

A Preventable Crisis

The Economic and Human Costs of
a Hudson River Rail Tunnel Shutdown



Regional Plan Association

ARUP

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A Preventable Crisis:

The Economic and Human Costs of a Hudson River Rail Tunnel Shutdown

What Would Happen If We Lost One of the Two Rail Tracks Under the Hudson River?

Every day, 200,000 passengers ride an Amtrak or New Jersey Transit train through a 110-year old, two-track tunnel under the Hudson River that was badly damaged by Superstorm Sandy. The tunnel is the only passenger rail link that connects Manhattan, the nation's largest job center, with its western suburbs. It is also a bottleneck for the Northeast Corridor running from Washington, DC to Boston, by far the most heavily used intercity rail line in the United States. The number of passengers served by this tunnel has grown rapidly over the last two decades, and is expected to continue growing as the economy expands.

Because the damage from Sandy cannot be fully repaired without closing down each of the two tubes in the tunnel, the only way to avoid several years of sharply reduced service is to build a second tunnel that could keep full service running while

the existing tunnel is repaired. But it will take several years to construct a new tunnel, and full construction cannot start until funding is secured. Each day that passes without agreement on funding for a new tunnel makes it more likely that a tunnel shutdown will happen first.

This would place enormous stress on the already overburdened transportation network in the Northeast, from interstate highways to international airports. Because passengers who would no longer be able to take a New Jersey Transit (NJT) or Amtrak train would spill over into already crowded trains, buses, highways and planes, the entire transportation network would become more congested. Employees would be late to work and more stressed when they arrive. Meetings would be missed. Family dinners would be late. Both residential and commercial property values would decline as prime locations served by rail become less desirable.

The shutdown would cost the national economy \$16 billion over four years.

More than half of this cost would come from the time lost by workers from longer daily commutes. These wage costs alone are the **equivalent to the loss of 33,000 jobs per year**. Added auto costs for those needing to drive, higher air fares, higher freight

Estimated four year costs of a partial shutdown of the Hudson River rail tunnel



delivery costs, and costs associated with health and safety risks also contribute. The impacts would be greatest in New Jersey and New York, but they would reverberate throughout the Northeast and the U.S. **This estimate does NOT include several costs that were not calculated due to insufficient data:**

- ▶ Buffer times that people would build into their travel times because service would be too inadequate or unreliable to consistently arrive at work, meetings or other destinations on time
- ▶ Bus trips that would be longer and less reliable due to traffic congestion
- ▶ Additional wear and tear on roads and other infrastructure
- ▶ Compound impacts if other transit links (PATH, Port Authority Bus Terminal, subways), Northeast airports or interstate highways experience disruptions
- ▶ Health and productivity impacts of increased mental and physical stress caused by congested and unreliable travel
- ▶ Delays in ambulance, police, fire and other emergency response vehicles

Nearly half a million people would have longer, less reliable and more crowded commutes, losing hours of productive, personal and family time and often putting their jobs at risk:

- ▶ 38,000 New Jersey Transit riders would need to find other ways to get to work.
- ▶ As many as 170,000 PATH and bus riders would be delayed by more crowded trains and congested roadways.
- ▶ 245,000 drivers, nearly half of whom drive to locations outside of Manhattan, would have longer commutes. More than half of these would see their daily commutes increase by more than 30 minutes.

Displaced Amtrak riders would further crowd airports, increasing DC to NYC air fares by as much as 65% and potentially doubling fares between Baltimore and New York.

Most business travelers would choose to fly if they can't get on a train that would get them to their destination on time. Because there is a cap on the number of flights in and out of New York's airports, the increased demand would push up ticket prices, with few seats left for those unable or unwilling to pay the higher fare.

Truck delays would cost the Northeast economy over \$1 billion.

Congested highways would create longer trips, many of which originate in Pennsylvania, central New Jersey or upstate New York. The added costs of delivering goods would be passed onto consumers.

Home owners would see their property values dip by \$22 billion.

Homes with better access to jobs are worth more. In fact, fully 40% of homes in New Jersey are within two miles of a train sta-

tion. These homes would decline in value, just as values increased when service was added to NJT in the last two decades. These would be most heavily concentrated in northern New Jersey counties such as Essex, Union and Middlesex, and the towns and school districts where these homes are located would experience a drop in tax revenue.

Owners of commercial property—offices, stores, health and education facilities, factories and warehouses—would also see a decline in property values.

This is more difficult to calculate than changes in homeowner values, and beyond the scope of this study to calculate. However, businesses that rely on workers, clients, tourists or other customers who would be affected by the shutdown would absorb some of the costs, putting downward pressure on commercial property values. This would be most acute in Manhattan, but would affect other locations as well, leading to a decline in local tax revenues.

38,000 additional car crashes and more air pollution could result in 90-100 additional deaths.

Because more people would be spending more time on the road, the number of auto and truck accidents would rise, along with pollutants that increase premature deaths. The two million additional tons of carbon dioxide that would be produced over four years is the equivalent of flying 2.6 million people from New York to San Francisco.

Federal, state and local governments would lose \$7 billion in tax revenue.

This includes \$1.5 billion in federal taxes and over \$1 billion in states outside of New York and New Jersey.

Both regional and national global standing as a place to live and work would suffer an incalculable loss.

Business surveys that rank cities such as New York and Washington as attractive locations to do business routinely list poor quality infrastructure as their Achilles heel. The deterioration of rail, subways, bridges and tunnels in these cities and across the U.S. adds to this perception and is already one of the greatest risks to continued economic growth. A partial shutdown of the Northeast's main artery would be a dramatic event that could solidify the perception and worsen the global position of some of the nation's most productive regional economies.

Besides preventing this crisis, building a new tunnel would provide enormous long-term benefits to the nation and the Northeast.

It would vastly improve both commuter and intercity travel, make it possible to add new rail service, and greatly expand growth in jobs and incomes while improving energy efficiency.



Photo: Amtrak

How a Tunnel Shutdown Would Impact the Entire Transportation Network

The aging Trans-Hudson rail tunnel is a key part of the network of interdependent tunnels, bridges, highways, subways, ferries and airports that serves the most densely populated core of the Northeast. Just as a recent shutdown of LaGuardia Airport caused flights to be cancelled as far away as Atlanta and Chicago, the all-too-frequent disruptions in New Jersey Transit and Amtrak service contribute to traffic jams at the Lincoln and Holland Tunnel and congestion on the I-95 Interstate highway.

As frustrating and costly as these service interruptions are already, they would become far worse in the event of a tunnel shutdown. Even before Sandy, transportation agencies and planners have long known that additional capacity was needed to handle growing passenger volumes and to make it easier to reroute service, and have spent years developing and promoting plans for a new tunnel that would double train capacity and provide vastly expanded service. New Jersey Transit's Access to the Region's Core (ARC) project was nearly approved in 2010, and Amtrak's proposed Gateway project has received initial funding and has the strong support of New York's and New Jersey's transportation agencies and political and business leaders.

Amtrak, which owns the existing tunnel, is maintaining the tunnel to ensure safe operations following the damage from Superstorm Sandy. But eventually, each tube of the tunnel will need to be taken out of service for an estimated two years at a time. In a best case scenario, this can be deferred until new tunnels are built. However, there is a real possibility that the condition of the tubes will deteriorate to the point where they need to be closed before new service is on line, especially if funding and approvals are delayed or denied. In a worst case scenario, an intense storm

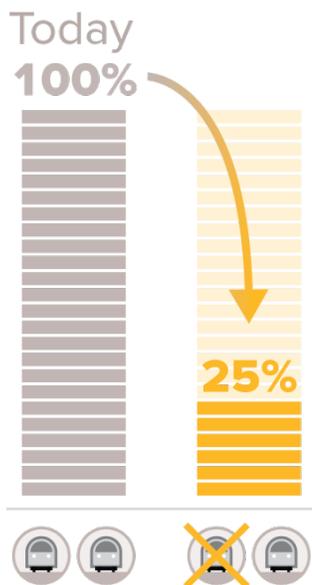
This report looks at the impacts of a potential partial shutdown of the Hudson River rail tunnel. While a shutdown is not planned right now, the possibility is becoming increasingly likely.

or other calamity would cause an emergency shutdown with little or no time to prepare. At a minimum, we are likely to see an ever increasing number of unplanned outages such as the failure of power cables in the summer of 2015, triggering temporary but multiple impacts similar to those described in this report.

This report takes a rigorous look at what would be likely to happen if one of the two tracks needs to be taken out of service before a new tunnel is built. It examines both the human and economic toll that it would take, and not just on those who rely on trains to get in and out of New York City. It shows how the ripple effect of a tunnel closure will affect hundreds of thousands of individuals and tens of thousands of businesses, from New Jersey homeowners to Pennsylvania trucking companies to air passengers living in Virginia or Maryland. It breaks down the costs in terms of time, wages, productivity, travel costs, property values and health and safety.

The numbers cannot fully capture either the stress that this would place on people's lives, or the damage that it would do to the economic competitiveness of the region and the country, both of which already suffer from a reputation for failing and outmoded infrastructure. To help convey what this would mean in human and business terms, the report uses stories of hypothetical characters that are representative of thousands of real people and based on available data and realistic assumptions.

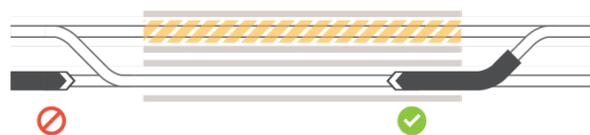
It is hoped that this report will contribute to a rational discussion of what is perhaps the most serious infrastructure problem in the United States today.



With **two tracks**, peak hour capacity is **24 trains**



With **one track**, peak hour capacity is **6 trains, or 25%**



Going to a single track would lead to a **75% reduction** in train services

Baseline Assumptions

The results presented here are based on an analysis of a **hypothetical planned shutdown** of each tube of the existing tunnel. It does not attempt to predict when a shutdown might occur, although for analytic purposes it uses the most current available data to approximate what would happen if the shutdown started in 2019. This would be less severe than an emergency shutdown that could affect both tubes at once and allow little time for providers, customers and employers to prepare. Key assumptions include the following:

- ▶ Using existing Amtrak estimates, each tube would be closed for a period of two years, resulting in four years in which only one track would be available to take trains from the western side of the Hudson River in and out of Penn Station. The actual time could be shorter or longer. An 18-month estimate was used for the project's environmental impact statement, but construction delays could extend the shutdown for more than four years.
- ▶ Because trains would have to wait for trains to pass in the opposite direction, the maximum number of trains that could be run would be reduced from 24 trains per hour to 6 trains per hour, as determined by Amtrak and described in RPA's *Tunnel Trouble* video.
- ▶ Of the six trains, the scenario assumes that five would be New Jersey Transit (NJT) trains that largely serve commuters and one Amtrak train serving intercity passengers. The actual mix of NJT and Amtrak service in the event of a shutdown could be different.
- ▶ Other existing transportation services—PATH, bus, ferries, roadways, bridges, tunnels and airports—would be available for diverted passengers up to the limits of their existing service levels.

- ▶ Travelers will adjust their trips based on the best available service options and best available information on flexibility and preferences for traveling on different modes or at different times.

The analysis does not include any new services or policies on the part of transportation providers to mitigate the effects, such as running new PATH, bus or ferry services, increasing tolls at peak periods, or restricting vehicles to those with more than one passenger. In reality, agencies, service providers and governments are likely to either add services or implement policies to manage demand. However, it is impossible to predict what these will be, and each would impose its own set of impacts and costs. The options are also limited by road space, terminal and parking capacity, and available labor.

Using these parameters, the project team constructed what it determined was the most likely scenario for travel behavior based on extensive research into what is known about job requirements, travel expenses, and how people have behaved in similar circumstances. This involved making decisions about how different types of commuters, business and leisure travelers, trucking companies and others would weigh their choices in terms of total time, cost of travel, time of travel, comfort, convenience and other factors. Some will be able to take an earlier or later train, but many have jobs that require them to be at work at a specific time or personal responsibilities that limit when they can leave. Others will try to get on congested highways to get to work on time, or take an expensive, less convenient flight for a work or business trip. Some have the ability to work from home, but presumably anyone commuting to work already sees a cost to not coming into work.

More details on findings, assumptions and methodology can be found in Findings and Methodology for Hudson River Tunnel Shutdown Assessment.

Getting to Work

People traveling to work in the New York metropolitan region, which includes two-thirds of New Jersey and parts of Connecticut and Pennsylvania, already have the longest commutes in the United States. And they are getting longer. The number of people and jobs has outgrown a transportation system that was largely built in the early and mid-20th century, and decades of underinvestment have led to disrepair and deteriorating service.

A partial closure of the Hudson River tubes would remove a critical link in the region's transportation network, putting more people on other types of transit and more cars on the already congested roads, bridges and tunnels. While there is enough room to absorb these diverted passengers at most hours of the day, there is little space for them during rush hours. This analysis looks at the 7-10 AM morning peak period when most people are trying to get to work. It shows what is likely to happen if one of the two tubes of the Hudson River tunnel is closed over a period of four years and passengers divert to the region's existing infrastructure and transportation services.

Because there is so little capacity in the transportation network at rush hour, even small numbers of additional passengers or cars can have big impacts on everyone who uses these services. For some, the effects will be relatively small, adding several minutes and more uncertainty to the trip they are making today. For many, however, commuting times could increase by more than an hour, force them to take other means of transportation, and cause major disruptions in work and family life.

Today, some 67,000 people take New Jersey Transit trains to get to work in New York City in the morning. As shown in the chart below and discussed in the detailed supplement to this report, there will only be enough room for 29,000 of these commuters during a shutdown, leaving 38,000 who need to find a different

way to get to work. There is room for about 20-25,000 to take another form of transit—and it is expected that a little more than half of those who are able would take a PATH train and the rest would take a bus or ferry. Many of these diverted transit riders will need to travel early or later than they do now, and most would have longer, more crowded commutes.

Of the remaining 15,000, about 10-12,000 would be expected to drive because there just isn't enough room on transit to allow them to get to work on time. For these workers, driving would introduce a major change to their commute. Instead of sitting on a train where they could work or rest, they would spend as much as two or more hours behind the wheel, much of it in heavy traffic, and bear the costs of parking, gas and tolls and auto maintenance.

How NJ Transit train commuters would be diverted in the event of a partial tunnel shutdown

In thousands of commuters

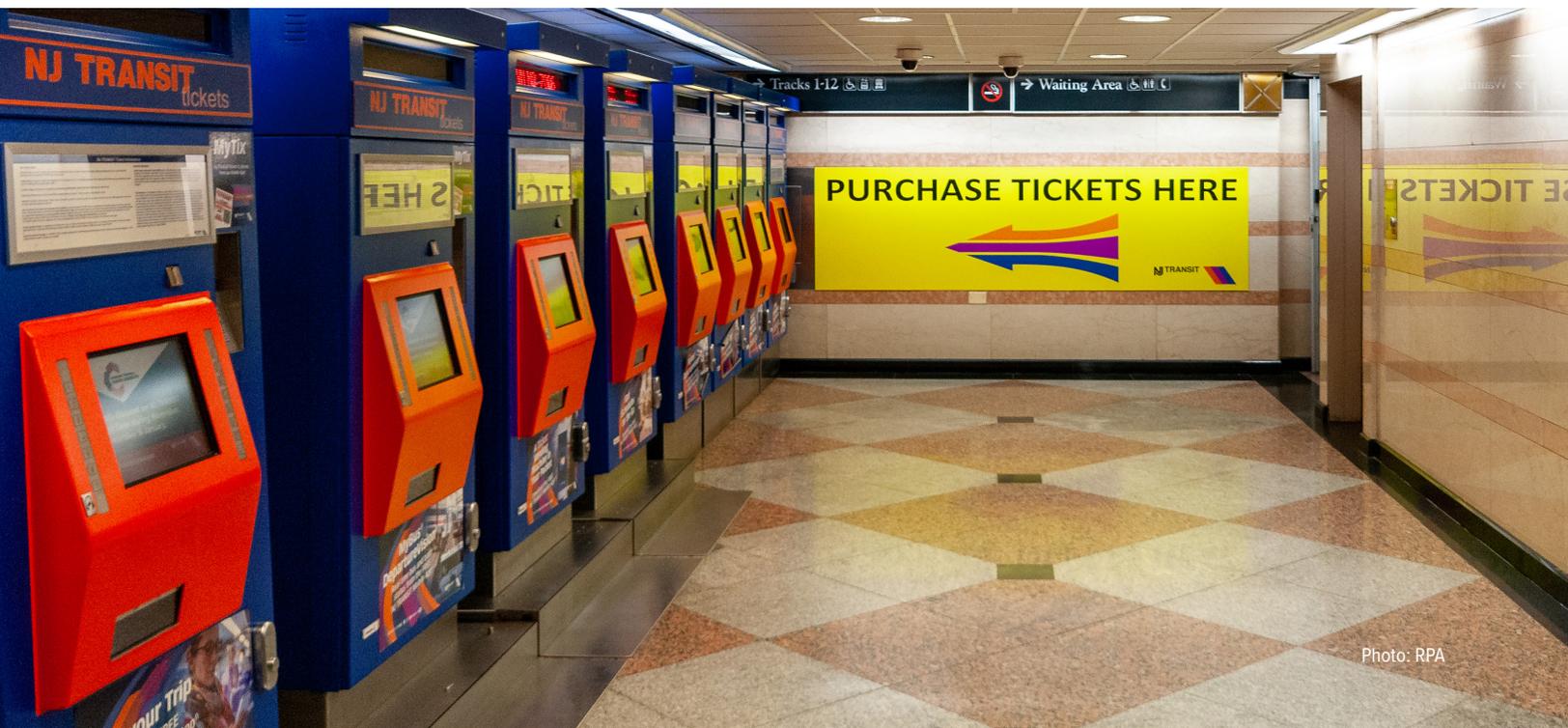
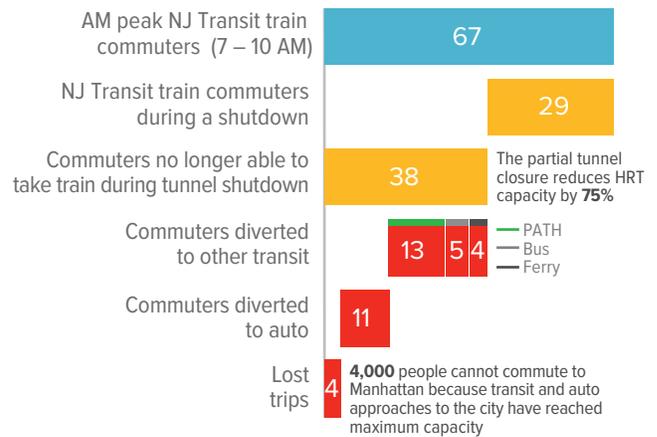


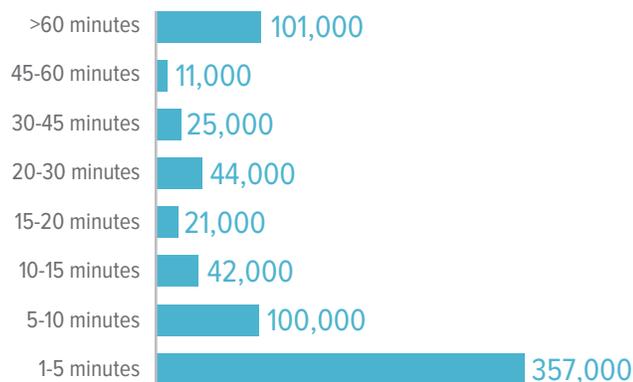
Photo: RPA



Photo: Shutterstock

Because the roads are so crowded at rush hour already, even these few thousand additional drivers will cause major delays at certain points, particularly the approaches to the Lincoln and Holland tunnels and George Washington Bridge. In fact, an estimated 245,000 drivers would be likely to see their commutes increased by 10 minutes or more. 135-140,000 of these drivers would see their commutes increase by at least 30 minutes, and of these approximately 100,000 would have to travel more than an hour longer.

Number of commuters by minute increase in two-way commutes in the event of a partial tunnel shutdown



Even people who don't have to get into Manhattan will experience major delays because of this congestion. About one of every four commuters who will be delayed at least 20 minutes are travelling to destinations outside of New York City, most to locations in northern New Jersey.

This would still leave about 3-4,000 people who wouldn't make the trip at all. At first, most of these would work from home. Not everyone has that option, but there would certainly be more who would do so if they can. But since they are not choosing to do this today, it's safe to assume that this is not their preferred option. Over time, most of these workers would likely move or get a different job, often at a lower wage.

In monetary terms, the costs of these changes and delays are estimated to cost nearly \$13 billion over four years. About \$9 billion would be the equivalent of wages for the amount of extra time people would be commuting. Nearly \$1 billion would be for parking and other auto related costs. Over \$2 billion would be for additional delays that can be expected whenever there is bad weather or other disruptions. With more people driving and more on PATH, buses and ferries, there is less flexibility to accommodate frequently occurring disruptions, creating more delay than there would be otherwise.

In human terms, this would take a significant toll on the work, personal and family life of thousands of people. Two typical examples of how this would affect commutes and lives are illustrated here. While these are not actual people, their stories are representative of thousands of individuals in similar circumstances.

Meet Shayna



Photo: Getty

Who Shayna Represents

- ▶ Managers of the 28,000 facilities workers in the New York region
- ▶ 3,200 companies that employ those workers, disrupting services and creating 70,000 hours of additional work for those who manage these workers

Location: Midtown, NYC

Occupation: HR Manager

Income: \$48,000/year

Transit: Bus and train

Age: 36 years old

Current Journey

Shayna is a manager at ABC Industries, an employer of 7,000 maintenance and facility service workers in New York. She oversees 70+ office buildings in Manhattan and ensures that they receive daily janitorial, electrical, HVAC/mechanical, engineering, parking, and landscaping services. Many of the workers Shayna is responsible for do not have cars and take the bus or train into Manhattan from New Jersey and the outer boroughs.

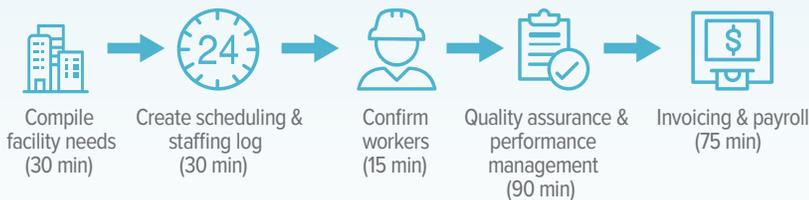
What Might Happen

- ▶ A tunnel shutdown would impact hundreds of the facilities workers that Shayna manages, causing lateness, absenteeism, and turnover.
- ▶ Gaps in service coverage have particularly costly consequences for certain functions (e.g. security, cleaning, electrical work, etc.) causing customer complaints.
- ▶ Shayna spends 17+ hours per week on additional administrative work (e.g. backfilling employees) that could have been spent on other business priorities.

Shayna's workflow before and after shutdown

Current workflow

4 hrs



New workflow in shutdown

7 hr 30 min



Meet Diana



Photo: Getty

Who Diana Represents

- ▶ 90 people who take transit during peak hours from Oradell, NJ to the Herald Square area
- ▶ 15 people who would be diverted to cars on this particular route, part of the 11,000 who would be diverted to cars in total by the shutdown
- ▶ Each diverted person on this route could be delayed up to 100 minutes roundtrip each day, totaling 95 hours for all diverted commuters

Current Journey

Diana is a working mother who travels to New York City every day to work as an Executive Assistant at an insurance company. She's extremely detail oriented and committed to being on-time both to work and getting back home to her family. Currently, from her home in Oradell she takes a quick walk to the train station and then departs at New York Penn Station which is walking distance from her office.

What Might Happen

- ▶ Diana needs to show up before her boss arrives, and as a result has to travel during the peak, or wake up unreasonably early and waste morning hours in the office.
- ▶ Shutdown service reductions on NJ Transit force Diana to shift to car. The family is forced to buy a new car, a \$13.5K/yr expense. Diana's total daily commuting expenses increase by \$73 per day including vehicle cost, tolls, and parking.
- ▶ Delays getting home in the evening preclude Diana from picking up her children from sports practice; she incurs additional childcare costs.
- ▶ Shutdown decreases home value by \$25K, frustrating family's interest in selling home. Simultaneously, local schools limit services (e.g. AP classes) as municipal budgets are reduced by up to 15% due to depressed property tax revenue.

Location: Oradell, NJ

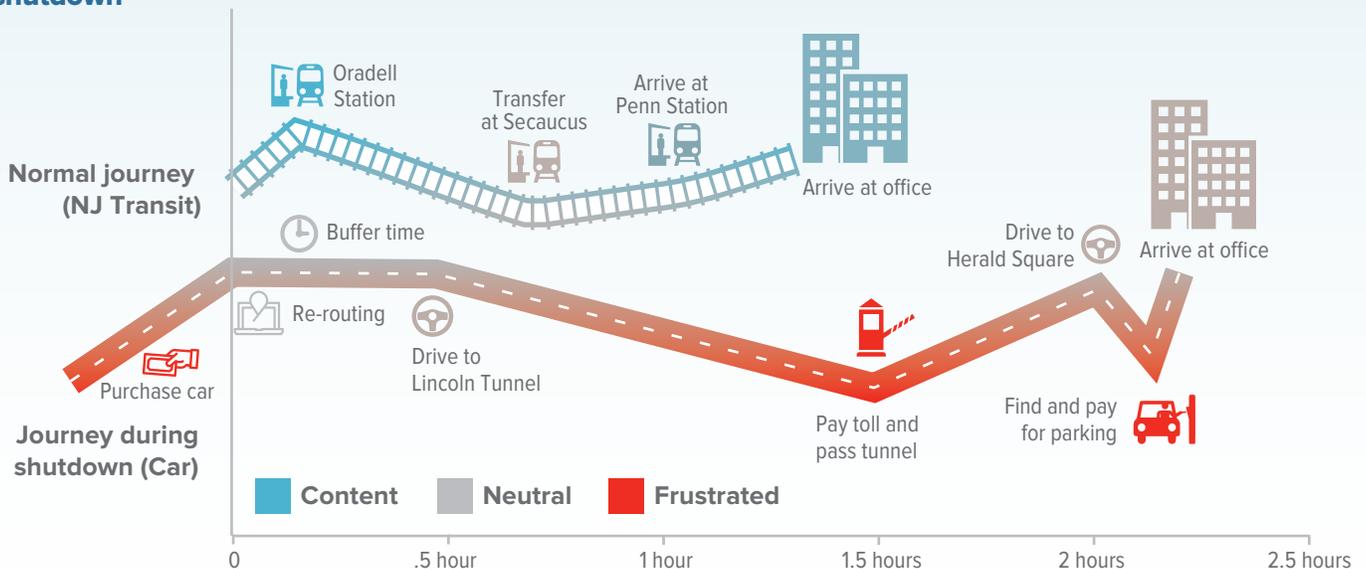
Occupation: Executive Assistant

Income: \$68,000/year

Transit: NJ Transit

Age: 51 years old

Diana's commute before and after shutdown



Traveling in the Washington to Boston Corridor

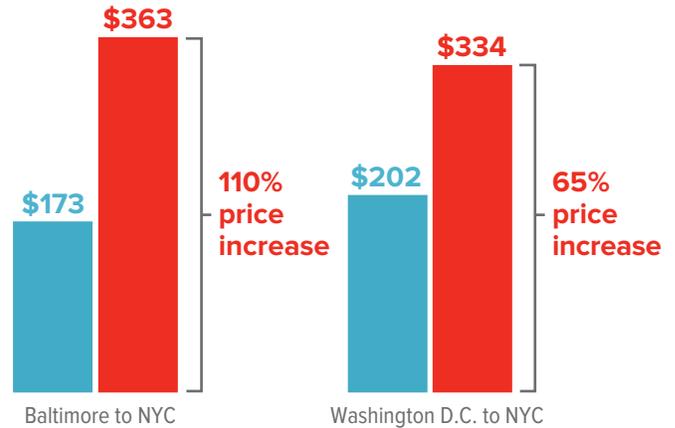
The northeastern United States is the most densely populated and economically productive part of the country, accounting for one-fifth of the national economy. Being able to travel between cities in the Northeast—New York, Baltimore, Wilmington, Philadelphia, Newark, New York, New Haven, Providence and Boston within hours by air, rail, bus or car gives these metropolitan economies an advantage that helps them compete with similarly connected regions in Europe and Asia. Amtrak’s Northeast Corridor service provides an option preferred by many business and leisure travelers, allowing comfortable trips directly into city centers. Without intercity rail, air fares would be higher, airports would be more crowded, and roadways, particularly Interstate 95 (I-95), would be more congested.

A tunnel shutdown would have little impact on New York to Boston service, but could cut service in half between Washington and New York. Today, Amtrak’s Acela and regional trains transport 22,000 passengers between Washington and New York daily. This analysis assumes the Amtrak service would be cut from two trains per hour to one in the event of a partial tunnel shutdown. Although it would be possible to maintain both hourly trains, this would further curtail the already limited NJT service described above.

This reduced service would only have capacity for 14,000 passengers per day. For the remaining 6,000, some would drive or take the bus, and some leisure travelers would choose not to travel. But the largest group—business travelers going between Washington or Baltimore and New York, would likely fly instead. The New York region’s airports—LaGuardia, Kennedy and Newark

—already suffer from some of the longest delays in the U.S. Because of this, the Federal Aviation Administration (FAA) has capped the number of flights that can arrive or depart from these airports. So diverted Amtrak passengers who want to fly at peak periods would have to get tickets on the limited number of remaining seats.

Average plane ticket price before and after a partial tunnel shutdown



This additional demand for seats would likely induce airlines to raise airfares, potentially by as much as 65% between Washington and New York’s airports at peak times, and could double prices between Baltimore and New York. This means that those least able or willing to pay would stay home. Most business travelers would pay the price, but many leisure travelers, small business owners or non-profit employees would not. The costs from both increased ticket prices and lost economic activity from those who don’t travel would total an estimated \$1.7 billion. The state with that would feel the largest impact is New York, but New Jersey, Maryland, Virginia and Connecticut residents and businesses would also have significant costs.



Photo: Amtrak

Meet Jerome

Who Jerome Represents

- ▶ 3,000 passengers who travel between DC/Baltimore and NYC
- ▶ Of these, 1,300 are price elastic business or leisure travelers who may be priced out of train and air options and forced to take the bus.
- ▶ These travelers will incur increased travel time of up to two hours each way, totaling up to 4,000 roundtrip hours.

Current Journey

Jerome is the Northeast Program Director at a non-profit organization focused on U.S. healthcare. The organization is based in Washington and he travels to New York and other cities several times per month to coordinate with funders and partners. Jerome is responsible for advocacy and fundraising, requiring significant face time. He typically drops his son off at daycare early in the morning before catching a train. He works on the Amtrak and enjoys the calm and comfortable journey.

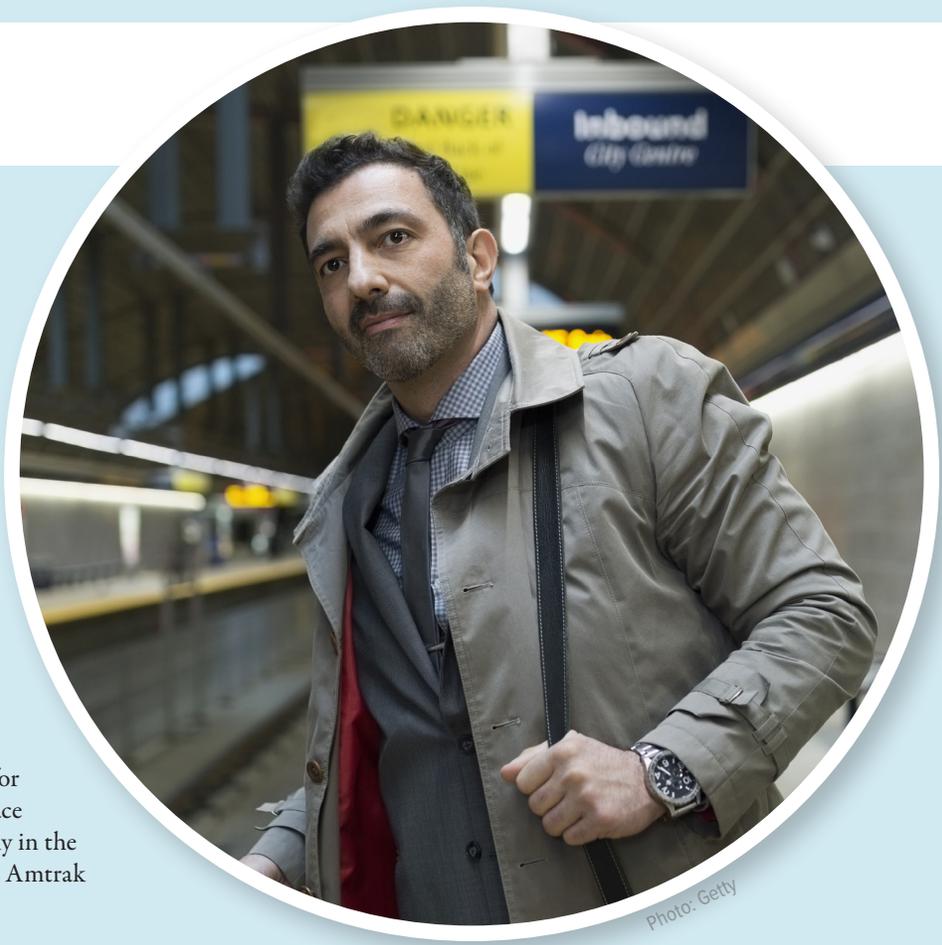


Photo: Getty

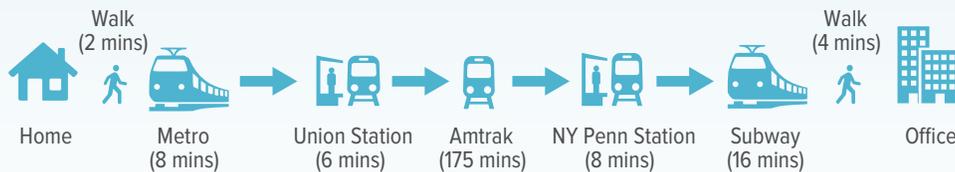
What Might Happen

- ▶ The bus is a less productive work environment, reducing the amount of work that Jerome can do while travelling.
- ▶ The bus is less reliable than the train, forcing travelers to budget 30 minutes of buffer time into journeys in which they are already leaving earlier and/or arriving later.
- ▶ Jerome's new travel schedule is outside the hours that he can drop his son off at daycare in the morning and return in time for bedtime.

Location: Washington, DC
Occupation: Program Director
Income: \$75,000/year
Transit: Amtrak
Age: 46 years old

Jerome's commute from Washington, D.C. to New York City before and after shutdown

Current mode: Amtrak 3 hr 39 min



Alternative mode under shutdown: Bus 5 hr 46 min



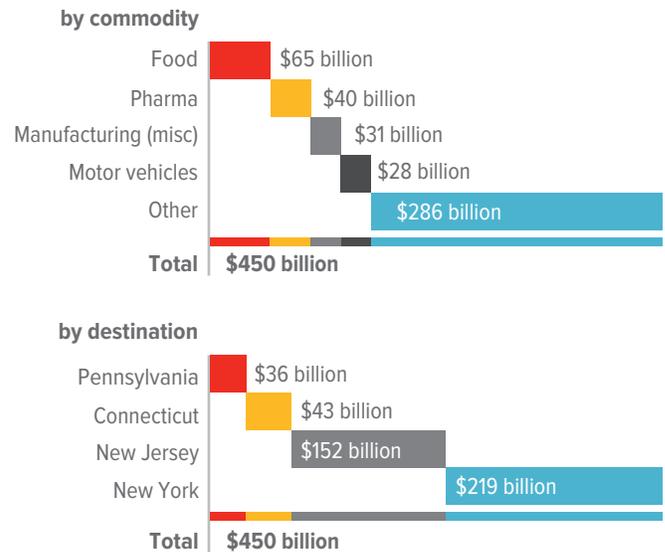
Moving Freight

Moving goods from producers to distribution centers to consumers is an essential function of the transportation network. Most of the freight in the region is transported by truck, a condition that is compounded by the region's limited rail freight network. Whether food, furniture or pharmaceuticals, most of the goods traveling in the region are destined for consumers in this large metropolitan area, and the costs of shipping them are largely passed on to these consumers.

The logistics chain for transporting goods is even more complicated and covers a wider area than the labor market within which people commute to work. Most goods that are consumed here are shipped in from other parts of the country or the world by ship, plane, train or truck, and much of what is produced here is shipped out to consumers elsewhere. Along the way, most freight is stored in one or more warehouse or distribution center until it is ready to be shipped to a retail store or consumer. While the ports of entry are concentrated in the core of the region—seaports in Newark, Elizabeth, Staten Island and elsewhere and airports, especially Kennedy and Newark, distribution centers are often located in central or south New Jersey, upstate New York, Long Island and Pennsylvania where land is cheaper.

The highway congestion that would be caused by a tunnel shutdown would affect the time and cost of delivering goods as well as moving people. Regional trucks make 147,000 daily trips in the region, and the extra traffic could make their trips 1.5% longer, on average. Delays getting in and out of the region's ports and airports, where many trucks originate from or are destined for, could be nearly three times the regional average. These trucks carry \$450 billion worth of goods, and the added costs of delay could cost the economy over \$1 billion.

Value of truck freight



Sources: BTS Freight Analysis Framework



Photo: Shutterstock

Meet David

Who David Represents

- ▶ 105 companies truck freight from Fogelsville, PA to Queens during peak hours may be impacted by the shutdown. The shutdown will impact a total of 147,000 trucks per day.
- ▶ The full journey (requiring re-routing and refueling) can be nearly three hours longer roundtrip, totaling 290 hours for all trucks.
- ▶ Driving time can be extended by 100 minutes roundtrip, totaling 175 hours for all trucks.

Current Journey

David runs a family-owned, mid-size trucking company based outside Allentown, Pennsylvania that is known for reliability and customer service. A significant portion of David's customers depend on him to deliver freight to the New York area. Most of these routes run over the George Washington Bridge and Verrazano-Narrows Bridge. The company uses several types of trucks and trailers, depending on the type of cargo being transported.

What Might Happen

- ▶ Increased traffic creates higher fuel and labor costs, causing David to raise prices.
- ▶ This causes David to lose some customers.
- ▶ Other customers pass on price increases to their buyers, lowering the total amount bought and sold.
- ▶ Simultaneously, it becomes harder for David to plan and execute timely deliveries, frustrating customers who need their goods on-time.

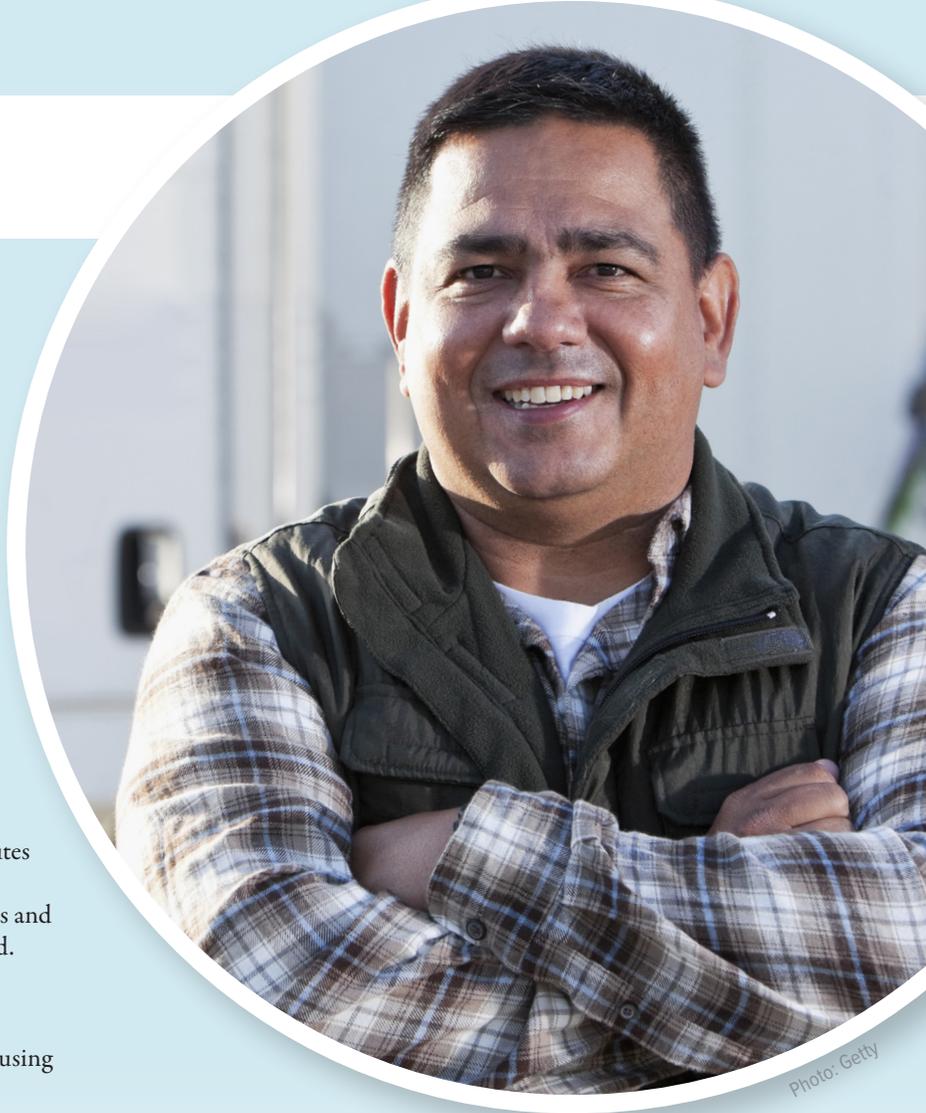


Photo: Getty

Location:
Allentown, PA area

Income:
\$140,000/year

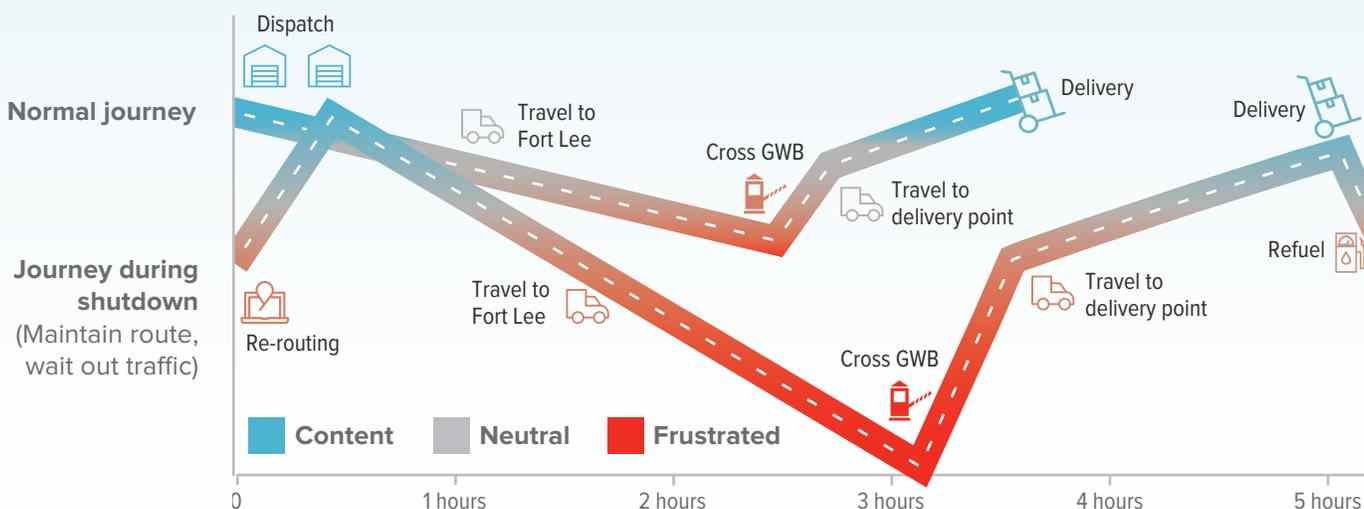
Age:
42 years old

Occupation:
Freight Operator

Transit: Regional highway network

Transportation mode: truck

Journey before and after shutdown

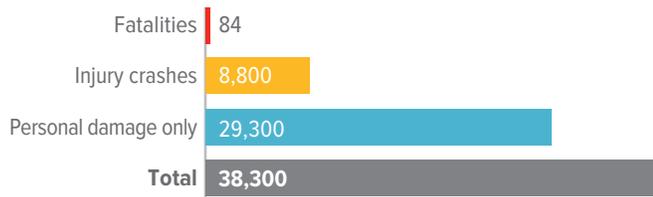


Impact on Health and Safety

The physical and mental stress of more difficult and less predictable commutes and intercity travel would have a negative impact on public health. While the health impacts of stress are well documented, it is difficult to calculate the specific impacts that would result from a tunnel shutdown. By contrast, there is accepted methodology for estimating the increase in vehicle accidents and air pollution that would result from increased highway congestion, and how these would result in injuries, illnesses and premature deaths.

Over the four years of the shutdown, just having more cars travelling more miles on the road would lead to approximately 38,000 more auto crashes. The large majority of these would result only in personal property damage, but about 9,000 would cause injuries and result in 80-90 fatalities.

Number of auto crashes by type over four years



Cost of auto crashes by type over four years

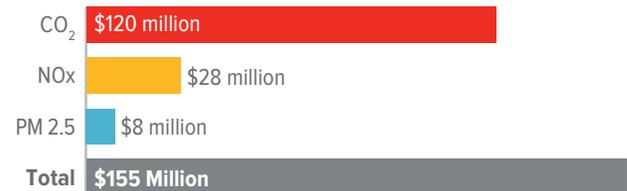


The environmental damage from increased air pollution will affect the health of people throughout the region, whether they drive or not. There would be about two million additional tons of carbon dioxide (CO₂) in the atmosphere, the equivalent of 2.6 million people flying between New York and San Francisco. Other pollutants (NOx and PM 2.5) would have a more immediate impact on health resulting in nearly 600 lost work days and approximately 10 premature deaths.

Environmental and health impacts of additional driving and congestion

- CO₂**
 - ~Two million additional tons of CO₂ emissions over four years
 - Equivalent to flying 2.6 million people from New York to San Francisco
- NOx**
 - Nearly eight premature fatalities over four years
 - ~450 lost work days
 - ~2,600 minor restricted activity days
- PM 2.5**
 - ~Two premature fatalities over four years
 - ~140 lost work days
 - 840 minor restricted activity days

Cost of emissions over four years



When combined, these health and safety impacts represent a cost of approximately \$550 million.

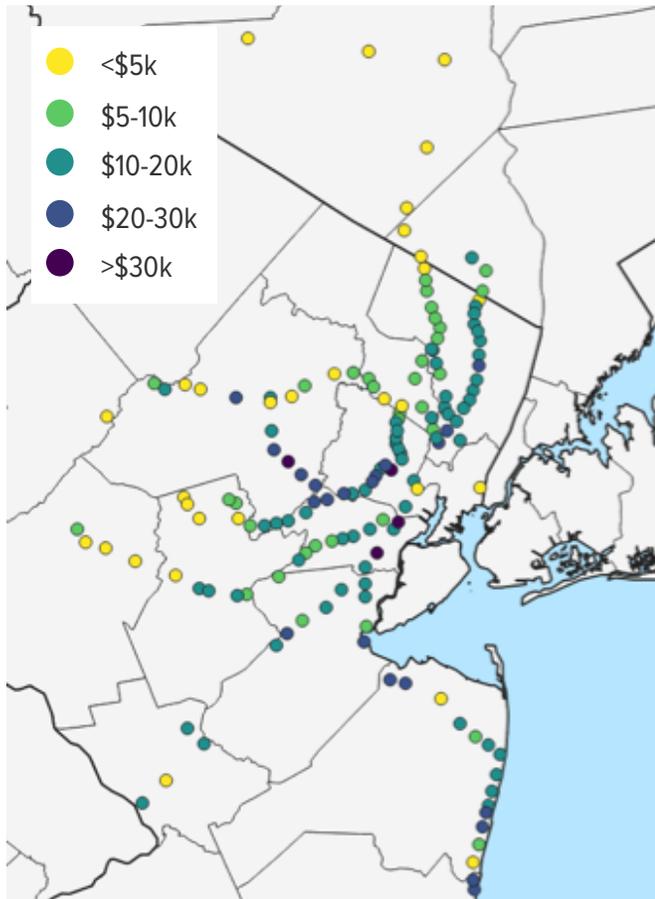


Impact on Homeowners and Local Government

Over the past two decades, increased New Jersey Transit service, such as the introduction of Midtown Direct service that greatly reduced travel times for many NJT riders, has lifted property values for homes near NJT stations. As documented in RPA's report *The ARC Effect*, home values increased by an average of \$33,000 for homes within half a mile of stations once all other factors were accounted for. Even homes as far as two miles away saw an average increase of \$10,000. Cities, towns, school districts and counties also benefited from higher property tax revenues. The benefits were greatest for places that experienced the largest reductions in travel times.

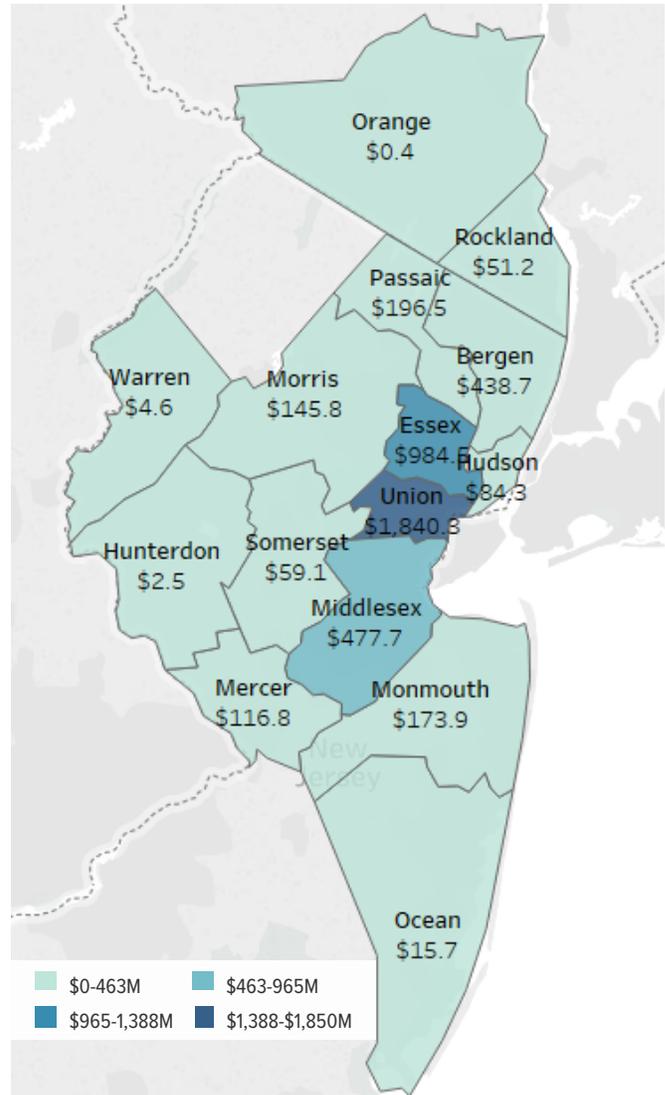
A tunnel shutdown would have the reverse effect. Less service and longer commutes would mean that property values would be likely to decline for the duration of the shutdown. The cumulative loss in home values could be up to \$22 billion. This would equal 6% of the home values in affected station areas and 2.5% of all home values in New Jersey. The average home could lose \$13-14,000 in value, with homes closer to station areas experiencing the greatest losses.

Average home value reduction by station



This \$22 billion dip in home values would mean an estimated \$4.6 billion less in local property taxes that support schools, fire and police departments and municipal services. That would account for roughly 4% of local property tax revenue in New Jersey. Essex and Union counties could each see almost a billion dollars each in lost tax revenue, while Middlesex and Bergen could see losses close to \$500 million.

Four-year lost property tax revenues, in millions



One final vignette shows how the cumulative effect of longer commutes and declining home values could affect thousands of residents. 80 people commute from eastern Monmouth County to East Rutherford each morning. Their trip could be over 30 minutes longer each way, causing them to leave early and incur more in child and elder care expenses. The average home value could decrease by \$23,000 and municipal budgets might have to be scaled back by as much as 25%.

Meet Lailah

Location: Hazlet, NJ

Occupation: Teacher

Income: \$55,000/year

Transit: Car

Age: 37 years old

Who Lailah Represents

- ▶ 80 people drive to East Rutherford from eastern Monmouth County during peak hours.
- ▶ Part of the 100,000 people whose round trip commutes increase by over 60 minutes
- ▶ The full journey (requiring route-finding and adding buffer time for variable delays) can be 90 minutes longer, totaling 120 hours for all drivers.
- ▶ Driving time may be extended by 30 minutes round trip, totaling 45 hours for all drivers.

Current Journey

Lailah is a language teacher at a private school in East Rutherford, NJ. She has taught there for 10 years, and loves her job, making the 1 hour commute worthwhile from her home in Hazlet, NJ. Lailah leaves early and drives her family's Toyota Corolla. She heads home in the evening to care for her elderly mother and spend time with her young children.

What Might Happen

- ▶ Lailah has to shift her wake-up time from 6:00 AM to 5:00 AM to take care of morning responsibilities at home and make it to work on time.
- ▶ Traffic variability requires Lailah to plan for the worst possible delays; otherwise, she risks disappointing her students and school administrators.
- ▶ Lailah incurs \$200 in additional weekly child and elder care expenses, as she cannot be as prompt in picking up her kids and relieving her elderly mother's caretaker.
- ▶ The disruption to her personal life forces her to consider changing jobs or where she lives.
- ▶ Home value decreases by 6%, or \$23,000, as a result of the shutdown. Family decides not to put home on the market. Simultaneously, local school and fire department under pressure to reduce services as decreases in property tax revenue reduces municipal budget by up to 25%.



Lailah's Commute During a Shutdown

6 hours of sleep; wake up at 5 AM

3 hours of family time in evening, caring for children and elderly mother

0-1 day per week late for school

0-1 day per week unable to prepare meals for family

\$200 in additional weekly child and elder care

\$12 per day in vehicle traffic/idle time cost, \$3,000 per year

\$23,000 in decreased home value

Increased physical risk due to road safety

High level of stress on commute

Aggregate: 80 People Like Lailah are affected

80 hours of lost sleep

80 hours of lost family time

0-80 late work arrivals per week

0-80 missed meal preparations per week

\$16K in additional child and elder care

\$900 per day in vehicle traffic/idle time cost, \$240,000 per year

\$1.8 million in decreased home value

Increased physical risk due to road safety

High level of stress on commute

AMTRAK



1041
LONG BRANCH
Long Branch

BACK
14



Platform information sign with yellow text.

TRANSIT

DANGER
HIGH VOLTAGE



Regional Plan Association

Regional Plan Association is an independent, not-for-profit civic organization that develops and promotes ideas to improve the economic health, environmental resiliency and quality of life of the New York metropolitan area. We conduct research on transportation, land use, housing, good governance and the environment. We advise cities, communities and public agencies. And we advocate for change that will contribute to the prosperity of all residents of the region. Since the 1920s, RPA has produced four landmark plans for the region, the most recent was released in November 2017. For more information, please visit rpa.org or fourthplan.org.

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