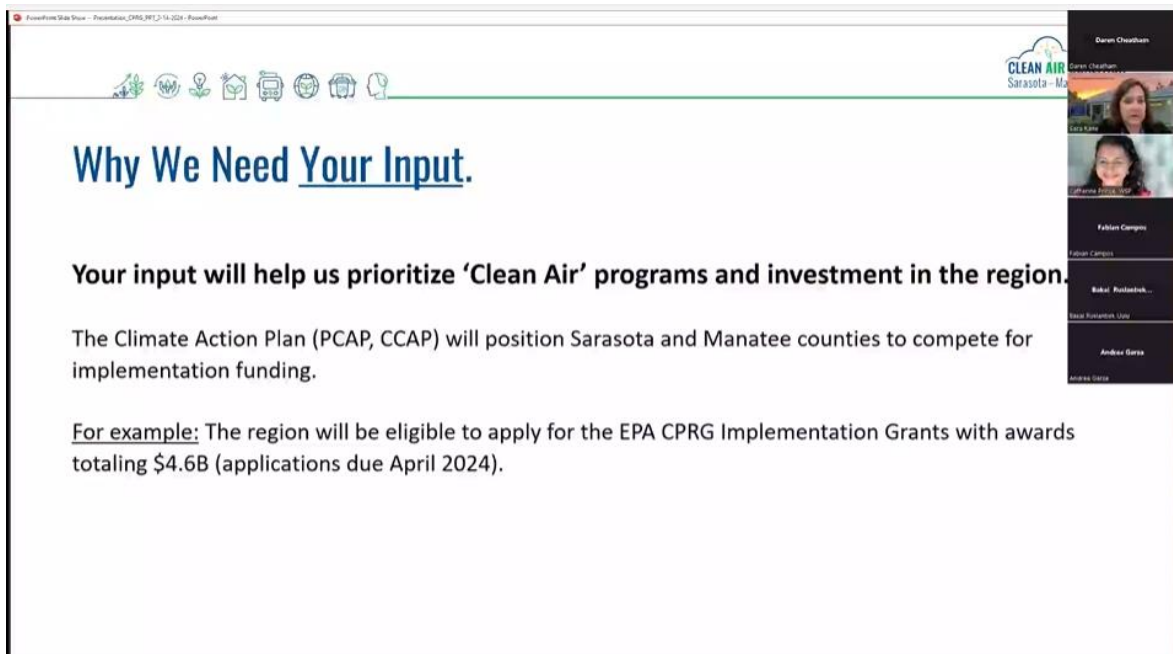
- **Transportation** discussions centered around the challenges of the existing transit system, the need for real-time data, improving on-demand services, and the importance of air quality. The session also highlighted the need for affordable housing to reduce congestion.
- **Solid Waste Management** conversations emphasized the importance of education and awareness about recycling methods, the need for infill technologies, and the development of incentive-based pilot programs for composting and recycling. The session also discussed the need for improved collaboration with schools and organizations for food redistribution.
- **Renewable Energy and Energy Efficiency** conversations focused on identifying residents' greatest energy burdens and addressing barriers to accessing the existing renewable energy and energy efficiency programs.
- The **Community Engagement** conversations focused on the importance of cultural preferences, local engagement, hosting culturally relevant workshops, youth engagement, and using advertisements and marketing campaigns.

During each breakout session, the team also asked participants about ways to better engage with historically underserved communities. Hearing directly from members of the community about how to

engage members enabled the team to engage with communities and receive feedback and input on priority needs more authentically. Suggestions included:

- Remain cognizant of cultural preferences and access.
- Pop-up events at local farmer’s markets on Tuttle Avenue and grocery stores could be a place to engage the community.
- Translation services in Spanish and Haitian Creole are priorities, but there are growing Ukrainian and Russian communities.
- Host in-person workshops on Saturdays when the community is more available and make these workshops more lively and culturally relevant. Providing food and childcare will encourage participation.
- Engaging ministers and churches to engage historically underserved communities as well as youth and high school students.
- Engage with local CBOs to ensure engagement remains culturally relevant with questions that are applicable to the community.

FIGURE 3-2. Community engagement was kicked off with a meeting with the community-based organizations, both educating the leaders and understanding how best we may engage with the communities.



Why it Matters in the Region...

- 21%** of region's population live in a disadvantaged census tract*
- 1 in 5** adults in disadvantaged census tracts* have a heart disease or asthma;
- 1 in 3** adults in disadvantaged census tracts* have diabetes
- \$47,314** median household income
- \$197,921** median home value
- 26%** of households spend more than half of their gross income on rent

**Note: based on definitions from Climate and Economic Justice Screening Tool (CEJST)*

3.2.3 COMMUNITY PRIORITIES IDENTIFIED THROUGH SURVEY

Given the restricted timeframe between contract execution and PCAP submission, the team used a digital survey to get an understanding of the top challenges and community priorities for investment. The region will conduct a comprehensive outreach and engagement during the CCAP as noted in the **Chapter 6 | Next Steps**.

The digital survey was open from February 1 through February 20th and distributed by CBOs and Sarasota County as well as was posted on the dedicated project website. The survey included questions about the largest challenges that residents experience in their daily lives; their thoughts on the county’s greatest assets for increased protection, transportation, housing, and other priorities; preferred ways to stay engaged throughout the project along with demographic questions.

280 community members responded to the survey and identified top community challenges such as 1) High energy bills, 2) Exposure to extreme heat, and 3) Lack of access to reliable, convenient, safe, and affordable public transportation or mobility options.

A detailed summary of the community survey is below.

TABLE 3-2. Summary of the Survey—highlights the top challenges and community priorities.

Total Responses	<ul style="list-style-type: none"> 285 responses (272 identified as individuals/13 identified as organizations)
Participant Location	<ul style="list-style-type: none"> 87% of respondents were from Sarasota County with the remaining 11% from Manatee County and 2% from Unknown.
Highest Concentration of Respondents	<ul style="list-style-type: none"> Zip codes 34232, 34293 and the 34239
Top Challenge Faced by Respondents	<ul style="list-style-type: none"> High energy bills Exposure to extreme heat Lack of access to reliable, convenient, safe, and affordable public transportation or mobility options
Community Assets that Need Greatest Protection	<ul style="list-style-type: none"> Natural and Cultural Resources Social Infrastructure Transportation
Top Transportation Priorities	<ul style="list-style-type: none"> Improved sidewalks Safe and accessible bike routes
Top Housing Priorities	<ul style="list-style-type: none"> More trees around where community residents live/work to provide cooling Financial incentives to improve housing condition
Top Other Priorities	<ul style="list-style-type: none"> Increasing the amount of green spaces/natural areas Improvements to make agriculture more sustainable
Greatest Challenges Faced by Respondents (Organizations)	<ul style="list-style-type: none"> Health-related challenges Unable to afford a newer/more reliable vehicle Commuting time/distance
Community Assets that Need Greatest Protection (Organizations)	<ul style="list-style-type: none"> Transportation Agriculture
Top Transportation Priorities (Organizations)	<ul style="list-style-type: none"> Reducing commute times/distances Improved sidewalks. Safe and accessible bike routes
Top Housing Priorities (Organizations)	<ul style="list-style-type: none"> Financial incentives to improve housing condition Financial improvements to upgrade to solar water heaters
Top Other Priorities (Organizations)	<ul style="list-style-type: none"> Increasing the amount of green spaces/natural areas More composting programs Reducing air pollution from commercial/industry activities near residential communities

3.2.4 ENGAGEMENT OBSERVATIONS

TRANSPORTATION

Residents and CBOs shared that their existing transit travel times are long, and commutes are made more challenging by a network that is disconnected, limited and unreliable. This has created an environment where public transit ridership remains stagnant even with fare incentives. Some solutions that were recommended included development of an app that shows real-time transit data to make the experience more efficient and popular. Other solution included investing in micro mobility options to connect residents to the existing transit network. Addressing poor air quality, particularly in areas around the airport, was also identified as a priority. Solutions included increasing real-time information about air quality, implementing an advertising campaign to education residents on the implications of poor air quality, and supporting the transition to zero emission fleets and transit busses.

BUILDINGS AND FACILITIES (RESIDENTIAL AND COMMERCIAL)

High energy bills are one of the many economic burdens facing communities in the region. Access to heating and cooling replacements or upgrades is also a challenge.

Solutions that were identified included launching an educational program to inform residents and business owners of the existing programs, including the County’s Property Assessed Clean Energy (PACE) program and the Step-Up Suncoast program; however, it was noted that some of the LIDAC communities’ literacy levels can be low, so in-person conversations and demonstrations are appreciated. Incentivizing property owners to make these renewable energy and energy-efficient investments was also supported. For residential solar, the unknown or miseducated impacts on the home was identified as a barrier. Connecting neighborhoods to groups like the Solar United Neighbors may be an opportunity to showcase pilot projects and talk to neighbors about the real impacts on their home and preferred contractors. Stakeholders also recommended developing a self-replenishing fund to help with up-front costs of installing solar panels.

Stakeholders identified schools, community centers, and libraries as agency-owned assets that should be prioritized for renewable energy and energy-efficiency investments. It was noted that all new buildings in Sarasota County are green-building certified.

SOLID WASTE

Stakeholders identified a need to invest in more education and awareness about appropriate recycling methods as well as food waste and redistribution programs. In addition, the investment in infill technologies was recommended as it can lead to more effective composting and recycling and reduces pollutants by increasing awareness of proper methods to dispose of waste and materials among lower-income residents. Stakeholders prioritized collaboration with local schools and redistribution organizations and recommended local CBO-led waste pickup programs that go to communities to meet them where they are using green fleets. Finally, stakeholders recommended developing a coalition of organizations, restaurants and other businesses committed to food redistribution.

3.3 UNDERSTANDING SARASOTA-MANATEE REGION AGENCY PRIORITIES

Regional collaboration for sustainability, climate and resilience action in the Sarasota-Manatee Region has been ongoing for many years. The coordination and collaboration for the PCAP is a continuation of these efforts.

Starting in April 2023, Sarasota County began to meet with jurisdictions in the North Port-Sarasota-Bradenton MSA. Over 25 planning discussions have been held to date resulting in over 30 hours of discussion with partners.

Representatives from various departments in each jurisdiction actively participated in the meetings, fostering a comprehensive approach to regional development. Sarasota County was well-represented with staff from the Sustainability, Grants, and Environmental Protection teams. Manatee County included staff from the Energy and Sustainability Division, Natural Resources and Air Division, Ecological and Marine Resources Division, Manatee County UF/IFAS Extension, Environmental Protection Division, Planning and Community Development, Engineering, and Public Works. The City of Holmes Beach had the Superintendent of Public Works and City Engineer in attendance. North Port sent representatives from Community Outreach, Compliance Utilities, and Grants. The City of Venice was represented by professionals from Engineering, Planning, and Zoning. The City of Sarasota was actively engaged with representatives from Sustainability and Grants. The Town of Longboat Key's Support Services Director was in attendance. Furthermore, Sarasota Manatee Metropolitan Planning Organization (MPO) and Tampa Bay Regional Resiliency Coalition were also well-represented, with multiple delegates participating in the meetings. Identified priorities were:

- **Community cooling and resilience centers.** Agency-facilities like community centers throughout the region where community members can get relief from the heat, get education and assistance resources. The team documented these priorities and used them to refine questions in subsequent community engagement events.
- **Renewable energy** for water and sewer facilities and school, community centers, and municipal buildings,
- **Methane recovery** from landfills,
- **Decarbonization of the bus (schools and transit) fleet.**

In February 2024, the team met with Sarasota-Manatee region agencies once more to review the regions' priorities. Some of the attendees in the second meeting included representatives from Sarasota County, Manatee County, City of Venice, City of Holmes Beach, Sarasota-Manatee MPO, City of North Port, City of Sarasota, and City of Bradenton. Throughout the meeting, attendees reiterated the importance of renewable energy, methane recovery from landfills, decarbonization of the school bus fleets, and the need for community centers that can serve as a refuge from heat as well as provide additional resources

about renewable energy. The team documented the feedback and used it to better understand community priorities in additional engagement events.

FIGURE 3-3. Sarasota-Manatee County Agency-stakeholders met regularly to collaborate in identifying the region's priorities for the PCAP.



4 | GREENHOUSE GAS (GHG) INVENTORY

The first step toward achieving tangible greenhouse gas emission reductions requires identifying baseline emissions levels, sources, and activities generating emissions in the community.

The following sections describe the 2019 GHG emissions inventory for the North Port-Sarasota-Bradenton (NPSB) Metropolitan Statistical Area (MSA) that includes Sarasota and Manatee counties. GHG emissions were inventoried on a county-wide basis for both Sarasota and Manatee counties and compiled for the regional MSA.

4.1 INVENTORY METHODOLOGY AND ASSUMPTIONS

4.1.1 INVENTORY PROTOCOLS

Inventory calculations followed guidance and methods provided by the U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions (U.S. Community Protocol) developed by the International Council for Local Environmental Initiatives USA (ICLEI). Inventories were prepared on a county-wide scale and calculated using ICLEI's ClearPath tool, which allows for future forecasts based on assumptions applied to baseline inventories.

GHG emission inventories are reported in units of Metric Tons of carbon dioxide equivalent (MT CO₂e) emissions per year. Three greenhouse gases were accounted for in the inventory: carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). CO₂e values were calculated using the Global Warming Potentials (GWP) relative to CO₂ for methane and nitrous oxide from the Intergovernmental Panel on Climate Change's (IPCC) 5th Assessment Report as shown in **Table 4-1**.

TABLE 4-1. Global warming potential (GWP) values relative to CO₂

Common name	Chemical Formula	GWP values for 100-year time horizon, Fifth Assessment Report (AR5)
Carbon Dioxide	CO ₂	1
Methane	CH ₄	28
Nitrous oxide	N ₂ O	265

4.1.2 BASELINE INVENTORY YEAR

The inventory process requires the selection of a baseline year with which to compare current and future emissions. Sarasota and Manatee Counties selected 2019 as the baseline year because it was the most recent year that was representative of typical activity, prior the COVID-19 pandemic and associated short-term changes in activity rates for major sources such as transportation.

4.1.3 BASELINE INVENTORY SECTORS AND SCOPE

The baseline inventory provides an overview of anthropogenic (human-activity) GHG emissions within the region. Natural sources of GHG are not included. The following sectors are included in the GHG emissions inventory developed for the PCAP:

- Transportation & Mobile Sources (including On-Road, Off-Road, Marine Vessel, and Rail Sources)
- Residential Energy Use
- Commercial Energy Use
- Industrial Energy Use
- Solid Waste
- Water and Wastewater
- Process & Fugitive Emissions

The community-wide inventory does not include emissions from sources such as land clearing, soils, and air traffic. Additionally, GHG emissions “sinks” were not accounted for in the emissions inventory. The baseline inventory also does not include the impacts of upstream emissions outside the MSA.

4.2 BASELINE GHG EMISSIONS INVENTORY

Methodology (described in the Appendix) was used to estimate county-wide GHG emission inventories as well as the cumulative NPSB MSA GHG emissions inventory for the sectors shown in **Table 4-2**.

TABLE 4-2. GHG Emissions by Sector for 2019

Sector	Sarasota County (MT CO ₂ e)	Manatee County (MT CO ₂ e)	NPSB MSA (MT CO ₂ e)	Percent (%) of Total
Transportation	1,984,651	1,701,864	3,686,515	49%
On-Road vehicle	1,691,142	1,363,596	3,054,739	82.9%
Public Transit	8,152	3,926	12,078	0.3%
Off-Road	285,357	309,703	595,059	16.1%

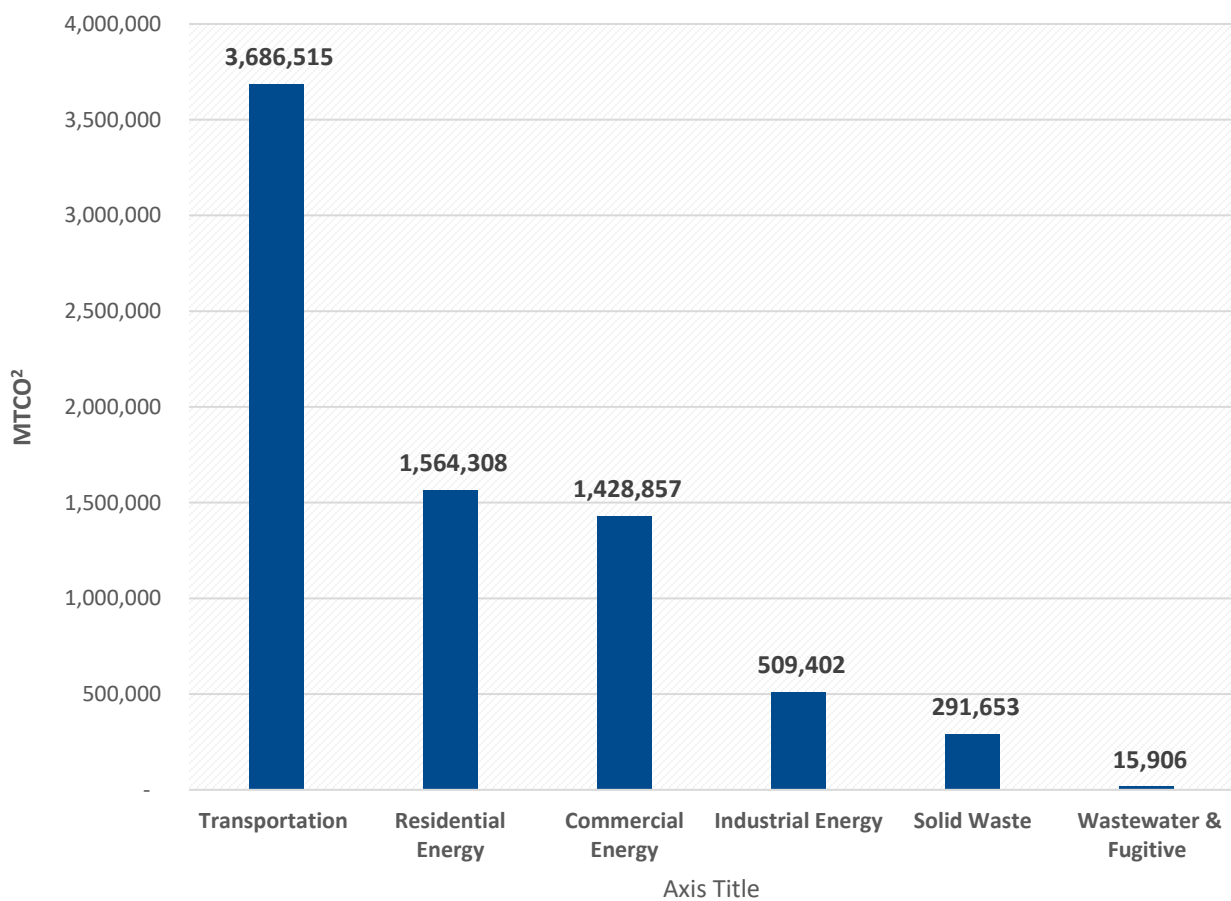
Sector	Sarasota County (MT CO ₂ e)	Manatee County (MT CO ₂ e)	NPSB MSA (MT CO ₂ e)	Percent (%) of Total
Marine Vessel & Rail	-	24,640	24,640	0.7%
Residential Energy	924,957	639,351	1,564,308	21%
Electricity	905,435	611,960	1,517,395	97.0%
Natural Gas	17,203	25,946	43,149	2.8%
Other	2,319	1,446	3,765	0.2%
Commercial Energy	703,174	725,683	1,428,857	19%
Electricity	603,794	617,368	1,221,162	85.5%
Natural Gas	68,462	88,913	157,375	11.0%
Other	30,919	19,403	50,322	3.5%
Industrial Energy	69,746	439,656	509,402	7%
Electricity	14,090	215,676	229,767	45.1%
Natural Gas	2,970	172,574	175,544	34.5%
Other	52,686	51,406	104,092	20.4%
Solid Waste	180,144	111,509	291,653	4%
Water & Wastewater	9,106	6,800	15,906	0.2%
Process & Fugitive	2,891	-	2,891	0.0%
Total	3,874,669	3,624,863	7,499,532	100.00%

The NPSB MSA's total emissions for the sectors considered totaled approximately 7,499,532 MT CO₂e in 2019. As shown in **Table 4-2** and **Figure 4-1**, the Transportation sector was the largest contributor of GHG emissions in the 2019 baseline inventory, with approximately 49 percent of the NPSB MSA's total GHG emissions. Residential and commercial energy use were the second and third largest contributors of GHG emissions with 21 percent and 19 percent of total emissions, respectively. Emissions from industrial energy sources represent 7 percent of the inventory, and approximately 4 percent of the emissions result from solid waste management. Other emissions sources, such as wastewater treatment and fugitive emissions from natural gas distribution, represent less than one percent of the emissions inventoried. A review of the GHG emissions contributing to the transportation sector total shows that approximately 83 percent of emissions result from on-road sources, which include passenger cars and trucks, municipal fleets, delivery vans, and heavy-duty trucks. 16 percent of the transportation sector emissions result from off-road mobile sources such as agricultural and forestry equipment, heavy industry and construction

equipment. Approximately 1 percent of transportation emissions are attributed to public transit, rail, and marine vessels.

Residential, commercial, and industrial energy usage were calculated for grid electricity and stationary fuel combustion. Electricity usage generated the bulk of residential, commercial, and industrial GHGs with 97 percent, 85 percent, and 45 percent, respectively. Natural gas combustion was the second highest contributor to GHGs with residential usage of approximately 3 percent, commercial usage of 11 percent and industrial usage making up 34 percent of total sector usage. Additional fuel combustion of propane, kerosene, and distillate fuel No. 2 made up less than a percentage of residential GHG emissions, 4 percent of commercial GHG emissions, and 20 percent of industrial GHGs.

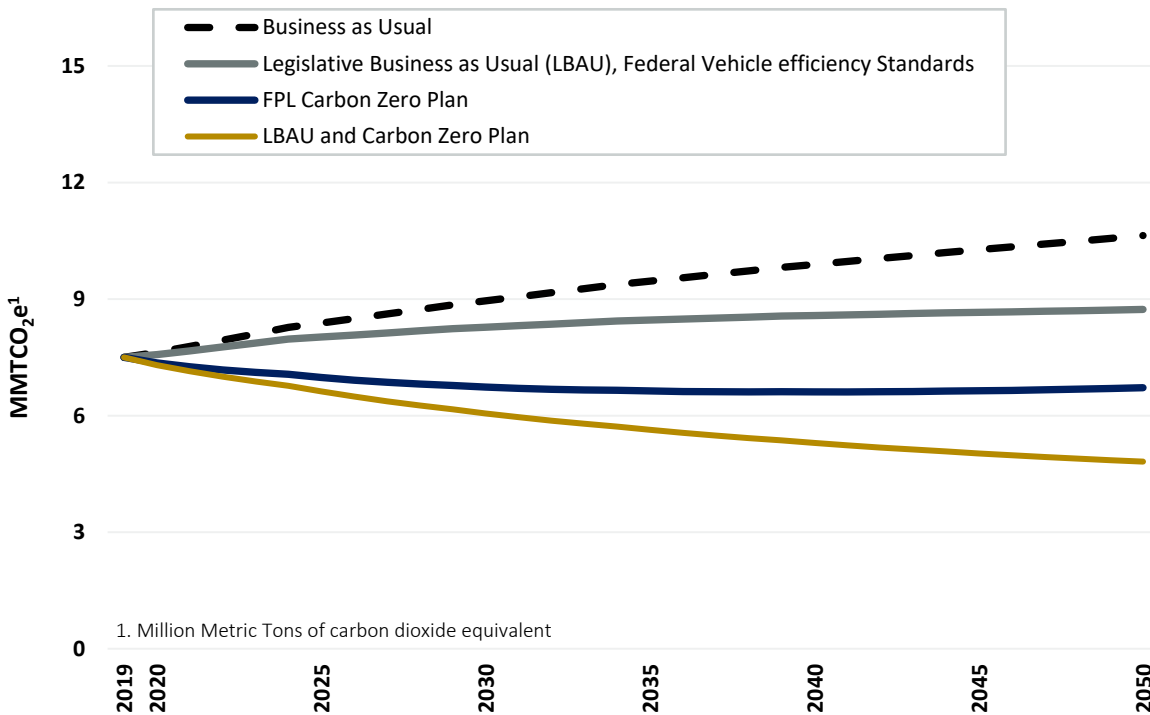
FIGURE 4-1. Sector GHG Emissions Contribution (MTCO₂) in the Baseline Year 2019



4.3 GHG EMISSIONS PROJECTIONS

An important step in GHG emissions management is the development of a forecast to summarize GHG emission trends based on anticipated demographic and economic changes. Forecasts provide the basis for the development of the Climate Action Plan by assisting with emissions comparisons to targets and evaluating options for addressing any gaps. Four forecast scenarios were prepared and are shown in Figure 4-2.

FIGURE 4-2. Forecasted GHG Emissions and Reductions



A **baseline Business as Usual (BAU) forecast**, presuming current emissions rates and activities are held constant, was prepared with projected population growth rates applied. Population growth rates were determined from the Bureau of Economic and Business Research (BEBR) at the University of Florida. Near-term population projections estimate that there will be a 24.68 percent increase in the NPSB MSA population from 2019 to 2030 based on its medium growth scenario. Long-term estimates between 2019 to 2050 show a 48.38 percent increase for the medium growth scenario. As a side note, in addition to the medium series, BEBR also created a low and a high series for Florida counties. These should not be considered low and high growth scenarios; rather, they represent an indication of the uncertainty surrounding the medium projections. These rates were converted into annual compound growth rates and were applied to Residential energy use, Transportation, Solid Waste, and Water and Wastewater⁹

⁹Growth rate not applied to *Daily Nitrogen load with release to environment* as Total Nitrogen concentration in effluent is regulated by the Florida Department of Environmental Protection and specific to Facility permit conditions.

sectors for short and long-term forecasts. Commercial and Industrial energy use sectors were multiplied by an annual compound growth rate of 1 percent based on employment projections from Florida Commerce an economic planning agency in the state of Florida.

A second BAU scenario, identified as the **Legislative Business as Usual (LBAU)**, reduces emissions from the baseline scenario due to anticipated impacts from existing federal, state, and regional policies. Currently, only federal vehicle fuel efficiency standards, identified as the Corporate Average Fuel Economy (CAFE) standards, apply in the MSA. Application of the standards to on-road vehicles show a reduction in the overall GHG emissions down of around 8 percent below 2019 levels in 2030, and about 18 percent below 2019 levels in 2050.

A third hypothetical emission projection, identified as the **FPL Carbon Zero Plan**, captures emission reductions attributed to Florida Power and Light's (FPL) (and their parent company, NextEra Energy) *Real Zero*¹⁰ goal of zero CO₂ emissions by 2045. Decreasing carbon intensity of grid electricity provided by FPL was assumed for residential, commercial, and industrial energy use sectors culminating in complete decarbonization in 2045. Implementation of the Carbon Zero Plan shows a reduction in the overall GHG emissions down of around 25 percent below 2019 levels in 2030, and about 37 percent below 2019 levels in 2050.

An additional hypothetical emission projection, identified as **LBAU and Carbon Zero Plan**, captures the combined reductions attributed to both vehicle fuel efficiency standards as well as FPL's *Real Zero* goal, referred to as the Adjusted BAU projection and not included in the forecasted emissions and reductions.

¹⁰ https://www.nexteraenergy.com/content/dam/nee/us/en/pdf/2023_NEE_Sustainability_Report_Final.pdf

5| GHG REDUCTION MEASURES WITH LIDAC BENEFITS AND CO-BENEFITS

Priority GHG reduction measures identified for Sarasota-Manatee region are within the top three GHG emission sectors and focused on achieving significant GHG reductions while considering 1) benefits to LIDACs and other co-benefits, and 2) the ability to implement and create immediate impact. The measures are identified as ‘priority’ to pursue funding through CPRG implementation grants and are not exhaustive of the Sarasota-Manatee region’s priorities.

The priority GHG emission measures are quantified based on the corresponding outputs those actions could reasonably be expected to produce. The tables below note the identified measures, the EPA sector, the entities' geographic location with implementation authority, and GHG reduction potential.

GHG reduction measure includes an analysis of LIDAC benefits and co-benefits, and how community and stakeholder feedback directly informed the GHG reduction measures.

Reduction measures also include information on authority to implement, implementation schedule and milestones, geographic scope, and metrics for tracking progress. The GHG reduction measures have the co-benefit of reducing emissions of harmful air pollutants as noted in the table.

Reduction of air pollutant emissions will improve air quality in Sarasota and Manatee Counties and help to maintain the area’s current attainment status with respect to the National Ambient Air Quality Standards.

Each GHG reduction measure is assumed to ramp or curve to the target years 2030 and 2050 from previous years. The cumulative GHG reduction is the sum of the individual years. The calculations supporting the reductions are noted in the Technical Appendix, detailing all assumptions, tools, citations, datasets, and methods to estimate and quantify GHG emissions and co-pollutant reductions.

5.1 LOW-INCOME COMMUNITIES RESIDENTIAL BUILDINGS-RESIDENTIAL ENERGY SECTOR

The GHG reduction measures for the Sarasota-Manatee region leverage the existing programs for residential buildings within low-income and disadvantaged communities. The identified measures reduce GHG emissions through building improvements, which reduce the property's energy load and demand, and technology that runs more efficiently.

5.1.1 THE NEED TO REDUCE RESIDENTIAL ENERGY BURDEN

The community need for improvements were identified by combining information gathered from the community engagement as well as data-analysis using publicly available data.

COMMUNITY PRIORITIES IDENTIFIED DURING ENGAGEMENT

Community feedback from community-based organizations (CBOs) and the community survey highlighted that energy burden as the number one challenge. Energy costs can be above \$500 per month and continue to increase with higher number of hot days. Exposure to extreme heat was identified as close second among the top three challenges faced by the community. Air conditioning replacement and upgrades were identified as a necessity that should be available to the renters, as well as owners.

As the community recovers from the recent hurricane damages and considering the condition of the existing housing stock in the low-income neighborhoods, investment into the building enclosure, as well as openings such as windows and doors are necessary. Roof condition assessments combined with potential roof upgrades were identified as concern when installing photovoltaics. Also, insulation and airtightness of the building enclosure when upgrading or replacing air conditioning were identified as a need considering the age of the housing stock in the low-income and disadvantaged communities.

LIDAC ANALYSIS ON ENERGY BURDEN

For residents in the Sarasota-Manatee region, housing costs, including mortgage payments, property taxes, and maintenance, comprise around 33 percent of gross household income.¹¹ This number goes up to 38 percent for households in LIDAC census tracts. In addition, around 8 percent of the region's household income is spent on utilities, including energy costs. Any cost reductions to energy bills will significantly impact LIDAC communities, especially those that are energy- or housing-burdened.

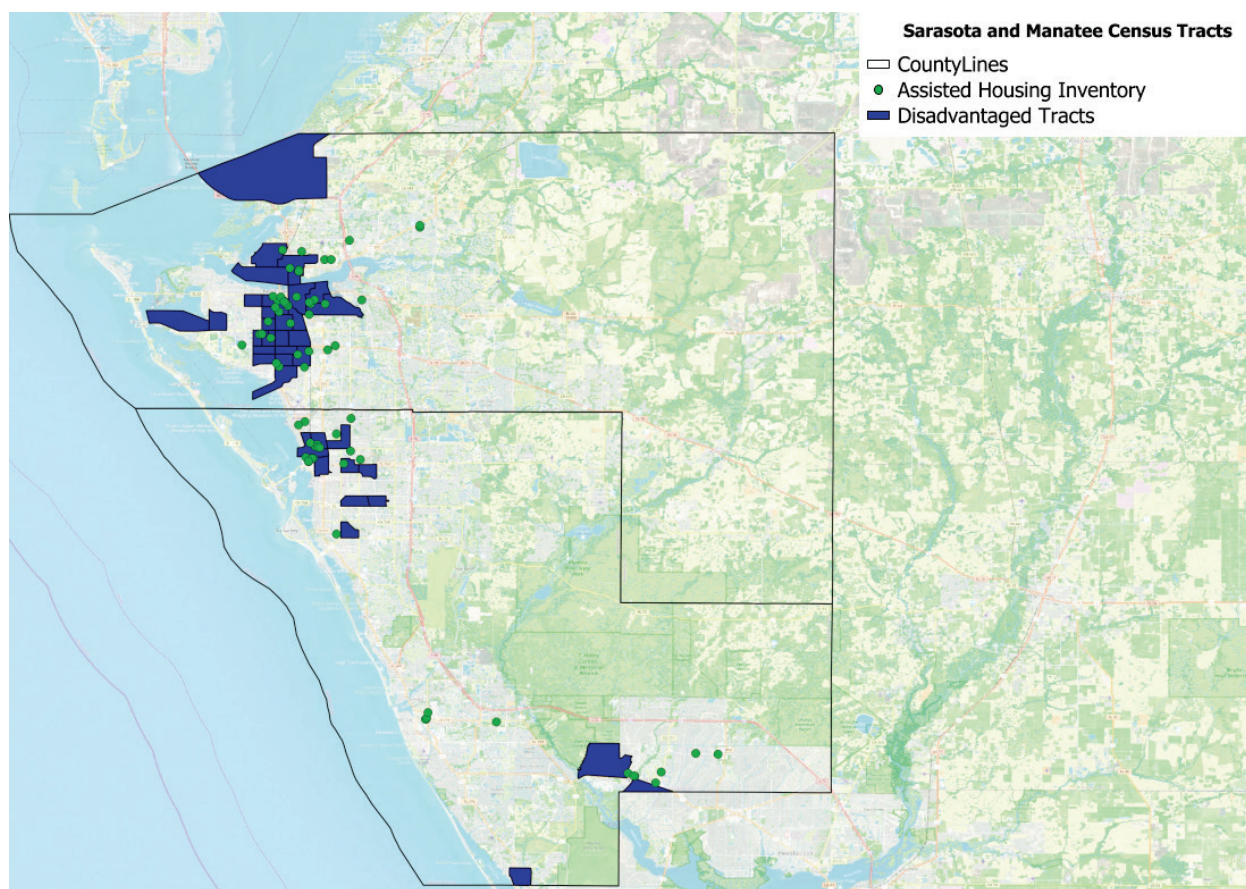
Approximately 60 to 70 percent of the region's affordable housing falls within a LIDAC. Energy programs targeting affordable housing will in turn also benefit the LIDAC communities where the affordable housing units are located.

Residents in LIDAC census tracts face higher energy burdens due to older housing structures. On average, houses in these tracts are 10 years older than the regional average, often leading to less energy

¹¹ Esri's Community Analyst data for Sarasota and Manatee counties; Consumer Spending data are derived from the 2019 and 2020 Consumer Expenditure Surveys, Bureau of Labor Statistics.

Residents in LIDAC census tracts face higher energy burdens due to older housing structures. On average, houses in these tracts are 10 years older than the regional average, often leading to less energy efficiency. This is further supported by a Sarasota County report showing that lower-cost homes are four times more likely to have the highest energy bills per square foot.¹² Reducing utility bills in LIDAC census tracts would significantly impact residents' lives, freeing up critical resources for essential needs like food and healthcare. **Figure 5-1** shows the affordable housing in the Sarasota-Manatee region with data from the Florida Housing Data Clearinghouse. Affordable housing is defined as buildings that receive funding from housing programs in the form of rental assistance, housing credits, and other forms of support. All buildings identified in **Figure 5-1** have multiple affordable housing units at those locations, ranging from three to 192 units.

TABLE 5-1. Affordable housing buildings and disadvantaged communities census tracts¹³



¹² <https://blogs.ifas.ufl.edu/sarasotaco/2018/02/26/saving-energy-need/>

¹³ Affordable housing unit locations come from the Florida Housing Data Clearinghouse Assisted Housing Inventory. <http://flhousingdata.shimberg.ufl.edu/>

5.1.2 GHG REDUCTION MEASURES REDUCE ENERGY BURDEN WITH CO-BENEFITS

The GHG reduction measures have benefits for residential owners and renters, such as savings on utility bills, property maintenance, and co-benefits of improving indoor environmental quality through enhancing thermal comfort and sound attenuation. The identified energy burden reduction benefits for renewable energy, and energy efficiency combined with building enclosure and opening improvements are included below.

Renewable Energy: Annual household savings are calculated using the average residential price per kilowatt hour in the State of Florida, which is 15 cents.¹⁴ Solar Photovoltaics (PVs) are expected to see the highest annual savings per household at \$2,175.00 per household. Savings from other strategies such as heat pumps or high efficiency AC retrofits, smart thermostats, roof insulation, and others, can range from \$23.87 to \$167.06 in annual savings per household.

Energy Efficiency and Building Improvements: The Sarasota-Manatee region has existing programs and capacity to expand their support for LIDAC communities. Sarasota County has an existing “Energy Upgrade Program” that focuses on energy equity, specifically targeting low-income residents with educational programs and outreach materials. Reducing utility bills gives these families more money for other necessities, such as food or health care. This program also educates participants on how indoor air quality can affect health and well-being through the [Healthy Homes](#) class, which delivers a comprehensive approach to housing-related hazards, focusing on the indoor environment, managing pests, and strategies on mold prevention and control.

The prioritized GHG reduction measures for the Sarasota-Manatee region in the residential energy sector are organized below by the highest energy burden reduction.



Measure #1

RESIDENTIAL RENEWABLE ENERGY

Description:

Community-based organizations and partners identified solar photovoltaics as a priority during engagement. High energy bills were identified as one of the top three challenges by the community.

R-01. Solar Photovoltaics (PV) for Low-Income and Disadvantaged Communities. Generate electricity from onsite solar PV panels at single and multi-family buildings (rooftop, covered parking, sidewalks, floating, etc.). The measure would decarbonize energy consumption in the residential sector by integrating on-site photovoltaics.

Location:

Sarasota and Manatee Region MSA

¹⁴ Garcia, F. (2024, January). *Electricity Rates in Florida*. Retrieved from FindEnergy: <https://findenergy.com/fl/>

**Measure #1****RESIDENTIAL RENEWABLE ENERGY**

Implementing Agencies:	Sarasota and Manatee Counties and the cities within the region have the authority to implement the measure through residential programs that offer incentives, rebates, or replacement within criteria that qualify low-income and advantaged communities under provisions of the FL Statutes 163.08 Supplemental authority for improvements to real property.
Potential GHG (MTCO₂/Yr):	<p>Year 2025-2030: 3,849</p> <p>Year 2025-2050: 46,617</p>
LIDAC Benefits and Co-benefits:	<p>Benefits to the low-income and disadvantaged community homeowners and renters are:</p> <p style="text-align: center;">Energy Reduction (MWh) per Household/Year: 14.5 MWh Annual Household Savings: \$2,175</p> <p>Additional benefits during implementation are an increase in the solar photovoltaics installation and maintenance jobs creation, particularly when combined with workforce development.</p> <p>Co-benefits include:</p> <ul style="list-style-type: none"> » Improved air quality » Improved public health » Improved community resilience
Implementation Schedule and Milestones:	<p>Goal: Decrease energy consumption by 4.42 MW (442 homes) by year 2030.</p> <p>Year 2025: Planning and design. Residential Solar PV Analysis will be performed for typical locations. Tier 2 criteria will be used to prioritize LIDAC system locations. The size of the electric utility service and the annual kWh consumption for each residence will determine PV sizes and maximum output capacities.</p> <p>Year 2026: 500 kW installed.</p> <p>Year 2027: 500 kW installed (1 MW total)</p> <p>Year 2028: 1 MW installed (2 MW total)</p> <p>Year 2029: 1 MW installed (3 MW total)</p> <p>Year 2030: 1.42 MW installed (4.42 MW total)</p>
Metrics for Tracking Progress	<ul style="list-style-type: none"> » MWh of clean energy produced » # of workforce/jobs created



Measure #2

RESIDENTIAL ENERGY EFFICIENCY

Description:	<p>Community-based organizations and partners identified energy efficiency strategies as a priority during the engagement. High energy bills and exposure to heat were identified as two of the top three challenges by the community. Community members and stakeholders identified financial incentives to improve air-conditioning to more efficient models as one of the top-three priorities.</p> <p>Implementing newer technology in the residential sector for heating and cooling systems, domestic hot water heating, smart appliances, and intelligent controls for more efficient energy use will reduce energy consumption and decarbonize the residential energy sector. The measures include:</p> <p>R-02. Residential Heat Pump or High-Efficiency AC Retrofits and Commissioning within Low-Income and Disadvantaged Communities. Replace old A/C technology with a heat pump or high-efficiency A/C coupled with the commissioning of the equipment.</p> <p>R-03. Residential LED Lighting within Low-Income and Disadvantaged Communities. Install LEDs (or more efficacious lamps) that are energy efficient while producing the same amount of illumination.</p> <p>R-03A. Residential Efficient Appliances and Plug Load Management within Low-Income and Disadvantaged Communities. Install Energy Star or equivalent appliances to reduce energy consumption. Installation of plug load controls allow for user-friendly management and reduced energy consumption.</p> <p>R-03B. Residential Smart Thermostats within Low-Income and Disadvantaged Communities. Install smart thermostats to optimize heating, cooling, and preferences to increase energy efficiency, comfort, and ease of use.</p>				
Location:	Sarasota and Manatee Region MSA				
Implementing Agencies:	Sarasota and Manatee Counties and the cities within the region have the authority to implement the measure through residential programs that offer incentives, rebates, or replacement within criteria that qualify low-income and advantaged communities under provisions of the FL Statues 163.08 Supplemental authority for improvements to real property.				
Potential GHG (MTCO₂/Yr)	<table border="1"> <tr> <td>Year 2025-2030:</td> <td>8,738.25</td> </tr> <tr> <td>Year 2025-2050:</td> <td>105,829.95</td> </tr> </table>	Year 2025-2030:	8,738.25	Year 2025-2050:	105,829.95
Year 2025-2030:	8,738.25				
Year 2025-2050:	105,829.95				



Measure #2

RESIDENTIAL ENERGY EFFICIENCY

LIDAC Benefits and Co-benefits:

Energy-efficient appliances provide the ability to utilize appliances and air conditioning more affordably, and thermostats will provide the ability to control for comfort and need. Benefits to the low-income and disadvantaged community homeowners and renters adopting these measures are:

Energy Reduction (MWh) per Household/Year: 1.77

Annual Household Savings: \$266.00

Co-benefits include:

- » Improved air quality
- » Improved public health
- » Potential reduced exposure to extreme heat

Implementation Schedule and Milestones:

Goal: Implement GHG reduction measures at 10% of LIDAC residences (8,185 homes)

Year 2025: Planning and design

Year 2026: 500 homes

Year 2027: 1,000 homes (1,500 homes total)

Year 2028: 2,000 homes (3,500 homes total)

Year 2029: 2,000 homes (5,500 homes total)

Year 2030: 2,685 homes (8,185 homes total)

Implementation strategies to expanding residential energy efficiency programs are to provide efficiency tool kits that may include energy audit equipment, energy and water efficiency devices, and educational materials, and education materials at libraries, community centers, city halls, and other trusted locations. Education will include energy efficiency workshops for community members to learn resource-saving strategies.

Metrics for Tracking Progress

- » Average energy savings per retrofit
- » Average energy cost savings per retrofit



Measure #3

RESIDENTIAL BUILDING ENCLOSURE UPGRADES

Description:	<p>Community-based organizations and partners identified that investment in enclosures, roof improvements, and building openings – windows, doors, and skylights – will support photovoltaic installation and energy efficiency improvements.</p> <p>Community members and stakeholders identified financial incentives to improve housing conditions as one of the top three priorities.</p> <p>R-04. Residential Enclosure Upgrades (with roof assessment) within Low-Income and Disadvantaged Communities. Improve the envelope efficiency by creating an airtight envelope for improved energy conservation and comfort. Assess roof conditions to ensure roofs are in good condition, not leaking, and within their useful lifespan. This measure does not include the replacement of windows or roof replacement.</p> <p>R-05. Residential Window, Door, and Skylight Replacement with Assessment. Replace windows, doors, and skylights to improve energy performance. Assess and evaluate the condition of the windows, doors, and skylights before replacement.</p>								
Location:	Sarasota and Manatee Region MSA								
Implementing Agencies:	Sarasota and Manatee Counties and the cities within the region have the authority to implement the measure through residential programs that offer incentives, rebates, or replacement within criteria that qualify low-income and disadvantaged communities under provisions of the FL Statutes 163.08 Supplemental authority for improvements to real property.								
Potential GHG (MTCO₂/Yr)	<table border="0"> <tr> <td>R-04. Year 2025-2030:</td> <td>5,489.24</td> </tr> <tr> <td>R-05. Year 2025-2030:</td> <td>1,568.35</td> </tr> <tr> <td>R-04. Year 2025-2050:</td> <td>66,480.79</td> </tr> <tr> <td>R-05. Year 2025-2030:</td> <td>18,994.51</td> </tr> </table>	R-04. Year 2025-2030:	5,489.24	R-05. Year 2025-2030:	1,568.35	R-04. Year 2025-2050:	66,480.79	R-05. Year 2025-2030:	18,994.51
R-04. Year 2025-2030:	5,489.24								
R-05. Year 2025-2030:	1,568.35								
R-04. Year 2025-2050:	66,480.79								
R-05. Year 2025-2030:	18,994.51								
LIDAC Benefits and Co-benefits:	<p>The building enclosure upgrades will address the high energy bills and exposure to heat that the community identified as two of the top three challenges. The existing housing stock in the LIDAC communities may require enclosure improvements to take advantage of measure #1 and measure #2. Benefits to the low-income and disadvantaged community homeowners and renters are:</p> <p>R-04. Energy Reduction (MWh) per Household/Year: 1.11 R-04. Annual Household Savings: \$167.06</p> <p>R-05. Energy Reduction (MWh) per Household/Year: 1.06 R-05. Annual Household Savings: \$159.13</p> <p>Co-benefits include:</p> <ul style="list-style-type: none"> » Improved air quality 								

**Measure #3****RESIDENTIAL BUILDING ENCLOSURE UPGRADES**

- » Improved building resilience to extreme weather
- » Potential reduced exposure to extreme heat

Implementation schedule and Milestones:

Goal: Implement GHG reduction measures at 10% of LIDAC residences (8,185 homes)

Year 2025: Planning and design

Year 2026: 500 homes

Year 2027: 1,000 homes (1,500 homes total)

Year 2028: 2,000 homes (3,500 homes total)

Year 2029: 2,000 homes (5,500 homes total)

Year 2030: 2,685 homes (8,185 homes total)

Implementation strategies to expanding residential energy efficiency programs are to provide efficiency tool kits that may include energy audit equipment, energy and water efficiency devices, and educational materials, and education materials at libraries, community centers, city halls, and other trusted locations. Education will include energy efficiency workshops for community members to learn resource-saving strategies.

Metrics for Tracking Progress

- » Average energy savings per retrofit
- » Average energy cost savings per retrofit

5.2 AGENCY-OWNED BUILDINGS AND FACILITIES-COMMERCIAL ENERGY SECTOR

The agencies within the Sarasota and Manatee region MSA are already investing in decarbonizing agency operations. The proposed measures will help further reduce GHG emissions in the commercial energy sector. These improvements include renewable energy, efficient equipment upgrades, and building envelope improvements.

5.2.1 THE NEED FOR ENERGY RESILIENCE AT AGENCY-OWNED FACILITIES

COMMUNITY PRIORITIES IDENTIFIED DURING ENGAGEMENT

The community identified exposure to extreme heat as one of the top three challenges. While air-conditioning upgrades and replacement at homes were identified as priorities, access to air-conditioning in places of work and play are also necessary. Community centers and libraries often serve as resiliency hubs, cooling, or heating centers, in LIDAC communities.

Community members survey responses identified utility costs as one of the burdens. Agency-owned facilities like the water and sewer plants provide services to the low-incomes communities, and their expenses are directly transferred to the end-users.

LIDAC BENEFITS

Improved reliability of community buildings and libraries will help provide essential services near where people work and play. Increased energy efficiency combined with renewable energy use can improve the community services throughout the year. Low income and disadvantaged community members can seek relief from extreme heat and cold in the community buildings, which will also provide pre-disaster services, such as sandbag distribution and post-disaster services, such as heating, phone-charging, and communications. When agency-owned facilities invest in renewable energy and energy efficiency measures, the co-benefits of energy cost savings are passed on to the end users, often disproportionately to LIDACs. For example, in Manatee County, the water and sewer facilities are the largest consumer of electricity and the Central water and sewer serve City of North Port's low-to-moderate income (LMI) communities.

5.2.2 IDENTIFIED ENERGY RESILIENCE MEASURES.

The identified energy resilience measures at agency-owned facilities have benefits for LIDAC communities as well as the larger community.

The proposed GHG reduction measures also increase energy efficiency and reduce the facility's energy consumption, peak load demands, and the pollution associated with fossil fuels and electricity production. The commercial measures include retro-commissioning of existing buildings, which will typically provide a 5% reduction in energy consumption at a very low cost and will utilize current technology to improve efficiency. In addition to reducing GHG emissions, there are added benefits to the agency and facility owners, such as savings on the cost of utilities, reduced equipment maintenance, property enhancements, and improved indoor environmental quality and comfort. The prioritized measures include:

- **Renewable energy.** Installing photovoltaics on rooftops, parking lots, floating or ground mounted on facility-owned facilities reduces climate pollution reduction by integrating on-site renewable energy provided by solar photovoltaic systems. Rooftop solar PV and covered parking with solar will be the most common installations.
- **Energy efficiency and building enclosures improvements.** Measure C-01 addresses decarbonization and pollution reduction by integrating on-site renewable energy provided by solar photovoltaic systems. Rooftop solar PV and covered parking with solar will be the most common installations. Measures C-02, C-03, and C-04 address decarbonization by implementing newer technology for heating and cooling systems, energy-efficient lighting, and smart controls for more efficient energy performance in commercial facilities. Measure C-05 assesses and recommends improvements to the roof and ceiling insulation levels and reflectivity. Improving the R-value for existing building enclosures is one of the top ten recommendations by National Renewable Energy Laboratory (NREL) for the reduction in cooling and heating loads for Florida buildings.



Measure #4

FACILITIES RENEWABLE ENERGY

Description:	C-01. Solar Photovoltaics (PV) for Agency-owned Buildings. Rooftop, covered parking and sidewalks, ground-mounted and floating.
Location:	Sarasota and Manatee Region MSA
Implementing Agencies:	Sarasota and Manatee Counties and the cities within the region have the authority to implement the improvements on the properties and facilities they own under provisions of the FL Statues 163.04 Energy devices based on renewable resources.
Potential GHG (MTCO₂/Yr)	Year 2026-2030: 4.626 Year 2026-2050: 56,022
Implementation schedule and Milestones:	<p>Goal: 5.3 MW of PV for county and municipality owned buildings by 2030.</p> <p>Year 2025: Planning and design. Facility Solar PV Analysis will be performed for each location, including the 24-month utility billing history. Tier 1, Tier 2, and Tier 3 criteria will be used to prioritize system sizes and battery energy storage system (BESS) options.</p> <p>Year 2026: 500 kW Year 2027: 500 kW (1 MW total) Year 2028: 1 MW (2 MW total) Year 2029: 1.5 MW (3.5 MW total) Year 2030: 1.8 MW (5.3 MW total)</p>
LIDAC Benefits and Co-benefits:	<p>Benefits during implementation are an increase in the creation of solar photovoltaics installation and maintenance jobs, particularly when combined with workforce development.</p> <p>Co-benefits include:</p> <ul style="list-style-type: none"> » Improved community resilience » Improved air quality » Improved public health. » Improved resilience » Potential savings in the agency-owned utility cost passed to end users
Metrics for Tracking Progress	<ul style="list-style-type: none"> » MWh of clean energy produced. » # of workforce/jobs created



Measure #5

FACILITIES ENERGY EFFICIENCY

Description:	<p>C-02. Commercial Heat Pump or High-Efficiency AC Retrofits and Commissioning for County and Municipality Buildings. Replace old A/C technology with a heat pump or high-efficiency A/C coupled with the commissioning of the equipment.</p> <p>C-03. Commercial LED Lighting for County and Municipality Buildings. Install LEDs (or more efficacious lamps) that are energy efficient while still producing the same amount of illumination.</p> <p>C-04. Commercial Smart Thermostats for County and Municipality Buildings. Install smart thermostats to optimize heating, cooling, and preferences to increase energy efficiency, comfort, and ease of use.</p>
Location:	Sarasota and Manatee Region MSA
Implementing Agencies:	Sarasota and Manatee Counties and the cities within the region have the authority to implement the improvements on the properties and facilities they own under provisions of the FL Statues 163.08 Supplemental authority for improvements to real property.
Potential GHG (MTCO₂/Yr)	<p>Year 2026-2030: 3,330.60</p> <p>Year 2026-2050: 40,337.19</p>
LIDAC Co-benefits:	<p>Co-benefits include:</p> <ul style="list-style-type: none"> » Improved community resilience » Improved community connectivity » Improved public health » Potential savings in the agency-owned utility cost passed to end users
Implementation schedule and Milestones:	<p>Goal: Implement GHG reduction measures at 20% of municipality and county owned properties by 2030</p> <p>Year 2025: Planning and design.</p> <p>Year 2026: 920 MWh energy savings from baseline year</p> <p>Year 2027: 1,840 MWh energy savings from baseline year</p> <p>Year 2028: 2,760 MWh energy savings from baseline year</p> <p>Year 2029: 3,680 MWh energy savings from baseline year</p> <p>Year 2030: 4,600 MWh energy savings from baseline year</p>
Metrics for Tracking Progress	<ul style="list-style-type: none"> » Average energy savings per retrofit » Average energy cost savings per retrofit



Measure #6

FACILITIES ENCLOSURE UPGRADES

Description:	C-05. Commercial Enclosure Upgrades (with roof assessment) for County and Municipality Buildings. Improve the envelope efficiency by creating an airtight envelope for improved energy conservation and comfort, including attic insulation and reflective roofing. Assess roof conditions to ensure roofs are in good condition, not leaking, and within their useful lifespan. This measure does not include replacing windows, sealing gaps, insulating attics, or optimizing ventilation.				
Location:	Sarasota and Manatee Region MSA				
Implementing Agencies:	Sarasota and Manatee Counties and the cities within the region have the authority to implement the improvements on the properties and facilities they own under provisions of the FL Statues 163.08 Supplemental authority for improvements to real property.				
Potential GHG (MTCO₂/Yr)	<table border="0"> <tr> <td>Year 2026-2030:</td> <td>504.65</td> </tr> <tr> <td>Year 2026-2050:</td> <td>6,111.82</td> </tr> </table>	Year 2026-2030:	504.65	Year 2026-2050:	6,111.82
Year 2026-2030:	504.65				
Year 2026-2050:	6,111.82				
LIDAC Co-benefits:	Co-benefits include: <ul style="list-style-type: none"> » Improved community resilience » Improved air quality » Improved public health » Potential savings in the agency-owned utility cost passed to end users 				
Implementation schedule and Milestones:	<p>Goal: Implement GHG reduction measures at 20% of municipality and county owned properties by 2030.</p> <p>Year 2025: Planning and design.</p> <p>Year 2026: 162 MWh energy savings from baseline year</p> <p>Year 2027: 324 MWh energy savings from baseline year</p> <p>Year 2028: 486 MWh energy savings from baseline year</p> <p>Year 2029: 648 MWh energy savings from baseline year</p> <p>Year 2030: 810 MWh energy savings from baseline year</p>				
Metrics for Tracking Progress	<ul style="list-style-type: none"> » Average energy savings per retrofit » Average energy cost savings per retrofit 				

5.3 TRANSPORTATION AND MOBILE SOURCES SECTOR

5.3.1 THE NEED TO DECARBONIZE THE TRANSPORTATION SECTOR

Transportation and other mobile sources are the top GHG emitters in the Sarasota-Manatee region MSA. LIDAC communities are disproportionately affected by air pollution due to the region's high-emitting transportation sector. Activities from this sector contribute to GHG emissions, criteria air contaminants, and co-pollutants, all affecting air quality. This is particularly concerning considering the high prevalence of health conditions vulnerable to air pollution within LIDAC. Therefore, improving air quality through reductions in transportation emissions is crucial for protecting the health and well-being of residents in LIDAC census tracts.

CEJST data reveals that nearly a third (32 percent) of adults in these areas have been diagnosed with diabetes, and 21 percent suffer from asthma or coronary heart disease.

During engagement, the community noted that access to reliable, safe, and affordable public transportation and mobility options was one of the top three community challenges. During engagement with CBOs, participants noted that transit wait times are very long and that the network is disconnected and unreliable. People who rely on transit are people who moved outside the city for more affordable housing options.

Transitioning agency-owned fleet vehicles to electric vehicles can be an effective way to reduce GHG emissions with agency operations. Additionally, switching from gasoline to electric lawn equipment can be a cost-effective investment to reduce GHG emissions.

5.3.2 LIDAC BENEFITS

Based on the Sarasota-Manatee region MSA the greatest amount of GHG emissions reduction potential comes from a decrease of Vehicle Miles Travelled (VMT) due to an increase in ridership on the local transit systems.

Approximately 80 percent of current public transit riders in the Sarasota-Manatee region make below \$100,000 a year, with approximately 50 percent of the total public transit ridership making below \$50,000 a year.¹⁵

Low income and disadvantaged community members are those that are most likely to benefit from an investment in public transportation infrastructure, as it increases the accessibility of the system to all persons within a community and reduces the cost burden of transportation on community members. The prioritized GHG reduction measures are:

¹⁵ Approximated from Replica data on the Sarasota-Manatee region for Spring of 2023 on an average weekday.



Measure #7

REDUCE ROADWAY VEHICLE MILES TRAVELED

Description:	<p>A lack of access to reliable, convenient, safe, and affordable public transportation or mobility option is one of the top three challenges identified by the community.</p> <p>Community-based organizations emphasized that improving first-last mile connections, and investing in e-bikes, e-scooters, and other forms of micro-mobility that connect to the existing network would benefit the low-income communities as some residents do not live near high-frequency transit.</p> <p>T-01. Increase Transit Ridership. Encourage mode shift from driving alone to transit by providing new, more frequent service along with new or improved station amenities and first-last mile/ micro-transit connections. This measure is in the Sarasota County Transit TDP and Manatee County Transit TDP. This was also the top priority identified during community engagement.</p> <p>T-02. Active Transportation and Complete Street Programs. Encourage mode shift from driving alone to transit, walking, and biking by providing new shared-use paths, sidewalks, and connections to transit corridors such as eBikes rebates. This measure is in the Sarasota/Manatee MPO LRTP project list and was noted as a priority during community engagement.</p>
Location:	Sarasota and Manatee Region MSA
Implementing Agencies:	Sarasota and Manatee Counties and the cities within the region have the authority to implement the measures within their properties and rights-of-way.
Potential GHG (MTCO₂/Yr)	<p>Year 2025-2030: 56,731</p> <p>Year 2025-2050: 434,935</p>
LIDAC Benefits and Co-benefits:	<p>A larger proportion of LIDAC community members use transit, carpool, and bike or walk to transit. Improvements in these systems will directly benefits these users by reducing transportation burden.</p> <p>Co-benefits include:</p> <ul style="list-style-type: none"> » Improved Air Quality » Energy and Fuel Savings » Improved Public Health
Implementation schedule and Milestones:	<p>Goal: A 2% mode shift to active transportation and transit by the year 2030.</p> <p>Year 2026: Implementation of programs, low adoption assumed in initial phase</p> <p>Year 2027: Mode shift of 20% of 2030 goal</p> <p>Year 2028: Mode shift of 60% of 2030 goal</p> <p>Year 2029: Mode shift of 80% of 2030 goal</p>



Measure #7

REDUCE ROADWAY VEHICLE MILES TRAVELED

Year 2030: Mode shift of 100% of 2030 goal

**Metrics for
Tracking Progress**

T-01.

- » Annual GHG emissions reduced from mode shift
- » Annual transit ridership
- » Annual VMT reduced from mode shift

T-02.

- » Annual GHG emissions reduced from mode shift
- » Number of miles of new trails, sidewalks, paths
- » Number of public or shared bikes and e-bikes
- » Annual VMT reduced from mode shift

**Measure #8****DECARBONIZE LAWN EQUIPMENT**

Description:	T-03. Replace City, County, and Community gasoline lawn equipment with electric equipment. Implement a rebate program to replace commercial and residential lawn equipment with electric options.
Location:	Sarasota and Manatee Region MSA
Implementing Agencies:	Sarasota and Manatee Counties and the cities within the region have the authority to implement the measures based on the provisions of the FL Statutes 163.04 Energy devices based on renewable resources and tribal sovereignty established by the U.S. Constitution and Florida Statutes.
Potential GHG (MTCO₂/Yr):	Year 2025-2030: 13,155 Year 2025-2050: 100,855
LIDAC Benefits and Co-benefits:	<p>A large portion of the landscape workforce servicing cities, counties and the community are from LIDAC communities. Reduced emissions from the lawn equipment have a direct benefit to the community, including:</p> <ul style="list-style-type: none"> » Improved air quality » Energy and fuel savings <p>Co-benefits include Improved public health.</p>
Implementation schedule and Milestones:	<p>Goal: Convert 5% of current residential and commercial gasoline and diesel lawn equipment to electric by 2030.</p> <p>Year 2025: Implementation of programs, low adoption assumed in initial phase</p> <p>Year 2026: Replace 20% of 2030 goal</p> <p>Year 2027: Replace 40% of 2030 goal</p> <p>Year 2028: Replace 60% of 2030 goal</p> <p>Year 2029: Replace 80% of 2030 goal</p> <p>Year 2030: Replace 100% of 2030 goal</p>
Metrics for Tracking Progress	<ul style="list-style-type: none"> » Annual GHG emissions reduced from electric lawn mowers » Number of rebates issued to the community » Gallons of gasoline reduced through replacement

**Measure #9****DECARBONIZE AGENCY FLEET**

Description:	T-04. Replace gasoline and diesel vehicles (passenger vehicles, work trucks, buses, refuse trucks, and heavy-duty maintenance vehicles) with lower carbon options (e.g., electric, CNG, or hydrogen).
Location:	Sarasota and Manatee Region MSA
Implementing Agencies:	Sarasota and Manatee Counties and the cities within the region have the authority to implement this measure on agency-owned fleet vehicles.
Potential GHG (MTCO₂/Yr)	Year 2025-2030: 1,172 Year 2025-2050: 8,982
LIDAC Co-benefits:	<ul style="list-style-type: none"> » Improved Air Quality » Energy and Fuel Savings » Improved Public Health
Implementation schedule and Milestones:	<p>Goal: A 10% reduction in gasoline-fueled agency fleet vehicles by the year 2030</p> <p>Year 2025: Implementation of programs: identification of appropriate vehicles, charging, and workforce training requirements</p> <p>Year 2026: Fleet replacement: 20% of 2030 goal</p> <p>Year 2027: Fleet replacement: 40% of 2030 goal</p> <p>Year 2028: Fleet replacement: 60% of 2030 goal</p> <p>Year 2029: Fleet replacement: 80% of 2030 goal</p> <p>Year 2030: Fleet replacement: 100% of 2030 goal</p>
Metrics for Tracking Progress	<ul style="list-style-type: none"> » Annual GHG emissions reduced from fleet vehicles » Number of fleet vehicles transitioned to EV » Gallons of gasoline/diesel reduced through transition to EV

6| NEXT STEPS

The next phase of the project is developing the Comprehensive Climate Action Plan (CCAP).

Phase Two will focus on thorough community and stakeholder engagement, a component constrained by time limitations during the PCAP phase. In this upcoming stage, there will be ample time for intentional community outreach, fostering a more comprehensive and inclusive approach to gather valuable insights. The expected community engagement in 2024-25 includes:

- **Continue engaging with community leaders:** Continue engaging with community and local government leaders at a certain frequency to receive feedback on the CCAP and ways to better engage with the community.
- **Bringing engagement to the community:** Work closely with CBOs to identify key gathering locations, including the locations already identified like grocery stores, places of workshop, and community centers. We will organize pop-up locations to provide information and encourage direct participation before the public meetings and provides updates on the project website.
- **Hands-on, in-person workshops:** We will launch a series of two externally focused in-person and virtual community workshops to seek feedback. The goal of the first workshop is to explore additional community priorities and strategies for implementation. The second workshop will focus on building consensus and feedback on the identified climate action and implementation plan.



Bring engagement to the community through pop-up events, along with appropriate language translation.



In-person Community workshops with interactive display and input options

Engagement with the jurisdiction within the Sarasota-Manatee County region will continue until the development of the CCAP to ensure it includes the long-term clean air strategy for the region while building consensus. The CCAP will include additional GHG reduction measure laying the roadmap for implementation. Each reduction measure will include LIDAC benefits analysis to ensure equitable outcomes for the community. The CCAP will be followed by a Status Report in November 2027 that includes tracking over a four-year period.

APPENDICES

APPENDIX 1 – GHG METHODOLOGY

NORTH PORT-SARASOTA-BRADENTON GREENHOUSE GAS INVENTORY METHODOLOGY

This memo describes the methodology and data used to develop an inventory of greenhouse gas (GHG) emissions across the North Port-Sarasota-Bradenton, FL Metropolitan Statistical Area (MSA) which is inclusive of Sarasota and Manatee counties for the baseline year 2019. Inventories were prepared on a county-wide scale and calculated using the International Council for Local Environmental Initiatives (ICLEI) USA’s ClearPath tool, which allows for future forecasts based on assumptions applied to baseline inventories. The Sarasota County inventory was prepared by county staff with guidance from ICLEI. WSP prepared the Manatee County inventory following Sarasota methodology and ICLEI guidance.

This inventory generally follows guidance listed in the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (U.S. Community Protocol), developed by ICLEI USA. The inventory is an activity-based inventory that captures the primary sources of emissions within the regional boundary that can be reduced through the actions of local governments and regional entities.

This inventory uses the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment, 100-year values for global warming potentials to calculate GHG emissions. The Global Warming Potential (GWP) allows the comparison of how much heat different greenhouse gases trap in the atmosphere relative to carbon dioxide.

Emissions were estimated for each of the following inventory sectors: Transportation & Mobile Sources, Residential energy, Commercial energy, Industrial energy, Solid Waste, Water & Wastewater, and Process and Fugitive emissions.

Methodology presented here is representative of county-wide analysis for both Sarasota and Manatee Counties. Emission totals for the MSA are summarized in Table 1.

TABLE 1. North Port-Sarasota-Bradenton MSA Community-Wide 2019 Emissions Inventory

GHG Emissions by Sector	Sarasota County	Manatee County	Total
Residential	924,957	639,352	1,564,309
Electricity	905,435	611,960	1,517,395
Natural Gas	17,203	25,946	43,149
Other	2,319	1,446	3,765

GHG Emissions by Sector	Sarasota County	Manatee County	Total
Commercial	703,175	725,684	1,428,859
Electricity	603,794	617,368	1,221,162
Natural Gas	68,462	88,913	157,375
Other	30,919	19,403	50,322
Industrial	69,746	439,656	509,402
Electricity	14,090	215,676	229,767
Natural Gas	2,970	172,574	175,544
Other	52,686	51,406	104,092
Transportation & Mobile Sources	1,984,651	1,701,864	3,686,516
On-Road vehicle	1,691,142	1,363,596	3,054,739
Public Transit	8,152	3,926	12,078
Off-Road	285,357	309,703	595,059
Marine Vessel & Rail	-	24,640	24,640
Solid Waste	180,145	111,509	291,654
Water & Wastewater	9,106	6,800	15,906
Process & Fugitive Emissions	2,891	-	2,891
Total	3,874,671	3,624,866	7,499,537

SARASOTA COUNTY EMISSIONS INVENTORY RESULTS

Table 2 presents a summary of the 2019 county-wide Sarasota County GHG inventory. Detailed information regarding the County's inventory methodology is presented in Table 3 through Table 9.

TABLE 2. Sarasota County Community-Wide 2019 Emissions Inventory

Sector	Fuel or source	Usage	Usage Unit	Emissions (MTCO ₂ e) ¹
Residential Energy	Electricity (Florida Power & Light and PRECO)	2,982,625,753	kWh ²	905,435
	Natural Gas (TECO)	3,234,488	Therms ³	17,203
	Propane	18,533	MMBtu ⁴	1,178
	Kerosene	15,075	MMBtu	1,141
Residential Energy total				924,957
Commercial Energy	Electricity (FPL and PRECO)	1,989,024,817	kWh	603,794
	Natural Gas (TECO and Infinite Energy)	12,872,052	Therms	68,462
	Distillate Fuel Oil No. 2	275,959	MMBtu	20,547
	Propane	166,940	MMBtu	10,360
	Kerosene	163	MMBtu	12
Commercial Energy total				703,175
Industrial Energy	Electricity (FPL)	46,416,262	kWh	14,090
	Natural gas (TECO)	559,553	Therms	2,970
	Distillate Fuel Oil No. 2	643,042	MMBtu	47,735
	Propane	80,041	MMBtu	4,950
	Kerosene	19	MMBtu	1

Industrial Energy total				69,747
Transportation & Mobile Sources	On Road- Gasoline	,942,107,179	VMT	1,227,553
	On Road- Diesel	313,876,861	VMT	463,590
	Public Transit- Gasoline	1,264,838	VMT	1,589
	Public Transit- Diesel	3,384,449	VMT	6,564
	Off-Road- Gasoline	-	-	79,887
	Off-Road- Diesel	-	-	205,470
	Off-Road- Other	-	-	-
	Marine Vessel & Rail	-	-	-
Transportation total				1,984,651
Water and Wastewater	Combustion of Biosolids and Sludges			-
	N2O Emissions from Effluent Discharge	-	-	8,657
	N2O Emissions from Wastewater Treatment	-	-	449
Water and Wastewater total				9,106
Solid Waste	Landfill Direct Emissions CH4 (MT)	6,434	CH4 (MT)	180,145
	Landfill Gas Flaring	-	-	-
Solid Waste total				180,144
Process & Fugitive Emissions	Fugitive Emissions from Natural Gas Distribution	-	-	2,891
Process & Fugitive Emissions				2,891
Total County Emissions				3,874,671

1. metric tons of carbon dioxide equivalent

2. Kilowatthour

- 3. a unit of heat equivalent to 100,000 Btu
- 4. million British Thermal Units

TABLE 3. Energy Data Sources

Activity	Data Source	Data Gaps/Assumptions
Residential, commercial, and industrial electricity consumption	Florida Power and Light.	<ul style="list-style-type: none"> » Factor Sets: <ul style="list-style-type: none"> ○ Grid electricity: FPL 2019 Emissions Factors (CO2) and EPA Egrid 2019 (CH4 and N2O) » Could not retrieve grid loss factors. » (FPL) Service supplied exclusively for domestic purposes in individually metered dwelling units, duplexes and triplexes was classified as residential. » (FPL) Assigns commercial buildings as "Service used for commercial (business) activities." » (FPL) Electricity used by Public Authority and Public Highways Lighting is classified as commercial and industrial activities. » (FPL) Assigns commercial buildings as "Service used for commercial (business) activities." » (FPL) Assigns industrial building types as "Service to facilities with power equipment used for manufacturing or processing."
Residential and commercial electricity consumption	Peace River Electric Cooperative (PRECO)	<ul style="list-style-type: none"> » Factor Sets: » Grid electricity: FRCC All (FRCC) eGRID 2019 » PRECO could not provide metering rates, utility emissions factors, grid loss factors, and community/household # serviced by the utility. » (PRECO) Building types assigned to residential were "residential dwelling." » (PRECO) Assigns commercial buildings as "service to one meter and requiring 50 kVA or less transformer capacity. For example, barns, pumps, small commercial, etc."

Activity	Data Source	Data Gaps/Assumptions
Residential, commercial, and industrial natural gas consumption	TECO People Gas	<ul style="list-style-type: none"> » (TECO) Assignment of residential buildings would primarily include single-family residential homes or individually metered residential-type buildings. » (TECO) Assignment of commercial buildings is “commercial-type” establishments.” Examples include restaurants, hotels, laundry facilities, medical facilities, assisted living facilities, waste haulers. » (TECO) Transit vehicle energy use (for private entities) is included in the commercial sector. » (TECO) Assignment of "government" means that it includes public works / schools, universities, public transit, fire departments and other City or Government owned facilities. This data is categorized under commercial/government. » (TECO) Description of industrial sector designation was not provided. » Households in Sarasota County are served by the utility – the data provided was based on approximate 16K premises. » Number of the population in Sarasota County is served by the utility is not tracked.
Commercial natural gas consumption	Infinite Energy	<ul style="list-style-type: none"> » County owned and operated buildings were classified as commercial.
Residential bottled, tank, or LP gas consumption	U.S. Census Physical Housing Characteristics & EIA household usage averages	<ul style="list-style-type: none"> » This record uses regional household energy use averages and census household counts.
Residential Fuel oil, kerosene, ect consumption	U.S. Census physical housing characteristics & EIA household usage averages	<ul style="list-style-type: none"> » This record uses regional household energy use averages and census household counts.
Commercial and industrial Distillate Fuel Oil No. 2 consumption	EIA Gov. database	<p>This record uses EIA Gov. database to extract all consumption estimates “in Btu.”</p>

Activity	Data Source	Data Gaps/Assumptions
Commercial and industrial Kerosene consumption	EIA Gov. database	This record uses EIA Gov. database to extract all consumption estimates “in Btu.”
Commercial and industrial Propane consumption	EIA Gov. database	This record uses EIA Gov. database to extract all consumption estimates “in Btu.”

TABLE 4: Emissions Factors for Electricity Consumption

Emission Factor	CO ₂ (lbs./MWh)	CH ₄ (lbs./GWh)	N ₂ O (lbs./GWh)
FPL 2019 Emissions Factors (CO₂) and EPA Egrid 2019 (CH₄ and N₂O)	664.89	55	7
FRCC All (FRCC) eGRID 2019	861.028	55	7

TABLE 5. Transportation Data Sources used in the 2019 Emissions Inventory

Activity	Data Source	Data Gaps/Assumptions
On Road Vehicle miles travelled	Google Environmental Insights Explorer	Vehicle miles travelled (VMT) provided from Google EIE represents all on-road vehicles. This does not include Sarasota County Area Transit activity (SCAT).
Public Transit	Sarasota County Area Transit (SCAT)	<ul style="list-style-type: none"> » SCAT provided VMT and fuel usage for all our transit services (fixed-route, trolley, and paratransit). » Nonrevenue service vehicle consumption (used for maintenance and non-passenger transportation) was excluded in this inventory. » The inventory for our fixed route bus service (which is owned and operated by the county) includes miles traveled out of boundary (adjoining boundary).
Off-road	EPA National Emissions Inventory (NEI)	<ul style="list-style-type: none"> » Record uses the EPA National Emissions Inventory’s county data to extrapolate community-wide emissions for CO₂ and CH₄. » The NEI does not provide N₂O emissions for off-road. » Other data that was not provided was fuel consumption, equipment type and sector.

Freight Rail	Seminole Gulf Railway	<ul style="list-style-type: none"> » Sarasota MPO Manatee instructed that there are no passenger rail services in Sarasota County. However, there are several active freight rail lines in the area, that are owned and operated by Seminole Gulf Railway. » Seminole Gulf Railway was contacted for data; however, data could not be retrieved.
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TABLE 6. MPG and Emissions Factors by Vehicle Type for the 2019 Emissions Inventory

Fuel	Vehicle type	MPG	CH ₄ g/mile	N ₂ O g/mile
Gasoline	Passenger car	24.1	0.0183	0.0083
Gasoline	Light truck	17.6	0.0193	0.0148
Gasoline	Heavy truck	5.37	0.0785	0.0633
Gasoline	Motorcycle	24.1	0.0183	0.0083
Diesel	Passenger car	24.1	0.0005	0.0010
Diesel	Light truck	17.6	0.001	0.0015
Diesel	Heavy truck	6.39	0.0051	0.0048

TABLE 7. Wastewater Data Sources

Activity	Data Source	Data Gaps/Assumptions
N₂O Emissions from Wastewater Treatment	Sarasota County Public Utilities	<ul style="list-style-type: none"> » While the WWTP serves the unincorporated area of our county (approx. 250,000 people), the input for this calculator record reflects the U.S. Census total population of 423,933 for year 2019. » The completed data request form claims that the WWTP is predominantly an aerobic system. » N₂O emissions from effluent discharge to rivers and estuaries were excluded from this report because any excess reclaimed water is disposed of in deep injection wells.
Energy Used in Wastewater Facilities and the Supply of Potable Water	Sarasota County Public Utilities	Potable water and wastewater kWh usage and natural gas consumption is parsed out from this metric since this data is included in the commercial or industrial totals provided by FPL and TECO.

N₂O From Effluent Discharge to Rivers and Estuaries

Sarasota County Public Utilities

- » Population served: 423,933
- » No Daily N load data from the effluent discharge was retrieved.
- » Industrial-commercial discharge multiplies; 1.25
- » Wastewater treatment is predominantly aerobic.
- » Facility does not employ nitrification/ denitrification.

TABLE 8. Solid Waste Data Sources

Activity	Data Source	Data Gaps/Assumptions
Central County Solid Waste Disposal Complex	EPA FLIGHT & Solid Waste Department	Direct emissions outputs have been generated with just the CH ₄ emissions provided by EPA FLIGHT.
Bee Ridge Landfill	EPA FLIGHT & Solid Waste Department	The Bee Ridge landfill which stopped receiving waste and closed in 1998, continues to emit methane. Thus, direct emissions from an in-jurisdiction landfill have been modeled by retrieving CH ₄ emissions reported by EPA FLIGHT.

Table 9. Fugitive Emissions Data Sources

Activity	Data Source	Data Gaps/Assumptions
Fugitive Emissions from Natural Gas Distribution	TECO & Infinite Energy	Fugitive emissions were calculated using the natural gas consumption by TECO and Infinite Energy utilities.

MANATEE COUNTY EMISSIONS INVENTORY RESULTS

Table 10 presents a summary of the 2019 county-wide Manatee County GHG inventory. Detailed information regarding the County's inventory methodology is presented in Table 11 through Table 18.

TABLE 10. Manatee County Community-Wide 2019 Emissions Inventory

Sector	Fuel or source	Usage	Usage Unit	Emissions (MTCO ₂ e)
Residential Energy	Electricity (NREL and PRECO)	1,560,739,013	kWh	611,960
	Natural Gas (TECO and NREL)	4,879,312	Therms	25,946
	Propane	15,093	MMBtu	937
	Kerosene	6,725	MMBtu	509
Residential Energy total				639,352
Commercial Energy	Electricity (NREL and PRECO)	1,574,531,392	kWh	617,368
	Natural Gas (TECO and NREL)	12,580,830	Therms	88,913
	Distillate Fuel Oil No. 2	173,172	MMBtu	12,894
	Propane	104,760	MMBtu	6,501
	Kerosene	102	MMBtu	8
Commercial Energy total				725,684
Industrial Energy	Electricity (NREL and PRECO)	550,060,166	kWh	215,676
	Natural Gas (TECO and NREL)	32,523,224	Therms	172,574
	Distillate Fuel Oil No. 2	631,069	MMBtu	46,846
	Propane	73,704	MMBtu	4,558
	Kerosene	18	MMBtu	1

				Industrial Energy total	439,656
Transportation & Mobile Sources	On Road- Gasoline	2,391,641,494	VMT	998,088	
	On Road- Diesel	248,139,404	VMT	365,508	
	Public Transit- Gasoline	-	-	-	
	Public Transit- Diesel	384,420	Gallons	3,926	
	Off-Road- Gasoline	-	-	45,745	
	Off-Road- Diesel	-	-	252,281	
	Off-Road- Other	-	-	11,677	
	Marine Vessel & Rail	-	-	24,640	
				Transportation total	1,701,864
Water and Wastewater	Combustion of Biosolids and Sludges	-	-	6,049	
	N2O Emissions from Effluent Discharge	-	-	242	
	N2O Emissions from Wastewater Treatment	-	-	509	
				Water and Wastewater total	6,800
Solid Waste	Landfill Direct Emissions CH4 (MT)	3,942	CH4 (MT)	110,368	
	Landfill Gas Flaring	1,191,371	ft3/day LFG	1,141	
				Solid Waste total	111,509
Process & Fugitive Emissions	Fugitive Emissions from Natural Gas Distribution	-	-	-	
				Process & Fugitive Emissions	0
				Total County Emissions	3,624,865

MANATEE ENERGY

Residential, commercial, and industrial energy usage in Manatee County were calculated in ClearPath for grid electricity and stationary fuel combustion. Electricity usage was supplied by Peace River Electric Cooperative (PRECO) and supplemented by the State and Local Planning for Energy (SLOPE) National Renewable Energy Laboratory (NREL) tool. Natural gas usage was supplied by TECO and supplemented by the SLOPE NREL tool. NREL data is currently being used as a utility placeholder in lieu of a response from FP&L and is reported in ClearPath as the difference between PRECO/TECO and SLOPE data. Stationary fuel combustion includes combustion of natural gas, propane, kerosene, and Distillate Fuel Oil.

Residential non-utility usage of *Bottled, tank, or LP gas* and *Fuel oil, kerosene* usage follows ICLEI Method 1 for calculating non-utility fuel use as follows:

Bottled, tank, or LP gas and *Fuel oil, kerosene* consumption per household (MMBTU), for Florida (2019), was attained from the Energy Information Administration’s (EIA) annual household site fuel consumption in United States homes by state for the state of Florida. This value was multiplied by 2019's US Census Data for households in Manatee County using fuel type.

Commercial and industrial Distillate Fuel Oil No. 2, Kerosene, and Propane consumption were calculated following ICLEI guidance as shown in Table 11.

TABLE 11. Energy Data Sources

Activity	Data Source	Data Gaps/Assumptions
Residential and commercial electricity consumption	Peace River Electric Cooperative (PRECO)	Factor Sets: Grid electricity: FRCC All (FRCC) eGRID 2019 PRECO could not provide metering rates, utility emissions factors, or grid loss factors. (PRECO) Building types assigned to residential were "residential dwelling." (PRECO) Assigns commercial buildings as "service to one meter and requiring 50 kVA or less transformer capacity. For example, barns, pumps, small commercial, etc."
Residential, commercial, and industrial natural gas consumption	TECO People Gas	Households in Manatee County are served by the utility – the data provided gas consumption and customer count for Manatee County in calendar year 2019.
Residential bottled, tank, or LP gas consumption	U.S. Census Physical Housing	Fuel use per household (EIA) multiplied by households using fuel (USCensus)

	Characteristics¹ & EIA household usage averages²	Census region and division: South- South Atlantic: 19.5 MMBTU Propane per household Occupied housing units in 2019, Manatee County: 774
Residential Fuel oil, kerosene consumption	U.S. Census physical housing characteristics & EIA household usage averages	Fuel use per household (EIA) multiplied by households using fuel (USCensus) Census region and division: South- South Atlantic: 46.7 MMBTU Propane per household Occupied housing units in 2019, Manatee County: 144
Commercial and industrial Distillate Fuel Oil No. 2, Kerosene, and Propane consumption	EIA Gov. database	ICLEI guidance: (1) extract commercial and industrial fuel consumption from EIA State database ³ . Download the “All consumption estimates” “in Btu” Report. » Filter by state and year » Filter for commercial and industrial fuel consumption using EIA Codes (2) Extract Jobs by NAICS ⁴ Industry Sector counts from "OnTheMap" Follow same methodology for State jobs. Find job ratio. » Differentiate jobs by commercial or industrial. » Find % of local county jobs over state jobs. Multiply commercial and industrial % by each fuel usage Finally converting from Billion Btu to MMBtu (Million Btu).

TABLE 12. Emissions Factors for Electricity Consumption

Emission Factor	CO ₂ (lbs./MWh)	CH ₄ (lbs./GWh)	N ₂ O (lbs./GWh)
FPL 2019 Emissions Factors (CO₂) and EPA Egrid 2019 (CH₄ and N₂O)	664.89	55	7
FRCC All (FRCC) eGRID 2019	861.028	55	7

1 <https://data.census.gov/table/ACSST1Y2019.S2504?q=S25&g=050XX00US12081&d=ACS%201-Year%20Estimates%20Subject%20Tables>

2 <https://www.eia.gov/consumption/residential/data/2020/c&e/pdf/ce2.1.pdf>

3 <https://www.eia.gov/state/seds/seds-data-fuel-prev.php>

4 <https://onthemap.ces.census.gov/>

MANATEE TRANSPORTATION

The emissions associated with on-road transportation (gasoline and diesel fuel vehicles) were calculated in ClearPath using Google EIE total estimated vehicle miles traveled (VMT) for Manatee County in 2019. Total VMT was then allocated among vehicle type (% by fuel use) using 2019 National Default Vehicle Fuel Efficiency & Emissions Factors for VMT by vehicle type⁵. VMT were assumed to be In-Boundary passenger travel.

Public transit emission estimates followed the 2018 Manatee County GHG Inventory methodology as follows:

- MCAT fleet assumed to run on traditional diesel.
- 1,537,680 VMT.
- 384,420 gallons of diesel for the year.

Off-road emissions were calculated outside of ClearPath using the EPA's 2020 National Emissions Inventory's (NEI) for CO₂ and CH₄. Off-road sources were broken down into six sources by the following source classifications:

- Off-highway Vehicle categorized by fuel type (diesel, gasoline, CNG, and LPG)
- Pleasure craft- categorized as marine vessel.
- Railroad Equipment- categorized as rail.

⁵ <https://docs.google.com/spreadsheets/d/1KXmtHoxl-mPXz0ujdtj76woUcK-RN9ITMRy-gMoUls/edit#gid=266790155>

TABLE 13. Transportation Data Sources

Activity	Data Source	Data Gaps/Assumptions
On Road Vehicle miles travelled	Google Environmental Insights Explorer	<p>Vehicle miles travelled (VMT) provided from Google EIE represents all on-road vehicles (QAPP Table 2.1). 2019 National Default Vehicle Fuel Efficiency & Emissions Factors used to determine vehicle type and fuel use. Table 14 Lists percentage of vehicle distribution and subset of 2019 US National Defaults (updated 2021) emission factors used.</p> <p>The EIE is assumed to include fleet vehicles. Does not include Manatee County Area Transit activity (MCAT).</p>
Public Transit	2018 Manatee County GHG Inventory	<p>2018 Manatee County GHG Inventory assumptions used for Manatee Area Transit (MCAT) VMT and fuel use. pg.20: The county owns 38 buses under the MCAT bus system, which is the major public transportation provided within Manatee County and serves the Bradenton, Ellenton, Palmetto and Gulf Beach regions. With a daily pull of 23 buses, a total of 1,537,680 vehicle miles traveled (VMT) was reported in 2018. An assumption was made that all MCAT buses employed in 2018 used conventional diesel. Based on an average 5.3 gallons per diesel gallon equivalent, the total diesel used was estimated to be 384,420 gallons of diesel for the whole year.</p>
Off-road	EPA National Emissions Inventory (NEI)	<ul style="list-style-type: none"> » 2020 EPA National Emissions Inventory's (NEI) county data to extrapolate community-wide emissions for CO₂ and CH₄. » The NEI does not provide N₂O emissions for off-road. » Off-road sources broken down by fuel use (gasoline, diesel, CNG, and LPG) and type (off-road vehicle, marine vessel, and rail)

TABLE 14. MPG and Emissions Factors by Vehicle Type

Fuel	Vehicle type	Vehicle %	MPG	CH ₄ g/mile	N ₂ O g/mile
Gasoline	Passenger car	75.90%	24.1	0.0183	0.0083
Gasoline	Light truck	21.80%	17.6	0.0193	0.0148
Gasoline	Heavy truck	1.60%	5.371652	0.0785	0.0633
Gasoline	Motorcycle	0.70%	24.1	0.0183	0.0083
Diesel	Passenger car	3.50%	24.1	0.0005	0.001
Diesel	Light truck	8.30%	17.6	0.001	0.0015
Diesel	Heavy truck	88.20%	6.392468	0.0051	0.0048

MANATEE WATER & WASTEWATER

Manatee county has three main wastewater treatment plants with combined permitted capacity of 33.5 million gallons per day (mgd) and one potable water facility. The facilities are North Regional Water Reclamation Facility (NRWRF), Southwest Water Reclamation Facility (SWWRF) and Southeast Water Reclamation Facility (SEWRF). Treatment processes at the WRF’s include the following as summarized in the 2018 Manatee County inventory:

- NRWRF operates an oxidation ditch for the biological treatment of wastewater; with that process, they will achieve both nitrification and denitrification with the aerobic and anoxic zones in the reactor.
- SERWRF operates a conventional activated sludge basin with both an anoxic and aerobic basin; while some denitrification could occur in the anoxic basin, they are likely not achieving sufficient conversion of nitrate to nitrogen gas. Therefore, the conclusion was drawn that the facility had nitrification but not denitrification.
- SWRWRF currently operates a conventional activated sludge basin, with anoxic and aerobic zones, but plans to convert the process to Modified Ludzack-Ettinger, which achieves nitrification, denitrification, and good removal of nitrogen through the internal recycle. Based on these permits, the conclusion was made that the project has not been completed and that the plant currently has nitrification but not denitrification. SWRWRF also has a biosolids dryer that operates using almost 100% landfill gas. The annual tonnage of sludge in 2018 was 25,315.76. For calculation inputs into ClearPath, the daily quantity of sludge produced was 25,315.76 tons divided by 365 days to equal 69.36 metric tons per day.

Both NRWRF and SEWRF pump effluent to either retention ponds or to the Manatee County Master Reuse System (Permit FLA474029) and have N2O emissions associated with discharge. SWWRF is permitted to dispose of treated effluent via underground injection - emissions associated with effluent discharge for this facility are marked as informational only. Table 15 lists relevant data for each facility.

TABLE 15. Wastewater Data Sources

Facility	Average Flow (MGD) ^a	Estimated Population Served ^a	Kg N/day ^b	kWh ^c	Nitrification and denitrification	Disposal to Underground Injection?
North Regional WRF (NRWRF)	3.8	72,000	88.04	8,042,000	Yes	No
Southeast Regional WRF (SERWRF)	6.6	125,000	230.30	3,473,266	Just nitrification	No

Southwest WRF Regional (SWRWRF)	10.4	198,000	291.19	11,608,800	Just nitrification	Yes
Potable Water Facility	--	--	--	15,489,600	--	--

- a. Table 3. Average daily flow, percentage, and estimated population, 2018 Manatee County GHG Inventory
- b. Total loading of discharged effluent was calculated with summarized monthly discharge monitoring reports (DMR). Reports were pulled from Oculus, FDEP's document access website.
- c. Greenhouse Gas Audit for Manatee County, FL, 2018. pg. 17

Water & Wastewater emissions calculated in ClearPath are associated with energy usage, N2O Emissions from Wastewater Treatment, N2O From Effluent Discharge to Rivers and Estuaries, and sludge processing.

TABLE 16. Wastewater Data Sources

Activity	Data Source	Data Gaps/Assumptions
N₂O Emissions from Wastewater Treatment (Process N₂O)	2018 Manatee County GHG Inventory, WRF permits	Based on assumptions in the 2018 inventory and WRF permits. Only NRWRF was assumed to have nitrification and denitrification processes. All three were assumed to have process nitrification. Nitrification and denitrification and Population served assumptions shown in Table 15. Default Industrial Commercial Discharge Multiplier of 1.25 used.
N₂O From Effluent Discharge to Rivers and Estuaries	2018 Manatee County GHG Inventory, FDEP's document access website Oculus6	<ul style="list-style-type: none"> » N₂O emissions from effluent discharge to rivers and estuaries were excluded from SWWRF due to effluent disposal via deep injection wells. » Population served: See Table 15 » Daily Nitrogen Total loading of discharged effluent was calculated with summarized monthly discharge monitoring reports (DMR). Reports were pulled from Oculus, FDEP's document access website. Follows 2018 methodology. » Industrial-commercial discharge multiplier: 1.25
Emissions from Combustion of Biosolids and Sludges	2018 Manatee County GHG Inventory	Manatee County 2018 GHG inventory. pg 13 Daily Quantity of Sludge or Biosolids Incinerated (MT/day): 69.36. $25,315.76/365 = 69.36$

6 <https://depedms.dep.state.fl.us/Oculus/servlet/hitlist?action=sort>

MANATEE SOLID WASTE

Manatee County currently has one landfill operating within its jurisdiction, Lena landfill. Emissions associated with waste generation were based on total Municipal Solid Waste (MSW) generated in 2019 and estimates for households and commercial accounts were pulled from the 2018 GHG Inventory. Waste composition is based on the 2018 GHG Inventory reported composition listed in Table 18.

TABLE 17. Solid Waste Data Sources

Activity	Data Source	Data Gaps/Assumptions
2019 Lena Road Landfill	EPA FLIGHT & Solid Waste Department	Direct emissions outputs have been generated with just the CH4 emissions provided by EPA FLIGHT
2019 Lena Road Landfill Gas Flaring	2018 Manatee County GHG Inventory	Based on Manatee County 2018 GHG Inventory. 43% sent to flaring. pg.18-19 Emissions from solid waste facilities Lena Road Landfill has a flare to burn the gas where in 2018 the landfill gas captured was 1,191,371 cubic feet/day which produced 1,141 metric tons of CO2e

TABLE 18. 2018 Florida Municipal Solid Waste Composition

Waste Composition	Percentage
Percentage Mixed MSW	67.41
Percentage Newspaper	1.73
Percentage Office Paper	1.33
Percentage Corrugated Cardboard	5.64
Percentage Magazines / Third Class Mail	7.26
Percentage Food Scraps	6.59
Percentage Grass	5.02
Percentage Leaves	5.02

MANATEE FUGITIVE EMISSIONS

Currently no fugitive emissions associated with Manatee County.

APPENDIX 2 – LIDAC ANALYSIS

12115001703			✓					
12115002605	✓		✓					
12115002710	✓		✓					
12115002721	✓		✓					

Figure: Socioeconomic Breakdown of Sarasota and Manatee Counties

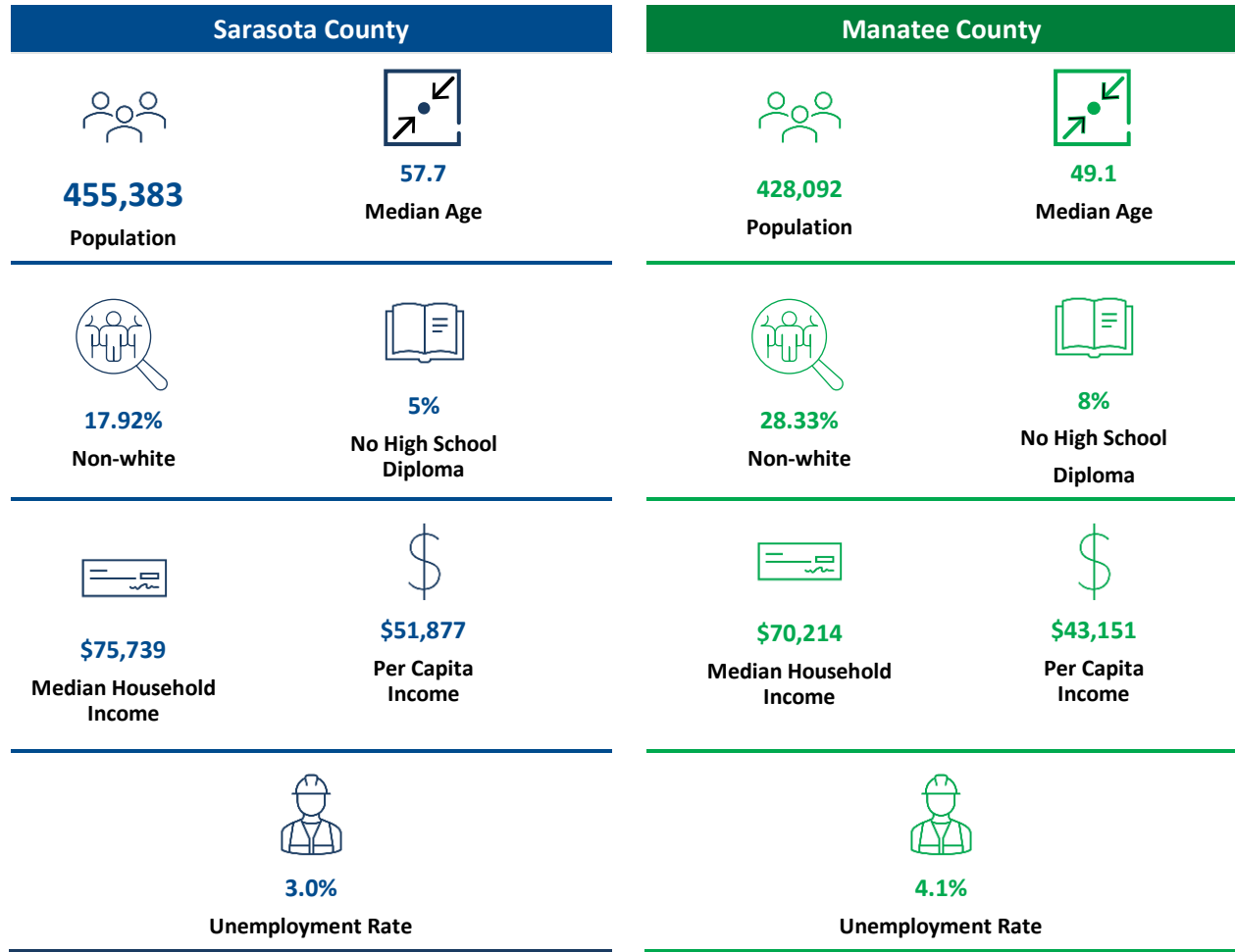


Figure: Housing Statistics for Sarasota and Manatee Counties

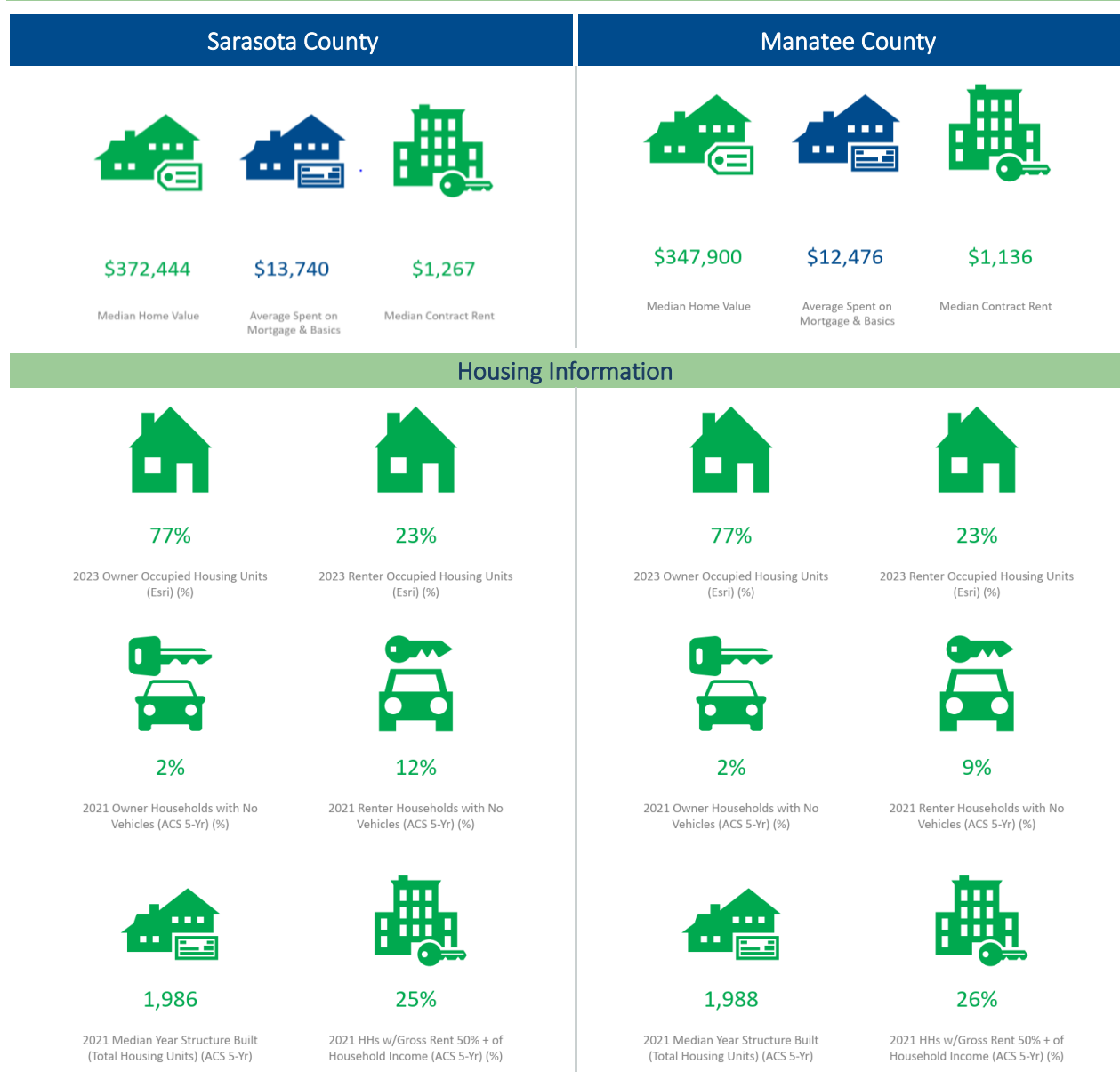


Figure: Commuting information for Sarasota and Manatee Counties

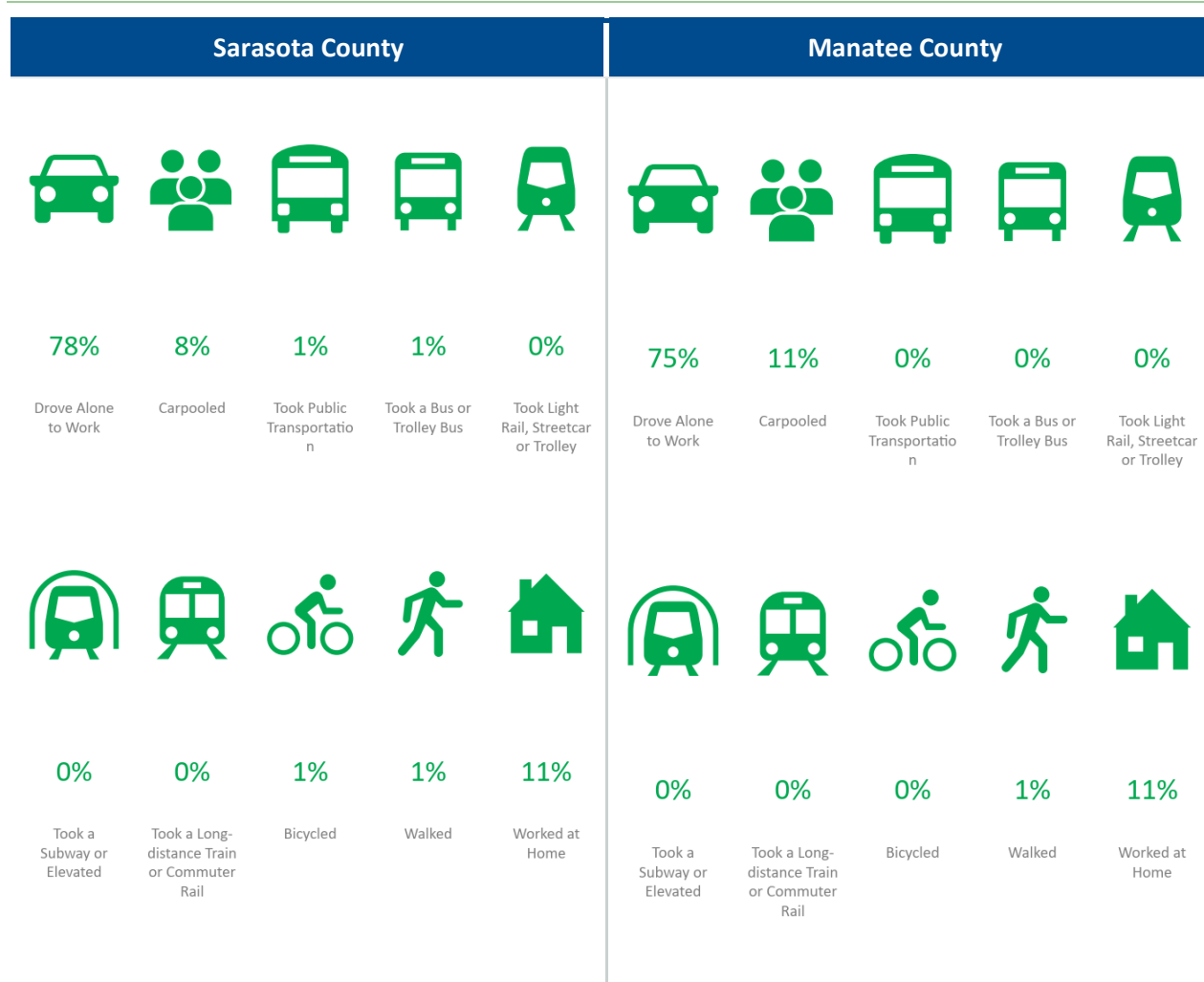
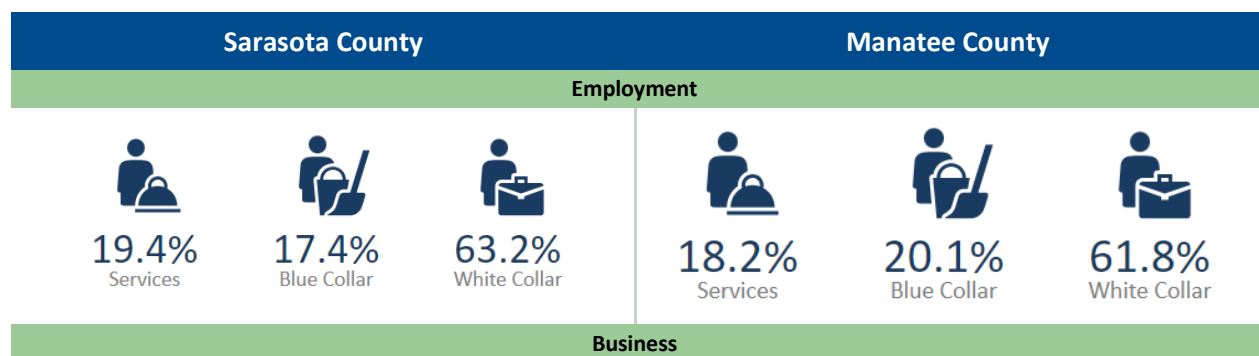


Figure: Workforce Summaries for Sarasota and Manatee Counties



Sarasota County

Manatee County



25,306

Total Businesses



210,669

Total Employees



15,625

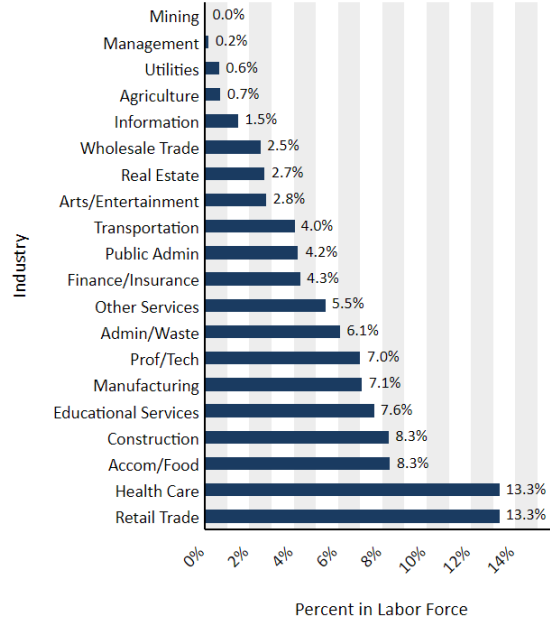
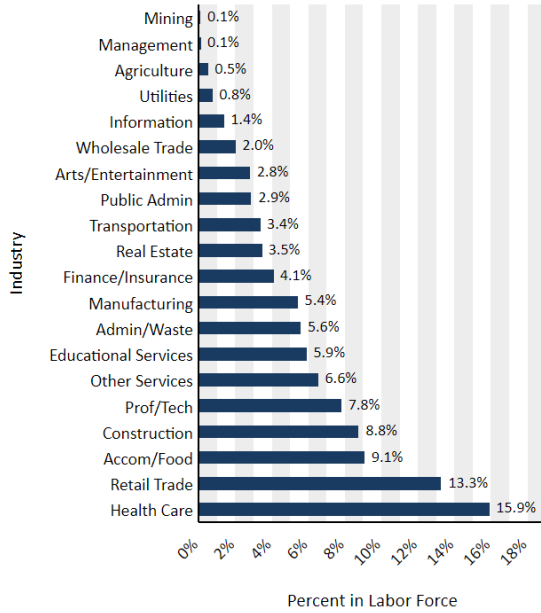
Total Businesses



142,889

Total Employees

Labor Force by Industry



APPENDIX 3 – GHG MEASURE AND LIDAC BENEFITS

TECHNICAL APPENDIX

ID	GHG Reduction Estimate Method	Models/Tools Used	Measure Implementation Assumptions	GHG Reduction Estimate Assumptions
Residential GHG Reduction Measures				
R-01	Solar Photovoltaics (PV)	Engineering estimates based on project examples and publicly available research.	https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-size.html PVWatts Calculator	Adoption Scenario for implementation is 1.25%, 2%, and 3%. Adoption scenarios are lower based on potential issues with roof structures and implementation in LIDAC communities. GHG Reduction estimates are equal to annual savings when the chosen implementation scenario is met. Assume that implementation scenario is met by 2030, scaling linearly from 2024-2030 and is maintained from 2030-2050.
R-02	Heat Pump or High Efficiency AC, Retrofits and Commissioning	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	Heat Pump Systems Department of Energy https://www.fpl.com/save/programs/ac-rebate.html	Adoption Scenario for implementation is 10%, 20%, and 30%. GHG Reduction estimates are equal to annual savings when the chosen implementation scenario is met. Assume that implementation scenario is met by 2030, scaling linearly from 2024-2030 and is maintained from 2030-2050.
R-03	LED Lighting	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	Lighting Choices to Save You Money Department of Energy https://www.fpl.com/landing/led-tariff.html	Adoption Scenario for implementation is 10%, 20%, and 30%. GHG Reduction estimates are equal to annual savings when the chosen implementation scenario is met. Assume that implementation scenario is met by 2030, scaling linearly from 2024-2030 and is maintained from 2030-2050.
R-03A	Efficient Appliances and Plug Load Management	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-4ug.pdf https://www.energystar.gov/sites/default/files/boos/ENERGY%20STAR%20Guidance%20on%20churn_508.pdf	Adoption Scenario for implementation is 10%, 20%, and 30%. GHG Reduction estimates are equal to annual savings when the chosen implementation scenario is met. Assume that implementation scenario is met by 2030, scaling linearly from 2024-2030 and is maintained from 2030-2050.
R-03B	Smart Thermostats	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	https://www.energystar.gov/products/smart_thermostats https://www.fpl.com/landing/energy-manager.html	Adoption Scenario for implementation is 10%, 20%, and 30%. GHG Reduction estimates are equal to annual savings when the chosen implementation scenario is met. Assume that implementation scenario is met by 2030, scaling linearly from 2024-2030 and is maintained from 2030-2050.
R-04	Envelope improvements with roof assessment	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	Guide to Home Insulation Energy.gov https://www.fpl.com/save/resources/ceiling-insulation.html https://www.energystar.gov/sites/default/files/boos/ENERGY%20STAR%20Guidance%20on%20churn_508.pdf https://www.energystar.gov/save/home/seal_insulate?smega https://www.energystar.gov/save/home/seal_insulate?smega	Adoption Scenario for implementation is 10%, 20%, and 30%. GHG Reduction estimates are equal to annual savings when the chosen implementation scenario is met. Assume that implementation scenario is met by 2030, scaling linearly from 2024-2030 and is maintained from 2030-2050.
R-05	Window, door and skylight replacement with assessment	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	Benefits of ENERGY STAR Qualified Windows, Doors, and Skylights ENERGY STAR https://www.energystar.gov/products/res_windows_doors_skylights	Adoption Scenario for implementation is 3%, 5%, and 7%. Reduced implementation scenarios are assumed due to the high cost nature of the measure. GHG Reduction estimates are equal to annual savings when the chosen implementation scenario is met. Assume that implementation scenario is met by 2030, scaling linearly from 2024-2030 and is maintained from 2030-2050.
Facilities Measures GHG Reduction Measures				
C-01	Solar Photovoltaics (PV)	Use 100kw per installation. 100 kW array produces 255,023 kWh annually, 1,550 kWh/kWp, 1,550 MWh/MW.	https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-size.html PVWatts Calculator	Adoption Scenario for implementation is 10%, 30%, and 50%. Adoption scenarios are higher because the properties are owned by the counties or municipalities and therefore have an increased ability to implement the measures. GHG Reduction estimates are equal to annual savings when the chosen implementation scenario is met. Assume that implementation scenario is met by 2030, scaling linearly from 2024-2030 and is maintained from 2030-2050.
C-02	Heat Pump or High Efficiency AC, Retrofits and Commissioning	NREL: Top Ten State-Wide Electricity Savings Potential by Measure - Florida	https://www.fpl.com/business/save/programs/direct-expansion-ac.html https://www.fpl.com/business/save/programs/chiller.html	Adoption Scenario for implementation is 20%, 50%, and 80%. Adoption scenarios are higher because the properties are owned by the counties or municipalities and therefore have an increased ability to implement the measures. GHG Reduction estimates are equal to annual savings when the chosen implementation scenario is met. Assume that implementation scenario is met by 2030, scaling linearly from 2024-2030 and is maintained from 2030-2050.
C-03	LED Lighting	NREL: Top Ten State-Wide Electricity Savings Potential by Measure - Florida, 3rd best savings	https://www.fpl.com/business/save/programs/lighting.html https://www.energystar.gov/buildings/save_energy_commercial_buildings/ways_save/upgrade_lighting	Adoption Scenario for implementation is 20%, 50%, and 80%. Adoption scenarios are higher because the properties are owned by the counties or municipalities and therefore have an increased ability to implement the measures. GHG Reduction estimates are equal to annual savings when the chosen implementation scenario is met. Assume that implementation scenario is met by 2030, scaling linearly from 2024-2030 and is maintained from 2030-2050.
C-04	Smart Thermostats	NREL: Top Ten State-Wide Electricity Savings Potential by Measure - Florida, 5th best savings	https://www.energystar.gov/buildings?smega https://www.energystar.gov/buildings/resources_audience	Adoption Scenario for implementation is 20%, 50%, and 80%. Adoption scenarios are higher because the properties are owned by the counties or municipalities and therefore have an increased ability to implement the measures. GHG Reduction estimates are equal to annual savings when the chosen implementation scenario is met. Assume that implementation scenario is met by 2030, scaling linearly from 2024-2030 and is maintained from 2030-2050.
C-05	Envelope improvements with roof assessment	NREL: Top Ten State-Wide Electricity Savings Potential by Measure - Florida, 9th best savings	https://www.energystar.gov/buildings/resources_topic https://www.energystar.gov/buildings/training/slide_library	Adoption Scenario for implementation is 20%, 50%, and 80%. Adoption scenarios are higher because the properties are owned by the counties or municipalities and therefore have an increased ability to implement the measures. GHG Reduction estimates are equal to annual savings when the chosen implementation scenario is met. Assume that implementation scenario is met by 2030, scaling linearly from 2024-2030 and is maintained from 2030-2050.

TECHNICAL APPENDIX

ID	GHG Reduction Estimate Method	Models/Tools Used	Reference Case Scenario (GHG Emissions or Activity Level)	Measure-Specific Activity Data
Residential GHG Reduction Measures				
R-01	Solar Photovoltaics (PV)	Engineering estimates based on project examples and publicly available research.	Electricity emissions factor of 0.334 MT/MWh. PV production of 1,450 kWh/kWp.	Study considers 10kW arrays on single family homes. Savings are calculated against baseline inventory data.
R-02	Heat Pump or High Efficiency AC, Retrofits and Commissioning	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	Electricity emissions factor of 0.334 MT/MWh, blended between Sarasota and Manatee County values. Blended emissions factor for fossil fuels based on overall consumption, resulting in 0.0541 MT/MMBtu. Blended value is the result of the blend of fuel use across Natural Gas (0.0532 MT/MMBtu), Propane (0.0621 MT/MMBtu), and Kerosene (0.0757 MT/MMBtu). FL Assumed Energy Breakdown: Space Heating = 9% Cooling = 27%	Electric Resistance Heating COP 1 upgraded to COP 3.0 Cooling SEER 12 upgraded to SEER 16 HP. The remaining savings taken from fuel switching for small percentage of gas units has been accounted for as savings to Natural Gas/Propane/Kerosene blend, and a portion of the new electrical consumption has been added back to the electricity reductions calculations. Savings are calculated against baseline inventory data.
R-03	LED Lighting	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	Electricity emissions factor of 0.334 MT/MWh, blended between Sarasota and Manatee County values. FL Assumed Energy Breakdown: Lighting = 7.58%	Mix of Incandescent and Fluorescent lighting replaced by LED, saving 60% of the electricity for lighting. Savings are calculated against baseline inventory data.
R-03A	Efficient Appliances and Plug Load Management	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	Electricity emissions factor of 0.334 MT/MWh, blended between Sarasota and Manatee County values. FL Assumed Energy Breakdown: Appliances = 13.30%	Residential units without EnergyStar appliances being upgraded to EnergyStar, saving 15% on appliance electricity consumption. Savings are calculated against baseline inventory data.
R-03B	Smart Thermostats	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	Electricity emissions factor of 0.334 MT/MWh, blended between Sarasota and Manatee County values. Blended emissions factor for fossil fuels based on overall consumption, resulting in 0.0541 MT/MMBtu. Blended value is the result of the blend of fuel use across Natural Gas (0.0532 MT/MMBtu), Propane (0.0621 MT/MMBtu), and Kerosene (0.0757 MT/MMBtu). FL Assumed Energy Breakdown: Space Heating = 9%	Units with no automated controls for heating and cooling install smart thermostats controlling space heating and cooling. Assuming 5% heating and cooling energy savings by implementing measure. Savings are calculated against baseline inventory data.
R-04	Envelope improvements with roof assessment	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	Electricity emissions factor of 0.334 MT/MWh, blended between Sarasota and Manatee County values. Blended emissions factor for fossil fuels based on overall consumption, resulting in 0.0541 MT/MMBtu. Blended value is the result of the blend of fuel use across Natural Gas (0.0532 MT/MMBtu), Propane (0.0621 MT/MMBtu), and Kerosene (0.0757 MT/MMBtu). FL Assumed Energy Breakdown: Space Heating = 9%	Air tightness measures: Windows air leakage accounting for 25% of heating and cooling loads being properly assessed and repaired. Roof Insulation: Upgrading existing insulation from R-13 to R-38. Savings are calculated against baseline inventory data.
R-05	Window, door and skylight replacement with assessment	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	Electricity emissions factor of 0.334 MT/MWh, blended between Sarasota and Manatee County values. Blended emissions factor for fossil fuels based on overall consumption, resulting in 0.0541 MT/MMBtu. Blended value is the result of the blend of fuel use across Natural Gas (0.0532 MT/MMBtu), Propane (0.0621 MT/MMBtu), and Kerosene (0.0757 MT/MMBtu). FL Assumed Energy Breakdown: Space Heating = 9%	Non-EnergyStar rated single pane windows, doors and skylights being upgraded to EnergyStar products including double pane impact windows, resulting in an overall energy savings of 12%. Savings are calculated against baseline inventory data.
Facilities Measures GHG Reduction Measures				
C-01	Solar Photovoltaics (PV)	Use 100kw per installation. 100 kW array produces 155,023 kWhs annually. 1,550 kWh/kWp, 1,550 MWh/MW.	Electricity emissions factor of 0.334 MT/MWh. PV production of 1,450 kWh/kWp.	Commercial Buildings without Rooftop solar PV and without covered parking with solar. Use 100kw per installation. 100 kW array produces 145,000 kWhs annually. 1,450 kWh/kWp, 1,450 MWh/MW. Savings are calculated against baseline inventory data.
C-02	Heat Pump or High Efficiency AC, Retrofits and Commissioning	NREL: Top Ten State-Wide Electricity Savings Potential by Measure - Florida	Electricity emissions factor of 0.334 MT/MWh, blended between Sarasota and Manatee County values. Blended emissions factor for fossil fuels based on overall consumption, resulting in 0.0569MT/MMBtu. Blended value is the result of the blend of fuel use across Natural Gas (0.0532 MT/MMBtu), Propane (0.0621 MT/MMBtu), Fuel Oil (0.0745 MT/MMBtu), and Kerosene (0.0757 MT/MMBtu).	Elec. Resistance Heating COP=1 upgraded to COP= 3.0. AC SEER 12 upgraded to SEER 16. 16 SEER is required for Federal Tax Incentive. Savings are calculated against baseline inventory data.
C-03	LED Lighting	NREL: Top Ten State-Wide Electricity Savings Potential by Measure - Florida, 3rd best savings	Electricity emissions factor of 0.334 MT/MWh, blended between Sarasota and Manatee County values.	Mix of Fluorescent and HID lighting replaced by LED, saving 30% of the electricity. Savings are calculated against baseline inventory data.
C-04	Smart Thermostats	NREL: Top Ten State-Wide Electricity Savings Potential by Measure - Florida, 5th best savings	Electricity emissions factor of 0.334 MT/MWh, blended between Sarasota and Manatee County values. Blended emissions factor for fossil fuels based on overall consumption, resulting in 0.0569MT/MMBtu. Blended value is the result of the blend of fuel use across Natural Gas (0.0532 MT/MMBtu), Propane (0.0621 MT/MMBtu), Fuel Oil (0.0745 MT/MMBtu), and Kerosene (0.0757 MT/MMBtu).	Base scenario includes buildings with minimal or no BMS controls introducing smart thermostat systems to reduce heating and cooling loads. Assuming 2% overall energy savings. Savings are calculated against baseline inventory data.
C-05	Envelope improvements with roof assessment	NREL: Top Ten State-Wide Electricity Savings Potential by Measure - Florida, 9th best savings	Electricity emissions factor of 0.334 MT/MWh, blended between Sarasota and Manatee County values. Blended emissions factor for fossil fuels based on overall consumption, resulting in 0.0569MT/MMBtu. Blended value is the result of the blend of fuel use across Natural Gas (0.0532 MT/MMBtu), Propane (0.0621 MT/MMBtu), Fuel Oil (0.0745 MT/MMBtu), and Kerosene (0.0757 MT/MMBtu).	Upgrading existing roof insulation from R-13 to R-38. Use of reflective cool roof membranes. Assuming 5% overall energy savings by implementing measures. Savings are calculated against baseline inventory data.

TECHNICAL APPENDIX

ID	GHG Reduction Estimate Method	Models/Tools Used	GHG Emissions Reduced	LIDAC Benefits			
Residential GHG Reduction Measures							
R-01	Solar Photovoltaics (PV)	Engineering estimates based on project examples and publicly available research.	1.25% adoption of this measure is projected to equate to 4.42 MW of PV resulting in the production of 6,403 MWh of electricity.	3,849.15	46,617	14.50	\$2,175
R-02	Heat Pump or High Efficiency AC Retrofits and Commissioning	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	10% adoption of this measure is projected to reduce electricity consumption by 8,218 MWh and Natural Gas, Propane, Kerosene energy by 87.94 MMBtu annually.	4,948.83	59,935.88	1.00	\$150.61
R-03	LED Lighting	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	10% adoption of this measure is projected to reduce electricity consumption by 3,475 MWh annually.	2,089.11	25,301.43	0.42	\$63.69
R-03A	Efficient Appliances and Plug Load Management	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	10% adoption of this measure is projected to reduce electricity consumption by 1,524 MWh annually.	916.13	11,095.38	0.19	\$27.93
R-03B	Smart Thermostats	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	10% adoption of this measure is projected to reduce electricity consumption by 1,302 MWh and Natural Gas, Propane, Kerosene energy by 14 MMBtu annually.	784.18	9,497.26	0.16	\$23.87
R-04	Envelope improvements with roof assessment	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	10% adoption of this measure is projected to reduce electricity consumption by 6,511 MWh and Natural Gas, Propane, Kerosene energy by 69 MMBtu annually.	5,489.24	66,480.79	1.11	\$167.06
R-05	Window, door and skylight replacement with assessment	Engineering estimates based on project examples and publicly available research. Percentage of anticipated reductions multiplied by the baseline end-use breakdown weighted by adoption percentages.	3% adoption of this measure is projected to reduce electricity consumption by 2,604 MWh and Natural Gas, Propane, Kerosene energy by 28 MMBtu annually.	1,568.35	18,994.51	1.06	\$159.13
Facilities Measures GHG Reduction Measures							
C-01	Solar Photovoltaics (PV)	Use 100kw per installation. 100 kW array produces 155,023 kWhs annually. 1,550 kWh/kWp, 1,550 MWh/MW.	30% adoption of this measure is projected to equate to 5.31 MW of PV resulting in the production of 7,694 MWh of electricity.	4,625.63	56,022		
C-02	Heat Pump or High Efficiency AC Retrofits and Commissioning	NREL: Top Ten State-Wide Electricity Savings Potential by Measure - Florida	20% adoption of this measure is projected to reduce electricity consumption by 2,426 MWh and Natural Gas, Propane, Fuel Oil, Kerosene energy by 541 MMBtu annually.	1,513.94	18,335.47		
C-03	LED Lighting	NREL: Top Ten State-Wide Electricity Savings Potential by Measure - Florida, 3rd best savings	20% adoption of this measure is projected to reduce electricity consumption by 1,845 MWh annually.	1,110.15	13,445.17		
C-04	Smart Thermostats	NREL: Top Ten State-Wide Electricity Savings Potential by Measure - Florida, 5th best savings	20% adoption of this measure is projected to reduce electricity consumption by 324 MWh and Natural Gas, Propane, Fuel Oil, Kerosene energy by 72 MMBtu annually.	201.86	2,444.73		
C-05	Envelope improvements with roof assessment	NREL: Top Ten State-Wide Electricity Savings Potential by Measure - Florida, 9th best savings	20% adoption of this measure is projected to reduce electricity consumption by 809 MWh and Natural Gas, Propane, Fuel Oil, Kerosene energy by 180 MMBtu annually.	504.65	6,111.82		

TECHNICAL

Transportation

Measure	Reference Case Scenario (GHG Emissions or Activity Level)	Measure-Specific Activity Data				
		Value	Units	GHG Emissions Reduced (MTCO ₂ /yr)	2025-2050 Potential GHG Reduction (MTCO ₂ /yr)	2025-2050 Potential GHG Reduction (MTCO ₂ /yr)
Transportation GHG						
#1 Reduce Roadway Vehicle Miles Traveled	As compared to no new transit service	2,638,477	boardings/day	15,174	45,522	349,000
		52,770	boardings/day			
		69.71%				
		4.52	miles/trip			
		43,230,492	miles/year			
	As compared to no new transit service	75,000	boardings/day	3,345	10,034	76,925
		11,631	boardings/day			
		69.71%				
		4.52	miles/trip			
	As compared to no new transit service	5,528,692	miles/year	392	1,175	9,010
		26	projects			
		52.4	trips/day			
		69.71%				
		4.52	miles/trip			
	#2 Decarbonize equipment	As compared to gasoline, diesel, and LPG lawn and garden equipment	4385	MTCO ₂ e/year	4385	13,155
#3 Decarbonize Agency Fleets	As compared to gasoline vehicles	597,003	Gallons/year	308	919	7,045
		59,700	gallons/year			
		24	miles/gallon			
		1,444,747	miles/year			
		351	g CO ₂ /mile			
	As compared to gasoline vehicles	139	g CO ₂ /mile	24	73	558
		47247	Gallons/year			
		4,725	gallons/year			
		24	miles/gallon			
		114,308	miles/year			
	As compared to gasoline vehicles	351	g CO ₂ /mile	60	180	1,380
		139	g CO ₂ /mile			
		20	vehicles/day			
		12,400	miles/year			
		5	ton CO ₂ /year			
	2	ton CO ₂ /year				

Transportation - Additional Details

Output from NREL's AFLEET version 2030 spreadsheet tool

https://afleet.es.anl.gov/home/

Values derived by entering 1 vehicle for the each of the vehicle/fuel combinations below, using all tool defaults with Florida electricity grid factors

Annual short tons GHG output from AFLEET (includes upstream emissions from electricity use and CNG production)

Vehicle Type	AFLEET Default Annual Mileage	AFLEET Default Annual Mileage				LNG / Diesel Pilot Ignition
		Gasoline	Diesel	EV	CNG	
Passenger Car	12,400	4.8		1.9		
Light Commercial Truck	24000	21.8		9.9		
Single Unit Short-Haul truck (delivery step van)	16500		35.1	13.5		
Single Unit Long-Haul Truck (delivery straight truck)	23000	0	55.2	21.2		
Combination Long-Haul Truck (freight)	170000	0				
Transit Bus	45000	0	140.8	86.2		
Refuse Truck	23400		186.1	80.7	178.6	
School Bus	15000		29.7	14.2		

Terminal Tractor: 1,257 hours per year of operation	NA	28.3	10.5			
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Lifecycle GHG emission factor in gram/mile from AFLEET (includes upstream emissions from electricity use and CNG production)

Gasoline	Diesel	Gasoline HEV	Gasoline PHEV	Gasoline EREV	EV	CNG	LNG	LNG / Diesel Pilot Ignition
351	0	0	0	0	139	0	0	0
824	0	0	0	0	374	0	0	0
0	1,930	0	0	0	742	0	0	0
0	2,177	0	0	0	836	0	0	0
0	0	0	0	0	0	0	0	0
0	2,839	0	0	0	1,738	0	0	0
	7,215				3,129	6,924		
	1,796				859			

Output from NREL's AFLEET CFI Emissions Tool v1.1

https://afleet.es.anl.gov/home/

Values derived by entering 1 L2 and 1 DCFC charging port, assuming moderate utilization with Florida electricity grid factors

	GHGs (short tons)	GHGs (metric tons)
AFV Fueling Infrastructure		
Level 2 EVSE	4.497899393	4.07959475
DCFC EVSE	20.99019717	19.0381088

Assumptions used to estimate new users of bike-ped facilities for IDOT Carbon Reduction Strategy emissions evaluation

Based on methodology in CARB's Methods to Find the Cost-Effectiveness of Funding Air Quality Projects

https://ww2.arb.ca.gov/sites/default/files/2020-06/Congestion_Mitigation_Air%20Quality_Improvement_Program_cost-effectiveness_methods_may2005.pdf

Annual Auto Trips Reduced = D * ADT * (A + C)

Where:

ADT = annual average daily traffic

A = adjustment factor based on project characteristics

C = credits for nearby activity centers.

Table 1 – Adjustment Factors based on project characteristics

BIKE FACILITY CLASS	AVERAGE DAILY TRAFFIC	LENGTH OF BIKE PROJECT	ADJUSTMENT FACTORS FOR CITIES WITH POP. ≥ 250,000 (and non-university towns < 250,000)	AVERAGE DAILY TRAFFIC	ADJUSTMENT FACTORS FOR UNIVERSITY TOWNS WITH POP. < 250,000
Class 1 (bike path) & Class 2 (bike lane)	ADT ≤ 12,000	≤ 1 mile	0.0019	12000	0.0104
	vehicles per day	>1 & ≤ 2 miles	0.0029	12000	0.0155
		> 2 miles	0.0038	12000	0.0207
Class 1 (bike path) & Class 2 (bike lane)	12,000 < ADT ≤ 24,000	≤ 1 mile	0.0014	24000	0.0073
	vehicles per day	>1 & ≤ 2 miles	0.002	24000	0.0109
		> 2 miles	0.0027	24000	0.0145
Class 2 bike lane	24,000 < ADT ≤ 30,000	≤ 1 mile	0.001	40000	0.0052
	vehicles per day	>1 & ≤ 2 miles	0.0014	40000	0.0078
	Maximum is 30,000	> 2 miles	0.0019	40000	0.0104

Values Used for GHG Reduction Measures

Commute Days	ADJUSTMENT FACTORS FOR CITIES WITH POP. ≥ 250,000 (and non-university towns < 250,000)	Credit (C)	Annual Trips Reduced	Daily Trips Reduced	Average for this ADT
260	0.0019	0.0015	10608	40.8	52.4
260	0.0029	0.0015	13728	52.8	
260	0.0038	0.0015	16536	63.6	
260	0.0014	0.0015	18096	69.6	84.8
260	0.002	0.0015	21840	84	
260	0.0027	0.0015	26208	100.8	
260	0.001	0.0015	26000	100	117.3
260	0.0014	0.0015	30180	116	
260	0.0019	0.0015	35360	136	

Table 2 – Activity Credits

Quantity of Activity Centers	Credit (C)	
	Within 1/2 mile	Within 1/4 mile
Three (3)	0.0005	0.001
More than 3 but less than 7	0.001	0.002
7 or more	0.0015	0.003

Implementation Assumptions for Cumulative Reductions

Percent of 2030 goal achieved	Calendar Year
0	2025
0.2	2026
0.4	2027
0.6	2028
0.8	2029
1	2030-2050