

The Ins and Outs of NYC Commuting

An examination of recent trends and characteristics of commuter exchanges between NYC and the surrounding Metro Region

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Background

NYC, hub of the largest metro U.S. economy, is part of an **interconnected regional ecosystem that relies upon a dynamic exchange of workers**, a shared transportation infrastructure, and the regional availability of housing and other resources.

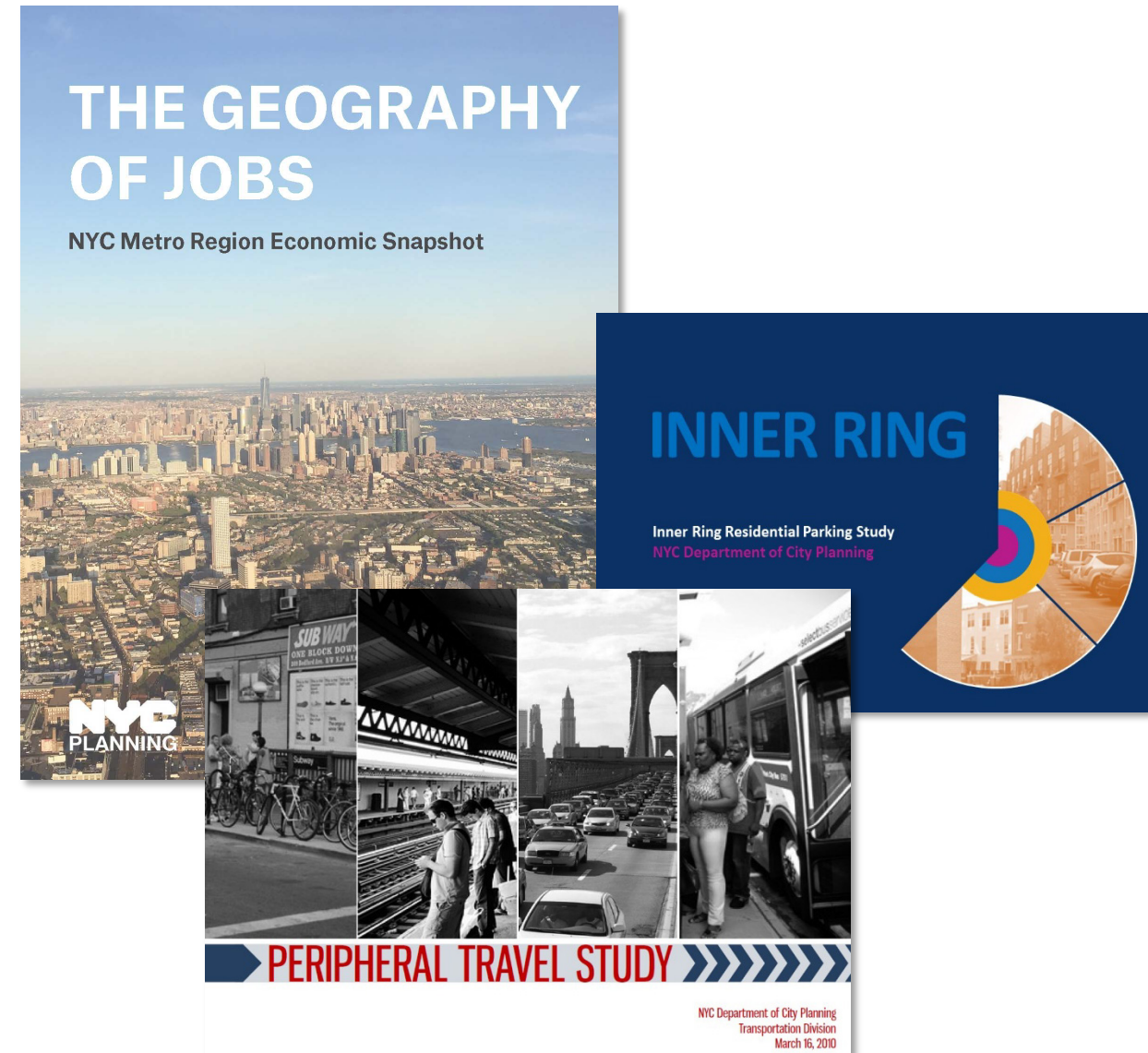
Building on trends identified in *The Geography of Jobs*, this report examines geographic and socioeconomic characteristics of NYC in- and out-commuters.

NYC, hub of the largest metro U.S. economy, is part of an **interconnected regional ecosystem that relies upon a dynamic exchange of workers**, a shared transportation infrastructure, and the regional availability of housing and other resources.

The Geography of Jobs, released in July 2018, highlighted recent **geographic shifts in the region's employment, labor force, and housing growth**, which have implications for regional commuting patterns and transit infrastructure.

The Ins & Outs of NYC Commuting seeks to provide an understanding of the geographies and socioeconomic characteristics of **workers traveling to NYC from outside the city for employment (in-commuters)**, as well as **NYC residents traveling elsewhere in the region for employment (out-commuters)**. It also reports on changes in these regional patterns since 2000, and compares those changes to overall shifts happening within NYC.

This report specifically examines the relationship between the NYC and regional labor force. It also builds on an established base of research examining movement within NYC. Previous studies are available on the Department of City Planning's website.

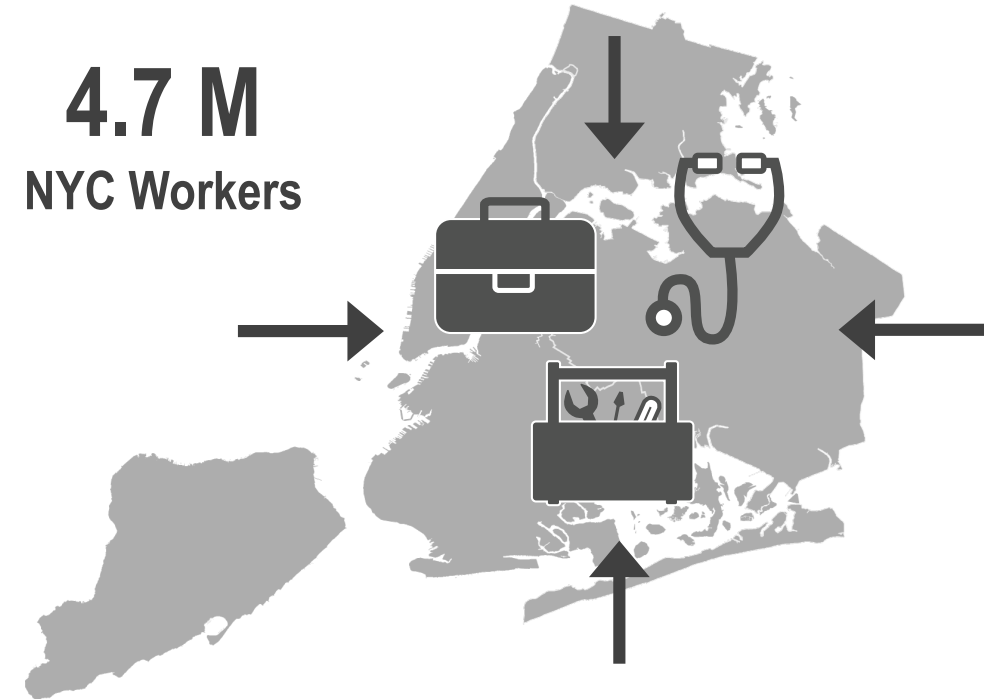


New York City residents and businesses are actors in a regional marketplace for talent that functions across political boundaries.



More than half of NYC residents work within their home boroughs, but the rest work elsewhere in the city or region.

More than half of the 4.2 million working New Yorkers work within their home boroughs. But the rest work elsewhere in the city or region. That mobility allows for a wider range of employment options, and supports economic growth across the NYC Metro Region.



NYC employers' ability to access a vast network of workers living within the city and region sustains the NYC economy.

80% of the 4.7 million employees working in New York City live within the five boroughs. The other 20% are housed outside the city and commute into NYC. That flexibility enables the city's businesses to grow, allows workers to access a wider range of housing options, and relieves pressure on NYC's housing market by complementing city housing production with suburban markets.

To examine commuter movements between residence and workplace, this report looks at “subregional” exchanges between NYC and different parts of the metro area.

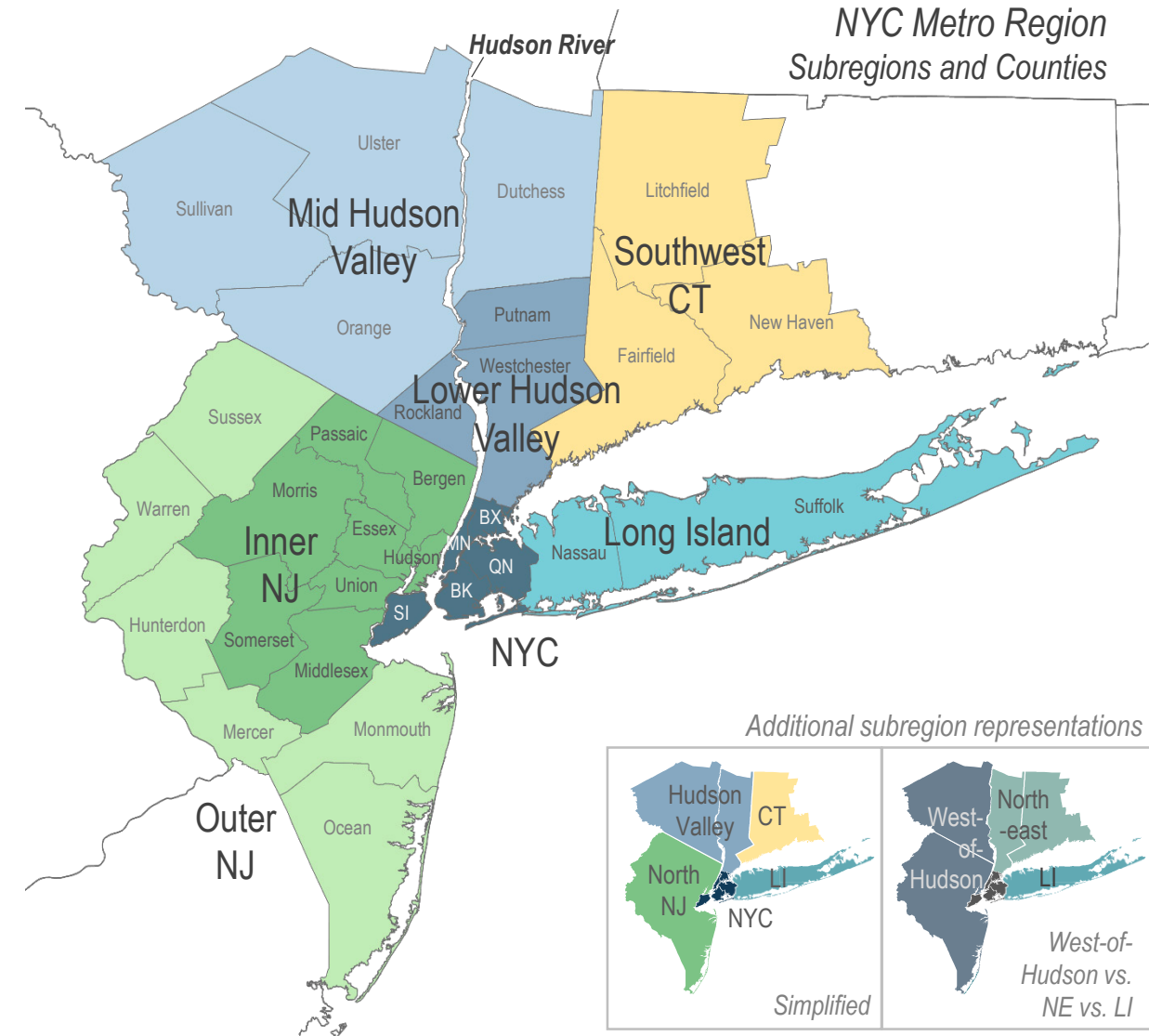
Report Geographies

This report examines worker exchanges within the 31-county NYC Metro Region (“the Region”) at a “subregional” geographic level. These subregions, shown at the right, are aggregations of counties relative to their locations to NYC, and do not represent formalized geographies or jurisdictional boundaries. The Mid and Lower Hudson Valleys are also aggregated as the “Hudson Valley”, and Inner and Outer NJ are aggregated as “North New Jersey” for statistical reliability and conceptual simplicity. This report also examines flows to NYC from west of the Hudson River versus areas north and east of NYC as it relates to transit infrastructure. Within NYC, data are reported by borough, and by Manhattan versus Non-Manhattan Borough (Bronx, Brooklyn, Queens, Staten Island) work destinations.

Methodology Overview

This report explores characteristics and origin-destination relationships of employed NYC Metro Region residents primarily using U.S. Census Bureau American Community Survey (ACS) and Decennial Census products from the IPUMS-USA database. The following basic terms describing origin-destination movements in this report are defined as follows:

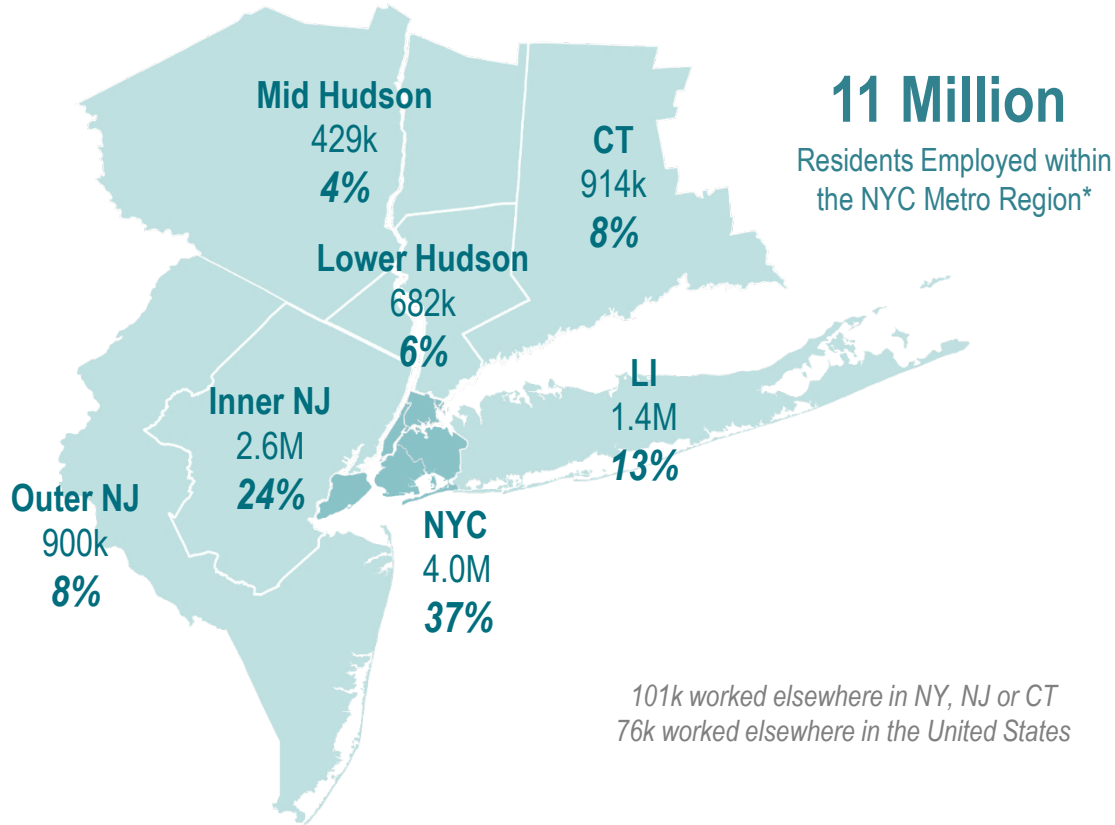
- **Residents:** employed persons at/by their location of residence, which represents the origin of their commute.
- **Workers or Workforce:** employed persons at/by their primary location of work, or commute destination. This does not account for secondary locations or other forms of employment beyond the reported primary job destination.
- **NYC In-commuters:** Residents of the 26 non-NYC regional counties who work in NYC.
- **NYC Out-commuters:** NYC residents employed outside of NYC, but within the NYC Metro Region.



Today, the NYC Metro Region is home to 11 million residents who live and work in this metro.



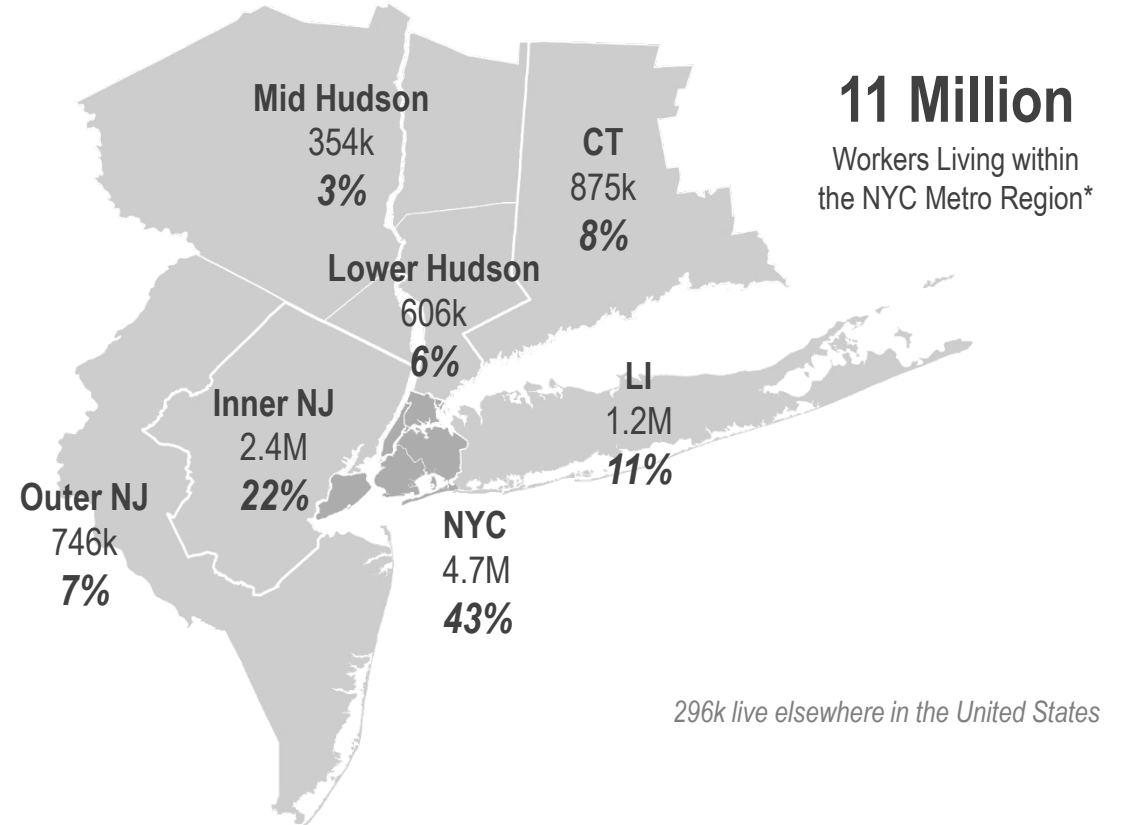
Where NYC Metro Region Resident Workers Live & Subregional Share of Metro Total, 2017



The distribution of the region’s employed residents generally mirrors the region’s population distribution, with NYC home to the largest share of the Region’s employed resident labor force. There are also nearly 200k regional residents who report that their primary place of work is located outside of the NYC Metro Region.



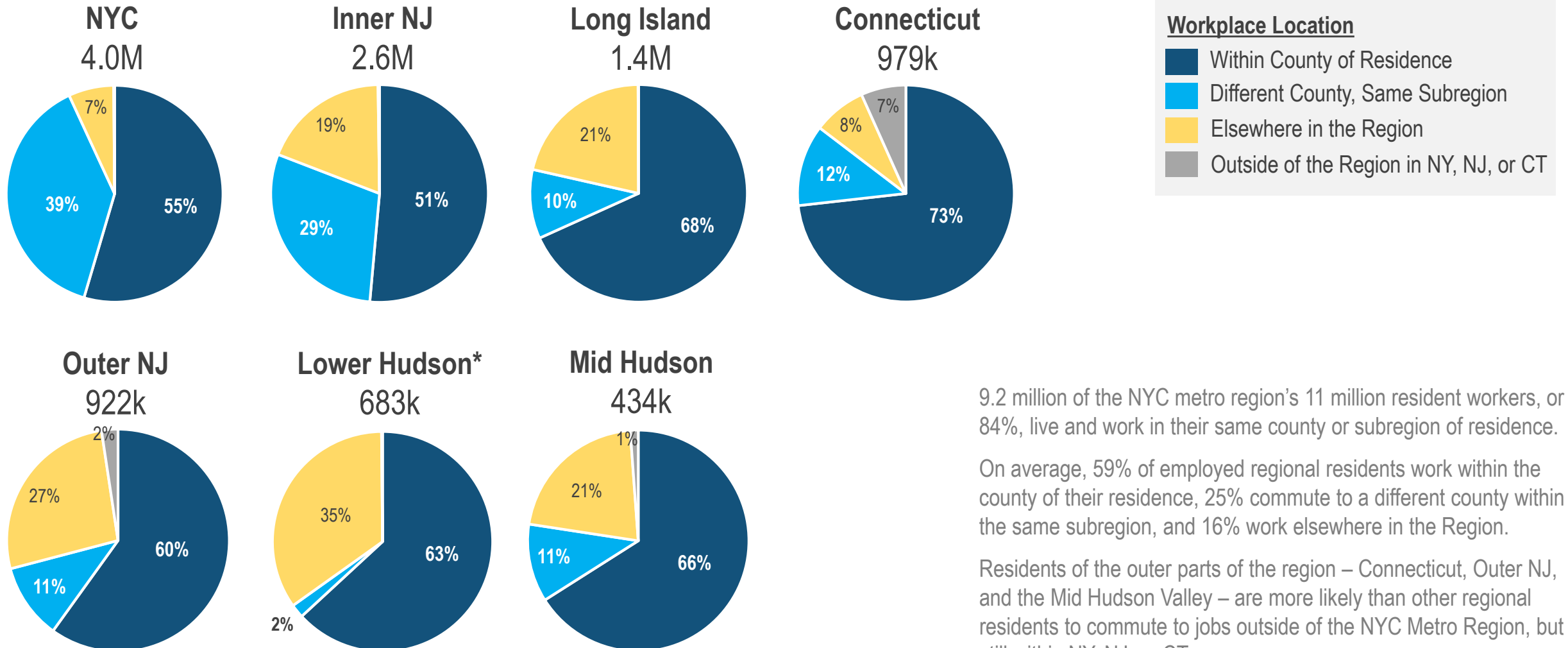
Where NYC Metro Region Residents Work & Subregional Share of Metro Total, 2017



Today, there are 11 million workers who are residents of the Region. NYC has a higher share of the Region’s workers than of employed residents, 43% versus 37% respectively. NYC is the only subregion within the metro area that has a higher number of workers than of employed residents.

Most people who live in the NYC Metro Region work close to home.

Where All NYC Metro Region Residents Work by Subregion of Residence, 2017



9.2 million of the NYC metro region’s 11 million resident workers, or 84%, live and work in their same county or subregion of residence.

On average, 59% of employed regional residents work within the county of their residence, 25% commute to a different county within the same subregion, and 16% work elsewhere in the Region.

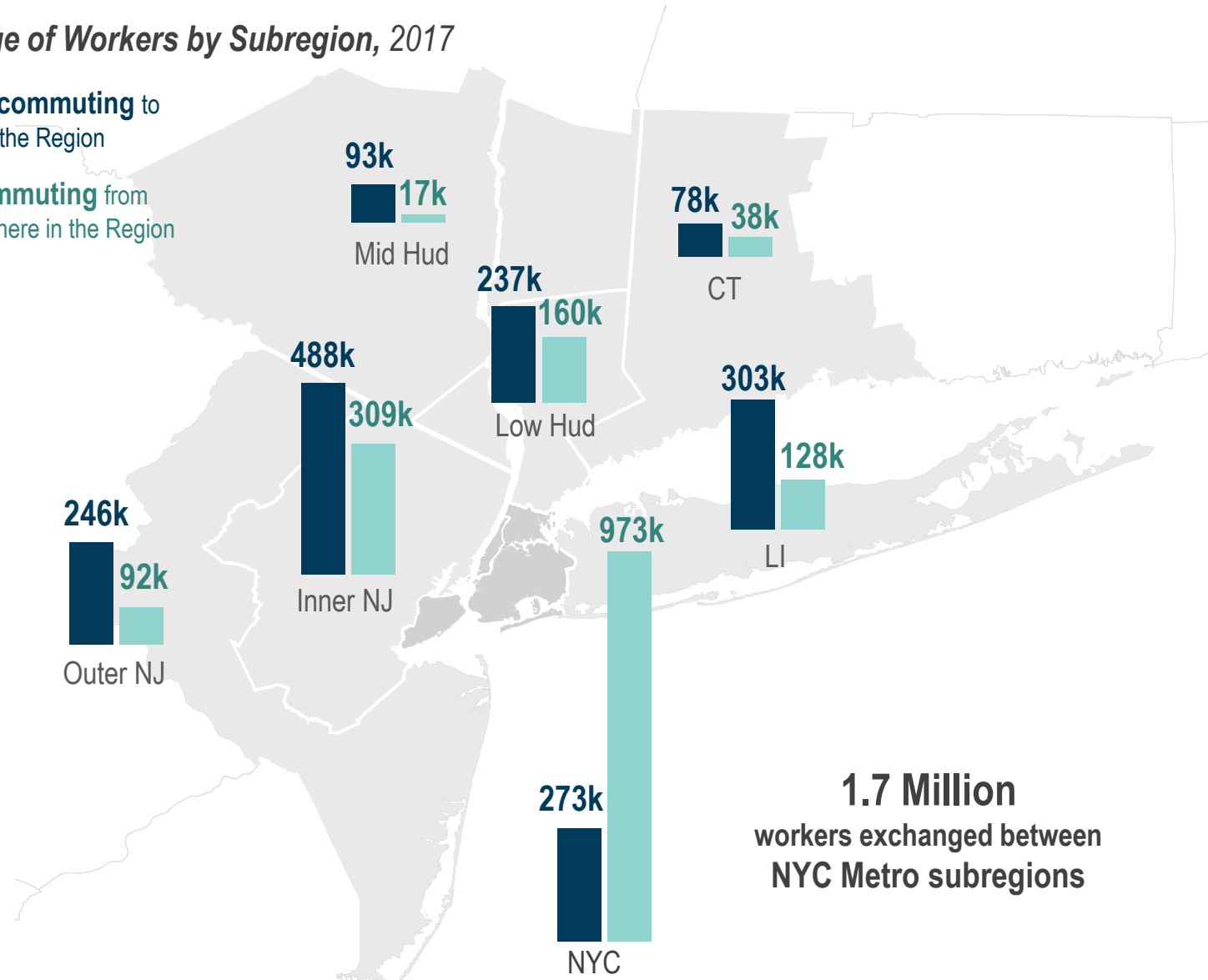
Residents of the outer parts of the region – Connecticut, Outer NJ, and the Mid Hudson Valley – are more likely than other regional residents to commute to jobs outside of the NYC Metro Region, but still within NY, NJ, or CT.

NYC PLANNING *Putnam and Westchester counties are aggregated as a workplace geography by the U.S. Census Bureau. Therefore, the 63% represented here includes Westchester residents who work in Putnam County and vice versa. For more information, please refer to the appendix of this report. Source: IPUMS-USA, University of Minnesota; U.S. Census Bureau ACS 1-Year Estimates 2017

Most workers who commute to other parts of the Region for work commute to NYC.

Regional Exchange of Workers by Subregion, 2017

- Residents out-commuting to jobs elsewhere in the Region
- Workers in-commuting from residences elsewhere in the Region



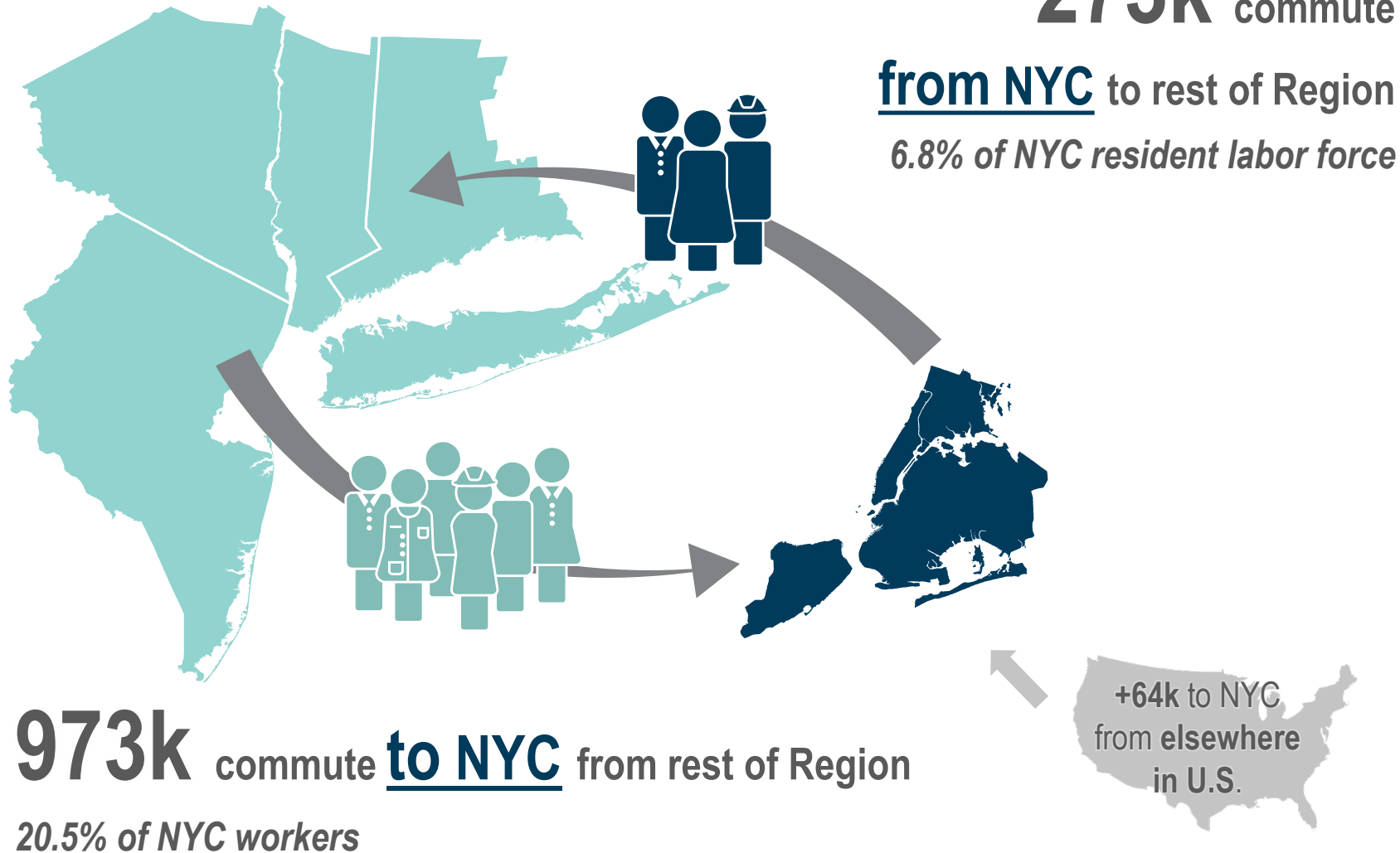
1.7 Million
workers exchanged between
NYC Metro subregions

1.7 million employed regional residents (16% of the total) work in a different subregion than the one in which they live, representing the total exchange of workers within the NYC Metro Region. Two-thirds of that regional exchange is between NYC and other parts of the region, and NYC is the only subregion to have more in-commuters than out-commuters.

While 273k NYC residents out-commuting to other parts of the region is small in comparison to the 973k NYC in-commuters, it makes NYC the third-largest source of out-commuters, after Inner NJ and Long Island. Additionally, those 273k NYC residents represent 36% of total in-commuters to the other six subregions combined (750k), making NYC the largest source of commuting workforce for the other subregions.

NYC draws one-fifth of its workforce from elsewhere in the NYC Metro Region, and is also a significant source of workers for surrounding counties.

NYC Regional Exchange of Workers, 2017

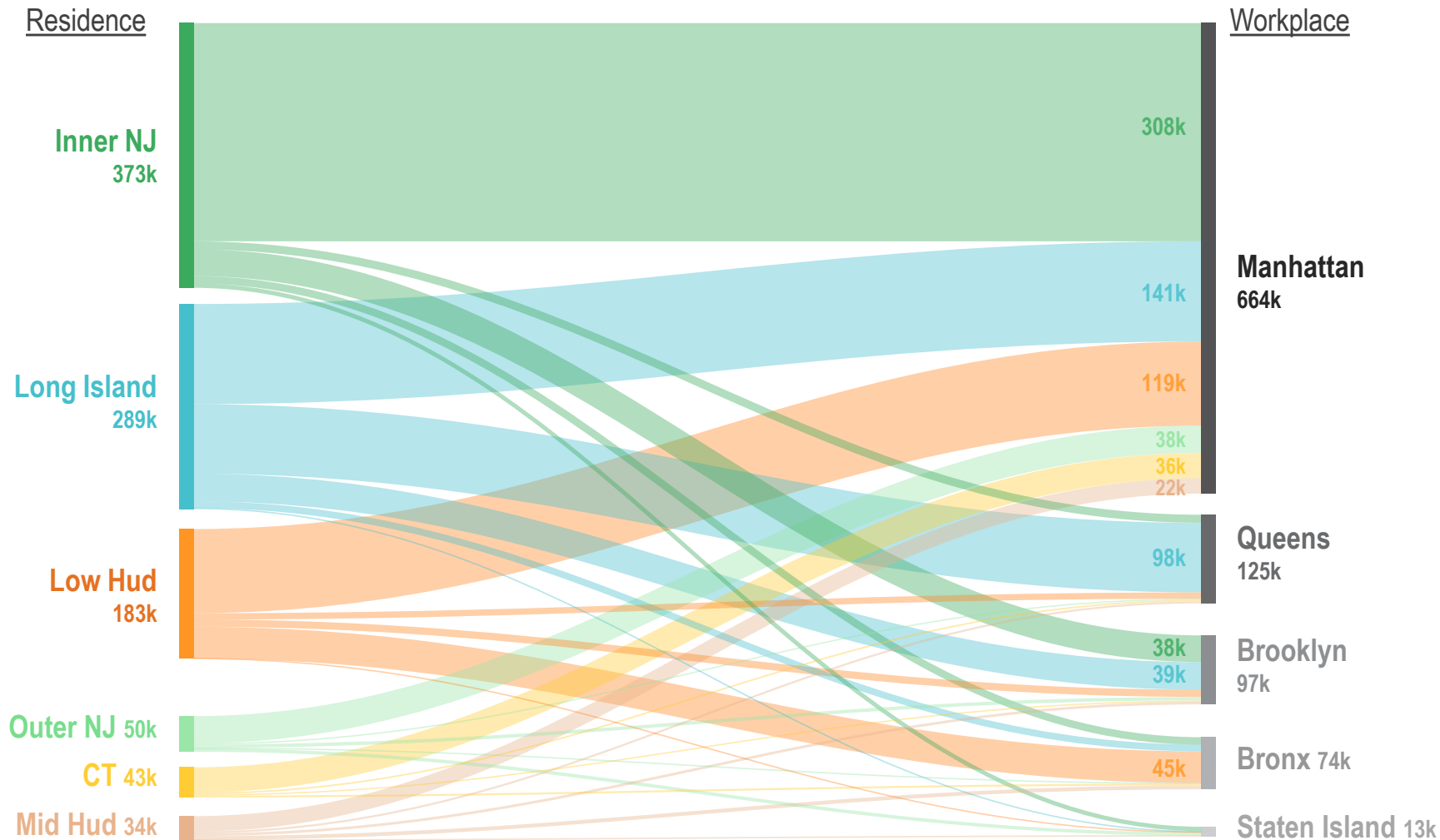


The ability to draw on a broad and diverse regional workforce is a major asset for employers located in NYC's central business districts. Nearly 1 million workers enter NYC every day for work, representing approximately 20% of the city's workforce.

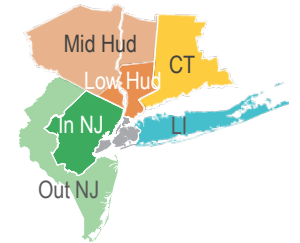
There are an additional 64k commuters to NYC from other parts of the United States. About one-third of those domestic in-commuters traveled from areas just outside the NYC Metro Region in New York, New Jersey, Connecticut, and Pennsylvania, and others are likely temporarily visiting the city for work.

Those 973k NYC in-commuters live throughout the region, and work in all five boroughs.

Where NYC In-Commuters Live and Work, 2017



In-Commuter Residence

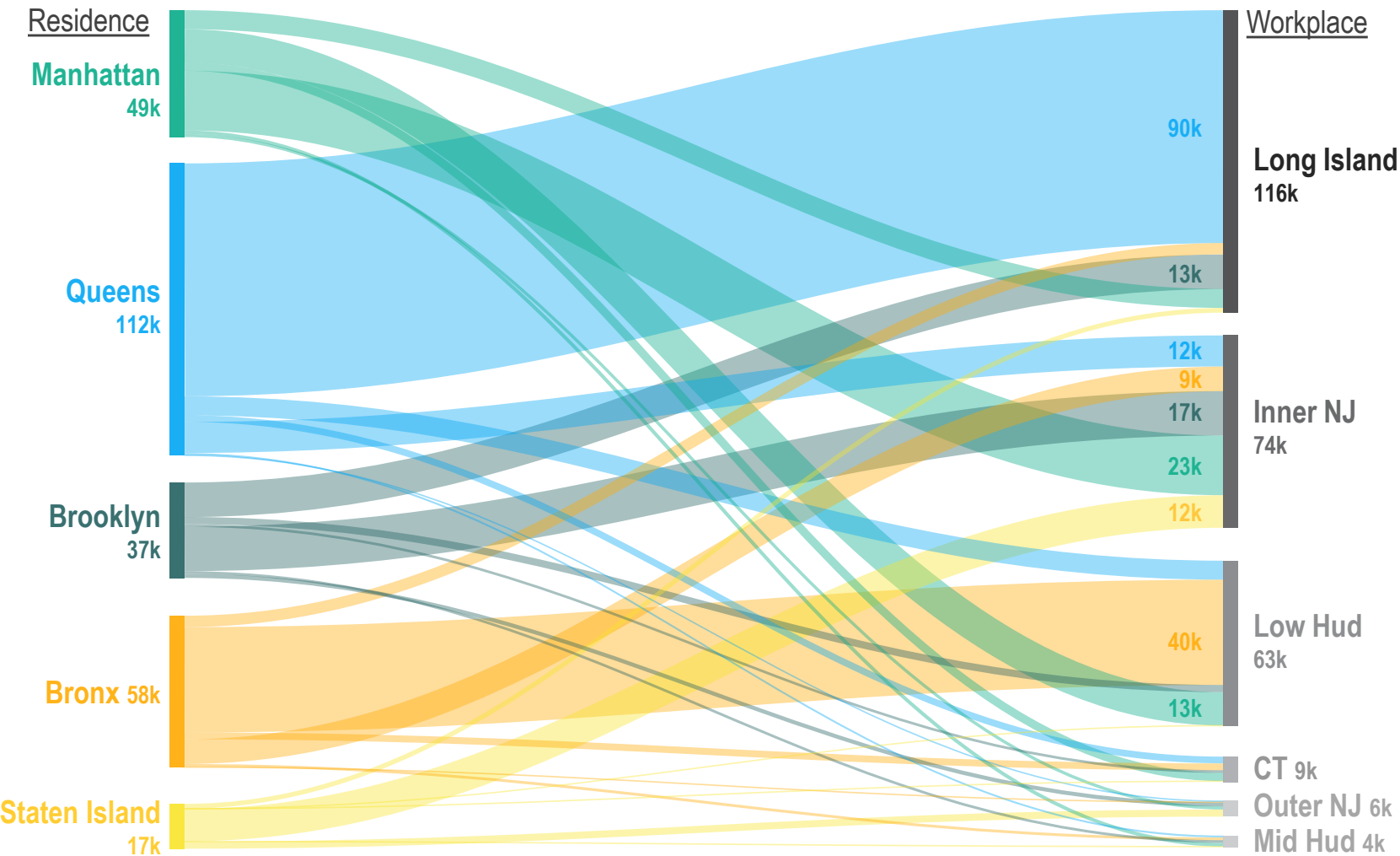


The flow of in-commuters to NYC from the rest of the region is dynamic, with in-commuters traveling to work in all five boroughs. While Manhattan is the destination for the majority of regional in-commuters, the distribution of where workers travel to varies by their subregion of residence. For example, as represented proportionally at the left, a greater share of Inner NJ residents travel to Manhattan for work than Long Island residents, who travel to Manhattan roughly at scale with those residents who travel to work in Queens.

Similarly, the 273k NYC residents out-commuting to the Region live throughout the city.

Where NYC Out-Commuters Live and Work, 2017

Out-Commuter Residence



NYC residents out-commuting to the region for work generally travel to adjacent areas or to areas with regional transit access between their residence and workplace. Out-commuting patterns further highlight the economic interrelationship between Queens and Long Island, and the Bronx and the Lower Hudson Valley. It also illustrates the volume of flow between areas connected to regional rail transit, such as Brooklyn and Long Island, and Manhattan and Inner NJ.

NYC's workforce exchange with the NYC Metro Region relies on the nation's most extensive transit and infrastructure network.

Regional Transit Service to NYC

NJ TRANSIT BUS

70 Manhattan-Bound Routes

Privately Operated Bus

70 Manhattan-Bound Routes

NJ TRANSIT RAIL

6 Branches

PATH

4 Routes

21 Ferry Routes

MTA Metro-North Railroad
3 Branches

the *bee-line* system

16 Routes

MTA Long Island Rail Road
11 Branches

nice NASSAU INTER-COUNTY EXPRESS
10 Routes

MTA New York City Transit BUS & SUBWAY

NYC Ferry



Commuters traveling via transit
58% of NYC workers vs. 5% of U.S. workers

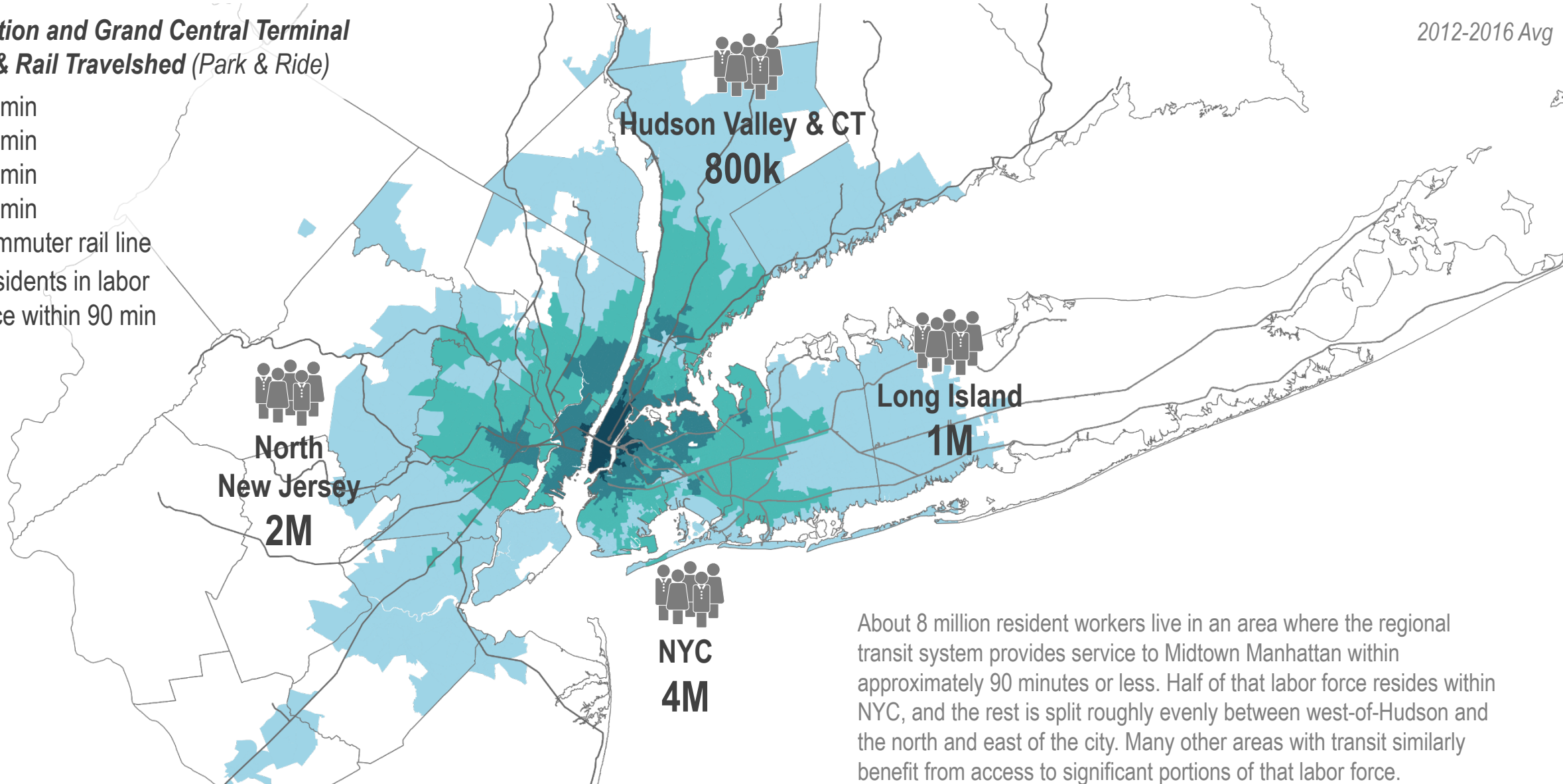
The NYC Metro Region has the largest non-auto mode share of any U.S. metro region, which is in part made possible by a vast transit network of trains, buses, and ferries primarily oriented in a hub and spoke pattern around Manhattan Island.

The transit network enables NYC to have a commuter shed with considerable regional access to Midtown Manhattan, as well as other destinations along the rail corridors.

Penn Station and Grand Central Terminal Subway & Rail Travelshed (Park & Ride)

2012-2016 Avg

- < 30 min
- < 45 min
- < 60 min
- < 90 min
- Commuter rail line
- Residents in labor force within 90 min

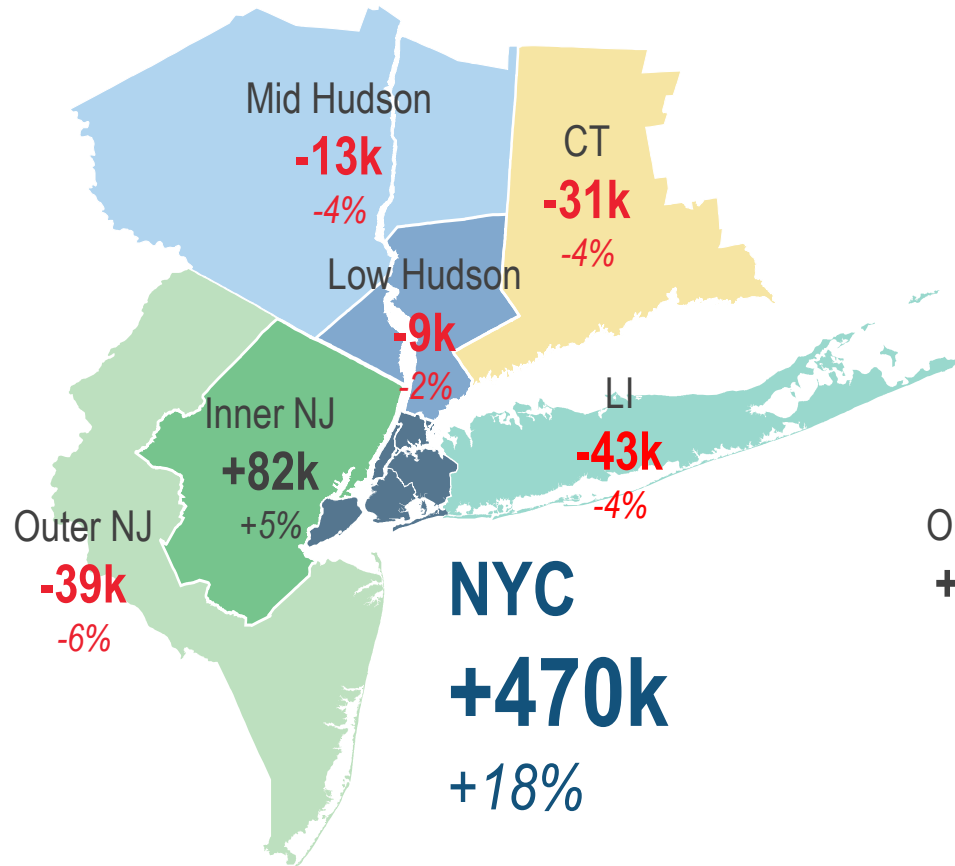


About 8 million resident workers live in an area where the regional transit system provides service to Midtown Manhattan within approximately 90 minutes or less. Half of that labor force resides within NYC, and the rest is split roughly evenly between west-of-Hudson and the north and east of the city. Many other areas with transit similarly benefit from access to significant portions of that labor force.

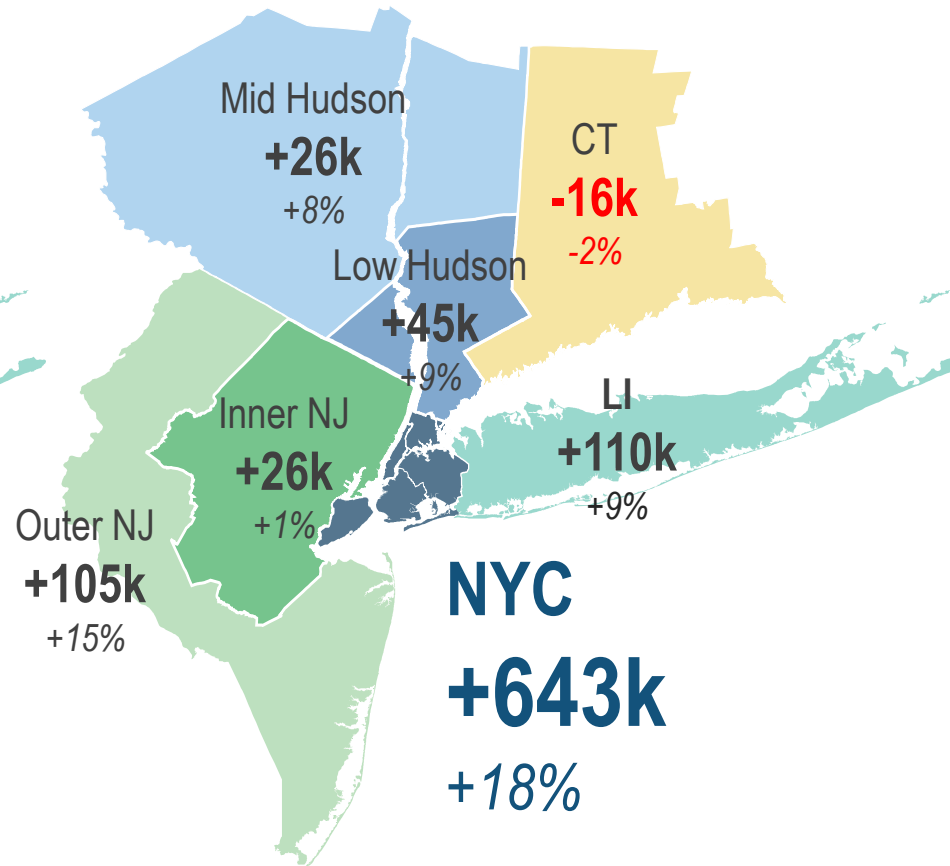
NYC PLANNING Travelsheds are calculated by NYCDPC using OpenStreetMap and General Transit Feed Specification Data for the 31-county region, and represent park-and-ride public transit trips to Penn Station and Grand Central Terminal, and do not include vehicular travel. Travel time is shown at the U.S. Census Tract level, with centroids of the blocks used as the origins of the trips. Source: U.S. Census Bureau ACS 5-Year Estimates 2012-2016

Recent job and labor force growth trends highlight the importance of coordinating transportation infrastructure with housing and employment changes.

ΔLabor Force Participants Aged 25-54
2000 – 2013-2017 Avg.



ΔTotal Employment, 2000 – 2017



NYC: 113% of regional net gain

NYC: 69% of regional net gain

Most of the Region's job growth between 2000 and 2017 occurred in NYC, with the largest share of gains located in the Manhattan central business district. The majority of the Region's growth of labor force aged 25 to 54 also occurred in NYC, 84% of which was in the boroughs outside Manhattan. Inner NJ was the only other part of the region that gained this labor force cohort since 2000, but it also experienced much slower job gains over the period. As a result, rivers separate the areas of greatest job growth from the areas of greatest labor force growth, including within NYC.

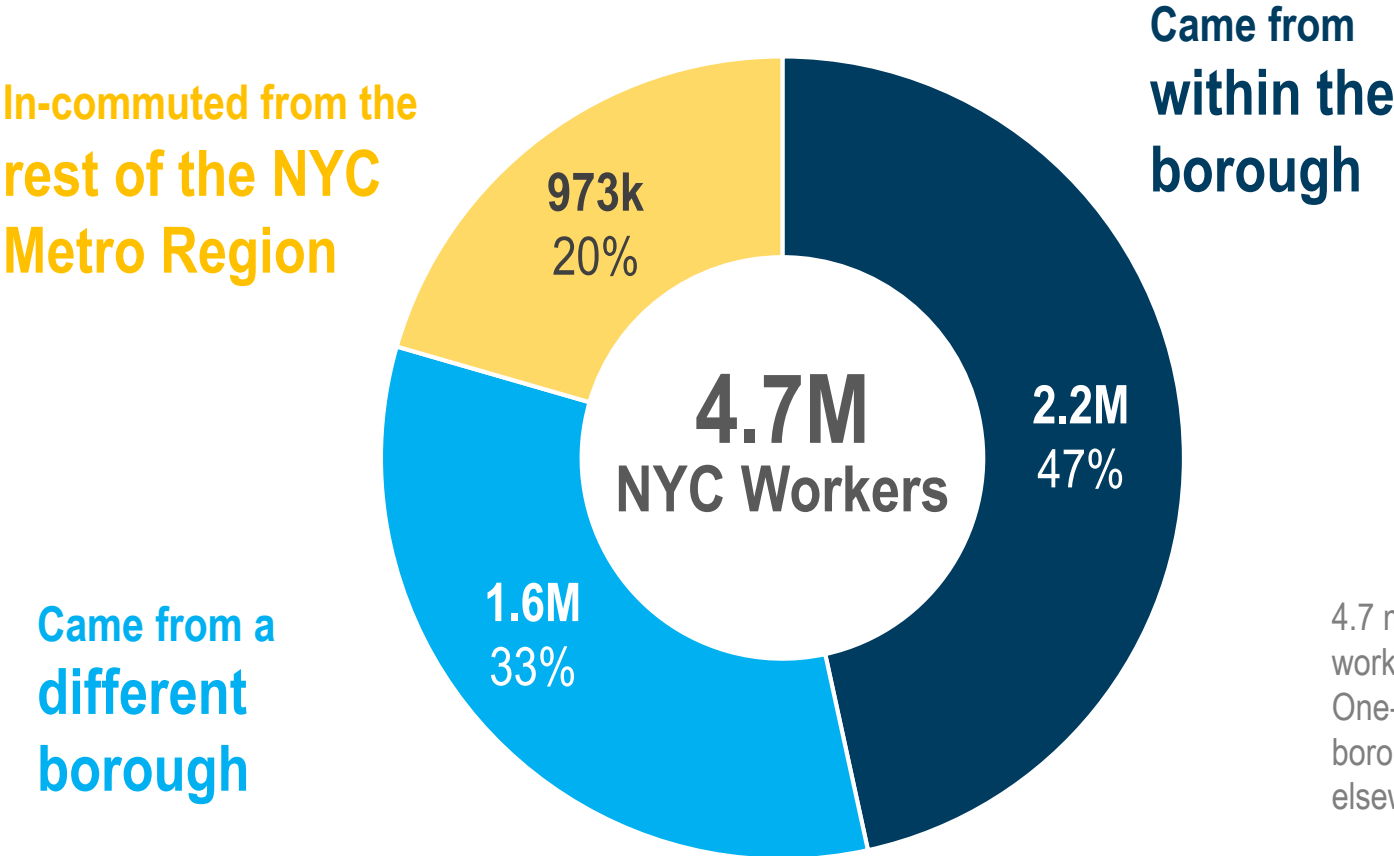
Geographic disparities between labor force and job growth highlight the significance of the subway and regional rail infrastructure linking the region's labor force to its economic center, as well as the potential for job growth outside Manhattan in areas closer to labor force growth to alleviate stress on our transportation network.

Insight #1

Though the total numbers of regional residents in-commuting to NYC and NYC residents out-commuting from NYC have increased, **NYC residents are increasingly finding economic opportunity within the city, especially within their boroughs of residence.**

While most NYC workers reside in the city, in-commuters represent a substantial proportion of the city's workforce.

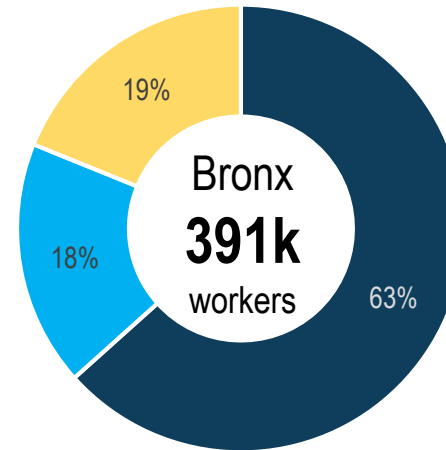
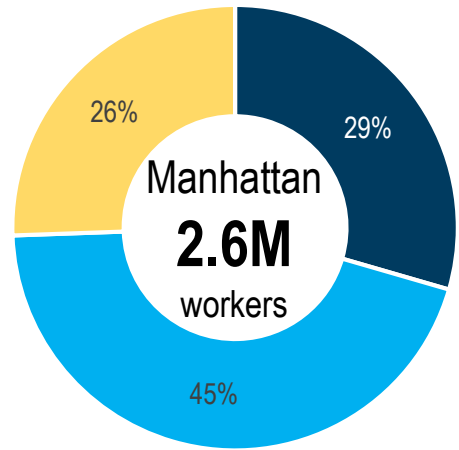
*Where NYC Workers Commuted From, 2017
(NYC Average)*



4.7 million people work in NYC. Nearly half of NYC workers reside and work within the same borough. One-third of NYC workers commute from another borough, and 20% of workers commute from elsewhere in the NYC Metro Region.

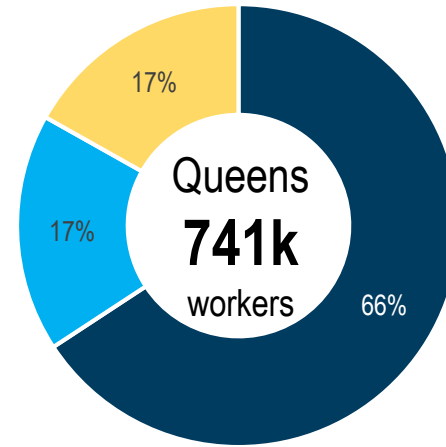
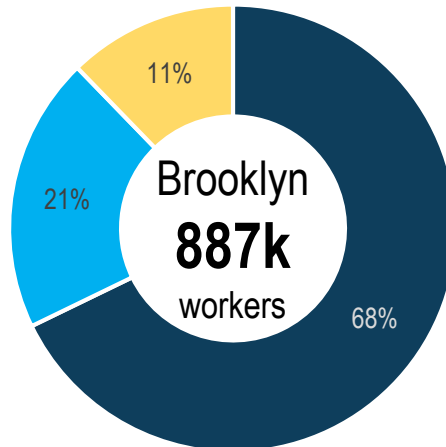
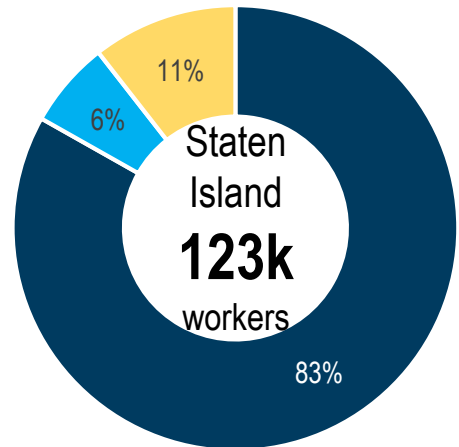
Manhattan has the highest share of nonresident workers of the five boroughs, and Staten Island has the lowest.

Where NYC Workers Commuted From at Borough of Workplace, 2017



NYC Workers' residence

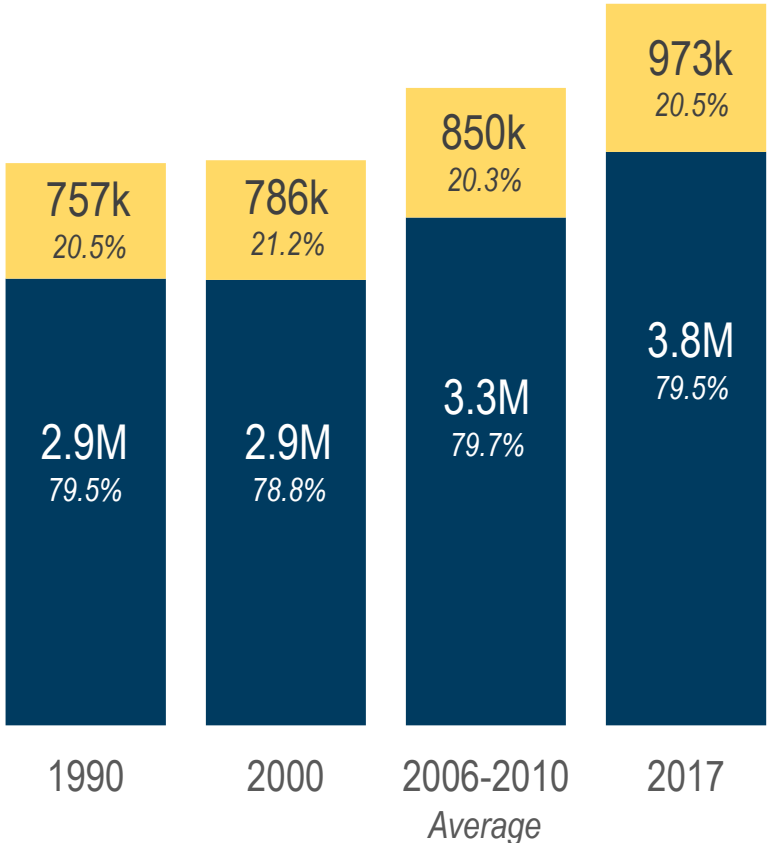
- From within workplace borough
- From a different NYC borough
- In-commute from the Region



Manhattan, which has the largest workforce, also has the highest share of non-resident workers, most of whom commuted from another borough. Non-Manhattan Boroughs averaged 67% of workers traveling from within the borough. Staten Island has the lowest share of non-resident workers, though it has a higher share of regional in-commuters than NYC workers commuting from a different borough.

Since 2000, growth of the NYC resident workforce has outpaced the growth of the in-commuter workforce.

Where NYC Workers Commuted From From Within NYC vs. In-Commuters from Region



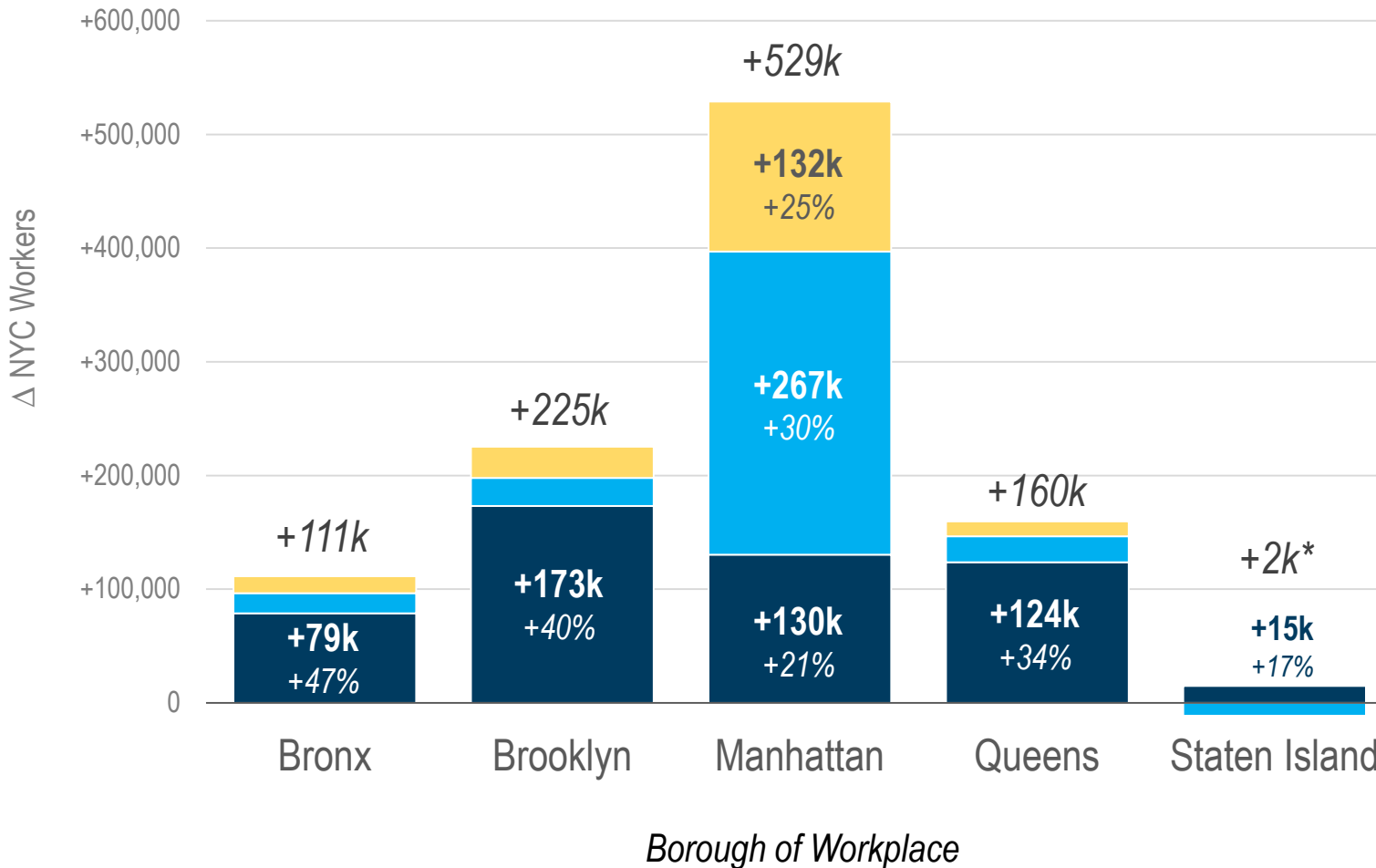
ΔNYC Workers 1990 to 2017



From 1990 to 2000, the size of the NYC workforce remained relatively stable. From 2000 to 2017, the city’s workforce grew by 1 million workers, representing a 28% increase. Over that time period, the NYC resident workforce grew by +29%, while the NYC in-commuter workforce grew by +24%. As a result, in-commuters became a slightly smaller component of the NYC workforce, returning to 1990 share of 20.5% of total.

Outside of Manhattan, which has more jobs than employed residents, workers in Non-Manhattan Boroughs have become more likely to commute from within the borough.

△Where NYC Workers Commuted From at Borough of Workplace, 2000 to 2017



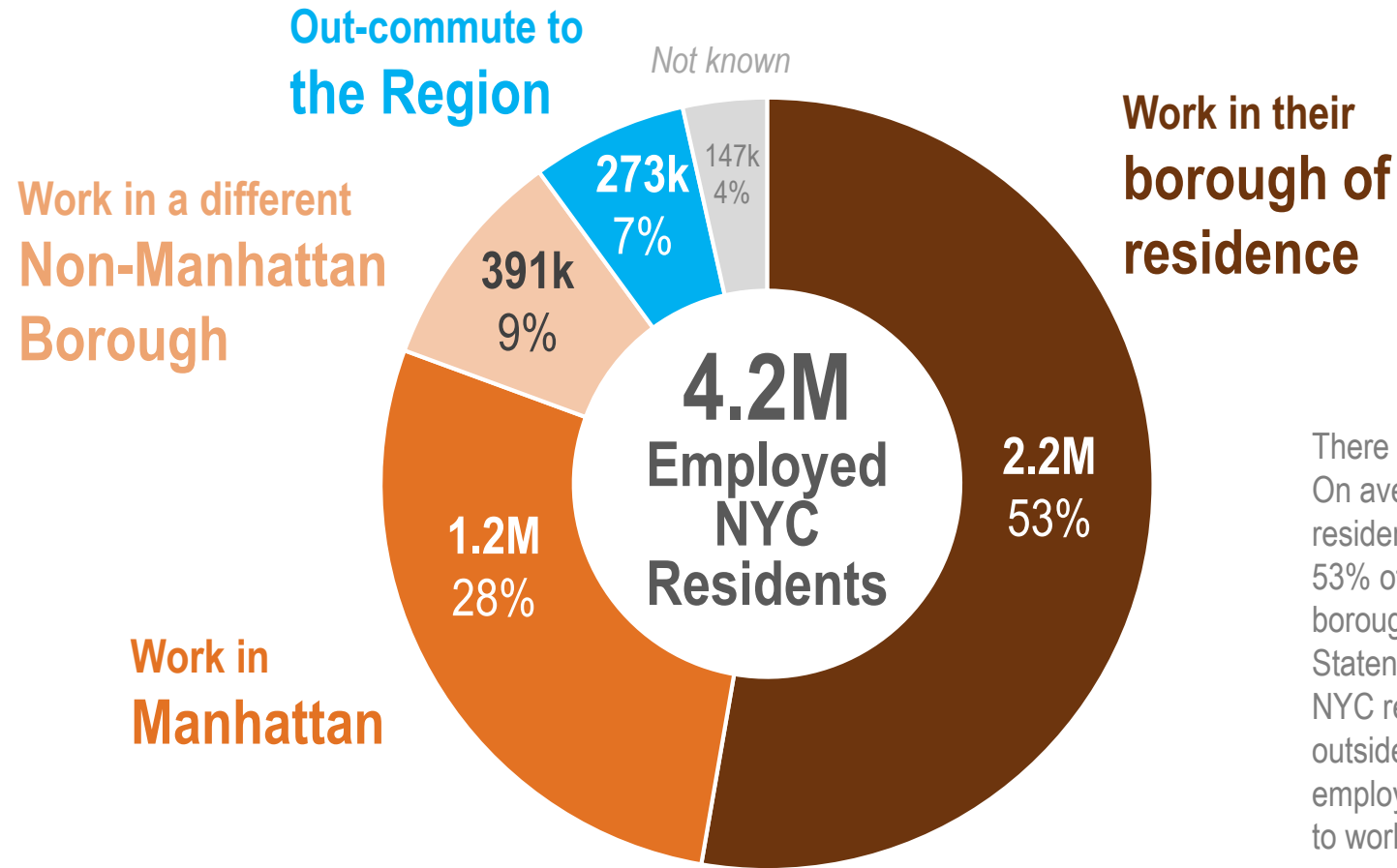
NYC Workers' Residence

- In-Commuted from Region **+186k**
- From Other Borough **+320k**
- From Within Borough **+521k**

Since 2000, the majority of workforce growth in the Bronx, Brooklyn, Queens, and Staten Island was attributable to the gain of residents employed within those boroughs. In Manhattan, the gain of non-resident workers outpaced the gain of Manhattan resident workers. Though the gain of in-commuters and Manhattan borough residents were roughly the same in absolute terms, the greatest workforce gain in Manhattan resulted from an increase in residents of Non-Manhattan Boroughs commuting to Manhattan.

Most NYC residents work within their borough of residence or in Manhattan.

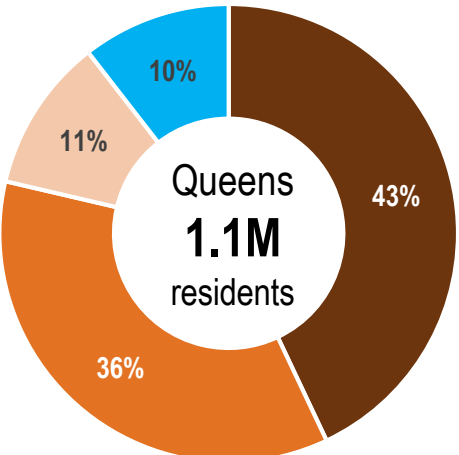
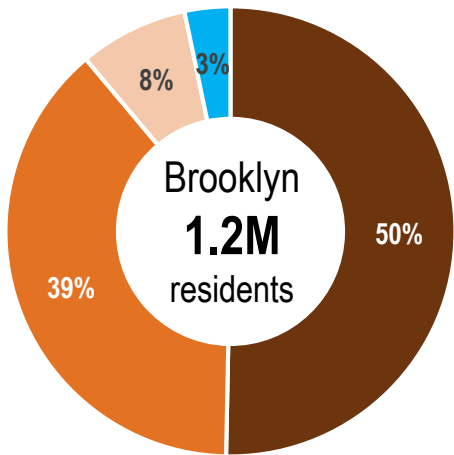
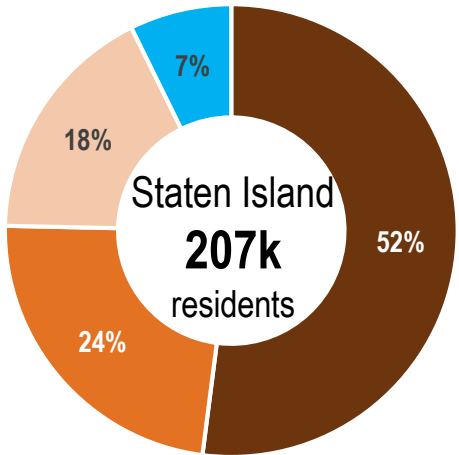
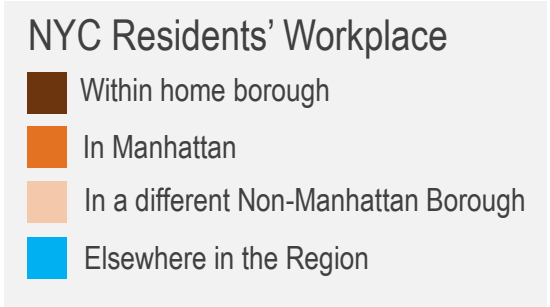
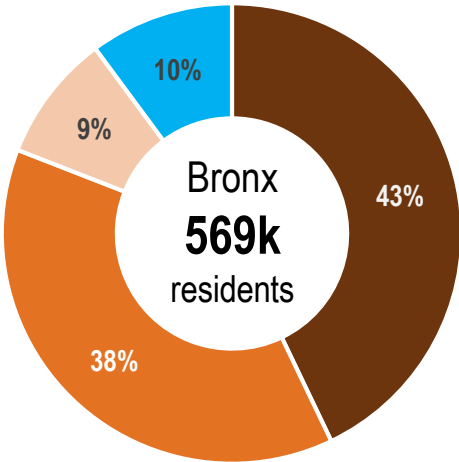
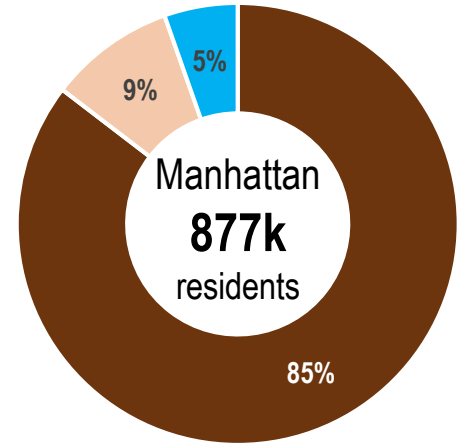
Where NYC Residents Work, 2017
(NYC Average)



There are 4.2 million employed NYC residents. On average, more than half of employed NYC residents work in their home borough. On average, 53% of NYC residents work within their home borough. 28% of Bronx, Brooklyn, Queens, and Staten Island residents work in Manhattan. 9% of NYC residents work in Non-Manhattan boroughs outside of their home boroughs. 7% of the employed NYC resident labor force out-commutes to work elsewhere in the NYC Metro Region.

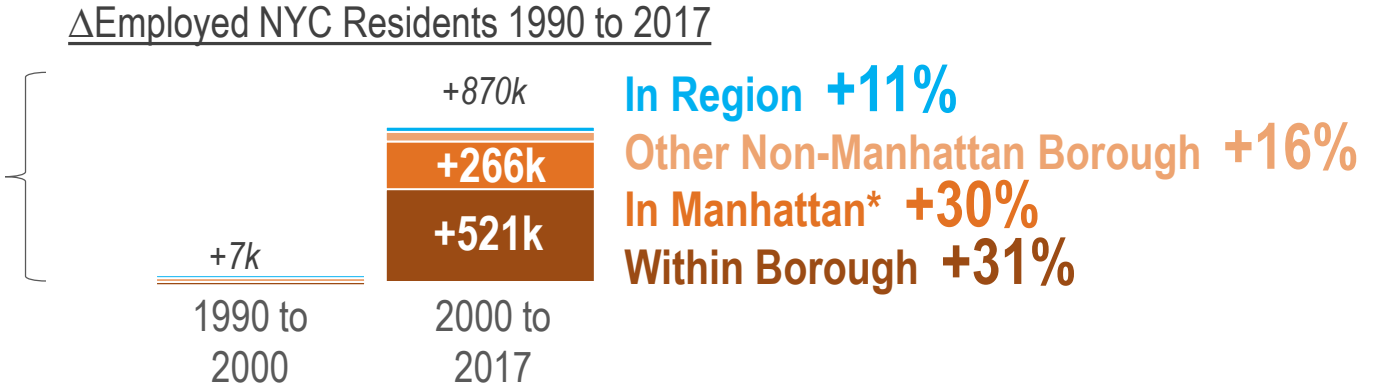
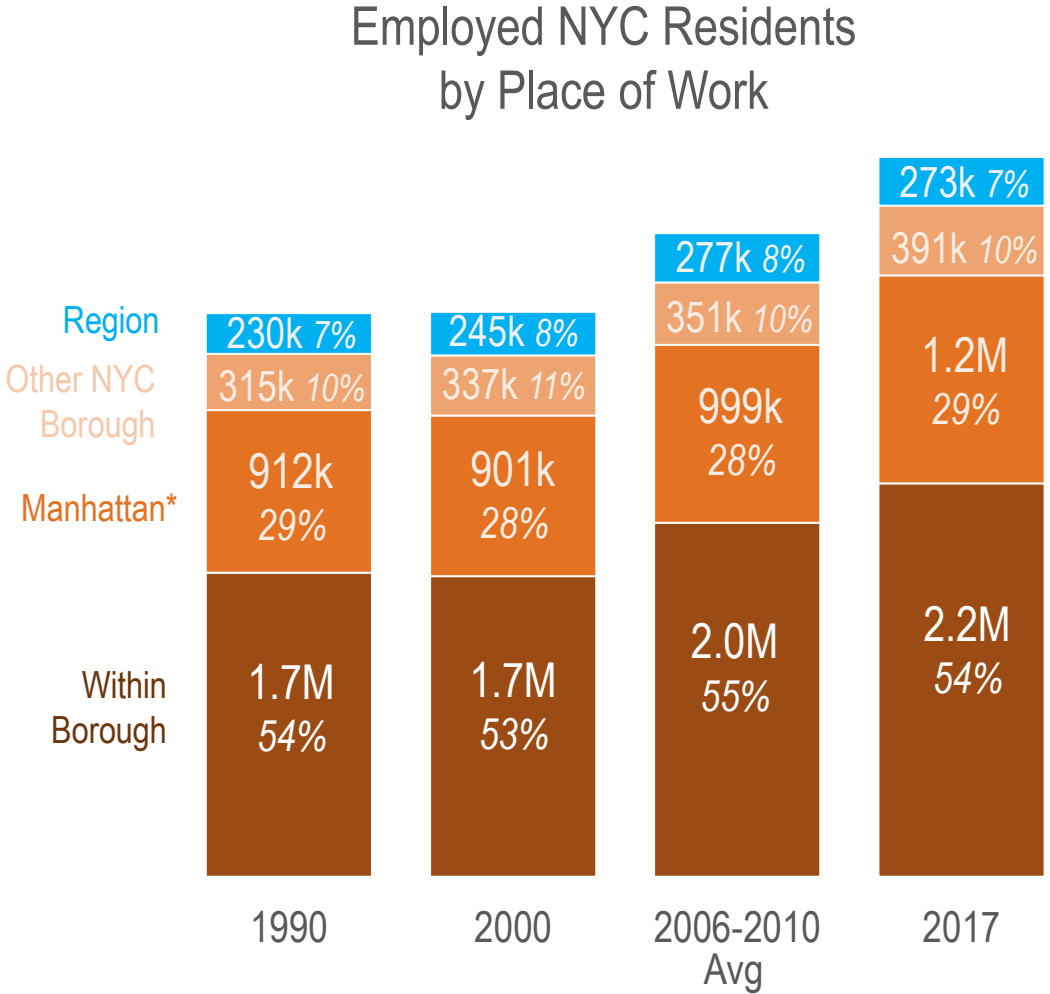
Propensity to out-commute to the rest of the Region varies by borough.

Where NYC Residents Work by their Borough of Residence, 2017



The Bronx and Queens, which share extensive land boundaries with Westchester and Nassau counties, have the highest shares of resident out-commuters. 10% of employed residents in each borough out-commute. Brooklyn, with the least direct connection to the Region, has the lowest share of out-commuters, just 3% of employed residents.

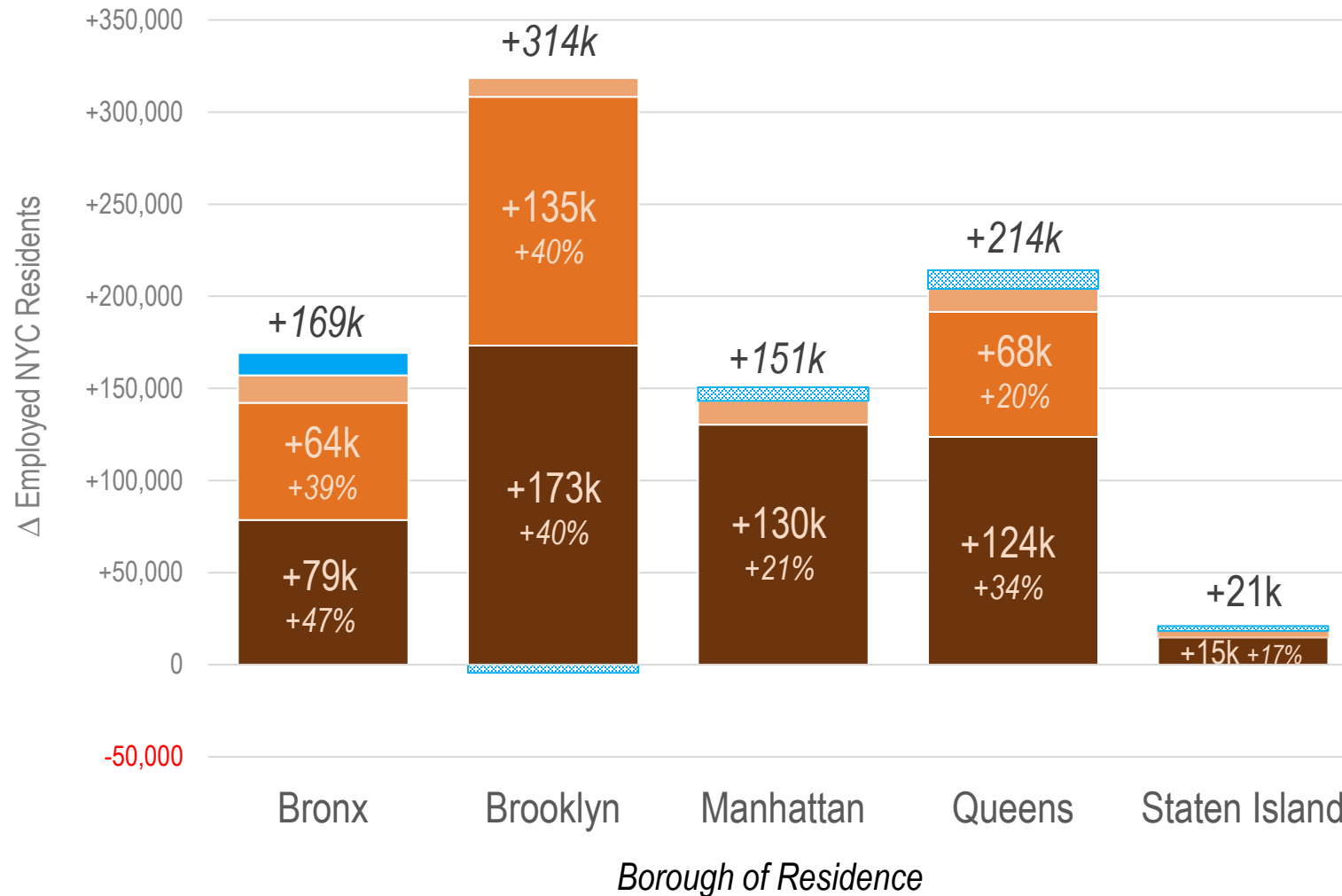
Though out-commuting has increased, NYC residents employed within the city, especially within their home boroughs or Manhattan, increased significantly faster.



The distribution of where NYC residents worked in 1990 versus today has remained relatively stable over time. Since 2000, NYC's employed resident labor force grew by 870k, representing an overall 27% increase. The fastest growing segment was residents working within their home boroughs, which grew by 31%, followed by Non-Manhattan NYC residents working in Manhattan, which grew by 30%. By comparison, out-commuting has grown by 11% since 2000.

NYC residents finding work in their boroughs of residence drove citywide employment gains.

ΔWhere NYC Residents Work by Borough of Residence, 2000 to 2017



Place of Work

- In Region +28k
- Other Non-Manhattan Borough +54k
- In Manhattan* +266k
- Within Borough of Residence +521k

Calculated change deemed not statistically reliable at 90% confidence level

The gain of +521k NYC residents working within their boroughs of residence accounted for 60% of the increase in employed NYC residents. Most of that growth (+390k) was of Non-Manhattan residents, with the Bronx growing resident workers faster than any other borough. Bronx and Brooklyn residents working in Manhattan also grew faster than other NYC resident worker growth, each growing by approximately 40%. The Bronx and Queens were home to the most substantial growth of NYC residents out-commuting to the Region for work.

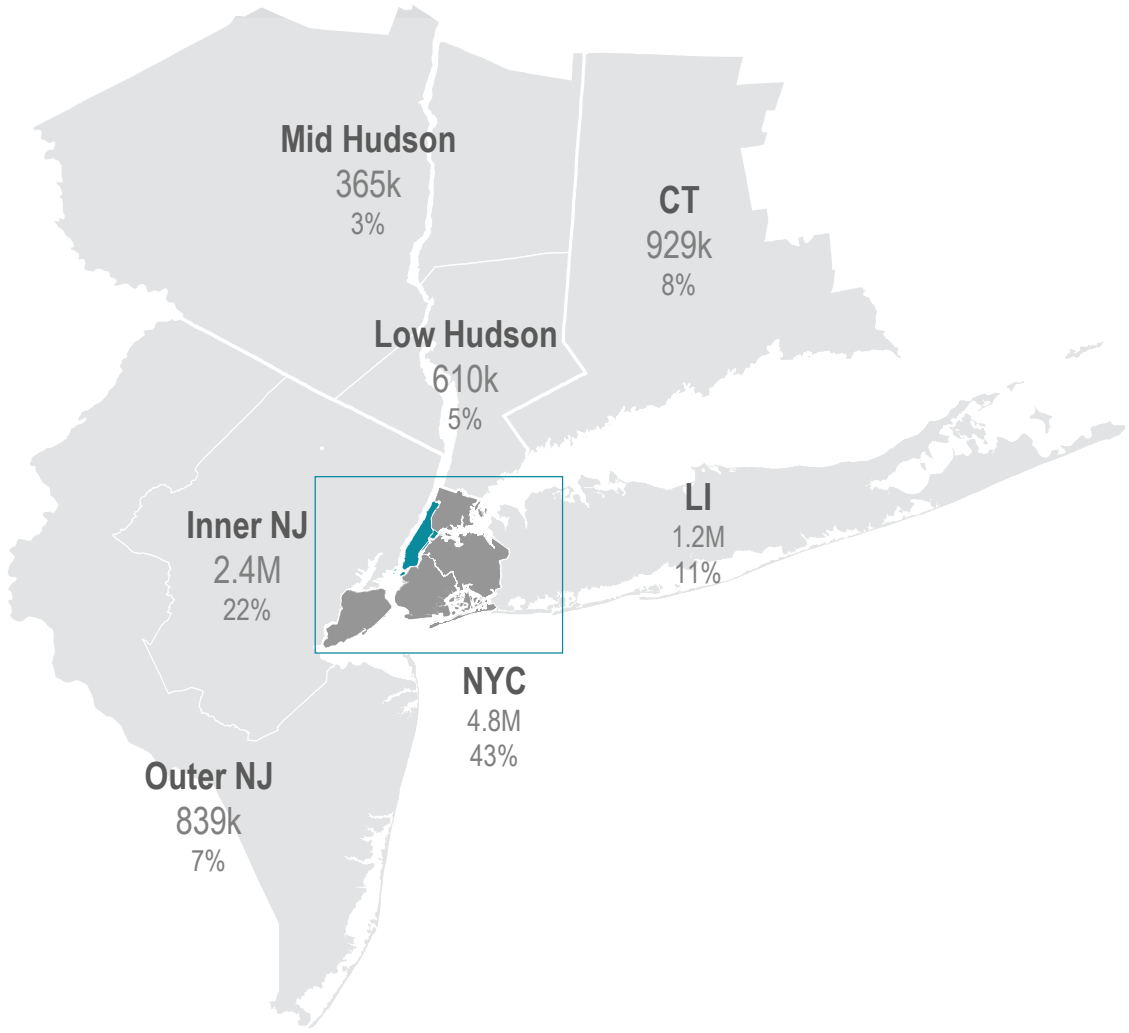
Insight #2

Manhattan strengthened its role as the hub of the Region's economy, and continues to draw upon a regional workforce.

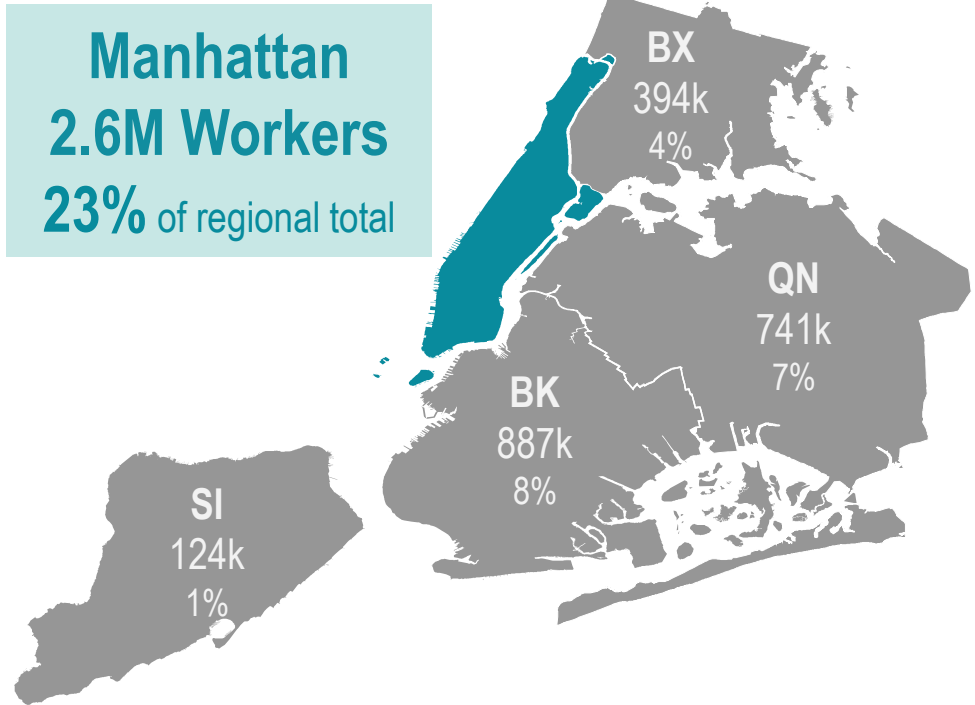
Other boroughs are also regionally significant work destinations, with growing economies that increasingly draw upon both resident and non-resident workers.

Nearly one-quarter of the Region’s employed residents work in Manhattan.

Total Workers* at Workplace by Subregion & Regional Share, 2017



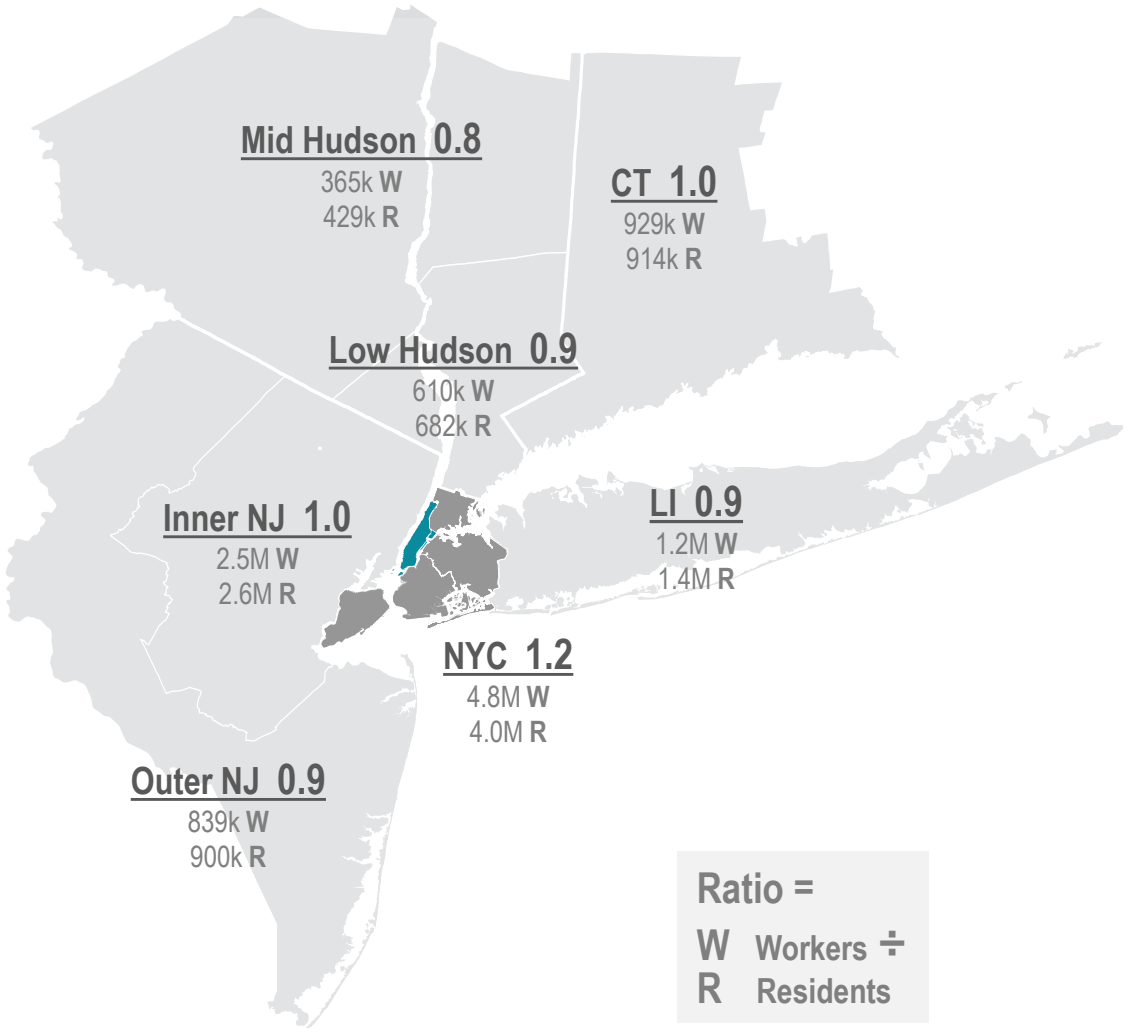
Manhattan, the hub of the NYC Metro Region’s economy, is where 2.6 million regional residents, or nearly a quarter of all regional workers, are employed. Non-Manhattan Boroughs have large workforces, nearly 2.2 million workers combined, and collectively represent 20% of all regional workers’ employment destinations.



NYC PLANNING *Total workers includes total workers within the region, including those who in-commute from outside of the NYC Metro Region. Source: IPUMS-USA, University of Minnesota; U.S. Census Bureau ACS 1-Year Estimates 2017

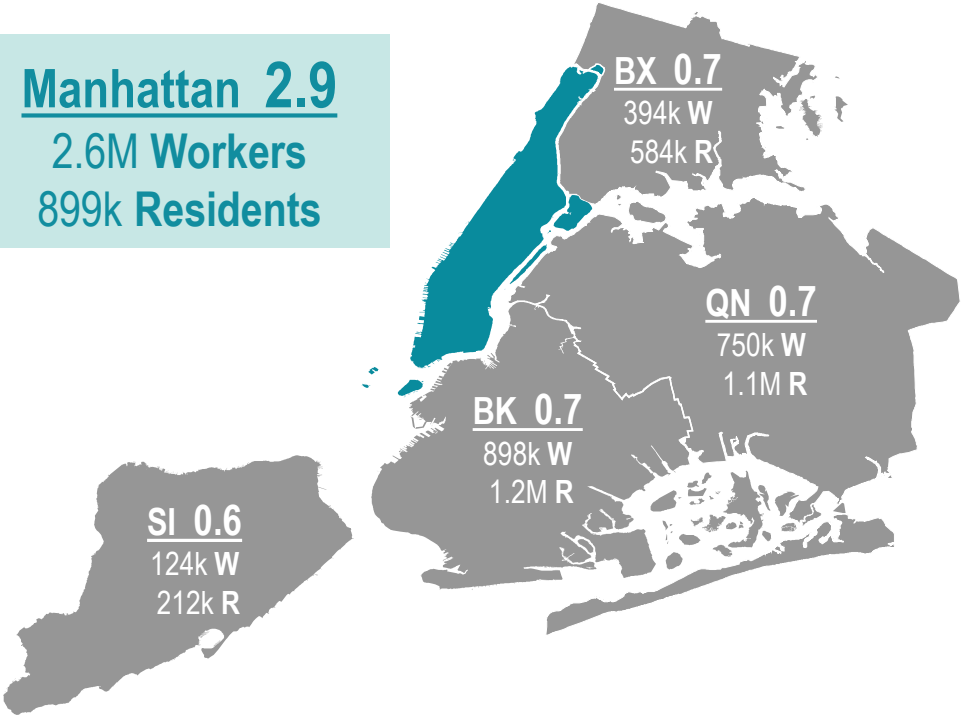
Manhattan is the most job-intensive area in our Region, with nearly three times the number of workers versus employed residents.

Ratio of Total Workers to Total Employed Residents by Subregion*, 2017



Because of its job intensity, Manhattan relies on an extensive labor pool: for every one worker who lives and works in Manhattan, three commute into Manhattan. Manhattan is a job center serving residents of the Bronx, Brooklyn, Queens, and Staten Island, as well as the rest of the Region. Each Non-Manhattan Borough has fewer workers than it does employed residents, and historically has strongly relied on employment opportunities in Manhattan to support other NYC residents.

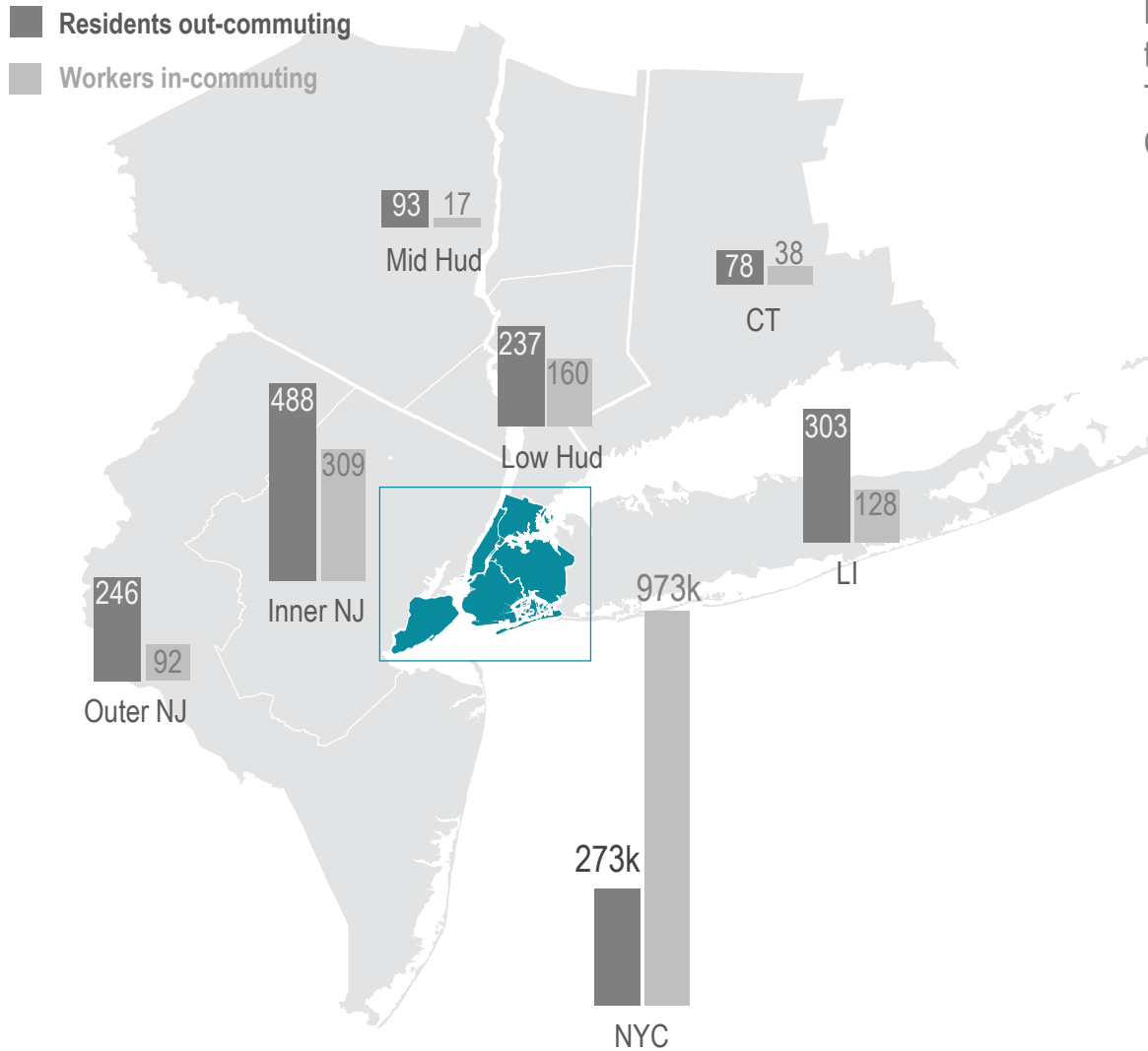
Manhattan 2.9
2.6M Workers
899k Residents



*Total workers represent all workers within the region, including those who in-commute from outside of the NYC Metro Region. Residents includes solely employed residents age 16 and older at subregion or borough of residence. Source: IPUMS-USA, University of Minnesota; U.S. Census Bureau ACS 1-Year Estimates 2017

Manhattan has the largest inflow of regional commuters, but other boroughs also attract in-commuter populations at scale with other parts of the Region.

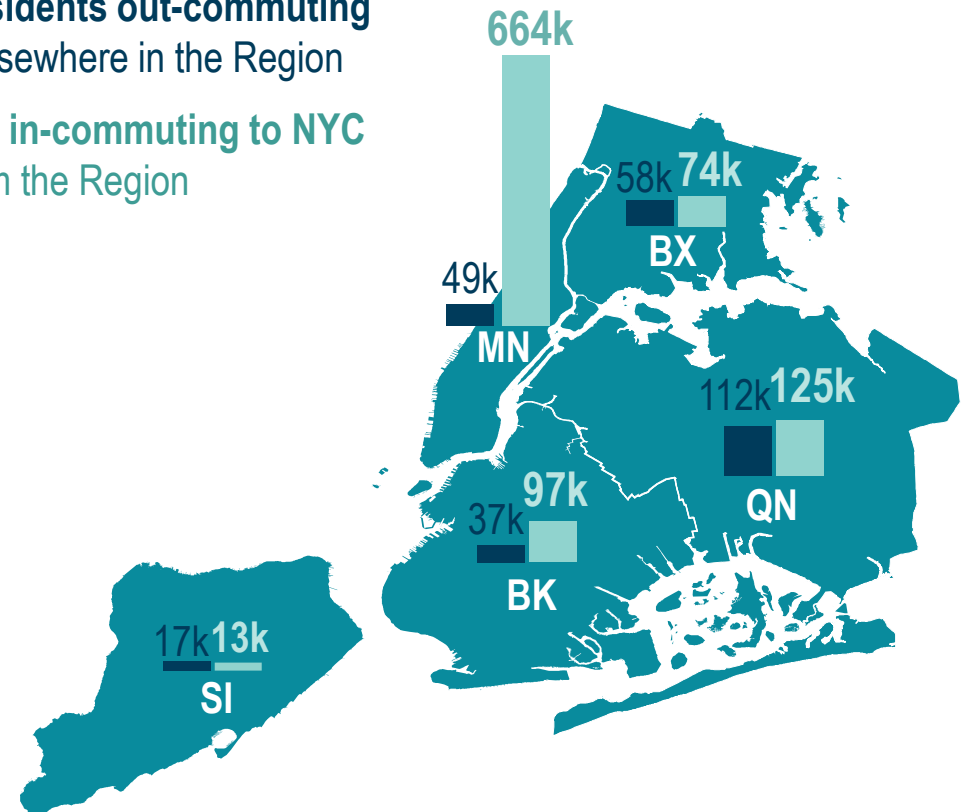
Regional Exchange of Workers by Subregion, 2017



Though Manhattan is the most significant in-commuter destination in NYC, Non-Manhattan Boroughs also experience large inflows of regional in-commuters. Queens receives roughly the same number of in-commuting workers as the Lower Hudson Valley and Long Island. The Bronx and Brooklyn each exceed the number of in-commuting workers seen in Connecticut, the Mid Hudson Valley, and Outer NJ.

NYC Boroughs' Regional Worker Exchange, 2017

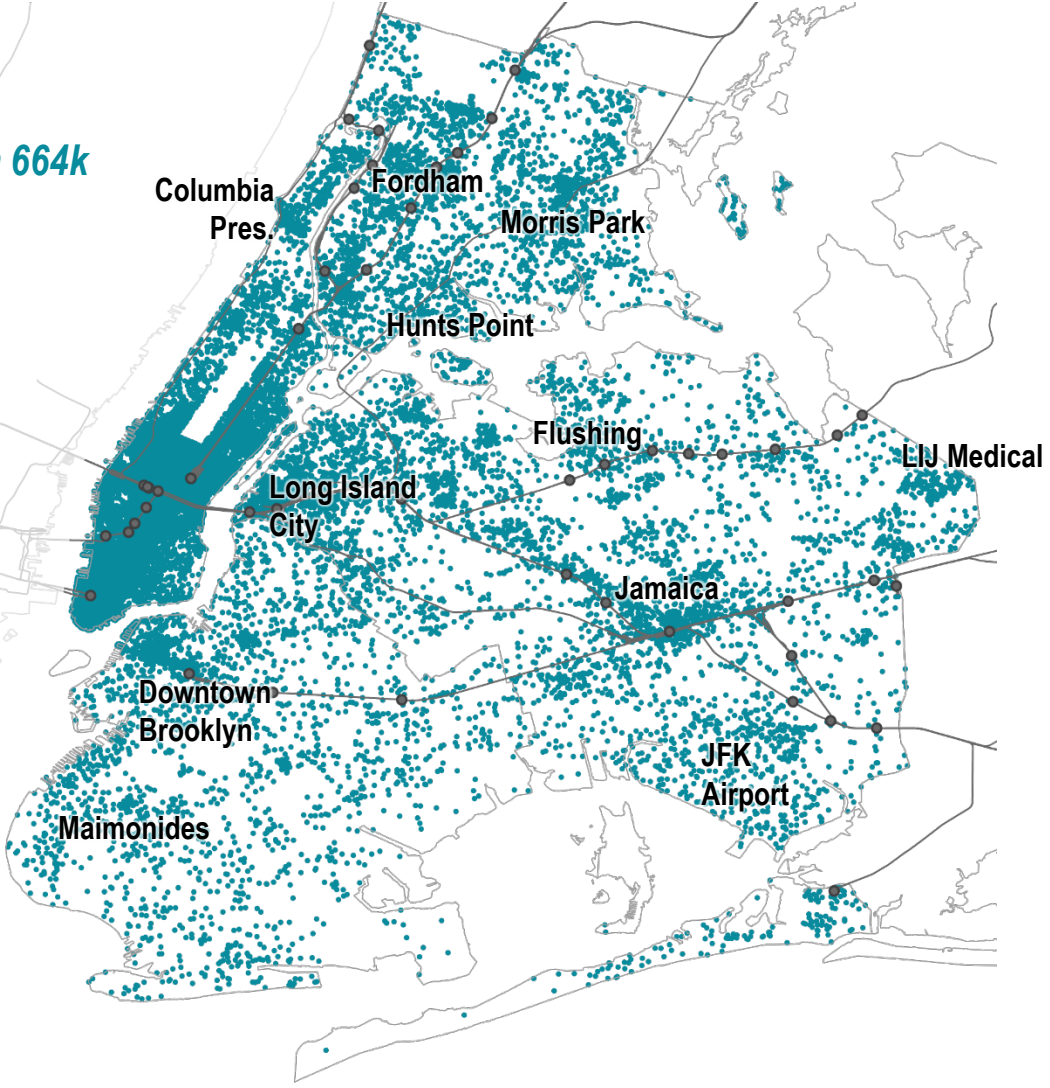
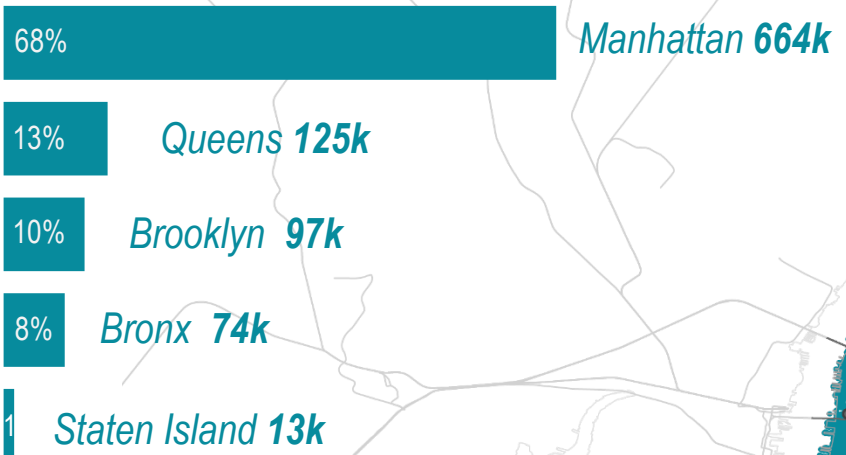
- NYC Residents out-commuting to jobs elsewhere in the Region
- Workers in-commuting to NYC jobs from the Region



Two-thirds of regional in-commuters work in Manhattan locations, with the remaining third clustered in Non-Manhattan business districts and institutional centers.

Where NYC In-Commuters Work, 2017

% Share

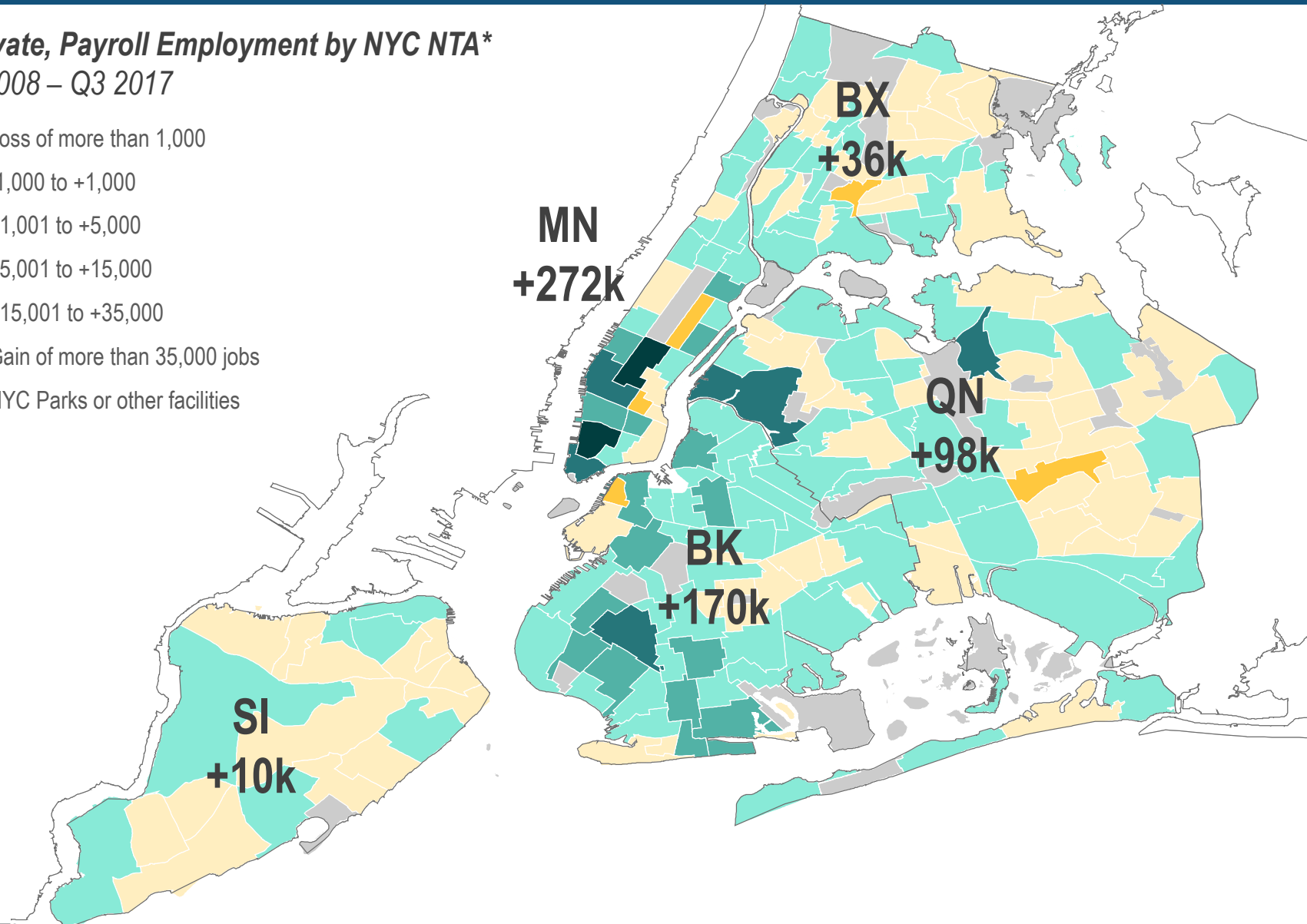
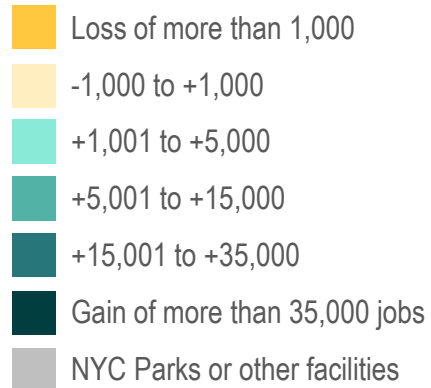


While the majority of in-commuters work in Manhattan, mostly in Midtown and Lower Manhattan, there are notable clusters of in-commuters traveling to Central Business Districts (CBDs) and major institutions outside of the Manhattan Core. CBD's like Long Island City, Downtown Brooklyn, and Jamaica are important job centers not just for NYC residents but also for regional in-commuters, particularly given these CBDs' access to commuter rail transit.

● 1 Dot = 25 NYC In-Commuters at Workplace
 —●— Commuter Rail Line + Station

Since the recession, NYC experienced broad-based job growth in all five boroughs.

ΔPrivate, Payroll Employment by NYC NTA* Q3 2008 – Q3 2017



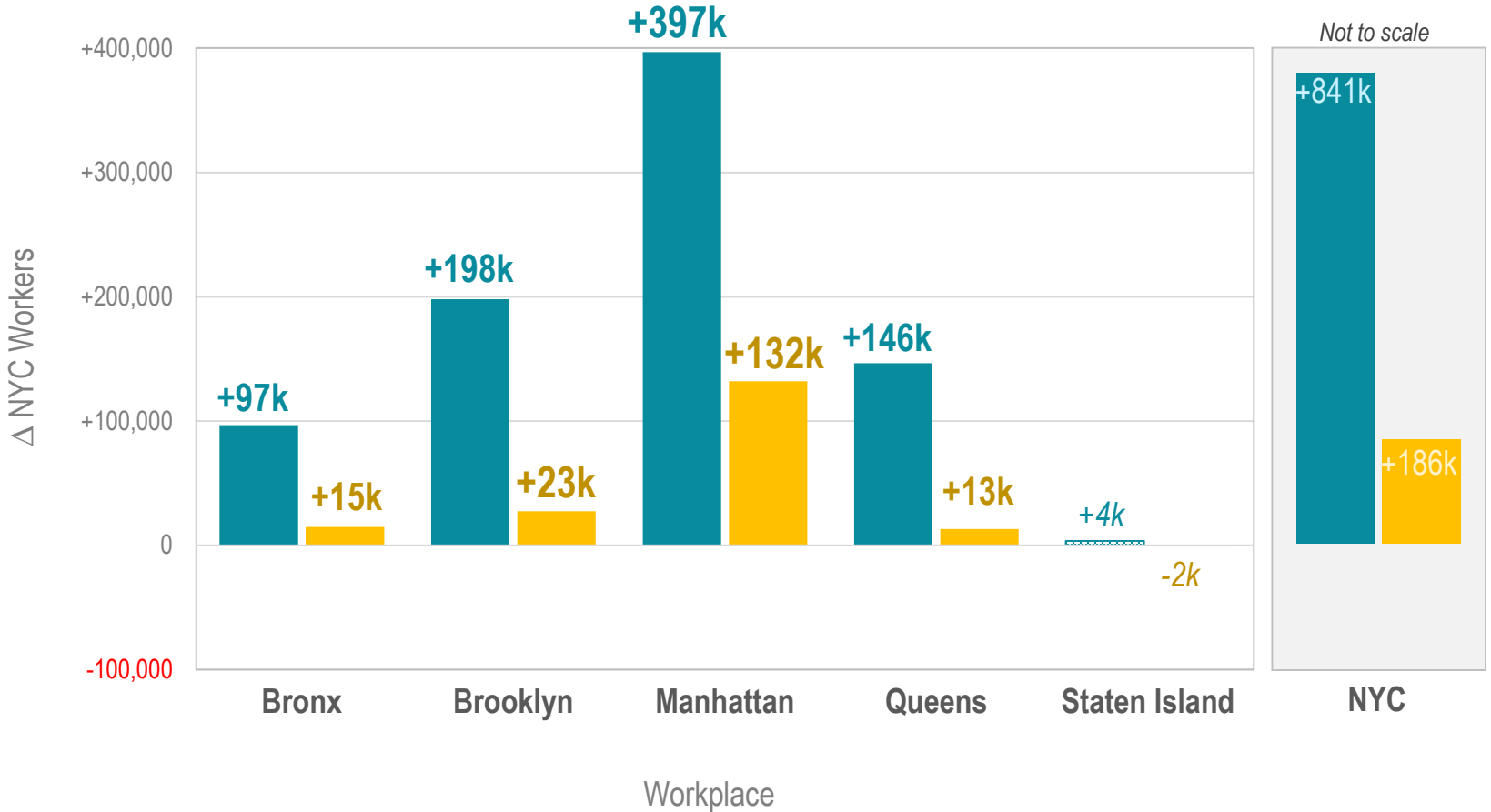
Since 2008, NYC experienced private sector job growth in all five boroughs. Midtown and Lower Manhattan neighborhoods grew the most private sector jobs, but as jobs grew in neighborhoods outside of Manhattan, notably in north Brooklyn and northwest Queens, employment opportunities available to NYC residents and regional in-commuters became more distributed throughout the city. This growth strengthened non-Manhattan CBDs, and supported employment growth in neighborhoods home to major healthcare and educational institutions, like Maimonides Medical Center in southern Brooklyn.

Manhattan accounted for the largest growth of both NYC resident workers and in-commuters since 2000, but gains of both worker populations were experienced citywide.



ΔWorkers by NYC Borough, 2000 to 2017

NYC Residents vs. *In-commuters from Region*



Worker Residence

- NYC Resident
- In-Commuter

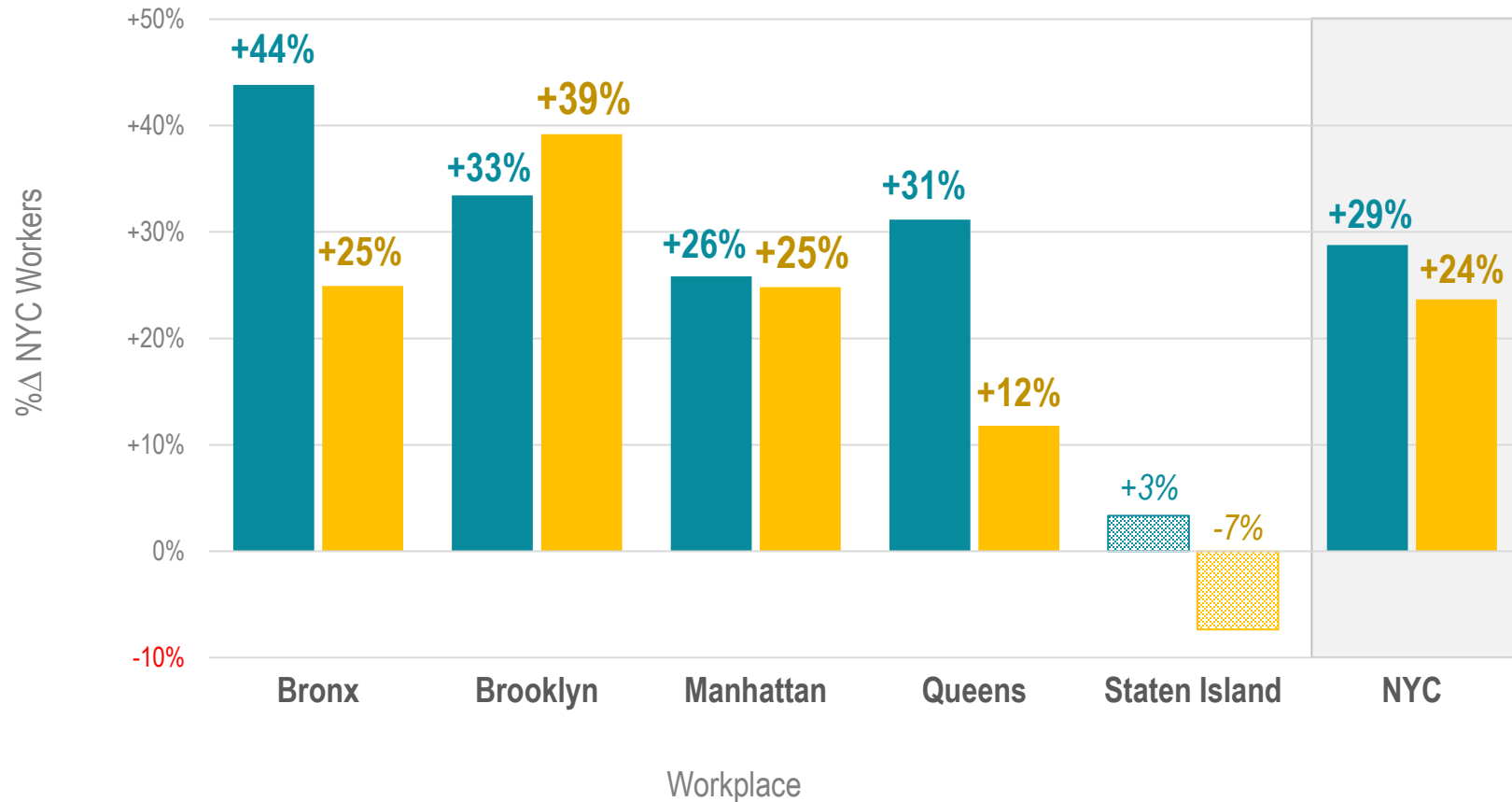
Change deemed not statistically reliable at 90% confidence level

Since 2000, Manhattan’s workforce experienced the greatest gain of both NYC resident workers (+397k) and regional in-commuters (+132k). In-commuting workforce also grew in Brooklyn (+23k), the Bronx (+15k), and Queens (+13k), though in-commuter workforce growth was much lower in absolute terms than the growth of resident workers.

Brooklyn grew in-commuter workforce faster than any other borough, and was the only borough where the growth rate of in-commuters outpaced the increase of NYC resident workers.



%Δ Workers by NYC Borough, 2000 to 2017
NYC Residents vs. *Regional In-commuters*



Worker Residence

NYC Resident

In-Commuter

Change deemed not statistically reliable at 90% confidence level

Though in absolute terms Brooklyn's gain of 23k in-commuters was modest, as a percentage gain it represents an increase of 39% over its relatively small in-commuter workforce in 2000. This rate exceeded the rate of all other boroughs. Brooklyn was the only borough where the growth rate of in-commuters outpaced the growth rate of NYC resident workers employed in Brooklyn (+33%). The Bronx and Manhattan's in-commuter workforce increased at the same rate of 25%, but the fastest rate of NYC workforce gain was in the Bronx, which grew its NYC resident workforce by 44% since 2000.

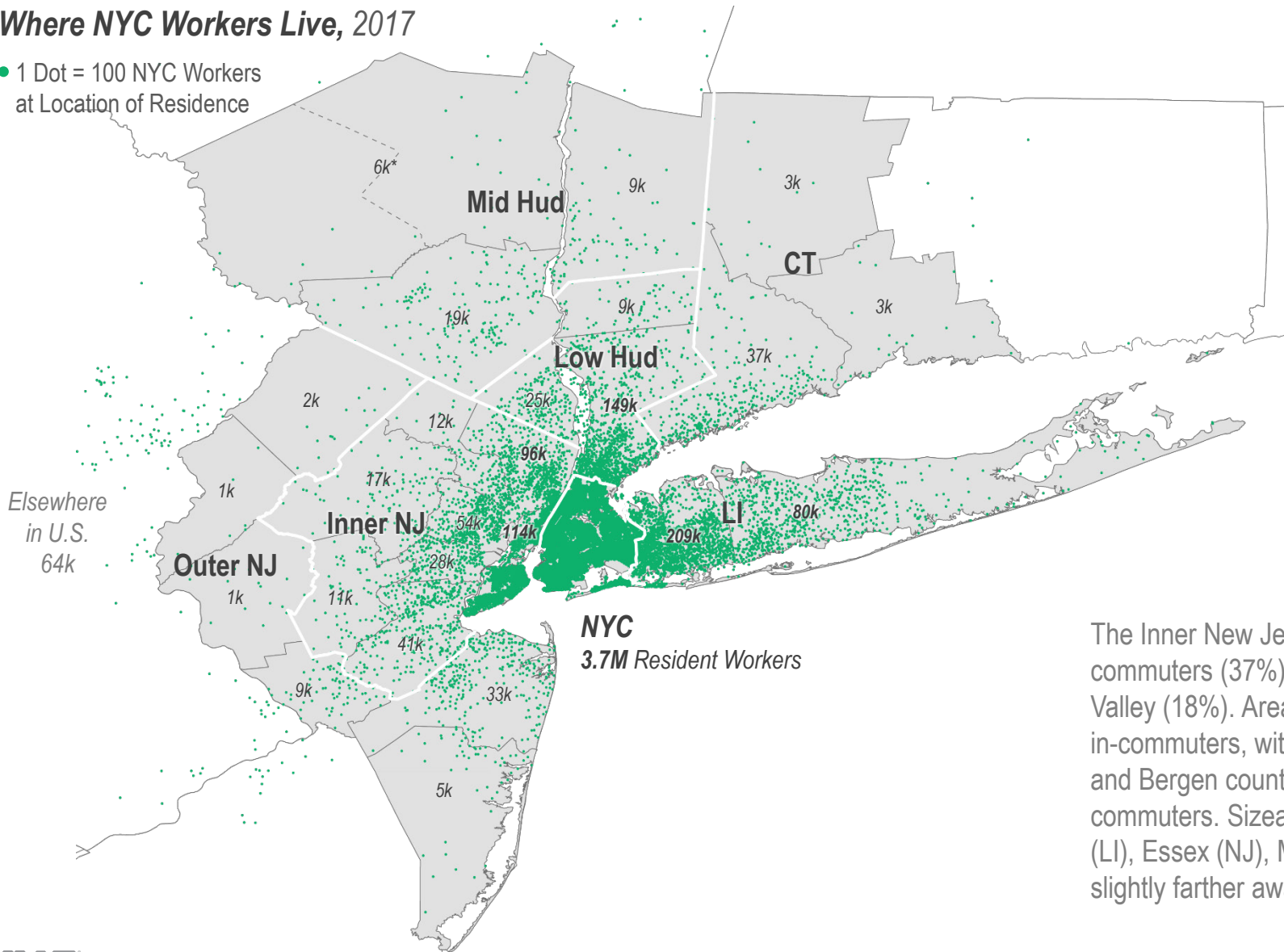
Insight #3

While commuter sheds to the north and east of NYC still play strong roles in housing the city's workforce, **New Jersey has recently been NYC's primary source of new in-commuters.**

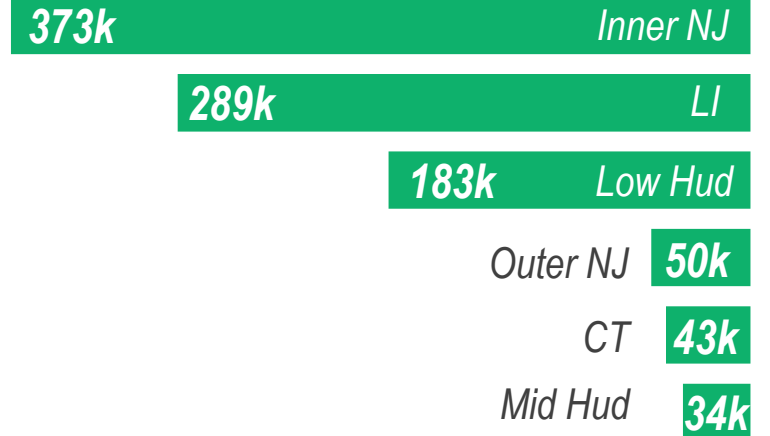
In-commuters travel to NYC from areas to the north, east, and west of the city.

Where NYC Workers Live, 2017

● 1 Dot = 100 NYC Workers at Location of Residence



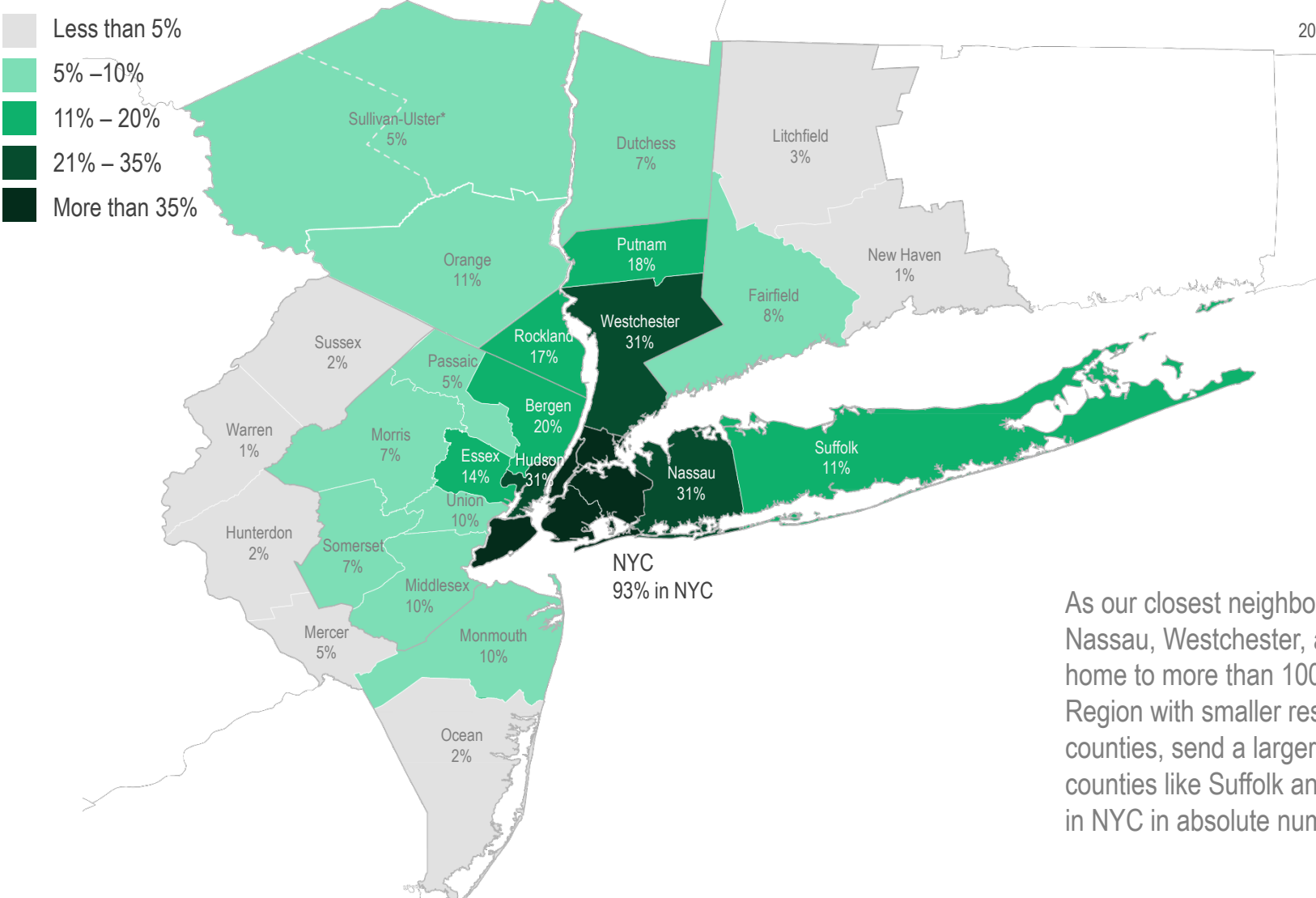
973k In-Commuters by Subregion



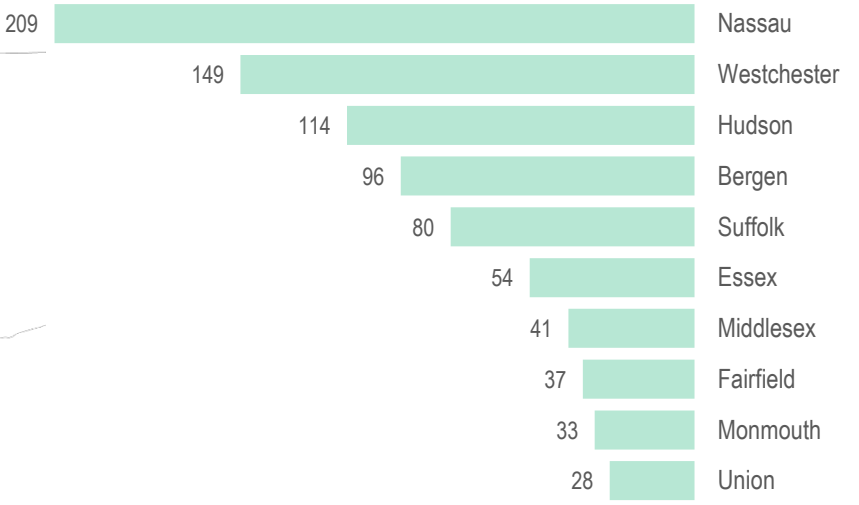
The Inner New Jersey subregion is home to the largest share of NYC in-commuters (37%), followed by Long Island (31%) and the Lower Hudson Valley (18%). Areas closest to NYC house the largest concentrations of NYC in-commuters, with Nassau (LI), Westchester (Lower Hudson), and Hudson and Bergen counties (Inner NJ) combined accounting for 58% of all NYC in-commuters. Sizeable concentrations of NYC in-commuters also live in Suffolk (LI), Essex (NJ), Middlesex (NJ), and Fairfield (CT) counties, which are slightly farther away but generally well-connected to NYC via commuter rail.

NYC is an important employment source for regional residents, especially those living in the counties closest to the city.

Share of Employed Residents Who Work in NYC, 2017



NYC In-commuters by County of Residence (top ten, thousands)

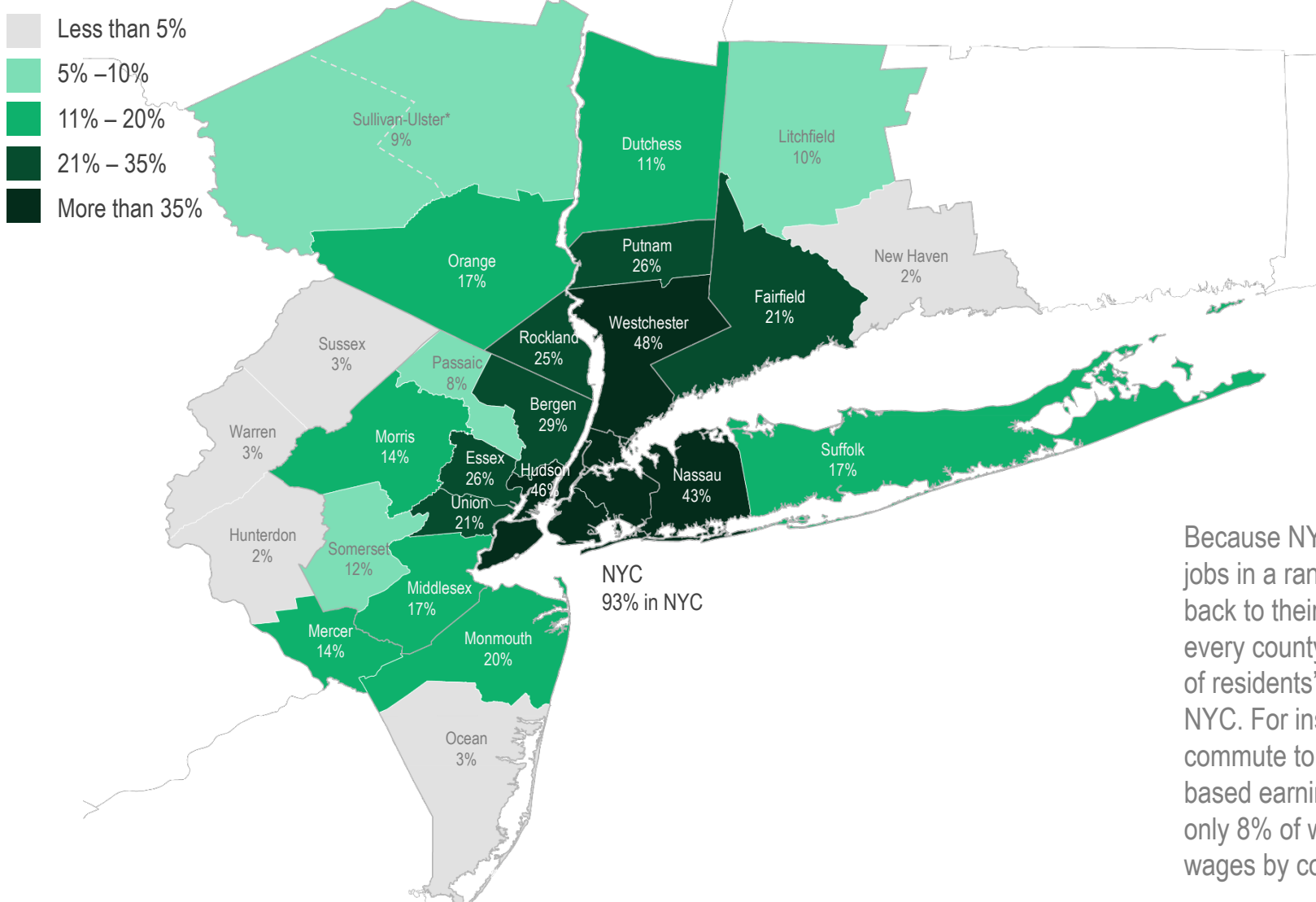


As our closest neighbors, nearly one third of the employed residents living in Nassau, Westchester, and Hudson counties work in NYC. Each county is home to more than 100,000 residents employed in NYC. Other parts of the Region with smaller resident labor forces, such as Putnam and Rockland counties, send a larger share of their residents to NYC for work than counties like Suffolk and Essex, which are home to more residents working in NYC in absolute numbers.

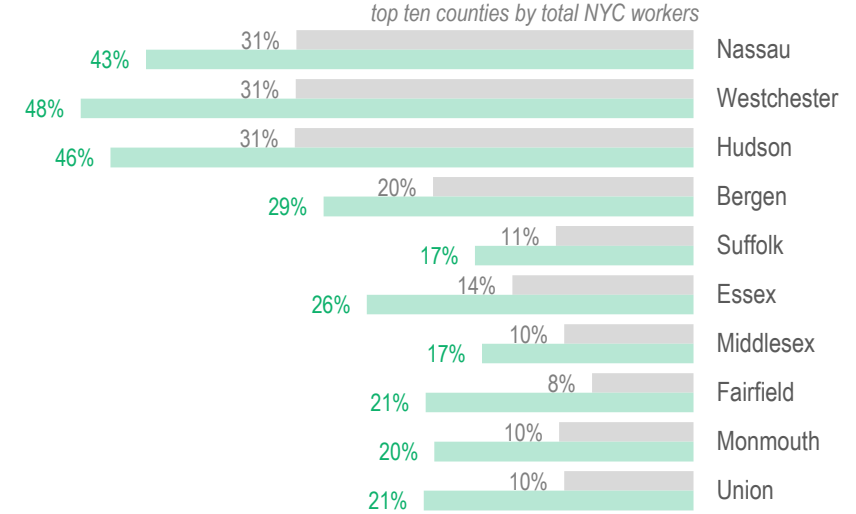
NYC PLANNING *Labels represent county percent shares for all counties but Sullivan and Ulster, which are combined for consistency with IPUMS-USA reporting geographies. Source: IPUMS-USA, University of Minnesota; U.S. Census ACS 1-Year Estimates 2017

NYC is an important economic resource for regional residents and local governments, especially for counties closest to the city.

Share of Employed Residents' Wages Earned in NYC, 2017



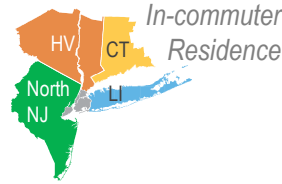
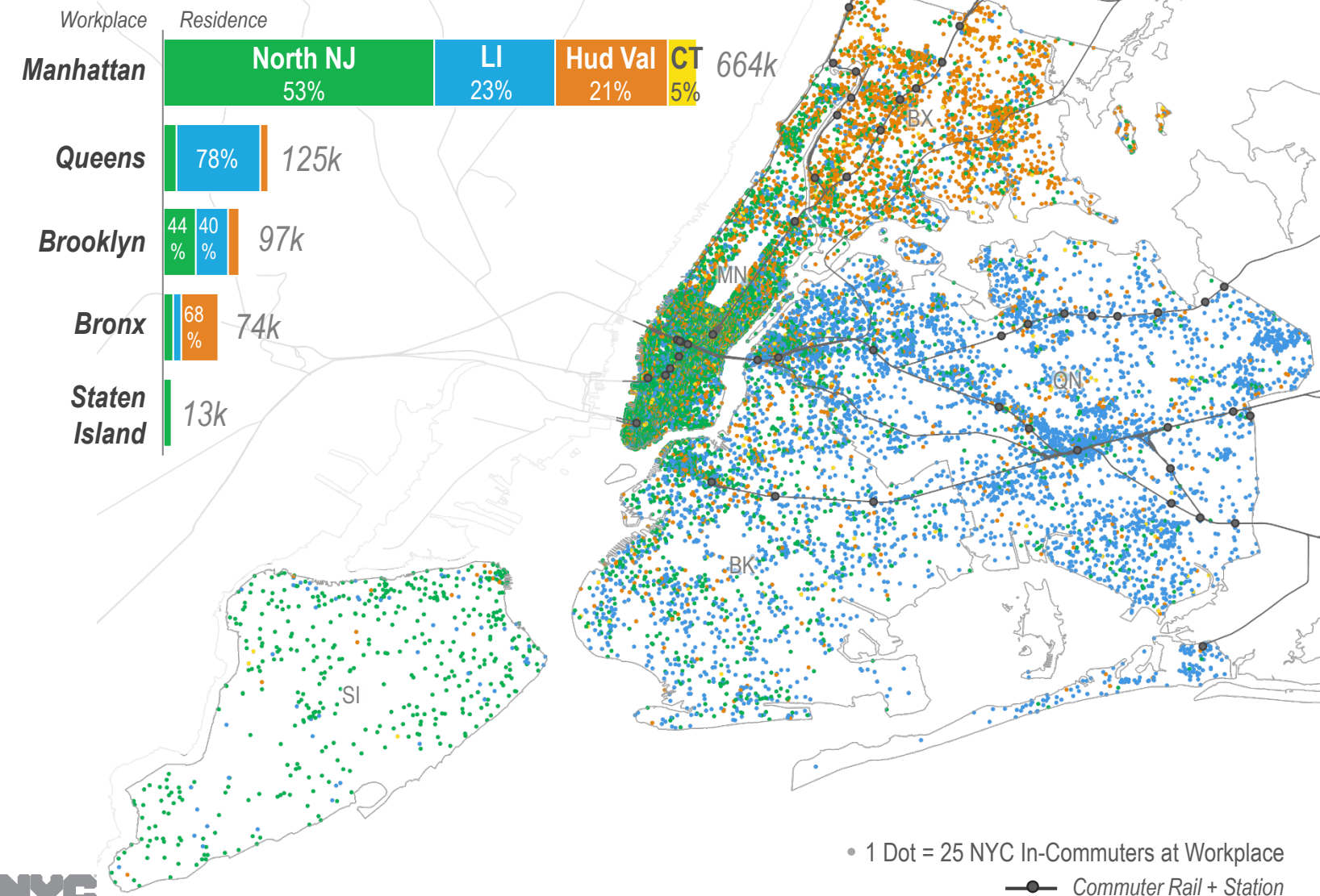
% Residents Working in NYC vs. % Wages Earned in NYC



Because NYC is a center not just of employment, but of higher-wage jobs in a range of industry sectors, the value that commuters bring back to their counties of residence is disproportionately high. For every county in the region, NYC commuters represent a larger share of residents' earnings relative to the number of residents working in NYC. For instance, in Westchester County, 30% of working residents commute to jobs in NYC, but 47% of Westchester workers' wage-based earnings are from jobs in NYC. Similarly in Fairfield County, only 8% of working residents contribute 21% of Fairfield's earned wages by commuting into NYC.

The pattern of regional in-commuters' NYC work destinations is shaped by geographic proximity and transit infrastructure.

Where NYC In-Commuters Work by Subregion of Residence, 2017



Manhattan, the Region's densest employment center, is geographically central to the Region's labor market and supported by a wide range of transportation infrastructure specifically designed for core-bound access. So, it is no surprise that the majority of in-commuters from the NYC Metro Region are traveling to jobs in Manhattan.

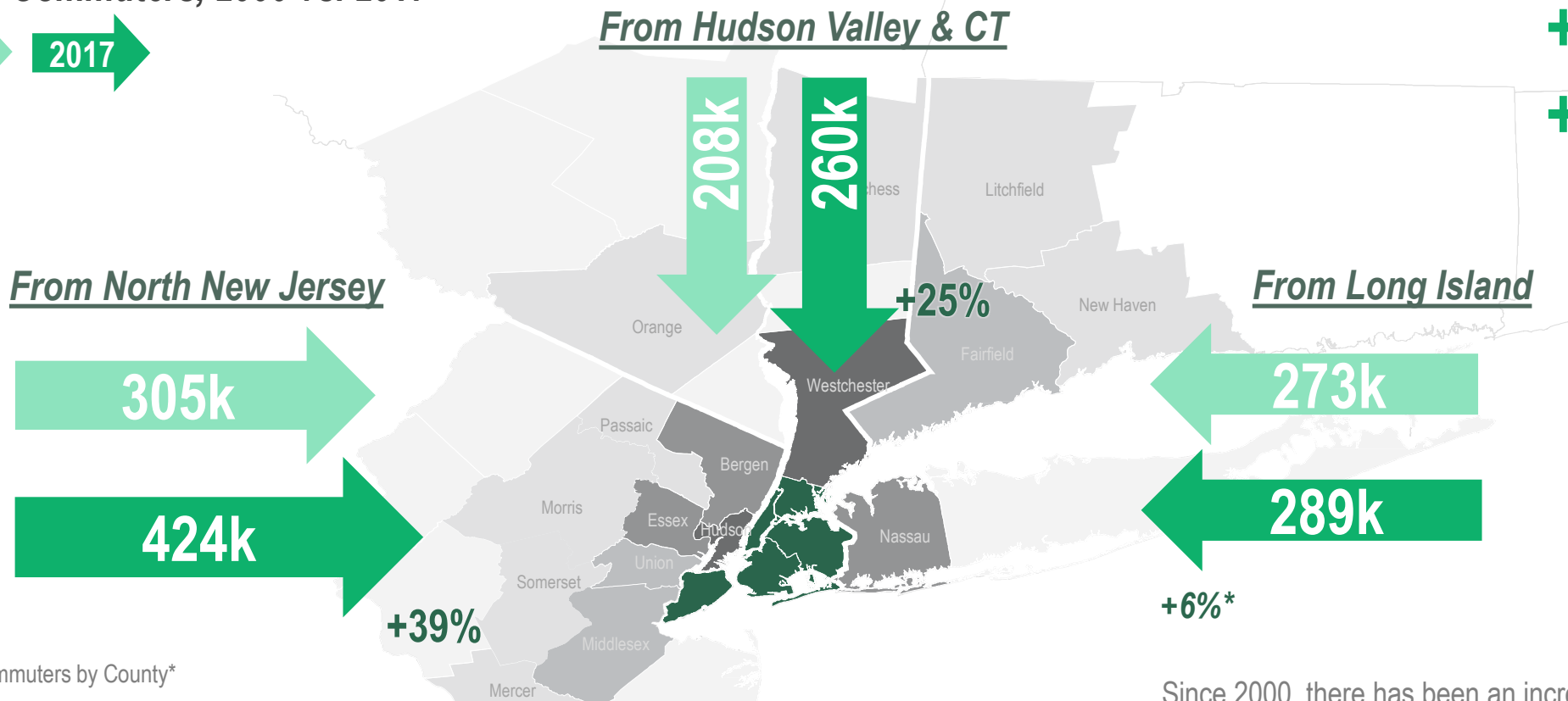
However, there are also strong commuter relationships between Non-Manhattan Boroughs and their geographic neighbors. Notably, two-thirds of regional in-commuters to the Bronx reside in the Hudson Valley; and, as many Long Island residents commute to Brooklyn and Queens (combined) as they do to Manhattan. While the majority of North New Jersey residents in-commuting to NYC work in Manhattan, there are also noticeable concentrations of North New Jersey in-commuters in Staten Island, northern Brooklyn, and western Queens.

• 1 Dot = 25 NYC In-Commuters at Workplace

—●— Commuter Rail + Station

Since 2000, in-commuting to NYC increased from all directions, but most significantly from North New Jersey.

NYC In-Commuters, 2000 vs. 2017



+186k in-commuters
+24% since 2000

ΔNYC In-Commuters by County* 2000 to 2017

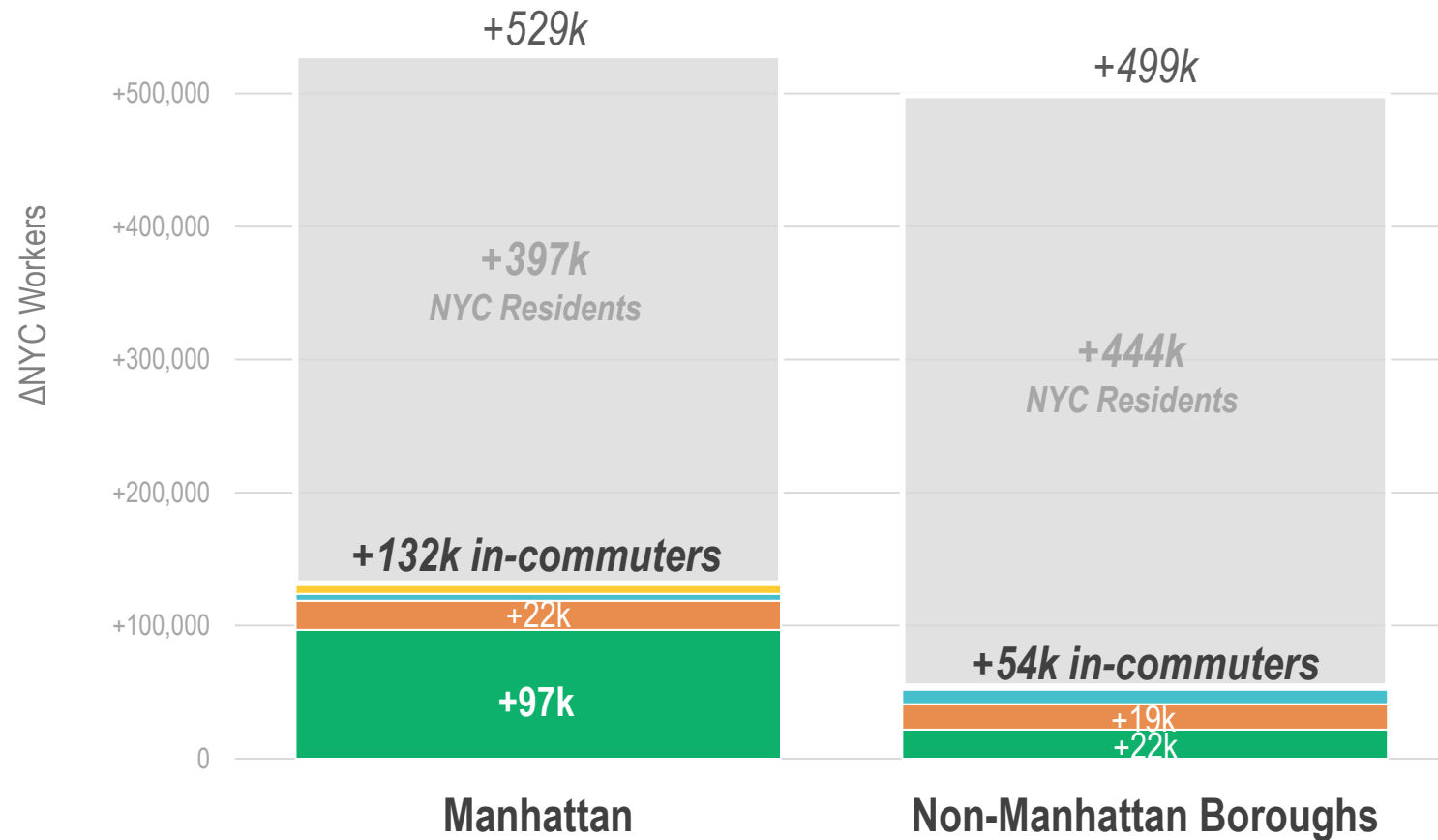
- No change
- +1k to +5k
- +5k to +10k
- +10k to +25k
- +25k or more

Since 2000, there has been an increase of 119k (+39%) North New Jersey residents traveling to NYC for work, accounting for approximately two-thirds of total in-commuter gains. Bergen, Essex and Hudson counties combined (+91k) accounted for nearly half of the total increase. In-commuting from the Hudson Valley and Connecticut increased by 52k combined, while in-commuting from Long Island grew the least (+16k) and at the slowest rate (+6%).

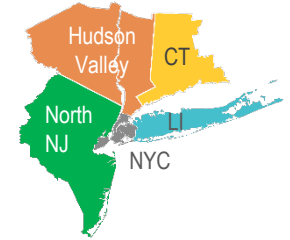
NYC PLANNING *Counties are aggregated by residential PUMA geography. Change represented for counties with calculated statistical reliability at 80% confidence interval. No change indicates that calculated change deemed not statistically reliable. Sources: IPUMS-USA, University of Minnesota; U.S. Census Bureau ACS 1-Year Estimates 2017 U.S. Decennial Census 5% Sample 2000

North New Jersey in-commuters represented the largest share of non-resident workforce gains both in Manhattan and Non-Manhattan Boroughs.

ΔNYC Workers by Subregion of Residence, 2000 to 2017
Work in Manhattan vs. Work in a Non-Manhattan Borough



NYC Worker Residence



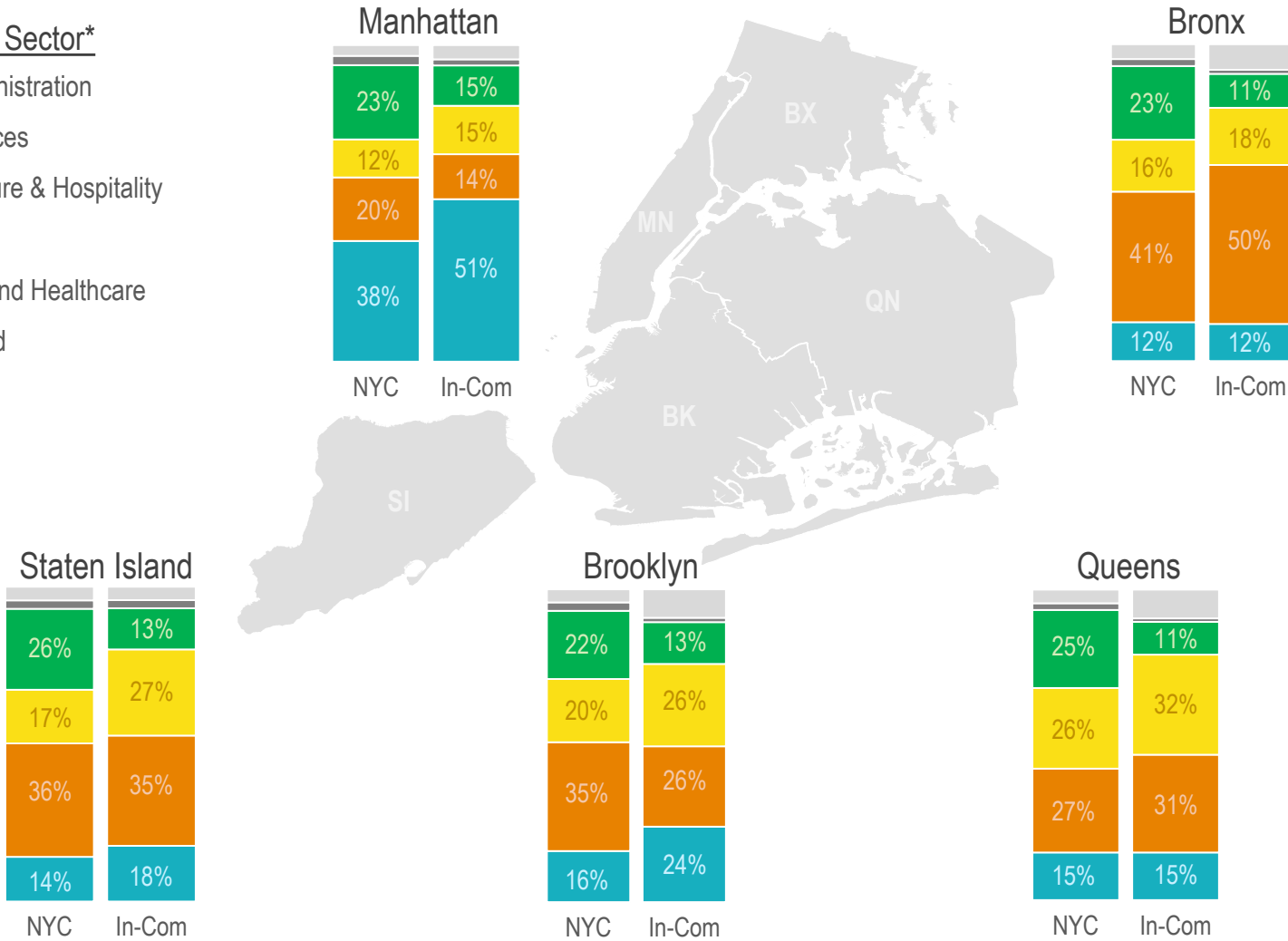
Despite representing just 13% of the total Manhattan workforce, North New Jersey residents represented 18% of the Manhattan workforce growth since 2000. The remaining in-commuters represented 7% of Manhattan's workforce growth, disproportionately smaller than those subregions' share of the total Manhattan workforce (12%). Similarly, though North New Jersey residents represent just 25% of the in-commuter workforce employed in Non-Manhattan Boroughs today, North New Jersey residents accounted for 40% of the growth of in-commuters working in those boroughs. This is primarily due to an additional 20k North New Jersey residents commuting to work in Brooklyn.

In-commuters travel to NYC for work in a variety of industries, but are less likely than resident workers to be employed in localized services.

Distribution of NYC Workers by Industry Macro Sector, NYC Residents vs. In-Commuters at Borough of Workplace, 2013-2017 Avg

Industry Macro Sector*

- Public Administration
- Other Services
- Retail, Leisure & Hospitality
- Industrial
- Education and Healthcare
- Office-based

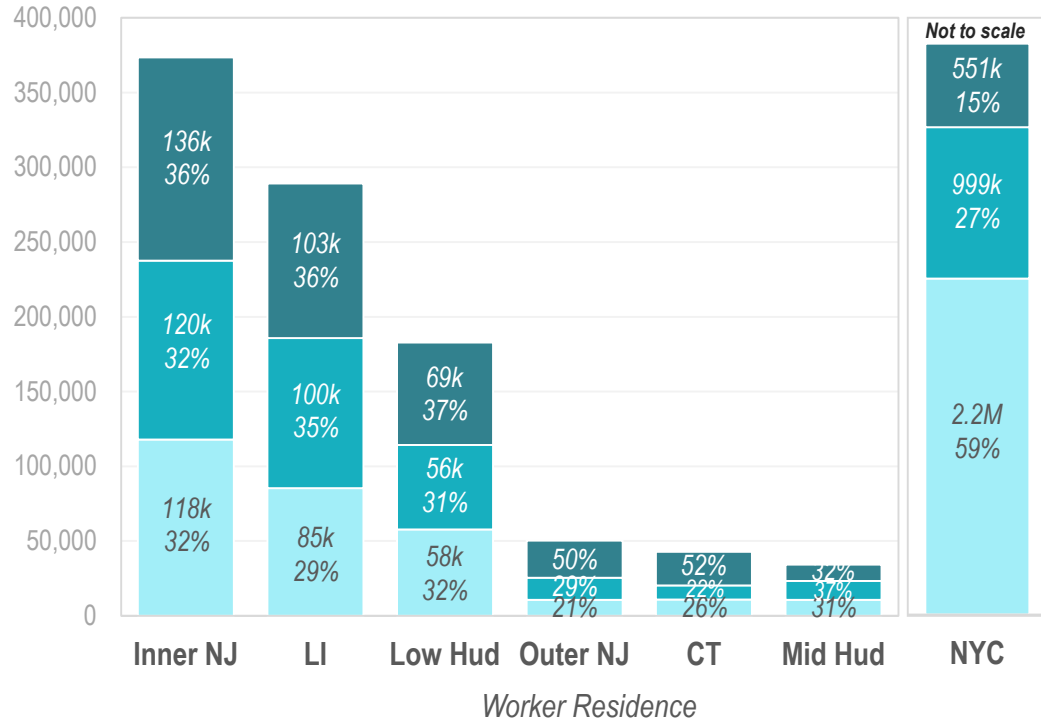


In-commuters travel to NYC for work across all industry sectors. The industry sectors in which both resident and non-resident workers are employed generally mirrors the composition of the economy in each borough. However, NYC residents are twice as likely as in-commuters to work in locally-serving sectors, such as Retail, Leisure and Hospitality. In certain boroughs, there is a higher share of in-commuters (though fewer total) employed in macro sectors that are especially strong in those locations. For example, half of Manhattan in-commuters work in Office-based jobs, whereas half of Bronx in-commuters work in Education and Healthcare jobs. In-commuters that work in Staten Island and Queens are more likely than NYC resident workers to be employed in industrial sectors.

As NYC's workforce grows, NYC and Inner NJ are the only areas housing an increasing number of middle-wage NYC workers.

NYC Workers by Wage Earnings, 2017

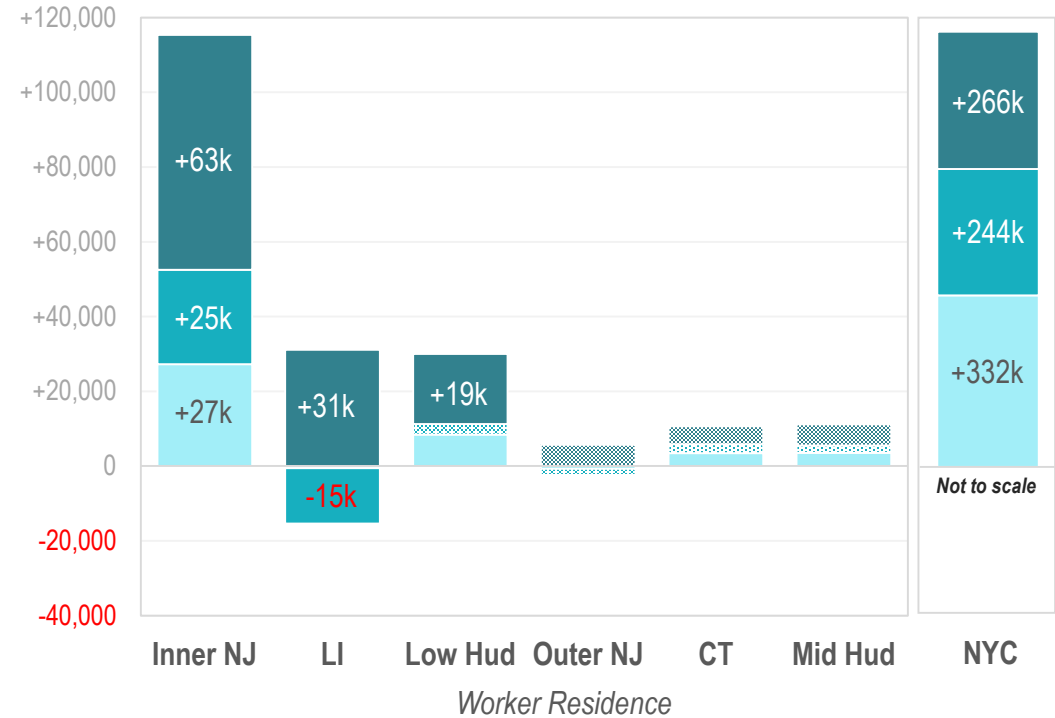
Low- (<\$50k) vs. Middle- (\$50k-\$100k) vs. High-Wage (\$100k+)



Today, NYC in-commuters from most parts of the region are evenly distributed among low-, middle-, and high-wage earners. NYC resident-workers exhibit a higher share of low-wage earners, in part due to the larger share of workers in local services jobs, (e.g., food and retail sectors). Commuters from more distant subregions, like Connecticut and Outer New Jersey, have a greater share of high-wage earners.

Δ NYC Workers by Wage Earnings, 2000 to 2017

Low- (<\$50k) vs. Middle- (\$50k-\$100k) vs. High-Wage (\$100k+)

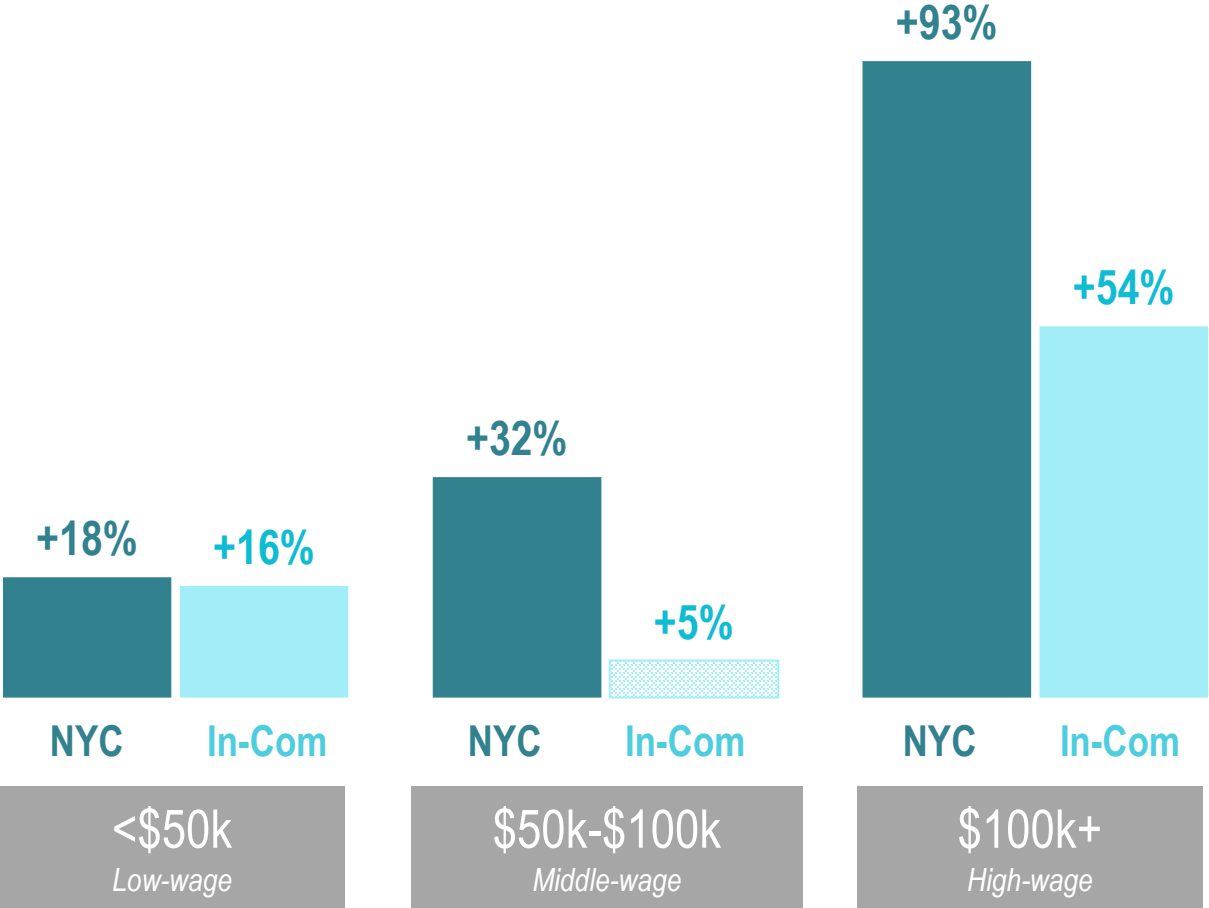


Since 2000, NYC and the Inner NJ subregion have been home to the only gains of middle-wage earners, with the vast majority of growth (90%) attributed to NYC resident-workers. Most parts of the region have seen gains limited to increases of high-wage and low wage in-commuters. Long Island has also registered a decrease of NYC workers in middle-wage jobs since 2000.

■ High (>\$100k)
■ Middle (\$50k-\$100k)
■ Low (<\$50k)
 Change deemed not statistically reliable at 90% confidence level

Middle- and high-wage jobs had the largest relative growth in NYC, and grew more quickly among NYC residents.

%Δ NYC Workers by Wage Earnings, 2000 to 2017
NYC Residents vs. In-Commuters from Region



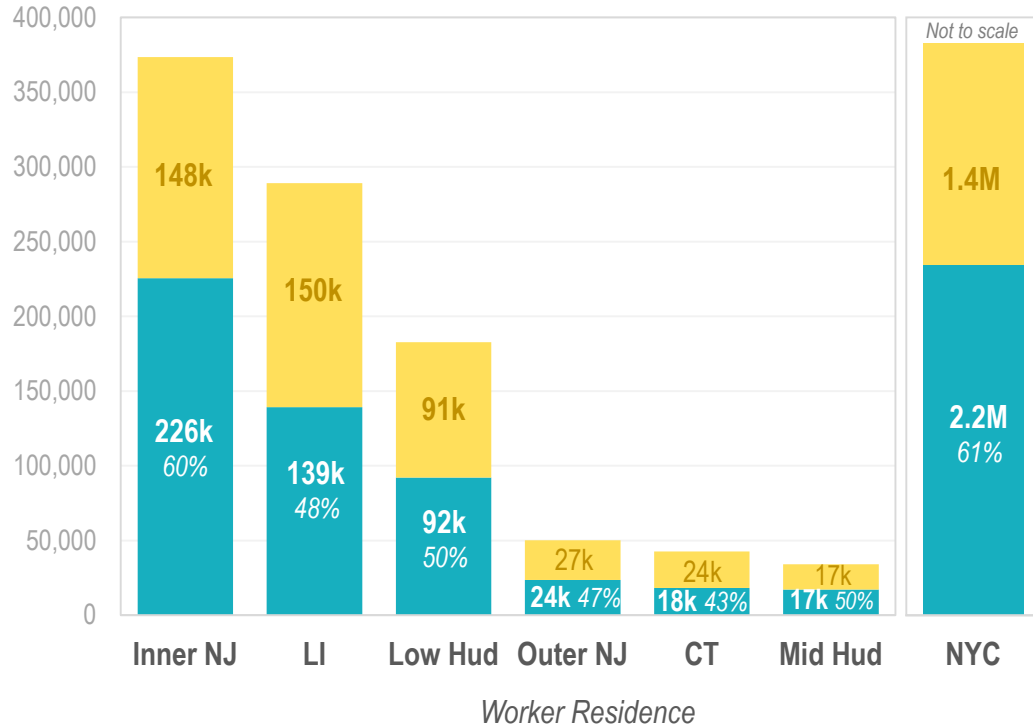
In comparing the percentage change of NYC workers by earnings category for those residing within the city versus those in-commuting from the region, NYC residents and in-commuters in low-wage jobs (earning less than \$50,000) grew at roughly the same rate. Workers who are NYC residents employed in middle-wage jobs (earning \$50,000 to \$100,000) grew at six times the rate of in-commuters earning those wages. Workers who are NYC residents in high-wage jobs (earning \$100,000 or more) grew at twice the rate of in-commuters. For both workers who are NYC residents and in-commuters, high-wage workers have had the greatest gain since 2000.

Deemed not statistically reliable at 90% confidence level

Workers earnings in 2000 were adjusted for inflation to 2017 dollars. Wages represent workers' total wage and salary income from all employment (not just primary job) prior to tax or other deductions. Percentage change reported here represents change of workers (people), not of wages earned. Please refer to the Appendix for additional notes. Sources: IPUMS-USA, University of Minnesota; U.S. Census Bureau ACS 1-Year Estimates 2017; U.S. Census Bureau Decennial Census 2000 5% Sample

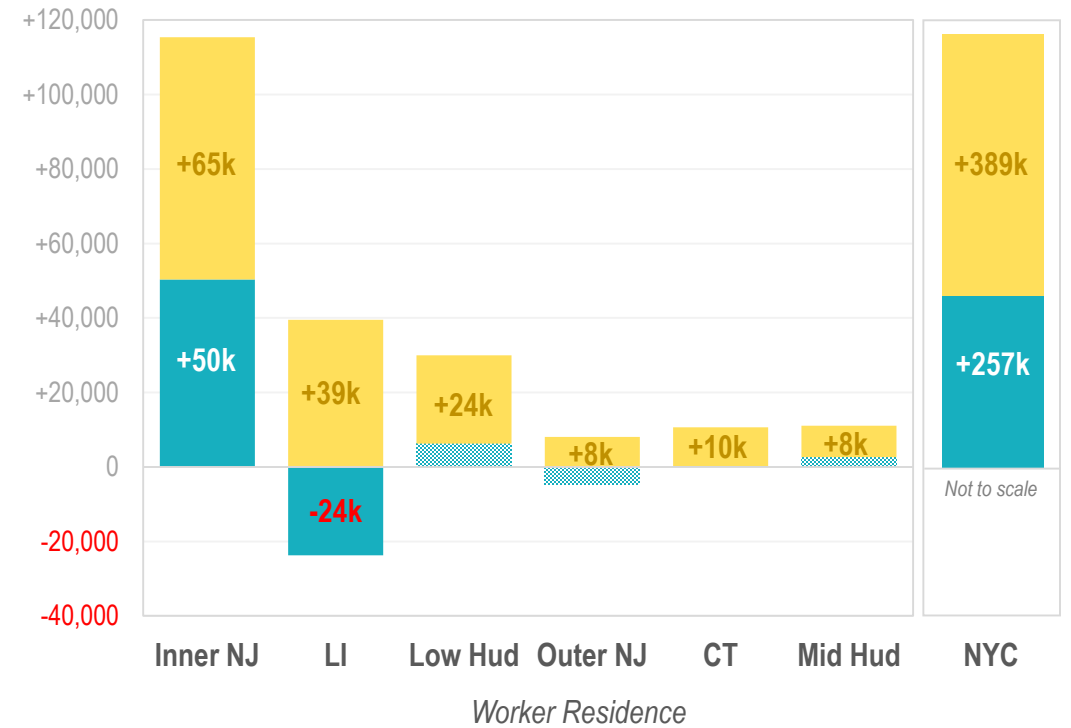
Most subregions are split between younger and older NYC in-commuters, but Inner NJ is the only subregion outside of NYC that experienced an increase of younger NYC in-commuters.

NYC Workers by Age 45+ vs. < Age 45, 2017

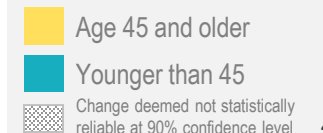


Today, NYC in-commuters are roughly split between younger and older workers. Residents of the Inner NJ subregion have a distribution of workers under/over age 45 that mirrors NYC's residents, while other subregions have moderately larger proportions of older workers comprising their in-commuter workforce.

Δ NYC Workers by Age 45 + vs. < Age 45, 2000 to 2017

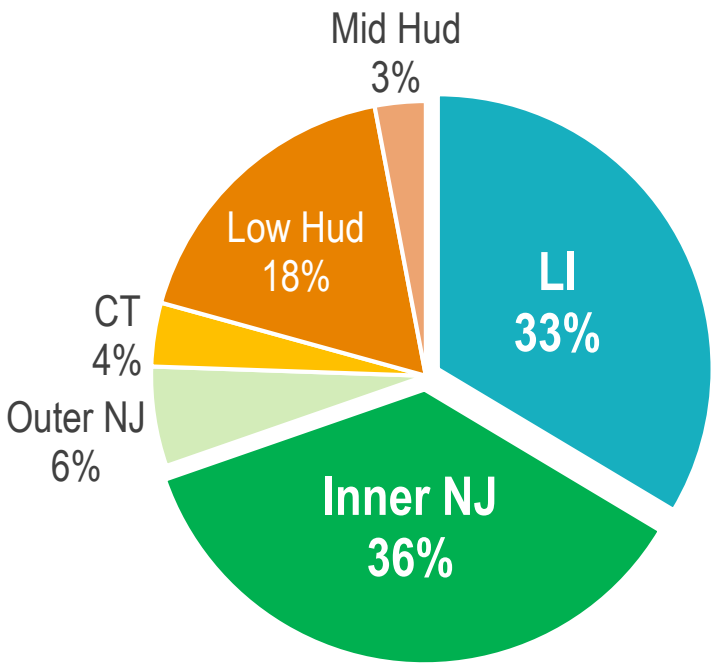
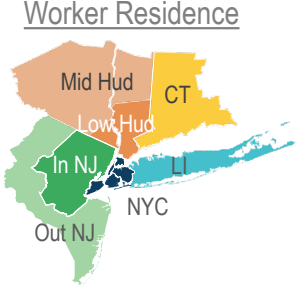


Since 2000, NYC and the Inner NJ subregion are home to the only significant gains in NYC workers younger than age 45. Most parts of the region have seen gains limited to NYC in-commuters age 45 and older. Long Island has registered a decrease of NYC workers younger than 45.

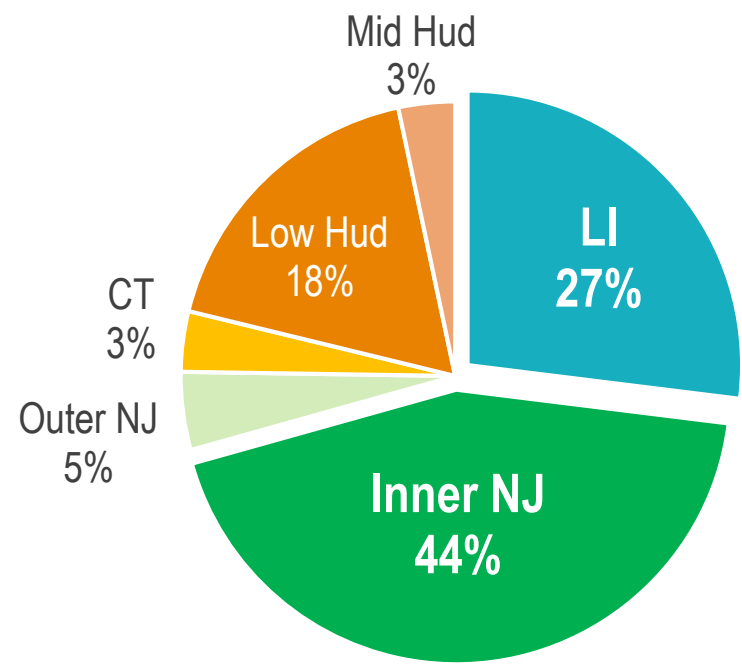


As a result of recent in-commuter growth patterns, the geographic source – or home – of the NYC in-commuter workforce has shifted.

NYC In-commuters Under Age 45 by Subregion of Residence, 2000 vs. 2017



2000
485k
62% of all in-commuters



2017
516k
53% of in-commuters

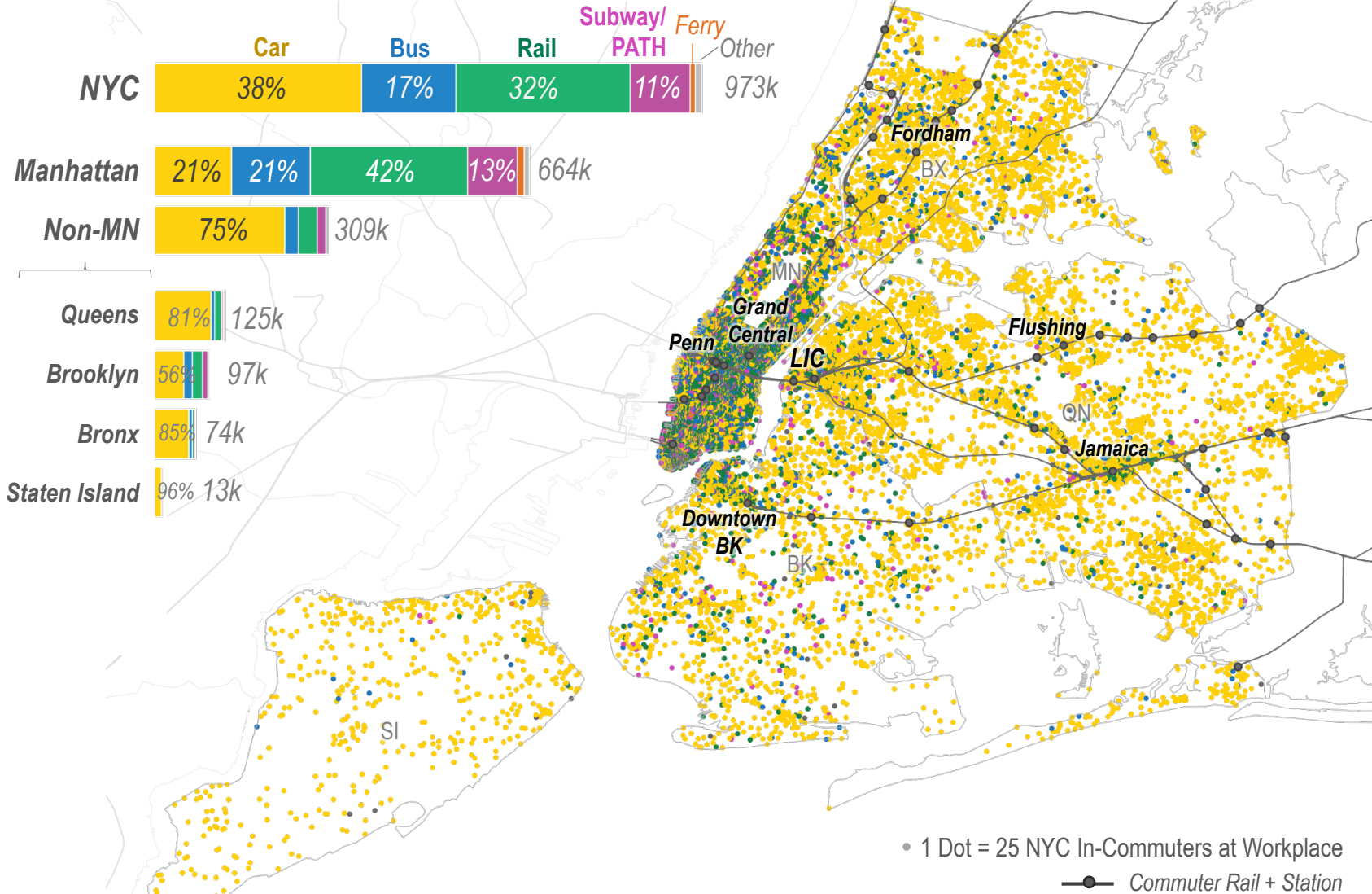
Though the under age 45 in-commuter workforce grew by 6% from 2000 to 2017, representing an increase of 31k workers, the in-commuter workforce age 45 and older increased by 52%. Therefore, younger workers as a share of the total in-commuter workforce declined from 62% to 53%. In other words, NYC and Inner NJ residents are now comprising an increasing proportion of the under age 45 workforce. The increasing shift of workers who reside within NYC and to the west of the city is an important trend that informs mobility planning and investments.

Insight #4

Whether living in NYC or the region, whether commuting to Manhattan or to another NYC borough, **resident and non-resident NYC workers are shifting to transit.** For regional in-commuters, **transit access at residence and work destination** factors heavily in **mode choice.**

Regional in-commuters travel to job locations across the city, but their primary modes of travel vary widely by NYC work location.

NYC In-commuters' Workplace Location by Primary Mode of Travel to Work, 2017



Of the 973K regional in-commuters, 61% travel to NYC jobs via transit, while 38% travel by car. The largest shares arrive via commuter rail (Metro-North, Long Island Rail Road, or NJ Transit), followed by bus, and NYC subway or PATH train. 2% of in-commuters also travel via ferry. However, unlike NYC residents who are able to use the NYC subway to access jobs centers throughout NYC, regional in-commuters primarily use transit to access jobs in Manhattan.

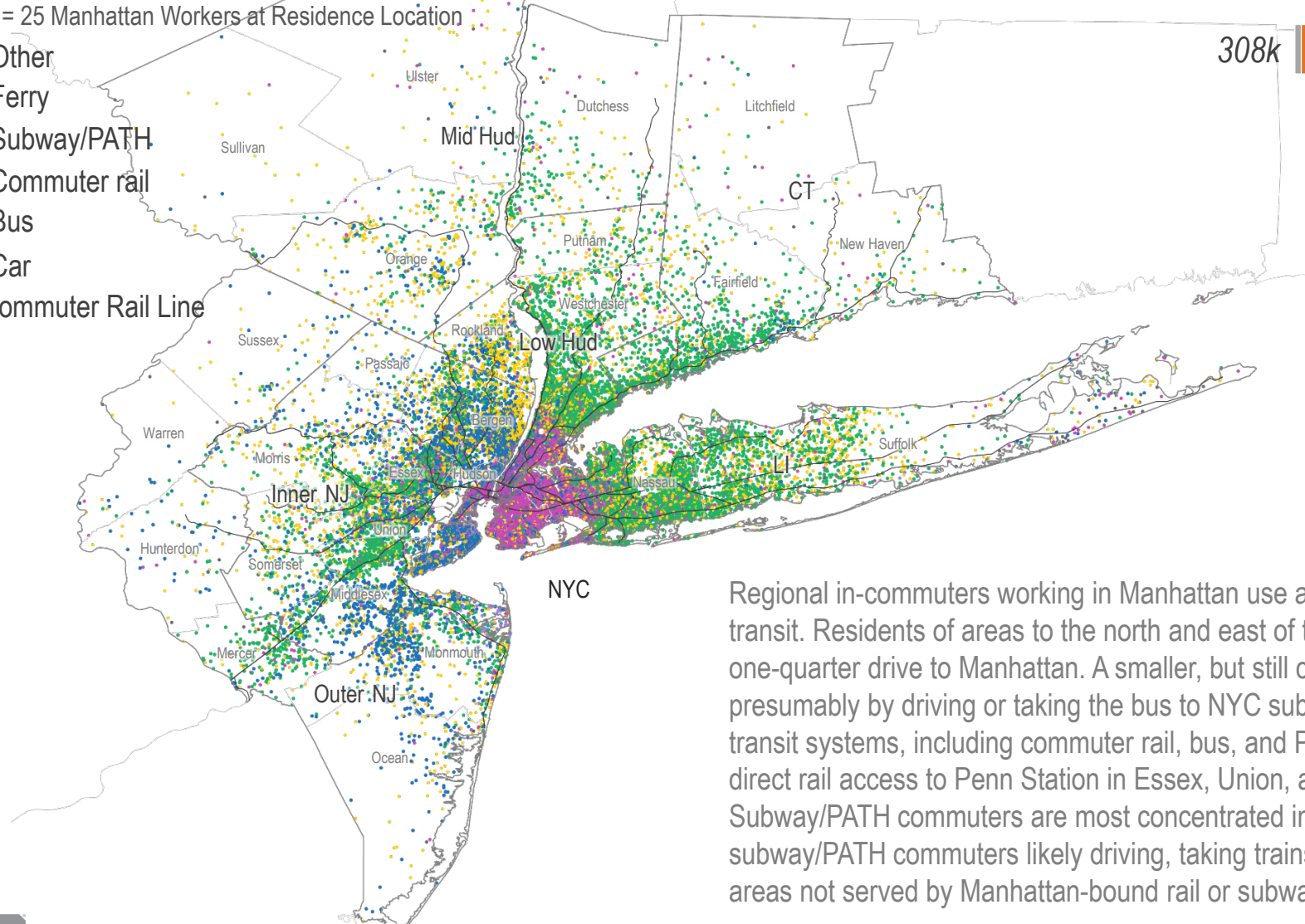
90% of all regional in-commuter transit trips are made to Manhattan, while nearly three quarters of regional in-commuters traveling to work in other NYC boroughs travel by car. Employment centers in the other boroughs are more dispersed than in Manhattan. However, there are pockets of in-commuters who use transit to travel to non-Manhattan CBD's such as Fordham Plaza, Downtown Brooklyn, Long Island City, and Jamaica, which are directly accessible via commuter rail. In all locations without direct commuter infrastructure, many in-commuters who use transit are likely using NYC subways for the last leg of their journey*.

The geography of the region's transit options shapes commuters' mode choices.

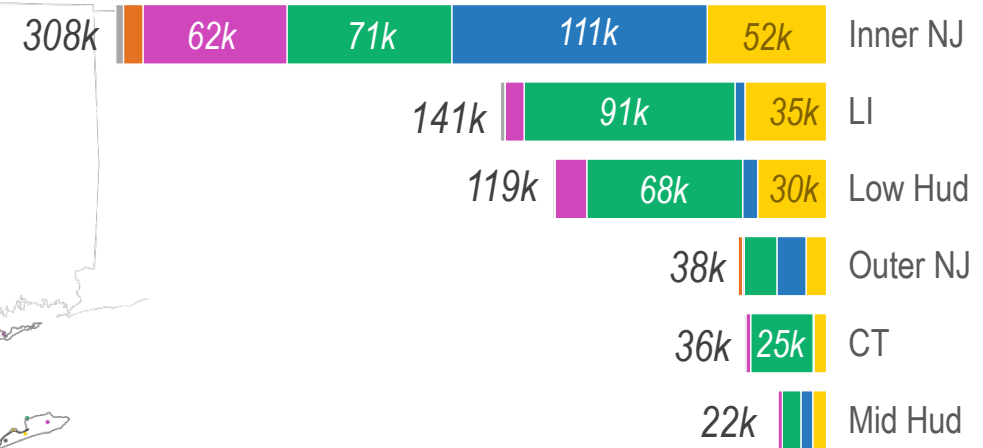
Manhattan Workers' Place of Residence by Primary Mode of Travel to Work, 2017

1 Dot = 25 Manhattan Workers at Residence Location

- Other
- Ferry
- Subway/PATH
- Commuter rail
- Bus
- Car
- Commuter Rail Line



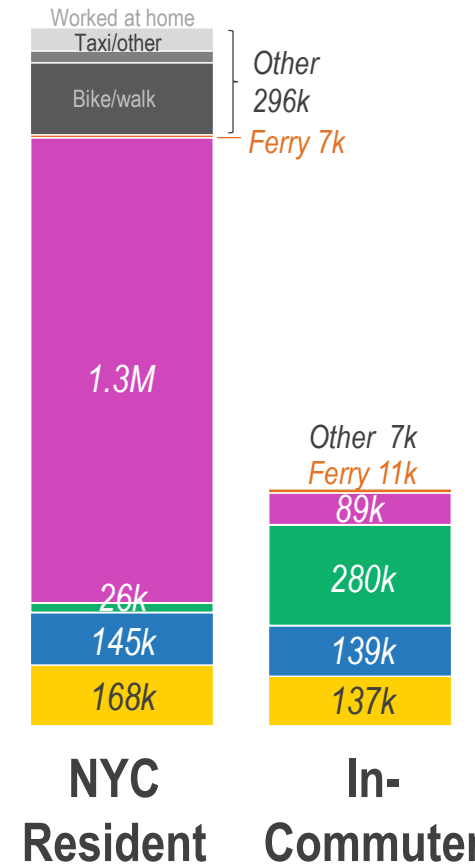
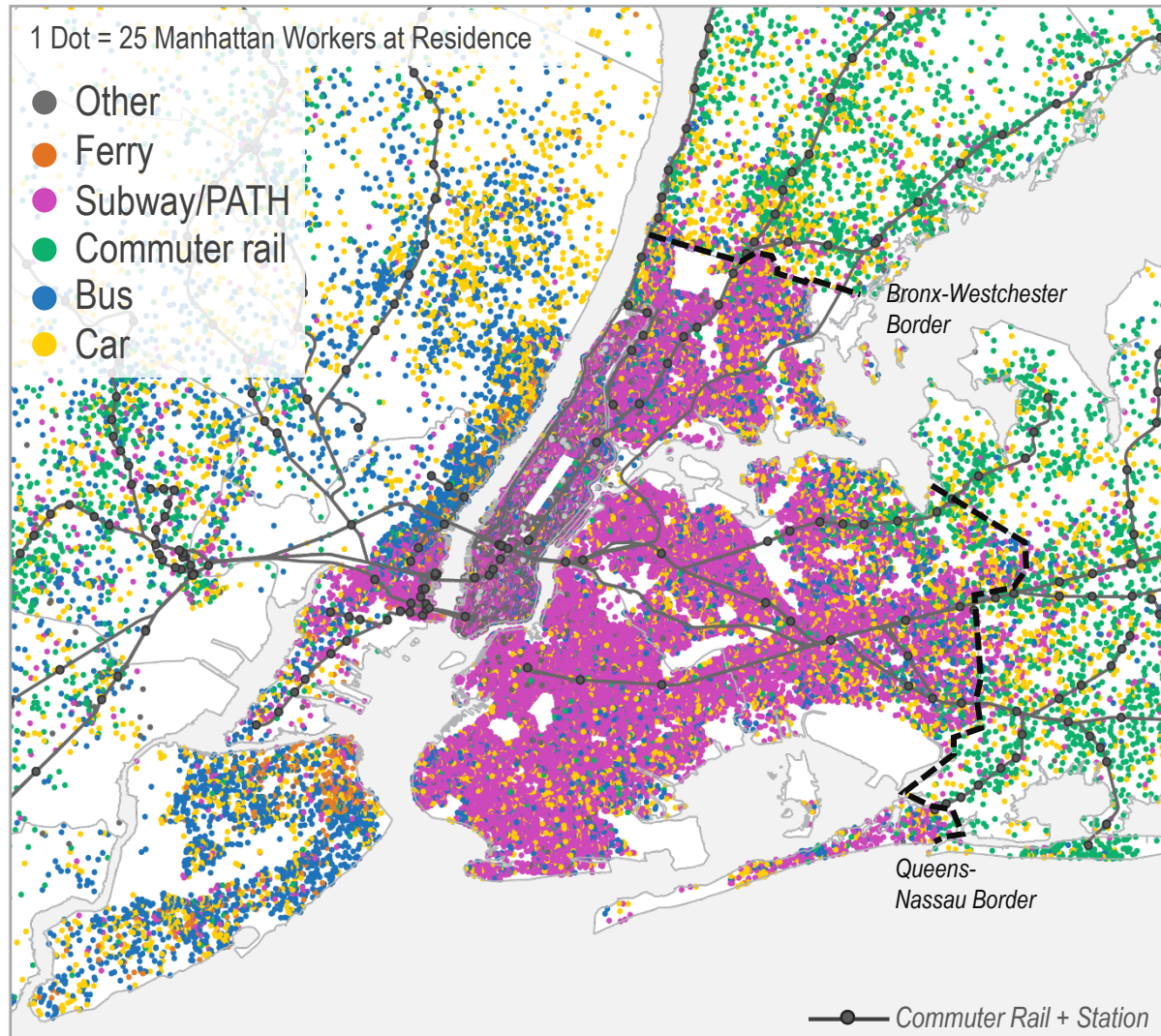
Summary by Subregion



Regional in-commuters working in Manhattan use a variety of modes, with rail the predominant mode of transit. Residents of areas to the north and east of the city are most likely to travel by commuter rail, though one-quarter drive to Manhattan. A smaller, but still considerable, number of in-commuters use the subway, presumably by driving or taking the bus to NYC subway stations. The Inner NJ subregion is served by multiple transit systems, including commuter rail, bus, and PATH train. Commuter rail usage is strongest in areas with direct rail access to Penn Station in Essex, Union, and Middlesex Counties, and in western Bergen County. Subway/PATH commuters are most concentrated in Jersey City and Hoboken in Hudson County, with some subway/PATH commuters likely driving, taking trains, or Hudson-Bergen Light Rail to access the PATH. In areas not served by Manhattan-bound rail or subway, bus and car are the dominant modes.

NYC residents are more likely than in-commuters to use transit to travel to work in Manhattan, but in total represent a greater number of private car commuters.

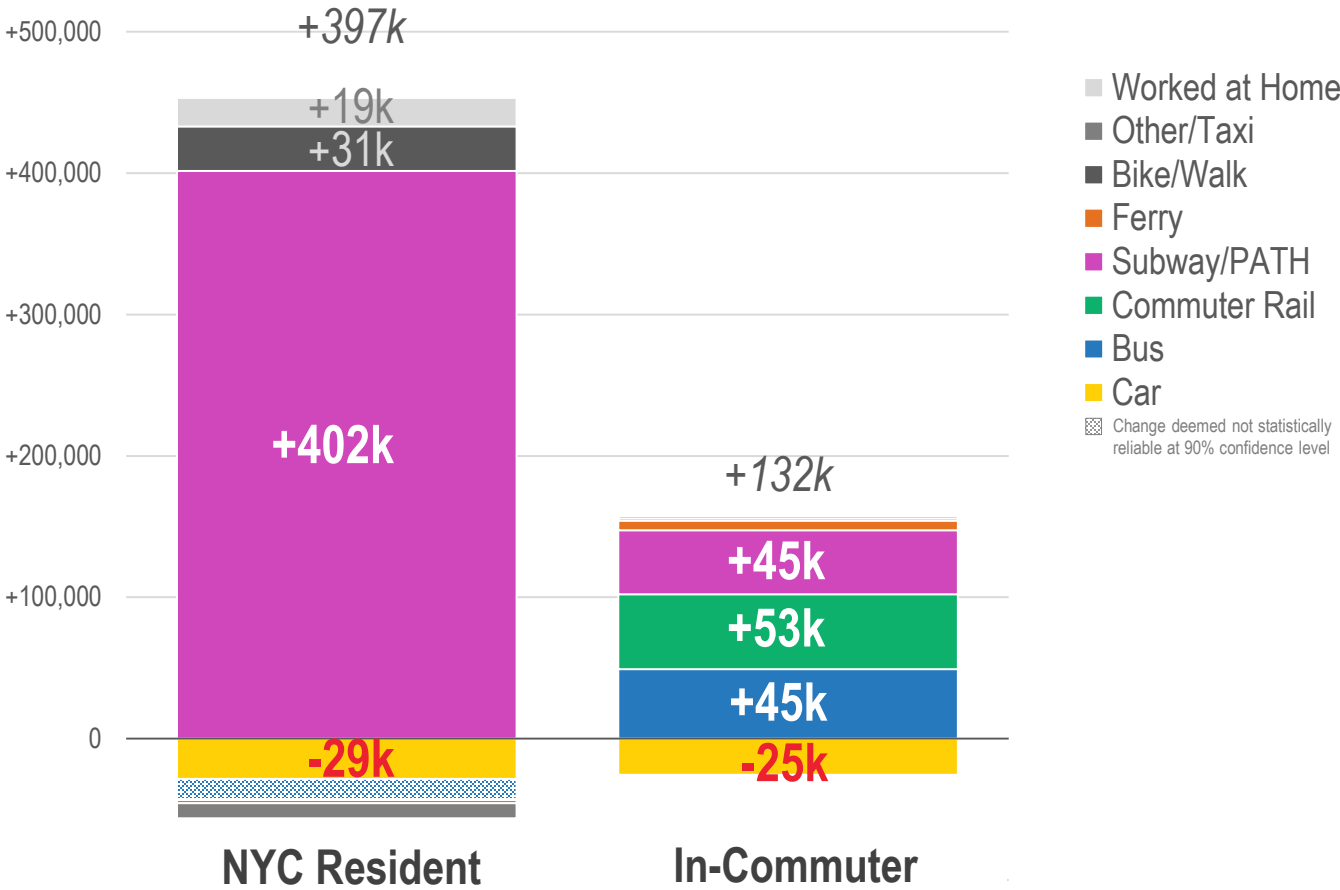
Manhattan Workers' Place of Residence by Primary Mode of Transit to Work, 2017



NYC residents working in Manhattan primarily travel by subway. This is also true for residents of the Bronx, Brooklyn, and Queens in areas served by commuter rail, which in some cases offers faster access to Manhattan at a higher cost. There are 168k NYC residents commuting by private car (including those who carpool) to jobs in Manhattan, representing 9% of NYC residents who work in Manhattan. By contrast, 21% of in-commuters drive to Manhattan, but because regional in-commuters represent one-fifth of Manhattan workers, the total in-commuters traveling by car (137k) is slightly lower than NYC residents driving to work.

The subway provided critical support for the growth of NYC residents working in Manhattan, while increases in regional in-commuting to Manhattan were distributed across transit modes.


ΔManhattan Workers by Primary Mode of Travel to Work, 2000 to 2017

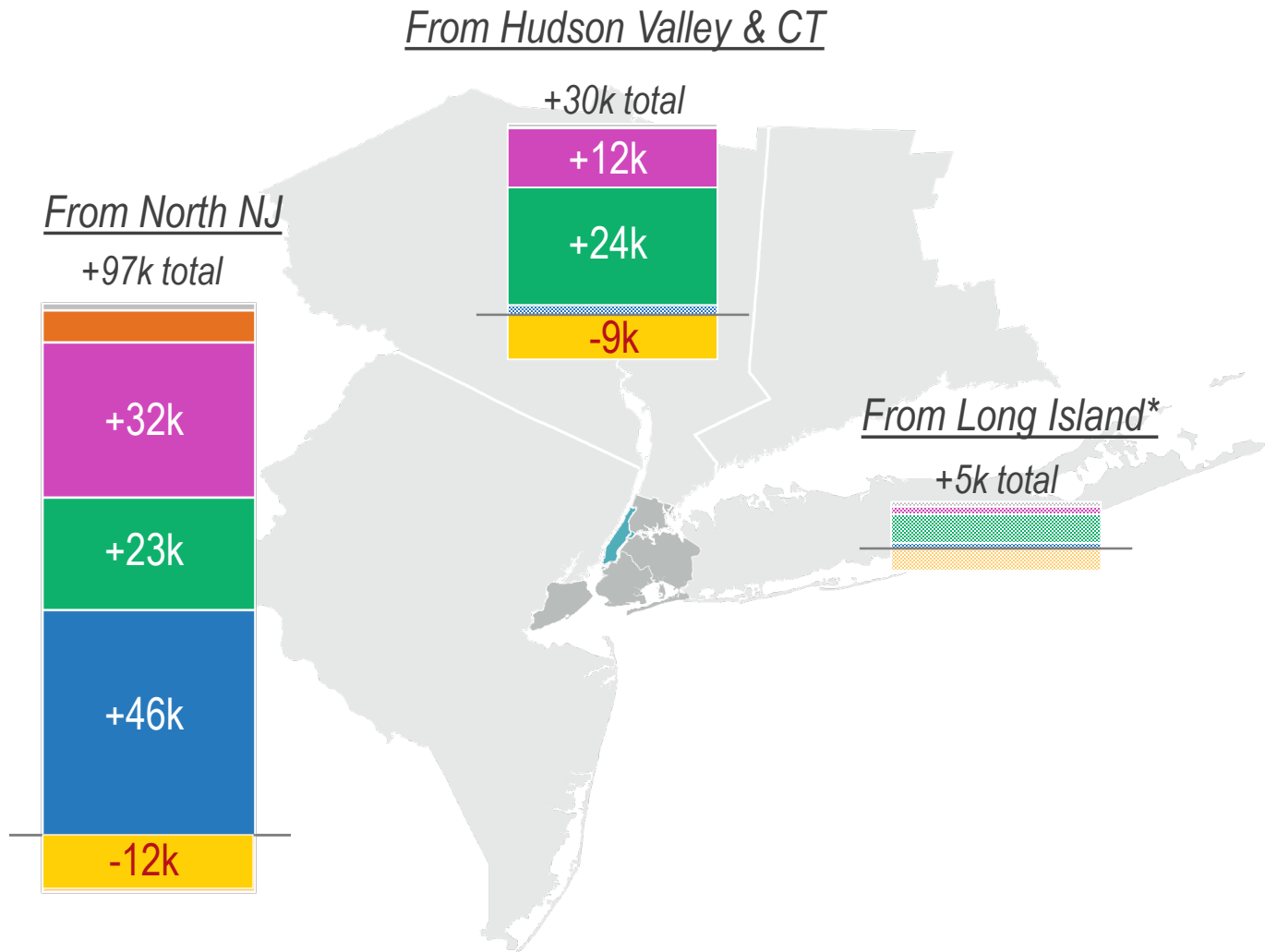


Since 2000, the number of NYC residents traveling to Manhattan for work by subway increased by 45%, representing 402k additional subway commuters. Regional in-commuters traveling to Manhattan increased across subway/PATH, commuter rail, and bus transit. Both NYC residents and in-commuters showed a decline in car users (including carpools) traveling to Manhattan for work, by 15% and 16% respectively.

North New Jersey residents accounted for the greatest increase of transit commuters to Manhattan.

ΔManhattan In-Commuters by Primary Mode of Travel to Work, 2000 to 2017

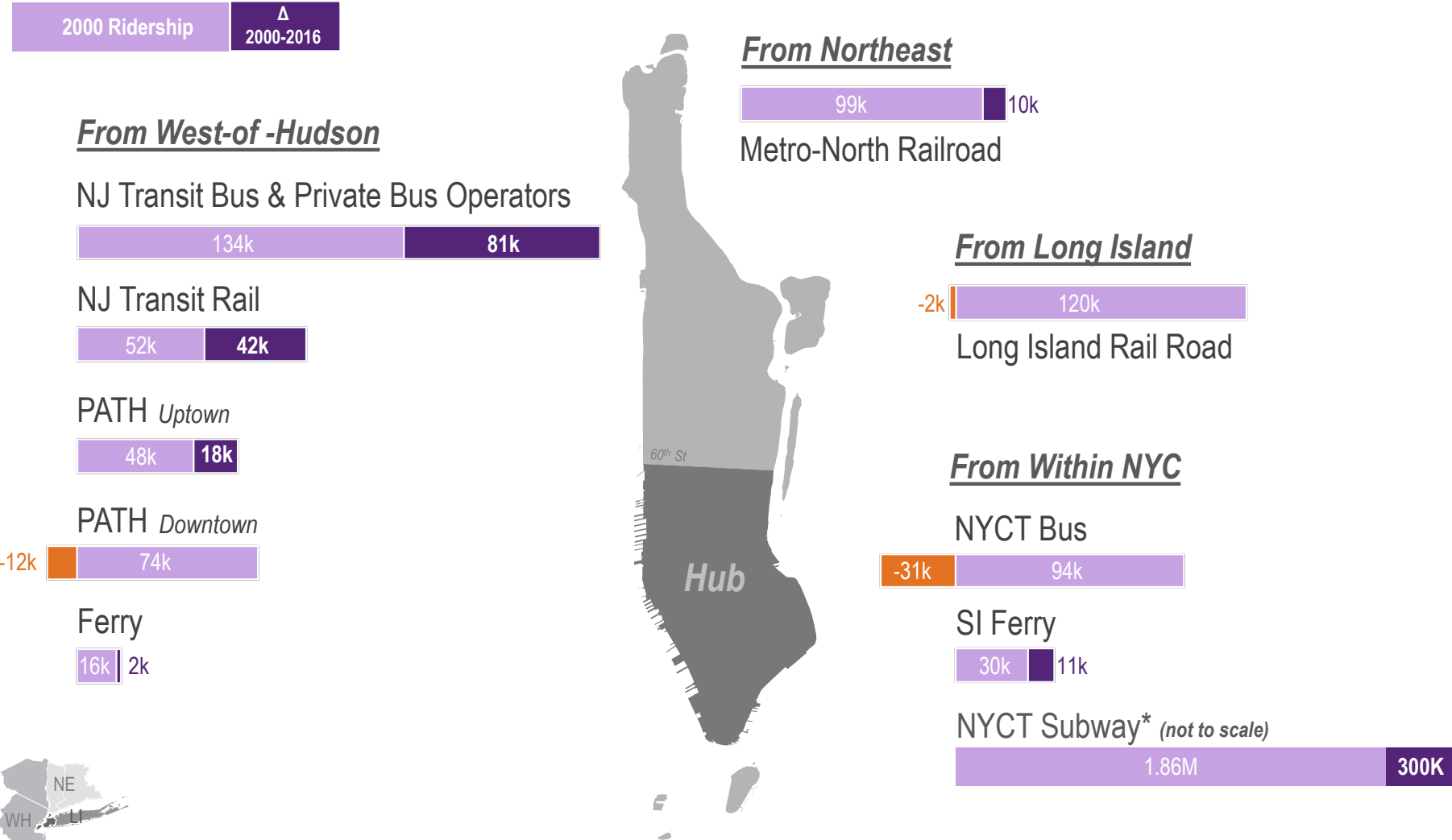
- Other
- Ferry
- Subway/PATH
- Commuter Rail
- Bus
- Car
-  Change deemed not statistically reliable at 90% confidence level



A majority (68%) of the total transit-based in-commuter gains can be attributed to increases in Manhattan workers traveling from North New Jersey. North New Jersey residents represented nearly all (94%) of the increase in bus commuters to Manhattan, as well as 70% of the increase in subway/PATH commuters to Manhattan. Areas north of NYC, in the Hudson Valley and Connecticut, also housed significant gains of transit commuters traveling to Manhattan. This was mostly on commuter rail, followed by subway, presumably by in-commuters accessing NYC subway lines at outer stations. Car in-commuters to Manhattan declined from regional origins.

Increases in transit commuting are reflected in Manhattan-bound ridership increases across most systems, especially on the subway and New Jersey transit networks.

Increase in Manhattan-Bound (Hub) Daily Ridership from 2000 to 2016

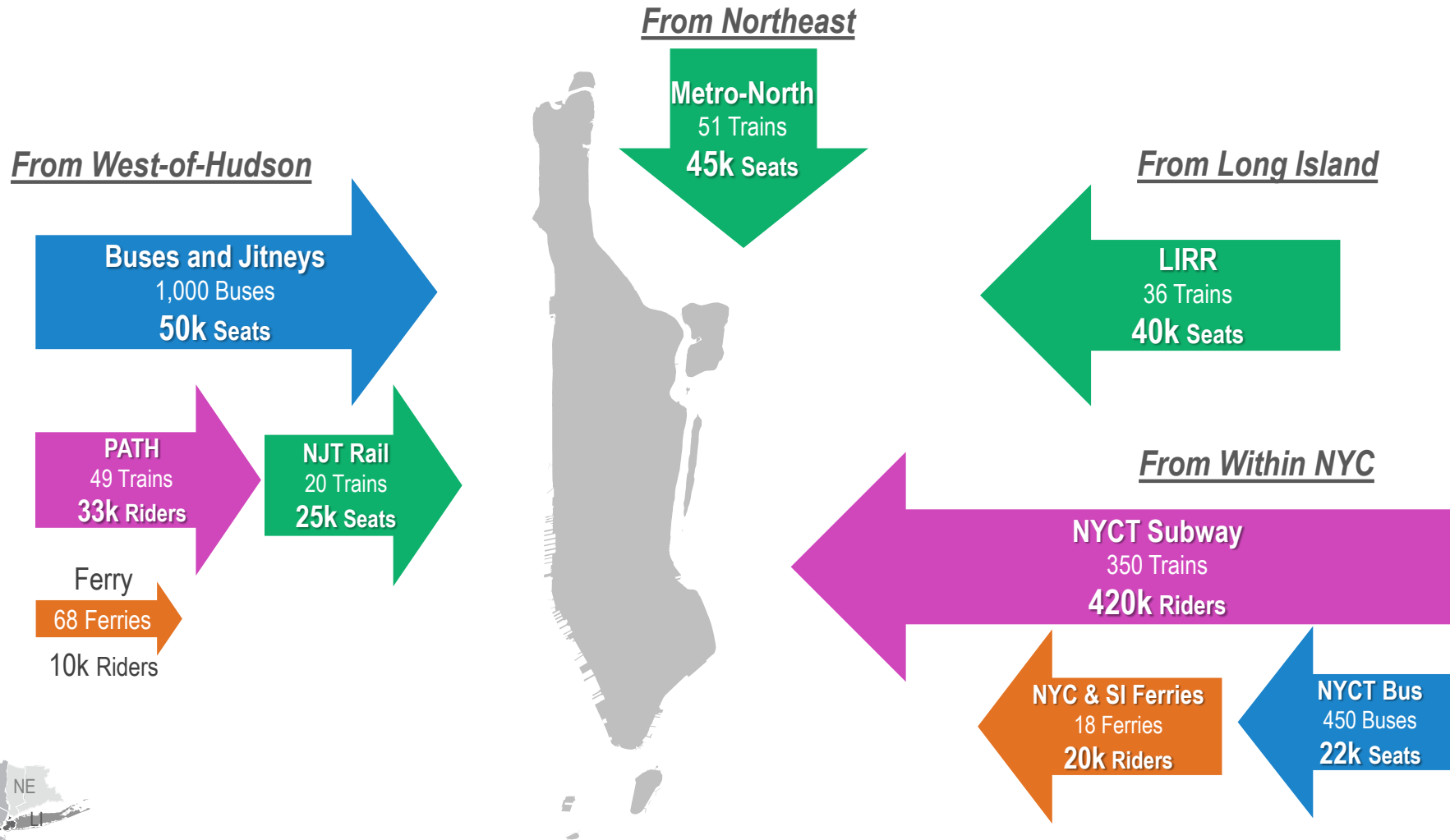


The change in Manhattan workers by their primary mode used to travel to work is mirrored by observed changes in daily ridership across regional transit systems. West-of-Hudson transit systems – including bus, commuter rail (NJ Transit and West-of-Hudson Metro-North), and PATH train – experienced a total gain of 131k daily Manhattan-bound riders. Metro-North originating from east of the Hudson River gained approximately 10k daily Manhattan-bound trips over the same period. The Long Island Rail Road (LIRR) experienced a 2% daily ridership decline since 2000. The largest gain, however, was on the NYC Transit Subway (NYC subway), which gained 300k daily Manhattan-bound riders from 2000 to 2016.



Outside of NYC, communities west of the Hudson River can access the most regional transit service to Manhattan through a mix of commuter rail, bus, and PATH service.

Manhattan-bound AM Peak Hour Transit Seat/Rider* Capacity (8AM – 9AM)



Consistent with the large and growing transit in-commuter population from west of the Hudson River, this order-of-magnitude estimation of morning peak hour (8AM to 9AM) transit service by number of seats available indicates that West-of-Hudson currently provides the greatest number of regional transit passenger seats to Manhattan. There are more than double the number of seats servicing riders from West-of-Hudson versus from Northeast of NYC and Long Island during the morning commute, split across bus, rail, PATH systems. However, access to Manhattan from the north and east traverses other NYC boroughs, which have more points of connection, and offer access to Manhattan via the NYCT Subway and NYCT Bus networks.



*Rider capacity includes both seated and standing riders. Arrows not drawn to scale.
 Sources: NJT, MNR and LIRR, PATH from GTFS feeds; LIRR 2016 Ridership book; MNR 2017 Ridership Book; PANYNJ; NYC subway and bus from NYMTC Hub-bound Report 2016; NY Waterway Seastreak, NYC Ferry, SI Ferry schedules. Please see Appendix for additional notes regarding estimation methodology.

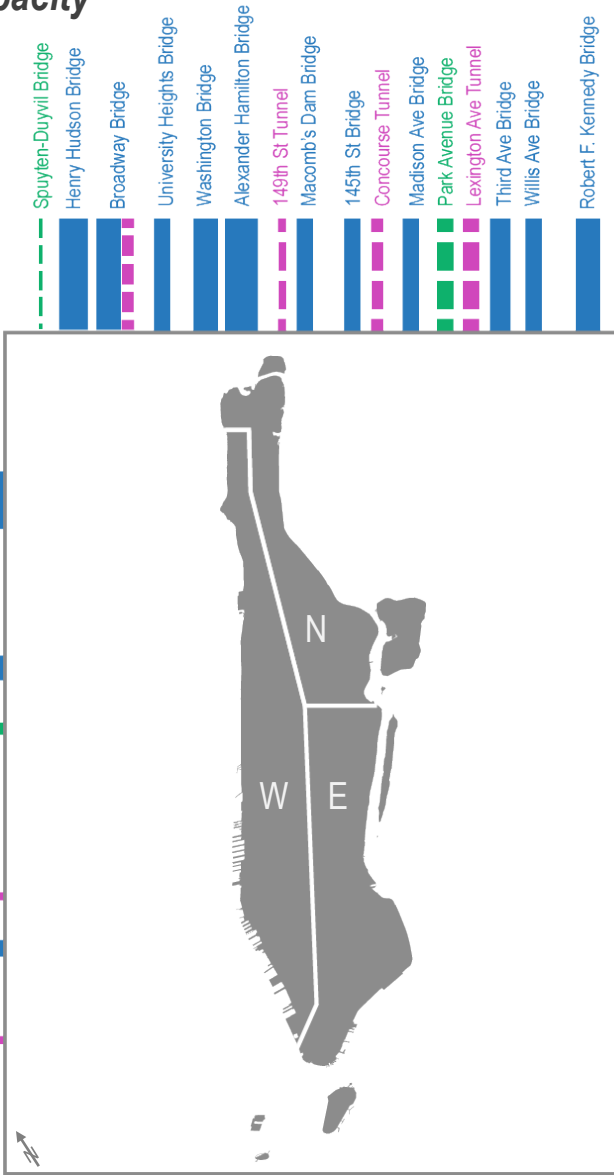
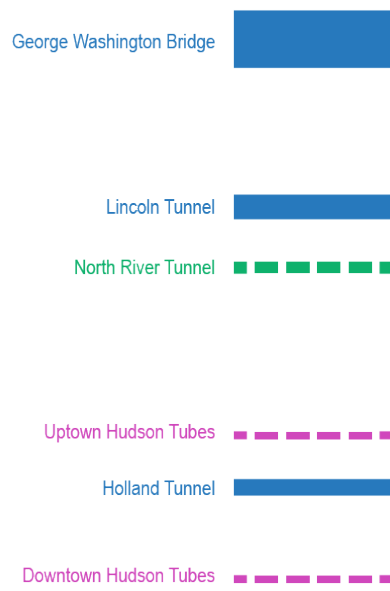
Infrastructure capacity to Manhattan is more limited from the west than from the north and east.

Manhattan-bound Infrastructure Capacity

--- 1 track
 ■ 14 lanes

From West of Manhattan

24 Vehicle Lanes
 4 PATH Tracks
 2 Commuter Rail Tracks



From North of Manhattan

58 Vehicle Lanes
 12 Subway Tracks
 5 Commuter Rail Tracks

From East of Manhattan

39 Vehicle Lanes
 26 Subway Tracks
 6 Commuter Rail Tracks

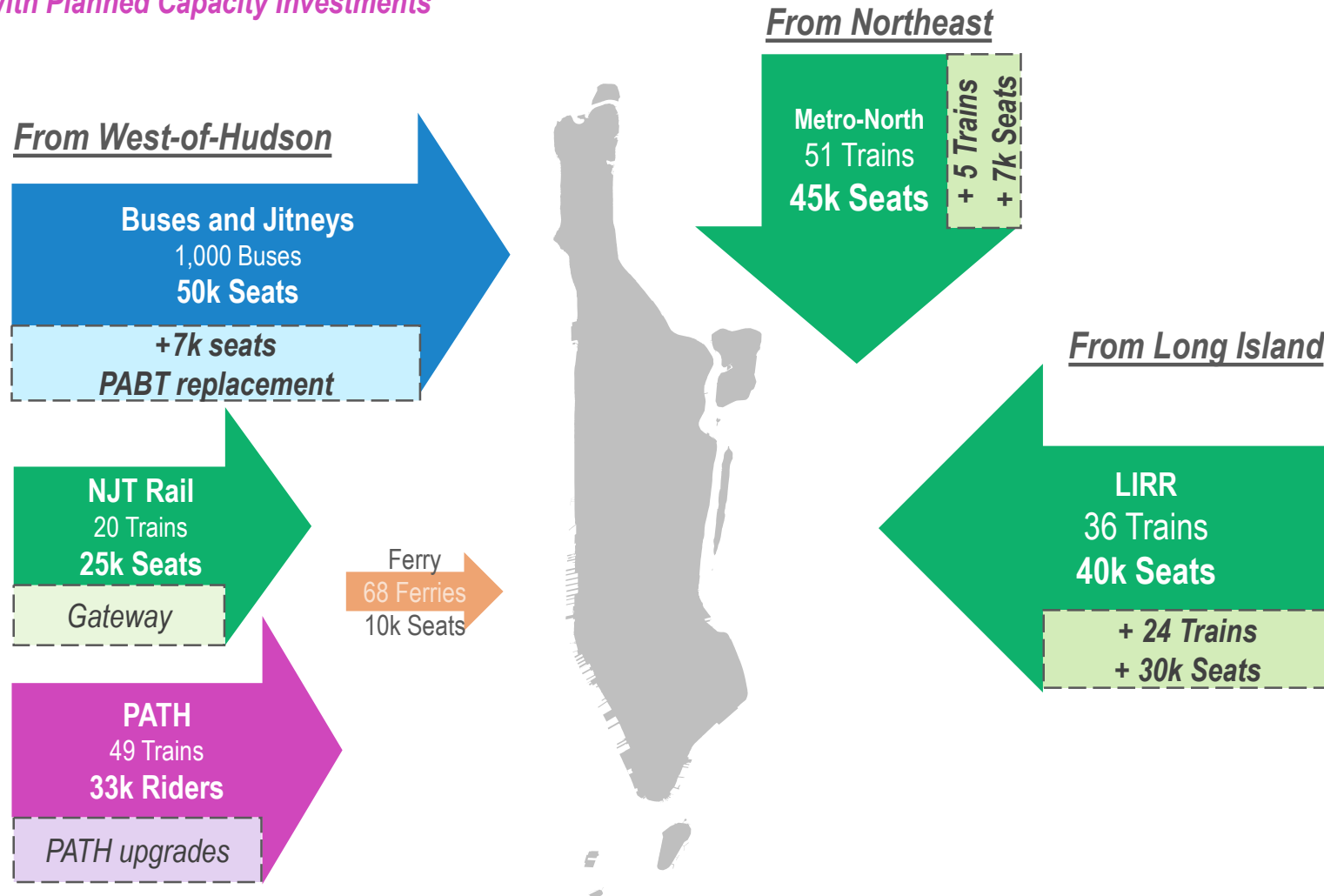


There is greater transportation infrastructure capacity connecting Manhattan to areas across the East and Harlem rivers than west across the Hudson River. There are six rail tracks and 24 vehicular lanes running from New Jersey and West-of-Hudson into Manhattan. By comparison, there are 32 rail tracks and 39 vehicular lanes serving Manhattan from the east (from Queens and Brooklyn), and 58 vehicular lanes and 17 rail tracks entering Manhattan from the north (from the Bronx). Areas north and east of Manhattan, all connecting points within NYC, each have greater numbers of vehicle, commuter rail, and subway tracks accessing Manhattan.

Billions of dollars are currently committed to network expansion projects that will improve core-bound mobility and capacity, adding at least 42,000 seats.

Manhattan-bound AM Peak Hour Service and Capacity (8AM – 9AM)

With Planned Capacity Investments



There are a number of planned and in-progress large-scale capital projects in NYC and the Region that, once completed, will improve access to Manhattan. This includes East Side Access, which will expand platform capacity at Grand Central and allow for 24 more trains, or 30k more regional rail seats. East Side Access also enables the Penn Station Access project, which will bring Metro-North trains into Penn Station using surplus LIRR platform space, also adding commuter rail capacity. The Port Authority Bus Terminal project, currently partially funded, would expand bus terminal capacity by approximately 7k seats. Completion of the first phase of the Second Avenue Subway (SAS) and the 7 Train Extension increased the reach of the subway within Manhattan. Phase 3 of the SAS, not yet funded, would increase the subway's trunk capacity. Future expansion of Penn Station through the Gateway program, though not funded, could increase rail capacity from West-of-Hudson by 50% (based on previous estimates for the terminated Access to the Region's Core, or "ARC" project).

*Rider capacity includes both seated and standing riders. Arrows not to scale. ↗

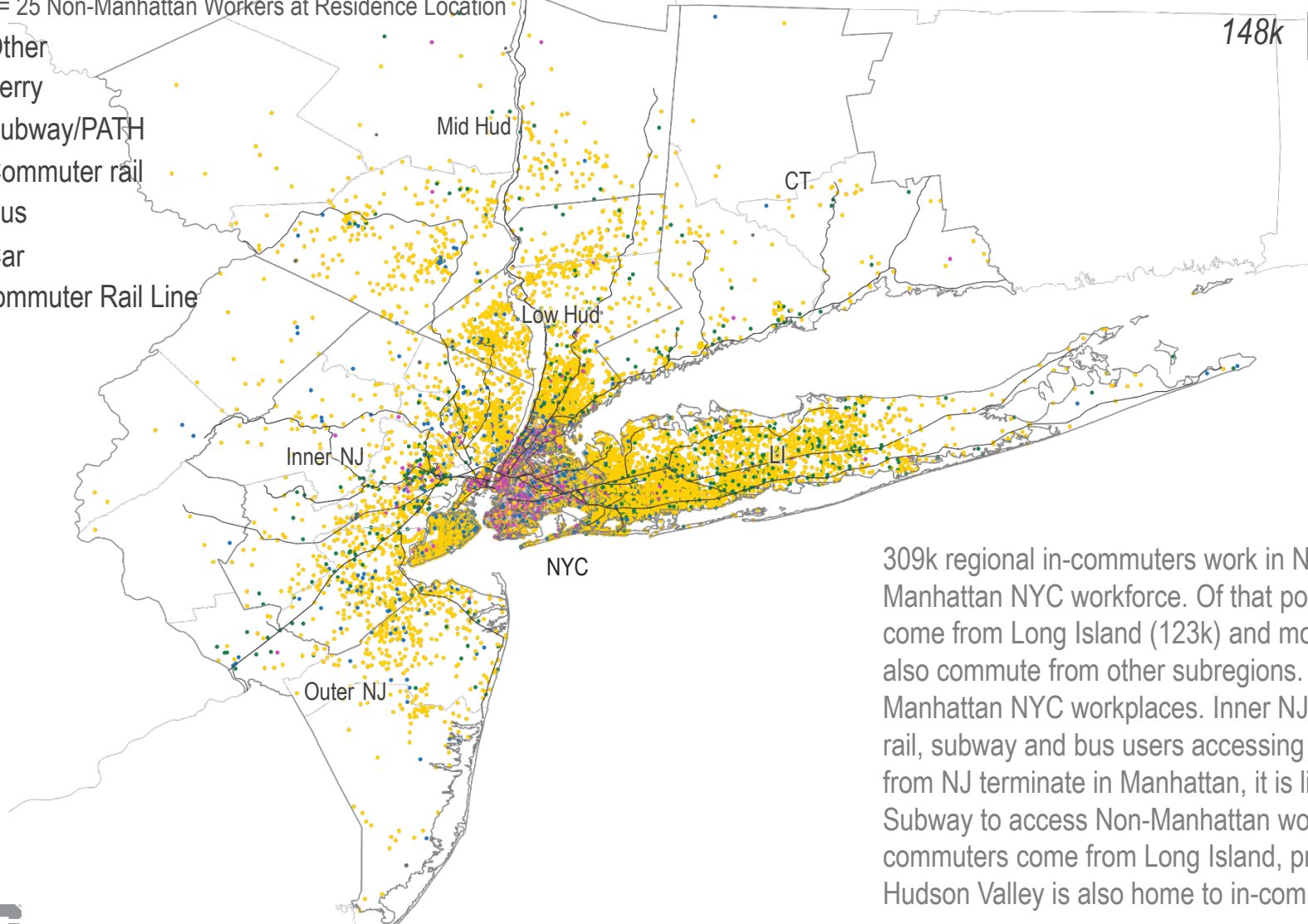
Sources: PATH, NJT, MNR and LIRR from GTFS feed; LIRR 2016 Ridership book; MNR 2017 Ridership Book; PANYNJ; NYWaterway and Seastreak schedule data; ESA EIS; Penn Access DEIS: Comparative Screening Results; Please see Appendix for additional notes regarding estimation methodology.

Long Island accounts for half of all in-commuters driving to Non-Manhattan NYC jobs. Inner NJ in-commuters to Non-Manhattan Boroughs are most likely to use transit.

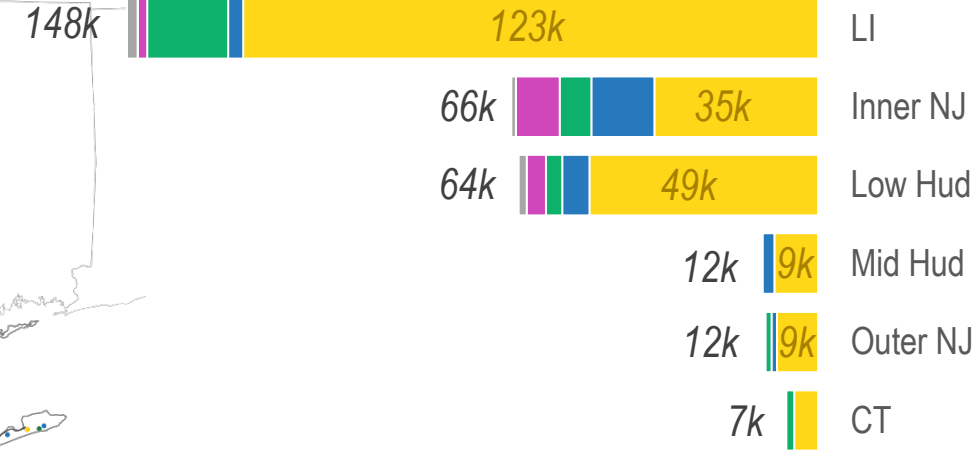
Non-Manhattan NYC Workers' Place of Residence by Primary Mode of Travel to Work, 2017

1 Dot = 25 Non-Manhattan Workers at Residence Location

- Other
- Ferry
- Subway/PATH
- Commuter rail
- Bus
- Car
- Commuter Rail Line



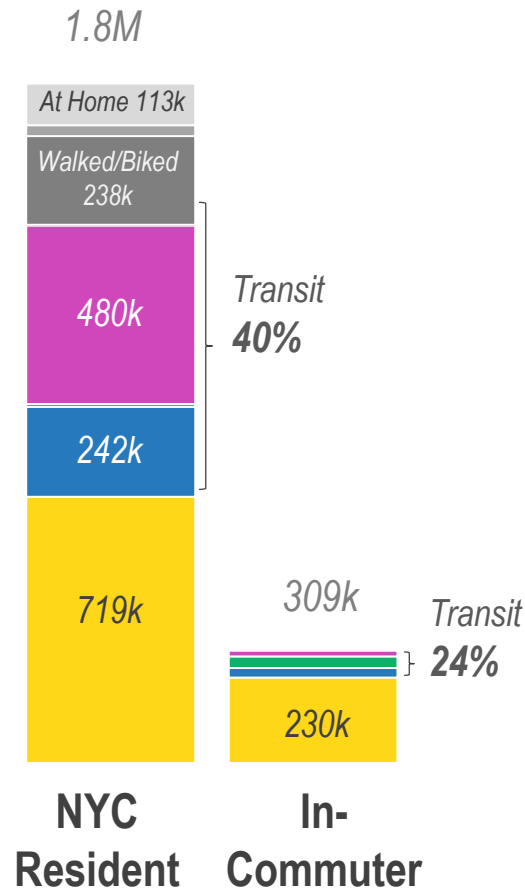
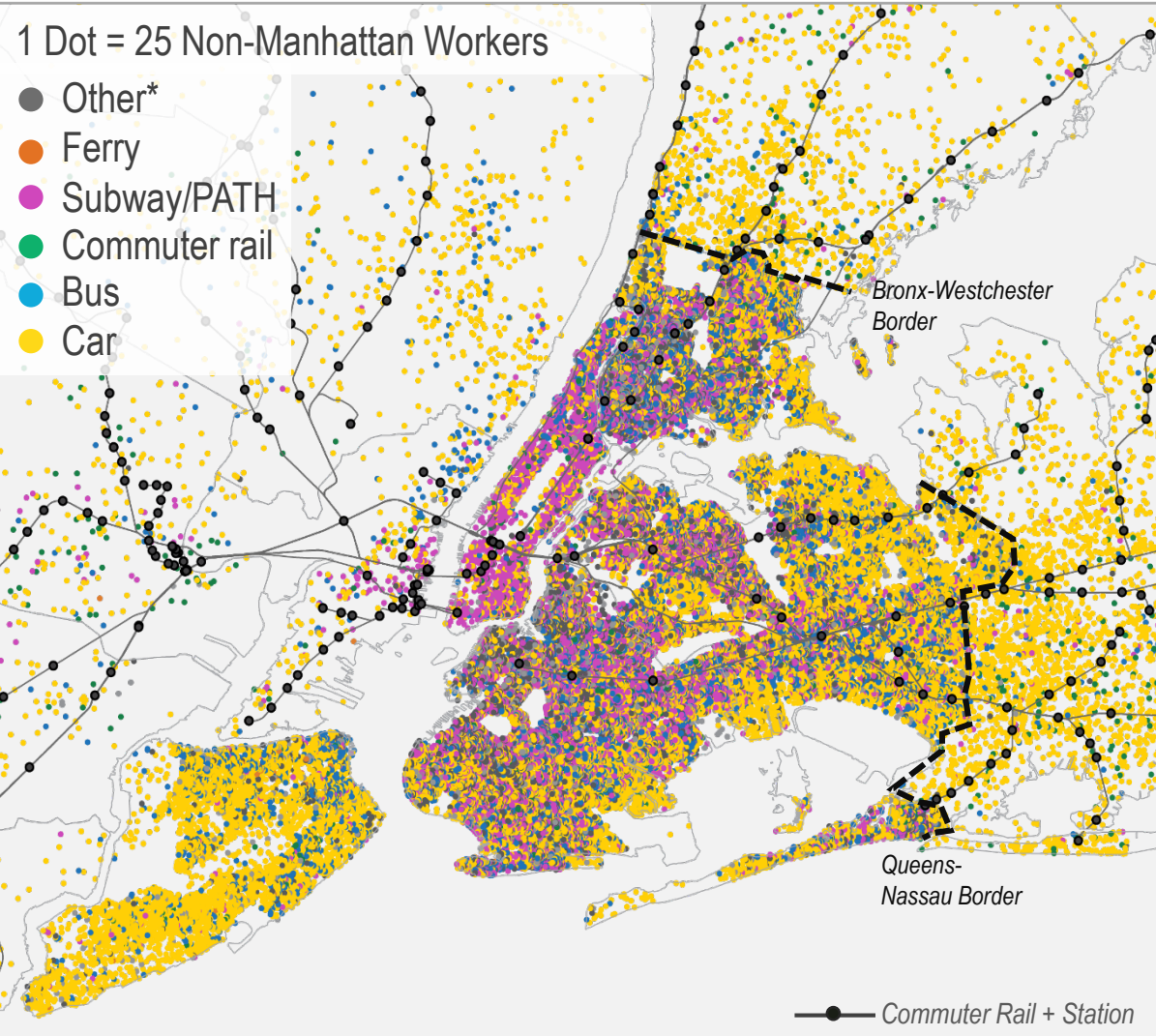
Summary by Subregion



309k regional in-commuters work in Non-Manhattan Boroughs, representing 17% of the non-Manhattan NYC workforce. Of that population, 75% are driving, the largest number of which come from Long Island (123k) and mostly travel to jobs in Queens. Sizeable driving populations also commute from other subregions. 73k regional in-commuters traveled on transit to Non-Manhattan NYC workplaces. Inner NJ is home to the greatest number of transit commuters, with rail, subway and bus users accessing Non-Manhattan NYC jobs. Since most transit services from NJ terminate in Manhattan, it is likely that transit in-commuters are also using the NYC Subway to access Non-Manhattan work destinations. 23k regional rail, bus and subway in-commuters come from Long Island, primarily accessing jobs in Queens or Brooklyn. The Lower Hudson Valley is also home to in-commuters accessing jobs in Bronx by transit.

In-commuters are more likely to drive to work in Non-Manhattan Boroughs than NYC residents, but a significant number of NYC residents drive to work outside Manhattan.

Non-Manhattan NYC Workers' Place of Residence by Primary Mode of Travel to Work, 2017



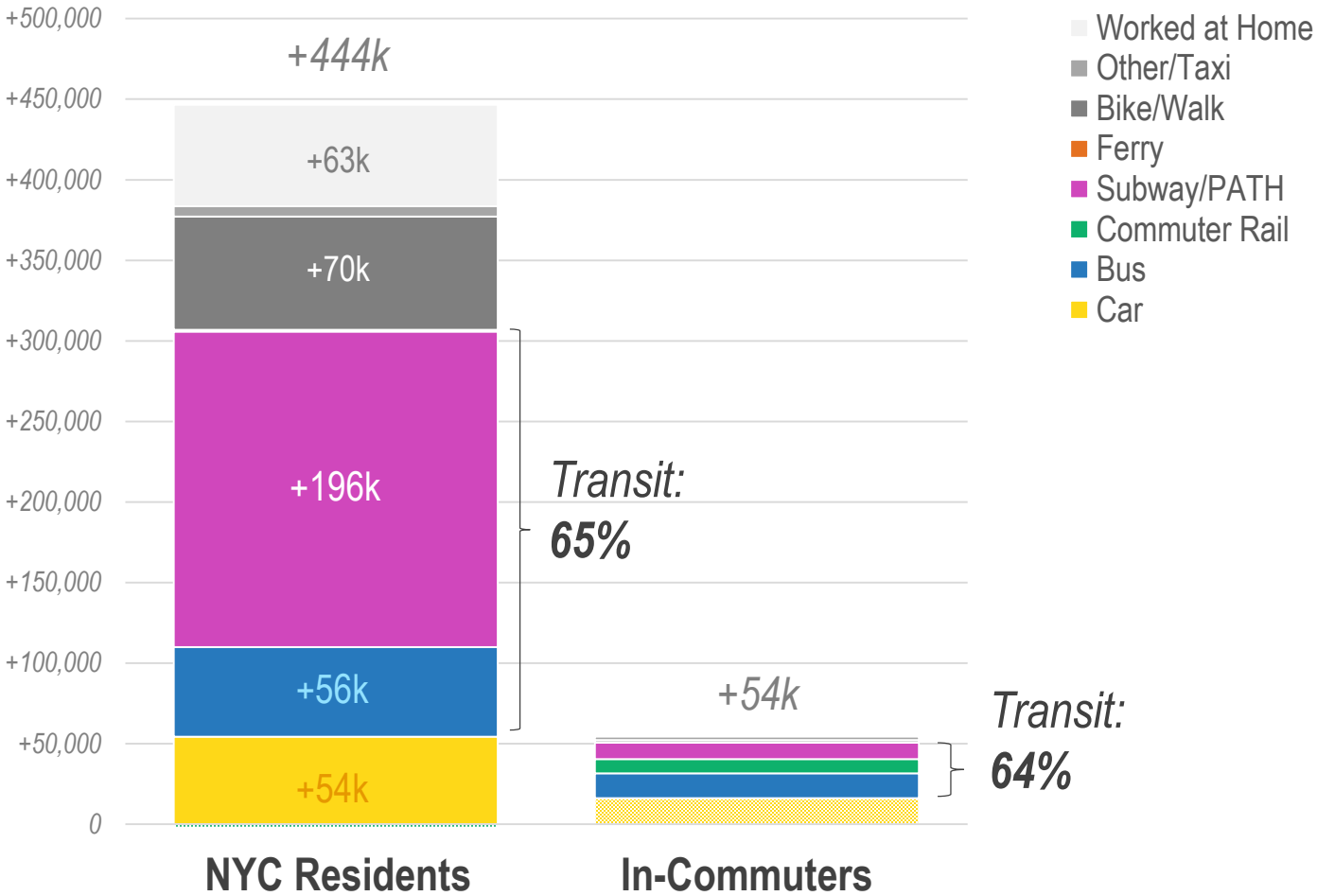
40% of NYC residents working in Non-Manhattan Boroughs use transit to commute to work (734k). That's less than the share traveling to Manhattan on transit, but twice the rate of regional in-commuters, only 24% of whom are commute to Non-Manhattan NYC jobs by transit.

The highest share of NYC residents commuting to Non-Manhattan NYC jobs by transit use subway. Bus commuters also travel to jobs dispersed throughout Non-Manhattan boroughs, primarily for shorter commutes, or in areas not served by subways. Bus is not as prominent of a mode choice for regional in-commuters, but bus markets exist where Nassau Inter-County Express (NICE) bus services portions of Queens, or where Bee-Line bus services the Bronx from Westchester. While commuter rail connects to Non-Manhattan NYC business districts, it is a small portion of in-commuters' mode choice, in part because of the smaller share of jobs near these stations.

NYC PLANNING Primary mode of travel to work represents the mode survey respondents say was used for the majority of their trip. It does not capture inter-modal splits or commuters using multiple modes per trip. *Other includes Manhattan residents who work at home, commuters traveling by bike or walking, or taxi and other modes of transit. Source: IPUMS-USA, University of Minnesota; For tabulations - U.S. Census Bureau ACS 1-Year Estimates, 2017; For mapping - U.S. Census Bureau CTPP 2006-2010

Transit is playing a key role in supporting economic growth. Transit commuters accounted for two-thirds of NYC worker gains in Non-Manhattan Boroughs.

ΔNon-Manhattan NYC Workers by Primary Mode of Travel to Work, 2000 to 2017



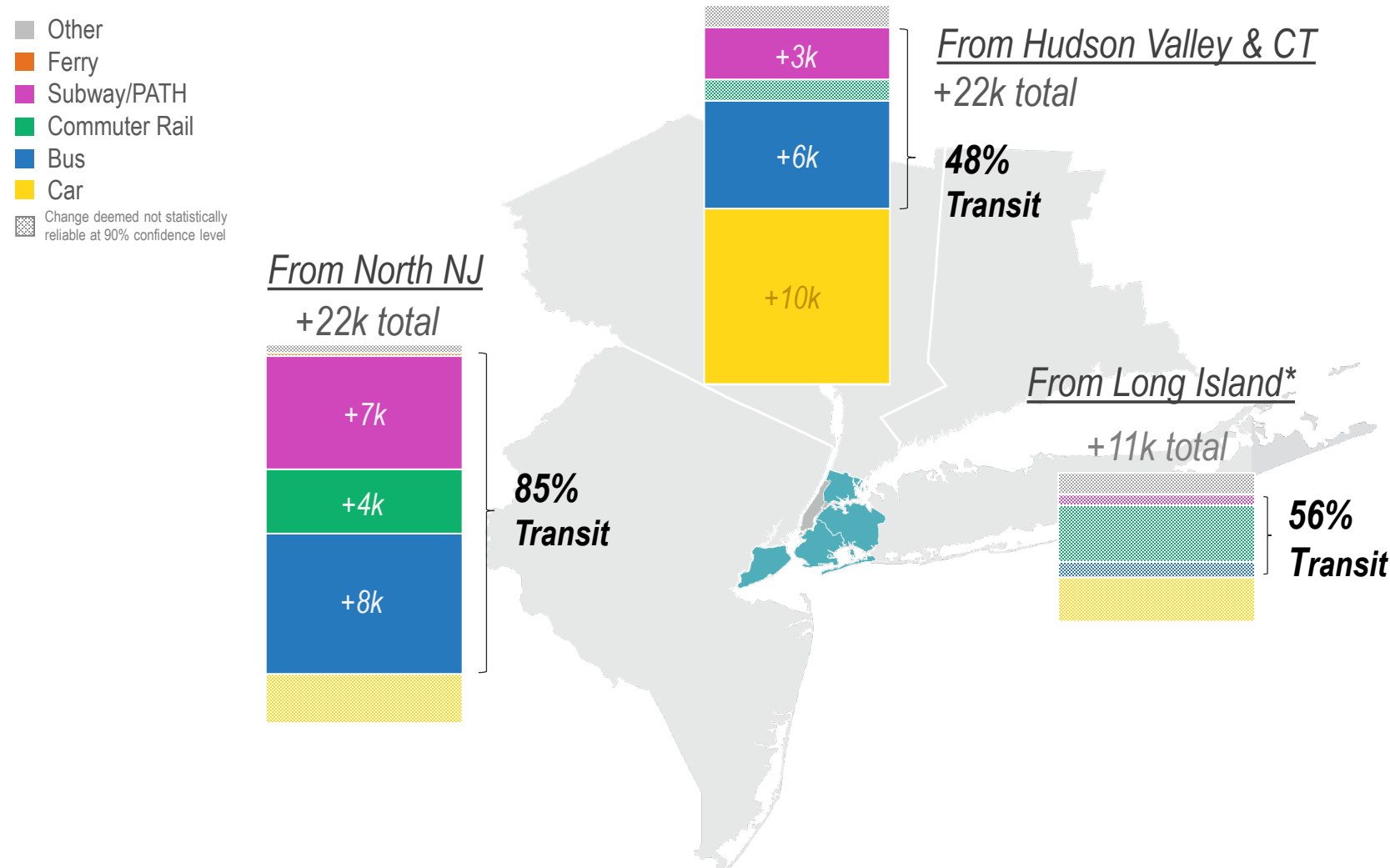
Though transit users represent 40% of NYC resident and 24% of non-resident commuters to Non-Manhattan Borough jobs today, transit commuters accounted for two-thirds of the increases in Non-Manhattan Borough workers. For NYC residents, much of the increase came from subway commuters, whereas regional in-commuters increased on subway/PATH, commuter rail, and bus.

In-commuters using subway or PATH for the predominant portion of their commute likely include non-NYC residents accessing NYC subways at outer stations in the Bronx or Queens, as well as New Jersey residents transferring from PATH to subway to travel to NYC work destinations outside of Manhattan.

NYC PLANNING Primary mode of transit to work represents the mode survey respondents say was used for the majority of their trip. It does not capture inter-modal splits or commuters using multiple modes per trip. Hatched fill indicates calculated change is not statistically reliable at 90% confidence interval. Source: IPUMS-USA, University of Minnesota; U.S. Census Bureau ACS 1-Year Estimates, 2017; U.S. Census Bureau Decennial Census 2000 5% Sample

North New Jersey commuters to Non-Manhattan Boroughs accounted for the greatest transit growth, but in-commuters from all directions shifted towards transit.

ΔNon-Manhattan NYC In-Commuters' by Primary Mode of Travel to Work, 2000 to 2017



In-commuters to Non-Manhattan Borough work destinations from the west, north, and east of NYC increasingly used transit to travel to work. Though 42% of in-commuters to Non-Manhattan Boroughs from North NJ use transit, 85% of the in-commuter growth was experienced by transit commuters. Similarly, 22% of in-commuters to Non-Manhattan Boroughs from the Hudson Valley and CT and 15% from Long Island use transit today; however, 48% of the gain from the north and 56% of the gain from the east were of transit in-commuters.

North NJ in-commuters experienced the highest share of non-Manhattan NYC worker gains on transit. Those commuters likely transfer to NYC subway for part of their trip, given most NJ transit service terminates in Manhattan. Areas north and east of NYC have direct cross-border bus service to Queens and the Bronx respectively, or in-commuters from these subregions might access NYC subways via terminal stations in the Bronx and Queens.

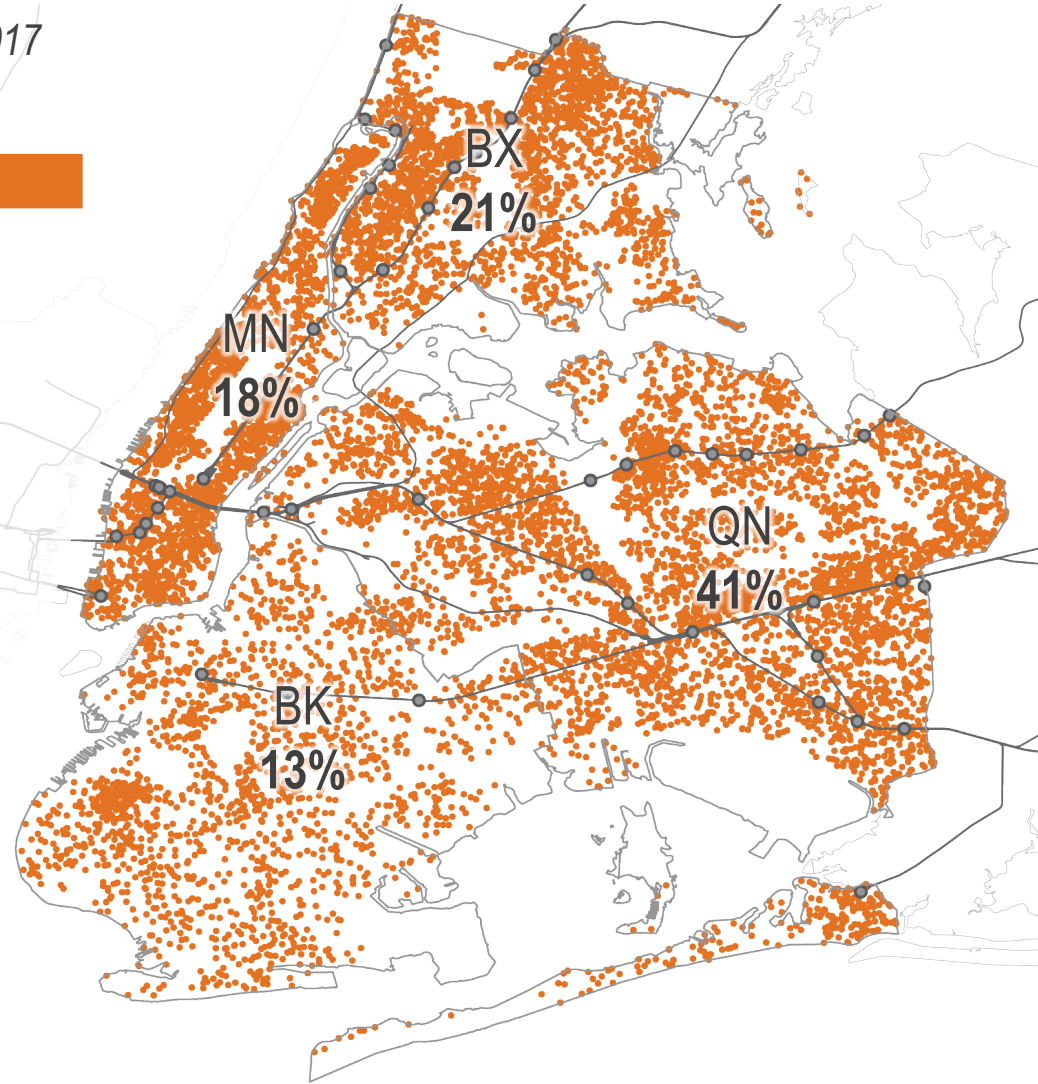
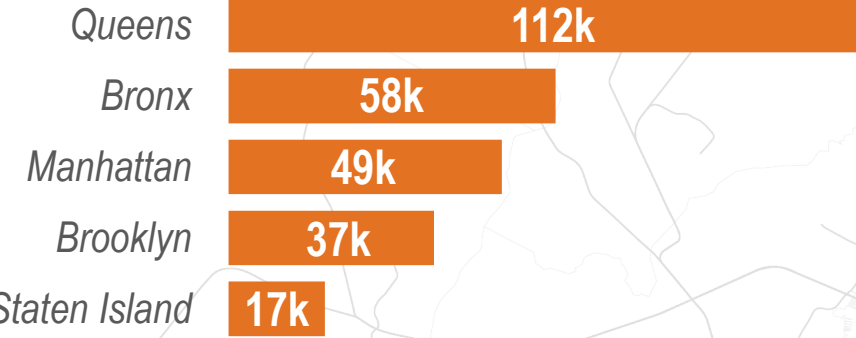
Insight #5

A substantial number of **NYC residents out-commute** to work in **nearby suburbs**, and the **majority drive**. Since 2000, however, the share of **NYC out-commuters using transit** to access jobs in the region **increased**.

Today, 7% of the NYC resident labor force out-commutes to jobs in the NYC Metro Region.

Where NYC Resident Out-Commuters Live, 2017

● 1 Dot = 25 NYC out-commuters at residence location



273k NYC Out-commuters

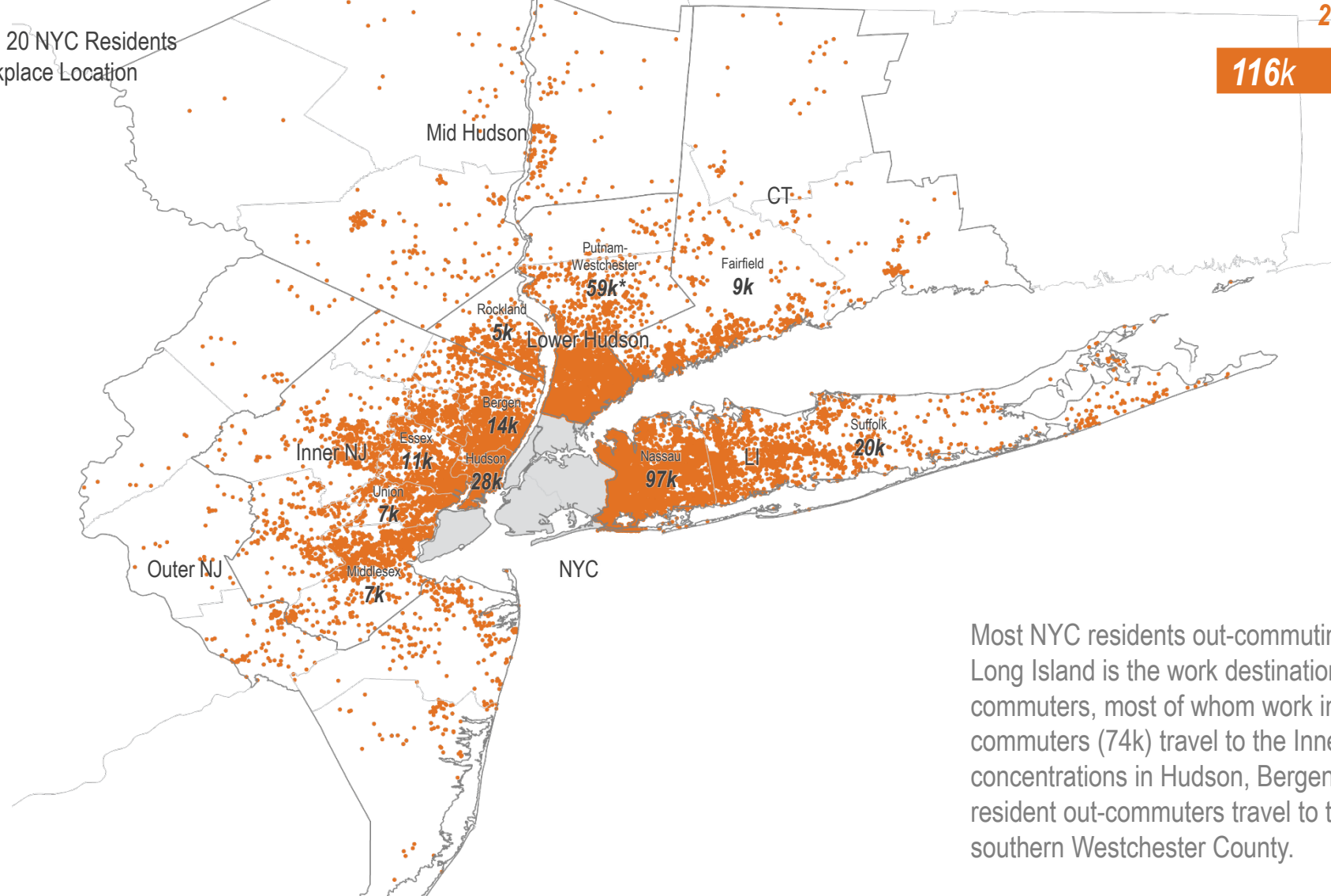
273k NYC residents, representing 7% of NYC's four million employed residents, commute out of the city for jobs elsewhere in the NYC Metro Region. Queens is home to the largest share of NYC resident out-commuters, followed by the Bronx and Manhattan. Though there are some concentrations of out-commuters living near the Queens and Bronx borders, as well as along road and regional rail corridors, residence locations are highly dispersed throughout the city.

—●— Commuter Rail + Station

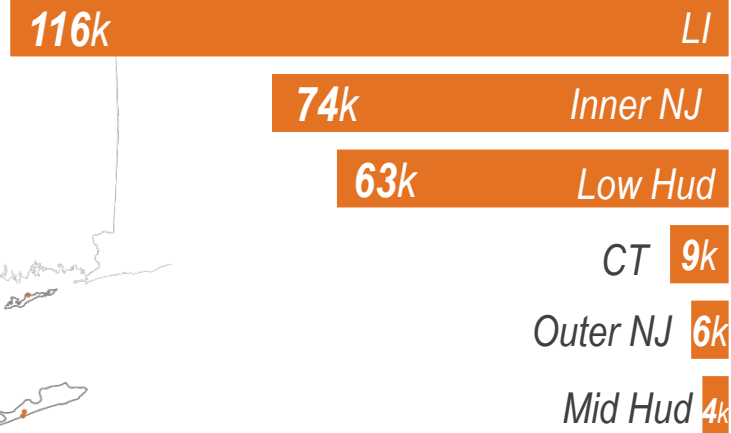
Long Island is the primary work destination for NYC residents out-commuting to the region, followed by areas west of the Hudson River and the Lower Hudson Valley.

Where NYC Resident Out-Commuters Work, 2017

● 1 Dot = 20 NYC Residents at Workplace Location



273k NYC Out-Commuters by Subregion



Most NYC residents out-commuting to the region travel to adjacent areas. Long Island is the work destination for 116k (43%) of NYC resident out-commuters, most of whom work in Nassau County. 27% of NYC resident out-commuters (74k) travel to the Inner NJ subregion, with the highest concentrations in Hudson, Bergen, and Essex counties. 22% (63k) of NYC resident out-commuters travel to the Lower Hudson Valley, mostly to southern Westchester County.

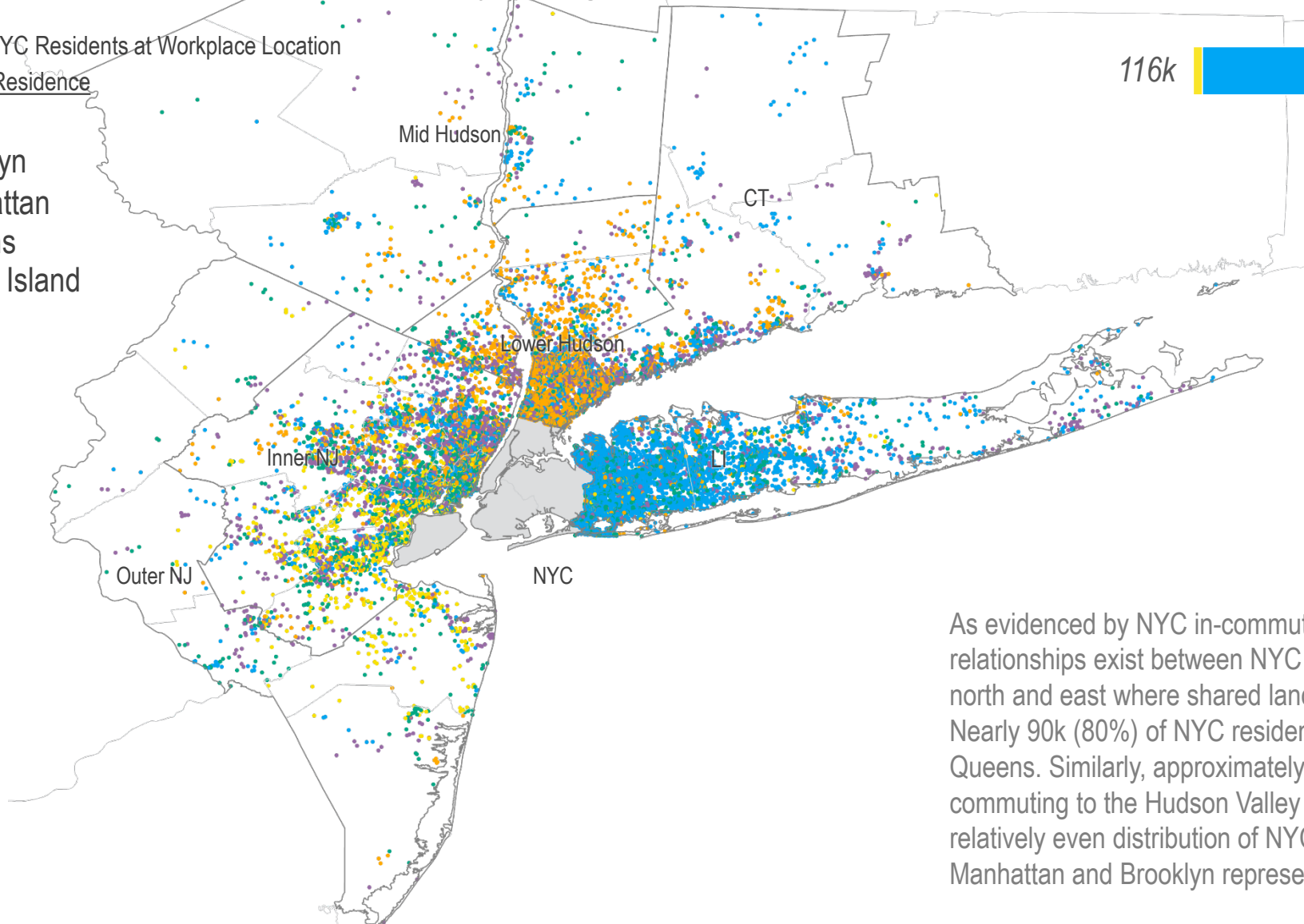
There are strong out-commuting relationships between Queens and Long Island and the Bronx and Lower Hudson Valley. There is a greater mix of NYC residents who work in NJ.

Where NYC Resident Out-Commuters Work by Borough of Residence, 2017

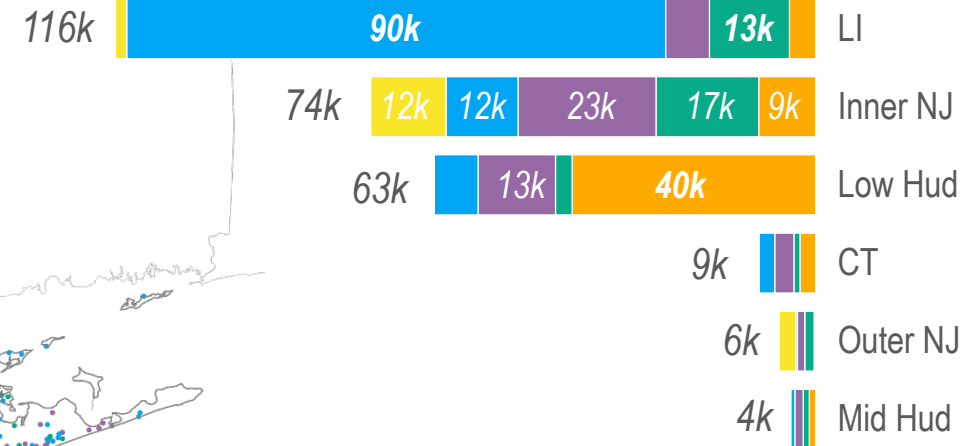
1 Dot = 20 NYC Residents at Workplace Location

Borough of Residence

- Bronx
- Brooklyn
- Manhattan
- Queens
- Staten Island



273k NYC Out-Commuters by Subregion

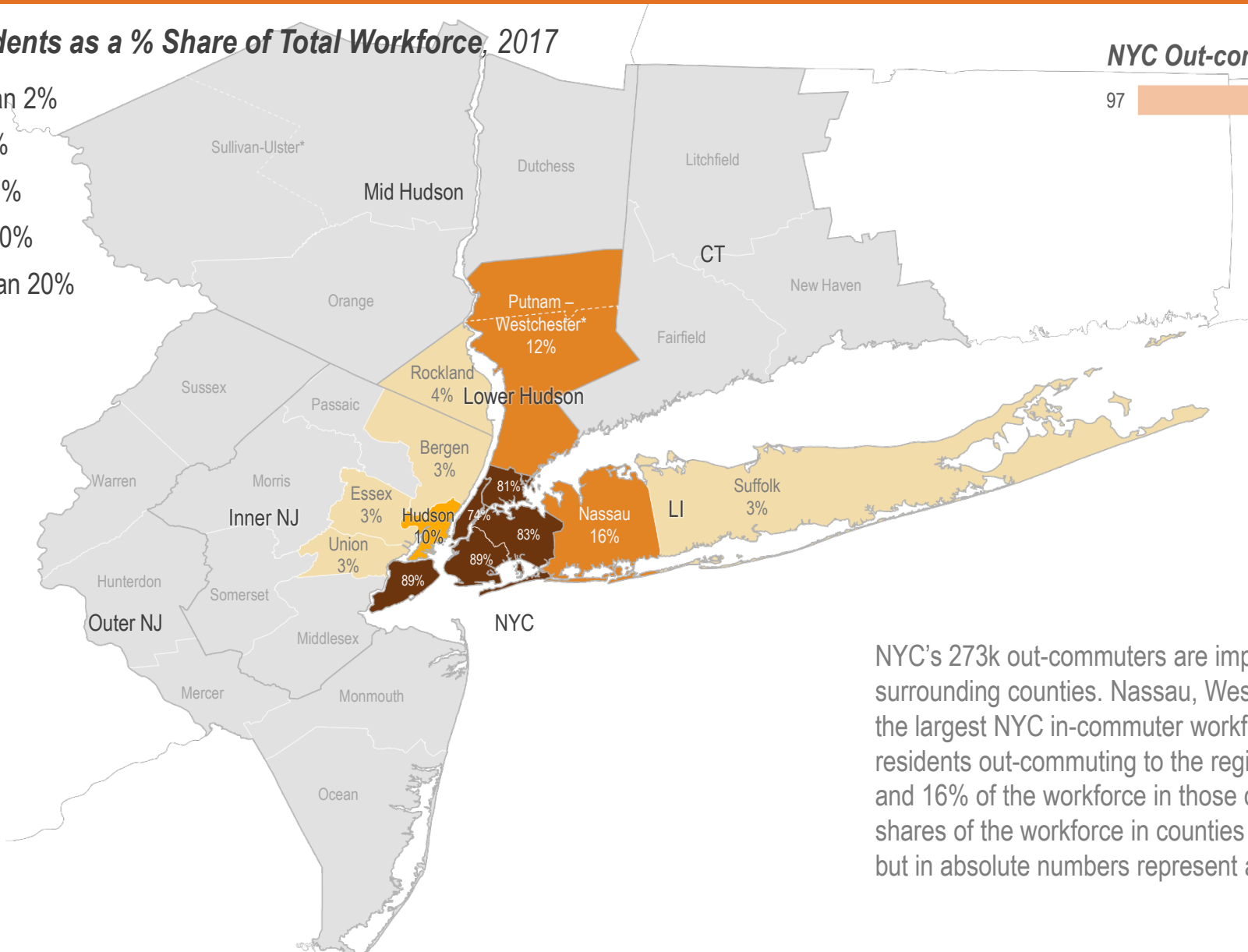


As evidenced by NYC in-commuter patterns, the strongest commuting relationships exist between NYC and neighboring counties, especially to the north and east where shared land boundaries facilitate cross-border travel. Nearly 90k (80%) of NYC residents out-commuting to Long Island live in Queens. Similarly, approximately two-thirds (40k) of NYC residents out-commuting to the Hudson Valley live in the Bronx. Inner NJ, however, attracts a relatively even distribution of NYC residents from all five boroughs, with Manhattan and Brooklyn representing the top shares.

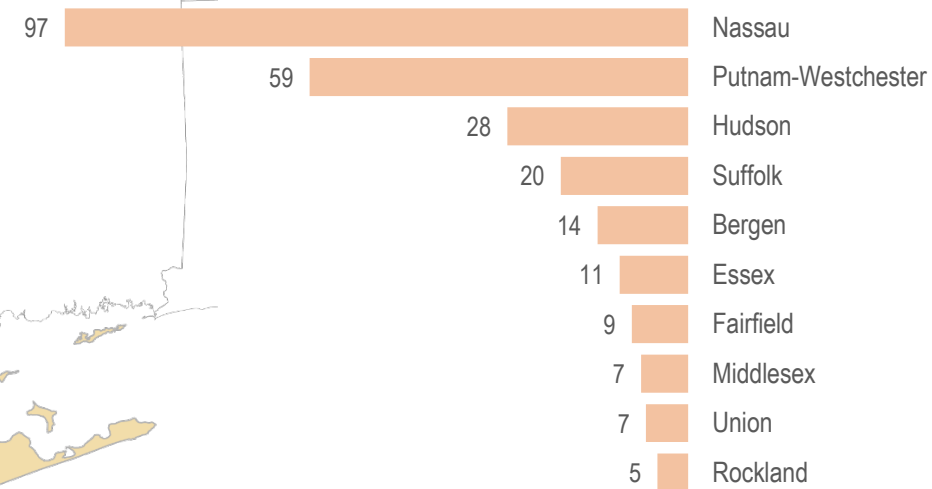
Nearby counties also rely on NYC residents for a significant share of their workforces.

NYC Residents as a % Share of Total Workforce, 2017

- Less than 2%
- 2% – 5%
- 6% – 10%
- 11% – 20%
- More than 20%



NYC Out-commuters by County of Workplace (top ten, thousands)



NYC's 273k out-commuters are important contributors to the workforces in surrounding counties. Nassau, Westchester, and Hudson counties, which all have the largest NYC in-commuter workforces, also employ the largest number of NYC residents out-commuting to the region. NYC residents represent between 10% and 16% of the workforce in those counties. NYC residents represent lower shares of the workforce in counties like Suffolk, Bergen, and Essex (3% for all), but in absolute numbers represent a sizeable number of workers (45k combined).

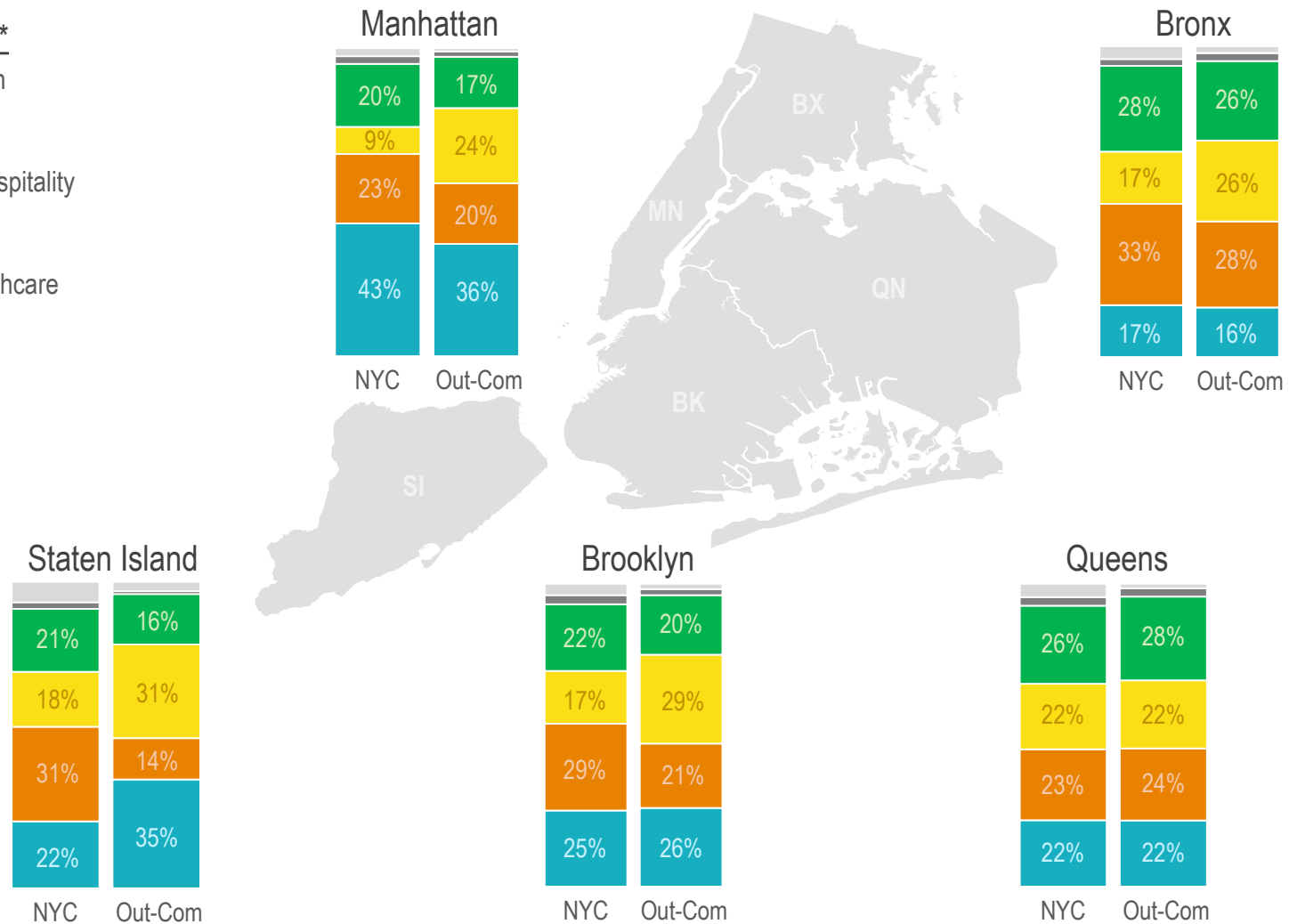
NYC resident out-commuters travel for work in a variety of industry sectors, generally mirroring the distribution by sector of NYC residents working within the city.

Distribution of NYC Residents' Employment by Industry Macro Sector, 2013-2017 Avg

Work in NYC vs. Out-Commute By Borough of Residence

Industry Macro Sector*

- Public Administration
- Other Services
- Retail, Leisure & Hospitality
- Industrial
- Education and Healthcare
- Office-based

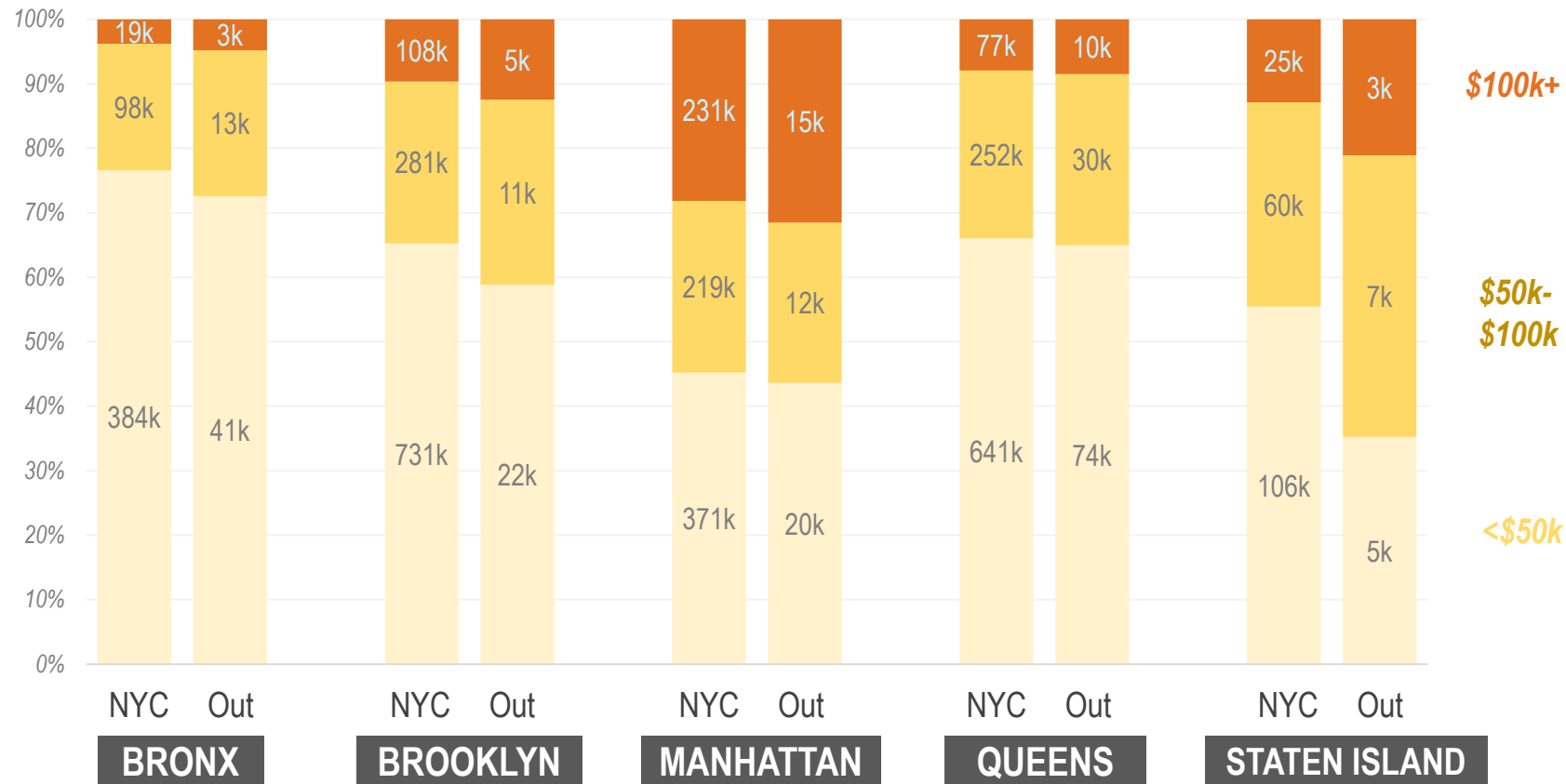


In comparing NYC residents by their industry sector of employment (at borough of residence), NYC out-commuters are generally employed in similar sectoral distributions as residents working within NYC. For instance, 43% of Manhattan residents working in NYC work in office-based sectors, while 36% of Manhattan residents working outside of the city out-commute to office-based employment. However, Bronx, Brooklyn, Manhattan, and Staten Island residents out-commuting to the region are more likely to work in industrial jobs than residents of those boroughs working within the city. This is likely because NYC has a lower share of the region's industrial jobs (versus, for example, higher concentrations of office jobs). NYC out-commuters are also slightly less likely to work in retail, leisure and hospitality jobs than NYC residents working within the city, except for Queens residents, a substantial number of whom are employed in Nassau County.

Out-commuters' wage distributions mirror that of NYC residents employed within the city, with NYC out-commuters slightly more likely to work in middle- and high-wage jobs.

NYC Residents Working Within NYC vs. NYC Resident Out-commuters, 2012-2016

Low- (<\$50k) vs. Middle- (\$50k to \$100k) vs. High-Wage (\$100k+)

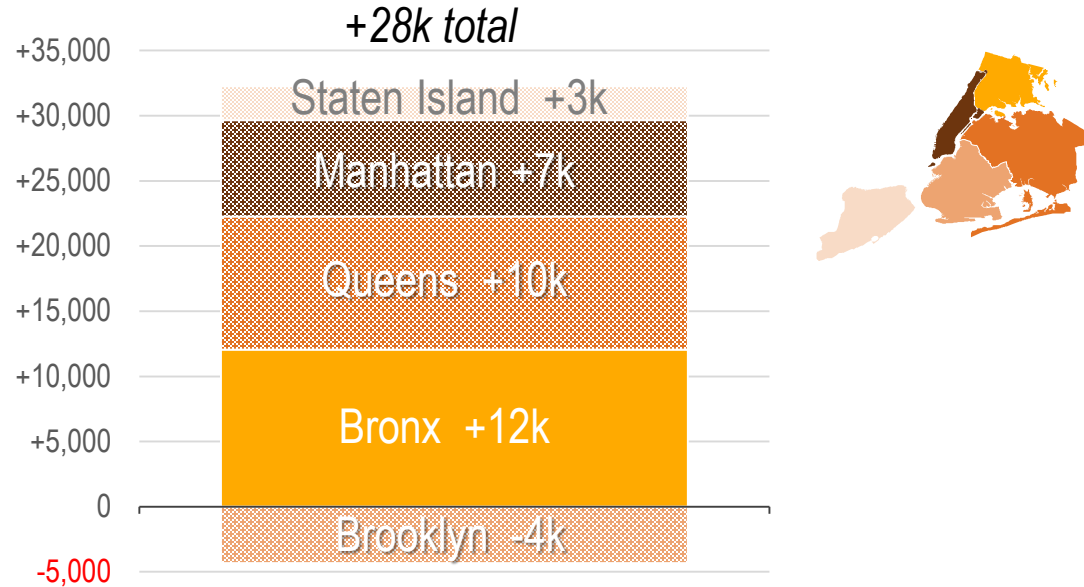


In comparing NYC residents' wage distributions (by borough of residence) for those working within NYC versus those out-commuting to the Region, NYC out-commuters skew towards middle-wage and high-wage jobs. Residents of Staten Island out-commuting to the Region showed the highest propensity to work in middle- and high-wage jobs in comparison to Staten Island residents employed within NYC. However, the absolute numbers are low by comparison (10k for out-commuters versus 85k for those employed within NYC).

Borough of Residence

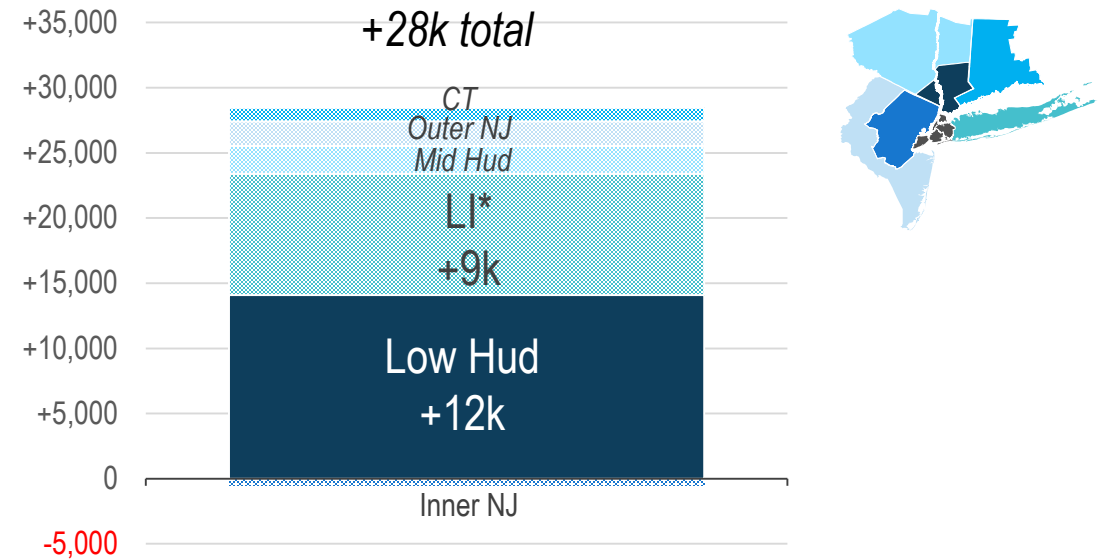
Out-commuting from NYC to the region has increased since 2000, mostly due to an increase of NYC residents working in the Lower Hudson Valley or Long Island.

ΔWhere NYC Out-Commuters Live, 2000 to 2017



Since 2000, the Bronx experienced the greatest gain of residents out-commuting to the region for work, representing an increase of +12k additional workers employed outside of the city, or 26%. Most of the increase is attributable to Bronx residents traveling to Westchester and Putnam counties for work. The growth of Queens residents out-commuting to the region (+10k) resulted entirely from an increase of Queens residents working on Long Island (+12k), which offset losses of Queens residents out-commuting to other parts of the region.

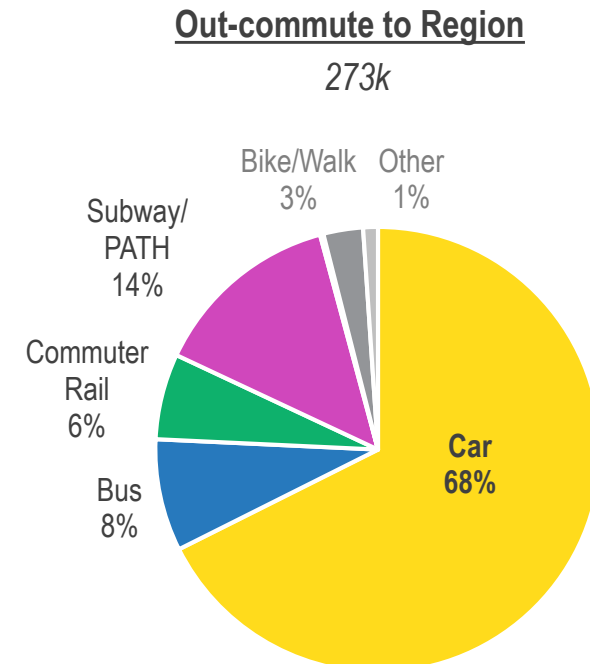
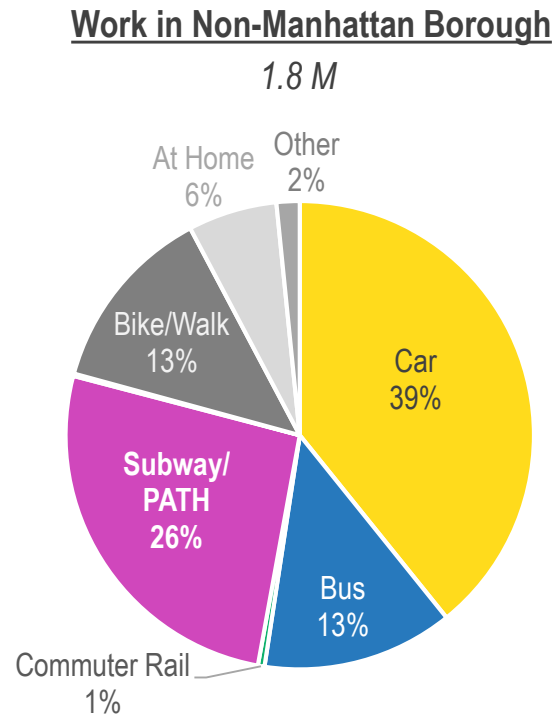
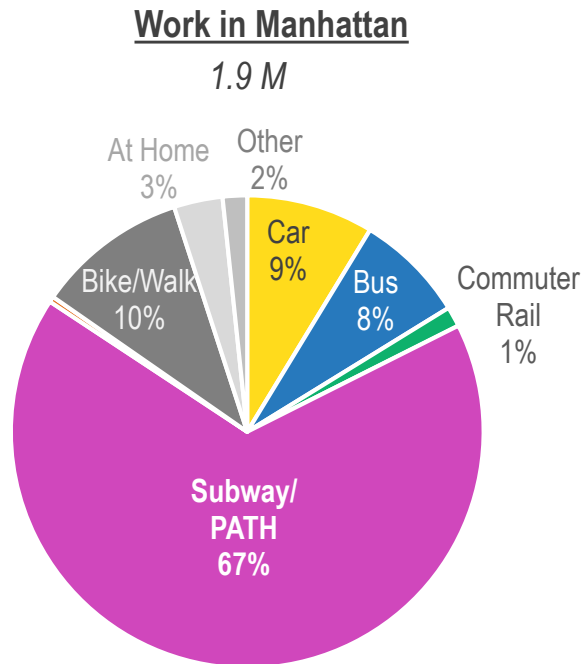
ΔWhere NYC Out-Commuters Work, 2000 to 2017



Though out-commuting to the Inner NJ subregion did not change in total, the dynamics within the Inner NJ subregion have shifted. The increase of Manhattan, Queens, and Brooklyn residents commuting to Hudson County (+6k) was offset by substantial declines in out-commuting to other Inner NJ counties, most notably Bergen County. Out-commuting to Bergen County decreased by 6k, and represented mostly a loss of Queens, Brooklyn, and Bronx resident workers. These increases, while substantial in absolute terms, are slower increases than those of NYC resident employment, which grew at 29%. The consequence is that a smaller proportion of NYC workers are employed outside the city today than in 2000.

NYC out-commuters are far more likely to drive to work than NYC residents working within the city, but are also far more likely to use transit than workers.

NYC Residents' Primary Mode of Travel to Work by Workplace Destination, 2017



NYC residents working within the city have high rates of transit use for commuting, with 76% accessing Manhattan jobs by transit, and 40% traveling to Non-Manhattan Boroughs by transit. By contrast, out-commuters have a 28% transit share, which though lower than rates of in-city workers, is 7 times greater than the share of suburban commuters traveling to jobs by transit in the rest of the region (4%). Furthermore, though NYC residents represent just 5% of the regional workforce outside the city, NYC out-commuters represent 23% of all transit commuters to those areas.

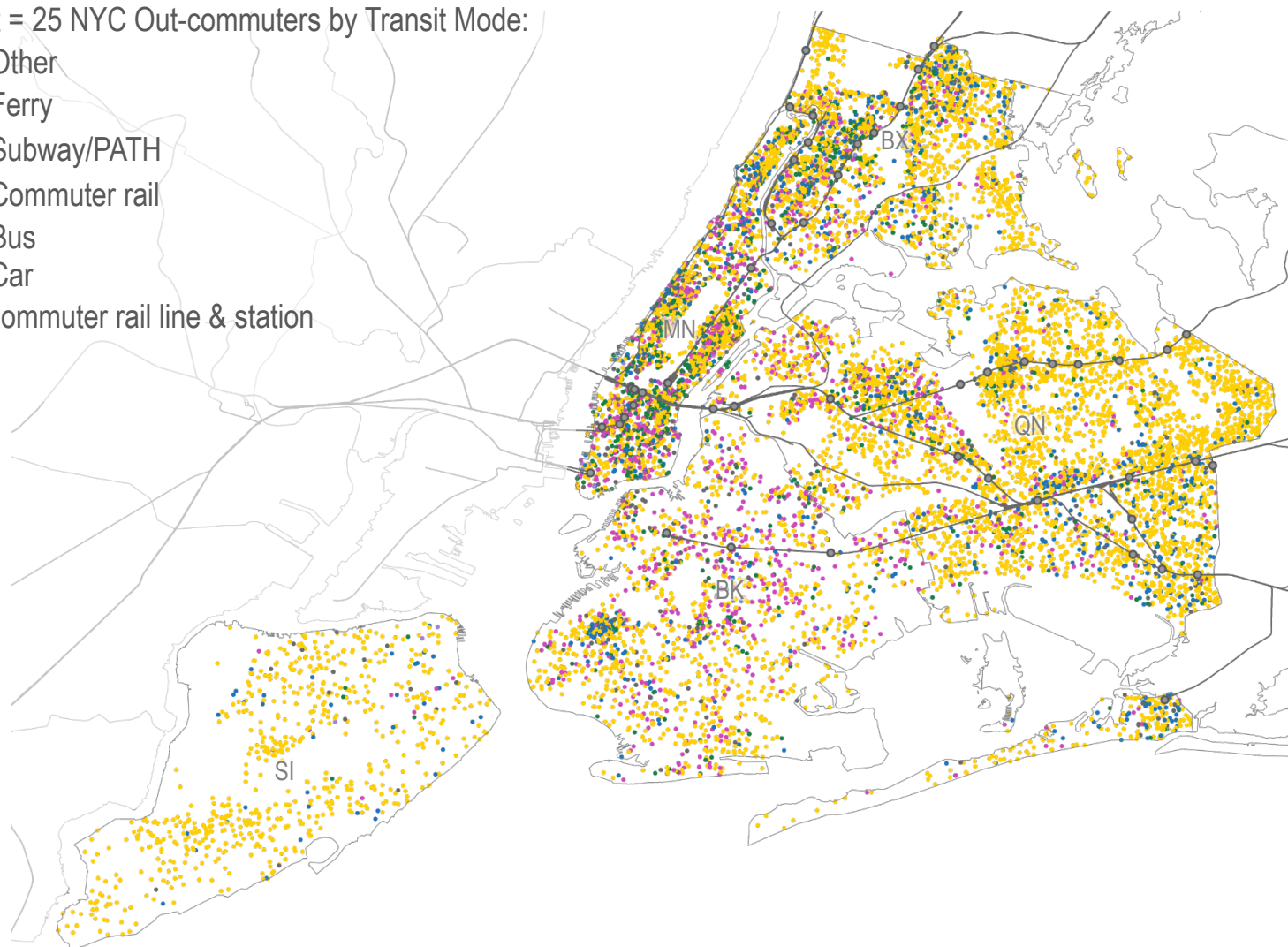
Fewer transit systems support out-commuting travel patterns. With the exception of Inner NJ job out-commuters lack access to rapid transit, and while commuter rail does service reverse commuters, frequency of service poses a challenge. Out-commuters are more likely than NYC residents to use the commuter rail network to travel to work than NYC residents working within the city. Out-commuters are also more likely to travel by bus to work than NYC residents working in Manhattan, using systems like the Westchester Bee-Line and Nassau County NICE bus – but less likely to commute by bus than city residents working in Non-Manhattan Boroughs.

Queens, especially eastern Queens, and Staten Island residents are more likely to out-commute via car. Other boroughs have higher shares of public transit users.

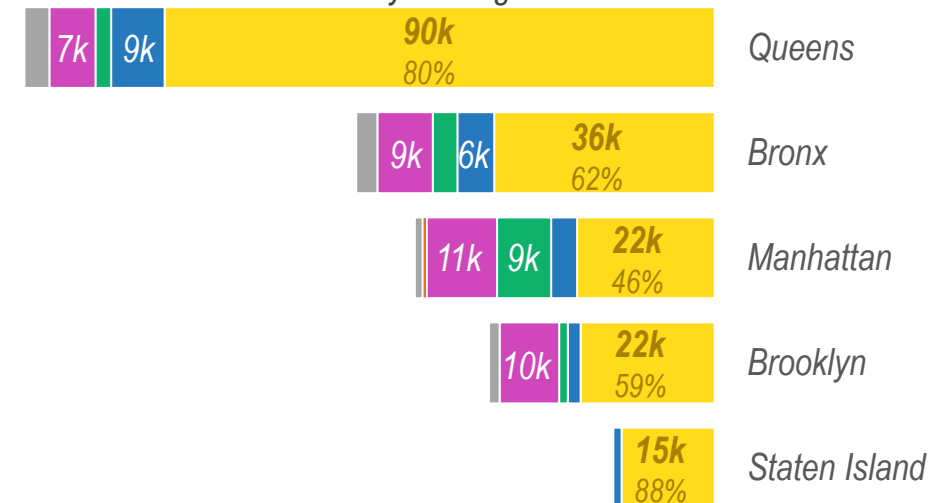
NYC Out-commuters' Location of Residence by Primary Mode of Travel to Work, 2017

1 Dot = 25 NYC Out-commuters by Transit Mode:

- Other
- Ferry
- Subway/PATH
- Commuter rail
- Bus
- Car
- Commuter rail line & station



Total by Borough of Residence



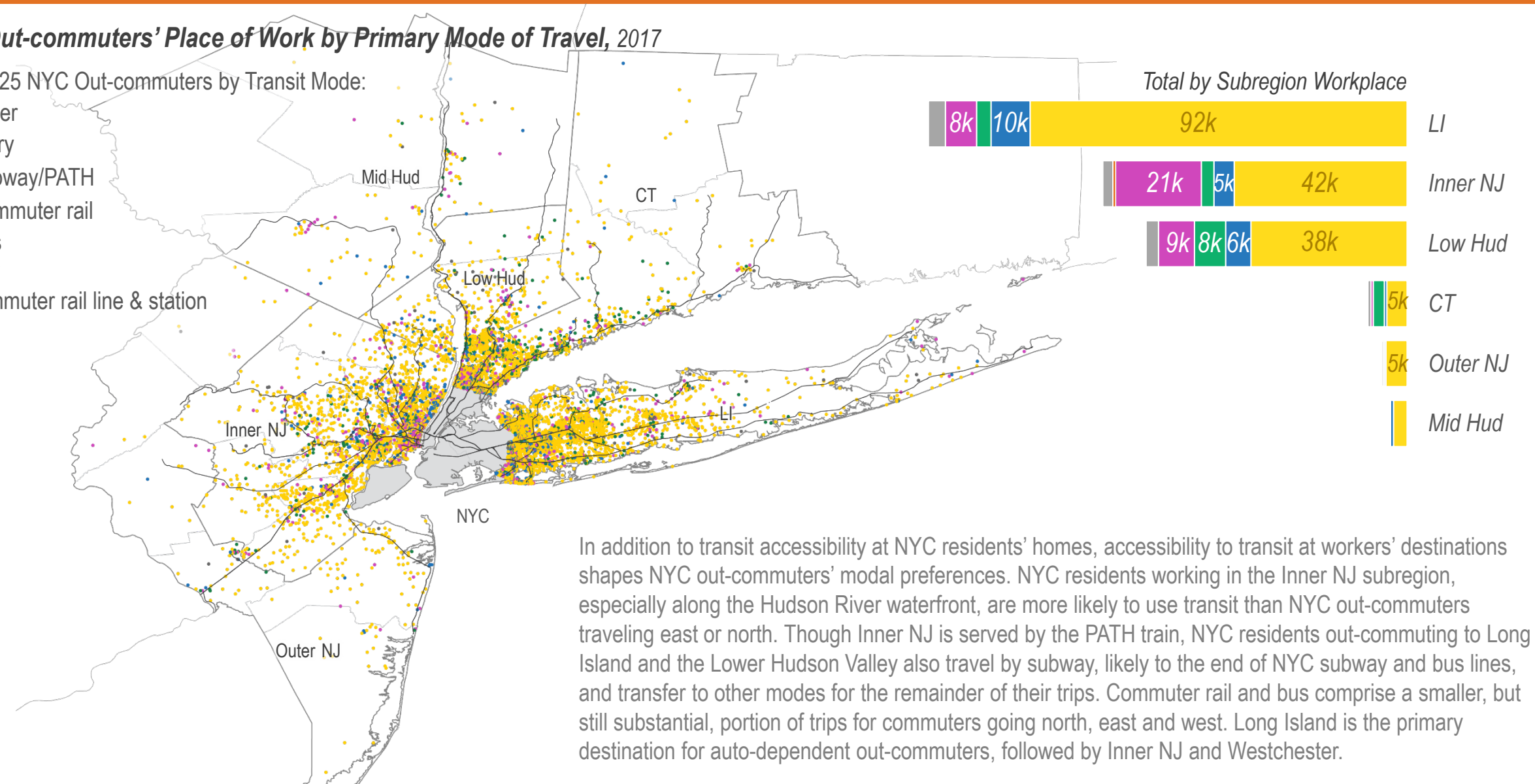
Queens is home to the greatest number of out-commuters driving to work in the Region, with more out-commuting drivers than the Bronx, Manhattan, and Brooklyn combined. Out-commuters from western Queens are more likely to use subway and rail transit, while southeast Queens residents have a higher proclivity to bus transit. Manhattan residents are most likely to out-commute via transit, with nearly half of out-commuters traveling by commuter rail, PATH, or bus. Bronx and Queens have high shares of bus out-commuters, while Brooklyn has a higher share of subway/PATH out-commuters.

For NYC out-commuters, geography of regional employment and transportation infrastructure also shape mode choices.

NYC Out-commuters' Place of Work by Primary Mode of Travel, 2017

1 Dot = 25 NYC Out-commuters by Transit Mode:

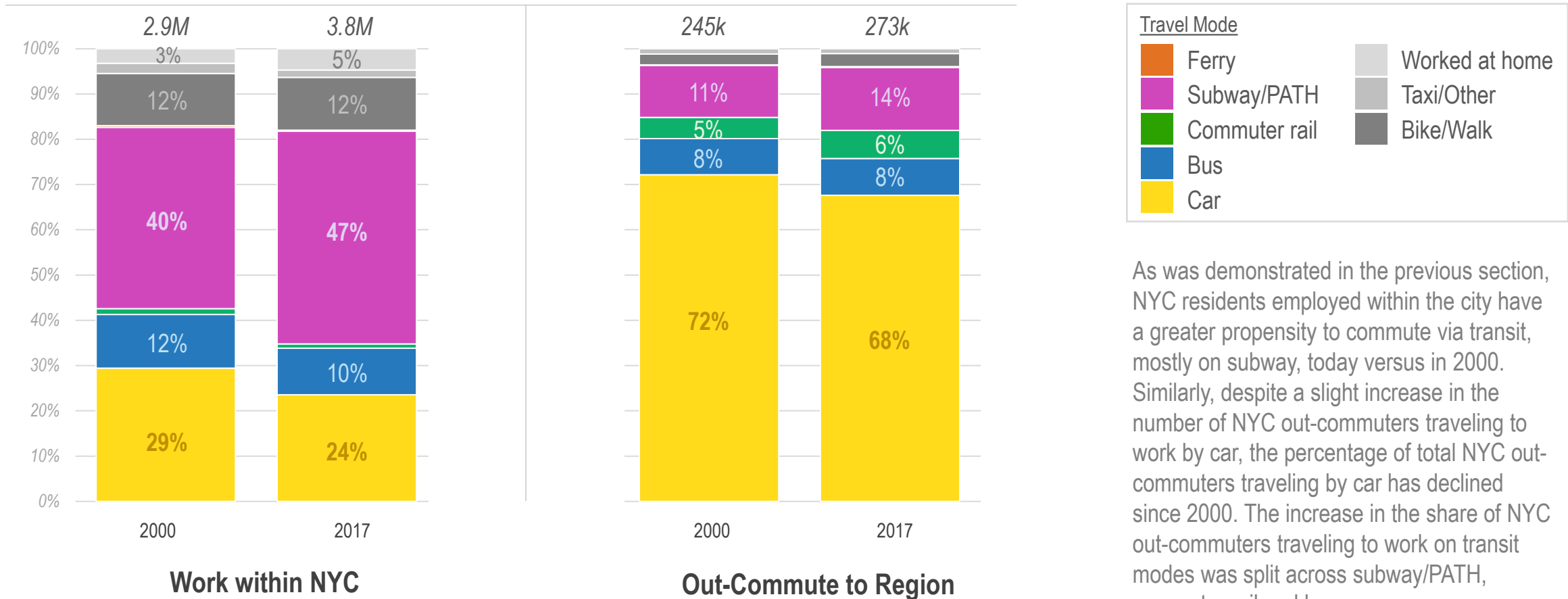
- Other
- Ferry
- Subway/PATH
- Commuter rail
- Bus
- Car
- Commuter rail line & station



In addition to transit accessibility at NYC residents' homes, accessibility to transit at workers' destinations shapes NYC out-commuters' modal preferences. NYC residents working in the Inner NJ subregion, especially along the Hudson River waterfront, are more likely to use transit than NYC out-commuters traveling east or north. Though Inner NJ is served by the PATH train, NYC residents out-commuting to Long Island and the Lower Hudson Valley also travel by subway, likely to the end of NYC subway and bus lines, and transfer to other modes for the remainder of their trips. Commuter rail and bus comprise a smaller, but still substantial, portion of trips for commuters going north, east and west. Long Island is the primary destination for auto-dependent out-commuters, followed by Inner NJ and Westchester.

NYC out-commuters are shifting towards rail and subway transit.

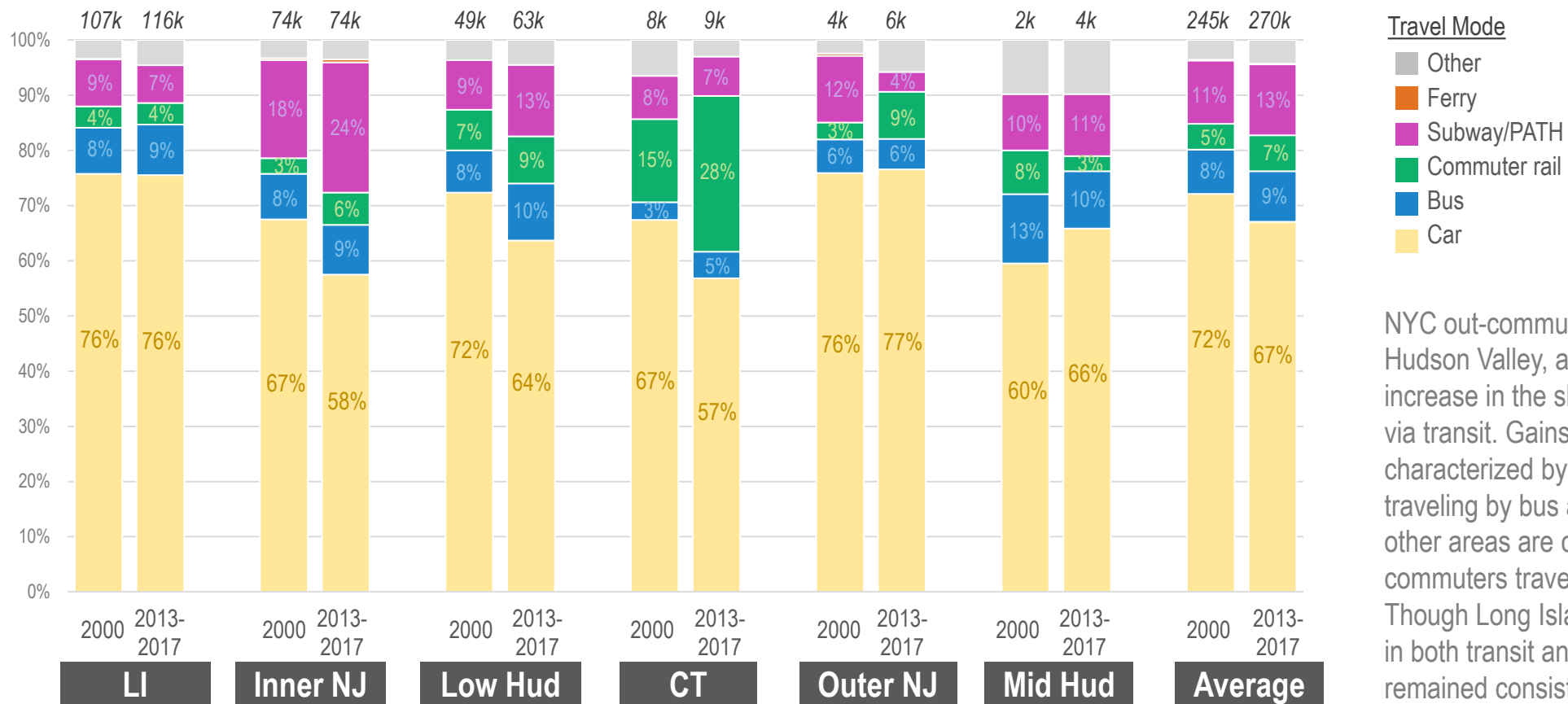
NYC Residents' Primary Mode of Travel to Work by Work Destination 2000 vs. 2017



As was demonstrated in the previous section, NYC residents employed within the city have a greater propensity to commute via transit, mostly on subway, today versus in 2000. Similarly, despite a slight increase in the number of NYC out-commuters traveling to work by car, the percentage of total NYC out-commuters traveling by car has declined since 2000. The increase in the share of NYC out-commuters traveling to work on transit modes was split across subway/PATH, commuter rail and bus.

The shift toward greater transit usage differs by NYC out-commuters' work destination.

NYC Out-Commuters' Primary Mode of Travel to Work by Work Destination 2000 vs. 2013-2017 Avg



NYC out-commuters traveling to the Inner NJ, Lower Hudson Valley, and CT subregions experienced an increase in the share of NYC out-commuters traveling via transit. Gains in the Lower Hudson Valley are characterized by increases of NYC out-commuters traveling by bus and subway, whereas increases in the other areas are characterized by gains of NYC out-commuters traveling by commuter rail and subway. Though Long Island experienced an absolute increase in both transit and car commuters, the mode split has remained consistent with the split in 2000.

Implications

- **Housing opportunity and transit access**, both within the city and in the region, have implications for **where people choose to live and businesses choose to locate**.
- **Improving transit accessibility of employment centers** in and outside of NYC is important to **accommodating combined population and job growth**, and **reducing city traffic congestion**.
- **Investments in the Region's transportation system and in economic development** should be guided by an **understanding of the shifting geography of population and workforce**.

Acknowledgements

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Appendix I

- Definition of Geographies...1
- Definition of Terms...2
- Methodology...4
- Sources...6

Appendix: Definition of Geographies

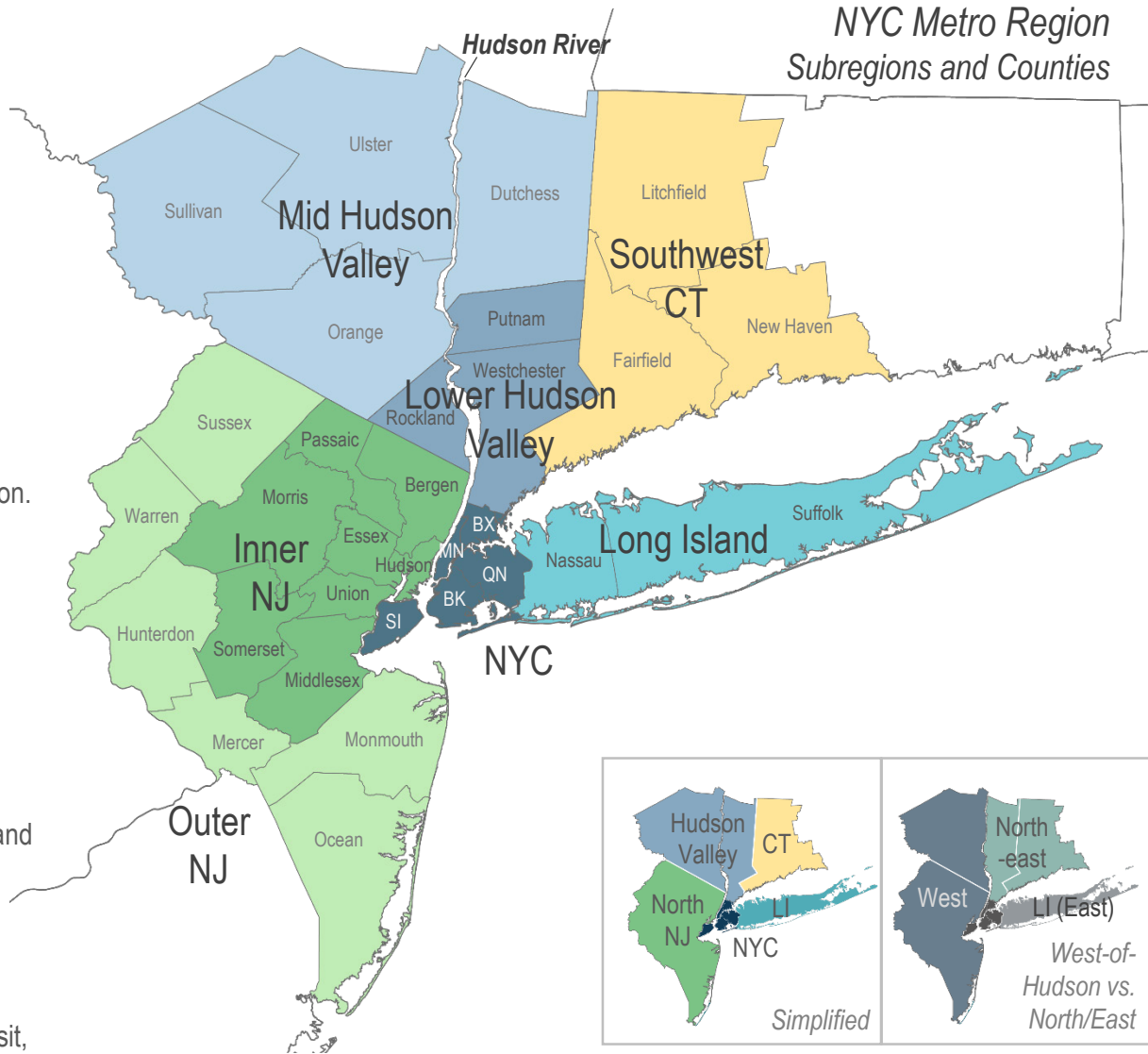
- NYC Metro Region (the Region):** The tri-state NYC Metro Region (“the Region”) geography represents the five boroughs of New York City (NYC) and the surrounding 26 counties in portions of New York, northern New Jersey (NJ), and southwest Connecticut (CT). This definition of the region is a generally accepted modification of the U.S. Census Bureau combined statistical area (CSA) of New York-Newark-Bridgeport and roughly represents the NYC commuter shed. This area does not represent a regulatory or other jurisdictional boundary.

- Subregions and Counties:** The subregion geography represents aggregations of U.S. counties, which are commonly used for transportation planning and other regional analyses. Counties are grouped into subregions as follows:

- New York City (NYC):** Bronx, Kings (Brooklyn), New York (Manhattan), Queens, and Richmond. (Staten Island). “Non-Manhattan Boroughs” refers to the Bronx, Brooklyn, Queens, and Staten Island combined. This geography is used in this report when discussing NYC workers.
- Inner New Jersey (Inner NJ):** Bergen, Essex, Hudson, Middlesex, Morris, Passaic, Somerset, and Union.
- Outer New Jersey (Outer NJ):** Hunterdon, Mercer, Monmouth, Ocean, Sussex, and Warren.
- Long Island (LI):** Nassau and Suffolk.
- Southwest Connecticut (CT):** Fairfield, Litchfield, and New Haven.
- Lower Hudson Valley (Low Hud):** Putnam, Rockland, and Westchester.
- Mid Hudson Valley (Mid Hud):** Dutchess, Orange, Sullivan, and Ulster.

Please note that “Inner” and “Outer” New Jersey suggest NYC proximity and/or accessibility and do not indicate formalized geographic locations or jurisdictional boundaries. For statistical reliability or conceptual simplicity purposes, this report also aggregates Inner and Outer NJ subregions into “North New Jersey”, as well as Lower Hudson Valley and Mid Hudson Valley into “Hudson Valley”. On occasion, the Hudson Valley and CT subregions are also grouped for statistical reliability.

- West of Hudson vs. North/East of NYC:** For consistency with the region’s rail transit systems, this report also aggregates New York counties west of the Hudson River with Northern New Jersey, as both are serviced by NJ Transit systems. The area Northeast of NYC, which includes Dutchess, Putnam, and Westchester counties in New York and all three Connecticut counties, are serviced by MTA Metro North transit, and Long Island (east of NYC) is serviced by MTA Long Island Rail Road.



NYC Metro Region Subregions and Counties

Appendix: Definition of Terms

- **Residents or Employed Residents:** Residents, or employed residents, represent individuals age 16 and older who are employed at/by their location of residence (where their household is located). In this report, residents represent the origin of a worker's commute.
 - Regional residents: Residents of the Region who live and work in the Region.
 - Resident workers: Residents who are employed within their area of residence, working either within the county or subregion where they live.
- **Workers:** Workers refers to employed persons at/by their primary location of work, and represent the destination of a commute trip. Reported estimates for workers do not capture persons holding multiple jobs across counties.
 - NYC Workers: all residents of the NYC Metro Region who work in NYC – NYC residents and in-commuters – sometimes separated by those who work in Manhattan vs. those who work in Non-Manhattan Boroughs (i.e. Bronx, Brooklyn, Queens, and Staten Island combined).
 - Workers who live in NYC: NYC residents that are employed within NYC. Also referred to as the “NYC resident workforce” or resident workers.
- **Place of Work or Workplace:** The workplace destination represents the primary location of employment for a worker. However, it should be noted that the U.S. Census Bureau survey question used to obtain this information is generally phrased as, “At what location did this person work LAST WEEK?”, with a follow-up question to identify where the person worked most if in multiple locations. Therefore, these data may capture irregular or uncommon commute patterns.
- **NYC In-commuter:** Non-NYC residents of the NYC Metro Region (i.e. surrounding 26 counties) who travel to work in NYC. In-commuting to NYC is also reported at the borough-level (i.e. Manhattan in-commuters), as well as for all Non-Manhattan Boroughs combined.
- **NYC Out-commuter:** NYC residents who are employed outside of the city, but within the NYC Metro Region (i.e. in the surrounding 26 counties). Out-commuting from NYC is also reported at the borough-level.
- **Industry Macro Sector:** For consistency with DCP's July 2018 report on the regional economy, [The Geography of Jobs](#), workers are grouped based on the U.S. Bureau of Labor Services (BLS) North American Industrial Classification System (NAICS). Please refer to *The Geography of Jobs* for more information about macro sectors and definitions.
- **Wages:** Wages represent total earnings reported from all jobs held prior to deductions, including wages, salary, commissions, bonuses, and tips, for the previous year. This data is self-reported by survey respondents in Census data products. Wage distributions (i.e. “low”, “middle”, “high”) used in this report were created for consistency with [New York Works](#) NYC jobs report. All wages reported for prior years, and calculated change, have been adjusted for inflation and represent 2017 dollars.
- **Primary Mode of Travel to Work:** Represents the reported primary means of transportation used to travel to work in the previous week, however, it does not capture multiple modes of transportation used for commuting. That is, the questionnaire indicates a respondent should report the mode used for the most distance if multiple modes were used. The modes of travel represented in this report represent commuters' self-reported mode of travel for the largest portion of their journey, irrespective of how many modes in total were required to complete the trip. Therefore, it can be assumed that the total number of commuters by each mode may be higher than is reported here. Furthermore, because the questionnaire reports mode in the previous week, it may capture infrequent/irregular commute patterns. Modes are grouped by Census definitions as follow:
 - Car: automobile, carpool, truck, or van.
 - Bus: bus, trolley bus, and streetcar.
 - Commuter rail: includes regional rail networks that may have occasional crossings with vehicular or pedestrian traffic.
 - Subway/PATH: defined as subway or elevated, indicating tracks that are separated from pedestrian or vehicular traffic.
 - Ferry: ferryboat.
 - Bike/Walk: bicycle or walking only.
 - Other: includes taxi, motorcycle, or a different method of travel (e.g., plane).

Appendix: Definition of Terms *(continued)*

- **Travelshed:** Travelsheds are calculated by DCP using OpenStreetMap and General Transit Feed Specification (GTFS) Data for the 31-county region, and represents walk to-public-transit trips and Park-and-Ride trips to Penn Station and Grand Central Station. It does not include automobile travel outside of Park-and-Ride. Travel time is shown at the U.S. Census Block level with centroids of the blocks used as the origins of the trips.
- **Hub-bound:** New York Metropolitan Transportation Council (NYMTC), the Metropolitan Planning Organization for NYC, Long Island and the Lower Hudson Valley, collects and analyzes data and provides forecasts to plan for the region's future transportation needs. This report presents a detailed analysis of travel to and from the Manhattan Central Business District (CBD), also known as the Hub, by person and by vehicle, as reported by NYMTC. The Hub, or CBD, is defined as the area of Manhattan lying south of 60th Street. The data are collected on a typical fall business weekday.
- **Jitney:** A privately operated large van or small bus that travels on a regular route, but on a flexible schedule. This is not a commuter option offered in the U.S. Census Bureau survey, but would most likely be characterized as a bus. Jitneys are differentiated from buses in this report with respect to capacity estimates, to ensure a more accurate assessment of ridership.
- **Transit Capacity:** For regional rail, buses, and ferries, capacity is measured by the number of seats. For subways and PATH, capacity is measured by space for both seated and standing passengers.
- **Peak Hour/ Peak Direction:** Peak hour is the hour, or hours, that the most commuters travel. Peak direction is the direction of the largest commuter flow. For this report, morning (AM) peak is from 8AM to 9AM in the Manhattan-bound direction.
- **General Transit Feed Specification (GTFS):** The GTFS is a standard format for exchanging publicly available transportation schedules and geographic information.
- **List of abbreviations for Transit Agencies and Other Entities:**
 - NJT Rail: New Jersey Transit Corporation (NJ Transit) Rail
 - NJT Bus: New Jersey Transit Corporation (NJ Transit) Bus
 - Metro-North: MTA Metro-North Railroad
 - Bee-Line: The Bee-Line Bus System
 - LIRR: MTA Long Island Rail Road
 - NICE Bus: Nassau Inter-County Express (NICE) Bus
 - NYCT: MTA New York City Transit (Bus and Subway)
 - PANYNJ: Port Authority of New York and New Jersey
 - PATH: Port Authority Trans-Hudson (PATH) Corporation rapid-transit system

Appendix: Methodology

- **Calculated Totals and Change at the County and Subregion Geographies**

Most of the analysis in this report draws from the [IPUMS-USA database](#), and represents U.S. Census Bureau American Community Survey (ACS) 1-Year Estimates for 2013 to 2017, and U.S. Census Bureau Decennial Census 2000 5% Sample Files. For certain calculations, the 2013 to 2017 data are averaged to represent a 5-year average from 2013-2017 (to improve statistical reliability). Where estimates were deemed statistically reliable, 2017 1-year estimates are used. These data represent the most currently available estimates for commuter patterns. Data files are composed of survey-derived microdata, and are subject to sampling error.

Current commuter-flow data are only available at the “PUMA”, or “Public Use Microdata Area” geography for the full United States. These areas generally represent populations of 100,000 or more, which for suburban areas of the NYC Metro Region are often contiguous with counties. Residential PUMAs are different than Place of Work PUMAs, which accounts for the differing aggregations of counties used in this report (i.e. Sullivan-Ulster, Putnam-Westchester). For more information about these geographies, please refer to the [IPUMS-USA website](#).

- **Statistical Reliability of Calculations**

Using IPUMS-USA published replicate weights, DCP calculated standard error directly from the data to assess statistical reliability of current estimates at the 90% confidence level. In examining longitudinal change, DCP calculated standard error for 2000 Decennial Census 5% Sample File data in accordance with U.S. Census Bureau [guidelines](#) for using the 2000 public use microdata sample. For more about longitudinal analyses, please refer to the U.S. Census Bureau [guidelines](#) regarding multi-year data product comparison. For calculated change, change deemed not statistically reliable at the 90% confidence level indicates that the margin of error (MOE) associated with change represents a coefficient of variation (CV) of 20% or greater. ACS data are subject to sampling variability, so these measures of reliability help to gauge the consistency of the ACS and the degree to which one can trust any given statistic. Additional information about the ACS and guidelines for using ACS data can be viewed on DCP’s website, where you might also access tools like the [map reliability calculator](#).

- **Data Visualized at the Sub-County Level (i.e. Dot Density Maps)**

The most comprehensive and geographically detailed commuting dataset published by the U.S. Census Bureau, the U.S. Census Bureau Transportation Planning Package (CTPP), was used to visualize origin-destination trends at a sub-county level. Unfortunately, at the time of publication, the most recently available dataset represented a 5-year average from 2006 to 2010. However, for the purpose of illustrating commuter characteristics and distributions with greater geographic detail, data are visualized at the Census Tract geography as dot-density maps. Though CTPP data publishes standard error for Census Tract-level data, this report does not take standard error into account for the purpose of data visualization. The county and subregional totals in charts and narrative represent the most recent total estimates. Due to the lag between the CTPP 2006-2010 and 2017 ACS estimates, some data may be imprecisely visualized.

- **Geographic Accuracy and Precision of Dot Density Visualizations**

Dot density visualizations represent data that have been assigned a random location within specific boundaries (i.e. Census Tract), and are illustrative only. Dots are assigned a value to represent (e.g., 25 in-commuters). In areas where no data are represented (no dots are mapped), values may fall below the selected threshold value and do not necessarily indicate a value of zero for the associated geography. In those cases, data are not visualized.

- **Additional Notes on Survey vs. Administrative Commuting Data**

In addition to providing the most recently available information about workers’ origin-destination movements, DCP prefers ACS and Census-derived survey data for the purpose of transportation planning rather than administratively-derived datasets (such as the U.S. Census Bureau Longitudinal Employer-Household Dynamics products). Survey-reported movements represent workers’ self-reported “common” commuter patterns, whereas administrative data may represent an imputed residence location registered to a corresponding location of employment. These movements are also subject to “headquartering” error, when multiple establishments for a single employer exist. For example, DCP found all 55,000 MTA NYC Transit jobs are registered to the headquarters location in Downtown Brooklyn in these data products. Thus, a Bronx resident working at a NYCT service location in the Bronx would appear on record to commute to Brooklyn. However, that same resident would more likely self-report that he/she lives and works in the Bronx. For Federal guidance on the differences between survey and administrative datasets, please refer to [this paper](#).

Appendix: Methodology *(continued)*

• Calculations of Change in Manhattan-bound Ridership (2000 to 2016)

The NYMTC Hub-bound report provided the information used to determine daily ridership into the Manhattan core by mode. Please refer to page 77 for clarification about “Hub-bound” locations. Data used in the Hub-bound report are provided by transit entities and compiled by NYMTC. Daily ridership includes all entrants to the Hub on a fall business day, not only commuters. West-of-Hudson bus ridership does not include the George Washington Bridge Bus Station, given that it falls north of the Manhattan “Hub-bound” boundary at 60th Street.

• Calculations of Manhattan-bound Transit Capacity

Transit capacity is defined in this report as the total number vehicles arriving at a designated terminal in Manhattan during the morning peak hour (8AM-9AM). It is not a measure of the fullness of those vehicles or the capacity of the tunnels or roadways to accommodate those vehicles.

- LIRR and NJT Rail capacity represents the number of trains that arrive at Penn Station during the morning peak hour.
- MNR capacity represents the number of trains that arrive at Grand Central Terminal during the morning peak hour.
- Buses and Jitneys represent the number of those vehicles arriving at the Port Authority Bus Station or George Washington Bridge Bus Station during the morning peak hour. Bus and jitney vehicle counts were provided by PANYNJ.
- PATH trains represent the number of trains that arrive at 33rd Street or World Trade Center.
- Ferries arrive at multiple points in Manhattan. Ferry schedules were found on respective websites.
- NYCT subway and buses numbers were taken from the NYMTC Hub-bound report. Hub-bound only counts the number of vehicles arriving at termini below 60th Street, and therefore does not count buses that only service upper Manhattan.

All other vehicle schedules were downloaded from agency General Transit Feed Specification data. The following assumptions were used to estimate capacity: PATH, LIRR, MNR: 110 riders per rail car; Subway: 120 riders per car; Buses: 50 seats per bus; Jitney: 25 seats per jitney; Ferry: 150 passengers per ferry; Staten Island ferry: 4,500 passengers per ferry.

• Manhattan-bound Infrastructure Capacity

Infrastructure capacity is the count of available traffic lanes and rail tracks entering Manhattan from the north, east, and west. Areas north include all crossings from Manhattan to the Bronx. Areas east include all crossings from Manhattan to Brooklyn and Queens. Areas west include all crossings to New Jersey. This data is aggregated by lane type: vehicle (car, bus), subway and rapid transit (NYCT subway or PATH train), or commuter rail (MNR, LIRR, NJ Transit Rail).

• Planned Capacity Investments

The number of trains for MNR future capacity estimates was determined using information provided in the *Penn Access Draft Environmental Impact Statement Alternative 2*. The maximum number of cars was assumed (12) for all new trains on MNR. The number of trains for LIRR future capacity estimates was determined using the *East Side Access Environmental Impact Statement*. The maximum number of cars (12) was assumed for all new trains on LIRR.

Appendix: Sources

- **Additional Photos and Images**

Cover: Robert Bye via Unsplash, licensed under CC0

Page 3: Yang Li

Page 10: Map of U.S.A. (Single Color) courtesy of FreeVectorMaps.com

Page 16: “Downtown Brooklyn” by Flickr user Several seconds, licensed under CC BY-NC-ND 2.0

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Page 45: “Penn Station” by Flickr user Erwin Bernal, adapted by DCP, licensed under CC BY 2.0

Page 59: Carolyn Grossman

Page 72: “Lower Manhattan and Jersey City” by Flickr user Subherwal, licensed under CC BY 2.0

- **For Reported Totals and Change at County and Subregion Geographies**

U.S. Census Bureau 1990 County-to-County Worker Files

U.S. Census Bureau American Community Survey (ACS) 5-Year Estimates, 2012-2016, 2013-2017

IPUMS-USA, University of Minnesota, www.ipums.org

Steven Ruggles, Sarah Flood, Ronald Goeken, Josiah Grover, Erin Meyer, Jose Pacas, and Matthew Sobek. IPUMS USA: Version 8.0 [dataset]. Minneapolis, MN: IPUMS, 2018.

<https://doi.org/10.18128/D010.V8.0>

U.S. Census Bureau Decennial Census 2000 5% Sample

U.S. Census Bureau ACS 1-Year Estimates 2013, 2014, 2015, 2016, 2017

Murata, Toshihiko. *Automated Standard Error (SE) Calculation with PUMS Data Excel Pivot Table*, available via https://acsdatacommunity.prb.org/p/2015_acs_conference

- **For Visualization at Sub-County Geography**

U.S. Census Bureau Transportation Planning Package 2006-2010

<https://ctpp.transportation.org/ctpp-data-set-information/5-year-data/>

- **For Transit Information**

Peak hour train schedules determined via GTFS feeds.

LIRR, MNR, and NYC subway GTFS: <http://web.mta.info/developers/developer-data-terms.html#data>

PATH GTFS: <https://www.panynj.gov/path/developers.html>

NJT GTFS: https://www.njtransit.com/mt/mt_servlet.srv?hdnPageAction=MTDevLoginTo

NYWaterway Schedules: <http://www.nywaterway.com/FerryRoutesSchedules.aspx>

NYC Ferry Schedules: <https://www.ferry.nyc/routes-and-schedules/>

Staten Island Ferry Schedules: <https://www.siferry.com/schedules.html>

NYMTC Hub Bound Travel 2016:

https://www.nymtc.org/Portals/0/Pdf/Hub%20Bound/2016%20Hub%20Bound/DM_TDS_Hub_Bound_Travel_2016-FINAL.pdf

NYMTC Hub Bound Travel 2000: <https://www.nymtc.org/Utility-Menu/Archive/Data-and-Modeling-Archive/Hub-Bound-Travel-Archive>

- **For Future Capacity Estimates**

ESA FEIS: http://web.mta.info/capital/esa_docs/feis.htm

Penn Access DEIS: http://web.mta.info/mta/planning/psas/pdf/comp_results.pdf

Appendix II

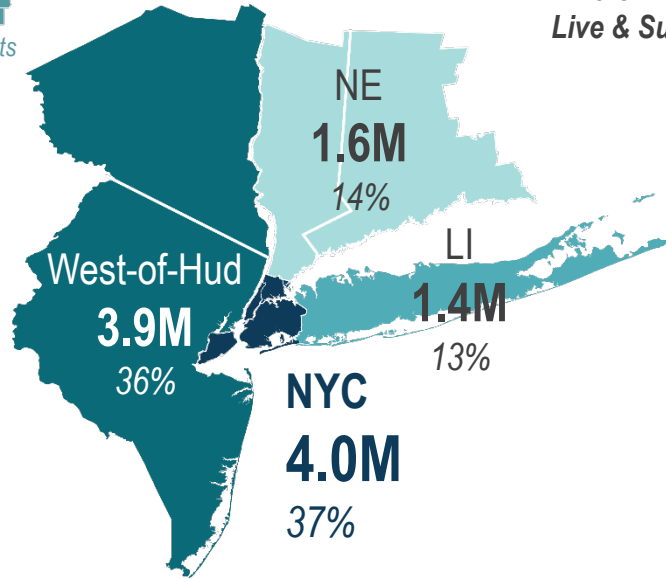
NYC In-Commuting by West-of-Hudson vs. Northeast of NYC vs. Long Island

Because Rockland and Orange Counties in New York are also west of the Hudson River and are serviced by NJ Transit, in-commuting patterns in those areas also reflect patterns of New Jersey in-commuters. This appendix presents alternative visualizations and analysis using this geographic distinction for a selection of in-commuting maps and graphs presented in the body of this report.

West-of-Hudson is home to as many employed residents as NYC, but a slightly lower share of the regional workforce. West-of-Hudson is also home to the greatest number of regional out-commuters.

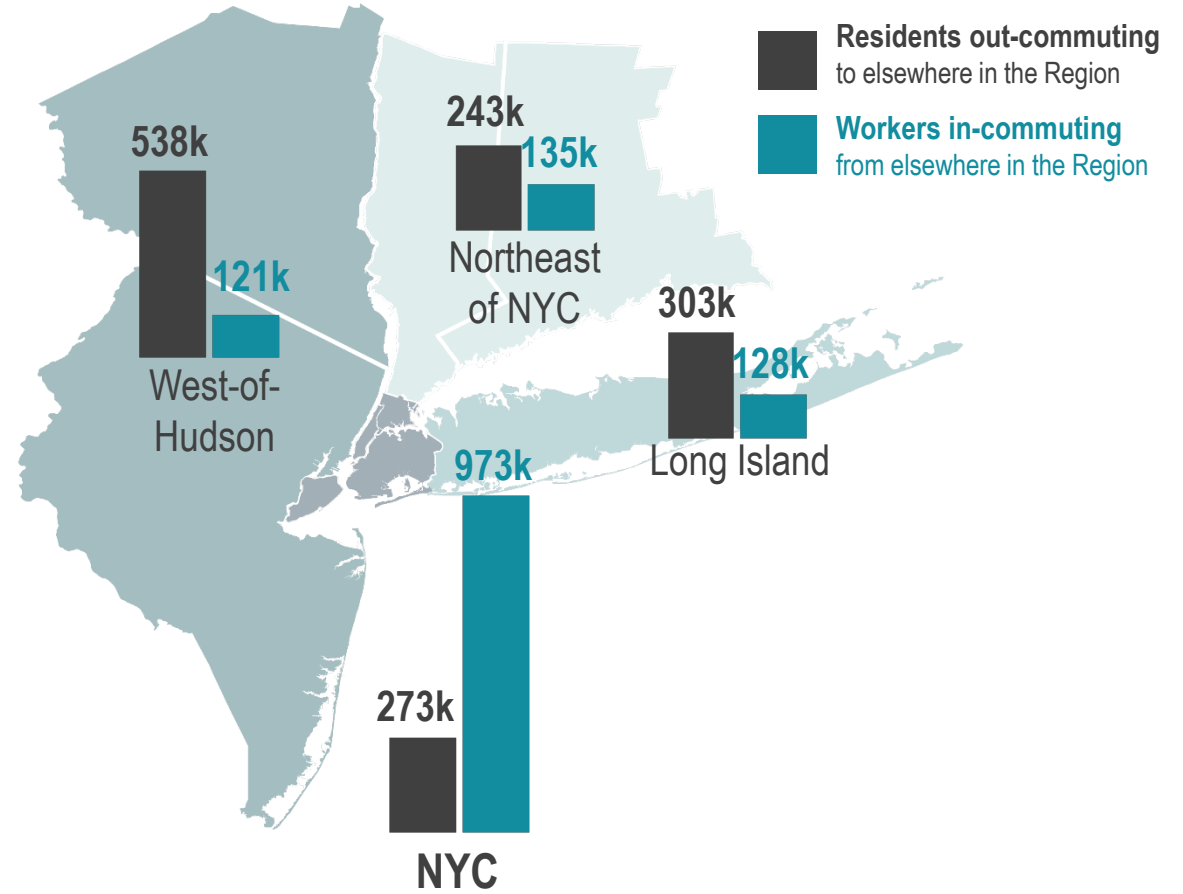


Where NYC Metro Region Resident Workers Live & Subregional Share of Metro Total, 2017



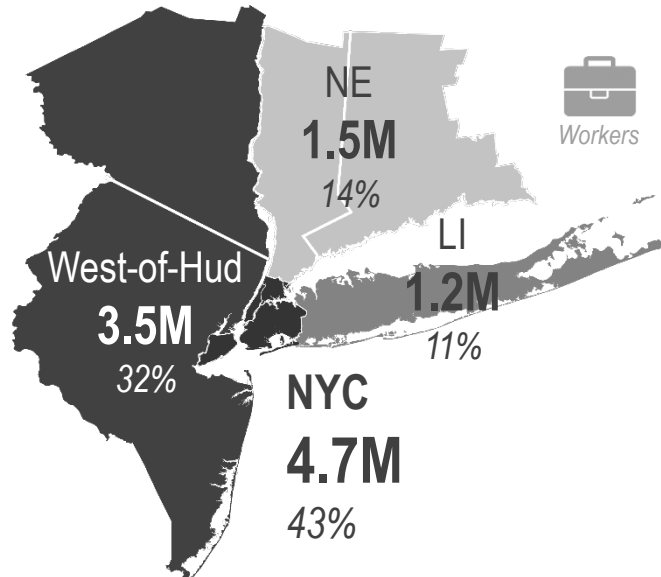
11 Million
Residents Employed within the NYC Metro Region*

Regional Exchange of Workers by Subregion, 2017



Where NYC Metro Region Residents Work & Subregional Share of Metro Total, 2017

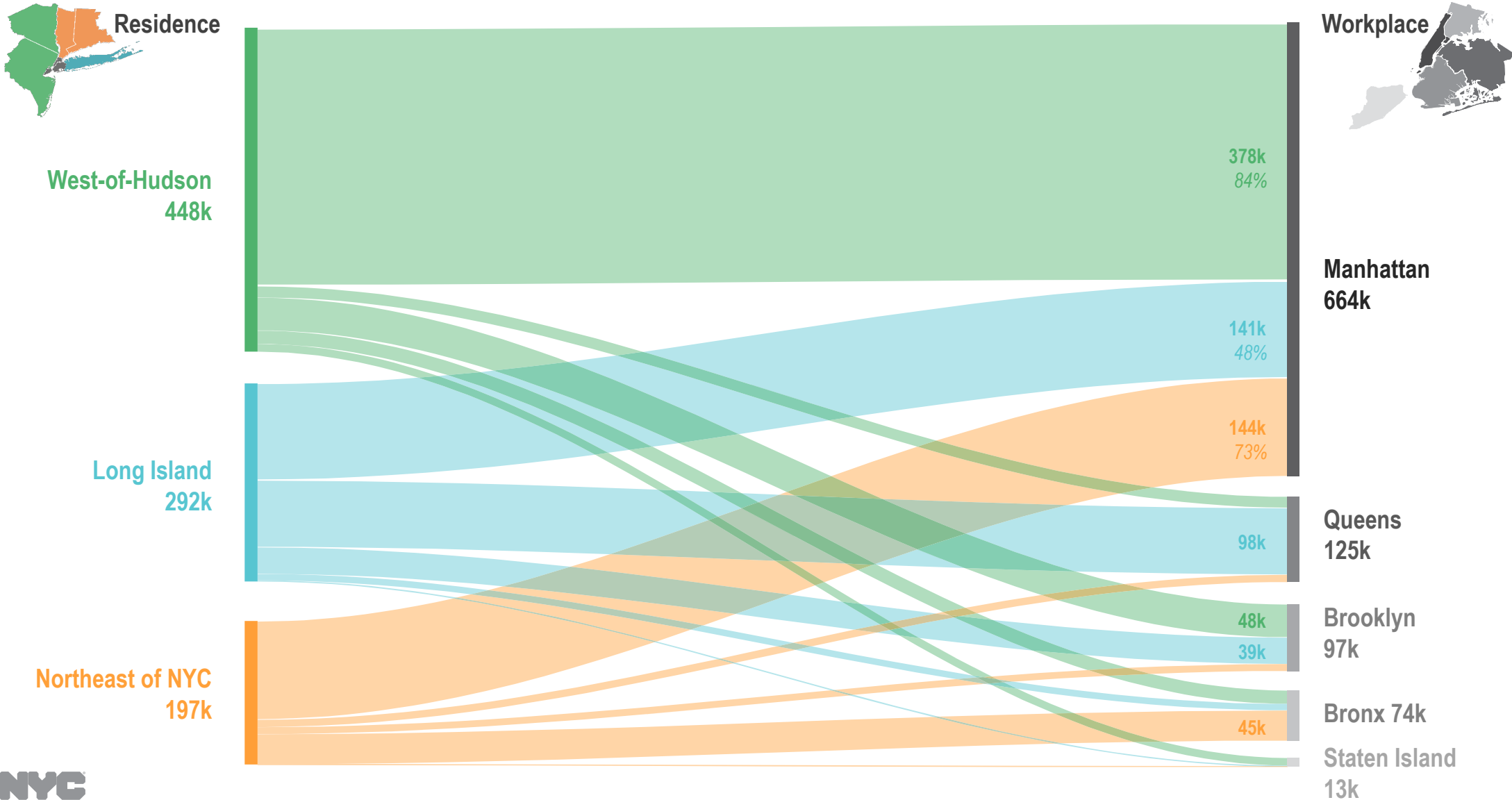
11 Million
Workers Living within the NYC Metro Region*



These diagrams provide alternative aggregations to those presented on pages 7 and 9, using this subregional geographic definition.

The majority of in-commuters travel to Manhattan, however, greater shares of in-commuters from Long Island and areas Northeast of NYC travel to Non-Manhattan Boroughs.

Where NYC In-Commuters Work, 2017



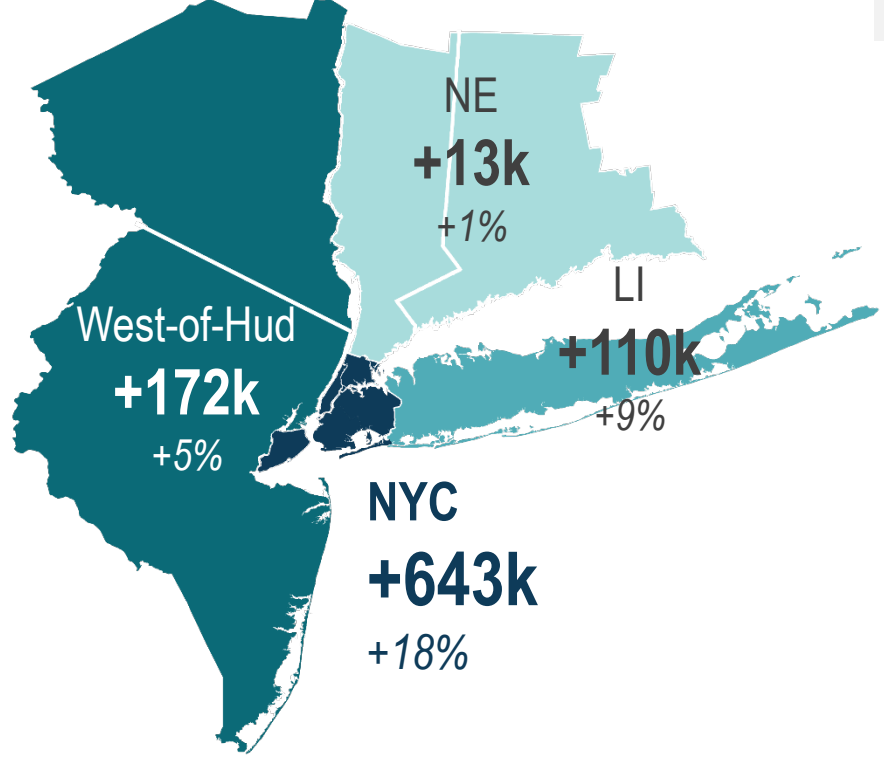
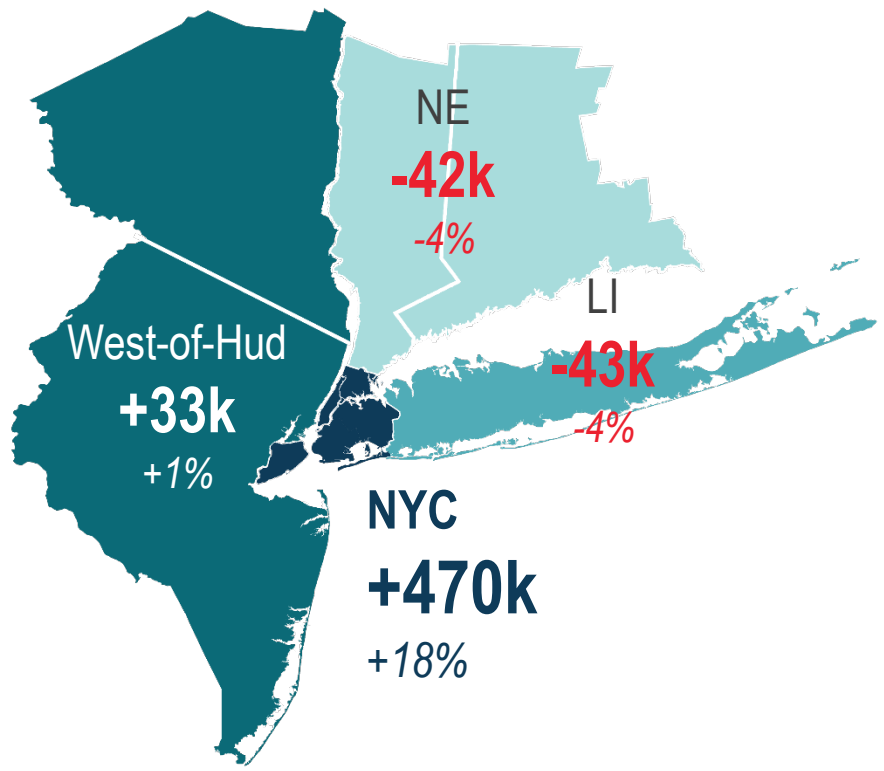
This diagram serves as an alternative to the analysis on page 11, using this subregional geographic definition.

Recent job and labor force growth trends highlight the importance of coordinating transportation infrastructure with housing and employment changes.

ΔLabor Force Participants Aged 25-54
2000 – 2013-2017 Avg.

ΔTotal Employment, 2000 – 2017

These diagrams provide alternative analyses to those presented on page 15, using this subregional geographic definition.

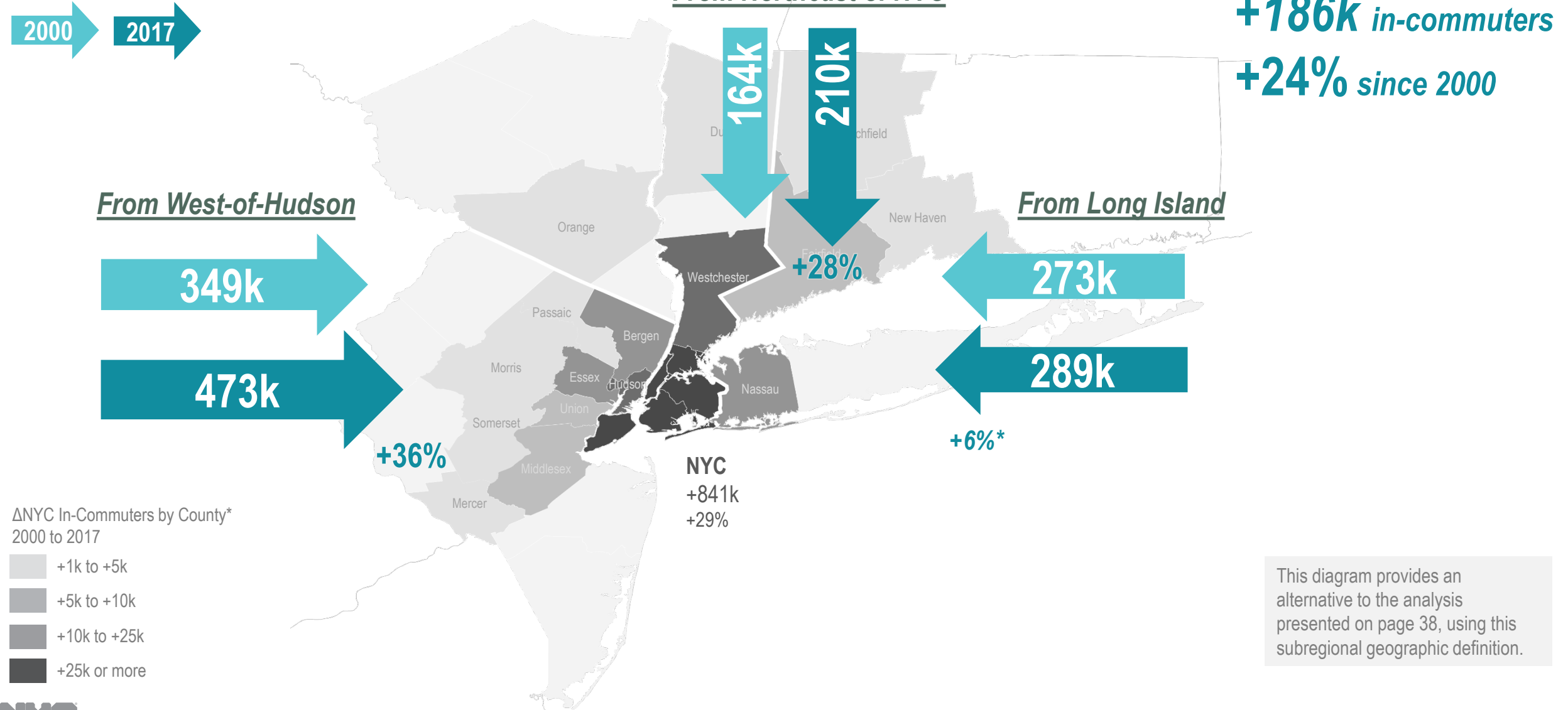


NYC: 113% of regional net gain

NYC: 69% of regional net gain

Since 2000, in-commuting to NYC increased from all directions, but fastest and most significantly from West-of-Hudson.

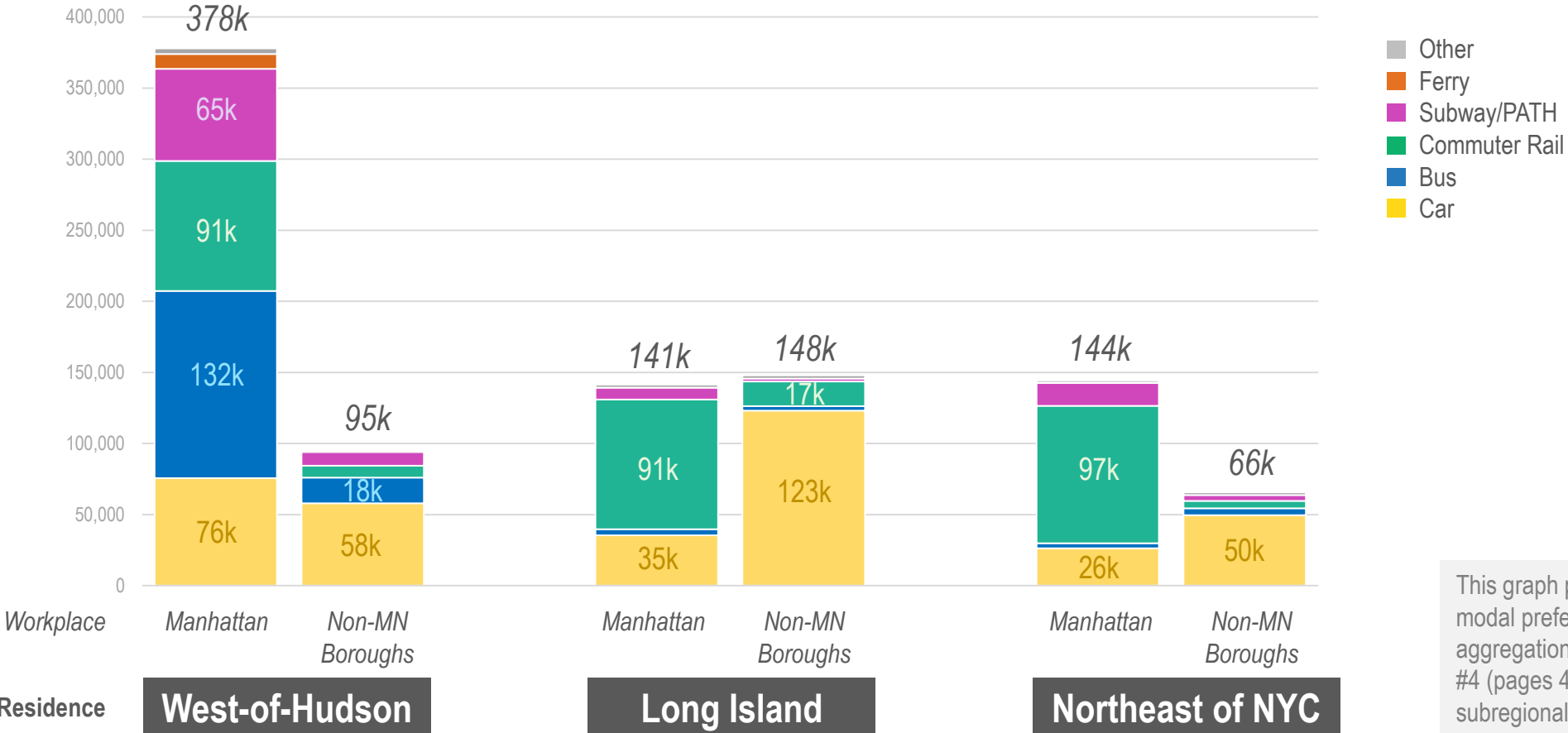
NYC In-Commuters, 2000 vs. 2017



This diagram provides an alternative to the analysis presented on page 38, using this subregional geographic definition.

Most NYC in-commuters travel to Manhattan via transit, while a greater share of in-commuters to Non-Manhattan Boroughs drive.

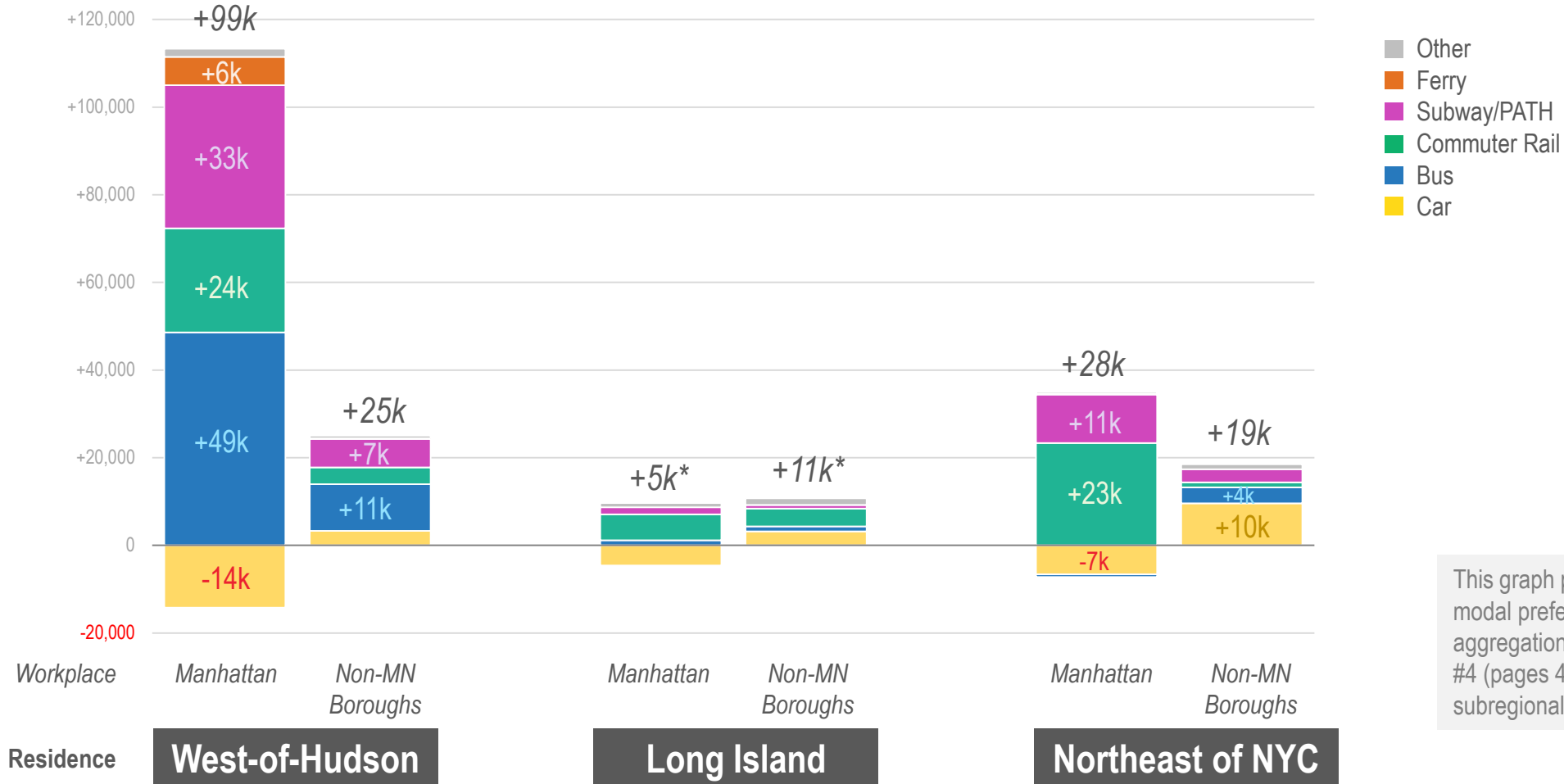
NYC In-Commuters Working in Manhattan vs. Non-Manhattan Boroughs by Primary Mode of Travel to Work, 2017



This graph provides an alternative modal preference analysis to the aggregations presented within Insight #4 (pages 45 to 58) using this subregional geographic definition.

The growth of NYC in-commuters was mostly represented by transit commuters, both for workers that traveled to Manhattan or Non-Manhattan Boroughs.

ΔNYC In-Commuters Working in Manhattan vs. Non-Manhattan Boroughs by Primary Mode of Travel to Work, 2000 to 2017



This graph provides an alternative modal preference analysis to the aggregations presented within Insight #4 (pages 45 to 58) using this subregional geographic definition.