






# MIAMI-DADE CLIMATE ACTION STRATEGY

# TABLE OF CONTENTS

<b>Introduction.....</b>	<b>01</b>
<b>Equity and Engagement.....</b>	<b>03</b>
<b>Emissions Overview .....</b>	<b>05</b>
• Inventory	
• Forecast	
<b>Areas</b>	
 <b>• Energy &amp; Buildings .....</b>	<b>09</b>
I. Benchmark, retune and retrofit existing buildings	
II. Expand on-site and off-site renewable energy	
III. Build ultra-low energy buildings	
 <b>• Land Use &amp; Transportation .....</b>	<b>19</b>
IV. Reduce transportation-related fuel consumption	
V. Expand and protect green and blue spaces	
 <b>• Water &amp; Waste.....</b>	<b>29</b>
VI. Convert waste to energy	
VII. Reduce waste and water use	



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*While the effects of climate change might still seem theoretical for many communities around the globe, in Miami-Dade County, we already clearly see the impact of rising seas, extreme heat and sunny day flooding. Now in our 11th hour with the clock rapidly ticking, we must take action immediately to dramatically reduce greenhouse gas emissions. Community input to this draft of our County's new Climate Action Strategy will transform how we use the proposed approaches to cut our footprint in half by 2030 and to zero by 2050 while also cleaning the air and water on which our economy depends, creating good-paying jobs, saving residents and businesses money, and improving public health for all.*



Miami-Dade County  
Mayor

**DANIELLA LEVINE CAVA**

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*Together with our County's Sea Level Rise Strategy and the Biscayne Bay Task Force Report, this Climate Action Strategy builds on the collaborative success of Resilient305, which started with Miami-Dade's partnership with the cities of Miami and Miami Beach and has now expanded to all 34 municipalities in our County. This teamwork will be critical to our success in reducing emissions as we draw on the wisdom, technological know-how and insights of our growing network of diverse community partners.*



Miami-Dade County  
Chief Resilience Officer

**JAMES MURLEY**

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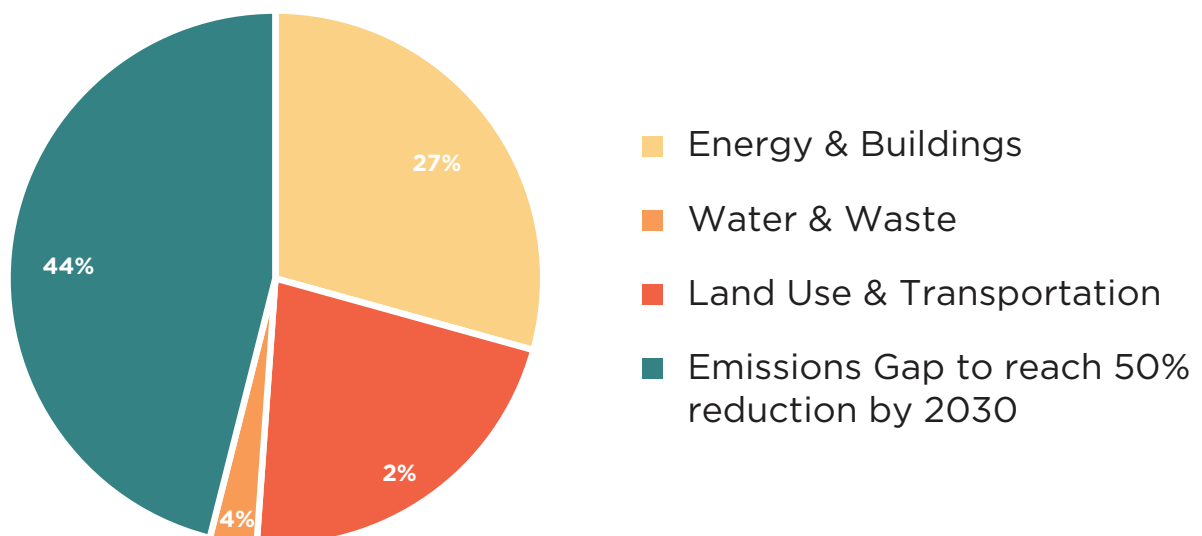
# INTRODUCTION

Miami-Dade County has led efforts to reduce greenhouse gas (GHG) emissions for decades and is a founding member of ICLEI – Local Governments for Sustainability, an organization that has helped communities around the world track and cut greenhouse gas emissions for over 30 years. Through the Resilient Cities Network the County works with the best of the best to become more resilient and implement strategies like Resilient305. Created with local municipalities and community partners, Resilient305 is a shared strategy to make the community more resilient.

Miami-Dade County's Climate Action Strategy is a communitywide strategy to cut greenhouse gas emissions, create jobs, improve health, and make life better. Cleaner air, water, and land plus new jobs in the low-carbon economy will save businesses and residents money and raise the quality of life. As a member of the Race to Zero, the County aims to reach net-zero emissions by 2050 and keep global warming below +1.5° C. This will take ambitious goals and new ideas from across Miami-Dade.

This draft Climate Action Strategy, released on Earth Day, April 22, 2021, lays out a framework for County government and the community to achieve a 50% reduction in greenhouse gas emissions by 2030 (from a 2019 baseline) by transforming the way we use energy, the way we get around, and what we do with our waste. It outlines seven approaches grouped into three strategic areas: Energy & Buildings, Land Use & Transportation, and Water & Waste.

## Emissions Reductions by 2030 (18 million metric tons CO<sub>2</sub>e)



# THE 7 APPROACHES AND 2030 TARGETS



## ENERGY & BUILDINGS



### 1. BENCHMARK, RETUNE AND RETROFIT EXISTING BUILDINGS

- BENCHMARK 1.3 BILLION SQUARE FEET COMMUNITYWIDE BY 2026
- RETUNE 100.7 MILLION SQUARE FEET OF COUNTY BUILDINGS BY 2030
- CONDUCT DEEP RETROFITS COMMUNITYWIDE TO SAVE 48 MILLION KWH BY 2030 BUILDINGS.



### 2. EXPAND ON-SITE AND OFF-SITE RENEWABLE ENERGY GENERATION

- INSTALL 61,725 KW OF SOLAR ENERGY BY 2030 ON COUNTY BUILDINGS - EQUIVALENT TO 12,200 HOMES' ELECTRICITY USE FOR ONE YEAR
- INSTALL 722,000 KW OF SOLAR ENERGY BY 2030 ON COMMERCIAL BUILDINGS - EQUIVALENT TO 94,600 HOMES' ELECTRICITY USE FOR ONE YEAR
- INSTALL 134,000 KW OF SOLAR ENERGY BY 2030 ON RESIDENTIAL BUILDINGS - EQUIVALENT TO 26,500 HOMES' ELECTRICITY USE FOR ONE YEAR



### 3. BUILD ULTRA-LOW ENERGY BUILDINGS

- REDUCE THE ENERGY USE INTENSITY OF NEW BUILDINGS 20% BY 2030 BELOW 2020 LEVELS



## LAND USE & TRANSPORTATION



### 4. REDUCE TRANSPORTATION-RELATED FUEL CONSUMPTION

- 10% MODE SHIFT AWAY FROM SINGLE OCCUPANT VEHICLES BY 2030
- SHIFT 80% OF THE COUNTY LIGHT VEHICLE FLEET TO ELECTRIC POWER BY 2030
- SHIFT 30% OF COMMUNITYWIDE VEHICLES TO ELECTRIC POWER BY 2030
- REDUCE GREENHOUSE GAS EMISSIONS FROM AIRPORT AND PORTMIAMI OPERATIONS BY 50% AND 25%, RESPECTIVELY



### 5. EXPAND AND PROTECT GREEN & BLUE SPACES

- REACH 30% TREE CANOPY COVERAGE COUNTY-WIDE BY 2030
- EXPAND ACRES COVERED BY HEALTHY SEAGRASS IN BISCAYNE BAY BY 2030



## WATER & WASTE



### 6. CONVERT WASTE TO ENERGY

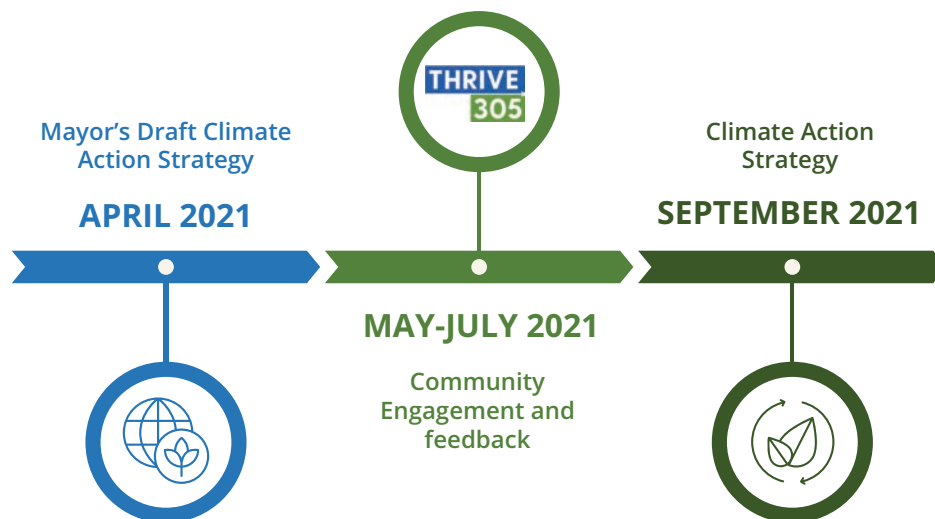
- 72 KWH OF ELECTRICITY FROM COGENERATION AT WASTEWATER PLANTS BY 2030
- 50% OF NON-RECYCLED GARBAGE BURNED FOR ENERGY BY 2030



### 7. REDUCE WASTE AND WATER USE

- REDUCE LANDFILL WASTE PER PERSON 50% BY 2030
- REDUCE WATER CONSUMPTION PER PERSON 30% BY 2030

# EQUITY AND ENGAGEMENT OVERVIEW



From May to July, the County will solicit feedback from the community on this strategy. Building on the community engagement models of the Thrive305 survey and Civic Week, the Office of Resilience will host virtual discussions with community members in collaboration with civic organizations. These meetings will focus on specific topics like energy, buildings, transportation, and green & blue space. Please provide feedback on the Draft Climate Action Strategy to [resilience@miamidadade.gov](mailto:resilience@miamidadade.gov).



The Climate Action Strategy will also engage the business community through Renew305, One Community One Goal, the Anchor Alliance, and the Greater Miami Chamber of Commerce Resilience Committee. Large and small business leaders will help Miami-Dade position itself to lead the transition to a low carbon economy.

Over 28,000 people in Miami-Dade completed the Thrive305 survey. Residents clearly said they want to be involved in decision making, and they strongly support the ideas in this draft Climate Action Strategy:

- When asked how county government can help you, “Increase training for “green jobs” (e.g., solar panel installation, electric vehicle maintenance)” was the second highest priority overall and the highest for age 18-34 year olds.
- When asked which actions they would support to eliminate energy from fossil fuel by 2050
  - 49% chose “Expand renewable energy”
  - 48% chose “Investing in better public transit to get people out of their cars”
  - 45% chose “Help businesses and homeowners make their buildings more environmentally sustainable”
  - 34% chose “Make County government buildings more environmentally sustainable”

This draft strategy is a framework and will be reviewed by the public. Public comments will help to:

- Review the approaches
- Prioritize actions within each approach
- Set a process for regular reporting
- Center equity

## CENTERING EQUITY

The County acknowledges historic and current structural racism and inequality and commits to creating more just outcomes. Using Resilient305 as a framework, this strategy aims to build Miami-Dade County’s capacity to address the causes of climate change so that our actions are effective and equitable, today and in the future.

This work contributes to creating a more effective and equitable government when it:

- Examines power dynamics and biases in ourselves and our government systems and actively works to address them
- Learns publicly and creates a more transparent government
- Is accessible to everyone in our community
- Listens to and elevates the voices and stories from communities of all identities who have historically experienced discrimination, including Black, Hispanic, and Indigenous communities

To advance equitable outcomes, the policies and projects included in the final strategy will be evaluated using tools like the Energy Justice Scorecard.

# EMISSIONS OVERVIEW

## MIAMI-DADE COUNTY'S HISTORY OF CLIMATE ACTION AND EMISSIONS TRACKING

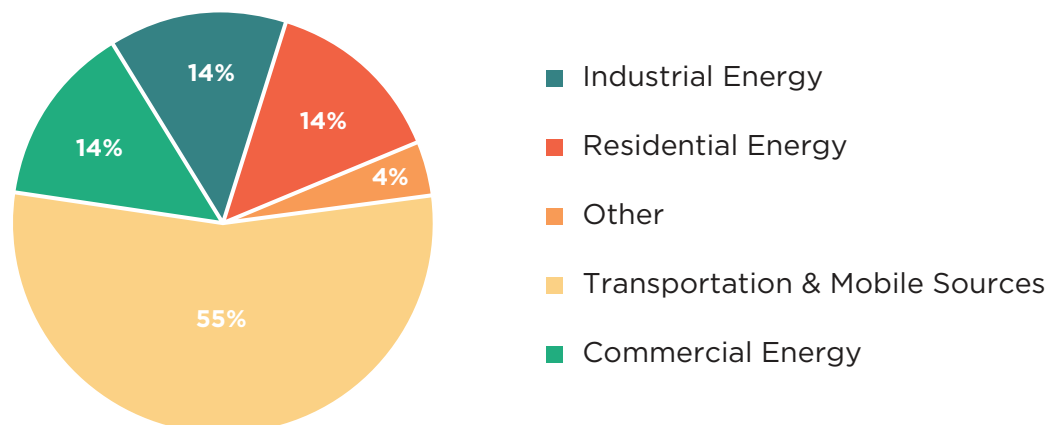
Miami-Dade County has long been a recognized leader in its commitment to reduce greenhouse gas (GHG) emissions, and has implemented numerous programs and policies over the years. This includes programs such as the original Long-Term CO<sub>2</sub> Reduction Plan (1990), creation of the Climate Change Advisory Task Force (CCATF; 2006), membership in the Chicago Climate Exchange (CCX) pilot program (2007), participation in the U.S. Cool Counties Program (2008), the joint establishment of the South-east Florida Regional Climate Change Compact (2009), and release of GreenPrint: Our Design for a Sustainable Future (2010). Miami-Dade County has been tracking GHG emissions across the county since the first emissions inventory was completed in 1988.

## EMISSIONS INVENTORY – RESULTS OVERVIEW

The results of the 2019 county-wide inventory indicate that GHG emissions have increased 43% between 2008 and 2019. These changes have largely been driven by increases in emissions from the Transportation sector. However, interpreting changes in emissions data over time can be difficult due to the effects of changes in inventory scope and methodology. For example, a change in inventory methodology between 2010 and 2015 resulted in a more holistic accounting for transportation emissions, which subsequently appears as a large increase between inventory years. Finally, while the net trend since 2008 has been an overall increase, we have observed that per capita emissions, a measure of efficiency, have held relatively constant since 2013.

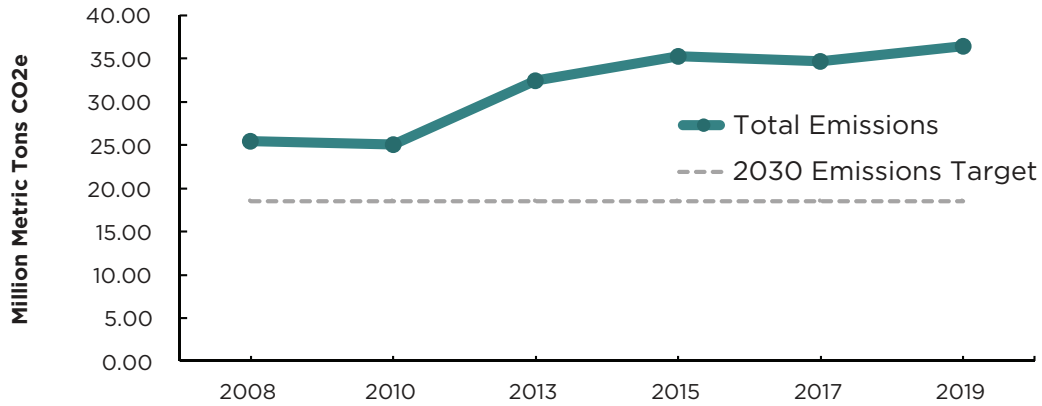
Miami-Dade County reports emissions in CO<sub>2</sub> equivalent, or CO<sub>2</sub>e, a metric standard of measurement that is used to aggregate emissions from a variety of greenhouse gases (GHG) such as NO<sub>2</sub>, CH<sub>4</sub>, and CO<sub>2</sub>, on the basis of their global-warming potential. Miami-Dade County reports emissions in CO<sub>2</sub>e to enable standardized understanding of impacts of all greenhouse gases accounted for in the inventory process. The most recent Community-Scale inventory results for 2019 are below:

2019 Community-Scale Inventory by Sector

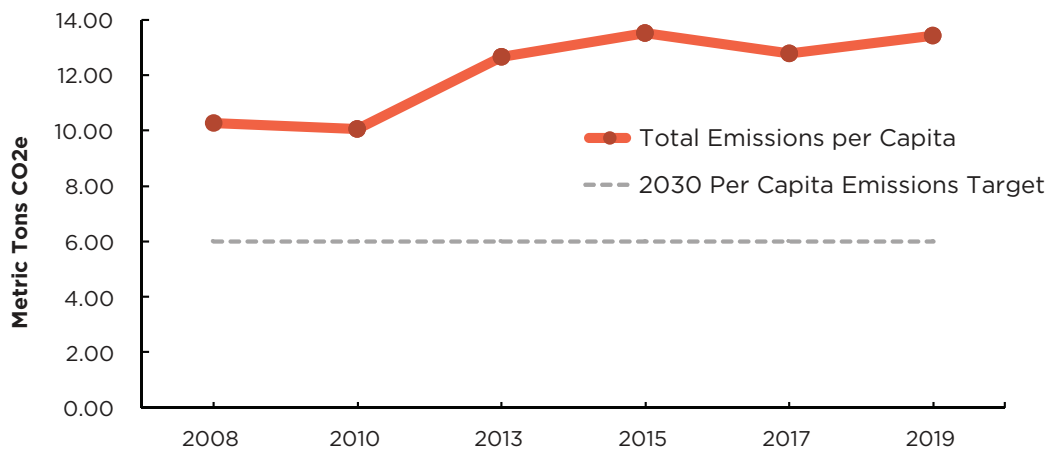




## Miami-Dade County - Community-Scale Emissions



## Miami-Dade County - Community-Scale Per Capita Emissions



The Climate Action Strategy refers to 2019 Emissions to provide crucial context on historical performance and future targets for each of the areas and approaches. These emissions inventories serve as critical goal-setting and measurement tools to help the County support targeted, data-driven interventions across all sectors of our community and economy. Going forward, this robust greenhouse gas emissions inventory will be used to measure and verify progress towards the goals outlined here.

## GREENHOUSE GAS METHODS AND VERIFICATION

The County's ability to measure its emissions, take effective action, and monitor progress towards emissions goals depends on maintaining a robust emissions data set and inventory process. Miami-Dade County practices credible and meaningful GHG accounting as required by the Global Protocol for Community-Scale Greenhouse Gas Inventories (GPC). The GPC was developed through a collaborative effort between the GHG Protocol at World Resources Institute (WRI), C40 Cities Climate Leadership Group (C40), and the International Council for Local Environmental Initiatives – Local Governments for Sustainability (ICLEI). Following these standards ensures that Miami-Dade County's emissions inventories are robust from the beginning and allow the County to stand peer-to-peer with communities and municipalities utilizing the GPC standard in Florida and across the nation and globe. With over three decades of inventory experience, the County has refined its methods over time to ensure inventories are thorough and include all critical emissions sources.

Miami-Dade County uses ICLEI's ClearPath, a cloud-based emissions management tool for performing GHG emissions inventories organized around the Local Government Operations Protocol and US Community Protocol. ClearPath supports reporting under the GPC standard to facilitate credible emissions accounting and reporting. In addition, the County uses ClearPath to forecast future emissions scenarios, set mitigation goals, create targeted climate action plans, and track progress over time.

The County conducts two types of greenhouse gas emissions inventories: Community-Scale Inventories and Government-Scale Inventories. The Community-Scale Inventory includes all emissions activity occurring within the geographic boundaries of Miami-Dade County. This scale is useful to assess the effectiveness of community- or county-wide programs targeting a variety of sectors. In contrast, the Government-Scale Inventory is focused on understanding emissions related to County government operations. Some examples of included activities are County building and fleet operations. This supplement to the Community Inventory helps the County government act as an emissions reduction leader and identify the effectiveness of policies which target emissions specific to government operations. All emissions data presented in this document are derived from the 2019 Community-Scale Inventory.

In addition to being built on a robust inventory and reporting framework, Miami-Dade County's greenhouse gas emissions inventories undergo third-party verification by assigned technical advisors at ICLEI. ICLEI staff assist Miami-Dade in conducting quality assurance and quality control reviews of inventories before they are marked as complete. This additional level of verification adds independent rigor to the quality of the County's emissions accounting.

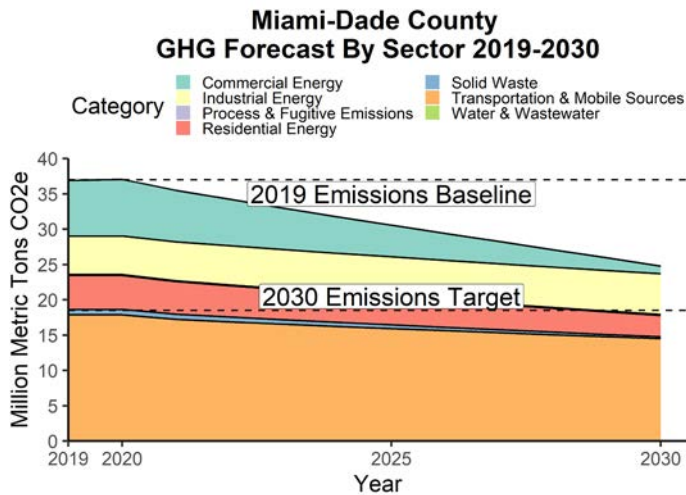
### CDMP: MIAMI-DADE COUNTY EMISSIONS, ELECTRICITY, AND FUEL REDUCTION GOALS

Achieve 80% communitywide emissions reduction by 2050 from baseline year of 2008.
Reduce the consumption of gasoline in County operations by 30% and the consumption of diesel fuel in County operations by 70% from the baseline year of 2016 by 2028 and further move toward conversion of the County's fleet to electric vehicles.
Reduce electricity usage for County facilities by 20% from the baseline year of 2009 by 2025.
Incorporate green building practices into the design of County facilities and infrastructure (Sustainable Buildings Program).
Have 30% of county-wide energy obtained from solar by 2030 with the ultimate goal of achieving zero emissions for county-wide energy sources

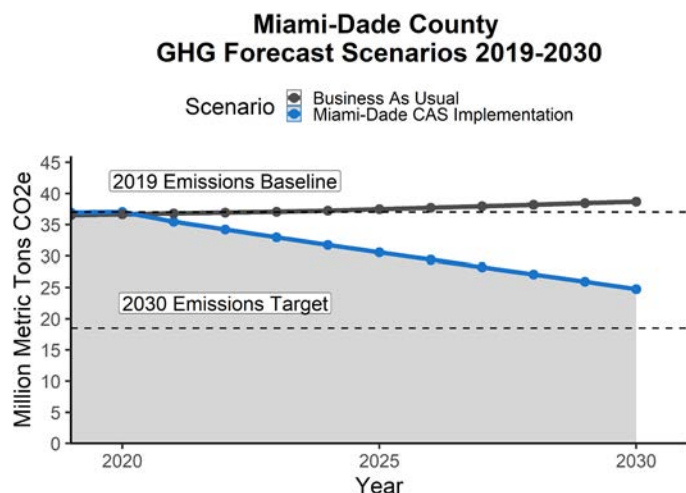
Finally, a key part of this process is the establishment of emissions reduction targets. Generally, progress is measured against the County's emissions levels in 2008, as established by the Board of County Commissioners through the County's Comprehensive Master Development Plan (CDMP). In line with Race to Zero and other commitments, this strategy targets 50% emissions reductions from 2019 levels by 2030, with an overall goal to reach net-zero emissions status by mid-century (2050).

## LOOKING FORWARD: GREENHOUSE GAS EMISSIONS FORECASTING

Meeting the ambitious emissions reductions goals laid out in this strategy requires a comprehensive understanding of emissions reduction potentials of various activities. The County conducts emissions goal-setting, forecasting, and measurement and verification of progress using the ICLEI ClearPath platform.



*GHG Forecast By Sector: Graph showing future emissions from 2019 to 2030 by Inventory Sector. Changes in emissions over time for each of these sectors are driven by implementation of the Climate Action Strategy.*



*GHG Forecast Scenarios Analysis: Graph showing future emissions from 2019 to 2030 in two different scenarios. The Business As Usual scenario shows the emissions trajectory assuming no emissions reductions activities are pursued. The Miami-Dade CAS Implementation Scenario shows the emissions trajectory with full implementation of all of the actions described in the Climate Action Strategy.*

In order to project the impact of emissions reduction activities, the County first creates a baseline forecast which projects a “business-as-usual” scenario in which demographic and economic changes, namely population and job growth, are the primary drivers of changes in emissions. These assumptions typically result in a baseline scenario in which emissions steadily increase over time. Other key inputs to the forecast are changes in the emissions generated by the electricity grid, and changes in vehicle fuel efficiency.

From this baseline, a variety of emissions-reducing activities are applied to the forecast. These activities and approaches are described throughout this plan. Each emissions reduction approach varies in the sectors it targets (for example – energy use in buildings) as well as their intensity and duration. This collection of emissions reduction activities together represent the County's planned emissions trajectory through 2030 and, ultimately, 2050. Critically, at the time of this writing, all of the County's planned emissions reduction activities do not meet the interim 2030 emissions reduction target. This gap represents the critical space where input from our community can help develop even more ambitious and targeted emissions reductions.





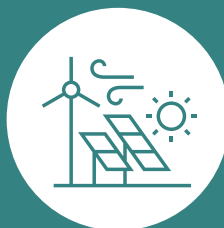




# ENERGY & BUILDINGS



**APPROACH 1:  
BENCHMARK, RETUNE AND RETROFIT EXISTING BUILDINGS**



**APPROACH 2:  
EXPAND ON-SITE AND OFF-SITE RENEWABLE ENERGY**



**APPROACH 3:  
BUILD ULTRA LOW ENERGY BUILDINGS**

EMISSIONS FROM ENERGY & BUILDINGS

41%

# ENERGY & BUILDINGS

Buildings provide the base for our homes and our businesses. As the pandemic highlighted, having efficient and healthy homes and properties is important. In Miami-Dade County most buildings run on electricity, with a very small percentage that use a combination of electricity and natural gas, a fossil fuel.

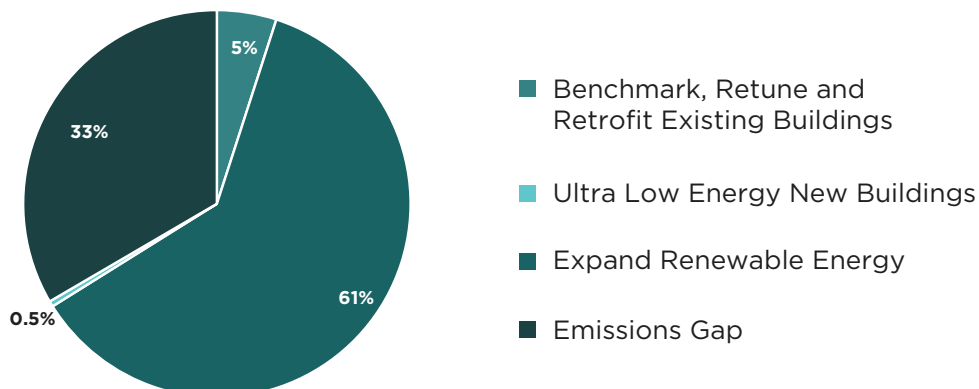
The electricity and fuel used in buildings produces 41% of emissions communitywide, according to the latest inventory. Strategies to tackle emissions from buildings center around reducing the energy used by buildings through energy efficiency, and ensuring that the energy needed comes from renewable sources, which includes electrifying systems that currently use fossil fuels and using on-site or off-site sources of renewable energy such as solar panels and solar hot water heaters. In other words, the objective is to make buildings as efficient as possible to avoid energy waste, and then get the energy required for the buildings from solar panels or other renewable sources that do not burn fossil fuels.

To achieve this goal, an aggressive acceleration of energy efficiency in new and existing buildings is needed, along with electrification of buildings, and the rapid expansion of renewable energy installation both on-site and off-site.

Fact: Miami-Dade County is the largest single consumer of electricity in Florida.



**Energy & Buildings Reductions by 2030**  
(7.5 million metric tons of CO<sub>2</sub>e)



## APPROACH 1:

# BENCHMARK, RETUNE, AND RETROFIT EXISTING BUILDINGS



According to the 2019 Census, out of the 1.03 million housing units in Miami-Dade County, 82% were built before 2000<sup>i</sup>, which is before the Florida Building Code entered into force in 2002. This means that the existing housing stock offers tremendous opportunities for energy efficiency and energy savings. Given South Florida's hot and humid climate, the building envelope and cooling systems are the main areas of interest.

There are three strategies to enhance building performance and tackle energy waste: benchmarking, retuning or retro-commissioning, and comprehensive retrofits.

A healthy and efficient building is especially critical for those experiencing a high energy burden and sub-par housing structures.



### TARGETS

- Benchmark 1.3 billion square feet communitywide by 2026
- Retune 100.7 million square feet of County buildings by 2030
- Conduct deep retrofits communitywide to save 48 million kWh by 2030



### CO-BENEFITS

- Create jobs
- Save money
- Lower energy burden
- Clean air
- Improve health
- Storm and energy resilience



### BOLD ACTIONS

- Present to the Board of County Commissioners the Building Performance Ordinance to benchmark and retune large existing buildings (43% of built space) countywide
- Conduct deep retrofits of buildings communitywide, with a focus on Low and Middle Income (LMI) housing



### KEY FACTS

- 80% of the building stock was built before the Florida Building Code came into place in 2002
- 27% of energy consumed in households is for air conditioning<sup>ii</sup>
- Miami-Dade County government is the number one customer of Florida Power and Light (FPL), purchasing approximately 1.2 billion kWh/year<sup>iii</sup>

**APPROACH 1:**

## **BENCHMARK, RETUNE AND RETROFIT EXISTING BUILDINGS**

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According to the 2019 Census, out of the 1.03 million housing units in Miami-Dade County, 82% were built before 2000, which is before the Florida Building Code entered into force in 2002. This means that the existing housing stock offers tremendous opportunities for energy efficiency and energy savings. Given South Florida's hot and humid climate, the building envelope and cooling systems are the main areas of interest.

There are three strategies to enhance building performance and tackle energy waste: benchmarking, retuning or retro-commissioning, and comprehensive retrofits.

Benchmarking refers to tracking energy use in a building over time. It establishes a baseline and allows us to observe consumption patterns as well as promoting data-driven decision making that ultimately leads to saving opportunities. Retuning or retro-commissioning refers to no-cost or low-cost conservation measures where small tweaks in operations and minor weatherization result in immediate savings. After these first measures are implemented, the last step is a comprehensive retrofit which includes an energy audit of all building systems to identify and prioritize areas for improvement. While the first two strategies are relatively cheap and immediate, the last strategy is more expensive and often requires external expertise.

There are many private companies, non-profit organizations, specialized networks and other entities operating in the home improvement market and energy management services. County programs available to community buildings revolve around energy monitoring and retrofits and include: the Building Efficiency 305 (BE305) Program managed by the Office of Resilience for large existing buildings; the Weatherization Assistance Program<sup>v</sup> and Home Rehabilitation Program<sup>vi</sup> run by the Community Action and Human Services Department for low- and medium-income (LMI) households.

The BE305 program seeks to promote improvements in building performance through a suite of strategies that increase energy and water efficiency in large, existing private and public buildings. The target audience is building owners and managers of buildings 20,000 square feet or larger, which represent about 12,200 buildings or approximately 43% of floor space in the entire County. One of the components of the BE305 program is the Building Performance Ordinance which mandates benchmarking and retuning, also known as retro commissioning.

Low- and medium-income households are more likely to live in older buildings that are less efficient. As a consequence, these households experience higher energy bills and lower comfort levels. This is also known as the "energy burden", when a disproportional amount of income is allocated to cover energy expenses. Often, a higher energy burden is correlated with higher incidences of asthma and other health conditions. This is a very important topic as crises, such as the recent Covid-19 pandemic, elevate the role of safe, efficient, and healthy homes and buildings.

To address this issue the County's Community Action and Human Services Department (CAHSD) offers the Weatherization Assistance Program (WAP) and Home Rehabilitation Program. The Weatherization Assistance Program is a federally funded program that assists low-income homeowners with making their homes energy efficient through the installation of cost-saving measures, such as insulation, and repair or replacement of lighting and air conditioning equipment. With the current federal funding level, CAHSD retrofits about 48 homes per year, addressing energy and health and safety concerns.

The Home Rehabilitation Program offers a forgivable loan to help low-income qualified single-family homeowners make repairs. Repairs are prioritized to eliminate health and safety issues, correct code violations, make the home more energy-efficient, and make improvements.



APPROACH 2:

EXPAND ON-SITE AND OFF-SITE  
RENEWABLE ENERGY GENERATION



In 2020 Florida ranked 3rd nationally for solar installed capacity<sup>vii</sup> and most of the growth in solar installation is due to utility investments in clean energy. Current options for the community to source renewable energy locally are through FPL's Solar Together Program, solar cooperatives, solar leasing, or independently installing solar systems at buildings. Solar installations will have to dramatically increase to meet buildings' energy needs.



TARGETS

- Install 61,725 kW of solar energy by 2030 on County buildings equivalent to 12,200 homes' electricity use for one year
- Install 722,000 kW of solar energy by 2030 on commercial buildings equivalent to 94,600 homes' electricity use for one year
- Install 134,000 kW of solar energy by 2030 on residential buildings equivalent to 26,500 homes' electricity use for one year



CO-BENEFITS

- Grow the economy
- Create jobs
- Save money
- Lower energy burden
- Storm and energy resilience
- Clean air



BOLD ACTIONS

- Install solar on as many County buildings, open lands, and lakes as possible
- Support installation of 850,000 kW of solar on private homes and businesses



KEY FACTS

- In 2020 Florida ranked 3rd nationally for solar installed capacity
- At the State level, solar generates 3.03% of electricity<sup>viii</sup>

**APPROACH 2:**

## **EXPAND ON-SITE AND OFF-SITE RENEWABLE ENERGY GENERATION**

In 2020 Florida ranked 3rd nationally for solar installed capacity and most of the growth in solar installation is due to utility investments in clean energy. Current options for the community to source renewable energy locally are:

- Solar Together program: A voluntary community solar program that will provide FPL customers the opportunity to support renewable energy while also experiencing the economic benefits in the form of monthly bill credits
- Solar Cooperatives (Co-ops): In June 2017, the Miami-Dade County Board of Commissioners passed a resolution in support of solar purchasing cooperatives<sup>x</sup>. These cooperatives, run by nonprofits such as Solar United Neighbors, facilitate lower pricing through bulk purchasing of solar photovoltaic equipment and contractor pricing
- Residential solar leasing: Approved by the Public Service Commission in 2018, it allows to lease solar equipment thus removing the barrier of high up-front cost
- Independently installing solar systems at buildings

Miami-Dade County has registered for the Solar Together Program which will offset up to 25% of the County's electricity usage from renewable sources and save \$7 million over 10 years. Moreover, in collaboration with RMI and WRI, the County initiated a Feasibility Study in 2019 to install solar panels on County buildings. The second phase of the study will narrow down the current list of 238 County buildings, based on structural consideration, roof condition, potential kW generation, and other factors.

Compared to other states, Florida does not have a Renewable Portfolio Standard (RPS) which requires utilities to meet a certain percentage of their electricity sales through qualifying renewable energy credits. Moreover, Community Choice Aggregation (CCA) and Purchasing Power Agreements (PPAs) are not allowed in the State. PPAs allow a third-party, such as a Renewable Energy (RE) developer, to build, own, and operate a RE system on behalf of a host customer. This model enables customers to avoid the upfront costs of distributed Renewable Energy (RE) installation and it allows tax-exempt entities (e.g., governments and non-profits) that do not have access to federal and state tax credits to leverage these incentives. CCA is a state policy that allows municipalities to select an electricity provider on behalf of their residents, businesses, and municipal accounts.

One innovative project has been the installation of floating solar, which is a solar array floating on bodies of water. The County's first installation is in partnership with the local utility, Florida Power and Light (FPL), at the Blue Lagoon next to Miami International Airport. The half-acre, 402-panel floating solar array, generates 160 kilowatts of power, and prevents 165 tons of carbon dioxide emissions each year.<sup>x</sup>



### APPROACH 3:

## BUILD ULTRA-LOW ENERGY BUILDINGS



New construction built today will last several decades. Since 2010 in Miami-Dade County, an average of 10.5 million square feet of floor space was added while the average increased to 13.9 million square feet from 2015 to 2019<sup>xi</sup>. Thus, incorporating energy efficiency in the design phase is essential to lock in energy savings from year one. Although retrofits are possible, it is cheaper to design structures that have energy conservation features holistically integrated into the building where all the various building systems work in synergy. Extremely efficient structures are called Ultra-Low Energy (ULE) or Zero Energy Buildings (ZEB). New construction has to transition towards ULE or ZEB standards by 2030.



#### TARGETS

- Reduce the energy use intensity of new buildings 20% by 2030 below 2020 levels



#### CO-BENEFITS

- Save money
- Lower energy burden
- Clean air
- Improve health
- Storm and energy resilience
- Reduce heat



#### BOLD ACTIONS

- Have 50% of new buildings meet Ultra-Low Energy performance goals by 2030



#### KEY FACTS

- Since 2010, an average of 10.5 million square feet of floor space was added while the average increased to 13.9 million square feet for the last five years, from 2015 to 2019
- The 2021 International Energy Conservation Code, the basis for the Florida Building Code, improved efficiency for residential and commercial buildings by 10% compared to the previous version<sup>xii</sup>

**APPROACH 3:****BUILD ULTRA-LOW ENERGY BUILDINGS**

New construction built today will last for decades. Since 2010, an average of 10.5 million square feet of floor space were added while the average increased to 13.9 million square feet for the last five years, from 2015 to 2019. Thus, incorporating energy efficiency in the design phase is essential to lock in energy savings from year one. Although retrofits are possible, it is cheaper to design structures that have energy conservation features holistically integrated into the building where all the various building systems work in synergy. The goal is to have new construction be Ultra-Low Energy (ULE) or Net Zero Energy.

Communitywide, new construction follows the Florida Building Code (FBC) which is updated on a 3-year cycle, and dictates efficiency standards. The FBC is based on the International Energy Conservation Code, which in its latest update, improved efficiency for residential and commercial buildings by 10% compared to the previous version.

All new construction or major renovations of County-owned –financed or -operated buildings have to comply with the County's Sustainable Building Program (SBP). Initially implemented in 2005, the SBP requires new construction that is owned, leased, or financed by Miami-Dade County to attain the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver certification, and major and non-major renovations to attain LEED Certified status. The USGBC LEED certification is the leading program in the nation for green buildings and communities. Since its inception, 23 SBP-qualifying projects achieved LEED certification, and there are over 2.8 million square feet of new or renovated "green" space currently planned for the County (41 qualifying projects spanning 8 departments). This translates to energy savings of around \$28 million over the next 20 years and a reduction of around 420 million lbs. CO<sub>2</sub>e.

Further, in 2020, the Miami-Dade County Office of Resilience proposed changes that would expand the Sustainable Buildings Program to include certification under the Institute for Sustainable Infrastructure (ISI) Envision certification for qualifying County infrastructure projects. In the revision, OOR addresses projects that qualify for the Sustainable Buildings Program but cannot meet LEED requirements, as well as project types not currently covered under the SBP.











# LAND USE & TRANSPORTATION



**APPROACH 4:  
REDUCE TRANSPORTATION-RELATED FUEL CONSUMPTION**



**APPROACH 5:  
EXPAND AND PROTECT GREEN AND BLUE SPACES**



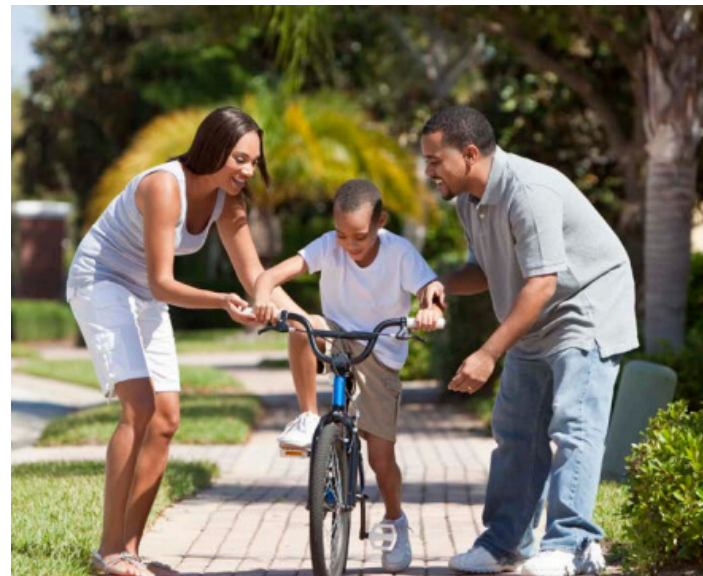


# LAND USE AND TRANSPORTATION

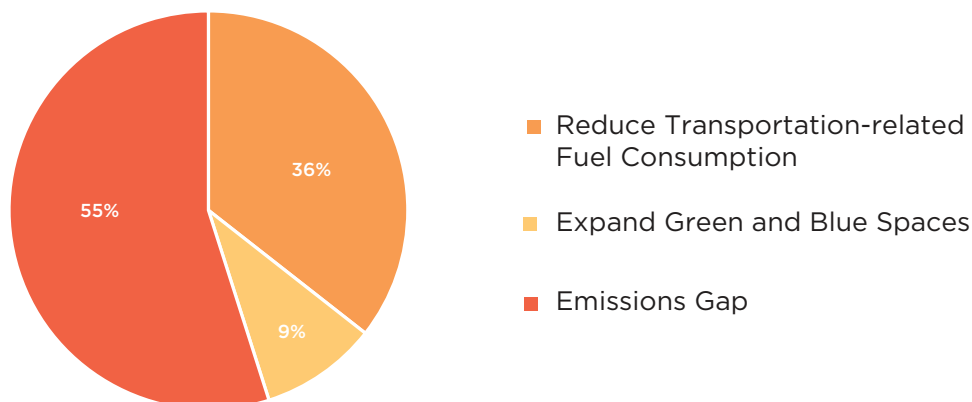
How land is used in Miami-Dade is important. Where people live and work determines their commuting patterns and also often affects transportation choices. How people get around and their method of transportation also drives half (55%) of our communitywide greenhouse gas emissions and is a source of other air pollutants. Transportation-related emissions result primarily from burning fossil fuels to power cars, trucks, planes, boats and ships, and related heavy or mobile equipment. Because transportation is a key economic driver, there are typically many municipal, county, state, and federal stakeholders involved in transportation decisions, such as the U.S. and State of Florida Departments of Transportation, and municipal and County transportation agencies. In Miami-Dade, the Comprehensive Development Master Plan (CDMP) guides land use and the Miami-Dade Transportation Planning Organization (TPO) Governing Board prioritizes transportation improvement projects for federal, state, and local funding.

Greenhouse gas emissions, such as those linked to transportation, can be partially offset by protecting and expanding land uses that are dedicated to natural areas, both on land and along our coast. Wetlands, seagrass, trees, and even some farms can absorb and store carbon a societal benefit that is garnering more recognition.

While intricately linked, transportation, land use, and air quality considerations are often not equally prioritized and properly integrated into decision-making. Identifying and implementing strategic transportation and land use solutions that have economic, social, and environmental benefits can be very complex, and is critical to helping us address the current climate change crisis.



**Land Use & Transportation Reductions by 2030**  
(10 million metric tons of CO<sub>2</sub>e)



## APPROACH 4:

# REDUCE TRANSPORTATION-RELATED FUEL CONSUMPTION



Reducing transportation-related fuel consumption will have the largest single impact on communitywide emissions in Miami-Dade County and requires multiple strategies. These strategies include reducing vehicle and mobile equipment usage, expanding effective low-carbon mobility options, accelerating the electrification of vehicles and equipment and prioritizing those powered by renewable energy, and cutting emissions from our port, airports, and other commercial hubs. Luckily, these are all propositions with multiple long-term economic, health, and climate benefits.



### TARGETS

- 10% mode shift away from single occupant vehicles by 2030
- Electrify the County fleet: 80% of light vehicles and 50% of buses by 2030
- Shift 30% of communitywide vehicles to electric power by 2030
- Reduce greenhouse gas emissions from Airport and PortMiami operations by 50% and 25%, respectively



### CO-BENEFITS

- Increase productivity
- Save money
- Clean air
- Emergency backup power
- Grow the economy
- Reduce traffic
- Improve health
- Create jobs
- Reduce crashes
- Reduce noise



### BOLD ACTIONS

- Accelerate the SMART Plan Transit expansion with first and last mile micro-mobility networks that prioritize pedestrians along each transit corridor
- Build a comprehensive network of protected bike lanes countywide integrated with transit corridors
- Install a robust, geographically dispersed, and equitable EV charging network that is EnergyStar certified and uses a renewable energy



### KEY FACTS

- Almost 50 % of Miami-Dade County's approximate 900,000 households have zero or limited access to a car; 10% of households have no car and 38% have only one car
- As of 2018, the average commuter in Miami-Dade loses more than 100 hours of productive time to congestion each year, and this costs roughly \$4 billion in lost economic output<sup>xiii</sup>
- Most electric vehicles (EV) are charged at home 80% of the time.
- Electric vehicles save the average Florida owner \$763 to \$1,259 every year, compared to a gas vehicle<sup>xiv</sup>



**APPROACH 4:**

## **REDUCE TRANSPORTATION-RELATED FUEL CONSUMPTION**

### **REDUCE VEHICLE AND MOBILE EQUIPMENT USAGE**

Land use development patterns and zoning impact the amount of time necessary to travel to obtain goods and services. For example, when development is spread widely across a geographic area, people need to travel farther to get to work or run errands. As of 2018, among large metro areas, Greater Miami had the 12th-worst traffic congestion and the 13th-longest commute time in the United States.<sup>xv</sup> Traffic, operational conditions, or business protocols can all lead to idling of vehicles, vessels, aircraft and other equipment, resulting in air pollution, wasted fuel, and excess engine wear. Reduced idling can therefore have many benefits, such as preventing riders from being exposed to diesel exhaust, reducing emissions, and saving money due to reduced fuel purchases.

#### **Actions to reduce vehicle and mobile equipment usage:**

- Design an Alternative Workplace Solutions policy and program for Miami-Dade County to maintain and expand the number of employees who telecommute and explore methods to encourage other large employers to implement telecommuting
- Double the utilization of roundabouts instead of traditional street intersections
- Facilitate infill, compact, and mixed-use redevelopment
- Build transit-oriented developments
- Encourage the use of fuel-efficient landscaping and gardening equipment

### **EXPAND EFFECTIVE LOW-CARBON MOBILITY OPTIONS**



Nearly half of Miami-Dade households have limited or no access to a private car. The Covid-19 crisis added new uncertainty to residents' transportation options, especially for public transportation. Expanding the mix of reliable, safe, and convenient low-carbon transportation options, including public transit, bicycling, walking, and micro-mobility (e.g. electric scooters) can increase the shift away from driving and is critical to ensure the economic and social well-being of all Miami-Dade residents. These options reduce the number of vehicles on crowded roads and cut air pollution, directly improving health in communities.

#### **Actions to expand effective low-carbon mobility options:**

- Implement the Miami-Dade 2045 Bicycle/Pedestrian Master Plan
- Develop and implement a pedestrian prioritization plan
- Implement Complete Streets and Vision Zero programs
- Rapidly deploy Bus Rapid Transit (BRT) and other public transit solutions along SMART plan corridors to increase service frequency and ridership

## ACCELERATE ELECTRIC VEHICLE ADOPTION

Economic forces increasingly point to a future where electric vehicles (EVs) are the standard. Every year, prices for EVs drop, the variety of models expands, and the number of charging stations increases. Right now, electric cars are cheaper to fuel (charge) and maintain than traditional vehicles that use fossil fuels.<sup>xvi</sup> Policies and programs that accelerate EV adoption in Miami-Dade County will create new industries and prepare us for a true low-carbon future once vehicles are charged by renewable energy sources. Methodologies for fostering vehicle electrification differ based on the two main types of vehicle owners/users: either the general public or large fleet owners, typically businesses or governments.

### Actions to Electrify the County Fleet:

- Complete a fleet electrification analysis and transition plan to rapidly replace County-owned fossil-fuel vehicles (e.g., cars, light- and heavy-duty trucks, public buses, police vehicles) with battery-electric vehicles (BEVs)
- Modify procurement methodologies to account for lifetime operational and maintenance cost savings
- Complete an assessment of County facilities to determine where to install EV charging infrastructure
- Find funding to modify facilities to install charging infrastructure, prioritizing charging infrastructure that is EnergyStar certified and use a renewable energy power source

### Actions to Accelerate Community Electric Vehicle Adoption:

- Partner with EV charging companies to expand public charging infrastructure
- Enforce and expand ordinances that require public charging infrastructure
- Create a plan and find funding to ensure County-financed chargers for public access are equitably distributed throughout the community and are ADA compliant so everyone, including renters, low-income residents, and people with disabilities, have access to affordable and convenient charging
- Expand public charging infrastructure at County parking facilities, prioritizing charging infrastructure that is EnergyStar certified and use a renewable energy power source



## CUT EMISSIONS FROM SEAPORTS, AIRPORTS, AND INDUSTRIAL VEHICLES

PortMiami and Miami-Dade Airports, anchored by Miami International Airport (MIA), have helped make South Florida an international gateway to the world, where successful movement of freight and passengers allows tourism and commerce to thrive. Our local ports also create hundreds of thousands of jobs. At the same time, our planes, port trucks, trains, cargo-handling equipment, and ships use a lot of fuel. In fact, emissions from jet fuel consumption at Miami International Airport represent nearly a quarter of all emissions in Miami-Dade County alone. Diesel engines are also common at our ports and emit significant amounts of air pollution, especially older engine models, that impact human and earth-system health and therefore lead to climate change and economic disruption.

U.S. ports and the large commercial companies they serve have started to pursue aggressive strategies to reduce greenhouse gas emissions. By rapidly addressing the challenges of climate change, Miami-Dade County ports can demonstrate leadership in the emerging low-carbon economy while serving as an incubator for best practices that will ensure continued economic health and competitiveness.

### **Actions to Reduce Emissions at PortMiami, Airports & Other Commercial Hubs:**

- Set cumulative goals to develop efficient fueling infrastructure, facilities, and operations within PortMiami and MIA facilities, following best practices from the EPA National Port Strategy Assessment and ACI's Airport Carbon Accreditation program.
- Support fuel reductions through: replacing older diesel fleets and equipment; operational improvements to idling; switching to renewable, electric, or hydrogen fuels; routing and delivery efficiencies; and behavioral and educational efforts.





## APPROACH 5:

# EXPAND AND PROTECT GREEN AND BLUE SPACES



Land use programs and policies in Miami-Dade County that maintain healthy natural resources help address climate change. Miami-Dade County is internationally recognized for its natural areas, including its coastal and freshwater wetlands, marshes, hardwood hammocks and globally-imperiled pine forests. Biscayne Bay and The Everglades are such unique ecosystems that two National Parks, a National Marine Sanctuary, Florida aquatic preserves and water conservation areas have been established within Miami-Dade. This is the only place in the U.S. where this occurs in a single county. These land and marine ecosystems can absorb and store carbon dioxide, a greenhouse gas, and can also reduce other types of pollution <sup>xvii</sup>. Coastal habitats absorb carbon at a rate ten times greater than mature tropical forests. They also store three to five times more carbon per equivalent area than tropical forests. While agriculture does not maintain ecosystems in their natural state, regenerative agricultural practices can be utilized to enhance carbon storage in the soil, and tree canopy increases shade and cooling, and reduces urban heat.

Many stakeholders in Miami-Dade County work through regulation, monitoring, habitat restoration and acquisition, and management of natural and agricultural areas to protect, maintain, and enhance blue and green spaces and the benefits they provide.



### TARGETS

- 30% community tree canopy coverage by 2030 and 50% for County properties outside Urban Development Boundary (UDB)
- Expand acres covered by healthy seagrass in Biscayne Bay by 2030



### CO-BENEFITS

- Create jobs
- Recreation and tourism
- Reduce storm damage
- Reduce flooding
- Clean water
- Clean air
- Reduce heat
- Improve health
- Supply food



### BOLD ACTIONS

- Continue to invest in the preservation and restoration of fresh and saltwater wetlands, restore seagrass meadows, and partner on Everglades restoration projects
- Expand the urban tree canopy to achieve 30% coverage countywide



### KEY FACTS

- Coastal habitats store more carbon per unit area than terrestrial forests <sup>xviii</sup>
- A single mature and healthy tree can absorb carbon dioxide at a rate of 48 pounds per year and release enough oxygen into the atmosphere to support four human beings <sup>xix</sup>
- In the last 200 years, Florida lost an estimated 9.3 million acres of wetlands through drainage and conversion to other uses, the most acreage lost in the continental United States <sup>xx</sup>

**APPROACH 5:****EXPAND AND PROTECT GREEN AND BLUE SPACES**

Marine and coastal habitats (blue) and terrestrial natural areas (green) help remove carbon dioxide gas pollution from our atmosphere, which helps to slow down or reverse climate change and related impacts. There are two main ways that natural areas can reduce carbon dioxide levels over the long-term.<sup>xxi</sup>

- Carbon sequestration — absorbing or capturing carbon dioxide from the atmosphere.
- Carbon storage — the long-term confinement of carbon in plant materials or sediment. Areas or habitats with carbon storage are sometimes also referred to as carbon sinks.

Mangroves, wetlands, and seagrass are essential to reducing climate change and associated negative climate change impacts such as rising temperatures and sea levels. Eighty-three percent of the global carbon cycle is circulated through the ocean, and coastal habitats account for half of the total carbon sequestered in ocean sediments despite their small area.<sup>xxii</sup> A 2011 study found that urban forests, trees, and parks in Miami-Dade County, sequester over 550,000 metric tons of carbon (over 2 million tons CO<sub>2</sub>e) every year.<sup>xxiii</sup> Shade from urban tree cover also reduces cooling costs, saving residents and businesses money on air conditioning costs, while reducing the need for additional energy production.

Maintaining natural areas has a tremendous amount of co-benefits. They lead to greater community health by increasing opportunities for exercise and recreation and have been demonstrated to reduce stress and the risk of heart disease.<sup>xxiv</sup> These natural resources also help keep our soil, air, and water cleaner, which also provides significant health and economic benefits. Natural resources also increase property values and economic vitality in the tourism, fisheries, farming, and recreational sectors.

Current Miami-Dade County programs, led by multiple departments, help maintain ecosystems that protect against climate change by absorbing and storing carbon. In addition to coordinating and implementing Comprehensive Everglades Restoration projects, the County also manages programs for Environmentally Endangered Lands, Natural Forest Communities protection, ecosystem restoration and enhancement, and urban tree canopy restoration, including Adopt-a-Tree. Unfortunately, it is very time-consuming and difficult to estimate ecosystem acreage and functionality loss or restoration, and therefore also difficult to calculate carbon absorption and storage benefits, which vary per ecosystem type.

**Additional actions that would expand and protect blue and green spaces in the future may include:**

- Increase urban tree canopy coverage to 30% communitywide, and to 50% for all County properties outside the Urban Development Boundary.
- Update regulations to protect specimen trees.
- Restore historically-filled, County-owned coastal wetland areas whenever possible.
- Restore habitats of seagrass and submerged aquatic vegetation whenever possible.
- Prioritize acquisition by Miami-Dade County and its partners of wetlands necessary for implementation of the Comprehensive Everglades Restoration Plan, and within an Environmentally Endangered Lands acquisition footprint.



- Improve implementation and enforcement of County environmental regulations to reduce net loss of wetland area and function within Miami-Dade County.
- Improve use of appropriate vegetative material removed from natural areas on County-owned lands and Environmentally Endangered Lands (EEL) as mulch and make it available to the public free of charge.
- Improve protection and management of Miami-Dade County properties that qualify as environmentally endangered, or as natural forest community, by transferring appropriate areas/land to the Environmentally Endangered Lands Program (EEL).
- Require landscape re-certification every 5 years for maintenance of landscaping within 300 feet of a canal feature that flows into Biscayne Bay.
- Conduct feasibility studies consistent with existing resource protection requirements for carbon sequestration of shellfish, sponge, and macro-algaculture industries.
- Develop and adopt a strategy to expand local forests in Miami-Dade County through inter-agency partnerships.
- Develop a policy, based on area impacted, to ensure that County-approved development results in a net increase to green infrastructure by the development's completion date.











# WATER & WASTE



## APPROACH 6: CONVERT WASTE TO ENERGY



## APPROACH 7: REDUCE WASTE AND WATER USE

EMISSIONS FROM WATER & WASTE

4%

# WATER AND WASTE

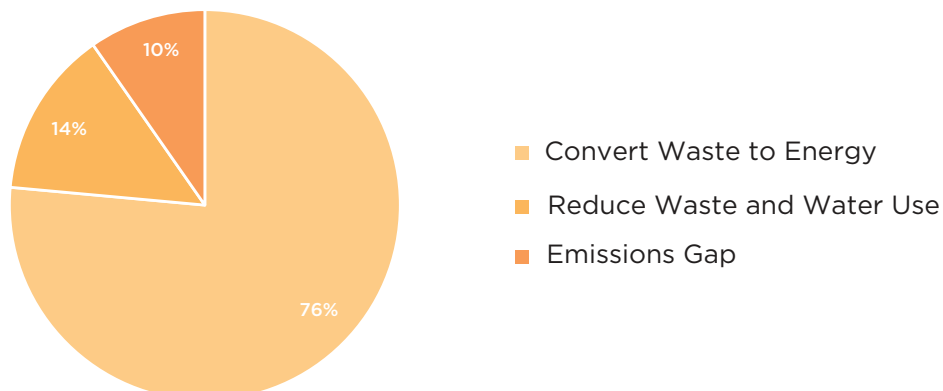
Water and waste generate about 4% of emissions in Miami-Dade County. Everyone in the community contributes to these emissions. The average person in Miami-Dade produces over 1 ton of garbage a year and 140 gallons of water per day. Emissions from waste have grown since 2014 as the amount of garbage burned in the County's Resources Recovery Facility has decreased and recycling rates have fallen in half. The cheapest way to cut these emissions is by using less water and making less waste. Good waste and wastewater management saves money. The typical American family throws about \$1,500 worth of food every year!

Garbage and wastewater produce methane, one of the most potent greenhouse gases. Methane is also the primary component of natural gas and a valuable resource when captured and used to make electricity. Converting more waste to energy could cut emissions 20% by 2030.

Fact: Miami-Dade County can produce up to 77 megawatts (MW) of electricity by burning garbage at its Resource Recovery Facility, originally built in 1985.



**Water & Waste Reductions by 2030**  
(722,000 metric tons of CO<sub>2</sub>e)





## APPROACH 6:

# CONVERT WASTE TO ENERGY



Miami-Dade's Department of Solid Waste Management (DSWM) and Water and Sewer Department (WASD) are the largest providers of waste and water and wastewater services in the county. The services they provide are essential for community, environmental, and economic sustainability. For decades, both have burned waste to produce energy. By investing in new, more efficient facilities they could burn more waste, create more energy, and avoid harmful methane emissions.



### TARGETS

- 72 kWh of electricity from cogeneration at wastewater plants by 2030
- 50% of non-recycled garbage burned for energy by 2030



### CO-BENEFITS

- Save money
- Clean water
- Clean air
- Clean neighborhoods



### BOLD ACTIONS

- Replace the County's aging Waste to Energy Plant, incorporating renewable energy and leverage the energy generated to power a fleet of battery electric trash collection vehicles.
- Expand cogeneration at wastewater treatment plants to produce at least 9.6 megawatts of electricity from biogas
- Implement new wastewater technologies to increase energy efficiency and onsite energy production, such as plasma energy, onsite oxygenation, and conversion of biosolids to hydrogen energy



### KEY FACTS

- Methane heats up the atmosphere 40 times more than the same amount of carbon dioxide
- The County's Resource Recovery Facility can produce up to 77 megawatts of electricity
- Burning garbage reduces the volume of landfill trash 87%<sup>xxv</sup>

**APPROACH 6:****CONVERT WASTE TO ENERGY**

Miami-Dade County's Department of Solid Waste Management (DSWM) Resources Recovery Facility (RRF) burns up to 4,000 tons per day (tpd) of municipal solid waste, producing up to 77 megawatts of electricity. Approximately 22,000 tons of ferrous (steel) metal and 2,000 tons of non-ferrous (tin, copper) metal are recovered and recycled. Through a collaboration with the University of Florida, DSWM has determined it is feasible to use bottom ash produced at RFF that is currently landfilled in cement production.

DSWM's diesel fleet of trucks will be converted to electric as they become available, starting with tractor trailers and moving on to electric garbage trucks. Using electricity from the Resources Recovery Facility, electric garbage vehicles could ultimately be fueled by the very garbage they collect.

The Water and Sewer Department (WASD) and DSWM currently capture methane from wastewater treatment plants and landfills. Major upgrades to the systems at the Central and South wastewater treatment plants, and North Dade and South Dade Landfills in 2020-21, will improve collection and destruction or conversion to electricity used to run wastewater facilities. One way WASD plans to reduce its energy costs is by increasing the amount of energy produced from captured methane or biogas from 3.2 MW to 9.6 MW at 7,500 hours/year by 2030.



## APPROACH 7:

# REDUCE WASTE AND WATER USE



Making less waste and using less water is the easiest and cheapest way to reduce emissions. In Miami-Dade County each person produces 6 pounds of garbage and uses 140 gallons of water every day. Moving and processing that garbage and water takes a lot of electricity and fuel, which costs residents and businesses money. County programs can help. Community led initiatives and entrepreneurial innovation can have an even bigger impact by creating new businesses and jobs.



### TARGETS

- Reduce landfill waste per person 50% by 2030
- Reduce water consumption per person 30% by 2030



### CO-BENEFITS

- Save money
- Reduce infrastructure costs
- Clean air
- Clean neighborhoods
- Healthier bay
- Supply food



### BOLD ACTIONS

- Create a communitywide food rescue plan in collaboration with community-based organizations, businesses, and farmers
- Implement a construction and demolition waste reduction plan to cut landfill waste
- Reduce per-capita water consumption through water conservation programs and facility upgrades



### KEY FACTS

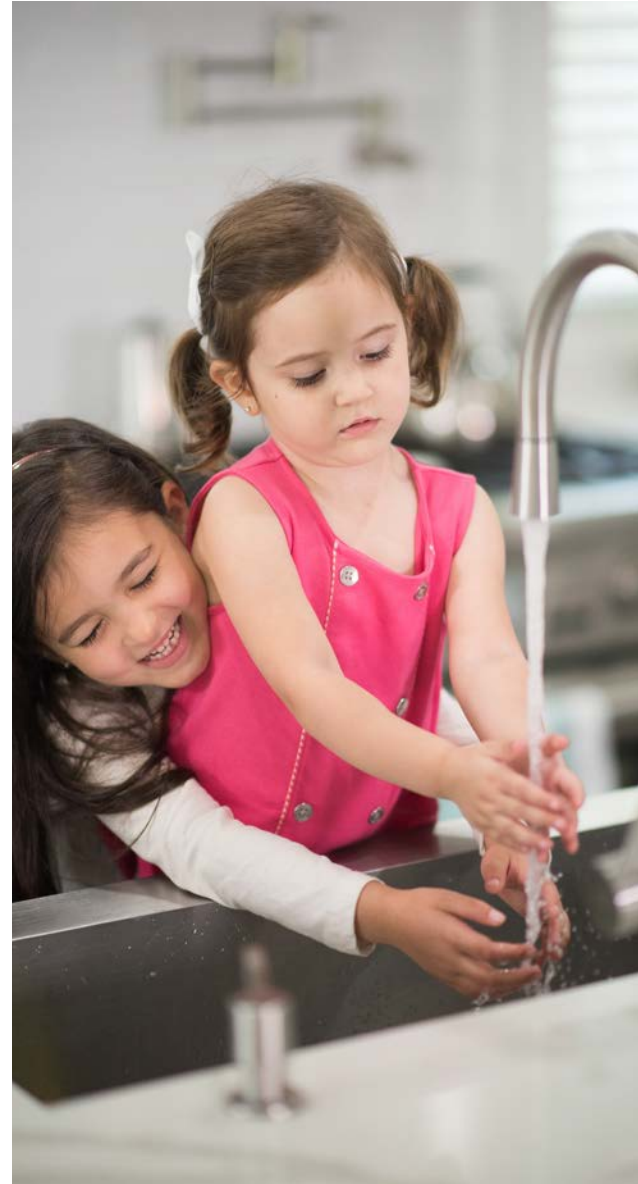
- Over 1/3 of food grown and prepared for people is thrown away
- Residents, businesses, and hotels can receive rebates from the County for installing a high efficiency toilet (\$50), showerhead (\$25 or free), or faucet (\$25 or free)
- Construction debris is 21% of waste in the County

**APPROACH 7:****REDUCE WASTE AND WATER USE**

Waste in Miami-Dade County comes from many sources: 25% is paper, 21% is from construction, 12% is metal, 11% is plastic, and 10% is food. Different tactics are needed to reduce each. Food is one area with a lot of potential. Over 1/3 of food is never eaten, and nearly 10% of people in Miami-Dade are food insecure – don't have enough to eat. In communities like Denver, Baltimore, and Alameda County local governments have teamed up with community partners to rescue food waste before it is thrown out. For more information check out NRDC's Food Matters program.

Miami-Dade County's Water and Sewer Department (WASD) is the largest water utility in the Southeastern United States. It provides water and wastewater services to most residents in the county either directly or as a wholesale supplier to 15 municipalities. The Water Use Efficiency Plan has reduced daily water use by 14 million gallons per day, saving energy and infrastructure costs and reducing customer bills. WASD's water conservation program provides rebates to residents and businesses for high efficiency toilets, faucets, and shower heads. It also provides landscaping tips and rain barrels.

Construction and demolition (C&D) waste is the material left over when buildings and infrastructure are torn down or constructed. Miami-Dade's development driven economy creates a lot of C&D waste like concrete, plaster, and metal. Unfortunately only 14% is recycled or reused. Best practices like requiring a waste management plan before demolition of a building could help and create new jobs in deconstruction and recycling.<sup>xxvi</sup>





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