Micromobility and Job Access in Miami

Models developed by the consulting firm Conveyal show that widespread availability of micromobility services in Miami-Dade County would allow commuters to access tens of thousands of additional jobs without using a car. Some key findings include:

- In the city of Miami, adding widespread micromobility services increases the number of jobs reachable by a substantial margin. On average, workers living in the City of Miami have access to 281,000 jobs within a 45 minute commute by walk or transit from home, compared to 394,000 jobs within a 45 minute walk, e-bike/e-scooter, or transit commute. This increase is equivalent to making 40 percent more jobs reachable without lengthening commutes or adding cars to the road.

- Some of these gains in job access have already been achieved by the Micromobility Pilot in Miami City Commission District 2, which gives some workers a faster last-mile option to connect to Downtown jobs. In City Commission District 5, a full micromobility scenario would enable workers to access an additional 93,000 jobs. Further expanding the availability of e-scooters and e-bikes could unlock substantial additional gains across the region.

- In each of Miami’s five city commission districts, widespread availability of micromobility options would result in access to tens of thousands of additional regional jobs, ranging from 85,000 in City Commission District 2 to 152,000 in City Commission District 1.

- County Commission Districts 3 and 5 see similar gains, with increases in average job access of 37 percent and 35 percent, respectively.

- Increases for certain home locations exceed 200,000 additional reachable jobs.

- For the average worker in some less central cities, such as Doral and Sweetwater, e-bike and e-scooter availability could more than double the number of jobs reachable in 45 minutes without a car.

Conveyal’s models were used to evaluate three scenarios for commuting without a car. The first scenario gauged baseline travel times by walking and public transit. The second scenario assessed a Pilot Micromobility scenario, with e-scooters or e-bikes available for trip segments starting in City Commission District 2 (with a five-minute pick-up delay). The third scenario, Full Micromobility, assumed these devices were available with a five-minute pickup delay region-wide. Conveyal then used U.S. Census Bureau data cataloguing residential and work locations to compare the number of jobs reachable within a 45-minute commute under each scenario.
The results demonstrate the breadth of expanded access to job opportunities that e-scooters and e-bikes can provide to the Miami region, without requiring longer commutes or adding cars to congested streets and highways.

Results

A Full Micromobility scenario would provide much more substantial job access gains throughout the region. The table below summarizes these results using weighted averages, describing the average change in job accessibility for workers in multiple jurisdictions.

The table below summarizes increases in number of jobs reachable for commuters starting in various locations in Miami-Dade County.
From NW 7th St. & 4th Ave. in Flagami, a 45 minute baseline commute by walking and public transit allows access to the area shown in red in the figure below, which contains 219,000 jobs. In the Pilot Micromobility scenario, commuters could use an e-bike or e-scooter from Coconut Grove or Douglas Road Stations, or other intermediate points in District 2, extending their reach and allowing access to 10,000 additional jobs. In the Full Micromobility scenario, commuters can combine micromobility and public transit to expand their reach in all directions, as shown in blue, allowing access to 157,000 additional jobs.

<table>
<thead>
<tr>
<th>Area reachable from Flagami within 45 minutes (total time, including transit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>in Baseline scenario</td>
</tr>
<tr>
<td>in Full Micromobility scenario</td>
</tr>
<tr>
<td>Sample Origin</td>
</tr>
<tr>
<td>City District Boundary</td>
</tr>
</tbody>
</table>

![Map of Miami showing area reachable from Flagami within 45 minutes](image)
From Calle 8 and 17th Ave. in Little Havana, baseline access by transit and walking is limited, in part due to this origin’s distance from Metrorail stations. Micromobility allows faster connections to Metrorail and other transit, expanding the area reachable north and south along Metrorail and increasing the number of jobs reachable in 45 minutes by 102,000.
From NE 62nd St. & Miami Ave. in Little Haiti, commuters in the baseline can barely access Downtown and Miami Beach. Micromobility enables expanded access to the surrounding areas and the Miami International Airport, increasing the number of jobs reachable by 95,000.
From Shenandoah, walking and transit trips allow access north along 22nd Ave, west along 8th St. and Coral Way, and south along Metrorail. Micromobility complements these options, unlocking access to 161,000 additional jobs.
For 45-minute commutes from South Beach, the Pilot Micromobility scenario increases jobs reachable by 25,000 and the Full Micromobility scenario increases jobs reachable by 32,000. Notably, the pilot in District 2 already helps connect people to job centers around Brickell. Availability of micromobility services beyond the pilot area enables some additional job access gains, and there might be further gains for commute durations longer than 45 minutes.
For a 45-minute commute from Doral Central Park, micromobility would increase the number of jobs reachable by 60,000.
For a 45-minute commute from Dolphin Mall in Sweetwater, micromobility would increase the number of jobs reachable by 49,000.
For a 45-minute commute from Florida International University, micromobility would increase the number of jobs reachable by 62,000.
This comparison was repeated, calculating the increase in number of jobs reachable within 45 minutes, for origins throughout the Miami region. The results are shown in the figure below for the Full Micromobility versus baseline scenario. Accessibility increases are widespread. For neighborhoods around Miami Springs, South Miami, and Coral Gables, the increase in jobs accessible without a car exceeds 200,000. Many of the areas with the largest job access gains are just beyond the assumed walking distance from Metrorail stations, highlighting the role that micromobility can play extending the reach of public transit.
The Pilot Micromobility scenario was also compared against the baseline. As expected, the largest gains in job access occur in City Commission District 2, where devices are assumed to be available in the Pilot Micromobility scenario. Even if transit commuters from surrounding areas do not have access to e-bikes and e-scooters near their homes, the availability of micromobility services as a last-mile option downtown allows access to thousands more jobs.
Methodological Details

In the baseline scenario, total travel time includes public transit time (time spent waiting at stops, riding in vehicles, and transferring, when applicable), stop access (walking up 30 minutes at 3.1 mph from an origin to nearby public transit stops), and stop egress (walking up to 30 minutes at 3.1 mph from public transit stops to final destinations).

In the micromobility scenarios, total travel time includes public transit time (as above), stop access (riding up to 30 minutes at 9.9 mph to nearby transit stops), and stop egress (riding up to 30 minutes at 9.9 mph from public transit stops to final destinations). To model e-bike/e-scooter pickup time, an assumption was made that travelers wait for 5 minutes before starting a segment of the trip by e-bike/e-scooter, then proceed by e-bike/e-scooter. The Pilot Micromobility scenario assumes micromobility devices are available for trip segments starting within the boundaries of City Commission District 2. The Full Micromobility scenario assumes micromobility devices are available for trip segments starting anywhere in the region.

In all scenarios, travelers can also reach destinations directly, without using transit, for trips up to 30 minutes. For transit, the assumption was made that travelers generally consult schedules and adjust their departure times within a window to avoid excessive waiting time; this is represented by using the 25th percentile travel times for trips starting between 7 AM and 9 AM on a typical weekday (July 19, 2019). For additional details and assumptions, see the source code of the multimodal routing algorithm used in this analysis.

Public transit network and schedules are derived from the General Transit Feed Specification (GTFS) files published by Miami-Dade Transit and SFRTA/Tri-Rail. Job and worker location data are derived from the 2015 Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics (LODES) published by the US Census Bureau. This dataset includes block-level job locations, though in some cases, locations reflect administrative addresses. For example, this dataset appears to code most Miami-Dade public school jobs at the district headquarters, rather than at individual schools. Street networks are derived from OpenStreetMap (OSM). The basemap data in the figures above is from OpenStreetMap © contributors.