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Climate Action in Miami

At the turn of 2022, it was harder for leaders in cities to ignore the impact of climate, which affected many aspects of life for everyone, but could hit the most vulnerable residents hardest. Local leaders were increasingly called upon to respond to climate-related challenges that were clear in the present and might get worse in the future without effective action.

Because of its tropical location on the east coast of the Florida peninsula, the region around Miami was often called ground zero for the challenges of climate change, the epicenter of risks from sea level rise, hurricanes, floods, and extreme heat. Some people in the region were skeptical about the idea of climate change, chose to ignore it, or simply didn't know enough about it. A newly-elected County Mayor defined "environment and equity" as her two major interests, and wanted to bring more of the private sector to the table. Younger leaders felt increasing urgency about the issue.

By 2022, there were many plans and also much impatience. Miami stakeholders wanted results. But how could multiple diverse entities become aligned behind clear, actionable, high-impact priorities for a multi-faceted problem? Were there tradeoffs between immediate relief and long-term investments? How could people become committed to a shared agenda when interests and resources varied greatly? Was there room for innovation, and how could it be accelerated? And what was possible when even issues such as the type of tree to plant were highly politicized?

Activists wanted government to stop talking and start spending, especially to meet the needs of lower-income residents. Government and community leaders wanted business to step up. A civic leader wanted to promote #ClimateTech ventures, to build a hub for green businesses. A business leader wanted a "chef" to put the ingredients together. An entrepreneur wanted a "superhero." There was hunger for leadership and commitment to a high-impact direction.

This case begins with an overview of the region and a brief history of how foundations tried to forge collaboration and jumpstart climate action. Then it takes the perspective of three sets of actors and stakeholders: (1) public sector officials from three jurisdictions who were mainly responsible for infrastructure; (2) community leaders acting as watchdogs and advocates; and (3) business interests, including real estate developers and entrepreneurs seeking opportunities for growth and profits. Each had differing priorities and tools for action. All had to consider what it meant to work on such a big systemic issue, and how the leadership of a few could grow into support and action by the many.

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The Lay of the Land (And Sea): The Miami Metropolitan Area

Miami-Dade County – sometimes known by its telephone area code 305 - included communities on the Atlantic Ocean and Biscayne Bay as well as inland over wetlands toward the Everglades National Park, a 1.5 million-acre wetlands preserve. (See **Exhibit 1** for maps of Miami-Dade County and South Florida.) As of the 2020 census, Miami-Dade County had a population of 2.7 million in 34 incorporated municipalities and some unincorporated areas.[1] The City of Miami had 468,000 people, and Miami Beach 49,000.[2] During the work day, the population could swell in City of Miami's thriving downtown or at night in its booming art and culture scene. During tourist season, Miami Beach might quintuple or more the number of people on its streets and beaches.

The Miami metropolitan area had the second-highest rate of income inequality in the nation, trailing only New York, according to 2019 figures.[3] Miami-Dade County, when combined with neighboring Broward, and Palm Beach Counties formed America's eighth-largest metro area, with an economic output of $300 billion, comparable in size to Singapore and Hong Kong.[4] It was home to more than 30 full-time resident billionaires, the 10th-highest concentration in the world.[5] But its percentage of households in the middle class was ranked as the 11th-lowest among large U.S. metros of a million or more people.[6] Average household income was 19% lower than the national average; 59% of residents lived above the poverty level but were said to struggle to meet basic needs.[7] A 2019 study found that nearly half of all households in Miami-Dade County were considered cost-burdened, which meant that hundreds of thousands of people were paying more than 30% of their income on housing.[8] Moreover, half of those struggling to pay rent were even more severely cost-burdened, spending at least half of their pay on rent.[9] (See **Exhibits 2 and 3** for Miami-Dade County demographic information and Miami-Dade County income disparities.)

In Miami, a region of immigrants, economic disadvantage fell along color lines. Black residents (comprising multiple ethnicities and countries of origin) were two-and-a-half times more likely, and Latinx residents nearly twice as likely, to live in poverty compared to white residents.[10] A first wave of Cuban exiles in the 1960s were generally affluent and dominated Miami's power elite, but successive waves of immigration from Cuba, Latin America, and the Caribbean brought people who remained less-resourced. Spanish joined English as a major spoken language.

Miami had relatively few big corporate headquarters. The largest employers were health care and government, with 41,000 people working for the County-wide school system and 29,000 working for County government.[11] The prominence of tourist and hospitality industries brought low-wage service jobs, averaging just over $25,000 in annual pay.[12]

Several economic development groups were working hard to change that. In the 2000s, signature arts and culture events, such as the annual Art Basel Miami fair, and investments in new museums and performing arts venues by local philanthropists and the James L. and John S. Knight Foundation, a large national foundation based in Miami, put the region on the world stage. In the 2010s, Knight helped support a growing entrepreneurial ecosystem; a #TechMiami push landed satellite headquarters of tech companies and financial firms, as well as numerous incubators and accelerators for startups. In 2017, Miami was named the #1 U.S. city for startups by the Kaufmann Foundation.[13]

The three largest colleges and universities were the University of Miami (UM), a private university with about 18,000 total enrolled students and a national ranking of 55; Florida International University (FIU), a public university with 54,000 total enrolled students and a national ranking of 162; and Miami-Dade College, a former public community college that had become a four-year college graduate programs, that was still heavily vocational, with over 100,000 full-time and part-time students.[14] UM's

Rosenstiel School for Marine and Atmospheric Science, enjoyed a #10 ranking in its field, and occupied its own campus on Virginia Key, a small island near downtown between bay and ocean.[15] FIU started a Sea Level Solutions Center under an Institute of Environment's Coastlines and Oceans Division.

Rampant, largely uncontrolled growth exacerbated natural climate vulnerabilities from Miami's location in one of the world's most hurricane-prone regions, and its hot weather could veer into extreme heat. Native American tribes such as the Miccosukee Indians were long environmental stewards of their lands in the Everglades. Sprawling new towns of single-story single-family homes were built on drained swampland ever-further from downtown and employment centers, creating dependence on automobiles. In a region built after the car, the County code was said to refer to people as "non-automotive vehicles." New high rise residential and commercial buildings were springing up at the edge of the shoreline. Storm flooding was joined by sunny day flooding. Overall, Miami's coastal location, high groundwater table, and complex canal water management system made it uniquely vulnerable to sea level rise. But communication about threats was controversial, because highlighting them might be detrimental to key economic sectors such as real estate and tourism. (See **Exhibit 4** for images of Hurricane Irma's impact in 2017.)

Electric power was supplied almost entirely by Florida Power & Light (FPL), a subsidiary of NextEra Energy, which also owned NextEra Energy Resources, a large generator of renewable energy from wind and solar. FPL was one of the largest rate-regulated investor-owned utilities in the United States. FPL proclaimed in its press releases that it was a clean energy leader, with one of the lowest emissions profiles and one of the leading energy efficiency programs among utilities nationwide, a statement disputed by critics citing other national rankings.[16] Its Solar Together program offered customers the option of selling excess solar from their own panels back to FPL, but that turned out to be hard to do, and *Miami Herald* reporters claimed that FPL was slowing progress on rooftop solar, including by donating to political candidates opposing a clean energy transition.[17]

Regional Compact

Miami-Dade County was part of the four-county Southeast Florida Regional Climate Change Compact, formed in 2009 to gain more federal clout through coordinated outreach.[18] That total region stretched 200 miles from the Florida Keys to Lake Okeechobee. It was initially funded by the Kresge Foundation to produce unified projections of sea level rise every five years – in 2021 it was in its third version – and later turned over to the counties for funding.[19]

State of Florida

The State of Florida, known as the Sunshine State, had an early but stalled climate action plan in 2008. Controversy over language seemed to slow progress; in his successful 2018 campaign, Governor Ron DeSantis told reporters that "I am not a global warming person. I don't want that label on me."[20] But as governor, he increasingly used the terms resilience, flooding, intensified storm events, and sea level rise. In May 2021, he signed into law a bill allocating funds for a Resilient Florida grant program administered by the state Department of Environmental Protection's Office of Resilience and Coastal Protection, which, among other things, offered a climate adaptation planning guidebook and had given Miami Beach a grant for its living shoreline, an approach that DEP touted on its website.[21] In December 2021, DeSantis unveiled a 3-year plan for climate called Always Ready Florida, which would dedicate $270 million to over 70 statewide projects to protect coastlines, communities, and shores. If approved by the legislature in its 2022 session, funds could be used to build storm-water pumps in coastal communities and bury utility cables, and the state could purchase flood-prone properties.[22] Resilient

Florida still had an additional $500 million in proposed funding (and more than 500 grant applications remaining), which didn't require legislative approval.

Miami Climate Action Planning: Resilient305 Begins Collaboration

Major official steps for Miami to tackle climate vulnerabilities were catalyzed when a national foundation provided funding and a local community foundation prodded fragmented government jurisdictions into focusing on climate and adding a new government role, that of "chief resilience officer." That it happened at all is a tribute to civic entrepreneurs.

In 2013, Rockefeller Foundation had announced 100 Resilient Cities, a competitive global challenge in three rounds conceived by then-CEO Judith Rodin. Javier Alberto Soto, president of the Miami Foundation at the time, recalled an interaction in 2015, "I go to New York and meet with Rockefeller. I put out there the pitch for Miami. The COO looks at me and says 'What Miami are you talking about?' And I say 'What do you mean what Miami? I'm talking about Miami, Florida.' He says 'No, no, no, that's not what I mean.'" It turned out that several Greater Miami cities and the County had applied separately and unsuccessfully in the first two rounds. Soto offered to develop a One Miami collaboration among Miami-Dade County, the City of Miami, and Miami Beach.

It was easier said than done. In those years, a Miami Foundation deputy recalled, the three entities wouldn't work with one other. Squabbling was calmed when each got a front-burner issue, such as transportation for the County, poverty for the City, and sea level rise for Miami Beach. Especially time-consuming was the issue of what to call a joint effort. The compromise was to "Greater Miami and the Beaches." Greater Miami and the Beaches became the only multi-jurisdiction entity in the program's final round, and the only one with a steering committee chaired by a community foundation.

Rockefeller funding was for expert strategy consulting for the development of a formal resilience plan, stakeholder convenings, participation in a global network, and three years of salary for a chief resilience officer (CRO) who would lead each government entity's planning. Rodin said, "The Chief Resilience Officer concept was critical. We required that he/she reported directly to the city chief executive and had authority to integrate all branches of government (and often the private sector and civil society) into the resilience planning and execution." Since Miami Beach and Miami-Dade County had recently appointed CROs, the Rockefeller CRO funding went to the City of Miami. The Miami Foundation got a grant to help the three CROs work together and coordinate a bevy of consultants. "There were working groups and listening sessions, with strong government and nonprofit presence," observed Rebecca Mandelman, then the Miami Foundation vice president. "The challenge was to get the private sector involved."

Resilience and climate change were still politicized and viewed as tainted words. A planning participant complained that "vested interests" didn't want topics such as land use or relocation on the table. But the Miami Foundation as a respected impartial arbiter kept the momentum going. Sometimes there was work behind the scenes, e.g., getting an influential person to write an op-ed column about the issue's importance when some participants were showing signs of going rogue. Mandelman also noted support from three Mayors who held non-partisan seats but were known Republicans: former County Mayor Carlos Gimenez, former City of Miami Mayor Tomas Regalado and his successor, Mayor Francis Suarez, who included resilience on his platform in his first Mayoral campaign.

After three years of work, a Resilient305 strategy was ready, with 59 areas of work identified.[23] (See **Exhibit 5** for the Resilient305 Action Plan.) When the Rockefeller grant concluded, Greater Miami transitioned to a Resilient 305 Collaborative, an alliance of government, universities, and NGOs. By the

end of another year, 29 municipalities had signed a Mayor's Pledge to support resilience, and some had attended Send Your Boss to Bootcamp training.[24]

But what did the three main entities in "Greater Miami and the Beaches" actually do? How did the CROs function, and what could the public sector accomplish?

The Public Sector: CRO's, Their Mayors, and Government Action

Given a topic as broad and multi-faceted as climate change, the three main units comprising Greater Miami and the Beaches – City of Miami, City of Miami Beach, and Miami-Dade County -- set different agendas, producing a plethora of plans. Although some items recurred on each jurisdiction's list, the question was where to find coherence to take effective action. CROs – the new Chief Resilience Officers – had to operate with a vague mandate and varying degrees of support. Nevertheless, accomplishments emerged, sometimes stimulated by an immediate climate-related crisis.

City of Miami

The City of Miami encompassed major downtown commercial centers and residential areas dotted with small businesses, including inner city areas of Little Havana, Little Haiti, Overtown, and Liberty City. With the Rockefeller grant, Jane Gilbert was named the city's first CRO. The position's reporting bounced around a bit, which some saw as a lack of clarity about what exactly it was. When a new head of public works was appointed from the Army Corps of Engineers in 2018 by the city manager, resilience was put under him, as though it referred only to the built environment. It was later restored as an autonomous department. When Gilbert resigned in 2020 for personal reasons, the public works chief again took it on, promising a continuation of Gilbert's work and grant-funded initiatives.

In the 2017 City of Miami election, just after Hurricane Irma's devastation and perhaps because of it, voters approved $400 million in general obligation (GO) bonds, called Miami Forever Bonds, as well as giving new Mayor Francis Suarez nearly 86 percent of the vote; Suarez included climate on his platform.[25] The scope encompassed action on sea level rise and flood prevention; roadways; parks and cultural facilities; public safety; and affordable housing. Tranche 1, approved December 2018, allocated $43.6 million to road repaving, parks improvement, a renovated fire station, and 50 flood valves, and another $15 million for developments in the inner city.[26] At the close of 2021, a presentation to the Miami Forever Citizens Oversight Board showed that just four of 33 projects funded with that first $58 million were complete, such as new roofs at parks; two were out to bid, the rest in design or planning stages.[27] The city appeared to be waiting for a storm water master plan before allocating funds.

Mayor Suarez, a participant in the Global Commission on Climate Adaptation, became president of the US Conference of Mayors on January 3, 2022.[28] He had gained national prominence championing Miami as the future block chain and cryptocurrency capital of the world.

City of Miami Beach

Miami Beach, which sat on a barrier island, already had a CRO on board before the Rockefeller grant, who doubled as assistant city manager. In 2013 Philip Levine ran for Mayor promising to keep the streets dry; by then, sunny day flooding could no longer be attributed to hurricanes. Moreover, flooding was not handled by the existing gravity-based drainage system, and was stopping traffic, ruining cars, and making underground garages inaccessible throughout the city. In late 2015, a formal department of environment and sustainability was created; Elizabeth (Betsy) Wheaton, then the assistant building director and head of environmental compliance, became the environment and

sustainability department head. (Wheaton eventually moved to the Mayor's office as the top environmental voice under Mayor Levine.) The department identified critical vulnerabilities and got things done project by project, such as raising roads, upsizing storm drainage capacity, and installing pumping and water quality treatment stations. (See **Exhibit 6** for an image of road raising project.)

Projects with natural green infrastructure got priority: living shorelines incorporating mangroves (which Wheaton had to argue for, as many viewed them as trash trees) and a dune management plan, which protected the city from storm surge and created or preserved habitats. Construction of a beach-walk created a protected path for pedestrians and bikes, which brought community support. Dune enhancements were funded mostly by the Florida Department of Transportation and proffers from any property redeveloping along the beach. By 2021, the combination of hard and soft elements stretched for eight miles. "The beach-walk is why we got to restore the dunes," she said. (See **Exhibit 7** for an image of the beach-walk.)

Miami Beach also had one of America's most stringent green buildings codes. Any new building above 7000 square feet had to be LEED-certified Gold or Living Building Challenge-certified or pay a fee. New construction was required to be built at a minimum elevation and interiors designed to accommodate future floor raising. To get allowances for more height, developers could elect to pay for public parks that hold and treat stormwater.

Wheaton reported benefiting from a bevy of national consultants (Urban Land Institute), networks of like-minded government officials (Southeast Florida Climate Change Compact, 100 Resilient Cities networks), and recommendation-heavy reports, many posted on a new public communications website, mbrisingabove.com. Local university partnerships and student interns were augmented by national expertise, e.g., from the Harvard Graduate School of Design. And unlike its neighbors, Miami Beach also had eye-catching, community-pleasing, completed projects. The city worked with the Aspen Institute to plan and host its first-ever Green Ideas Festival, slated for May 2022.

Miami Beach's progress garnered praise. "The City of Miami Beach put the most intention, the most strategic thought behind designing a system that improves resilience," observed Raul Moas, Knight Foundation's Miami program director "They did not wait on state dollars to get started. They did not wait on an infrastructure bill to elevate roads, to improve pumping capacity. And so, flooding on the beach has gotten a lot better."

There were also concerns. Some pointed to unintended consequences of Miami Beach raising roads: ground level entrances were now at basement level, prone to flooding; a former street level restaurant now considered a basement might have difficulty getting insurance. Miami Beach's work "led to lots of roadwork but not necessarily behavioral change or cross-town collaboration," a business leader said.

Miami-Dade County

James Murley, a regional sustainability planner known for a collaborative style, became Miami-Dade County CRO in 2015, reporting to the deputy County Mayor through the Department of Regulatory and Economic Resources. New Mayor Daniella Levine Cava, elected in November 2020, elevated the post to sit in the Mayor's Office and report to her Senior Policy Advisor for Policy and Planning. About 17 people were dedicated to implementing the County's share of the 59 action items in the Resilient305 strategy, grouped under people, places, and pathways as line items in the budget. "The budget is a key implementation tool," Murley said. Among County functions were the water and sewer department, the port, and the airport. The County was responsible for upgrades to infrastructure to withstand storm surges on top of 2-3 feet of sea level rise. Its actions were not regulatory, Murley explained; the 34 cities didn't have to follow County guidance. County officials worked through

persuasion, one of the tools being the larger investments municipalities could get if they aligned with the County. But, Murley commented, "The 34 cities are very different; some are small suburbs. Intergovernmental coordination can be hard."

In April 2021, Levine Cava added a Chief Heat Officer, an American first, and later a Chief Bay Officer to respond to challenges of a rapidly deteriorating Biscayne Bay. Miami-Dade, along with Athens, Greece, and Freetown, Sierra Leone, had received the first grants from the Arsht-Rockefeller Foundation Resilience Center at the Atlantic Council in Washington, DC, to name Chief Heat Officers.

"A Chief Heat Officer is not someone who runs a basketball team," Jane Gilbert joked, referring to the Miami Heat NBA franchise. After leaving the City of Miami's CRO post to work as a climate resilience consultant, she was lured back to government to become County CHO. Her charge was to bring all stakeholders together and build a regional plan to deal with extreme heat-- a national issue in 2021 due to record-breaking heat waves in the West and elsewhere, but not yet receiving enough attention as a vulnerability for Miami. Heat affected about 300,000 outdoor workers in Miami-Dade, plus other workers in indoor settings without cooling, kids in outdoor sports, and adults waiting for a bus with no shelter. At home, a large utility-burdened population faced trouble paying their bills due to limited assets and low incomes.

Gilbert began in June 2021 and got busy with an education campaign through multilingual posters in all public facilities, a social media campaign, daily hazard reports with the National Weather Service, and educational programs in all County summer camps. She wanted to educate employers of construction workers and the healthcare community about the risks of heat exposure. Underway were expanded training and supplies for disaster volunteers and identification of a heat season, which would raise public awareness. In the County system, the Mayor developed ideas and could appoint Gilbert, but County commissioners adopted the budget, and they had a range of political leanings. As of December 2021, Gilbert hadn't yet met with all 13 because she was still completing vulnerability assessments at a level of detail to reflect their districts. "I want to hear their priorities, and see where there's alignment," she said.

Thrive305 Community Engagement

County Mayor Levine Cava also initiated a large-scale public engagement initiative early in her first year, with the Miami Foundation and other civic partners. Thrive305 started with a Countywide survey answered by over 26,400 residents, followed by a week of large-scale community discussions in locations around the County in English, Spanish, and Haitian Creole, culminating in a participatory community-directed art installation ready for Earth Day on April 22, 2021.[29] A Thrive305 Action Plan was finalized in November 2021. Among its 12 priority areas were climate-specific items such as disaster preparedness and a 30% tree canopy County-wide by 2030. "Blue-green jobs" were a major focus[30] -- both new jobs in solar and energy efficiency, and applying green and blue technologies to traditional carpentry and plumbing jobs, such as building with low-carbon materials, retrofitting homes, and septic-to-sewer conversions and water management systems.[31]

Agreement on What Not to Do: No Seawall (but start another plan)

Though public sector units in Greater Miami and the Beaches were brought together as one entity for Rockefeller grant purposes; each was charting its own course and defining the work of CROs in often widely varying ways. But while there were differing definitions of what to do about climate, there tended to be agreement on what NOT to do: not let the Army Corps of Engineers build a concrete seawall in response to sea level rise and flooding.

In October 2018, soon after Hurricane Irma, the US Army Corps of Engineers began to draft a protection plan for the South Florida coast that centered on a 6-mile-long sea wall, up to 20 feet high to contain storm surges from sea level rise,[32] with 65 percent of the cost borne by the federal government. But public reactions were highly unfavorable. Because the proposed wall would be sitting on porous limestone, there were fears that it would act like a sponge to hold water and create runoff that would add pollution and cover streets. Community leaders said that residents preferred natural barriers. The *Miami Herald* reported that the project would require seizing more than 350 properties and remaking entire neighborhoods.[33] Alternative proposals included submerged oyster reefs, an earthen wall with a boardwalk on top of it, mangrove trees, and a much smaller concrete seawall as a last line of defense. In August 2021, the County pulled the plug and started on its own greener plan, which the Corps of Engineers would have to approve.[34] More plans ahead.

Public Sector in Review: Watchdogs Unleashed

Watching the public sector closely were public interest organizations that identified gaps or unintended consequences. Rachel Silverstein, head of Miami Waterkeeper, had already sued the Army Corps of Engineers and was watching public sector performance. Miami Waterkeeper was the local affiliate of a global citizen-led alliance which monitored water quality and used education and litigation as tools. After a stint in Washington as a staffer for the U.S. Senate Commerce Committee subcommittee on oceans, Silverstein wrote her doctoral dissertation at UM's Rosenstiel School on the value of coral reefs; on becoming Miami Waterkeeper in 2014, she sued the Army Corps of Engineers to prevent the destruction of those reefs when dredging Miami Harbor.

Silverstein applauded appointing CROs "who've been fantastic and taken on a lot, with an unfunded mandate. But there's this sense that we have chief resilience officers so we're done," she said, arguing that there should be one per department, not one per city. She pointed out that "we're still putting septic tanks in low level areas. We're still offering stormwater permits that don't account for sea level rise. We know what needs to be done, but solutions are vastly expensive, and there is no sense of urgency because they are long term problems. Timing of environmental issues doesn't match election cycles. The community is not demanding action from elected officials."

Community Activists: Seeking Climate Action with Justice

By the start of 2022, storm surges in Miami had been met with a surge of plans. Talk, talk, talk; report after report, even favorably-disposed leaders said. Climate activists and community advocates wondered, where was the action? Were their priorities considered? And who was at the table?

Community leaders focused on environment and equity formed a second set of stakeholders. Some grass roots leaders expressed faint praise along with impatience. One applauded community stakeholder discussions but said the outputs were very broad and not yet actionable enough. Many wondered whether plans were good enough, action was fast enough, and solutions were community-focused enough in a region with great economic disparities.

Greater Miami had many community-based groups urging bigger climate action and leading community adaptation efforts. Though operating on different time frames, from immediate issues like paying overdue energy bills to longer-term issues of environmental protection and carbon emissions reductions, they were impatient for change. Most were small, but they were increasingly connected with one another, through such groups as the Miami Climate Alliance. They educated and trained grass roots leaders, carried out neighborhood projects, and made noise through protests or public testimony.

Climate Justice: Catalyst Miami and Community Coalitions

Catalyst Miami was a prominent organizer and advocate for communities of lesser wealth. Founded by Daniella Levine Cava in 1996 to unify human service organizations, Gretchen Beesing became CEO in 2013 when Levine Cava left to run for County Commissioner before becoming Mayor.[35] Catalyst Miami aimed to engage with, and advocate for, lower-income communities, especially (but not only) around high energy bills, protection from extreme heat and flooding, and a just transition to renewable energy. Catalyst Miami put resilience hubs in some Black and Brown neighborhoods, paying small stipends for projects such as disaster kits. Beesing was a Resilient305 champion.

Catalyst Miami operated a variety of programs to build a cadre of community climate leaders. CLEAR (Community Leadership on the Environment, Advocacy, and Resilience), launched in 2016, was a series of free 10-week training programs for anyone 14 and older, with a related youth program. Empowering people to act was a focus; for example, when community activist Valencia Gunder was CLEAR's graduation speaker in spring 2021.[36] Gunder demanded respect for communities of color and inclusion in climate action. Co-director of the Smile Trust, and a national Red, Green and Black New Deal organizer, Gunder had served on the original steering committee for the Rockefeller grant, as one of three women out of about 25 people; she was the only Black woman and one of just two people representing lower-income communities, she recalled. At events, "When I used the language of equity, they thought I was talking about finance," she quipped. "To be fair, they did facilitate community conversations, but they had to go back to the drawing board because people weren't attending." She attributed that to not making them feel welcomed, respected, or understood. Though praising County Mayor Daniella Levine Cava for her background in resilience and anti-poverty programming, Gunder said that "I think our local government lacks a sense of equity. I think most of the ideas and solutions they have lack a class, race, immigration lens. That's super dangerous for a place like Miami."

Catalyst Miami stimulated other activists to seek grass roots solutions. Its "neighbors to leaders" fellowships supported projects, such as youth climate summer camps or rain gardens to catch storm-water and reduce flooding.[37] Michael Clarkson, a graduate of the first CLEAR cohort founded the Klimate Action, Kultural Arts and Science Initiative (KAKASI) to educate community members about climate change.[38] In 2017, after the devastation of Hurricane Irma, he co-founded Konscious Kontractors in 2017 with François Alexandre to combat "climate gentrification" by helping marginalized communities get construction help for resilience projects at their homes and neighborhoods.[39] (See **Exhibit 8** for images of an inner city neighborhood).

Miami Climate Alliance

Climate advocacy non-profits including diverse populations were increasingly networked. Miami Climate Alliance formed in 2015 when a diverse group of about 100 affiliates mobilized a "people's march for climate justice." It helped gain support for 100RC and hiring CROs. Catalyst Miami was a leader in the Miami Climate Alliance, which Konscious Kontractors joined. Other organizations included CLEO Institute (Climate Leadership Engagement Opportunities), which was founded in 2010 by a high school science teacher and principal to produce more climate leaders, especially women); the Circle of Brotherhood ("Black men solving our own community problems"); We Count! (for low-wage immigrant workers); and Engage Miami Foundation (targeting young people).[40] Catalyst Miami's vice president of policy and advocacy, Zelalim Adefris, co-chaired the steering committee with Miami Workers Center board chair Trenise Bryant. A report on Housing Justice in the Face of Climate Change was issued in 2020 with significant community input.[41]

Energy costs were a major focus. Konscious Kontractor's Alexandre teamed with Bryant to urge Florida Power & Light, the regional electricity company, and Florida's other major utilities to ease the burden on low-income people by increasing energy efficiency, writing on the Florida Climate Reporting Network blog about the utility's poor performance in advance of Public Utilities Commission hearings about rate increases.[42] In August 2021, as public hearings continued, organizers from Catalyst Miami, Miami Climate Alliance, Florida Rising, Florida Conservation Voters, and 350 South Florida planted 250 red-and-black flags outside the Miami FPL building to represent 250,000 households in Florida that couldn't pay their electricity bills and had their power shut off during the last three months of 2020.[43] In October 2021, FP&L got its rate increase anyway, although less than requested.[44] FP&L claimed that this supported the largest solar buildout in the U.S., along with a green hydrogen pilot project, expansion of electric vehicle infrastructure, and closing of a coal unit. However, as activists pointed out with dismay, solar expansion subsidies applied primarily to large industrial customers; residents had to join a waiting list and face bureaucratic barriers.[45]

Crowdsourcing Grassroots Solutions

Activists could also produce ideas for action. In 2014, Rebecca Fishman Lipsey, then CEO of Radical Partners, created a crowdsourcing effort called 100 Great Ideas, through which any community member could present potential solutions for an intractable community issue, such as designing the future of public transit, and get highlighted in a report to policy-makers, and perhaps even modest funding. The 2018 theme of climate resilience engaged thousands of local residents, promoted by familiar names in the climate action advocacy network, including Catalyst Miami, CLEO, Miami Waterkeeper, and FIU.[46] Winning ideas included toolkits for street-level disaster response, "climate 101" education for media, and sustainability consulting for event managers.

Young people were well-represented among activists and advocates. Those who achieved mainstream positions pushed faster action. Luisa Santos was elected to the Miami-Dade public school board as a first-time candidate in November 2020; six months later, she had catalyzed work to transition the nation's fourth-largest school system to clean energy by 2030, including all-electric school buses.[47] She said she was inspired by the Class of 2030, who were then third-graders. The board's task force to work toward the 2030 goal included County CRO James Murley, CHO Jane Gilbert, experts, and community organizations. They envisioned hands-on learning opportunities for schoolkids, including digital dashboards in the schools displaying energy use. Although this effort involved still more talking, planning, and reports, the time frame was faster and the sense of urgency much higher.

The Private Sector: Who Is Mobilizing?

The business community was a third set of stakeholders considered to have high potential for shaping and acting on a climate agenda and was increasingly looked to for leadership to go from nice plans to substantive actions. Without business, some felt, action would stall. "What's needed is the big flashy mobilizing of the private sector," former Miami Foundation officer Rebecca Mandelman said.

Two sets of business actors were especially relevant to the climate action question: real estate developers, who dealt with the built environment and were especially prominent in Miami; and climate tech entrepreneurs with promising innovations, but small in numbers and largely unconnected.

Developers: The Sky's the Limit (but Watch the Ground)

Real estate was booming in Miami. Luxury residential properties soared; a record-setting mid-2021 $75 million sale of a single home on Star Island, off a causeway joining downtown Miami to Miami

Beach, could be exceeded by another Star Island residence on the market for $90 million.[48] The pandemic years were banner years. New towers were going up everywhere, including close to the edge of the ocean and bay. Danet Linares, Executive Vice Chairman of Blanca Commercial Real Estate, a major leasing agent, said there were 2.4 million square feet of completed office lease transactions in Miami in 2021, up 50 per cent from 2020, and the highest activity ever in the city. About a quarter of the tenants were new to the market, many coming from the Northeast, including financial firms such as private equity and family offices, but also branches of Silicon Valley tech companies. (See **Exhibit 9** for images of downtown residential properties.)

After Hurricane Andrew in 1992, which caused over $37 billion in damage, South Florida building codes were made more stringent, with requirements for elevation, high impact windows, and the like. The U.S. Green Building Council's LEED certification program also raised standards nationally, giving ratings points for such items as low VOC paint (limiting the carbon-producing volatile organic compound released into the atmosphere), wastewater, materials recycling, light, and air filtration. To many developers, such codes took care of climate action. Linares observed that prospective commercial tenants rarely if ever asked about sea level rise or other climate vulnerabilities – maybe one person out of a hundred tours she led. But, she said, LEED certification was very important to them. Architects were leading the charge in adding green spaces, such as living walls in offices or rooftop terraces.

Climate change was an infrequent topic of public conversation, even though some developers stood out as civic-minded leaders. One prominent developer, Related Group of Florida, focused on neighborhoods, from luxury towers to revitalizing inner cities. CEO Jorge Perez gave seminal gifts to the Perez Center for Metropolitan Studies at FIU and the naming gift for Miami's popular new waterfront modern art museum. After a widely-reported dismissive comment he made to a journalist at a museum event in 2018 about dealing with sea level rise as a builder, for which he apologized, Jorge Perez became outspoken about the importance of environmentally conscious companies in coastal cities.[49] He argued that real estate developers and lawmakers needed to work together to protect low-lying areas and continue restoration of the Everglades,[50] among other efforts.

Miami Worldcenter

The $4-billion, 27-acre Miami Worldcenter (MWC) under construction in 2021 took resilience to a new level. It was one of America's largest urban core construction projects and its second-largest mixed-use real estate development. Nitin Motwani, Managing Partner of Miami Worldcenter Associates, wanted to do much more than required by code. MWC chose a site 12-16 feet above the water table, then spent $100mm on infrastructure before starting a single building, including upgrades to public transportation stations surrounding the site. The group improved water and sewer capacity, buried all power lines, and created over 200,000 square feet of public spaces with 10-25-foot-wide sidewalks (instead of the mandated 4-foot) and ample landscaping, which would help to avoid flooding and encourage people to walk to public transportation. Motwani was also proud of a planned "Blue Zone" (for healthy lifestyles and longevity), via the world's first COVID-conscious, pandemic-ready residential, hotel, and medical center skyscraper, Legacy Miami Worldcenter, a 55-story project started in August 2021. (See **Exhibit 10** for a Miami Worldcenter rendering.)

"The world spotlight is on Miami – good, bad, or indifferent – when it comes to resiliency," Motwani declared. He hoped that mindsets would change. "We need to work together to find real solutions and incentives for developers to overspend on nascent technologies or designs that will be important down the road, because once a building is built, it is hard to change it," he said. He felt that there was much to do. Conflicting priorities among the City, County, and State, as well as with equity

investors, lenders and insurers, had to be sorted out, and a means found to finance upgrades in old and deteriorating inner city areas to build resilience.

Innovation and Entrepreneurship: #MiamiTech to #ClimateTech?

Could the epicenter of climate vulnerability become the epicenter for climate solutions? Could technology, innovation, and entrepreneurship move the needle quickly?

South Florida venture capital had a record-breaking year in 2021 in dollar amounts, number of deals, and highest growth for both. About $4.63 billion flowed to the tri-county metro of Miami-Dade, Broward, and Palm Beach Counties, up from $1.92 billion the previous year, making the region #11 nationally for dollars invested. Some of venture capital's biggest names were now investing in Miami startups: Softbank, Andreesen Horowitz, and General Catalyst.[51] Softbank managing partner Shu Nyatta had moved to Miami to oversee Softbank's $5 billion Softbank Latin America Fund and $100 million SB Opportunity Fund focused on Black, Latin, native American entrepreneurs and promptly became a board member of accelerator Endeavor.

The money was flowing to fintech and blockchain, health and insurance tech, not to climate tech. Matt Haggman wanted to add that emerging area. Executive vice president for Opportunity Miami at the Beacon Council, the County-affiliated independent economic development agency, Haggman had been Knight Foundation's Miami program director instrumental in getting the #MiamiTech scene off the ground. Now he wanted to "move sustainability from an existential threat to a generational business opportunity to transition our whole economy: how we get around, how we manufacture things, how we produce food, how we cool and heat our homes and offices, where we get our electricity from," he said. He was betting that communicating the business potential could make Miami one of the world's centers of #ClimateTech.

With the excitement stemming from cryptocurrency and blockchain, promoted by city Mayor Francis Suarez and given a showcase just before the December 2021 Art Basel Miami week, few investors or ventures had climate resilience as their main mission, and all were relatively new. Patricia Wexler had started Starlight Ventures, raising a seed fund of just over $20 million, and exiting CarboCulture, carbon capture from soil, when it raised its next round. Kiel Berry an experienced investor managing assets for his entertainment clients, announced Mission One Capital, just underway in December 2021, commenting that finally there was a sense of urgency about climate change.

Miami's few ventures in this space were largely one-offs, not part of a group of other similar companies which could build an industry in Miami as a #ClimateTech or #GreenTech network, and generally not using their home base as their test ground or source of sophisticated customers. Electric scooter company Bolt Mobility, for example, started in Miami, bought Last Mile assets at auction and expanded to 48 markets in 2021, but a micro-mobility thrust was just underway downtown. A rare Miami unicorn, REEF Technology, seemed climate-friendly but not climate-focused in its transformation of parking lots and unused urban spaces into sites for app-based popup services, including delivery-only kitchens, mobile health clinics, charging stations for electric vehicles, and micro-mobility vehicle rental. Softbank led REEF's $700 billion funding round in late 2020.[52]

Local Heroes Few Were Yet Following

Some companies proved that climate action could create jobs at many income levels and have significant impact on both environment and equity. EcoSystems, founded by CEO Richard Lamondin Jr. and his brother Lawrence in 2012 with $5000 in personal funds, won its founders Endeavor Miami's entrepreneurs of the year award in October 2019.[53] In December 2021, it topped Inc Magazine's best in

business list in the environment category.[54] By focusing on water and energy conservation in plumbing and electrical installations, the Miami natives wanted to prove that conservation is good for business. Water was the first target because their access to data from local condo buildings showed that it was the second highest cost for residents after insurance. They applied tech, such as efficient showerheads, rather than invented their own, and learned as they installed. Soon they reduced consumers' water bills by as much as 40 percent.

Demand grew even though climate issues weren't yet particularly salient. They self-financed through profits and built a blue-collar work force of plumbers and electricians – examples of the new green jobs the County sought. Customers helped them scale nationally, such as the opportunity to work on a multi-unit project in Denver which became the largest of its kind in Colorado. When customers asked about energy, Ecosystems added it. EcoSystems worked on half of Blackstone's multifamily real estate portfolio to reduce their carbon emissions. "Though we started in installation, we've evolved to become the outsourced sustainability department for some of the largest real estate departments in the country," Richard Lamondin said.

In the aggregate, by 2022, EcoSystems had saved more than 5 billion gallons of water, $51 billion on utility bills, and 140,000 metric tons of CO2. "This is not sexy work by any means. It's granular, we focus on toilets, lights, and thermostats. But, at scale, tens of thousands a year, it generates the impacts we have now," Lamondin observed. But he expressed great frustration that progress was so slow in the Greater Miami region. "Solar in the Sunshine State is in its infancy!" he declared. "Which is pathetic. You can quote me on that." He was disappointed that there was so little local activity, mentioning Origis Energy, a Belgian company with U.S. headquarters in Miami, working globally on solar energy and storage for utilities and commercial customers, as a hidden local asset. He continued, "Miami should be the laboratory for everything we need to try. We're on the front lines. Maybe that's an aspiration, but I have not seen enough of the government, NGO, business axis conversation. If I don't understand the vision, no one else does." He pointed out that new technologies such as for water reuse were adopted more widely elsewhere, and that there were few businesses working on them when it could be a huge opportunity for a County burdened by sewage issues.

Advanced Tech

Water-oriented technology development was embryonic in a region defined by water. Daniel Kleinman started Seaworthy Collective in 2020 to co-create and grow technologies addressing big climate issues around oceans. Kleinman, a marine robotics expert and mechanical engineer with a masters from UM Rosenstiel School and a post at the Woods Hole Oceanographic Institution in Massachusetts, returned to his native Miami hoping to create a #ClimateTech startup community with the potential to deploy solutions in South Florida. He saw the same thing others did: a nascent ecosystem with few local ventures. Of the first 10 startups in the collective, only three were based in Miami. His aspiration was to build a blue economy focused on regeneration (going beyond mitigation), including carbon removal and regenerative food sources. A particularly ambitious startup was using robotic arms and gantries to 3D Print living seawalls that could function as coral reefs, with sensors to track water quality data and communicate via 5G. Blockchain and crypto were dominating attention at the tech portion of Art Basel week, but he did find some colleagues which showed the opportunity to connect Web3 with climate tech.

A widely-publicized technology-enabled salmon fishery showed both potential and the usual challenges of one-off innovation. Atlantic Sapphire, a Danish company, launched a land-based salmon industry in the Miami-Dade city of Homestead in 2013. Its "bluehouse" location was chosen because of connections to both fresh and salt water aquifers. Several UM Rosenstiel School graduates and

researchers were involved. The fish could be sold nationally and beyond. But as with any innovation, not all went swimmingly. In 2020, Atlantic Sapphire had to kill 200,000 salmon stressed by construction noises and vibrations, and another 600,000 died in 2021 due to a problem with the filtration system.[55] Still, there were signs that it could be the beginning of a cluster. In November 2021 a Vancouver BC company that supplied Atlantic Sapphire's feed decided to locate a facility near it in Homestead.[56]

Yet, as Bolt Mobility, REEF Technology, EcoSystems, and Atlantic Sapphire showed, homegrown Miami tech companies didn't benefit from a network of similar companies around them or do much to help address Miami's climate vulnerabilities. "Tech is growing here but in absolute terms, not that much," said EveryMundo president Seth Cassel, who had helped build his software company to a successful exit.

#MiamiTech had begun to take off over the course of a decade as a supportive ecosystem was built. Could that be done for #ClimateTech? Could Miami become a solutions-generator and testing site? And could entrepreneurs join developers as forces for public awareness and voices for change?

The Future of Resilience: From Bad Word to Buzzword

"Resilience has gone from bad word to buzzword without much action in between," an observer said. The announcement that the Aspen Institute Green Ideas Festival would be held in Miami Beach in May 2022 with Knight Foundation and Related Companies as sponsors was a sign that climate challenges could be discussed openly, rather than hidden so as not to discourage tourism or real estate transactions. "In the past state government wouldn't say climate change and had to message it without using the words. Now there's a state-wide resilience plan," Rachel Silverstein of Waterkeeper said. "But people got used to not hearing about climate change."

One question was how to rally the public behind a future-oriented issue, especially when there were stark economic divides between those struggling to pay rent and utility bills and those residing in high-end luxury towers, some of them seasonal second homes. On issues as mundane as sewers, it was hard to convince residents to pay thousands of dollars to make changes in their homes which they didn't think they needed; and they'd blame government for the burden.

"The climate change issue is increasingly top of mind but always gets deprioritized because of a crisis," a well-connected civic leader said. "The nation has expectations of Miami that Miami doesn't have of itself, of being on the front lines of climate change. Some folks are leading on it, but I don't see mass activism, mass public consciousness around it. That takes time to build up. And every time that you're trying to build it up, then rent goes up."

County Mayor Levine Cava knew that this was a situation she had to contend with. "When people come to terms with our changing climate and the devastating impacts it will bring for South Florida's future, it can become overwhelming and disempowering," she said. "And so, it is critical that we couple these things with the concrete actions that we can each do, and do as a community and a society."

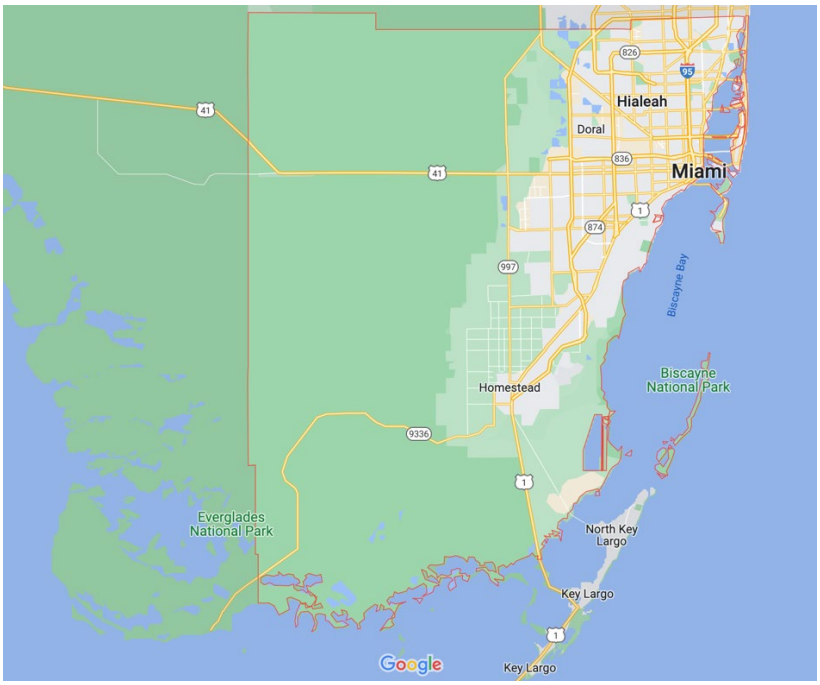
There was abundant finger pointing about which sector bore responsibility for the slow pace of change and who should act. An entrepreneur said, "Everyone agrees that something has to be done. But the dysfunction of government because we're a network of little cities makes collaboration and orchestration a difficult challenge." A civic leader pointed right back, "Where does the business community see its role in this? It's not as cohesive as it needs to be." A prominent developer said he saw the ingredients for change but no chef yet to put them together; he mused about whether the lead

would be taken by foundations, by public officials like the County Mayor, or at the neighborhood level, where community leaders could go from conversation to execution to implementation.

Some plans focused on gray infrastructure (concrete construction), and others on green or blue infrastructure (natural solutions from the land or sea). But what should be done about the human infrastructure – the infrastructure for collaboration that could get things moving faster and effectively?

Exhibit 1 Maps of Greater Miami

Exhibit 1a Map of Miami-Dade County (Boundaries in Red)



Source: Map data ©2022, INEGI, Google, https://www.google.com/maps/place/Miami-Dade+County,+FL/@25.5573601,-81.0186428,9z/data=!3m1!4b1!4m5!3m4!1s0x88d98b054de91839:0x49691e748195638b!8m2!3d25.5516034!4d-80.6326916.

Exhibit 1b Map of South Florida

Source: Casewriters, with base map from Google Earth Map data ©2022 Google.

Exhibit 2 Population Demographics for Miami-Dade County

Total Population: 2,792,176
Percent Population Change, 2010 to 2021: 11.85%

Population by Race –
White: 2,118,455 (75.87%)
Black/African American: 458,401 (16.42%)
Some Other Race: 95,995 (3.44%)
2+ Races: 70,061 (2.51%)
Asian: 42,739 (1.53%)
Native Hawaiian/Pacific Islander: 689 (0.02%)

Population by Ethnicity –
Hispanic/Latino: 1,996,774 (71.51%)
Non-Hispanic/Latino: 795,402 (28.49%)

Population by Sex –
Male: 1,356,3776 (48.58%)
Female: 1,435,800 (51.42%)

Population by Age –
0-17: 564,811 (20.23%)
18-34: 606,727 (21.73%)
35-64: 1,146,177 (41.06%)
65+ : 474,461 (16.98%)

Source: Casewriters, with data from Miami-Dade Matters, Health Council of South Florida.

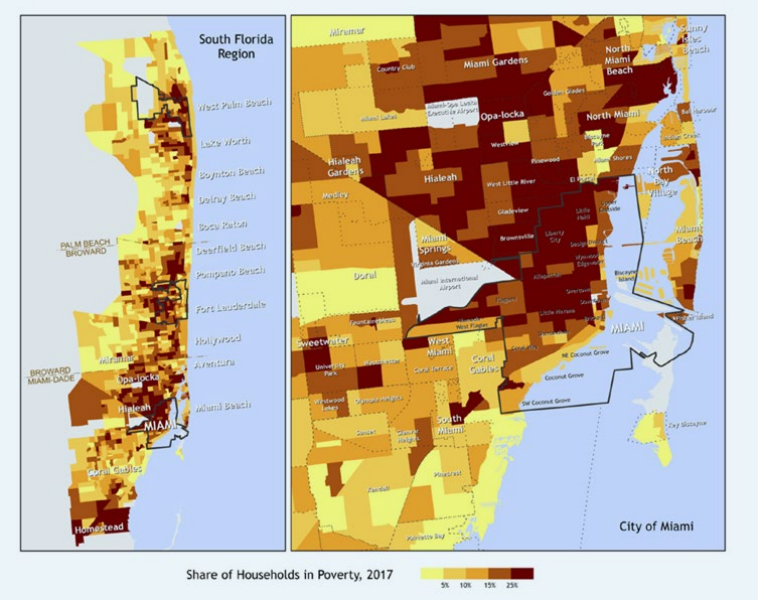
Exhibit 3 Income Disparities for Miami-Dade County

Exhibit 3a Income Disparities in Miami as Compared to Other U.S. Cities

Ranking	Metro	Gini Coefficient
1	New York	0.514
2	Miami	0.508
3	New Orleans	0.500
4	Philadelphia	0.497
5	Memphis	0.495
6	Los Angeles	0.493
7	Houston	0.488
8	Cleveland	0.487
9	Birmingham	0.482
10	Chicago	0.482
11	San Francisco	0.482
12	Boston	0.481
13	Tampa	0.480
14	Detroit	0.478
15	Charlotte	0.478

Note: The Gini Coefficient, or Gini Ratio, demonstrates inequality by measuring distribution of income across a population. The larger the difference between the share of income the low-income earners hold versus the share of income the high-income earners hold, the higher the Gini Coefficient.

Exhibit 3b Map of Poverty in South Florida



Source: Florida, Richard; Pedigo, Steven; and Miami Urban Future Initiative, Florida International University, "Toward A More Inclusive Region: Inequality and Poverty in Greater Miami" (2019). Miami Urban Future Initiative. 7, https://digitalcommons.fiu.edu/mufi-reports/7 ; based on data from, "U.S. Census American Community Survey 2017."

Exhibit 4 Images of Impacts of Hurricane Irma on Miami, 2017

Exhibit 4a Miami Being Struck by Hurricane Irma, 2017

Source: Warren Faidley/Getty Images.

Exhibit 4b Truck Blown Over by Hurricane Irma, 2017

Source: Joe Raedle/Getty Images.

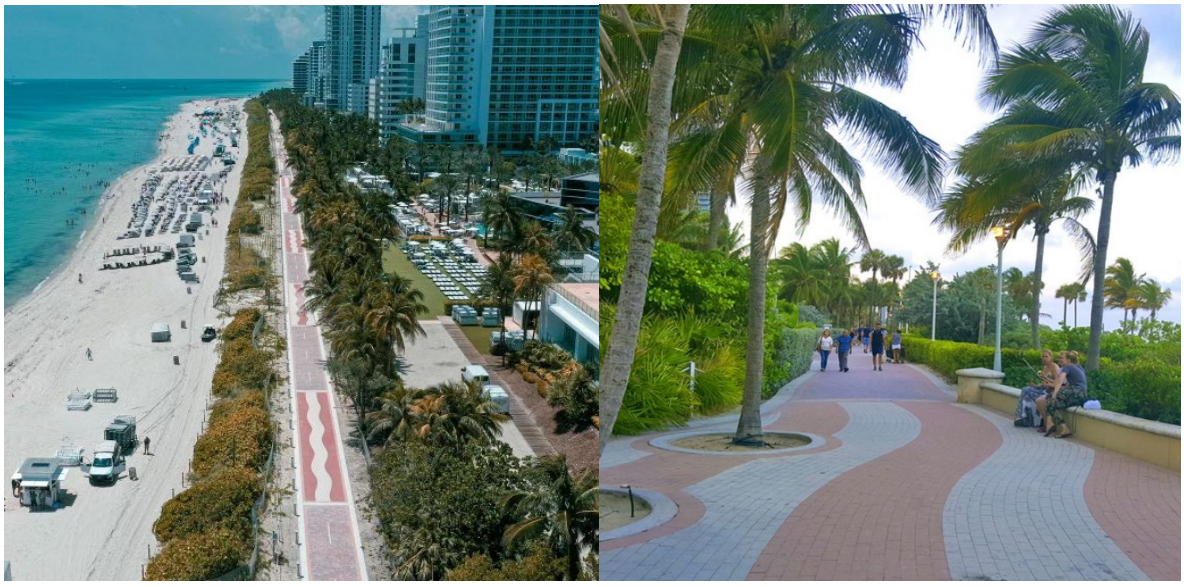
Exhibit 5 Resilient 305 Action Items: Status After Year One

Source: Resilient305, Office of Resilience, Miami-Dade Dept. Of Regulatory and Economic Resources of Miami-Dade County.

Exhibit 6 Road Raising Project in Miami Beach

Source: B137/Wikimedia Commons, February 15 2016, https://commons.wikimedia.org/wiki/File:Miami_Beach_rising_above_road_raising_2015_03.jpg, licensed under CC0 1.0 Universal (CC0 1.0) Public Domain Dedication, https://creativecommons.org/publicdomain/zero/1.0/deed.en, accessed May 2022.

Exhibit 7 Miami Beach's Beach-Walk



Source: Left: City of Miami Beach via https://twitter.com/MiamiBeachNews/status/1392111575490867203. Right: Miami New Times, https://www.miaminewtimes.com/best-of/2017/sports-and-recreation/best-jog-9406128.

Exhibit 8 Inner-City Neighborhoods in Miami

Exhibit 8a Overtown, Miami

Source: KultureVulturez.com, https://www.kulturevulturez.com/miami-ghetto-story/.

Exhibit 8b Housing in Overtown, Miami

Source: Sam Turken/WLRN, https://www.wlrn.org/news/2019-01-30/miami-redevelopment-agency-breaks-ground-on-overtown-affordable-housing-project.

Exhibit 9 Residences in Downtown Miami

Exhibit 9a

Source: Sobe Villas, https://sobevillas.com/sobe-villas-top-10-luxury-villas-in-south-beach-and-downtown-miami/.

Exhibit 9b

Source: Barry Winiker/Getty Images.

Exhibit 10 Miami Worldcenter, Rendering

Source: Paramount Miami Worldcenter. Paramount Miami Worldcenter, https://www.paramountmiami.com/miami.

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