



MIAMI FOREVER CARBON NEUTRAL

*City of Miami Greenhouse Gas Reduction Plan
and Pathway to Carbon Neutrality by 2050*



[EXECUTIVE
SUMMARY]

MIAMI FOREVER CARBON NEUTRAL is the City's Greenhouse Gas Reduction Plan (GHG Plan) and is a roadmap to achieve carbon neutrality by **2050** in the community, strengthen the local economy, and enhance climate justice. This Plan is focused on rapidly decreasing greenhouse gas emissions from sources within City of Miami's jurisdiction, aiming to achieve a minimum 60% reduction in emissions from 2018 levels by 2035 and setting the City up to get as close to zero emissions as possible. The plan is based on five overarching goals that support a GREEN Miami and achievement of the City's GHG reduction targets:

G - GETTING AROUND MIAMI

Objective: 15% shift away from private vehicle trips compared to 2018 levels by 2035

R - RENEWABLE ENERGY

Objective: 100% carbon-free electricity by 2035

Objective: 35% reduction in natural gas emissions compared to 2018 levels by 2035

E - ELECTRIC VEHICLES

Objective: 40% of registered passenger vehicles are electric by 2035

E - ENERGY EFFICIENCY

Objective: Improve energy efficiency in buildings to decrease overall energy consumption and support achievement of Goal 2: Renewable Energy

N - NEW ECONOMY

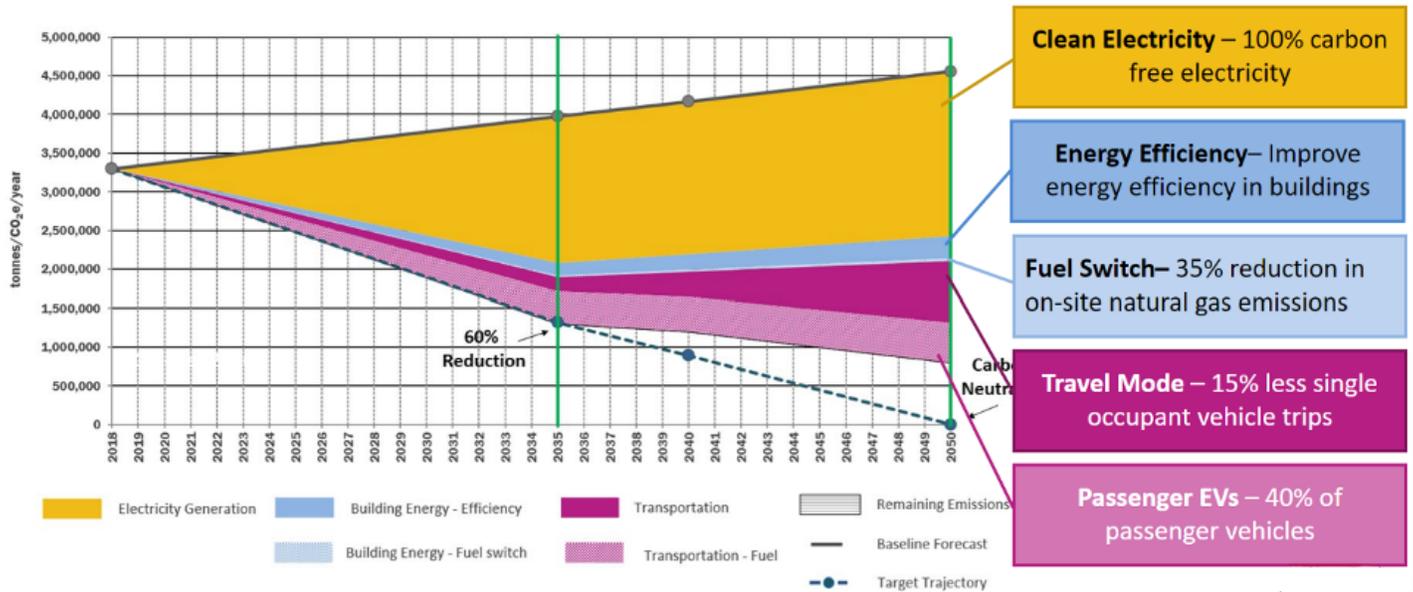
Objective: Grow the Green Economy Ecosystem

Objective: Recruit and Retain Green Workforce

Objective: Open Occupational Pathways

Objective: Welcome and Support Green Industry

GREEN actions will not only reduce GHG emissions but also build a new green economy!

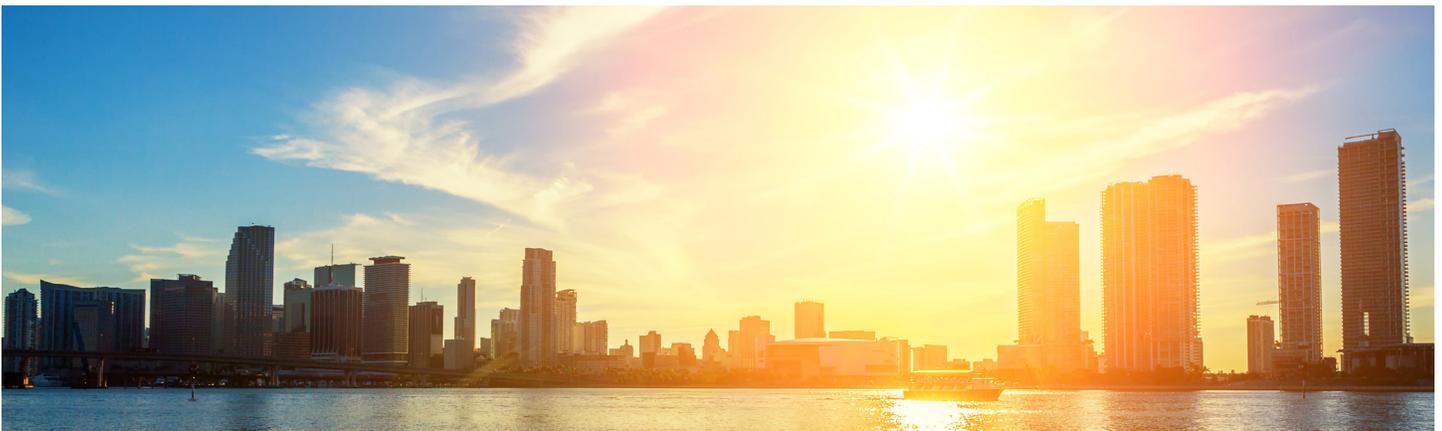
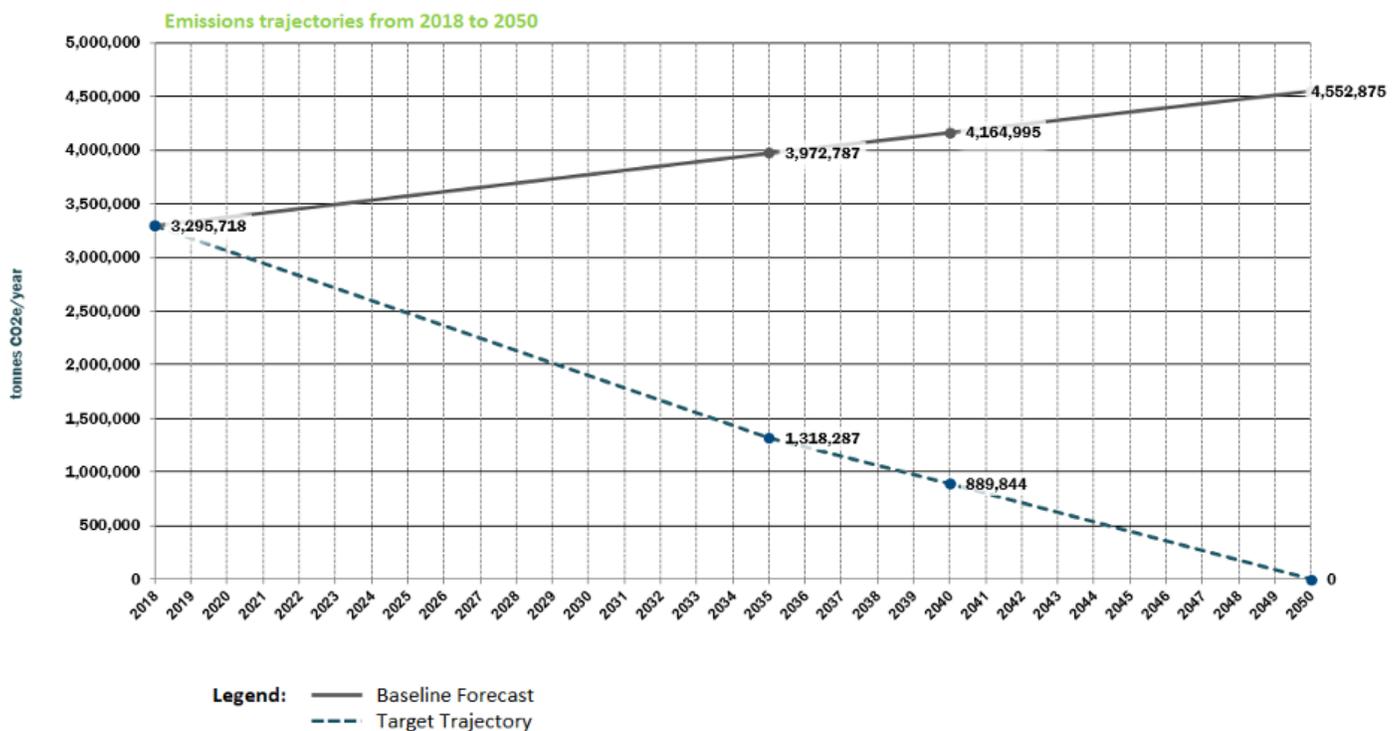


THE CASE FOR ACTION

Human-caused GHG emissions from activities like burning fossil fuels to produce electricity or driving our cars are the primary contributors to global climate change. 70% of global carbon dioxide emissions (the primary human-caused greenhouse gas) come from cities, which means local governments must be leaders in their commitment to ambitious actions that drastically reduce emissions to avoid the worst impacts of climate change.¹ Miami is a low-lying, subtropical, coastal city, which makes it susceptible to flooding due to sea level rise, impacts from intensifying tropical storms, and extreme heat.² This confluence of factors paired with population density and exposed assets makes greater Miami one of the most vulnerable areas to climate change in the world.

The chart below shows the city's GHG forecasts (top line) and GHG targets (bottom line); the gap between the two lines represents the amount of GHG reductions needed to achieve the targets. If the City does nothing, our annual emissions will increase by roughly 1 million MT CO₂e by 2050. However, with dedicated efforts and investments to climate adaptation and carbon mitigation, Miami can combat these climate challenges and create a resilient and sustainable city for all.

Miami's GHG Forecasts and Targets



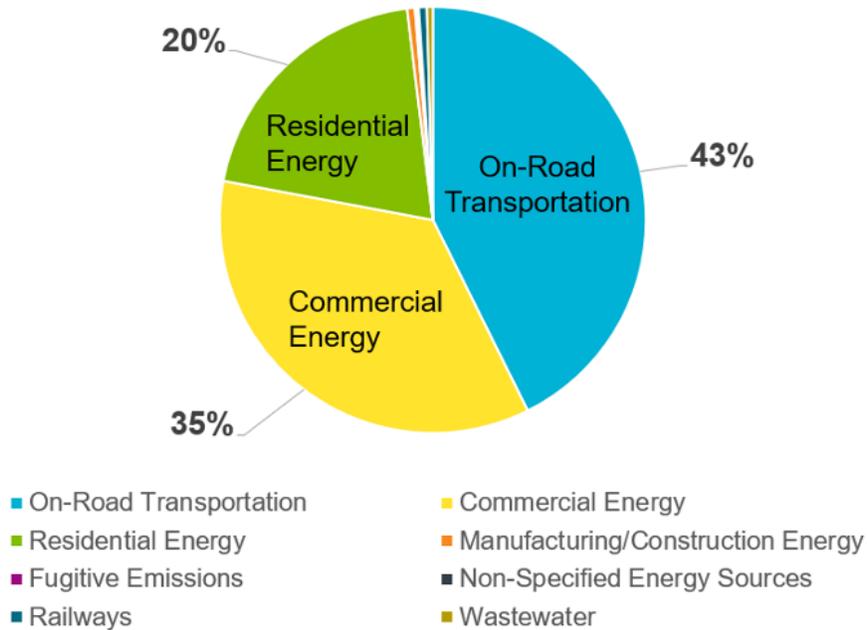
¹ https://www.c40.org/why_cities

² More details on Miami's vulnerabilities can be found in *Resilient305* and *Miami Forever Climate Ready*

MIAMI'S 2018 GHG INVENTORY

Citywide emissions totaled approximately 3.3 million MT CO₂e in 2018, and as shown in Figure 2.1 the majority came from on-road transportation (e.g., cars and trucks), commercial building energy use (e.g., stores and offices), and residential building energy use (e.g., homes and apartments). The remaining 2% of emissions came from light rail operations, energy use in manufacturing, fugitive emissions from natural gas distribution³, and wastewater treatment plant activity.

Figure 2.1 - Miami's 2018 Base Year Inventory



³Fugitive emissions in the City's inventory are attributed to leaks within the natural gas transmission and distribution system. Methane is the largest component of natural gas and is a potent greenhouse gas - 28 times more powerful than carbon dioxide at trapping heat in the atmosphere over a 100-year timeframe.



GREENHOUSE GAS REDUCTION ACTIONS

The list below presents all greenhouse gas reduction actions. Actions that are bolded and highlighted in green are the City's prioritized actions. Actions that have been noted with "\$\$" have green economy opportunities.

G = Getting around Miami
R = Renewable Energy
EV = Electric vehicles
E = Energy efficiency
NE = New green economy
A = Additional enabling actions

G-2: Collaborate with Miami-Dade County and local advocacy groups to increase utilization of biking as a transit method by implementing the Bicycle Master Plan and expanding the number of protected, green bikeways. \$\$
G-3: Expand micromobility options throughout the entire city including Citibikes, scooters, and electric bikes. \$\$
G-4: Develop a Trolley Master Plan including a long-term vision for the program and route updates. \$\$
G-5: Build upon existing transit-oriented development policies in Miami21 to increase residential density, access to goods and services, and decrease single-occupancy vehicle use focusing on areas surrounding Metrorail stations.
G-6: Establish parking disincentives, such as parking maximums and dynamic parking prices, to discourage the use of single occupancy gas vehicles.
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G-7: Adopt transportation demand management ordinance to require certain employers and developers to establish plans to reduce single-occupant vehicle use and traffic during peak hours among employees and residents.
G-8: Work with partner entities to create bus lanes in strategic, key corridors. \$\$
G-9: Work with Miami-Dade County and local advocacy groups to increase utilization of public transit through investments in safety, improving public transit literacy, and campaigns.
G-10: Improve pedestrian experience and safety through investments in sidewalks such as ADA compliance measures and increasing number of crosswalks, especially in low-medium income areas. \$\$
R-1: Starting in 2024, require all new buildings to be solar-ready and storage-ready.
R-2: Join FPL SolarTogether program to purchase City's building electricity from solar.
R-3: Promote community participation in FPL SolarTogether program, especially among renters, to purchase 100% of their electricity from solar.
R-4: Provide additional policy and financial incentives to encourage private solar installations and identify incentives that would appeal to owners of affordable housing. \$\$
R-5: Install solar and storage in public buildings or parking structures where feasible, prioritizing critical facilities.
R-6: Partner with community organizations such as local non-profits, trade organizations, and electric and gas utilities, to develop a building electrification education program to provide information and technical assistance. \$\$

E-1: Implement Building Efficiency 305 (BE305) program requiring energy benchmarking and disclosure for commercial, multi-family residential, and City of Miami municipal buildings over 20,000 sq. ft. \$\$
E-2: Improve public benefits and green buildings tracking to increase program participation and impact.
E-3: Require all new public buildings to be built to zero net energy standards starting in 2025.
E-4: Adopt a residential, single-family home energy rating and disclosure ordinance. \$\$
E-5: Adopt building performance standard for commercial, multi-family residential, and City of Miami municipal buildings over 20,000 sq. ft. \$\$
E-6: Establish residential, single-family home energy conservation requirements. \$\$
E-7: Develop energy reduction targets for City of Miami municipal buildings.
E-8: Provide incentives for construction firms to use locally-sourced materials with low-embodied carbon and high-efficiency fixtures.
E-9: Make all non-emergency energy use in existing public buildings carbon-free by 2035. Explore and adopt as much carbon-free emergency energy generation and storage as possible.
NE-1: Work with regional partners to identify a regional green economy champion and align resilience and adaptation goals.
NE-2: Dedicate staff to support green economic development goals and implementation of the GHG Plan.
NE-3: Develop a plan for expanded, permanent economic development capacity.
NE-4: Develop green economy performance metrics.
NE-5: Offer relevant job trainings through the Opportunity Center and connect job seekers to local employers.
NE-6: Expand the Miami Summer Jobs Connect program to include internships that align with the new green economy.
NE-7: Strengthen the City's procurement requirements so that green and sustainable are not only the preferred option, but the required option.
NE-8: Facilitate expedited design and permitting review of projects that will achieve Miami's GHG and resilience goals.
NE-9: Preserve or enhance zoning that supports green industries.
A-1: Improve city data on waste streams and disposal. Establish a per capita waste goal.
A-2: Train City employees on emerging resilient and sustainable buildings initiatives and technologies including solar PVs, energy storage, EV charging, energy efficiency, electrification, and climate adaptation policies.
A-3: Implement green and sustainable special events program.
A-4: Train City staff on climate change.
A-5: Work with existing advocacy organizations and non-profits to improve citywide climate literacy and awareness.
A-6: Improve recycling participation and reduce contamination.
A-7: Work with community composting organizations to increase household composting.
A-8: Help restaurants and businesses reduce their waste stream by connecting them with resources to reduce single-use plastic, integrate composting, and recover and redistribute surplus food.
A-9: Lobby for climate-forward policies at the state and federal level.
A-10: Advocate for climate-forward policies from FPL that support carbon-free energy at scale and energy efficiency.
A-11: Develop a financial and technical assistance program that helps residents, particularly low-income, to pursue climate action. \$\$
A-12: Establish construction and demolition waste diversion requirements.
A-13: Develop end-of-life requirements for solar PV and other relevant renewable energy technologies, including battery storage.

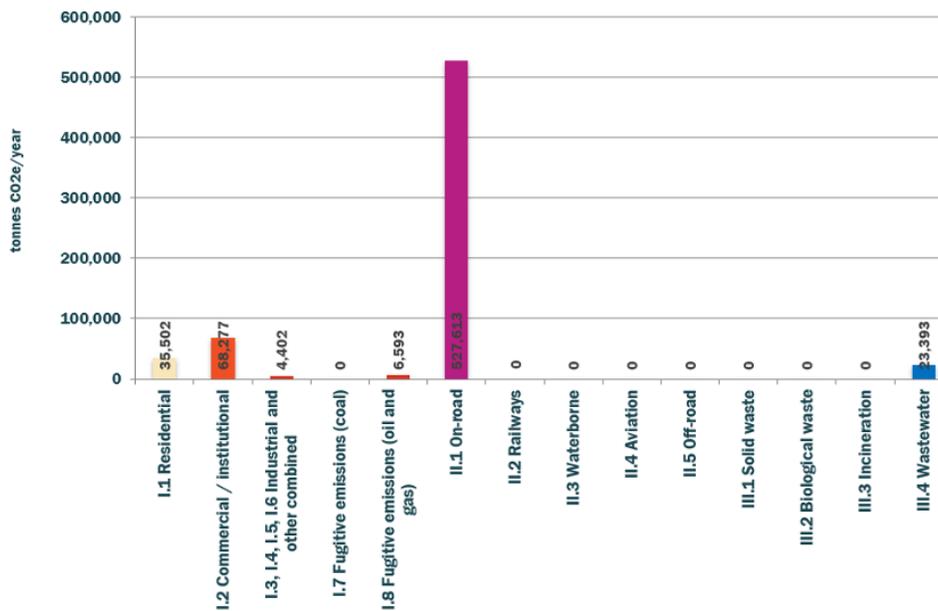
REMAINING EMISSIONS IN 2050

Remaining Emissions Sources

Miami's GHG Plan maximizes efforts to deliver emissions reductions from the city's largest emissions sources, including building energy use, transportation, and the electric grid. Other cities aiming for carbon neutrality like Miami typically do not demonstrate a pathway to zero carbon emissions in their plans, but instead show how to reduce local emissions to the maximum extent feasible. There are technological, regulatory, economic barriers, or other barriers that currently prevent eliminating 100% of carbon emissions. Instead, cities will balance their remaining emissions with different strategies like carbon sequestration or carbon capture and storage. Based on the city's emissions forecasts and the GHG actions presented in this plan, we are likely to still have emissions in 2050 from several sources, shown in Figure 3.5, including:

- passenger vehicles, trucks, and transit buses that have not converted to electric options yet
- natural gas cooking appliances in commercial (e.g., restaurants, hotels, schools) buildings
- natural gas used in the potable water supply
- fugitive emissions from natural gas distribution
- wastewater treatment activities

Figure 3.5 - Emissions Remaining in 2050



These sources represent the remaining emissions that need to be reduced or balanced by 2050 for the City to demonstrate achievement of its carbon neutrality target, and total approximately 690,000 MT CO2e/yr. Global best practices on how to balance these remaining emissions are currently in development and the City will take a “wait-and-see” approach to determine what is the best solution when the time approaches.

IMPLEMENTATION MONITORING APPROACH

The City is committed to providing the necessary resources and technical support to ensure successful plan implementation, including the following steps:

- Future GHG inventories – the City will prepare a GHG inventory every two years to support top-down monitoring of total community emissions. These updates will also include comprehensive action level updates on the GHG Plan and adaptation plan.

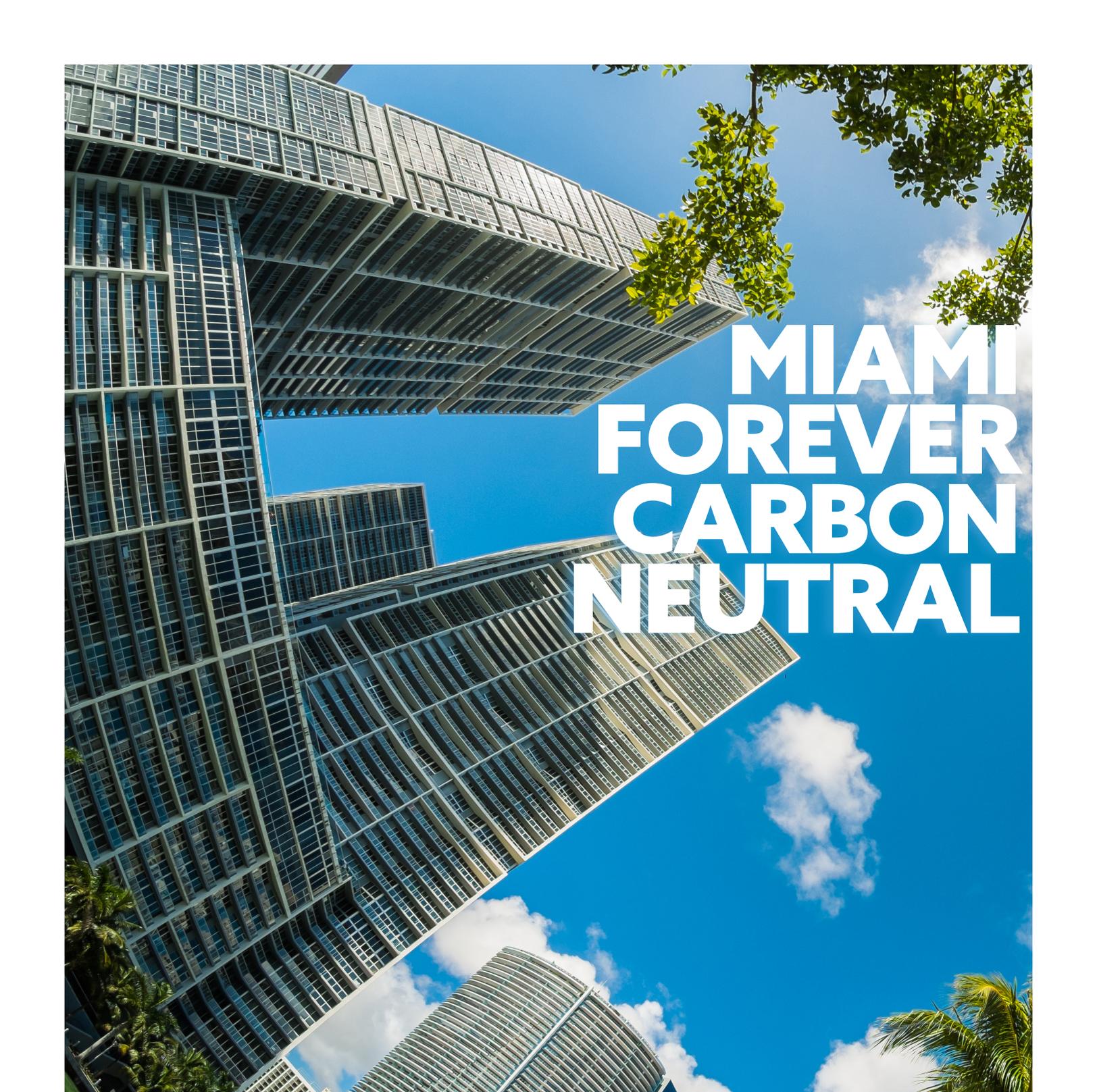
- Key metrics:

- Annual total emissions in MT CO2e
- % change in emissions in MT CO2e
- % of trips taken in private vehicles
- % of electricity fuel mix that is carbon free
- % of passenger vehicles that are electric

- Future plan updates – the City will also perform a comprehensive review of the GHG Plan every five years, at most, to determine if updates are needed to reflect new information and revise its approach, as needed, based on implementation monitoring results.

- Communication channels – the City will maintain communication with the public to facilitate collaboration and accountability on plan implementation with residents, other community stakeholders, and Miami-Dade County and adjacent cities.

- www.miamigov.com/climatechange will continue to serve as the City's central hub for updates on all climate plans including Miami Forever Climate Ready.
- Progress on the Resilient305 strategy can be found at www.resilient305.com.



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