Gateway and the Post-COVID Economy

Scenarios for Future Growth and Trans-Hudson Travel

Transit trips across the Hudson River will continue to grow beyond the region’s current capacity. Without the infrastructure to meet this demand, the region’s economic growth and sustainability are in jeopardy.
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Twelve years after construction was halted on the long-planned Access-to-the-Region’s Core (ARC) passenger rail tunnel between New Jersey and New York, and after several years of delay in obtaining federal approvals and funding commitments for the Gateway Program, construction of a new tunnel is finally ready to move forward. This first phase of the program would enable the only rail connection between Boston and Washington DC to be repaired without a three- to four-year disruption to New Jersey Transit (NJ Transit) and Amtrak service. The existing connection, a 111-year old, two-track tunnel, was badly damaged by Hurricane Sandy. It is well past its design life and its deteriorating condition has caused many delays and service disruptions over the past several years. Completion of the new tunnel will make train service faster and far more reliable than it has been for decades. It will also set the stage for further improvements in the Gateway Program’s second phase that would double the amount of train service capacity under the Hudson.

Public support for building Gateway is very strong, and support for investment in public transportation is growing. A recently conducted RPA/Global Strategy Group poll found 82% of respondents supported Gateway, and only 8% opposed. Despite this, some have questioned the need for new rail capacity as transit ridership remains depressed more than two years into the COVID-19 pandemic. To address these concerns, Regional Plan Association (RPA) examined multiple scenarios for how travel demand could change using different assumptions about how many and how often people will continue to work from home and how much the region’s economy will grow in the future.
RPA’s analysis finds that trans-Hudson travel demand on the heaviest travel days is likely to be at or above pre-COVID levels by the time the Hudson Tunnel Project is fully completed, and that by 2050 those trips will be 15% to 32% higher than they were before the pandemic.

Future demand for Trans-Hudson travel was estimated for four different scenarios: two that assumed the amount of time that the average worker spends working from home would double from its pre-pandemic level of 5% to 10%, and two that assumed it would quadruple to 20%. For office workers, the amount of work-from-home time would be...
much higher, a range of 25% to 50% in these scenarios. By comparison, a May 2022 survey by the Partnership for New York City found that 62% of Manhattan office workers were either not working or working remotely, a share that has been generally declining as more workers return to the office.

For each of these pairs, RPA assumed different rates of economic growth. One scenario assumed that the tri-state metropolitan region’s long-term rate of job and population growth would come close to its average rate of growth from 1989 – 2019, and one assumed growth would be only half that amount. From these four scenarios, projections for work trips and non-work trips for both transit and auto were developed using travel models developed by RPA.

**Four Scenarios:**

![Diagram showing four scenarios]

Because the Gateway Program’s infrastructure investments will likely serve the region for a century or more, projections were made for 10-year intervals for the next 50 years.
By nature, the farther projections extend into the future the more speculative they become. These scenarios neither attempt nor claim to capture every possible future for the region. They are intended to demonstrate the outcomes that are most probable within a range of plausible assumptions.

Gateway will have different impacts in each of these scenarios, and will also influence which scenarios are *more likely* to happen.

With the better service and additional capacity that Gateway would provide, growth will almost certainly be higher and the amount of time people would work from home would be lower than they would be otherwise. In fact, it would be virtually impossible for the scenarios projecting higher growth and higher Trans-Hudson travel to materialize with only the existing Hudson tunnel and Penn Station.

**Additional Trans-Hudson capacity remains essential if the New York region is to compete with other regions where travel is far easier and transit service is more attractive and comfortable.**
Key Findings

Economic Recovery

- Any further delay in starting or completing the new Hudson River rail tunnel will seriously impede the tri-state region’s economic recovery by 1) discouraging companies and residents from remaining in the region, 2) delaying improvements in NJ Transit and Amtrak service reliability and on-time performance, and 3) increasing the risk of a catastrophic shutdown of one or more of the two existing tracks before a new tunnel is built.

- It is likely to take several years for remote work patterns to stabilize. The bargaining positions of workers and employers will change along with economic conditions, and organizations are still in the early phases of learning how hybrid and remote work affect productivity and competitiveness. Predictions about the average amount of time that all workers will work from home after the pandemic range from 10%, or twice the pre-pandemic average of 5%, to 20 – 25%. For office workers, this would mean an increase from 12% before the pandemic and over 60% today to a range of 25% to 50%.

- Gateway is an important part of creating an equitable recovery, particularly for essential workers and those who can’t work from home or travel by car. About two-thirds of the region’s workers are in jobs with limited or no ability to work from home, including a substantial portion of Trans-Hudson commuters. Any delay in the project would put these workers’ livelihoods and well-being at risk, and also defer the equivalent of 83,000 full-time work years in jobs that would come with construction of the tunnel and replacement of the Portal North Bridge. A high proportion of these would be well-paying jobs that don’t require college degrees.

Essential Infrastructure Repairs

- Regardless of how Trans-Hudson demand changes in the future, the Gateway Program includes critical repairs and upgrades to century-old infrastructure in the nation’s most heavily traveled passenger rail corridor. Both the rail tunnel and Penn Station have long been handling far more passengers than they were designed for, and these and their supporting infrastructure require major investment just to maintain safe and reliable existing service.
Gateway is important to the success of other critical infrastructure investments, including the essential replacement of the Port Authority Bus Terminal and upgrades to PATH, NJ Transit, and automobile crossings. The region’s transportation system is an integrated system, and inadequate service on one part of this network will shift ridership and put more strain on other facilities. Investments in these facilities are intended to improve service and handle increased demand along with Gateway. Without the rail improvements Gateway provides, it’s unlikely that even a new bus terminal and other upgrades would be enough to handle riders who would shift to these other modes.

Future Growth

While Amtrak, NJ Transit and other rail lines are still well below pre-pandemic ridership, it won’t take many more riders for trains to feel crowded again. Train crowding was excessive well before the pandemic, and Gateway will provide enough capacity for frequent, reliable, and comfortable service, a major improvement over where we were in 2019. It is also likely that riders will be less willing to tolerate poor, crowded service now that many have greater choice in how far to live from their worksite and how often to commute into work. This would mean that more frequent service could be needed even with fewer riders, and that transit and federal agencies would do well to revise train loading guidelines.

On the heaviest travel days, trains are likely to be as crowded by the time the new tunnel is completed in the early 2030s as they were before the pandemic. In two of the four scenarios, the number of Trans-Hudson transit trips (including PATH, bus, and ferry as well as NJ Transit and Amtrak) are projected to exceed 2019 levels on the heaviest travel days, most likely Tuesdays, Wednesday and Thursdays when hybrid workers are more likely to be in the office. By 2040, transit trips on these days would exceed 2019 in all four scenarios.

By 2050, Trans-Hudson transit ridership on the peak weekday – likely a Tuesday, Wednesday, or Thursday – could be 15% to 32% higher than it was before the pandemic. While some of the rush hour demand could shift to “shoulder” hours around the peak periods, it will be impossible to accommodate this demand without the additional capacity that Gateway would add.

In all scenarios, Gateway will support the transition to a hybrid economy that is likely to have more off-peak and reverse commute travel. Throughout the region’s transit network, the fastest growth in ridership before the pandemic was to places other than Manhattan and at times other than the traditional rush hour. These trends are likely to accelerate, and travel patterns are likely to become more unpredictable, as different work
schedules evolve in different industries, and as many people and businesses relocate. Without Gateway, there would be much less operational flexibility to respond to these changes with more reverse direction service in peak periods and more frequent service on different lines and at different hours as needs evolve.

- **It’s uncertain when future expansion of the rail network beyond Gateway will be needed, but any expansion will build on the capacity created by the Gateway Program.** Because the Northeast Corridor is a trunk line that connects many of the region’s rail services, new services could be added incrementally as future patterns of growth emerge. A logical next generation investment, as recommended in RPA’s Fourth Regional Plan, would be to extend the completed Hudson River Tunnel to Queens. This would increase the amount of train capacity under both the Hudson and East Rivers, provide through service between New Jersey and Long Island, and increase service possibilities for Amtrak, NJ Transit, Long Island Rail Road, and Metro-North Railroad. Without Gateway, however, these further expansion plans cannot go forward.

### Health and the Environment

- **Failure to complete the full Gateway Program, including a modernized and larger Penn Station complex, would increase air pollution and make it nearly impossible to meet the climate goals of all three states and New York City.** By encouraging people to make trips by transit instead of cars, the program will limit the automobile emissions that are a major public health hazard as well as a leading source of greenhouse gas emissions.

- **Gateway will limit suburban sprawl by making downtowns and transit-accessible places more desirable places to live and work.** The scenarios analyzed in this report estimate that anywhere from an additional 100,000 to 600,000 people could make their homes in low-density suburbs, agricultural land, and open space between 2020 and 2040. An additional 700,000 to 1.2 million could live in moderate or medium-density suburbs. This has the potential to put enormous development pressure on existing open space, put more cars on the road, and worsen both road congestion and air quality. High quality transit service is essential to encourage a larger share of people to live in walkable communities that consume less open space and drive less than in low-density suburban and exurban areas.

- **Beyond 2050, the region will be in uncharted waters; the flexibility and robustness that Gateway provides to the transportation network will be essential to the region’s ability to adapt to a new environment and economy.** By 2050, sea levels are likely to have risen by at least a foot, and could rise by three feet as early as the 2080s. The region will be hotter and experience more frequent and severe storms and droughts. How this will impact the
global and regional economies, and where people can and will choose to live and work, remains to be seen. Besides helping to reduce greenhouse gasses and making Trans-Hudson facilities more resilient to climate change, Gateway is the foundation for any future additions to the rail network that will enable it to expand service to where it will be most needed.
Purpose of Report

The full impact of the COVID-19 pandemic will not be known for many years. The coronavirus has already claimed over 6 million lives worldwide, including 1 million in the United States. Its future evolution is still anyone’s guess. The concomitant economic, social, and political changes that it unleashed are still unfolding, and will continue to shape the way we live and work in unpredictable ways.

The COVID crisis of 2020 was clearly of such magnitude that RPA — along with other institutions, businesses, and all levels of government — needed to do two things: *focus on the immediate health and economic crises and reassess long-term assumptions.*

The immediate needs meant protecting health and safety first and foremost, shielding the most vulnerable from the economic shock by preventing massive evictions and widespread hunger, providing financial lifelines to the unemployed and others in precarious circumstances, and keeping vital services like subway, bus, and rail lines running in spite of huge shortfalls in revenue. Concerted and often heroic efforts at all
levels, along with unprecedented federal funding, enabled the region to avoid the most catastrophic outcomes.

The continuing pandemic and economic fallout require continued focus on and funding for these immediate needs, but decisions affecting the long-term future of the region cannot be delayed, especially with unprecedented levels of funding available through the Infrastructure Investment and Jobs Act and a powerful alignment of federal, state, and local stakeholders. Even though it is a particularly difficult time to assess the long-term impacts of large infrastructure projects, many of these projects have been delayed for far too long and are looking at a window in which critical decisions need to be made. Leading this list is the Hudson Tunnel Project, which would add a new train tunnel beneath the Hudson River and rehabilitate the existing tunnel that has been in use for over 111 years. The tunnel will take many years to build and is intended to serve people and businesses well into the next century.

Amtrak

Built to Last, But Not This Long...

Built in 1910 and and serving 450 trains per day before the pandemic, the 111-year old tunnel connecting Penn Station commuters to New Jersey and beyond is no longer able to reliably meet the needs of the region.

The new tunnel would be the first expansion of Trans-Hudson rail capacity in over 100 years, even though the current tunnel and Penn Station have been overcapacity for decades and new facilities have been planned for at least the last 30 years. The project would also provide immediate economic stimulus and prevent a potential economic
disaster should the existing tunnel need to be taken fully or partially out of service for needed repairs.

With the Hudson Tunnel Project finally ready to move ahead after years of delay, new questions have emerged about how the nature of work and commuting have been altered by the pandemic. In particular, how much new rail capacity – such as the doubling of trans-Hudson capacity that would result if the Gateway Program is completed – will be needed over the coming decades if a significant share of office work will now be done from home or other remote locations? Will fixed rail infrastructure be able to adapt to future changes that are difficult to predict?

This report examines how Trans-Hudson travel could evolve under different long-range scenarios for the tri-state New York metropolitan region. Scenario planning is particularly useful in times of rapid change or high uncertainty. By looking at a range of plausible futures, it can help identify what is most important under most sets of circumstances. Scenario planning avoids the danger of getting locked into planning only for what is considered the most likely or politically popular scenario, and it allows for an assessment of the opportunities and risks of different courses of action. For Gateway, this means examining how the program, or its absence, would affect the region’s economy and quality of life under different scenarios for jobs, population, work, and travel patterns.

RPA previously examined the preservation of the existing North River Tunnel and the economic and human impacts of a partial shutdown of the Northeast Corridor’s only Trans-Hudson connection in our report A Preventable Crisis. The first phase of the Gateway Program, which includes the construction of the Portal North Bridge and the Hudson Tunnel Project, will ensure that this calamitous future does not occur. This report considers one of the primary markets that the Gateway Program is designed to serve: commuter ridership into and out of Manhattan. The report does not analyze the Northeast intercity travel market, although it is an important part of the service demand for which Gateway is intended. It asks the question of whether or not the capacity
increase of the full Gateway Program to support the future growth is still required, or if ridership levels will remain low enough for the second phase of the Gateway Program to be delayed.

While this report focuses specifically on Gateway, the approach and many of the findings are applicable to other projects and types of infrastructure and development planning.

**Related Report**

Feb 2019

**A Preventable Crisis**

The Economic and Human Costs of a Hudson River Rail Tunnel Shutdown
Why Gateway is Considered the Nation’s Most Critical Infrastructure Project
The Gateway Program is a series of interconnected projects designed to rehabilitate and expand one of the biggest transportation bottlenecks in the United States. While it focuses on a 10-mile segment of the Northeast Corridor (NEC) stretching from Penn Station Newark to Penn Station New York, it is the busiest section of the nation’s most heavily used passenger rail corridor.

The Northeast Corridor serves 2,000 trains per day, which before the pandemic carried 800,000 passengers at points between Washington DC and Boston daily. The eight states that it connects represent 20% of the U.S. economy and 17% of its population. Without it, travel between any of the cities that it serves would be choked by car, truck, and air traffic from displaced rail passengers.

**Plans for the Gateway Program involve two phases of development, the first of which has already made some significant progress.**
Portal North Bridge

The Portal North Bridge Project will replace the current, functionally obsolete Portal Bridge – a century-old two-track, railroad swing bridge spanning the Hackensack River between Secaucus and Kearny, New Jersey – with a new, high-level, two-track fixed span. The existing bridge swings open and closed to allow maritime traffic to pass and often does not close properly, resulting in significant delays. The new Portal North Bridge is currently under construction with a projected completion date of 2027 and will be built high enough to allow ships to pass under the bridge without having to move.
Hudson Yards Concrete Casing

To preserve the rail right-of-way under the western expansion of Hudson Yards, a concrete casing is being constructed to connect the forthcoming Hudson Tunnel with Moynihan Train Hall and Penn Station.

Track Configuration at New York Penn Station

Gateway Development Commission (GDC)
The Hudson Tunnel Project
The largest Phase 1 project, the Hudson Tunnel Project, will add two new tracks under the Hudson River. The project is scheduled to begin in 2023, with the new tunnel scheduled to be completed by 2032. Its completion will be followed by the rehabilitation of the existing North River Tunnel, which will last 1.5 years per tube and be completed by 2035.

Phase Two

Phase 2 currently has four projects advancing through the design phase.

- Sawtooth Bridges
  In Kearney, NJ the NEC passes above the PATH World Trade Center line, the NJ Transit Morris and Essex Line and a Conrail freight track on a series of viaduct structures known as the Sawtooth Bridges. Completed in 1907, the existing structures are in need of full replacement and expansion to accommodate a four-track right-of-way as part of the Gateway Program. The project has advanced the farthest of any Phase 2 project, having passed its environmental review in 2020 and into the design phase of development.

- Dock Bridge
  Straddling the Passaic River, the Dock Bridge connects Newark Penn Station with Harrison, NJ with six tracks that serve all NEC trains as well as PATH trains. Built in the early 1930s, the bridge is undergoing a rehabilitation project under the Gateway Program to bring it to a state of good repair, convert the bridge from moveable to fixed, and streamline future maintenance and improve safety.

- Penn Station Expansion
  To unlock additional capacity on the NEC, an expansion of New York Penn Station is currently being planned to include additional tracks, platforms, passenger concourses, and operational supports. The Environmental Impact Statement process is expected to begin in 2022.

- Harrison Fourth Track
  This project would move PATH Track G to the north in order to add a fourth track to the NEC through a 0.66-mile section of combined right-of-way in Harrison, NJ which currently only has three available tracks for trains using the NEC.

Phase 2 also has four projects that are still conceptual.
- **Bergen Loop**
  To provide a one-seat ride to New York Penn Station for riders on the Pascack Valley, Main, and Bergen County lines, a rail loop would be built to allow trains coming from the North into Secaucus Station to turn to the east rather than only continuing south toward Hoboken Terminal.

- **Secaucus Junction Capacity Expansion**
  Tracks through Secaucus Junction will be expanded to alleviate the reverse peak bottleneck imposed on the NEC by the current station configuration and to accommodate the doubling of train traffic planned as part to the Gateway Program.

- **NJ Rail Yard**
  An additional rail yard in New Jersey (location to be determined) is being planned for storage and maintenance of additional NJ Transit trains that will be needed to accommodate additional service.

- **Portal South Bridge**
  To add an additional two tracks of capacity on the Northeast Corridor connecting to a new Hudson River Tunnel, a second bridge must be built over the Hackensack River.

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**Essential Infrastructure**

In July 2019, the States of New York and New Jersey created the Gateway Development Commission (Commission) through the enactment of parallel legislation by each state and codified as the Gateway Development Commission Act (GDC Act). The Commission is empowered to facilitate and coordinate activities and encourage the actions of others to effectuate the Gateway Program, in particular, Phase 1 of the Gateway Program which includes the HTP. The Commission has informed FTA that it intends to assume the roles of HTP CIG Grant Applicant and NEPA Project Sponsor.

It’s difficult to overstate Gateway’s importance to the tri-state metropolitan economy. The rail link provides the only commuter rail service between New Jersey and New York, with NJ Transit and Amtrak squeezing all trains onto two tracks through a deteriorating, 111-year old tunnel. Without this service, the Manhattan central business district (CBD) would falter and the ripple effects would be felt throughout the NY-NJ-CT metropolitan area.

Both the tunnel and New York Penn Station have been operating at far above their intended capacity for years. In addition to overcrowding in trains and stations, the poor condition of the facilities, along with other critical links such as the Sawtooth and Portal Bridges, have resulted in an escalating number of delays and service disruptions.
Hurricane Sandy damaged the tunnel so severely that it is just a matter of time before the two tubes need to be taken out of service and repaired, one tube at a time, a process that would reduce service by an estimated 75% over a period of four years.

The Gateway Program serves several essential purposes.

- **It will repair and modernize facilities**, improving service reliability and safety, and prevent a sharp reduction in service if the tubes need to be taken out of service before a new tunnel is built.

- Construction of the Hudson Tunnel Project alone has been projected to **create 72,000 jobs and $19 billion in economic activity**, while the Portal North Bridge will create another **11,600 jobs**.

- **Existing riders will have more reliable and robust service** with a more comfortable ride.

- **It will relieve auto congestion, improve air quality, and reduce greenhouse gasses** by attracting passengers who would otherwise drive.

- **It prevents the devastating impacts** of a potential North River tunnel closure. Those impacts include, but are not limited to, a $16 billion loss for the national economy, $22 billion in lost property values in New Jersey, and $7 billion in lost state and local tax revenue.

- **It improves climate resiliency and adds needed redundancy** in a busy section of the NEC that cost commuters over 2,000 hours in delays over a five-year period from 2014 – 2018. That included 85 major delays of five hours or more.
New Jersey residents accounted for 8% of total New York state income tax liability generated by all filers in 2018. Nearly 475,000 New Jersey resident tax filers accounted for $3.7 billion in New York State income tax liability in tax year 2018, which is approximately half of all taxes earned by non-New York residents.

Meeting the Region’s Needs

The remainder of this report will look at how Gateway could impact the region’s economy and environment in the decades to come. It will focus on potential growth in Trans-Hudson travel under different scenarios, and how well the program would meet the region’s needs under different assumptions for growth and labor market conditions.
What Will Determine the Long-Term Future of the Tri-State Region?

Even before the pandemic hit, the New York-New Jersey-Connecticut metropolitan region faced a great deal of uncertainty. Would the economic advantages of New York and other global cities continue to attract economic activity and talent as much as they have for the last 30 years? Would the international migration that had sustained its population growth continue? Would income inequality continue to grow? How would rising sea levels, more extreme heat and more frequent storms impact every aspect of life in the region? How quickly would new technologies such as artificial intelligence or autonomous vehicles become ubiquitous, and what would it mean for the region’s competitiveness, health, sustainability, and quality of life?

RPA addressed these questions in its Fourth Region Plan, which was released in 2017. In forming its recommendations, RPA projected alternative scenarios for how the region might develop under different sets of assumptions. These included what would be likely to happen if we continued with current policies, and different ways the region could grow if we provide enough housing and infrastructure to meet projected demand. It concluded that the region’s rate of growth would be cut in half if current policies continued, but that a new course would enable the region to equitably and sustainably maintain its current rate of job and population growth.
Charting a New Course

This pre-COVID chart from RPA’s Fourth Regional Plan compares a business-as-usual growth scenario to the potential growth that could be achieved by providing enough housing and infrastructure to meet projected demand.

All of these uncertainties and choices remain, but the advent of COVID-19 has added new questions. Will New York City and the region be as attractive to people and businesses if remote work gives them greater freedom in where they choose to live and work, or if lingering health concerns result in different behaviors and choices? Will the racial and economic disparities laid bare by the pandemic grow even wider as those who don’t have the ability to work from home or have access to quality healthcare get left farther behind? Can we avoid a vicious cycle in which deterioration in public safety, transit, and other services lead to declines in income and the tax revenue needed to maintain these services?
While it is easy to imagine all that could go wrong, we often forget that there are also possibilities that could make the economy and quality of life much better.

In many cases, the pandemic has increased the possibility of these positive outcomes as well. What if a combination of technological advances, favorable demographics and good policy choices both improve productivity and reduce inequality? What if remote work makes New York more attractive by eliminating crushing commutes and making life and work easier to manage? What if we use this moment to address our most pressing problems, from climate change to the lack of affordable housing? Not allowing for these possibilities can lead to poor decisions that limit the upside potential of these opportunities.

When envisioning the future, two things are important to remember:

- **The future is a choice, not just a prediction.**
  There are some trends that we have little control over, but many that we do. We can’t stop the effects of global warming that are already baked in, but we can prepare for those changes and reduce future warming. Housing affordability is almost entirely within our control, and decisions about the amount, type, and location of the housing we allow and the infrastructure we build will go a long way in determining which parts of the region prosper and grow, and which don’t.

- **It’s important to take a very long view for region-shaping infrastructure investments.**
  It will take over a decade to build the new tunnel and other elements of the Gateway Program, and these new additions to the region’s transportation network are likely to serve the region and the nation for a century or more. Job growth, housing prices, and transit ridership are all affected by both long-term and short-term trends, and it’s important not to overreact to recent events or cyclical patterns. If office vacancies go up and rents come down, it can provide an opportunity for entrepreneurs who might not have been able to afford them before. If people start avoiding transit because it’s too
crowded, some will come back once conditions ease. Some of the most dire predictions for New York in the early days of the pandemic have already proven to be an overreaction to short-term responses. In looking out at the multi-decade life of Gateway and other major infrastructure projects, it’s even more important to remember that even long-term trends won’t persist forever.

WHAT’S LIKELY

There are some things that we can count on because their outcome has already been determined.

- **The region will get hotter and wetter and experience more disasters as the impacts of climate change worsen.**
  
  Predictions vary for how fast these will happen and what the impacts will be, but there is scientific consensus and increasingly visible evidence that leave no reasonable doubt that these will both continue and accelerate.

- **The region’s population will become older and more racially diverse.**
  
  Barring unprecedented and unlikely changes in migration and birth or death rates, the age, race, and ethnicity of people who are already born mean that the region’s — as well as the nation’s — population will grow older and have a higher share of Latinx and Asian American and Pacific Islander (AAPI) residents and a shrinking share of white residents for at least the next two decades.

- **Much of the change in patterns of work, commerce, and travel that have occurred because of COVID-19 will continue after the pandemic.**
  
  The biggest change brought about by the pandemic is a rapid acceleration of the share of work and shopping done from home. Workers and businesses in many industries quickly adapted during the initial lockdowns, technology that facilitates remote work and shopping has improved and been widely adopted both at home and the workplace, and worker expectations have been transformed. The degree to which these will continue after the pandemic fades is widely debated, but few imagine a return to pre-pandemic patterns.

Other post-pandemic trends are less certain, but still likely.

- **Fear of contagion will likely fade.**
  
  History tells us that initial fears and changes in behavior that arise during disasters tend to recede with time. People largely returned to previous routines after the 1918 influenza pandemic, the September 11 attacks, and Hurricane Sandy. Some adaptations stuck,
such as tighter building and airplane security after the 9/11 attacks, but after time there was no appreciable increase in fear of flying or working in tall buildings, just as there was no decrease in demand for coastal homes after Hurricane Sandy. There is no telling how long the pandemic will last or what precautions people will continue to take once COVID-19 becomes a less harmful endemic disease, but it’s doubtful that many will permanently defer travel, dining out, or in-person events.

- **New York will eventually adapt and is likely to remain a dynamic global city.**
  While the risks of a painfully slow recovery and a loss of regional competitiveness are real, the reasons for New York’s resilience after previous downturns and recessions remain in place. As argued in RPA’s *New York’s Next Comeback* report, urban density is still an advantage in the global economy and large, diverse cities like New York have more ability to adapt to change than places that rely on single industries or community types. Few other world cities, and none in North America, can match the New York region’s diverse, talented workforce, the scope of its transit service, or the agglomeration of businesses and cultural and educational institutions. Demand for housing has already returned to pre-pandemic levels, and leading technology firms are expanding their facilities and investments in Manhattan and other parts of the region.

- **Inequality between those who can and can’t work from home will grow.**
  Jobs with an option to work from home are more likely to be in high-income occupations. Demand and salaries are growing for many of these occupations, and most who work in them have the resources to purchase high-quality internet, educational services, health care, and other advantages that allow them to adapt. By contrast, low-income workers and communities of color suffered more COVID-related illness and death, higher unemployment and more educational disruption while having fewer options to avoid overcrowded housing or jobs that expose them to contagious illnesses. Without intervention, it’s hard to see how the divide between those who can and can’t work from home won’t continue to worsen pre-existing disparities.

- **Energy and fuel prices will be volatile.**
  Until we are able to fully transition to domestic, renewable energy, prices of fuel for transportation and for heating and cooling are likely to experience spikes and become more expensive. Global disruptions from war and disasters will exacerbate price volatility. How this will impact residential and travel choices is hard to predict.

- **Population is more likely to decentralize than jobs.**
  Remote work will make it likely that more people will choose to live farther from their place of employment since the time and burdens of commuting will be less. Some businesses, like restaurants or doctors’ offices, are likely to move to where they will be
close to their customers. For other businesses, including most of those in office industries, it is more important to be where they can attract workers from the largest possible labor pool. Hybrid work schedules will mean that most workers in these businesses will need to be within commuting distance of their worksite. This favors central locations with transit options that serve a large potential workforce. Even for employers who choose to go fully remote, there will still be an incentive to locate where their workers can most easily travel for trainings, client meetings, and other functions.

**Related Report**

Oct 2020
New York’s Next Comeback

**WHAT’S NOT LIKELY**

While possible, some frequently voiced predictions are unlikely.

- **New York City is unlikely to see a repeat of the 1970s.**
  Symbolized by the New York Daily News headline “Ford to City: Drop Dead,” the 1970s was a decade in which the city barely avoided default, lost over 800,000 people, and suffered eight continuous years of job declines. Early in the pandemic, many predicted that the city was facing a similar downward spiral, and the fear still lingers. But this was very different from the current crisis and unlikely to repeat itself. White flight and the decline of the city’s manufacturing base were well entrenched before 1970, and the inept accounting practices that led to the fiscal crisis have been replaced by standard accounting practices and financial safeguards. By contrast, New York was in a much stronger position when COVID-19 hit than it was before the fiscal crisis, with a rapidly growing, more diversified economy and a strong housing market. While it has been slower to regain all the jobs lost than the rest of the U.S., job growth is headed in the right direction and federal assistance has enabled the city to avoid unsustainable budget deficits.

- **Future residential growth is unlikely to come primarily in the form of new single-family, suburban homes.**
  Even if there is a permanent increase in demand for this type of housing because of a reduced need to commute and a desire for larger homes, the limited available land that is left in the region for new subdivisions is mostly in the outer-rings, far from job centers, and in areas with limited services and amenities. In addition, over 92% of the region’s housing growth in the last decade has been from large multi-family homes, either within cities or suburban areas, driven in part by demographic change as families
have fewer children, retiring baby boomers downsize, and younger generations are less able to own their own home. For population to grow in suburban towns and villages, it will require a loosening of zoning restrictions and a substantial increase in multi-family homes, whether in the form of two-family homes, garden apartments, or mid-sized apartment buildings.

- **A technology-driven “jobless economy” is unlikely anytime soon.**

  There is a long history of futurists and economists dating back to the 19th century predicting the automation of work would vastly reduce the number of jobs. This has never happened to date as most technological advances have created more jobs than they replaced. There are valid arguments that this time could be different, particularly because artificial intelligence can replace higher-level cognitive functions that have been the function of the fastest growing occupations. However, there is still a long list of growing needs, from personal care to scientific discovery, that will be difficult to automate. Slower job growth is certainly possible, but will be determined by a number of factors besides technology, from demographics and labor policies to social and cultural change.

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**BIGGEST WILDCARDS**

- **Extent and pattern of work-from-home**

  This is the biggest uncertainty ushered in by the pandemic that will affect the region’s competitiveness, growth, and inclusivity. As described in the introduction to this section, there is a wide range of predicted outcomes that will evolve not just as people return to work, but for years to come as both workers and employers continue to learn and negotiate, and as the future of work interacts with other economic and demographic trends. How these new work patterns evolve will impact not only how and when people commute, but also where they choose to live and where businesses choose to locate.

- **Pace and impacts of climate change**

  While hotter cities, rising seas, and more frequent storms are a virtual certainty, it is impossible to confidently predict how quickly the climate will change, much less the timing and severity of storms, heat waves and flooding. How these will affect the region’s economy, population growth and development, how damaging they are, the effectiveness of resilience measures that are taken in advance, and how climate change affects this region relative to other parts of the nation and world are all unknown.
Global and national economic growth

The region’s growth and prosperity will be greatly influenced by how robust global and U.S. growth is over the long run, as well as the types of industries and activities that grow or decline the most. There is a general expectation that there will be some slowing in the national economy due to slower labor force growth in the coming decades, but there is a wide range of potential outcomes.

Immigration

Without foreign immigration, New York City and much of the region would have experienced net population decline over the last several decades. Immigration will arguably be more important in the future as the natural increase in population slows. The level of immigration and countries of origin will be highly dependent on national immigration policies.

Labor market dynamics

Labor force participation rates will determine how much population the region will need to support a given level of jobs, and influence how much employers invest in labor-saving technology. These in turn will be influenced by wage rates, unionization trends, how much a growing elderly population chooses to keep working, and labor, education, and workforce training policies.

Transportation, energy, and digital technologies

Scientific breakthroughs, technological innovations, commercial applications, and their impacts on society are difficult to predict. Artificial intelligence, electric batteries, and autonomous vehicles are among the many technologies that will shape everything from economic growth to greenhouse gas emissions.

Residential and consumer preferences

Changes in where and how people choose to live and travel, as well as the goods and services they choose to buy, have changed dramatically in the last several decades in response to changes in marriage and parenting, energy and home prices, climate concerns, and other factors. And because there is no single market, but rather a large variety of groups with different preferences, it is difficult to predict dominant trends. Differences at the margin can also matter a great deal. Young and childless households have long had more of a preference for living in cities than older households with children, for example, but a modest shift in either group can have a substantial impact on housing markets.
How RPA Developed its Scenarios

RPA developed the scenarios in this report using a process and models originally developed for RPA’s Fourth Regional Plan, including a growth allocation model based on a robust land use typology to distribute new jobs and housing, and travel models to estimate origins, destinations, and modes for journeys to work. That scenario process, which was a key component of the Fourth Plan’s development, involved developing alternative growth scenarios that prioritized different objectives, tested different assumptions and generated a range of outcome metrics. The scenarios, methods, and output are described in the 2016 report Charting a New Course: A Vision for a Successful Region. The result was an aspirational scenario for growth that provided enough housing, infrastructure capacity, and open space to meet demand through 2040 and achieve ambitious goals for health, equity, prosperity, and sustainability.
To meet expected increases in Trans-Hudson demand, the plan not only urged expeditious completion of the Gateway Program, including an expansion and overhaul of the Penn Station complex. It also recommended two new bus terminals and an extension of the new tunnel under the Hudson to continue under the East River to Queens. The extension would create full through-running service at Penn Station, increase the number of trains that could be run from New Jersey through the Hudson River tunnels, and help integrate the regional rail network. Even with these projects, RPA predicted that additional Trans-Hudson capacity could be needed as early as the 2030s, and that planning should begin for the next generation of investments that would include one or more additional rail tunnels under the Hudson and lead to a fully integrated regional rail network.

The RPA Trans Regional Express (T-REX) report describes how a strategic set of investments, phased over the next few decades, can combine the Long Island Railroad, Metro-North Railroad and New Jersey Transit into a unified system that vastly improves mobility throughout the region.

While the Fourth Plan’s projections anticipated multiple recessions, new technologies, and unpredictable disruptions between 2015 and 2040, it did not predict a global pandemic of the magnitude of COVID-19. The scenarios in this report are meant to be a tool for making decisions with long-term impacts while uncertainty is unusually high.
In creating the scenarios presented in this report, the first question that we needed to address was what had changed in the five years since RPA released its vision and plan for 2040?

This assessment informed the scenario process with three key observations:

- **Growth in jobs, population and transit ridership from 2015–2019 exceeded the pace projected by RPA and others.** In 2016, RPA projected that New York City would add between 456,000 and 764,000 payroll jobs from 2015 to 2040. By 2019, jobs in New York City actually grew by 366,000 jobs. So in only four years, the city had added 80% of the jobs predicted for 25 years in low projection, and 48% of the jobs predicted in the high projection. This growth contributed to rapid increases in transit ridership and overcrowded, deteriorating service.

- **Most of the likely long-term effects of the pandemic represent acceleration of existing trends, rather than changes in direction.** Working from home and ecommerce were increasing before the pandemic and were expected to continue growing. The disproportionate impacts of both the pandemic and the sharp employment loss that followed on people of color and low-income households was a predictable exacerbation of long-standing inequities.

- **Of all the changes brought about in the last two years, changing expectations for how and where we work has the most profound implications** for the region’s economy, settlement patterns, energy use, and travel of all kinds. These implications are particularly important for businesses and workers who depend on a daily flow of people going to work or business meetings, places like Midtown Manhattan that developed to serve a 9 to 5 office economy, and transportation agencies that provide the infrastructure and services that currently depend on high ridership volumes to finance their operations.

It’s possible to imagine a nearly infinite number of scenarios, particularly when looking out over a 50-year time horizon. For scenario planning to be useful, it’s necessary to contrast a limited number of alternatives constructed around a reasonable range of outcomes for relevant variables. For large transit projects like Gateway, the most important variables are the growth and distribution of population and jobs, and how often, when, and by what means people will travel to jobs and other destinations.

To test the implications of a range of plausible futures, RPA constructed scenarios built around a range of trajectories for job and population growth and working from home.
Both of these factors have a potentially wide range of outcomes and will influence where new housing and economic activity takes place.

Four Regional Scenarios

The extent and pace of both growth and work-from-home will be shaped in part by local and regional decisions, and in part by forces largely outside of the region’s control. The range of possible outcomes was estimated by making different assumptions about how global and national forces — national economic growth and immigration policies, demographic change, climate change, technological change, business and labor preferences, competition and consumer preferences — could impact growth and the amount of work performed remotely. Where the region falls within these ranges will be determined in no small part by state, regional, and local policies and investment choices.

From these two vectors of growth and work patterns, four regional scenarios were constructed using the following process:
Narratives were developed for four possible futures at the intersection of these vectors: two scenarios with a relatively moderate increase in the amount of work performed remotely, one combined with robust regional growth and the other with slow growth, and two at the high end of the expected increase in remote work, one with robust growth and one with slow growth. These narratives articulated what would need to happen in order for a future of this type to emerge.

Assumptions for work-from-home and growth were estimated by analyzing current conditions and trends, previous forecasts and post-COVID surveys, studies and predictions. In setting each range, RPA balanced potential and likelihood. The goal was to have endpoints that are sufficiently differentiated to illuminate possibilities and choices, but not infeasible or too unlikely.

Work-from-home including time working away from the worksite in both hybrid and fully remote jobs, was projected to double from pre-COVID levels in the low work-from-home scenarios and increase fourfold in the high work-from-home scenarios. The high scenarios also assumed a higher degree of fully remote jobs compared to the low scenarios. This range was based on different prognostications from academic, business, and government sources and acknowledges the high degree of uncertainty for how work patterns will settle and evolve in the years after the pandemic recedes. Since the ability to work remotely varies widely by industry, these multipliers were applied to the pre-COVID share for major industry sectors.

Regional jobs were calculated by industry for each decade from 2020 to 2070. Job projections for 2030 took account of long-term industry trends, the pace of decline and recovery in different industries and parts of the region from February 2020 to February 2022, and alternative industry projections from the Bureau of Labor Statistics that estimated national change under assumptions of modest or strong COVID-19 impacts. Projections for 2040 are modifications of RPA’s previous high and low projections used in the Fourth Plan. Projections beyond 2040 are straight line projections of the high and low trends.

Regional population was calculated for each decade by applying a population-to-jobs ratio that was consistent with ratios when the region was at the midpoint of previous expansions. The resulting population estimates were compared to national projections to 2060 by the U.S. Census under both high and low immigration assumptions, and the past experience of New York and other large, formerly industrial regions in the Northeast and Midwest to insure that they were in line with both historic precedent and national projections.
Distribution of jobs and population within the region was an iterative process that used RPA's land use allocation model, past trends at the level of five subregions (New York City, Northern New Jersey, Long Island, the Hudson Valley, and Southwestern Connecticut), and projected industry trends.

Journey-to-work trips were then calculated using updated trip generation and mode choice models developed for RPA’s Fourth Regional Plan. These estimated work trips by mode between origin and destination pairs within the region.

Non-work trips were estimated using 2011 regional travel surveys and current hub bound data published by the New York Metropolitan Transportation Council.

Process Diagram
How Much Will People Continue to Work Remotely?

The data source used to determine how much people worked from home before the pandemic is the 2018 American Time Use Survey (ATUS) conducted by the U.S. Bureau of Labor Statistics (BLS), a national survey that includes questions on what share of a person’s work hours are spent working from home. While the survey does not provide data for individual states, cities, or regions, it does disaggregate data by industry, income, and other characteristics.

To estimate how much time people were working from home in the region, the ATUS percent of time working from home for each industry was applied to the industry composition of employment for each county in the tri-state region. As shown in the table below, workers in industries in which people work primarily in office settings, such as finance or professional services, spent a higher share of time working from home than those in industries such as manufacturing, retail, health services, or education that are more reliant on specialized equipment or personal service.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Share of Work Time Spent While Working at Home, United States, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodation and Food Services</td>
<td>0.8%</td>
</tr>
<tr>
<td>Arts, Entertainment, and Recreation</td>
<td>0.9%</td>
</tr>
<tr>
<td>Construction</td>
<td>1.7%</td>
</tr>
<tr>
<td>Transportation and Warehousing</td>
<td>1.8%</td>
</tr>
<tr>
<td>Mining, Quarrying, and Oil and Gas Extraction</td>
<td>2.0%</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>2.2%</td>
</tr>
<tr>
<td>Agriculture, Forestry, Fishing, and Hunting</td>
<td>2.4%</td>
</tr>
<tr>
<td>Utilities</td>
<td>2.5%</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>2.8%</td>
</tr>
<tr>
<td>Management of companies and enterprises</td>
<td>3.1%</td>
</tr>
<tr>
<td>Administrative and support and waste management services</td>
<td>3.8%</td>
</tr>
<tr>
<td>Public Administration</td>
<td>3.8%</td>
</tr>
<tr>
<td>Health Care and Social Assistance</td>
<td>3.8%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>4.0%</td>
</tr>
</tbody>
</table>
Using this method, the average share of time working from home in 2018 was 5% in both the nation and the 31-county region in which RPA operates. Counties with a higher share of office industries, such as Manhattan, generally had a higher than average share of their workforce’s job hours conducted from home.

A study by economists Jonathan Dingel and Brent Neiman estimated how many jobs are theoretically possible to be done remotely by industry. Applying their findings to the region’s jobs indicates that about 36% of jobs in the region are in occupations that can be done remotely. The remaining 64% are largely in lower-paying occupations which tend to have less job security and fewer career opportunities. Over time, the share of work that can be done from home is likely to increase as many routine functions are automated.

The pandemic forced an economy-wide learning experience that demonstrated what tasks could be performed productively from home, at least in the short-term, and reset expectations for much of the workforce. There are many predictions for how much of this temporary change will become a permanent part of how the economy functions. All of these require speculation about how employers and their employees will behave after the pandemic, and how this might dovetail with ongoing trends such as the increase in self-employed and short-term contract (“gig”) jobs. Many rely on surveys of
what employers are planning or what employees expect or anticipate that their employer will require. Others are based on the analyses of industry experts, business associations and economists.

Survey findings need to be interpreted with care since they use different metrics and sample different populations. Some measure the U.S. population, while others measure only office workers or other subsets of the workforce, or employers for particular geographies or industries. Metrics vary from work time to work days to type of work arrangement.
Current and Relevant Surveys and Analyses of Work-from-Home Patterns

An April 2021 paper by Jose Maria Barrero, Nicholas Bloom and Steven J. Davis published by the National Bureau of Economic Research estimated that the days worked from home will quadruple for the U.S. workforce from 3% before the pandemic to 26% after the pandemic, based in part on a survey they designed. This Survey of Working Arrangements and Attitudes (SWAA) has been surveying working Americans ages 20 – 64 who earned at least $20,000 in 2019 since May 2020. The authors expect higher rates of working from home in large downtown centers, particularly Manhattan and downtown San Francisco. At an April 2022 conference hosted by the Federal Reserve Bank of New York, Bloom presented updated findings that increased their post-pandemic prediction for work-from-home days to 25% of the U.S. workforce.

In two presentations at the January 2022 meeting of the Transportation Research Board, Xinyi Wang, Sung Hoo Kim and Patricia L. Mokhtarian of the Georgia Institute of Technology presented findings on the probable trajectory of post-COVID telework based in part on surveys from the Dallas-Fort Worth and Washington DC metropolitan regions in February-April 2021. After categorizing workers into eight segments based on ability and propensity to telework, they estimated that the amount of time teleworking post-COVID could be two-to-three times the pre-COVID amount. The higher estimate (3.2x pre-COVID) relies on stated worker expectations from the surveys. The lower estimates (1.8 – 2.2x pre-COVID), which they considered more likely, discount survey responses for how telework expectations historically have failed to materialize.
In a February 2022 presentation to Regional Plan Association’s Board of Directors, economist Jonathan Woetzel, Director of the McKinsey Global Institute, presented data from the U.S. Census Household Pulse Survey showing that the average number of days working from home has increased from 3.5 to 6 days per month, a near doubling that he expects to stick after the pandemic.

A November 2021 survey by the Partnership for New York City found that 47% of major employers expected some portion of their New York City-based workforce to work remotely for more than three days per week after the pandemic ends. In a later survey by the Partnership in May 2022, employers expected that 49% of their workers would be in the office on an average workday by September 2022.

These are all important and well-informed pieces of the puzzle, but none can be considered a reliable prediction. Expectations have changed over the course of the pandemic, and may not accurately reflect decisions that will be made in a year, much less in 10 or 20 years. These will be based on changing labor market conditions, the priorities and expectations of both workers and employers, technological adaptations, and further experience with different work arrangements.

While it is difficult to make apples-to-apples comparisons of the different surveys and predictions, they indicate expectations that the share of time working from home for the region’s workforce could range from almost twice the pre-COVID level of 5% to more than four times that level, with considerable variation by industry, occupation, and income. It should be noted that a number of employers and some commercial real estate professionals expect many businesses, especially in finance and real estate, to return to a full five days in the office — if not immediately after returning to work, then within a few years.
Creating Scenarios

To capture the uncertainty described above, the two “low” work-from-home scenarios described in the next section of this report (Scenarios A and B) assume that the average share of time working from home will double from 5% before the pandemic to 10% by 2030. For office workers, the share would increase from 12% to 25%. This would be consistent with a scenario in which many large corporations, particularly in finance and real estate, return to a five-day work week, while most professional, service, and non-profit employers go to a hybrid structure averaging three days a week in the office. Some organizations in this scenario — particularly technology firms — would go fully remote.

The two “high” work-from-home scenarios (Scenarios C and D) assume that the average share of time working from home would quadruple to 20%. For office workers, the share would increase to 50% of all work time. This assumes both a much larger share of jobs going fully remote and a nearly ubiquitous adaptation of hybrid arrangements for the rest of the office workforce. There would also be considerable increase in time working from home for non-office jobs, but this would remain much lower than for office jobs.

### Low and High Work-From-Home Assumptions

<table>
<thead>
<tr>
<th>Industry</th>
<th>2018</th>
<th>2030 Low Work-From-Home</th>
<th>2030 High Work-From-Home</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>2%</td>
<td>4%</td>
<td>8%</td>
</tr>
<tr>
<td>Trade, Transportation, and Utilities</td>
<td>2%</td>
<td>4%</td>
<td>8%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>4%</td>
<td>8%</td>
<td>16%</td>
</tr>
<tr>
<td>Office Industries</td>
<td>12%</td>
<td>25%</td>
<td>50%</td>
</tr>
</tbody>
</table>
How Much is the Region Likely to Grow?

In the last thirty years, the tri-state region has grown by 1.9 million jobs and 3.7 million people, or by 18% and 19%, respectively. The period, measured from the peak of one regional economic cycle in 1989 to its peak in 2019 just before the COVID crisis, was a period of urban revival in which global cities like New York were ascendant. But it was also a period that contained three recessions, including two of the worst in the region’s history, the 9/11 attacks on the World Trade Center, Hurricanes Irene and Sandy, and a growing housing crisis.

Then, in a mere two months from February to April 2020, the number of jobs in the region dropped by more than 2 million. Much of this was temporary, and since then the region has regained 1.3 million jobs. In other words, in two months the region lost as many jobs as it had added over the previous 30 years, and then in two years of recovery it added back almost as many jobs as it did in the entire decade following the 2008–2009 recession. By contrast, the U.S. has regained nearly all the jobs it lost, largely because the region lost a much larger share of its jobs than the nation when it was the U.S. epicenter early in the pandemic.

**Monthly Employment in the New York Region, 1990–2022**

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**JOB GROWTH ASSUMPTIONS**
The scenarios in the next section show two high growth scenarios for the region (Scenarios A and C) and two low growth scenarios (Scenarios B and D). Constructing both the high and low scenarios started with projecting jobs to 2030. These incorporated different assumptions about the rate of recovery for different industries using alternative national forecasts developed by the U.S. Bureau of Labor Statistics, the region’s share of these industries, and historic industry growth trends. In the high forecast, the region adds 1.5 million jobs between 2021 and 2030 and exceeds its 2019 peak by 400,000 jobs. In the low scenario, the region adds a million jobs and by 2030 has only just gotten back to its 2019 peak.

The region’s long-term rate of growth after 2030 is likely to be slower than in the period of recovery that preceded it. The high growth scenarios assume a long-term growth rate of 0.5% per year. This is based largely on the industry growth assumptions in the Fourth Plan aspirational scenarios. This is a higher growth rate than in baseline projections from the New York Metropolitan Transportation Council, which are used for the region’s federally-mandated transportation plan, but are still slightly less than the region’s 1989 – 2019 growth rate of 0.6%. The low growth scenarios assume that the region will grow only half as fast as the high scenarios. This is also similar to the Fourth Plan’s low growth scenario, and a much slower rate of growth than at any time since the 1970s.

### Jobs: High and Low Growth Scenarios

![Jobs: High and Low Growth Scenarios](image)

**Bureau of Labor Statistics Current Employment Survey, Regional Plan Association**

### POPULATION GROWTH ASSUMPTIONS

The region’s population has grown in every decade since the 1970s. From 1980 – 2020, the population grew at an average rate of 0.5% per year. Unlike the early post-World War
II era, New York City has more than kept pace with the rest of the region, growing at a slightly faster pace than the region as a whole.

Population estimates for July 1, 2021 indicate that the region’s population declined by 366,000 since the April 1, 2020 Census, with 305,000 of that decline in New York City. This was a period that roughly coincided with the first 15 months of the COVID-19 pandemic in the New York area. As an analysis by New York City’s Department of City Planning notes, “the estimated large decline in the population after the April 1, 2020 Census enumeration date is a result of temporary, pandemic-related phenomena that are limited to the estimation period covered by the Vintage 2021 population estimates. Many of the trends contributing to the decline have attenuated or reversed.” These trends included higher death rates, lower birth rates, an increase in domestic out-migration and a decrease in international in-migration.

Numerous factors will determine the region’s population change in the years ahead including birth rates, economic opportunities, the cost of living and quality of life relative to other parts of the United States and beyond. In the long-term, two of the biggest factors will be the rate of international immigration and how much new housing is created in the region. Immigration will be determined more by global trends and national policies than local decisions, while housing is largely within the control of local and state housing and land use policies.

For the scenario analysis, population is projected to grow at approximately the same rate as jobs for the region as a whole: 0.5% per year in the two high growth scenarios (Scenarios A and C) and 0.3% per year in the two low growth scenarios (Scenarios B and D). While job and population growth can vary a lot within economic cycles (jobs change with recessions and expansions much more than population does), they grow at relatively consistent rates for a metropolitan labor market over the long run. Over the last 30 years, the ratio of jobs to population for the tri-state region has ranged from 2.0 to 2.3 persons per job. The ratio tends to be high at low points in the economic cycle, such as in 2010, and low at economic peaks, such as in 2019. For both the high and low growth scenarios, the population-to-jobs ratio is 2.1 for each of the projected years.

These population projections are consistent with national projections by the U.S. Census (Current Populations Reports, P25-1146, Sandra Johnson, A Changing Nation: Population Projections Under Alternative Immigration Scenarios, February 2020). The region’s share of the national population falls from 7.2% in 2020 to 6.4% in 2060 when comparing the high growth scenarios to the Census’ high immigration scenario, and to 6.9% when comparing the low growth scenarios to the low immigration scenario.
The distribution of jobs and population growth within the region varies in each of the four scenarios as described in the next section. In all scenarios, growth is more decentralized than it has been in recent decades, both because New York City’s recent high rate of growth relative to the rest of the region was probably unsustainable even under pre-COVID conditions and because work-from-home will allow people to live farther from their jobs. Population growth is somewhat more decentralized than job growth for the reasons described in Section 3, and decentralization is higher in the high work-from-home scenarios.
Scenarios for a Post-COVID Economy

The scenarios described below represent four hypothetical futures constructed from the assumptions described in the previous section for how much people in different industries will work from home after the pandemic phase of COVID-19 ends, how much jobs and population will grow over the next 10, 20, 30, 40, and 50 years, and where, within the region, that growth will occur.

These are not predictions or forecasts, nor are any of the scenarios presumed to be more likely than any of the others. They are meant to assess the implications of plausible futures to help address the following questions:

- What investments or actions are needed under any scenario?
- What projects can be deferred until trends are clearer?
- How can we maximize flexibility to respond to unpredictable challenges or seize new opportunities?
**Scenario A**: describes a future in which relatively modest increases in working from home coincide with robust job and population growth.

**Scenario B**: describes what the tri-state region might be like if modest increases in working from home materialize in the context of a slow growing economy.

**Scenario C**: describes a future in which more dramatic increases in working from home coincide with rapid job growth.

**Scenario D**: describes what the tri-state region might be like if more dramatic increases in working from home materialize in the context of a slow growing economy.
Scenario A: Low Work-From-Home with High Growth

By 2023, COVID-19 has evolved into a milder endemic disease with relatively predictable seasonal cycles. Employees expect greater flexibility with respect to when and where they work, but businesses and industries have adopted widely different models for how to incorporate remote work. Some organizations adapt seamlessly to hybrid schedules, while others find that a full five days in the office maximizes productivity and team cohesion. Others give their employees full flexibility to work from home, but many of these workers find they prefer coming into the office one or more days per week. On average, office workers spend between 3.5 and 4 days per week in the office, and most non-office workers continue to work full time at the worksite. Gradually, the average amount of time working from home increases as the share of work with the ability to be done remotely grows over time.

The region’s economic recovery accelerates and New York City recovers all jobs lost from the pandemic in 2023. Long-term, the region benefits from a thriving, fast-growing national economy. The long awaited technology-driven productivity boom finally happens, enabled by robust national investment in infrastructure, education, and research and development. National immigration, family, and labor policies allow the population and workforce to grow faster than in other developed economies in spite of an aging population. This trend particularly benefits regions like the tri-state metro area that are most welcoming to new immigrants. Global warming is in the low range of official projections, and the region fares no worse from storms, heat waves, and droughts than other parts of the U.S. and most of the world.

Jobs in the region grow almost as fast as they have on average over the last 30 years, but not nearly as fast as they did in the 2010s alone. Job growth in NYC moderates from its unusually fast 2009 – 2019 pace, while growth picks up in New Jersey, Long Island, Connecticut, and the Hudson Valley. Even with this shift, the city keeps pace with job growth in the rest of the region, adding 1.2 million jobs between 2020 and 2040, as job centers outside of the Manhattan CBD continue to expand, and as new entrepreneurs take advantage of empty space and lower rents in Midtown. Population decentralizes somewhat more than jobs as the increase in working from home induces some to move farther from their job location to get more space at a lower cost. Northern NJ adds 1.5 million new residents, New York City adds 1.3 million, and Long Island, Connecticut and the Hudson Valley add 800,000.
Scenario A: Population Growth by 2040

Scenario A: Population Growth by 2070

Scenario A: Population Growth

Absolute Change

Percent Change

RPA: Gateway and the Post-COVID Economy
What would it take for this to happen?

In addition to favorable national trends, this scenario will require the region to greatly expand its housing supply, as well as the infrastructure capacity needed to sustain this level of growth. For years before the pandemic, new housing construction has failed to keep pace with population growth, making housing increasingly unaffordable and uncompetitive with other parts of the country. New York State and Connecticut, in particular, would likely need policies to incentivize municipalities to allow more multi-family homes in their jurisdictions.

Without additional transit capacity, even with more people working from home, overcrowding on subways, buses, and trains would soon reach pre-pandemic levels. Without a reconfiguration of how we use and price scarce street space, streets, and highways would become increasingly congested — in part, because of the increase in trucks and delivery vehicles due to the increase in e-commerce. Without dramatic improvements in both energy efficiency and clean energy supply, power generation and energy systems would be under greater stress, and air pollution and greenhouse gas emissions would continue to increase.
Scenario B: Low Work-From-Home with Low Growth

As in Scenario A, businesses make different adaptations to employee desire for more flexibility, and the amount of time people spend working from home is about twice as much as it was before the pandemic. Many larger firms in finance and real estate, as well as government, gravitate back to five days in the office, and most organizations in other industries adopt a hybrid schedule.

However, both job and population growth slow considerably from what it was in the past 30 years. It takes longer for COVID-19 to settle into less frequent and less virulent waves, and several years for the region to recover all the jobs it lost during the pandemic. The U.S. economy grows at a slower pace, and restrictive immigration policies constrain population growth in expensive parts of the U.S. that continue to have net domestic outmigration. More rapid sea level rise and more frequent coastal storms further constrain the region’s growth.

As a result, jobs and population grow only half as fast as they had over the last 30 years. New York City still adds 900,000 jobs and 800,000 new residents by 2040. Northern New Jersey continues to build new homes faster than other parts of the region and adds a million new residents. Long Island, the Hudson Valley, and Southwestern Connecticut continue growing at a slow rate in spite of increasing housing demand as towns make few changes to zoning that restricts multi-family housing development, adding only 500,000 new residents between them.
What would it take for this to happen?

In this scenario, national growth trends would be less favorable and the region would have to work harder to remain competitive. Maintaining high quality services with slower growth in tax revenues and transit ridership will require greater efficiency as well as maintaining needed levels of investment. Economic opportunities would not be as plentiful — particularly in poorer neighborhoods, smaller cities, and bypassed communities — requiring greater levels of investment in these places as well as intentional policies to reduce racial and economic inequality.

It would take longer for trains and other infrastructure to reach pre-pandemic levels of crowding. But even with slower growth, these will eventually run out of capacity, particularly if users expect more comfortable and reliable service than before or use greater amounts of electricity or water. It will be essential to complete currently planned projects as quickly and efficiently as possible, as well as start to plan for the next generation of investments.
Scenario C: High Work-From-Home with High Growth

As people return to the office throughout 2022, organizations work out the bugs in coordinating schedules for hybrid work, aided by continuing improvements in technologies that facilitate collaboration between multiple locations. Fully remote jobs grow rapidly, and the most common arrangement for hybrid work is three days in the office and two days at home. Midtown is busy on Tuesdays through Thursdays, while tourists and residents take advantage of less crowded streets and restaurants on Mondays and Fridays. The economy has fully recovered by 2023, but on average office employees spend half their time working from home, or four times as much as it was before the pandemic. Non-office workers still work mostly at the worksite, but technology has enabled more to be done from home even for these occupations.

As in Scenario A, the region benefits from robust national growth and favorable immigration policies. Even though remote work is now firmly entrenched in many industries, many remote workers choose to stay in the New York area to be close to family, cultural amenities, and New York’s unique energy and diversity. Reduced crowding on streets and transit is one way in which the region is a more attractive place to live and do business than it used to be. Midtown struggles for several years, and the transition is particularly hard on low-wage workers and small businesses that depend on the daily influx of commuters. But eventually the district emerges better than ever with more residents, tourists, and a different mix of industries. Population decentralizes more than in the scenarios with a smaller increase in working from home, but New York City still grows by more than 700,000 people by 2040. The rest of the region, however, adds nearly 3 million new residents. Northern New Jersey remains the fastest growing part of the region and adds almost 1.8 million new residents. Long Island, the Hudson Valley, and Connecticut increase their rate of multifamily housing and population growth and add 1 million new residents.
What would it take for this to happen?

This scenario is most dependent on more rapid growth in housing supply outside of New York City. Towns in Long Island, Connecticut, and the lower Hudson Valley in particular would need to greatly loosen restrictive zoning for multi-family housing. The region as a whole and urban areas in particular would need to maintain their attractiveness, although falling rents could attract many who were previously priced out.

Energy infrastructure and greenhouse gas reduction may require the most attention under this scenario. Not only would there be more demand and energy use from a growing population, but a more decentralized population will mean more people driving and pose the greatest risk of sprawling land use patterns. Transit investments will be vital not only to keep up with growth in trips of all kinds, but to extend to underserved areas and provide better transportation alternatives to private automobiles.
Scenario D: High Work-From-Home with Low Growth

As in Scenario C, work from home is four times greater than before the pandemic. Nearly all office employers adopt hybrid work structures, with many jobs that are fully remote. On average, 50% of office work time is spent at home or other remote locations.

However, this change in the nature of work coincides with slower economic growth in both the U.S. and the region. Technology continues to replace many routine functions, but productivity growth doesn’t accelerate enough to generate robust economic growth. Restrictive immigration policies and climate change limit population growth.

New York City’s population grows slowest in this scenario. Population growth slows to 0.2% a year, less than a third of its rate of growth from 1990 – 2020. It still adds nearly 500,000 residents over the next 20 years and close to 700,000 jobs. Growth also slows in the rest of the region, but to a lesser degree. Northern New Jersey adds 1.2 million residents by 2040, and Long Island, Connecticut, and the Hudson Valley collectively add 600,000.

Job growth also slows everywhere. Population-related jobs like retail, medical care and personal services, and some office jobs, gravitate to places outside of the five boroughs. Many employers remain in Manhattan to keep most of their workers within commuting distance, even if they only come into the office occasionally. New York City recovers the jobs it lost in the pandemic but is only 100,000 jobs higher than 2019 by 2040.
**What would it take for this to happen?**

Different combinations of adverse trends could bring slow growth in an economy with high-work-from-home and greater population mobility — slow national growth, too many shocks from climate, disease, or other disruptions, failure to maintain public safety and quality public services, or hold down housing costs and tax increases.

This scenario would require the greatest attention to maintaining the region’s quality of life, improving resilience from economic- or climate-related shocks, and helping vulnerable residents, workers, and businesses through a lengthy recovery and transition. Investments in infrastructure, including transit, clean energy, affordable housing, parks, and other community amenities, would provide needed economic stimulus in the short-term, while improving resilience in the long-term.

**Scenario Comparisons**

The following charts provide a comparison of job and population growth across all four scenarios.

**Job Growth Comparisons**

New York City adds between 1.1 million (Scenario A) and 2.1 million (Scenario D) jobs between 2020 and 2070. All other parts of the region have the least growth in Scenario B when regional growth is low and work-from-home increases moderately, and the most growth in Scenario B when both growth and work-from-home are greater. Job growth between 2020 and 2070 ranges from 800,000 to 1.5 million in Northern New Jersey, 320,000 to 550,000 on Long Island, 210,000 to 400,000 in the Hudson Valley, and 90,000 to 160,000 in Southwestern Connecticut.

**Jobs, Annual % Change, 1989-2019 Compared to 2019-2070 Scenarios**

<table>
<thead>
<tr>
<th></th>
<th>1989-2019</th>
<th>Scenario A</th>
<th>Scenario B</th>
<th>Scenario C</th>
<th>Scenario D</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York City</td>
<td>0.84%</td>
<td>0.54%</td>
<td>0.32%</td>
<td>0.45%</td>
<td>0.21%</td>
</tr>
<tr>
<td>Northern New Jersey</td>
<td>0.41%</td>
<td>0.51%</td>
<td>0.28%</td>
<td>0.60%</td>
<td>0.38%</td>
</tr>
<tr>
<td>Long Island</td>
<td>0.56%</td>
<td>0.50%</td>
<td>0.24%</td>
<td>0.51%</td>
<td>0.27%</td>
</tr>
<tr>
<td>Hudson Valley</td>
<td>0.49%</td>
<td>0.46%</td>
<td>0.23%</td>
<td>0.55%</td>
<td>0.34%</td>
</tr>
<tr>
<td>Southwest Connecticut</td>
<td>-0.20%</td>
<td>0.14%</td>
<td>0.05%</td>
<td>0.18%</td>
<td>0.10%</td>
</tr>
<tr>
<td>Region</td>
<td>0.55%</td>
<td>0.49%</td>
<td>0.27%</td>
<td>0.49%</td>
<td>0.27%</td>
</tr>
</tbody>
</table>
Population Growth Comparisons

New York City’s population growth ranges from 900,000 in Scenario D to 2.2 million in Scenario A between 2020 and 2070. As with jobs, population growth in other parts of the region is lowest in Scenario B and greatest in Scenario C. Northern New Jersey adds between 1.9 and 3.4 new residents, Long Island adds between 400,000 and 1 million, the Hudson Valley between 450,000 and 900,000, and Southwestern Connecticut between 200,000 and 700,000.
Implications for Travel Patterns and Demand

Next to the nature of work itself and the anticipated permanent increases in remote work, how the transportation system is used may be the facet of life that will experience the most profound long-term impacts of the pandemic. Not surprisingly, when people stopped going to work and other activities during the initial lockdowns, street traffic, transit ridership, and air travel dropped to almost nothing. Long-distance and discretionary travel were all but suspended. Non-essential shopping trips and trips to visit family and friends were also suspended. The few people driving and on transit were those considered essential workers – transit operators themselves, grocery store and pharmacy staff, and, of course, the frontline healthcare providers. Meanwhile, home package deliveries grew exponentially.

The New York region’s transportation system, and particularly its rail transit network, was built to get people to and from work in the Manhattan CBD during morning and evening rush hours. Manhattan jobs tend to be disproportionately tele-commutable and/or in tourism and recreation-oriented, which were among the last sectors to re-open. The lingering low demand for transit-served destinations continues to be the primary reason for the slower return to transit. Before the pandemic, changing travel patterns – partially due to the changing nature of work and partially due to outmoded facilities – were hampering the transit system’s ability to meet mobility needs. Trains and streets were overcrowded, and much of the region’s economy and housing had expanded beyond the reach of the rail transit network. The fastest growth in passenger transit was during evenings and weekends, and to destinations outside of the CBD. Freight deliveries were also increasing at a rapid clip, in response to the significant rise in e-commerce.

The combination of development outside the reach of transit and the lack of growth enabling capacity, left transportation providers, and those responsible for funding or regulating them, with a difficult set of challenges. Today, with the growth and travel uncertainties outlined in this report, those challenges are heightened. Nevertheless, transportation policy and infrastructure choices will have a pronounced impact on the
region’s future; those choices determine how quickly transit riders return, whether ridership growth can be sustained, whether road congestion and air pollution will increase or decrease, how much room there will be for pedestrians, bikes and other modes of transportation on streets, how productive and competitive the region’s economy becomes, and who will or will not benefit from these choices.

In planning for both the immediate and long-term future, decision-makers need to account for several complicating factors:

- Much of the transportation network was over capacity and in need of modernization well before COVID was a concern.

- Reliance on levels of fare revenue that are only generated under extreme overcrowding is unsustainable – the recent reduction in ridership has laid this fact bare.

- Fare revenues won’t increase until transit riders return, but service reductions or fare increases will delay this return.

- Work-from-home patterns could fluctuate for some time; today, about one-third of the labor force works in occupations that can be performed remotely.

- Non-work trips and freight trips will likely increase more than work trips, and the more people work remotely, the more these are likely to increase.

- Traditional travel peaks will be diminished, and travel volumes will vary more by day of week and time of day. With increasing hybrid work models we expect more commute trips on Tuesdays, Wednesdays, and Thursdays exaggerating an existing pattern.

- Passengers may demand more space and tolerate less crowding than before.

- Reductions in peak demand will make commuting more humane and help keep the region competitive. Ironically, reduced crowding could also entice some to use transit more often.

PRE-PANDEMIC GROWTH IN TRANS-HUDSON TRAVEL INTO NEW YORK CITY

Trans-Hudson travel is a large, diverse market that includes much more than workers traveling from New Jersey to office jobs in Manhattan. It includes destinations on both sides of the river, non-office as well as office workers, and trips for school, doctors appointments, shopping, family visits, business meetings, entertainment and other purposes. Work trips from homes west of the Hudson River to jobs in New York City still represent the largest number of Trans-Hudson transit trips, and because they are
concentrated in the morning and afternoon rush hours, represent the biggest strain on limited capacity. Historically, the existing tunnel served over 210,000 daily passengers. Over 80% were NJ Transit commuters destined for Penn Station and beyond.

An Increasingly Crowded Commute

Trans-Hudson commuters represented the fastest growth of commuters to NYC over the past 30 years. Between 1990 and 2019, work trips from New Jersey into Manhattan grew by 145,000, and accounted for 71% of all the growth in commuters from outside New York City. NJ Transit ridership through the tunnel alone grew at an explosive rate, tripling from 52,000 trips per average weekday in 1990 to more than 170,000 in 2018.

These numbers were driven largely by two factors – New York City’s strong job growth and New Jersey’s population growth. Northern New Jersey had the region’s largest population outside of New York City to start with, and it experienced faster population and housing growth than other parts of the region. A number of factors contributed to this, including New Jersey’s Mount Laurel Doctrine that requires municipalities to contribute their fair share of the state’s affordable housing. Northern New Jersey also has a large land area with a range of cities, suburban towns, and exurban areas that grew in population.
Change in Manhattan-bound Commuters, 1990-2019

Hudson Valley
+23K

Connecticut
+13K

Long Island
+21K

New Jersey
+145K

Commuters from within NYC
+391K
Travel in the region declined markedly from February, 2020 to May, 2020, with ridership on NJ Transit Trans-Hudson hitting a low of 3.5% of the prior year’s travel in May of 2020. Amtrak hit a low of 2% of pre-pandemic travel. NJ Transit and Amtrak have since reached 51% and 58% of prior travel. Both saw declines in December 2021 and January 2022, coinciding with the Omicron variant, and both are on an upward trajectory. Similarly, within NYC bus and subway ridership dropped to less than 10% of typical weekday ridership and the MTA commuter rail services dropped to almost nothing.

As early pandemic restrictions relaxed, driving became more prevalent. In part, the low levels of traffic made driving the fastest, most convenient choice for many trips for people who had access to automobiles. By the summer of 2021, automobile and truck traffic over the Port Authority’s bridges and tunnels into Manhattan was back up to 100% of its pre-pandemic level. In part, the prevalence of driving was due to lingering fears about transit as a possible COVID vector. The final factor for increased driving is that destinations also changed; as fewer trips were made to the CBD and other parts of the city best served by transit, the choice to drive was increasingly appropriate.

As more and more pandemic restrictions have been lifted, and activity returned to the region, transit ridership has also begun to restore itself. Along with subways, buses and other commuter rail services, Trans-Hudson travel is also making steady gains. As travel continues to increase, an increasing proportion of the additional trips will be accommodated on transit as the roads are now capacity constrained.
For each future scenario we estimated access to work (including work-from-home/remote work) and non-work travel. In the following sections we look at different types of Trans-Hudson travel, with a particular focus on transit ridership from west of the Hudson River into New York City. As an artifact of how future travel is traditionally estimated, trips are divided into home based and non-home based and further into work or non-work trips. Four categories of trips are:

- **Home-based work trips** have either a start or end point at home and the other start or end point at work. This is a straightforward trip from home to work or back with no intermediate stops.

- **Home-based non-work trips** have either a start or end point at home and the other start or end point at a location other than work – this could be a trip to a grocery store, a medical appointment, restaurant, a visit to friends, or any other non-work activity. It could also be a trip to drop off a passenger at school or run another errand on the way to work.

- **Non-home-based work trips** have a trip end or start at work with the corresponding trip end or start at a location that is not the home. This could include travel during the day to a work-related meeting, travel to work after dropping off a passenger at school, or stopping for dinner after work, on the way home.

- **Non-home-based non-work trips** are trips that are not anchored either at home or at work. These trips include traveling on to college or to the grocery store after dropping a passenger at their school, or attending a medical appointment and then going to visit a friend, or any string of trips that are not work related and do not start or end at the trip-maker’s residence.

The following analyses divide the travel forecast into these mutually exclusive groups.

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**CENTRAL BUSINESS DISTRICT-BOUND TRIPS FROM ALL LOCATIONS**

To understand the Trans-Hudson market, it is important to put it in the context of the region’s transportation network and travel flows, particularly its role serving the region’s central business district (CBD).
In 2019, an estimated 7 million daily trips were made to the Manhattan CBD, defined as the area south of 60th Street.

Of those, only about 21% were home-based work trips, the straightforward journeys from home to work and back again. Almost 40% were direct from home but not work-related and the remaining 40% did not originate or end at a home – these non-home-based trips are about evenly split between work-related and non-work-related trips. None of these represent trips by tourists or visitors who do not reside in the region.

The majority of trips that ended in the CBD in 2019 (90%) originated within NYC including the 62% of trips that also began in the CBD. 5% (342,000 trips) came from New Jersey and 3% (205,000) from Long Island. Overall, 41% of CBD bound trips are work-related, 8% and 5% of work trips began in New Jersey and Long Island, respectively.

Transit Trips

In 2019, 41% of total CBD bound trips were made by transit, while 58% of CBD bound work trips were made by transit. If we exclude trips that originated within the CBD, the highest relative transit ridership is from Connecticut, and the lowest share is from
within the CBD itself. New Jersey had a higher share of trips made by transit than either Long Island or the Hudson Valley.

**Transit Share of All Trips and Work Trips Into the Manhattan CBD by Place of Trip Origin**

<table>
<thead>
<tr>
<th>Place of Trip Origin</th>
<th>Total Trips</th>
<th>Work Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Business District</td>
<td>18%</td>
<td>26%</td>
</tr>
<tr>
<td>Connecticut</td>
<td>98%</td>
<td>98%</td>
</tr>
<tr>
<td>Hudson Valley-East</td>
<td>68%</td>
<td>77%</td>
</tr>
<tr>
<td>Hudson Valley-West</td>
<td>50%</td>
<td>53%</td>
</tr>
<tr>
<td>Long Island</td>
<td>74%</td>
<td>78%</td>
</tr>
<tr>
<td>New Jersey</td>
<td>82%</td>
<td>83%</td>
</tr>
</tbody>
</table>

In the Trans-Hudson travel market we first analyzed trips that begin in New Jersey and the Hudson Valley West (Rockland, Orange, Ulster and Sullivan Counties) and end in New York City and Long Island. Almost 85% of this market is between New Jersey and New York City or Long Island; 15% is from the Hudson Valley West.

In 2019 there were 822,000 average daily trips from New Jersey and Hudson Valley West to destinations in New York City and Long Island. It’s important to note that a majority of these trips were to destinations other than the CBD. 377,000 total trips were destined to the CBD and another 405,000 (for a total of 95%) were destined to other NYC destinations, and the remaining 5% were destined for Long Island. Work trips comprised 62% of Trans-Hudson trips – 70% of trips to the CBD are for work; 55% of Trans-Hudson travel destined for other parts of New York City and Long Island were work trips.

50% of all Trans-Hudson trips and 56% of Trans-Hudson work trips were made by transit. CBD destinations had higher transit shares with 79% of all trips and 80% of CBD bound work trips having been made by transit.

**Future Scenarios for Trans-Hudson Travel**

Based on the four scenarios described in Section 7, future daily commuters and round-trip daily trips were estimated for both all trips and transit trips alone.
The number of all trips – work and non-work, transit and automobile – grows at different rates depending on assumptions for work-from-home and growth, but exceed their 2019 peak by 2040 in all scenarios. In Scenario A (low work-from-home with high growth), there would be 73,000 more trips by 2040 and 261,000 by 2070. In Scenario B (low work-from-home with low growth), there would be 68,000 more by 2040 and 185,000 by 2070. In the two high work-from-home scenarios, the comparable numbers would be 27,000 and 179,000 in Scenario C, and 6,000 and 125,000 in Scenario D.

The number of daily Trans-Hudson commuters from west of the Hudson to New York City and Long Island grow in all scenarios over the next decade as people return to work and the region’s economy continues to recover from pandemic downturn. In the two scenarios with low work-from-home (A and B), these journey-to-work trips reach their 2019 level around 2030. The high work-from-home, high growth scenario (Scenario C) reaches that level in the 2040s, and the high work-from-home, low growth scenario reaches it in the 2050s.

By 2070, the number of daily commuters is 221,000 higher than 2019 in Scenario A, 126,000 in Scenario B, 99,000 in Scenario C, and 35,000 in Scenario D.
Transit ridership grows faster than the number of commuters, both because non-work trips grow faster than work trips, and because there is little room in Trans-Hudson highway crossings to accommodate more cars during peak periods. Scenarios A and B surpass 2019 by the late 2020s, Scenario C by 2040 and Scenario D by the mid-2040s.

By 2070, there will be 170,000 more transit trips than 2019 in Scenario A, 125,000 in Scenario C, 97,000 in Scenario C, and 73,000 in Scenario D.

Transit ridership is also likely to vary much more by the day of the week as people return to work and hybrid schedules become more entrenched. More people will likely come into Manhattan midweek than on a Monday or Friday. The analysis of Gateway impacts
in the next chapter assumes that this variation will increase from its current range of 93% of an average workday on Fridays to 105% on Tuesdays and Wednesdays, to a range of 85% of average on Fridays to 110% midweek.

This outcome would be consistent with the employer expectations described in the May 2022 Partnership for New York City survey. The biggest shifts from April to September 2022 are expected to be a decline in employees working remotely five days per week (28% to 14%) and an increase in those working three days per week (21% to 33%).
How Gateway Will Help the Region Succeed in a Post-COVID World

To thrive in any possible future, the New York region will need reliable rail service between the communities and business centers located west of the Hudson River and those located to the east. About 8.4 million people and 3.6 million jobs are located in northern New Jersey and New York counties west of the Hudson. These represent 36% of the region’s population and 33% of its jobs. The remaining 64% of people and 67% of jobs are in New York City, Long Island, the Hudson Valley counties east of the Hudson, and Connecticut.

Whether more new jobs and homes are created east or west of the Hudson, the two existing rail tracks under the river are increasingly unreliable and under-capacity for the volume of trans-Hudson travel needed to support an economy of this size, not to mention the need to serve growing markets on both sides of the river. No matter how much people work from home, rail service will be essential for the flow of people and commerce through the dense center of the densest area of the United States, and to meet the ambitious but essential climate targets that all three states and the city of New York have set.

In all of the scenarios posited in this report, as well as in any conceivable future, building a new tunnel and fixing the other bottlenecks in the busiest section of the busiest rail corridor in the North America are needed just to avoid further deterioration of service that was too often disrupted, late, crowded, and unpleasant for many years before COVID-19.

What the Gateway Program will do is:

- build the most critical piece of infrastructure needed to provide the mobility and quality of life that the region will need to prosper in an era when professionals and companies will have more choices in where to locate;

- improve the health of its residents and the resilience of its communities by reducing the number of cars on the road and pollution in the air;
The scenarios described in this report can be used to show more specifically how the different phases of the Gateway Program could align with the region’s most pressing needs over the next several decades. This timeline can be divided into three distinct periods: the 2020s, when the greatest priorities will be on post-COVID recovery and adaptation; 2030s and 2040s, a new era of growth and change for which specific needs are harder to predict, and the second half of the 21st-century when we can be certain that the region will be a different place that has been altered by rising seas and higher temperatures.

### 2020s

**Recovery and Adaptation**
- Pandemic becomes endemic
- Regional economy recovers
- Workers, industries, business districts, and transportation adapt to increased remote work and commerce

**Gateway Phase I**
- Portal North Bridge completed
- Hudson Tunnel under construction
- Advanced planning for expanded Penn Station and other Phase II projects
2030s – 2040s

Growth and Change
- 700,000 – 1.4 million more jobs
- 1.7 – 3 million more people
- Artificial intelligence and digitization of routine tasks
- Older, more racially diverse population
- New transportation technologies
- More extreme heat and storms

Gateway Phase II
- Tunnel completed
- New Penn Station Complex completed
- Trans-Hudson rail capacity doubles with the completion of all Gateway Program projects

Post 2050s

Climate-Altered Region
- Accelerating sea level rise and increased flooding
- Carbon neutral economy
- Continued population and job growth

Next Generation
- New tunnels across East and Hudson Rivers
- Fully integrated regional rail network built in stages
- High-speed rail along the Northeast Corridor

THE NEXT DECADE: RECOVERY AND ADAPTATION

As of March 2022, New York City had regained 71% of the jobs lost between February and April of 2020, but was still nearly 300,000 jobs short of its pre-pandemic peak. Other parts of the region were in better shape. Southwestern Connecticut has regained
88% of lost jobs, both Long Island and Northern New Jersey have regained 84%, and the Hudson Valley has regained 71%. Only 37% of Manhattan office workers are at their desks on an average day in Manhattan, as a high percentage work from home, even as rents for Class A office and residential space have risen to record levels. Subway, bus, and commuter rail ridership are at nearly 60% of their pre-pandemic peaks.

All of these indicators are still pointing up, and both residential and office markets are strengthening, but there is no shortage of global disruptions – war, inflation, interest rates, new coronavirus variants – that could stall the recovery.

It may take a couple of years for stable patterns of office and remote work to become clear. Both workers and employers are likely to experiment with different types of remote work options before reaching an equilibrium between worker and employer expectations and preferences. That balance could also shift with changes in labor demand and supply in different industries and occupations, and organizations will have to adapt if they find initial return to office plans prove unproductive or bad for employee morale, retention, and attraction.

Policy choices will also affect the pace of recovery and work patterns. City and state investments in job creation and worker training, and both actual and perceived changes in public safety, the cost of living, and quality of life will influence where workers and businesses choose to locate. How much people work from home will also be determined partly by how long, pleasant, and costly their trips are.

While the new Hudson tunnel is not scheduled to be completed until 2032 and the existing tunnel repaired until 2035, the project should play a significant role in the speed and sustainability of the region’s economic recovery:
Construction of both the North Portal Bridge and the Hudson Tunnel are expected to add the equivalent of 84,000 work years in full-time jobs and over $19 billion in economic activity over the next decade as the projects are built. This economic stimulus will be even more important if the region struggles to recover as assumed in the low growth Scenarios B and D.

Completion of the North Portal Bridge in the late 2020s will make NJ Transit and Amtrak trips faster and more reliable by removing one of the main trouble spots known for disruptions and delays.

The expectation that Trans-Hudson travel should be much better and easier after the tunnel is completed is likely to be a factor for many households and businesses when they make decisions on where to make their homes and set up shop.

If the Gateway Program is stalled or canceled, it is likely that many more people and employers will choose to leave the region, and more will attempt to drive to work, which would worsen congestion and air quality for everyone.

This would be especially damaging to essential workers who must rely on transit to get to work. Most importantly, it would leave the region poorly prepared to adapt and grow with future changes to work and the economy.

By the time the new Hudson Tunnel is completed early in the 2030s, the region should have fully recovered its economic losses from COVID-19 and entered a new phase of its development. There is no way of knowing what new changes might once again disrupt
the trajectory of the region’s economy, environment and settlement patterns between
now and 2050. The unexpected could range from a global disruption as big as COVID-
19 to technological breakthroughs that expand human possibilities and well-being.
There is no guarantee that the number of people and jobs in the tri-state region will
continue to grow, but both historic precedent and the fundamental strengths of both
the regional and national economies make it far more likely that both New York City
and the larger tri-state region will continue to add people and jobs.

By 2030, by our estimates the region is likely to have between 300,000 and 600,000 jobs
more than it did before the start of the Covid-19 pandemic. By 2040, it is likely to exceed
its pre-pandemic peak by between 600,000 and 1.5 million jobs, and by 2050 exceed it by
1 – 2 million jobs. New York City may take longer to reach its pre-pandemic peak, but
by 2050 the city is expected to exceed it by 500 – 800,000 jobs. Population could increase
by 3 – 5 million in the region and by 500,000 – 1.5 million in NYC over this 30 year
period.

Most high-income workers will have more flexibility in where they work and when they
come into the office, but this flexibility will be limited by varying job requirements,
employer demands, family responsibilities, physical abilities, and career aspirations. The
majority of workers will still have little choice but to come into the worksite at
designated hours. The transportation system, and mass transit in particular, will have to
adapt to new travel patterns and customer needs.

**Train Crowding and Economic Growth**

Any increase in the number of people coming into work is likely to be exceeded by
growth in the number of transit riders. This is both because nonwork trips are expected
to grow faster than work trips, and because the auto crossings into Manhattan are
unable to accommodate many more cars at peak periods.

*In the two low work-from-home scenarios (A and B), trains could be as crowded by the time*
*the new tunnel comes in service as they were in 2019 before the pandemic.*

On the heaviest travel days, Tuesdays-Thursdays, the number of people taking transit
from west of the Hudson to the Manhattan CBD would recover from losses during the
pandemic and increase by an additional 46,000 – 55,000 riders by 2030 in Scenarios
A and B, which would be 11 – 14% higher than an average workday by 2019. Even in the
two high work-from-home scenarios (C and D), the number of midweek transit riders
would be about what they were in 2019.
Without the new tunnel and more capacity at Penn Station, there would be no room to accommodate any substantial amount of growth.

Even with low growth and 50% of office work performed remotely (Scenario D), the number of midweek transit riders is projected to be 15% higher in 2050 than it was in 2019 before the pandemic. In the scenario with high growth and 25% of office work performed remotely (Scenario A), commuters would be 32% higher than before the pandemic. While more flexible schedules will allow some rail trips to shift to shoulder hours around peak periods, without more capacity in the tunnels and at Penn Station crowding and service reliability would deteriorate until ridership plateaus, limiting job and economic growth that would otherwise occur.

In all scenarios, Gateway will support the transition to a hybrid economy with faster, more comfortable commutes and greater operational flexibility.

Better rail service will give workers more flexibility to come into the office when needed, and allow employers to reach a larger workforce. With high-income workers having more flexibility and spending fewer days commuting, some are likely to choose to live farther from their job site. In the high work-from-home scenarios, about a third of population growth is expected to take place in outer suburban and exurban counties. With twice the track capacity, Gateway will also allow transit operators more flexibility to provide service when and where it is needed in an era when travel patterns will be harder to predict.

Air Quality and Sprawl

In all scenarios, Gateway will reduce the share of trips taken by car, improve air quality and help meet climate goals.

When transit is more convenient, reliable, faster, and comfortable, more people will choose to travel by train or bus than drive. Because the Gateway Program will vastly improve train service, it will take cars off the road no matter what the level of growth or remote work, reducing a major source of air pollution and greenhouse gas emissions. The pandemic has shown what is possible, with air quality the best it has been in years in 2020 when people were avoiding all but essential travel, and reverting to high pollution levels in 2021 and 2022 when auto traffic approached pre-pandemic levels while transit ridership remained depressed.
○ **Gateway will help contain suburban sprawl, particularly in high work-from-home scenarios.**

The scenario projections estimate that anywhere from an additional 100,000 to 600,000 people will make their homes in low-density suburbs, agricultural land, and open space between 2020 and 2040. An additional 700,000 to 1.2 million would live in moderate or medium-density suburbs. This has the potential to put enormous pressure on existing open space, put more cars on the road, and worsen both road congestion and air quality. Gateway will do more to limit this damage than any other transit investment. It will not only encourage people to drive less, but it will make downtowns and transit-accessible places more desirable places to live and work, creating the conditions for both residential and commercial development to cluster in walkable, transit-oriented communities.

**Economic Opportunity and Equity**

○ **In 2030, workers in health services, food services, transportation, power delivery, and other industries offering little flexibility to work from home will constitute two-thirds of workers in the region and 44% of Manhattan workers.**

While most of these travel by bus or subway to get to work, some have no choice but to take commuter rail. A much larger number would take this service if fares were more affordable.

○ **In addition to Manhattan jobs, Gateway will improve access to a growing number of job opportunities in New Jersey, the rest of New York City, Long Island, the Hudson Valley, and Connecticut.**

While most commuters using NJ Transit are commuting to and from jobs in Manhattan, some transfer to the subway or other commuter rail to jobs in the other boroughs or other points east of the Hudson. And many travel in the reverse direction to jobs in New Jersey. These job markets are projected to grow faster than Manhattan in the future, and offer job and career opportunities for people with a wider range of educational and skill backgrounds than jobs in the Manhattan central business district. Jobs in northern New Jersey are projected to grow in a range of 800,000 in Scenario C to 1.2 million in Scenario B. But more frequent service in the reverse direction during the peak period would be virtually impossible without the additional capacity that Gateway would provide. Jobs in the rest of New York City are projected to grow in a range of 400,000 in Scenario D to 700,000 in Scenario A. More frequent and reliable service into Manhattan would put these jobs within reach of more New Jersey residents,
particularly with anticipated through-running service that would be enabled by the expansion of Penn Station and the addition of a third East River Tunnel to allow for direct service to Queens.

**BEYOND 2050: ADAPTING TO A REGION REDEFINED BY CLIMATE CHANGE**

In the last 50 years, the region has had periods of strong economic and population growth interrupted by five different recessions that included two financial crises and the three worst downturns since the Great Depression, experienced the transition to the digital age, weathered a number of historic and devastating storms and a global pandemic, rebuilt lower Manhattan after the worst terrorist attack in U.S. history, and experienced the first unmistakable impacts of climate change.

The next 50 years are likely to be just as transformative and unpredictable. One thing that we can count on is a new environment with hotter temperatures, rising sea levels and more frequent storms and droughts. By 2050, sea levels are likely to have risen by at least a foot, and could rise by three feet as early as the 2080s. How this will impact the global and regional economies, and where people can and will choose to live and work, remains to be seen. The policy and investment choices will be critical to the region’s ability to adapt and thrive in the second half of the 21st century.

In many ways, Gateway is essential to preparing the region for whatever comes next.

- It will help mitigate the effects of climate change by reducing the amount of suburban sprawl, auto travel, and greenhouse gas emissions that would otherwise occur.

- It will greatly improve the resilience of the transportation network. All the elements of the Gateway program – new and refurbished rail tunnels, a larger and safer Penn Station, modernized bridges and facilities – will be built to better withstand flooding and other climate impacts. With two tunnels and four tracks rather than one tunnel with two tracks, trains will be able to keep running if one tunnel is damaged for any reason, and service is likely to resume faster if an event requires both tunnels to be temporarily closed.

- It will give the region’s economy greater flexibility to adapt to changes in work, travel, and settlement patterns, both creating more options for through service and multi-dimensional travel, and laying the foundation for future additions to the region’s transit network.
In a future characterized by high growth and low-work-from-home, more Trans-Hudson capacity will be needed well before 2050. As modeled in Scenario A, Manhattan jobs could grow by 850,000 and Trans-Hudson commuters taking transit could grow by nearly 60% over their 2019 pre-pandemic peak by 2070. This would argue for planning to increase Trans-Hudson capacity beyond Gateway, starting with an extension of the new tunnels to Queens, as soon both of the planned phases of Gateway are completed.

With low growth in a low work-from-home economy (Scenario B), Manhattan jobs could still grow by 500,000 over 2019 by 2070, with Trans-Hudson transit commuters growing by more than 40%. Additional Trans-Hudson capacity beyond Gateway would still be needed, although not as soon as in Scenario A.

In a high-work-from-home, high growth economy (Scenario C), Manhattan jobs and Trans-Hudson commuter trips could grow as much as they do in Scenario B. In addition, jobs in northern New Jersey could grow by 1.4 million, a 40% increase over 2019 that would create a substantial increase in reverse commutation originating east of the Hudson. Gateway would enable more trains to be run westbound in the morning and eastbound in the evening, and through service would expand the number of jobs that are accessible to people living on both sides of the river.

In a low growth scenario with high work-from-home (Scenario D), additional capacity into Manhattan beyond Gateway may not be needed before 2070, even though the number of Trans-Hudson commuter trips would still likely be higher than in 2019. However, through-running service and an integrated regional rail network could be even more critical to reducing auto traffic and expanding economic opportunity when jobs will be scarcer and more dispersed throughout the region.

Climate change makes this flexibility even more critical. Settlement patterns could change significantly as coastal areas experience greater flooding and urban areas experience more extreme heat. By opening up the most congested choke point in the region’s central rail corridor, Gateway is the foundation for any future additions to the rail network that will enable it to expand service to where it will be most needed.
The scenarios examined in this report are not exhaustive and each of them assumes that housing, energy, land use, infrastructure, and other policies will evolve to permit the conditions that they envision. While these four scenarios encompass what the authors believe are a reasonable range of expectations for growth and the future of work, it is worth thinking about what would happen in other scenarios with and without the Gateway Program.

What if even the high growth scenarios underestimate potential job and population growth? If true, Gateway would be even more essential than described in this report.

What if growth is much lower, or work-from-home is much higher, than assumed in any of these scenarios? While these are possible, they would represent a sharp break with both historical precedents and most predictions. Both would reduce the amount of projected commutation into the Manhattan CBD, but would not negate all the reasons that Gateway is essential – the need to repair damaged and outmoded facilities that have been operating well above their intended capacity, the air quality benefits and climate mitigation benefits that Gateway would provide, the additional service reliability and passenger comfort, and the jobs created during construction.

What if the distribution of jobs and population within the region are much different from what is assumed in these scenarios? This is certainly possible, and could have a significant impact on Trans-Hudson travel. The high growth scenarios in particular assume that infrastructure investments and local zoning, land use, and housing policies will, to varying degrees, permit more multifamily housing and other development in downtowns and near transit than they do currently. New York City and New Jersey have been more receptive to new housing than other parts of the region, but that could change if state or local policies in New York and Connecticut facilitate more housing in the form of accessory dwelling units, the conversion of single-family homes, the conversion of commercial space and new housing construction. Likewise, residential development could become more expensive or politically difficult in New York City and New Jersey.
Perhaps the most likely additional scenario would be if New York City and some of the region’s smaller cities take in a greater share of population growth, both because these places become even more attractive places to live and suburban communities maintain their restrictive zoning. This could result in less growth in Trans-Hudson travel than predicted in the high growth scenarios, but would also produce more demand for trips originating in New York City, including nonwork trips and reverse commutes, as well as for more freight deliveries coming into the city.

Gateway will also influence which scenarios are more likely to happen. With the better service and additional capacity that Gateway would provide, growth is likely to be higher and work-from-home lower than it would be otherwise. In fact, it would be virtually impossible for two low work-from-home scenarios or the high work-from-home, high-growth scenario to materialize with only the existing Hudson River Tunnel and Penn Station. Even the high work-from-home, low growth scenario could be overly optimistic if the New York region is to compete with other regions where travel is far easier and transit service is more attractive and comfortable.
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