

2013 Report Year 

# NTD

National Transit Database



## National Transit Summaries and Trends

Office of Budget and Policy  
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## Introduction

### General Information

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Welcome to the National Transit Summaries and Trends (NTST), one of the Federal Transit Administration's (FTA) National Transit Database (NTD) Annual Data Products. The goal of the NTST is to present and summarize transit data in an easy-to-read format and to introduce public transit in the United States. This 2013 NTST discusses data from 2004 to 2013. With the exception of the Rural Reporters appendix, all data included in the NTST are from urban reporters, whose data may also include service operated in rural areas.

### What is the National Transit Database (NTD)?

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The National Transit Database (NTD) is the primary source for collecting information and statistics on transit systems in the United States. Congress requires the NTD to collect financial and service information annually from public transportation agencies that benefit from FTA Urban and Rural funds. The NTD also requires its larger reporters (Full Reporters) to submit monthly operating and safety data. Each year, the FTA uses NTD data to apportion over \$8 billion to urbanized areas (UZAs), States, and recipients from other programs such as §5337 (State of Good Repair grants), §5339 (Bus and Bus Facilities capital program), and §5310 (Transportation for Elderly Persons and Persons with Disabilities).

### Who reports data to the NTD?

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- **§5307 Program Recipients:** Recipients or beneficiaries of the FTA's Urbanized Area Formula Program (§5307) must file annual reports, monthly ridership, and safety and security reports with the NTD. These reporters are also called **Urban Reporters**. Beginning in FY 2011, transit agencies with 30 or fewer vehicles became eligible for reduced reporting requirements, including reporting exemptions for passenger miles, mode-specific capital and operations costs, employee counts, maintenance performance, energy consumption, monthly ridership, and safety data.
- **§5311 Program Recipients:** Recipients or beneficiaries of the FTA's Other Than Urbanized Area Formula Program (§5311) must file annual reports to the rural module of the NTD, also called **Rural Reporters**. States and Indian Tribes report directly to the NTD. States file reports on behalf of their sub-recipients, who do not report directly to the NTD.
- **Voluntary NTD Reporters:** The FTA accepts voluntary NTD reports from other transit systems, both public and private, that serve both urbanized and non-urbanized areas. Voluntary reporters must provide public transportation services and meet all of the same reporting obligations as mandatory reporters.

Some agencies that do not operate transit service report to the NTD. **Capital Reporters** are agencies that benefit from federal funding and are in the process of building transit infrastructure, but do not yet operate service. **Planning Reporters** do not intend to operate

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transit service, but instead receive federal funding and distribute the funds among transit operators in their area.

Because of the difference in reporting requirements for agencies that report as Small Systems, certain exhibits within this document exclude their data for the entire ten-year period. In these cases, exhibits are labeled with a footnote. Unless otherwise noted, all exhibits in the NTST include data from all urban reporters.

### What are the modes of transit?

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Public transit includes bus routes, train schedules, ferryboat rides, request-a-ride paratransit, and much more. Different types of vehicles, scheduling, and more distinguish the 'Modes' of transit. The following are public transit modes uniquely identified by the FTA:

- **Aerial Tramway (TR)** is an electric system of aerial cables powered by centralized motors with suspended powerless passenger vehicles.
- **Alaska Railroad (AR)** is a special mode for passenger cars on the Alaska Railroad.
- **Bus (MB)** includes a variety of rubber-tired passenger vehicles operating on fixed routes and schedules over roadways.
- **Bus Rapid Transit (RB)** is a fixed-route bus mode that operates intensively and at least 50 percent on its own pathways to emulate rail transit.
- **Cable Car (CC)** is a street traffic railway with individually controlled rail cars propelled by underground cables powered by centralized motors not on board the cars.
- **Commuter Bus (CB)** is a fixed-route bus mode that primarily connects outlying areas with a central city through bus service that goes at least five miles with closed doors.
- **Commuter Rail (CR)** is an electric or diesel propelled railway for urban passenger travel on freight or Amtrak rail between a central city and adjacent suburbs.
- **Demand Response (DR)** includes automobiles, vans, or small buses dispatched by request to pick up passengers and transport them to their destinations on undefined routes.
- **Demand Response-Taxi (DT)** is a Demand Response function operated through contracted taxicab providers.
- **Ferryboat (FB)** is a seafaring mode carrying passengers and/or vehicles over a body of water using steam or diesel-powered boats.
- **Heavy Rail (HR)** is an electric unshared railway with the ability to carry a heavy volume of passengers. HR vehicles are typically powered by an electrified third rail.

- **Hybrid Rail (YR)** systems primarily operate light rail-type diesel multiple unit vehicles on the national system of railroads.
- **Inclined Plane (IP)** is a railway on steep slopes with powerless vehicles propelled by centrally powered moving cables.
- **Jitney (JT)** includes passenger cars or vans on fixed routes (sometimes with minor deviations) according to passenger demand without fixed schedules or fixed stops.
- **Light Rail (LR)** is typically an electric railway with a light passenger volume capacity compared to heavy rail (HR). LR vehicles are typically powered by overhead catenaries.
- **Monorail/Automated Guideway (MG)** includes rail vehicles on exclusive guideway without using steel wheels on rails. Many of these systems run without operators.
- **Público (PB)** includes passenger vans or small buses operating with fixed routes but no fixed schedules.
- **Streetcar Rail (SR)** is a rail transit system powered by overhead catenaries, and operating mostly on streets in mixed traffic.
- **Trolleybus (TB)** is an electric rubber-tire bus system powered by overhead catenaries, and operating on streets in mixed traffic.
- **Vanpool (VP)** includes vans, small buses, and other vehicles operating as a ride sharing arrangement, transporting at least seven people directly between their home area and a regular destination.

### What is an Urbanized Area (UZA)?

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The U.S. Census Bureau defines urbanized areas (UZAs) based on incorporated places (e.g., cities, towns, villages) and their adjacent areas. The U.S. Census Bureau considers a densely populated area of 50,000 people or more to be an urbanized area. There are 498 UZAs according to the 2010 U.S. Census, and while urbanized areas make up 2.5 percent of United States land area, the populations of urbanized areas make up 71.5 percent of United States population.

The FTA bases UZA designations on the most current Census. The NTD reporting system assigns a unique number to each of the UZAs in the 50 States and the District of Columbia a numerical ranking by population size. For the purpose of transit grants, the FTA also designates the Virgin Islands and certain areas in Puerto Rico as urbanized areas.

In the NTD, transit providers indicate the primary UZA of service operations as their “primary UZA” along with any secondary UZAs. The NTD groups UZAs into the following categories for the purposes of the NTST:

- **UZAs Over 1 million:** population of more than 1 million (42 urbanized areas, 338 agencies, or 32.6 percent of all agencies reporting).



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- **UZAs Under 1 million:** population of more than 50,000 and less than 1 million (456 urbanized areas, 700 agencies, or 67.4 percent of all agencies reporting).

### What is a Rural Area?

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Rural areas are all areas not included in a UZA. The FTA includes Urban Clusters (2,500 – 50,000 population) in rural areas, while the U.S. Census Bureau considers Urban Clusters a part of urban areas. For this reason, the FTA provides “Other Than Urbanized Area Formula Program” funds to reporters to the rural module of the NTD. In comparison to UZAs, rural areas tend to have large distances between transit destinations and smaller populations.

### What data does the NTD collect?

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Transit operators report information regarding service provided, service consumed, and service resources, including financial data. Service provided includes information such as Vehicle Revenue Hours (VRH) and Vehicle Revenue Miles (VRM). Service consumed is described in terms of Unlinked Passenger Trips (UPT), the total count of individual vehicle boardings, and Passenger Miles Traveled (PMT), the total number of miles traveled by passengers. Service resources include many values such as operating funding – approximated through Operating Expenses (OE), Vehicles Operated at Maximum Services (VOMS), and fixed guideway Directional Route Miles (DRM – number of miles of movement area dedicated solely to transit vehicles).

### What is Safety and Security reporting?

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NTD safety and security (S&S) reporting requires all reporters to provide the number of safety and security events that involve the transit system’s property, along with the number of fatalities and injuries that result from those safety and security events. While the exact reporting timelines and level of detail differ slightly based on agencies’ NTD reporting type, a safety or security event is one that meets any of the following criteria:

- A fatality resulting from the event occurs within 30 days
- Injuries to one or more persons resulting from the event that require immediate transport for medical attention
- The estimated property damage from the event is at least \$25,000
- An evacuation is made for life safety reasons

Generally, the NTD requires Full Reporters to provide summary data for all events on a monthly basis. However, these agencies report additional details for more serious safety events. In contrast, §5311 reporters and urban Small Systems provide annual summary totals of safety and security events, fatalities, and injuries.

## Rounding and Inflation

Rounding may lead to minor variations in total values from one exhibit to another, or may lead to instances where percentages may not add to 100. Due to rounding, percent changes may not exactly match the values calculated using the formatted figures shown in the exhibits.

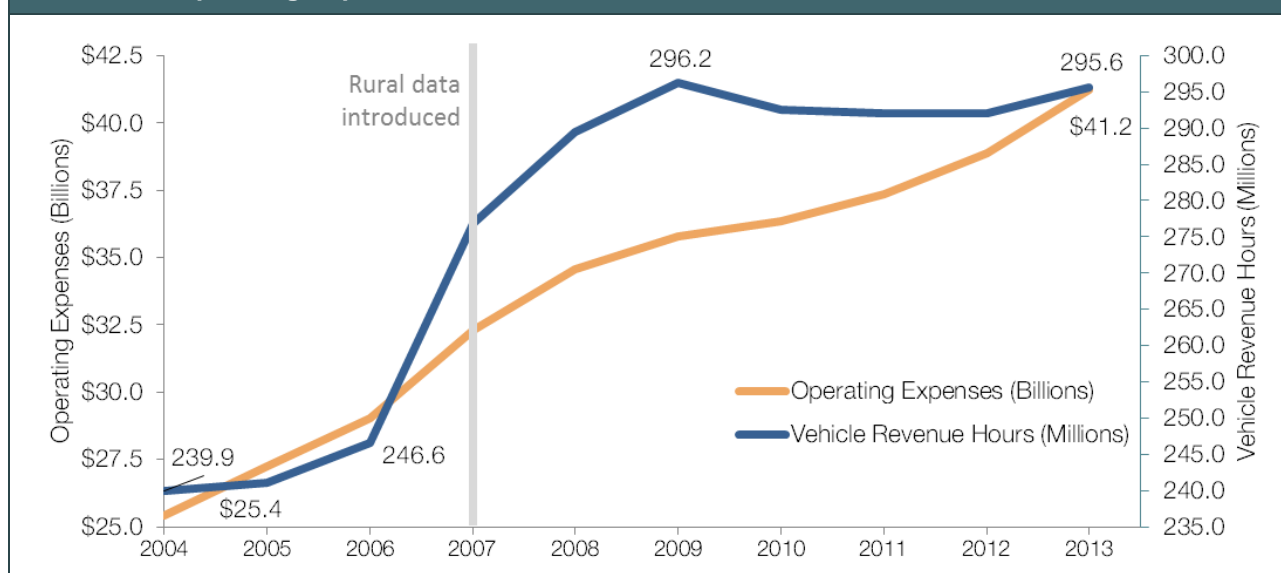
The NTD has adjusted all exhibits involving dollar amounts to 2013 constant-dollar values, or dollar amounts adjusted in terms of constant purchasing power. In previous versions of the NTST, the NTD obtained correction factors for current year constant dollars from the White House Office of Management and Budget. In order to represent public transit's economic trends, the NTD acquired correction factors for the 2013 version from the National Highway Construction Cost Index (NHCCI). For more information regarding correction factors, please visit this link: <http://www.fhwa.dot.gov/policyinformation/nhcci.cfm>.

## Web Information

For information about National Transit Database publications and training, visit the FTA website at [www.fta.dot.gov](http://www.fta.dot.gov) or visit the National Transit Database website at [www.ntdprogram.gov](http://www.ntdprogram.gov).

## Transit Trends in Service Operated, Service Consumed, and Costs

**Exhibit 1 — Operating Expenses and Vehicle Revenue Hours: Time Series**

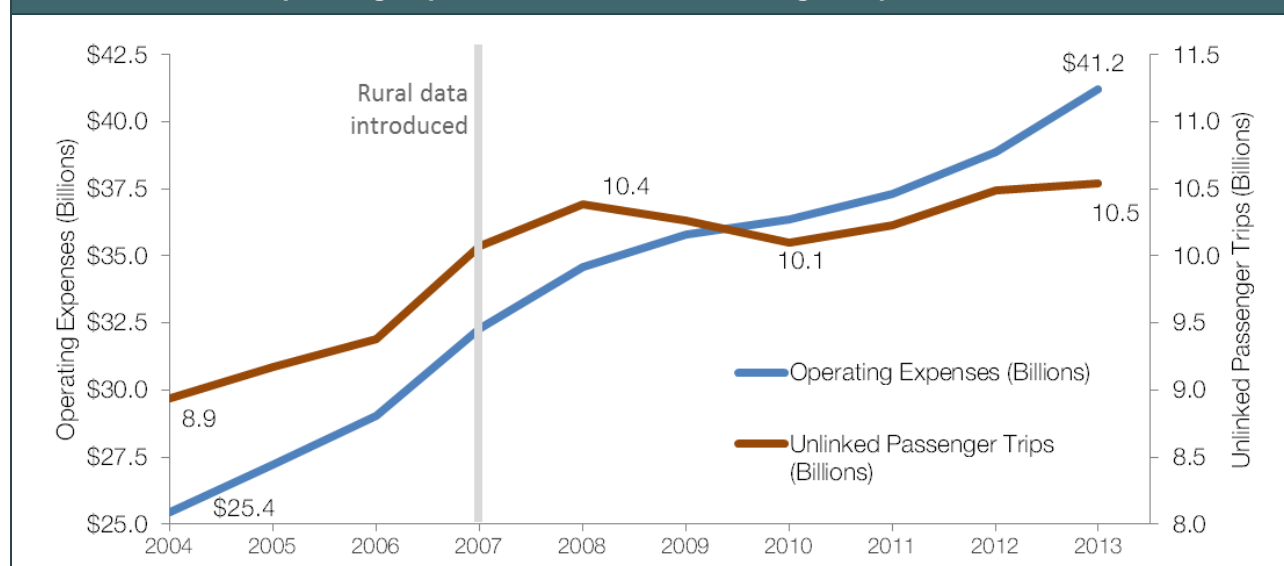


Since 2004, use of public transit has increased in terms of service operated, service consumed, and service costs. In 2007, the FTA introduced rural service data, increasing total transit service data. Unlinked passenger trips increased 18 percent (8.9 billion to 10.5 billion), vehicle revenue hours increased 23 percent (239.9 million hours to 295.6 million hours), and operating expenses increased 62 percent (\$25.4 billion to \$41.2 billion). While operating expenses experienced only a brief plateau during the recession, service operated dropped 1.4 percent from 296.2 million revenue hours in 2009 to 292 million revenue hours in 2011. Passenger trips began dropping

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the year before, making a 2.7 percent drop from 2008 to 2010 (10.4 billion trips to 10.1 billion trips).

**Exhibit 2 — Urban Operating Expenses and Unlinked Passenger Trips: Time Series**



## Report Year 2013 Service and Cost Ratios

Service is provided, consumed, and financed differently for every transit mode. Service factors and expenses depend on the limitations and opportunities of different vehicles, and the operating environment of different areas. For example, the average total operating cost per vehicle revenue hour is highest for ferry systems (FB, \$1,532.07). However, the mode provides an average of 179 trips per hour on large boats, thus the final cost per unlinked trip is relatively low (\$8.58).

**Exhibit 3 — Cost Per Vehicle Revenue Hour**

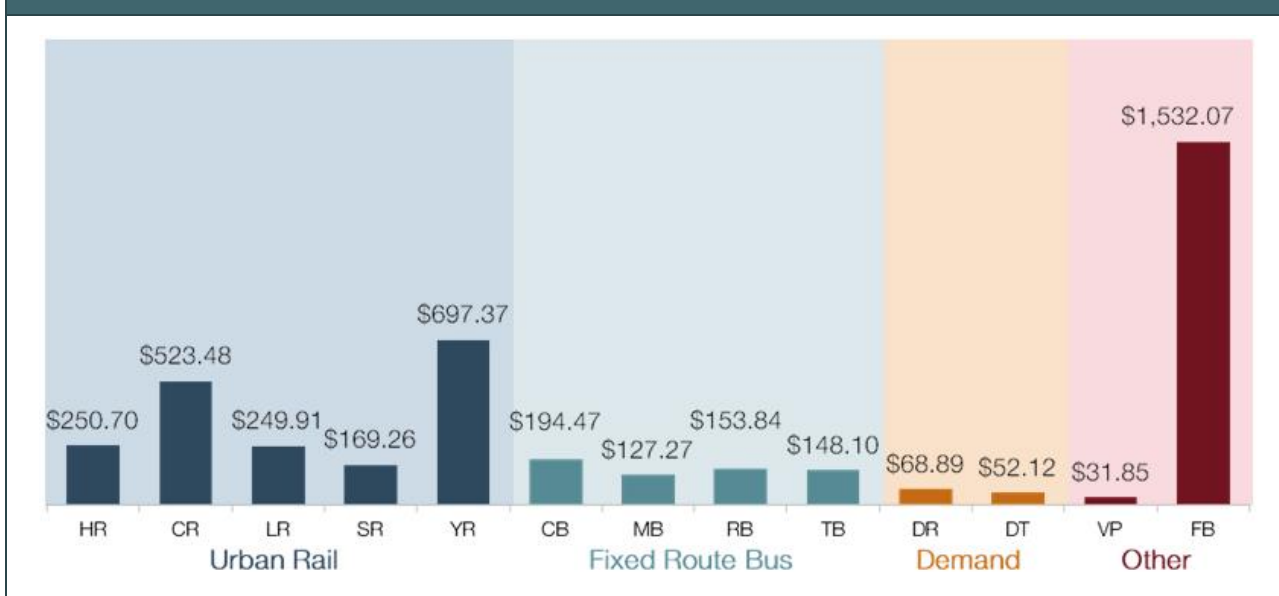
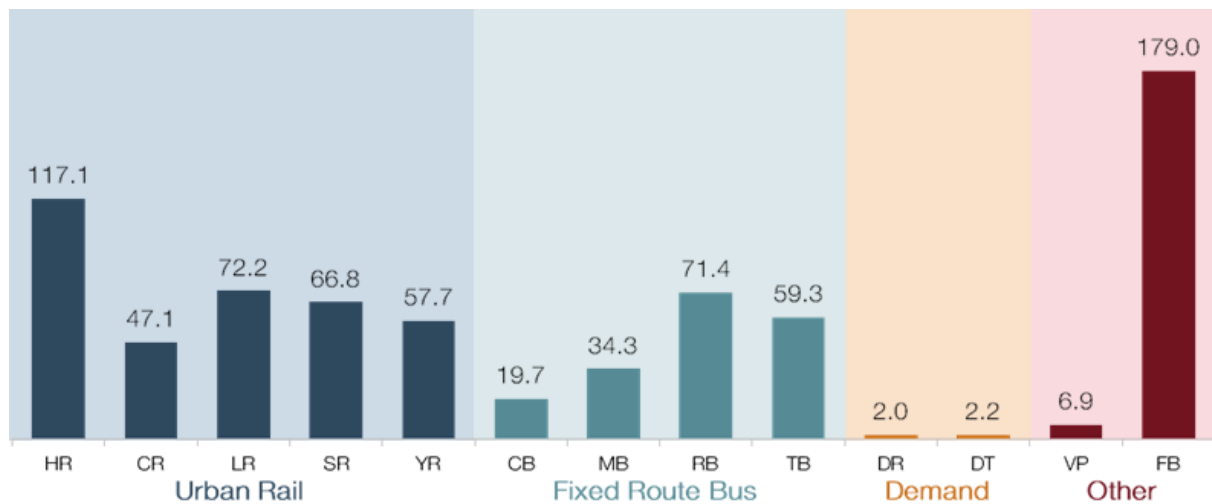
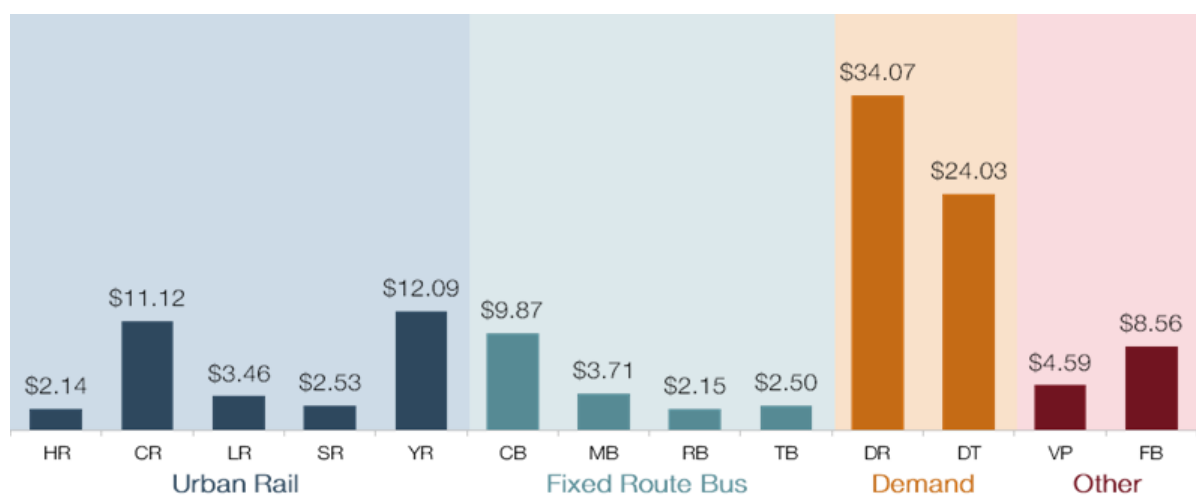


Exhibit 4 — Unlinked Passenger Trip per Vehicle Revenue Hour



Demand modes (demand response (DR) and demand response taxi (DT)) are very inexpensive per vehicle hour because they require fewer workers and vehicles. However, these modes frequently provide few or even single-passenger trips for individuals meeting the requirements of the Americans with Disabilities Act (ADA). Due to the fewer trips per hour, the ultimate cost per unlinked trip on these modes is higher than other transit modes.

Exhibit 5 — Cost per Unlinked Passenger Trip

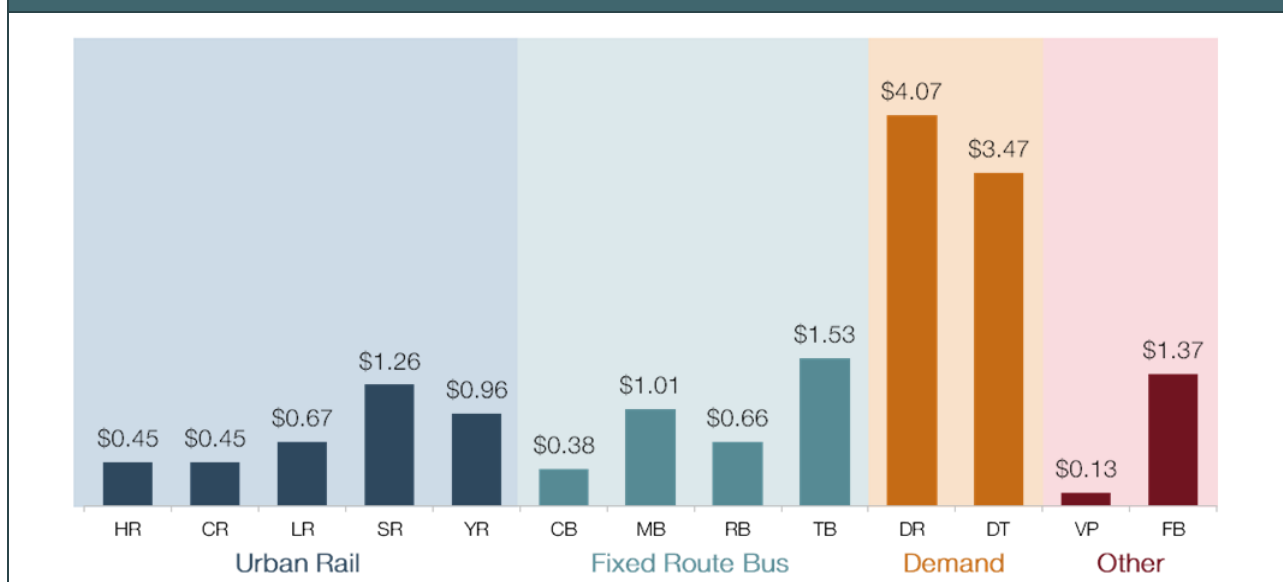


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Urban rail modes split further into transit rail (heavy rail (HR), light rail (LR), and streetcar (SR)) and commuter rail (commuter rail (CR) and hybrid rail (YR)). Typically, transit rail passengers use these services for shorter trips, while commuter rail services carry passengers for longer trips on the FRA-regulated general railroad system. Transit rail has among the highest number of trips per hour among all modal categories. Therefore, even though cost per hour is higher than fixed route services, the ultimate operating cost per trip is comparable.

Unlinked Passenger Trips are only a part of service consumed; the goal of transit service is to transport passengers from one place to another, and a measure of that distance is Passenger Miles Traveled (PMT). With this more complete picture of service consumed, the operating cost per passenger unit is slightly different. Vanpool (VP) service, for example, may carry fewer people, but it carries them a consistently longer distance per trip. The opposite is true of trolleybuses (TB) and streetcars (SR), which carry many people in dense urban settings, but not very far.

Exhibit 6 — Cost per Passenger Mile



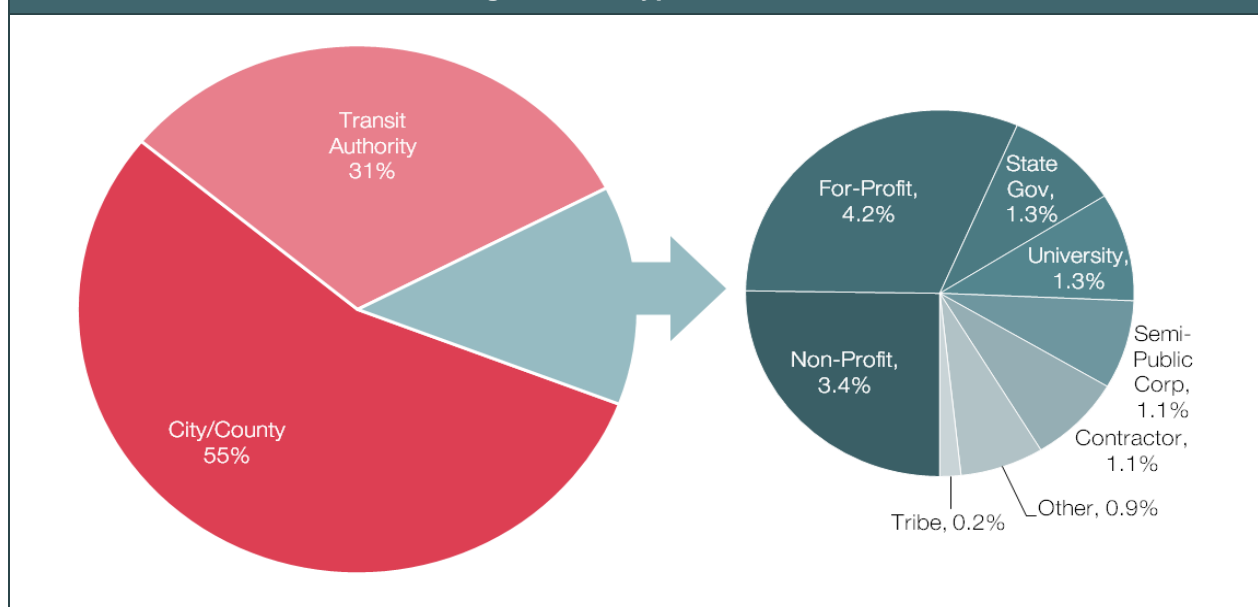
## Transit Service Providers: Organization Type

There are at least 856 public transit providers across the country with many different organization types. While the NTD allows voluntary reporters, most NTD reporters are beneficiaries of federal funding and are required to report. Therefore, the totals in Exhibit 7 do not include systems such as the Roosevelt Island Tramway in New York City and other systems that do not benefit from FTA funds and do not report to the NTD. Some NTD reporters submit a single report on behalf of multiple agencies, known as Consolidated Reporters. Exhibit 7 includes individually re-classified constituent transit operators of Consolidated Reporters. Other large transit providers separate into multiple reporters of differing services, which are re-incorporated here to represent a single transit provider.

**Exhibit 7 — Transit Providers by Type**

Organization Type	Count
City/County	472
Transit Authority	269
<i>Other Types</i>	115
Non-Profit	29
For-Profit	36
State Gov	11
University	11
Semi-Public Corp	9
Contractor	9
Other	8
Tribe	2
<b>Total Transit Providers</b>	<b>856</b>

**Exhibit 8 — 2013 Transit Provider Organization Types**



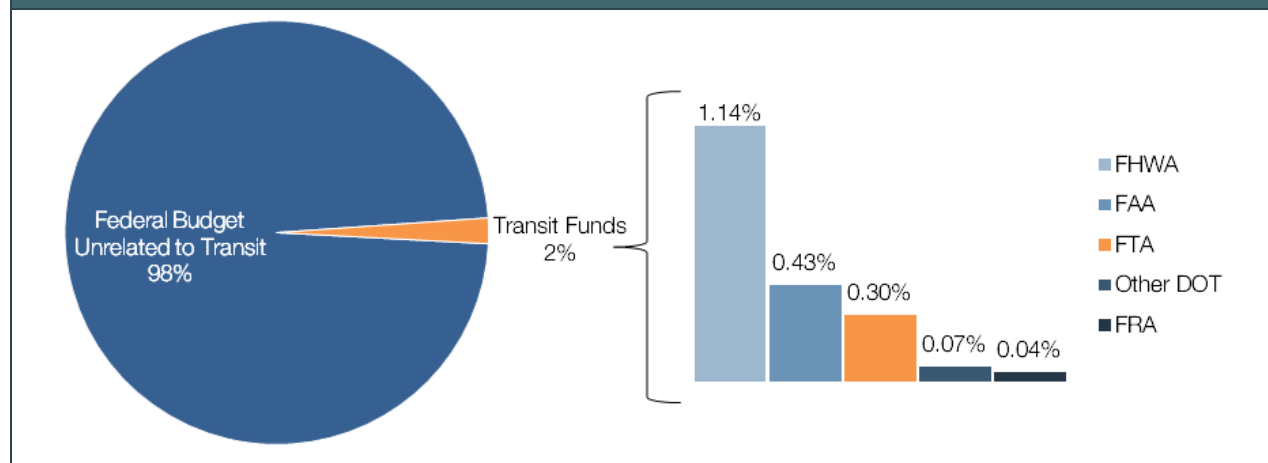
City and county organizations are departments of local government, while Transit Authorities are independent public agencies led by boards focused on providing public transit. These two types of local government subsidiaries make up 86 percent of all public transit. The remaining eighth of public transit is operated by private For-Profit companies, Non-Profit companies, contractors, and semi-public corporations (9.8 percent); state governments and departments of transportation (1.3 percent); Universities (1.3 percent); Native American Tribes (0.2 percent); and other transit operators who did not complete a report to the NTD due to a reporting waiver or a failure to report (0.9 percent).

### Federal Funding

#### The Federal Transit Administration's Annual Budget

The FTA budget is a small portion of the U.S. federal government's total annual budget. During 2013, Congress appropriated two percent (\$70.1 billion) of the total federal budget (\$3.5 trillion) for transportation needs for the entire country. Just over \$10 billion goes to the FTA, or one-third of one percent (.3%) of the total federal budget.

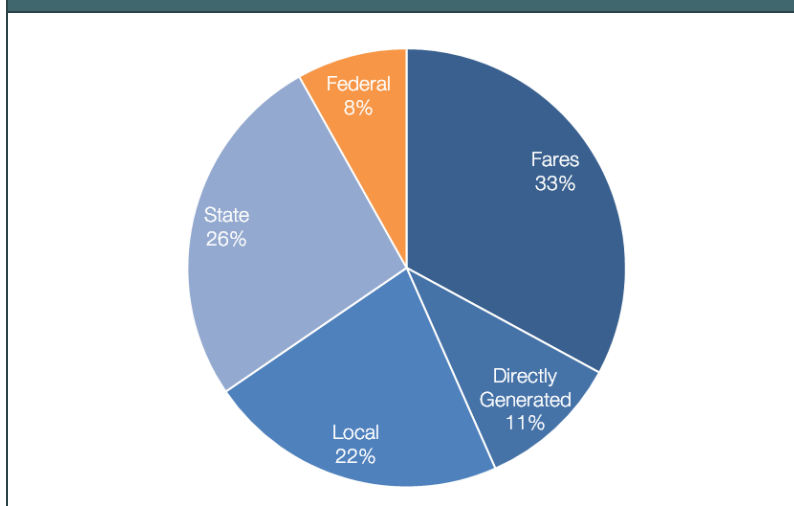
**Exhibit 9 — Transportation as a Percentage of the Total Federal Budget**



#### Operating Expense Funding Sources

On average, passenger fares fund one-third of public transportation operations in the United States, with another 11 percent earned directly by the transit operator. Local and State sources each fund about one quarter of all operations; federal government sources fund the remaining eight percent.

**Exhibit 10 — 2013 Funding Sources for Transit Operations**

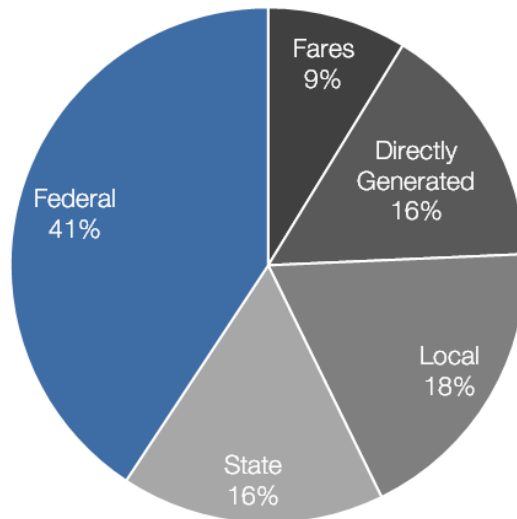


## Capital Expenditure Funding Sources

Transit operators spend resources not only on operations, but also on constructing, acquiring, and improving the systems and equipment used to operate transit service. These improvements are called Capital Expenses.

The funding support for capital expenses differs from operational expenditures. The federal government provides over 40 percent of all capital funds. Recently, transit agencies and local and state governments have increased their funding to replace and rehabilitate aging infrastructure. Fares and directly generated funds from transit agencies now account for one quarter of all capital purchases. Local and state governments jointly fund the remaining third of the capital.

**Exhibit 11 — 2013 Funding Sources for Capital Expenses**



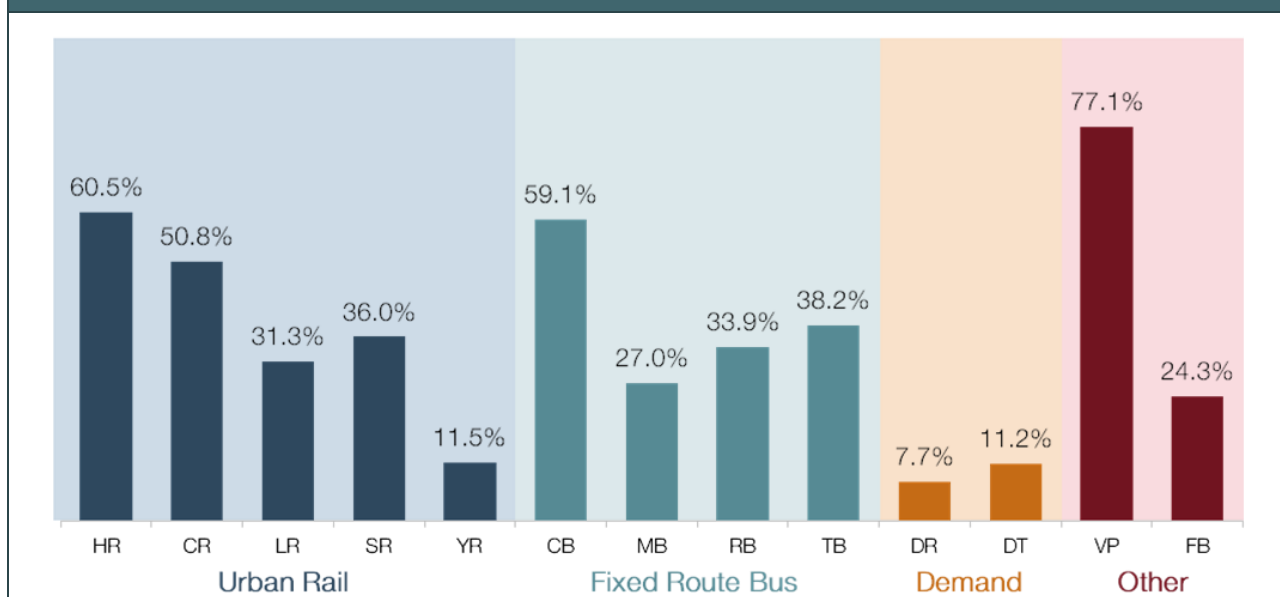


## Fare Box Recovery

### Average Fare per Operating Expense (Fare Box Recovery Ratio)

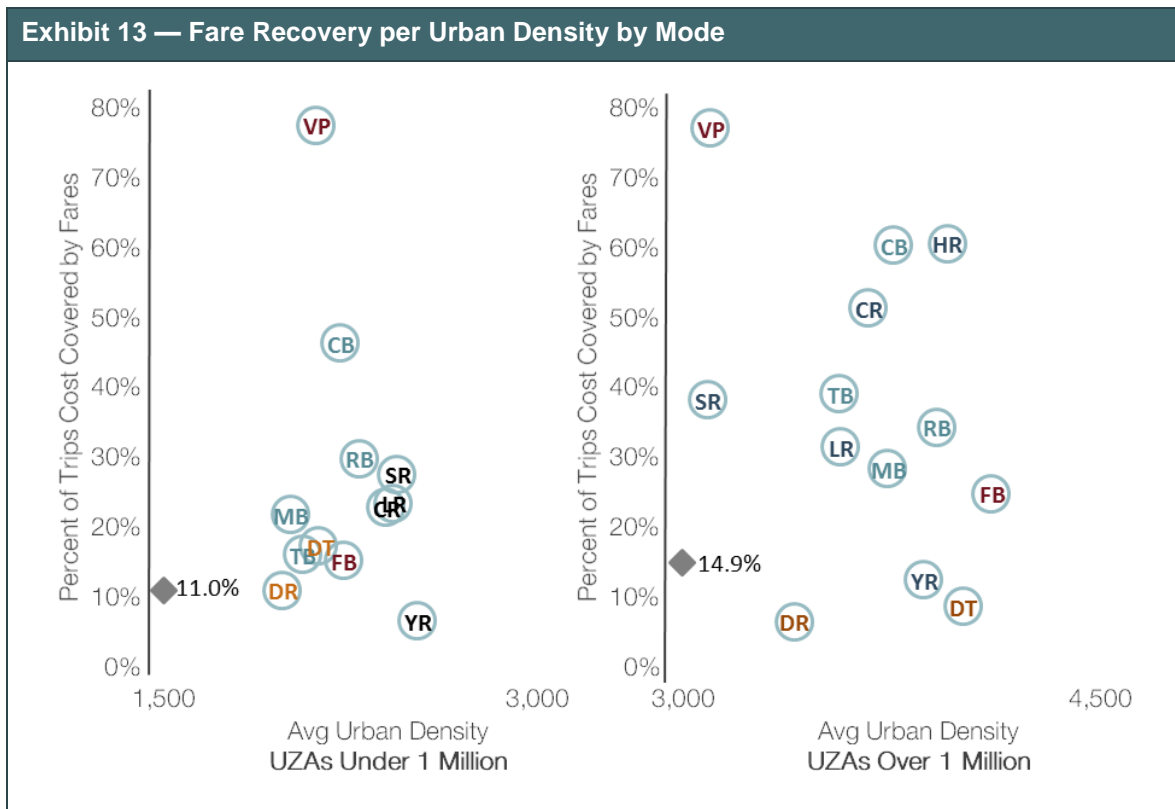
Transit agencies do not establish passenger fares simply based on the cost of each trip. Across all modes and all transit systems, the average fare recovery per unlinked passenger trip is approximately 36 percent of the operating cost for the trip. The fare box recovery ratio is the percent recovered of a trip's operating costs through passenger fares, and varies by mode and each transit operator. It is typical to see low recovery ratios on demand response services (DR and DT) that often serve the needs of customers who cannot use conventional modes of transportation and frequently have no alternative means of transportation. Vanpool transit operates by scheduling passengers ahead of time, one of the passengers drives the van, and the passengers travel together to and from the destination. This amount of scheduling ahead, unpaid drivers, and simplicity of technology reduces vanpool-operating expenses to 16.5 percent above fare revenues.

**Exhibit 12 — Fares as a proportion of Operating Costs**



## Fare Recovery per Mode per UZA

Fare recovery as a proportion of total operating costs varies significantly between transit operators. However, it is far more common for agencies in less dense areas to charge fares that cover a smaller portion of the operating cost. The median fare recovery is not excessively different, but the average densities per mode do not overlap between UZAs over and under 1 million.



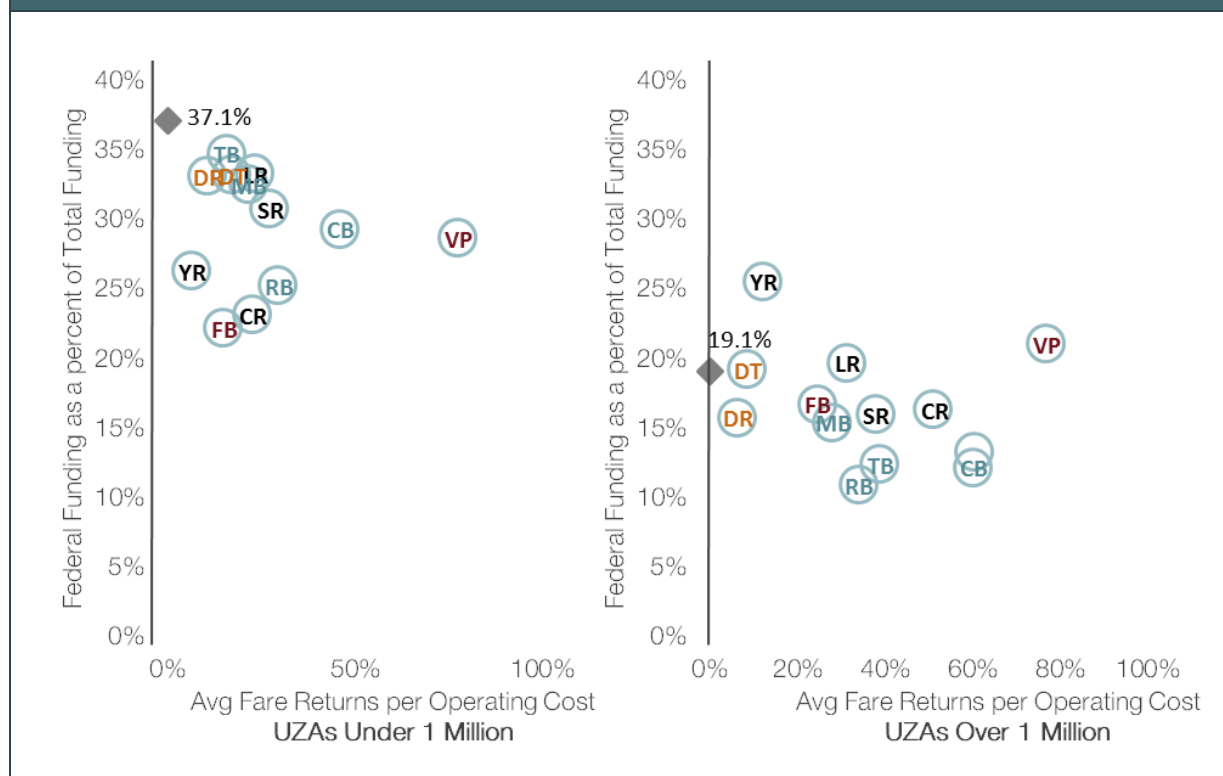
Dense urban areas are difficult to drive in, which creates incentive for commuters to choose convenient public transit over personal vehicles. These discretionary riders can consistently pay higher transit fares, making both average and median fare recovery higher in dense UZAs over 1 million. Vanpool (VP) and commuter bus (CB) modes consistently recover more fares than other modes, in part due to longer distances justifying higher prices. Demand modes (DR, DT) and hybrid rail (YR) consistently recover fewer fares than other modes, but for different reasons. Demand mode trips have increased trip costs for single individuals with disabilities or with a caretaker, and demand modes typically accommodate ADA requirements, including the requirement that paratransit fares be comparable for the same trip on regular transit. Hybrid rail transports primarily commuters, but differs from commuter rail by its light rail operation and vehicle style. Commuters on hybrid rail are offered long term passes which charge very little per trip.

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### Non-Directly Generated Funds versus Fare Box Recovery Ratio

Large transit agencies in densely populated urban centers tend to have more public funds available to build and operate their public transportation systems. With higher local and state spending, fewer federal dollars are necessary, and many large urban transit agencies do not receive any federal funding at all. Smaller Urbanized Areas, however, receive more federal dollars to balance lower local and state funding.

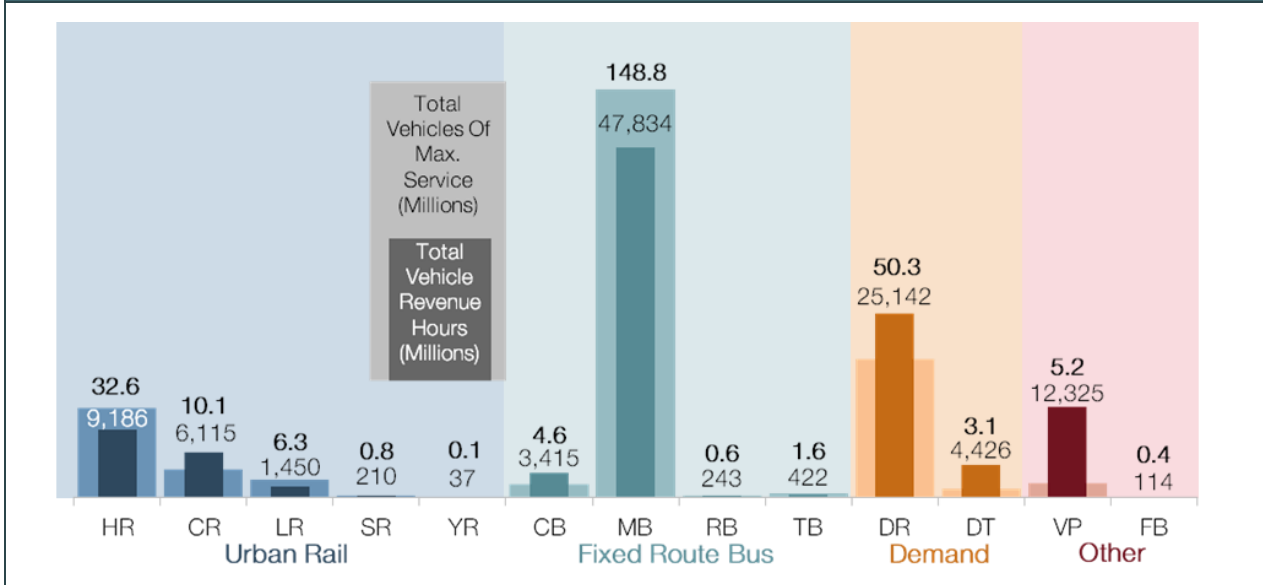
**Exhibit 14 — Percent of Federal Funds per Fare Box Ratio per Mode**



## Modal Differences

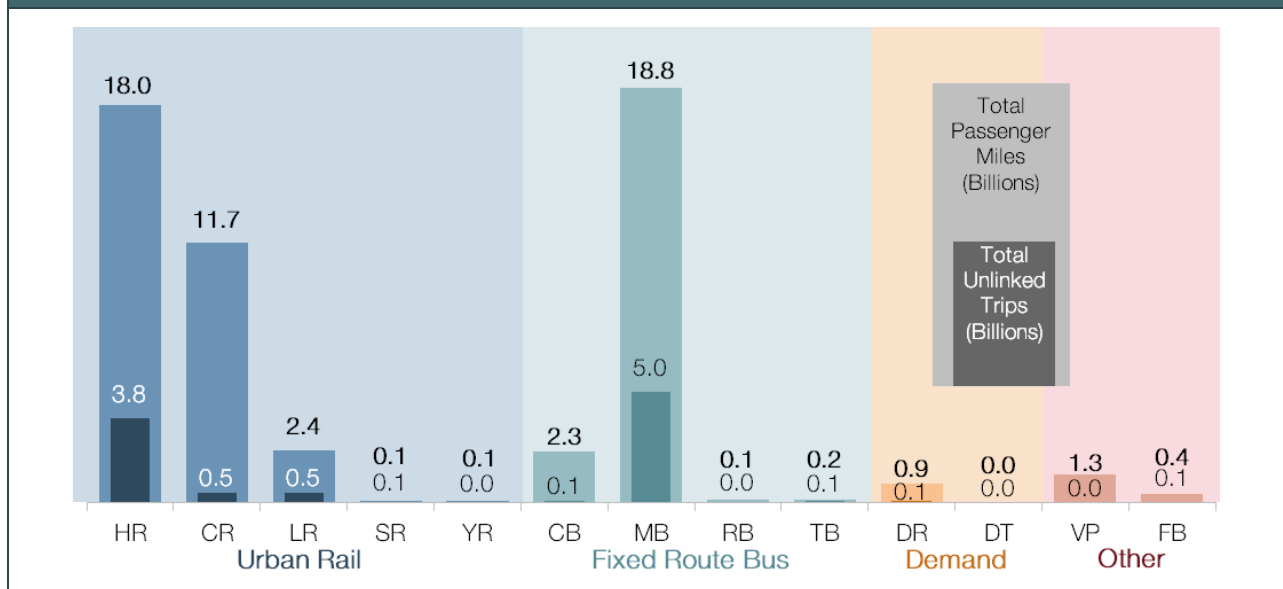
### Service Size

Exhibit 15 — Service Provided Size



The FTA differentiates many different modes, as noted previously, and those differences are clearly visible in graphs that compare and analyze transit service. For example, Exhibit 15 above demonstrates that fixed route motor bus (MB) systems are the most common form of public transit in the United States. With nearly 150 million vehicles operated in peak service (VOMS) operating over 47 billion revenue hours (VRH) of service, MB is typically the most cost effective method of providing public transit in an urbanized area where building the necessary infrastructure for a rail network is impractical. Demand response (DR) is the second largest transit service type (50 million VOMS and 25 billion VRH) and is the main provider of service in rural and sparsely populated areas. Fixed route bus or rail service often uses DR as a support mode. Of rail modes, heavy rail (HR) systems are the most used (32 million VOMS and over 9 billion VRH), with commuter (CR) and light rail (LR) falling closely behind in terms of service provided.

**Exhibit 16 — Service Consumed Size**



Motor bus (MB) transit operates the most service and carries the most passengers the farthest. Heavy rail (HR), however, operates less service than demand response (DR), but carries passengers almost as far as MB transit. This is due to the high density of passengers during peak service on HR transit. Demand transit modes operate significant amounts of service, but carry relatively few passengers.

## Service Data by Factor

**Exhibit 17 — Passenger Miles per Boardings (Average Trip Length)**

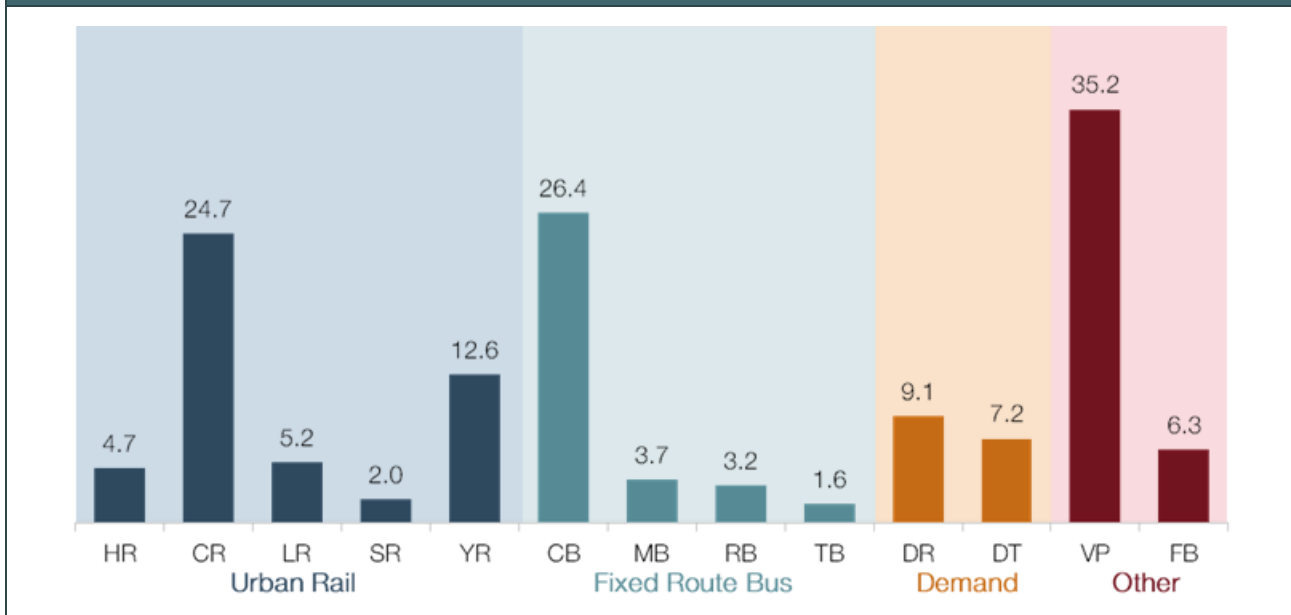
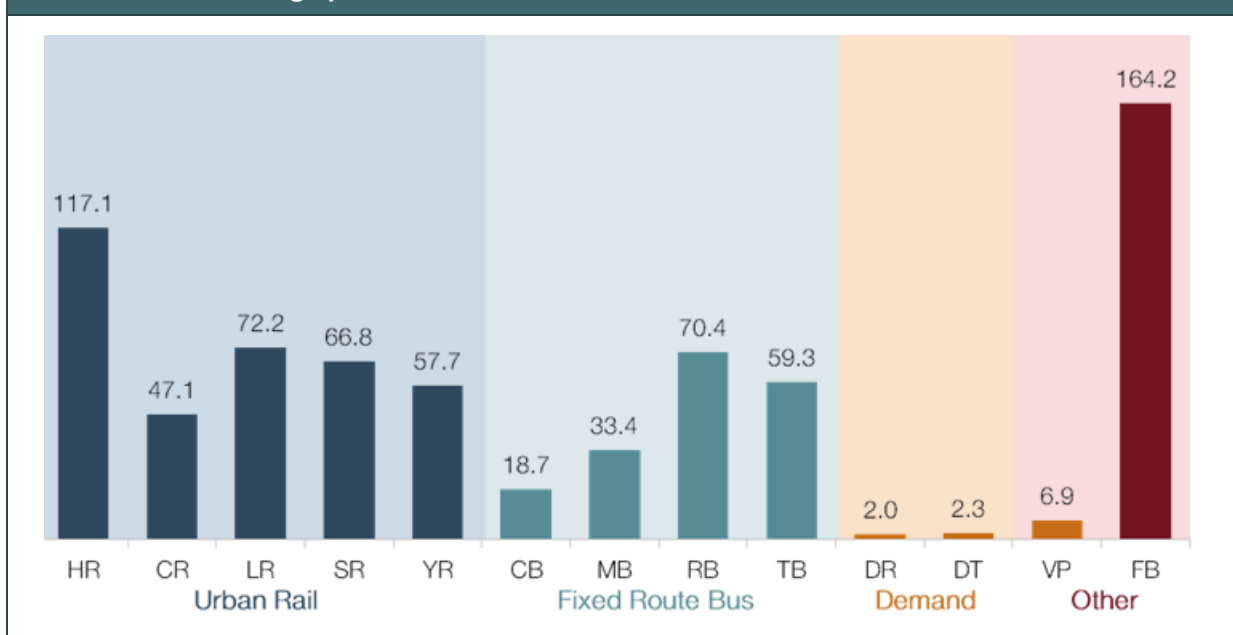


Exhibit 18 — Boardings per Vehicle Revenue Hour



Figures 17, 18, and 19 compare transit operation statistics separated by transit modes and transit service type. **Average trip length** (passenger miles per trip) estimates the average distance a passenger travels when using a certain mode of public transit, and **trips per vehicle revenue hour** indicates the volume of passengers moved in an equivalent period on a vehicle. **Passenger Miles Traveled per Vehicle Revenue Mile** estimate the average number of passengers per vehicle at any given time.

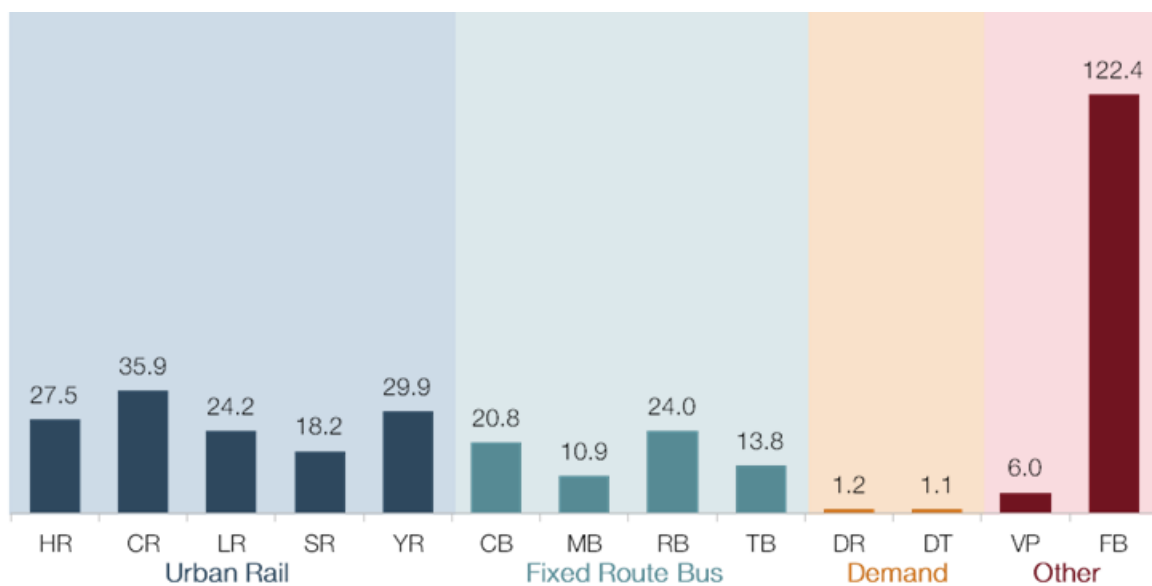
Comparing average trip length and average trips per hour demonstrates how many passengers are on a transit vehicle and how far they travel. Demand bus modes take small passenger loads a relatively long distance to meet the requirements of the ADA, and ferry boats move the largest number of passengers a very short distance across a waterway. Commuter rail (CR), hybrid rail (YR), commuter bus (CB), and vanpool (VP) all transport passengers a long distance, but carry a relatively low number of passengers per trip. Vanpool transit also uniquely includes very few transfers between vehicles and modes. Intensive city transit modes such as heavy rail (HR), light rail (LR), streetcar rail (SR), bus rapid transit (RB), trolleybus (TB), and motor bus (MB) all tend to provide a large number of trips for a much shorter distance. These intensive city transit modes also often include multiple transfers on a passenger's journey between vehicles of the same mode and among multiple modes. To get to work, for example, a passenger might take a bus trip to get to the underground train, and walk from the train station to their workplace.

Ferryboats are capable of carrying more passengers at a single time—an average of 122 passengers—than any other mode. Demand modes often assist disabled passengers as a part of the ADA and respond to single passenger trip requests, dropping their load factor to nearly one passenger at a time. For nearly all other modes that run on schedules instead of requests,

## National Transit Summaries & Trends 2013

load factor does not take into account peak travel, such as rush hour, which can be more than twice the number of passengers in off-peak times.

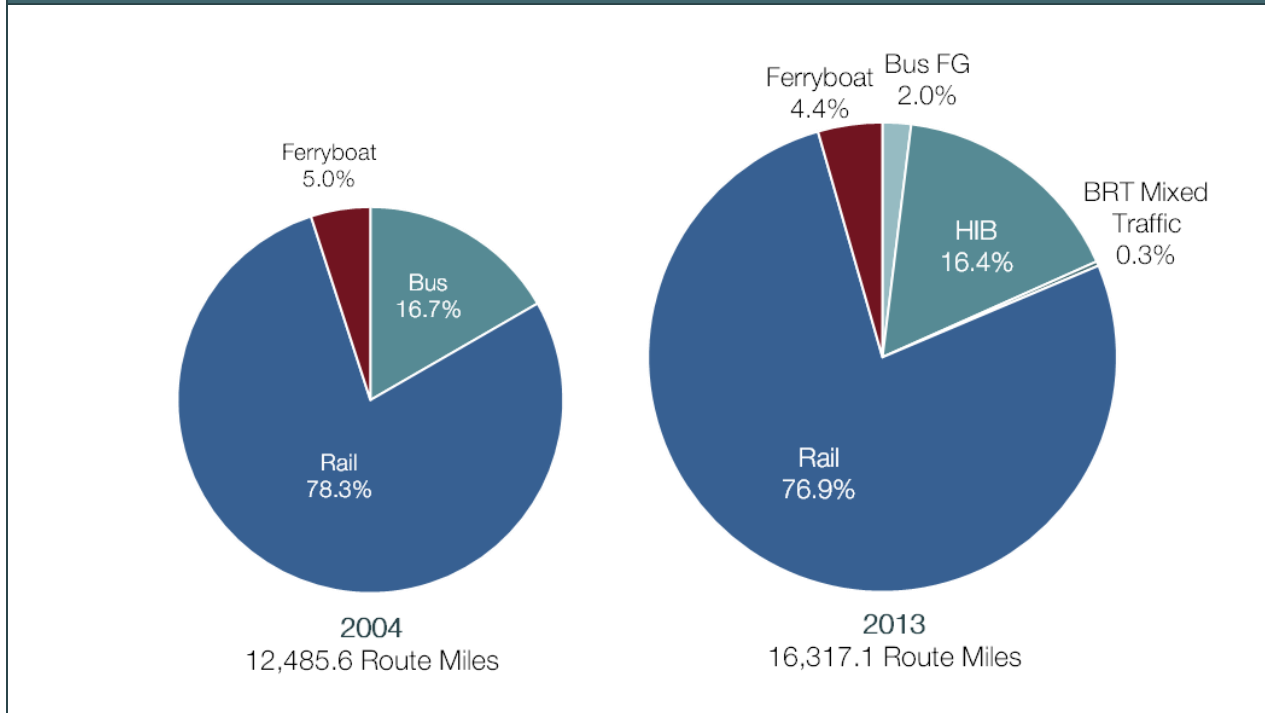
**Exhibit 19 — Passenger Miles per Vehicle Mile (Average Number of Passengers per Vehicle)**



## Fixed Guideway and High Intensity Busway

### Fixed Guideway Route Miles from 2004 to 2013

Exhibit 20 — Fixed Guideway Route Miles, 2004-2013



Public transit often operates on fixed guideway (FG) where only the transit vehicle can operate, as opposed to mixed traffic where both transit vehicles and private vehicles can operate. Since 2004, public transit agencies have developed 2,772 new miles of rail fixed guideway. Though rail construction requires large capital investments, in 2013, rail transit modes still account for 77 percent of all directional route mileage for fixed guideway, down about 1 percent from 2004. This high proportion of rail is due in part to the growth of light rail (LR) and streetcar rail (SR) modes in growing urban areas as alternatives to expensive heavy rail (HR) systems.

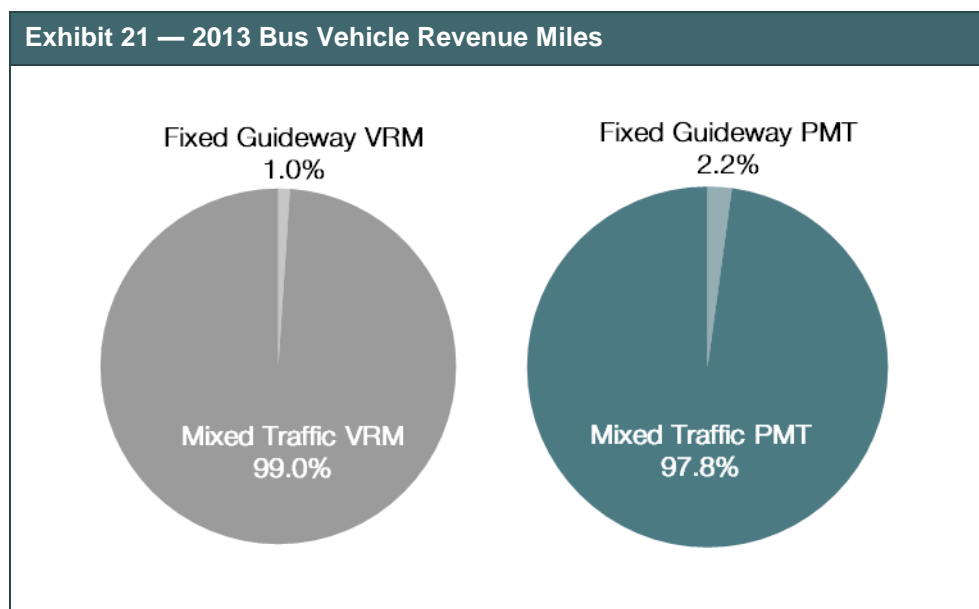
Some transit buses operate on mixed-traffic roadways but in high occupancy lanes where private vehicles are sometimes allowed; these are called High Intensity Bus (HIB) lanes. In 2012, Congress introduced the “Moving Ahead for Progress in the 21st Century Act,” or MAP-21, which identified HIB lanes as comparable to other fixed guideway systems.

In 2004, over 2,000 bus directional route miles qualified for funding as bus fixed guideway; after MAP-21, only 320 directional route miles qualify as bus fixed guideway, with the remainder being reclassified as either HIB lanes or bus rapid transit (RB) mixed traffic.



### Bus Fixed Guideway Distribution

Fixed guideway bus service moves passengers intensively in urban areas and made up 1 percent of all bus vehicle revenue miles (VRM) in 2013. However, fixed guideway bus constituted 2.2 percent of passenger miles traveled, a high proportion in contrast to 1 percent of VRM. Bus rapid transit (RB) operates as fixed guideway, but is a relatively new mode of transit in the United States. Bus rapid transit is a bus system designed to emulate rail transit capacity and speed, while taking advantage of the low cost and flexibility of bus operations.



## Safety and Security

Safety and Security (S&S) events include vehicle collisions on the roadway, assaults on transit property, train derailments, slips and falls, damage from fallen trees, and more. The NTD requires large transit agencies to report any safety or security events that meet any of the following thresholds:

- A fatality resulting from the event occurs within 30 days
- Injuries to one or more persons resulting from the event that require immediate transport for medical attention
- The estimated property damage from the event is at least \$25,000
- An evacuation is made for life safety reasons

Any of these events is a 'Major Event' that the agency must report within 30 days to help the FTA better address safety and security issues in public transit.

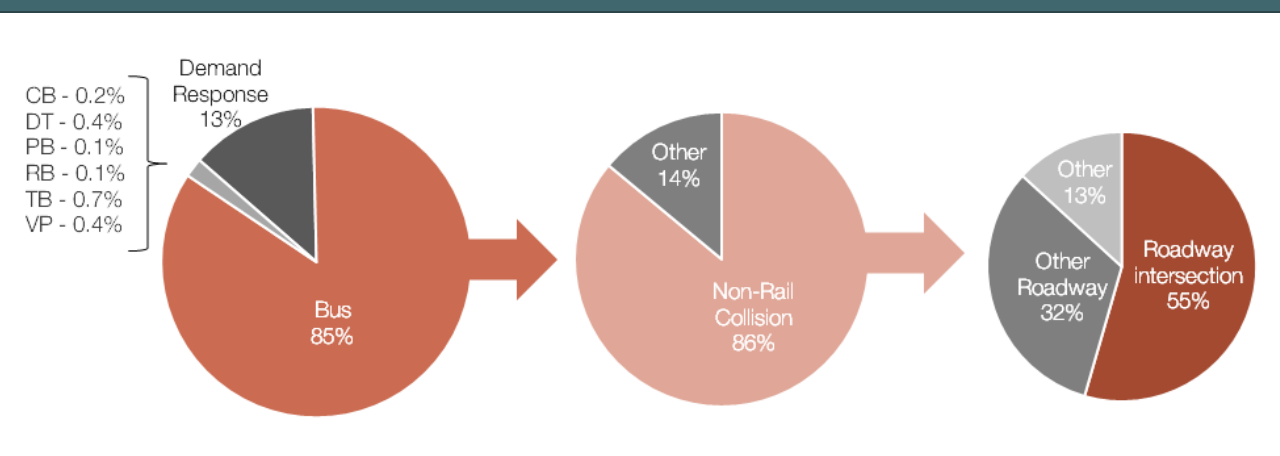
**Exhibit 22 — 2013 Safety and Security Major Event Rates by Mode**

Mode Avg.	S&S Events per 100M Revenue Miles	Fatalities per 100M Revenue Miles	Injuries per 100M Revenue Miles	Fatalities per 100 Events	Injuries per 100 Events
HR	94.0	16.8	80.7	17.8	85.8
LR	297.4	33.6	300.5	11.3	101.0
SR	1,503.0	0.0	2,746.9	0.0	182.8
YR	296.7	84.8	763.0	28.6	257.1
CB	33.7	5.1	78.3	15.0	232.5
MB	229.4	5.8	428.2	2.5	186.7
RB	340.7	0.0	936.8	0.0	275.0
TB	406.8	0.0	530.6	0.0	130.4
DR	79.9	1.3	113.2	1.7	141.7
DT	95.7	0.0	133.0	0.0	139.0
VP	11.2	0.9	29.5	8.3	262.5
FB	121.7	30.4	182.6	25.0	150.0
Total Avg.	158.6	7.2	265.6	4.5	167.5

The lowest rates of events tend to be in rural, less dense areas with fewer cars and pedestrians. Demand response modes (DR – demand response, DT – demand response taxi) and commuter modes (CB – commuter bus, VP – vanpool) all operate primarily in less dense areas where intensive transit is not available. Heavy rail (HR) transit operates primarily underground, which also reduces the opportunity for collisions with vehicles and pedestrians.

### Bus Collision

**Exhibit 23 — Non-Rail Event Categories**



Between 2008 and 2013, transit agencies reported 31,412 major events, 61 percent of which were not on rail transit. Out of these non-rail events, 85 percent were on motor bus (MB) modes.

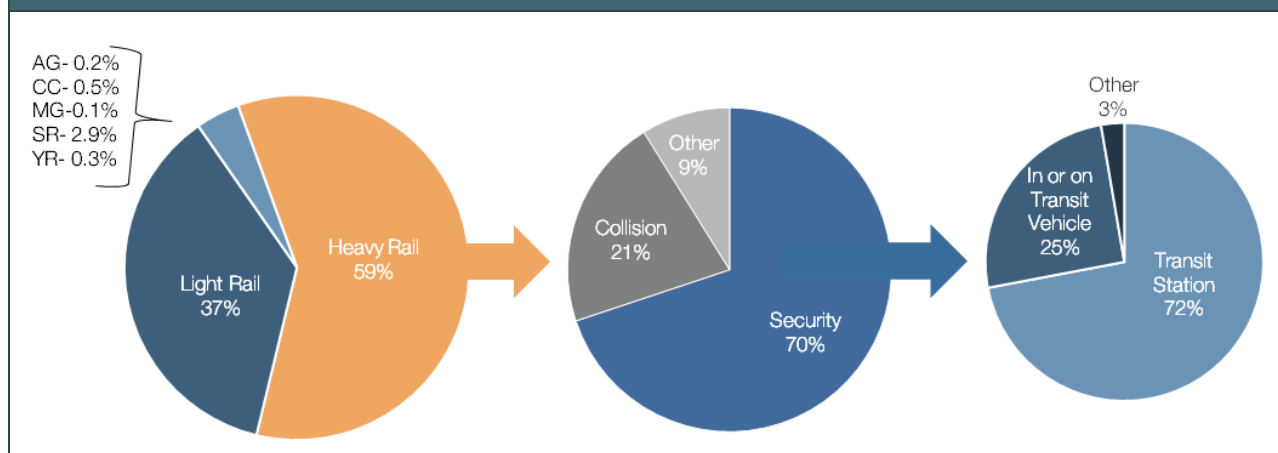
Eighty-six percent of MB events were collisions, and of those MB collisions, 87 percent occurred in the roadway, two-thirds of which were at an intersection or a grade crossing.

MB collisions account for 61 percent of all major events reported to the NTD, with more than half of those occurring at intersections or grade crossings.

### Rail Security Events

Between 2008 and 2013, urban transit agencies reported 4,920 rail safety and security events to the NTD, 59 percent of which were on heavy rail (HR) modes.

**Exhibit 24 — Rail Events by Mode**



Out of heavy rail events, 70 percent were security-related events, 72 percent of which occurred within a transit station. Rail transit operations are extremely safe since the vehicles interact far less often than bus modes with general traffic and passenger walkways.

### Fatality Rates

Public transit is very safe in proportion to the amount of service provided. In 2013, public transit had a total average rate of 7.4 fatalities per 100 million vehicle revenue miles. The majority of these fatalities are members of the public (frequently trespassers and suicides), not passengers, patrons, or workers. Passenger fatalities occur at a rate of 0.15 per 100 million Unlinked Passenger Trips. To put this into perspective, the odds of a passenger on public transit dying in one year are 1-in-20,583,036. By comparison, there is a 1-in-10,676,876 chance of dying from a lightning strike over a lifetime.

**Exhibit 25 — Fatality Rates per 100 million Vehicle Revenue Miles by Person Type**

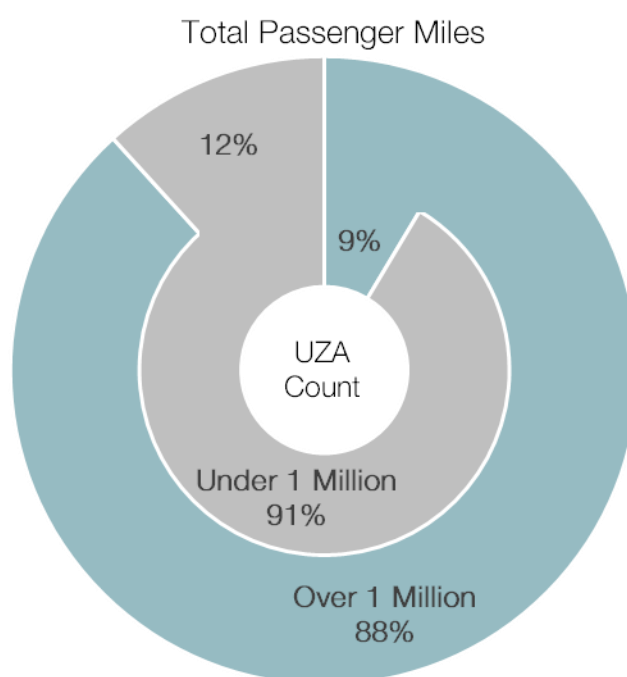


### Urbanized Areas Over and Under 1 Million People

#### Population and Transit Agencies

Nine percent of all UZAs defined by the 2010 Census have over 1 million people. That nine percent of UZAs provides 88 percent of all transit passenger miles traveled. Transit agencies serving such large metropolitan areas are providing public transit service to a much larger population, and the operations environment is different. This density of population and ridership makes individual trips less expensive, but brings a higher risk of safety and security events.

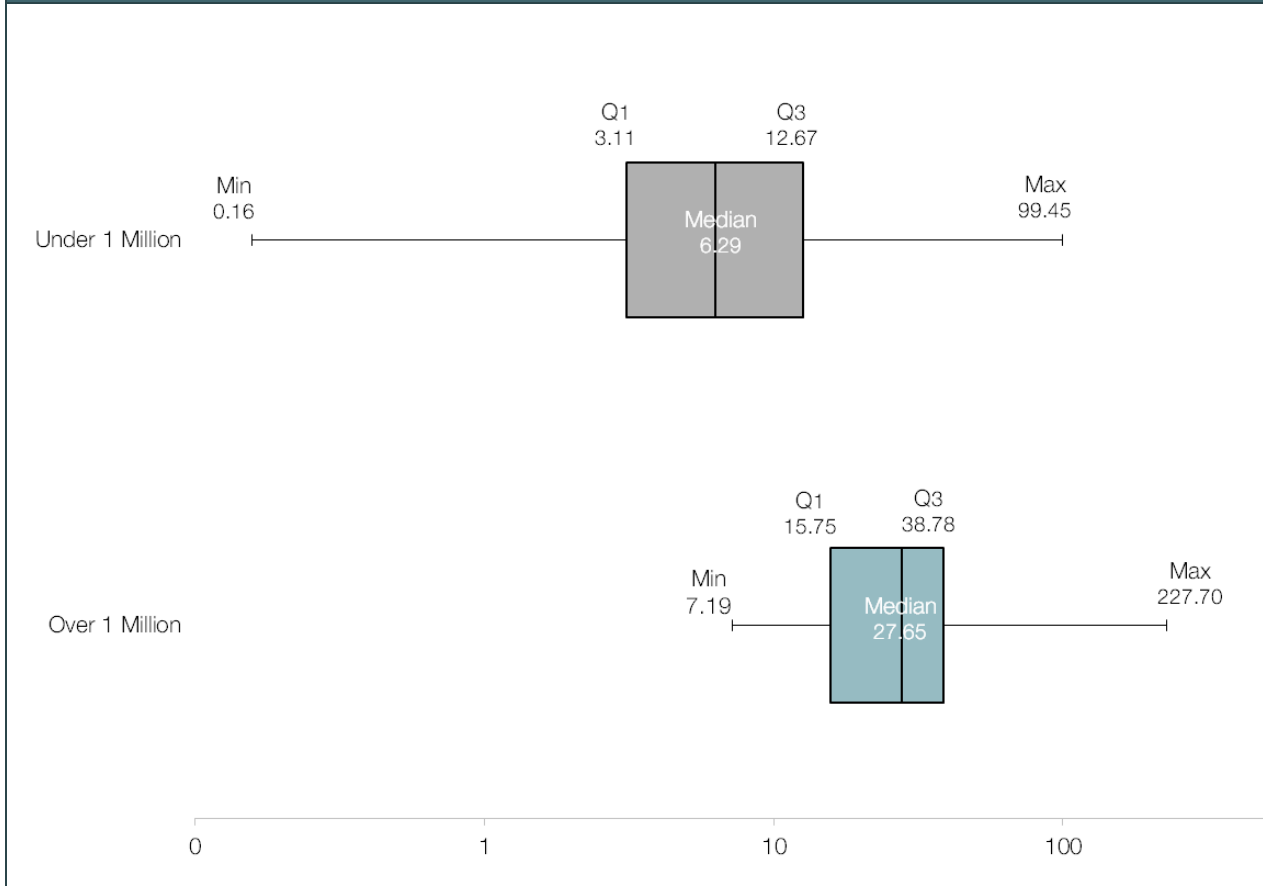
**Exhibit 26 — UZA Count and Total Passenger miles traveled**



## Trips Per Capita

Despite higher population denominators, UZAs over 1 million have more trips on public transit per capita. The median ridership density for UZAs under 1 million in 2013 is 5.11 trips per capita, whereas the median for UZAs over 1 million is 27.65. This shows higher usage of public transit in UZAs over 1 million where private transportation is both expensive and inconvenient. UZAs over 1 million also tend to have more discretionary trips, meaning there are more people preferring public transit over private cars, bikes, or walking rather than riding public transit out of necessity, medical or otherwise.

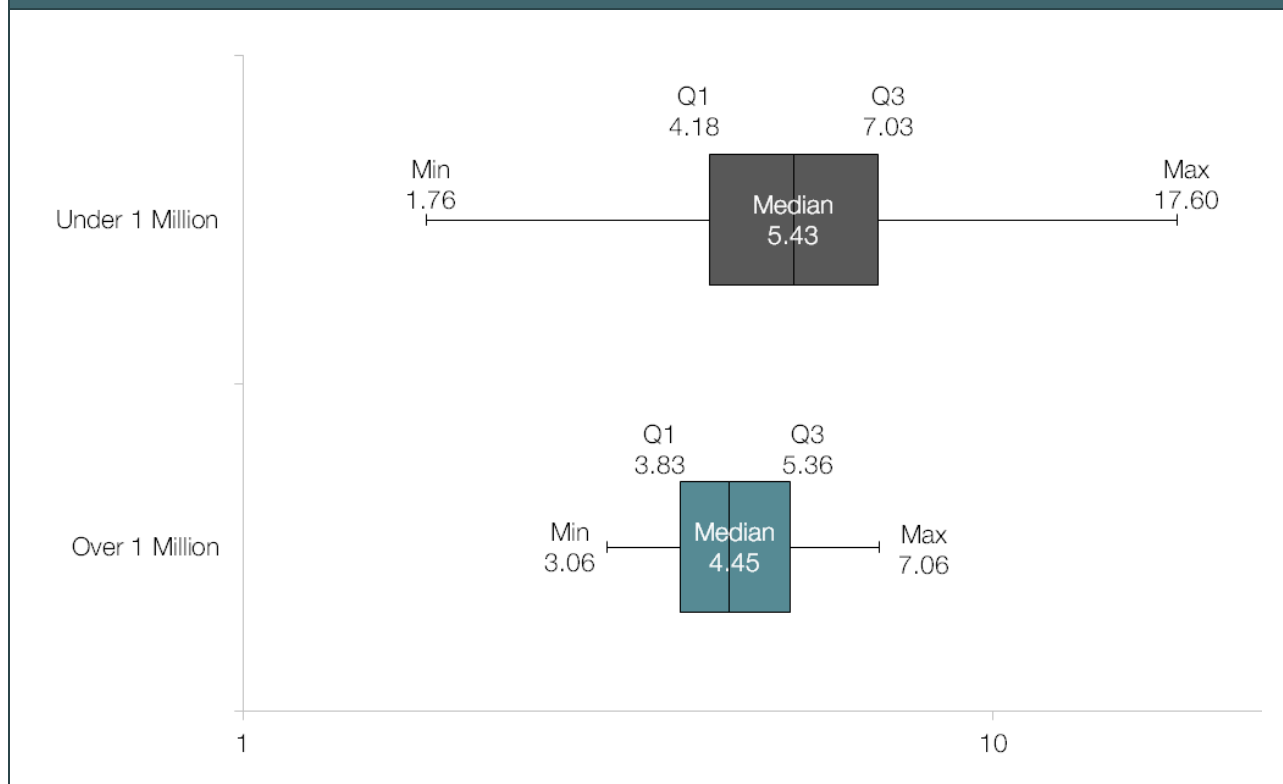
**Exhibit 27 — Ridership Density**



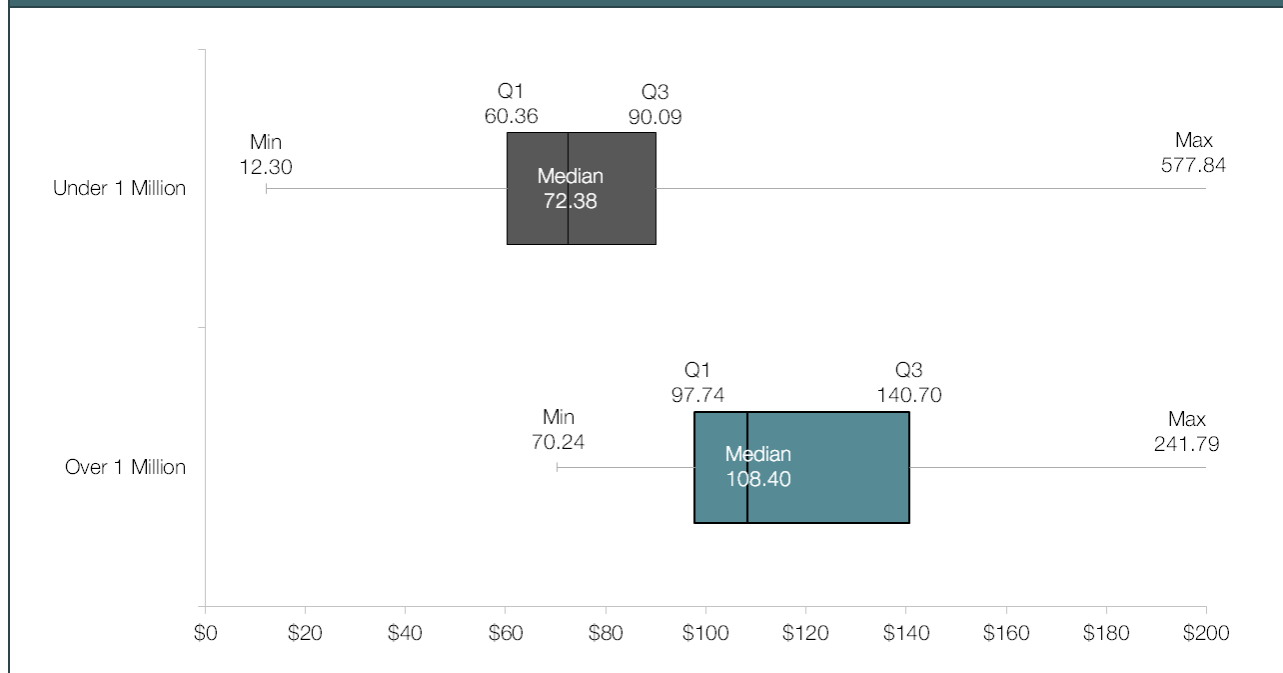
### Operating Cost per Passenger Trip

There is wide variety of costs per trip in UZAs under 1 million, more variety than for UZAs over 1 million. There is less difference between the median costs for UZAs over and under 1 million ( $\Delta$  \$2.09), suggesting that comparatively expensive rural demand response services more greatly affect UZAs under 1 million. These rural demand response services often have very low load factors, meaning the average trip services only a few passengers. Whereas UZAs over 1 million are more likely to have extensive fixed-route and rail systems which are more heavily utilized resulting in each trip carrying more passengers and maximizing cost effectiveness.

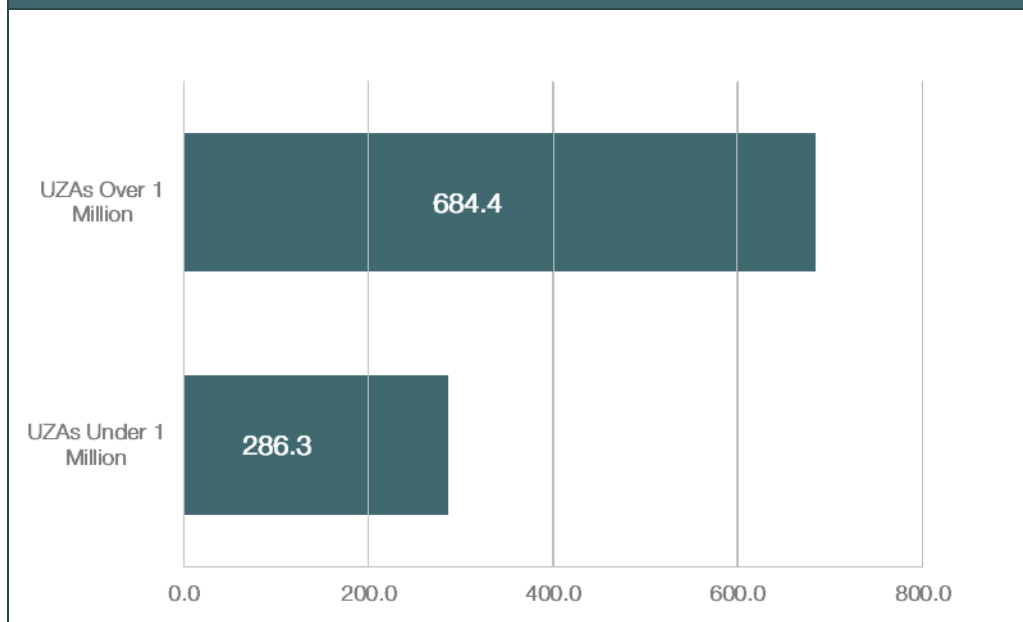
**Exhibit 28 — Operating Cost per Passenger Trip**



While UZAs over 1 million have a slightly lower cost per trip, this is reversed when measured by service provided instead of service consumed. The lowest average cost per hour in UZAs over 1 million is \$70.24, the middle of the pack (median) for UZAs under 1 million is \$72.38. This is because intensive urban city transit has significantly more passengers at a time, requiring more personnel and fixed route transit. Cost of living is higher in dense cities, increasing employee costs.

**Exhibit 29— Operating Cost per Vehicle Revenue Hour**


## Event Rate Comparison

**Exhibit 30 — Total S&S Event Rate Comparison**


Many people in a small area in UZAs over 1 million make safety and security (S&S) events more likely and possibly more damaging to the dense traffic around them. In UZAs over 1 million there were an average of 684.4 S&S events per 100 million Vehicle Revenue Miles in 2013, compared to 286.3 for UZAs under 1 million. Dense UZAs with populations over 1 million



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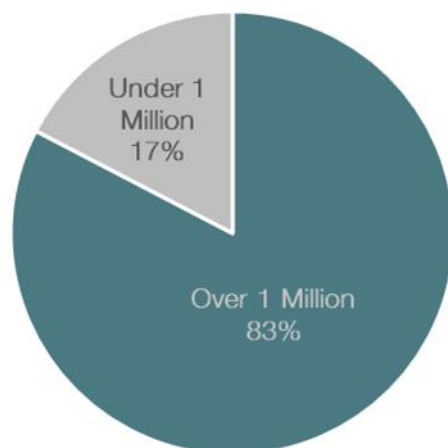
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have, by definition, larger and different populations and traffic than small UZAs. Based on the 2010 Census, UZAs over 1 million have an average of 3,229 people per square mile, while UZAs under 1 million have an average of 1,901 people per square mile. More vehicles and people in a smaller area increase the risk of human and vehicle safety accidents, as well as human security incidents.

### Fixed Guideway Comparison

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**Exhibit 31 — Rail, Bus, and other Fixed Guideway Directional Route Miles Comparison**

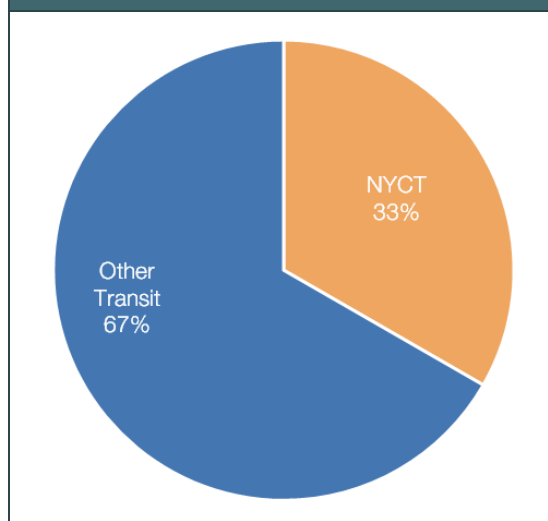


UZAs with populations over 1 million operate over 83 percent of all fixed guideway directional route miles. Each directional route mile is a mile of transit operation space where private transportation cannot operate. For example, New York City Subway operates on rail track unavailable to Amtrak, CSX, and any other private trains. The Boston Silver Line is bus rapid transit with dedicated right of way, meaning that it operates similar to rail transit, but car traffic cannot trespass on the roadway reserved exclusively for the Silver Line.

## New York City Transit

New York City Transit (NYCT) is a subsidiary of the regional New York Metropolitan Transit Authority, and is the largest public transit operator in the United States, and one of the largest transit systems in the world. NYCT has the most passenger trips, the most federal funding, and the most safety and security events in the country. The scale of NYCT operations is much different than most systems in the country and offer different opportunities for service efficiencies and systems development. The comparisons and analyses here are for urban reporters to the NTD in 2013.

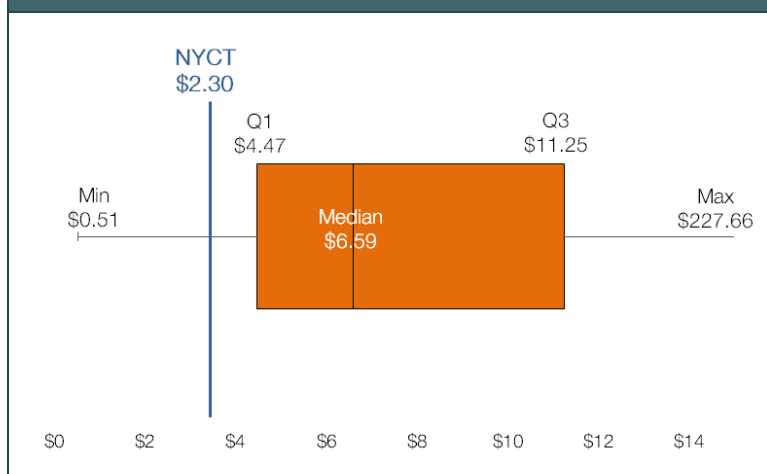
**Exhibit 32— Unlinked Passenger Trips**



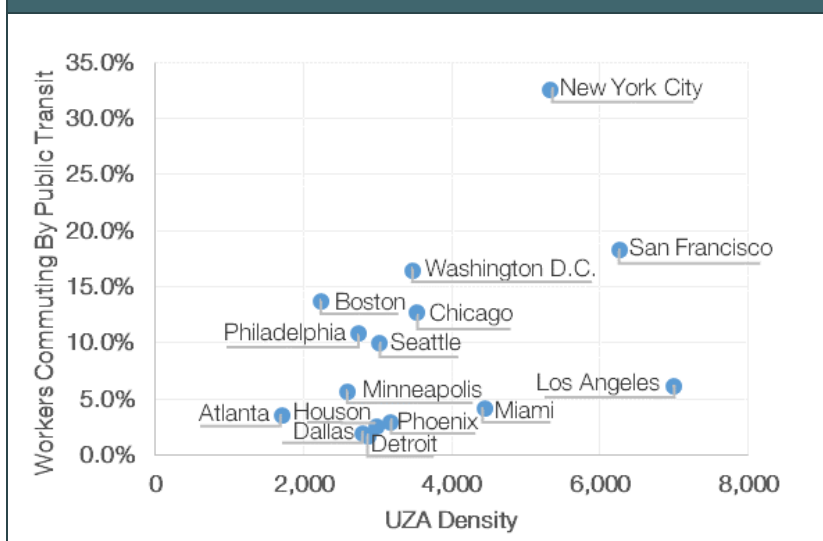
### Unlinked Passenger Trips

NYCT has the highest ridership of any public transit service provider (3.1 billion trips), supplying one-third of all urban transit trips (10.4 billion trips) in 2013. However, because of economies of scale, NYCT's operating cost per trip (\$2.30) is among the lowest in the nation (median of \$6.59).

**Exhibit 33 — Operating Cost per Trips**



**Exhibit 34 — Percent Commuters by UZA Density**



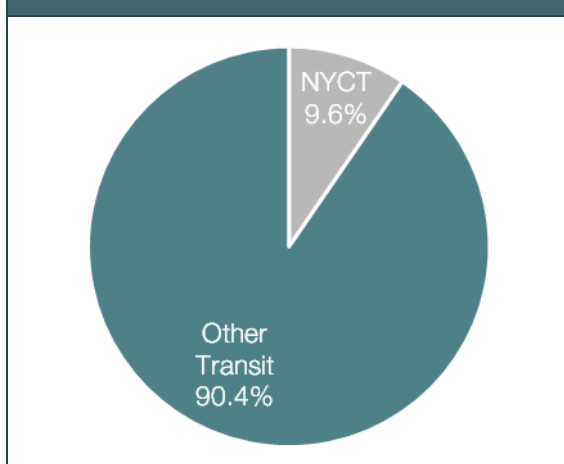
New York City experiences a higher density of trips than in other urbanized areas, allowing NYCT to use high passenger carrying modes such as heavy rail.

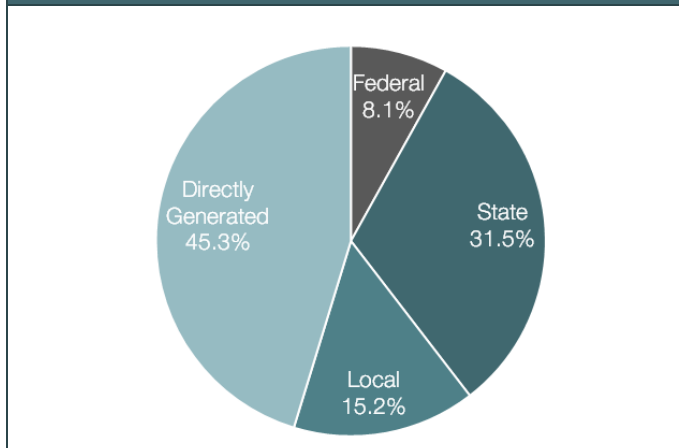
The urbanized area of New York City is unique in that 32 percent of all workers commute using public transit. San Francisco is the second highest urbanized area rate of transit for work commuting, with 18 percent.

### Federal Funding

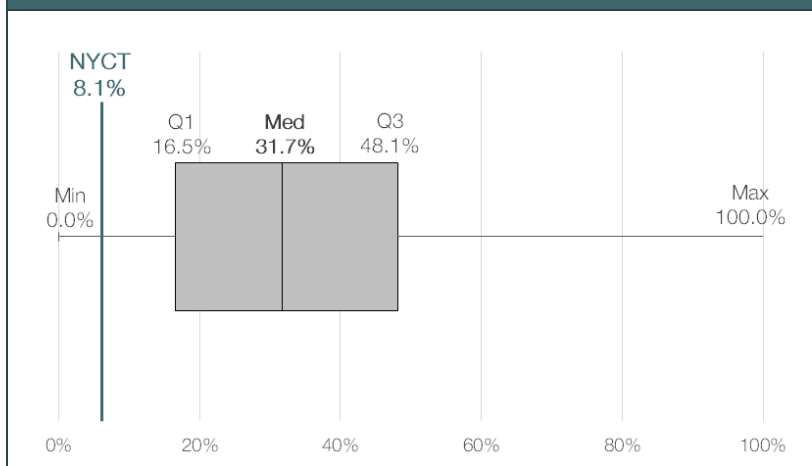
New York City Transit receives the largest amount of federal transit funding in the country by a transit provider. NYCT spent over \$1 billion federal transit dollars in 2013. American transit providers spent a combined total of \$10.6 billion federal transit dollars in 2013.

**Exhibit 35 — Total Federal Funds**



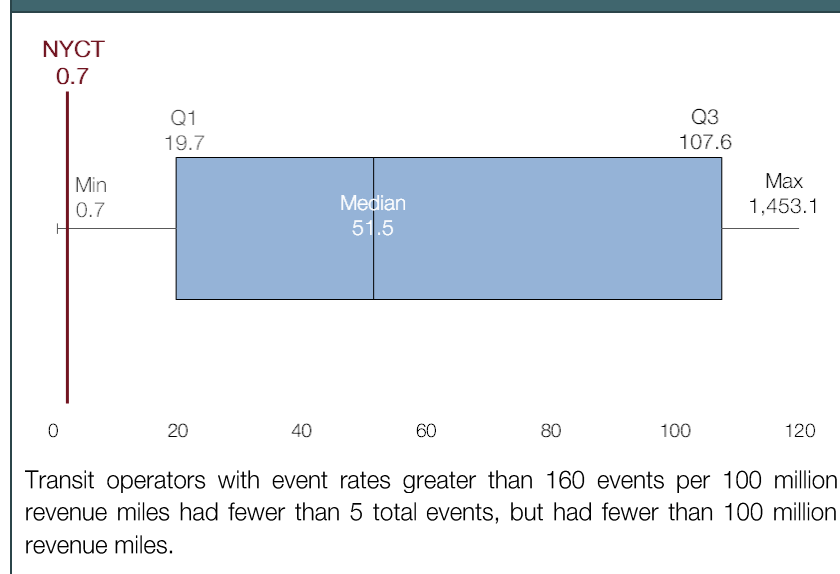
**Exhibit 36 — 2013 NYCT Capital & Operating Funds**

Federal funding made up only 8.1 percent of NYCT's total funding of \$12.5 billion dollars, in contrast to providing 39 percent of all public transit trips. Among all public transit providers, federal funding at NYCT made up one of the lowest proportions of total funding. The median value in the country was 31.7 percent in 2013. NYCT supplies over 45 percent of its own funding, primarily from passenger fares.

**Exhibit 37 — Federal Funds Compared to Total Funds**

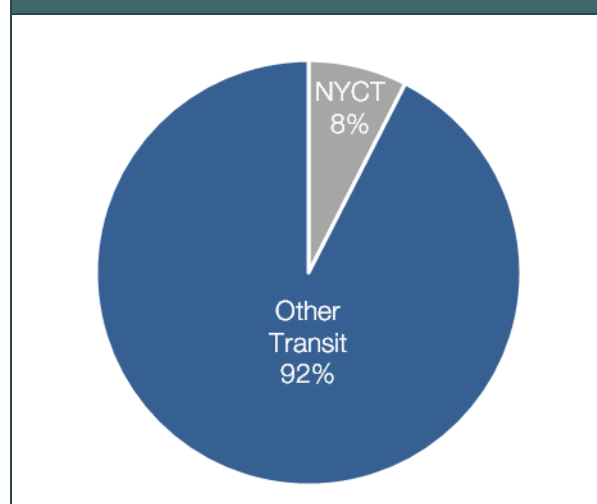
### Safety and Security Events

**Exhibit 38 — Safety Events per 100 million Vehicle Miles**



New York City Transit has the highest number of major reportable safety and security events. In 2013 about ten percent of safety and security events in the country occurred at NYCT. More than one-third of all 2013 NYCT major events were security events, including suicides, robberies, and assaults. Without security events, in 2013 NYCT had eight percent of all safety events in the country.

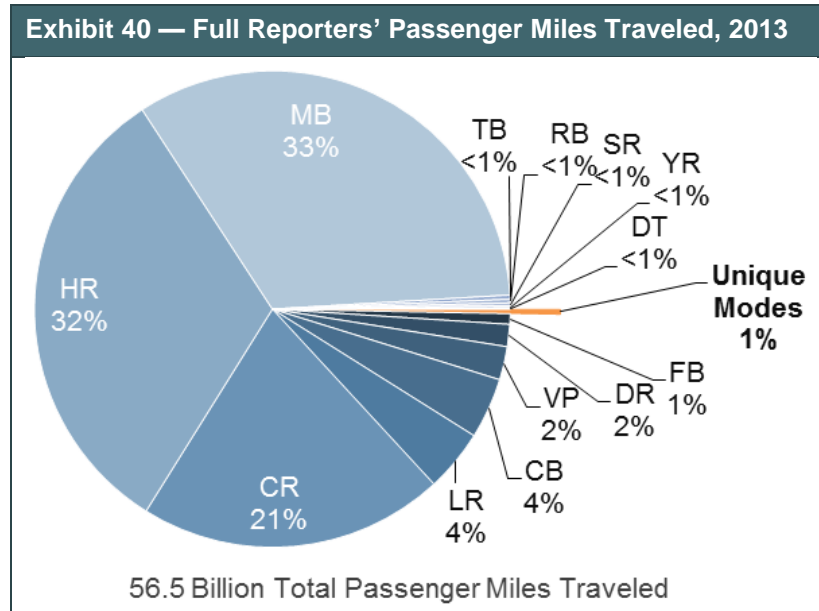
**Exhibit 39 — 2013 Safety Events**



As a rate of safety events per 100 million vehicle miles, NYCT has the lowest rate (0.7) among all transit operators with safety events (median 51.5). The New York City Subway operates underground away from traffic and pedestrians, which removes a great deal of event danger.

## Unique Transit Modes

More modes were described in the Introduction than were included in most exhibits. This is because some modes are so rare and unique in their service characteristics that they appear as outliers in comparison to all other modes.



Passenger Miles Traveled (PMT) provides insight into the use of public transit services. The majority of PMT is concentrated in three transit modes: MB, HR, and Commuter Rail (CR) (Exhibit 39). About 86 percent of the PMT are on these three modes. The remaining modes are responsible for about 14 percent of transit service across the United States, of which the unique modes subset accounts for approximately 1 percent. The NTD includes the following under unique modes of service:

- Aerial Tramways (TR)
- Alaska Railroad (AR)
- Cable Car (CC)
- Inclined Plane (IP)
- Monorail/Automated Guideway (MG)
- Públicos (PB)

Aerial tramways, cable cars, inclined planes, and automated guideway systems are unique because of the technology required to run these systems. The Alaska Railroad services the widest area of any rail system in the country, using more than 500 miles of track across Alaska. The Público system is the largest transit system in Puerto Rico, and each driver operates as a separate business unit.

### Aerial Tramway

Aerial tramway (TR) is a transit mode where vehicles shuttle along suspended cables between two tram terminals at differing heights. In most cases, one or two fixed cables support the vehicle while the vehicle's electrically-powered wheels roll up and down a third cable, or haulage rope. This propulsion method and cable setup enables aerial trams to move forward or backwards as needed.

**Exhibit 41 — Portland Aerial Tram**



Source: [http://commons.wikimedia.org/wiki/User:Another\\_Believer](http://commons.wikimedia.org/wiki/User:Another_Believer)

Different variations of tramways have been in use for hundreds of years, especially for industrial cargo and in mountainous regions to carry ore in mining operations. As time passed, aerial trams began to carry passengers instead of exclusively cargo.

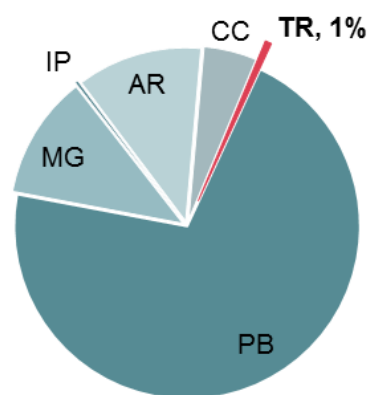
However, as electric power became more widely used in transit services in the 1930 – 1940s, aerial tramways became obsolete. Since then, tramways have been largely used for recreational purposes such as ski lifts. However, there has been a recent interest in operating tramways in the urban market. There now are two aerial tramways that provide mass transit service in the country. The Roosevelt Island Tramway connects Roosevelt Island to the upper east side of Manhattan in New York City, does not benefit from federal funding, and was featured in the 2002 film *Spider-Man*.

The City of Portland is the only NTD reporter that reports aerial tramway service. The Portland Aerial Tram opened in 2006, and operates a two-vehicle line service which can carry 78 passengers per cabin. The tramway connects the Oregon Health & Science University (OHSU) campus with the South Waterfront district of Portland.

While an aerial tramway does not operate on rails or roadway, it operates in exclusive air space. For the purposes of NTD reporting, the NTD considers aerial tramway a non-rail, fixed route mode operating exclusively on fixed guideway.

Aerial tramway provides about 1 percent of the total PMT of service provided by the unique transit modes (Exhibit 41).

**Exhibit 42 — Unique Modes: Aerial Tramway PMT**



172 Million Total PMT

## Alaska Railroad

Alaska railroad (AR) is a transit mode designated solely for the Alaska Railroad Corporation. This railroad provides both freight and passenger services and uses more than 500 miles of track across the state of Alaska.

This railroad has been in operation since the early 1900s. The Alaska Central Railway constructed the railroad to provide an all-weather route to take advantage of the natural resources in the interior of the Alaska Territory. Alaska Central Railway began laying the first railroad in Seward, Alaska in 1903, which eventually extended 50 miles north. In 1914, Congress approved the construction of 470 miles of track to Fairbanks that was completed in 1923.

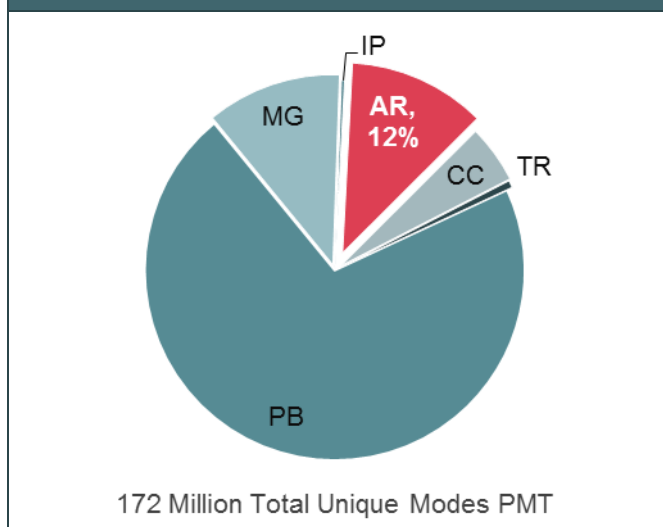
**Exhibit 43 — Alaska Railroad Corporation**



Source: Alaska Railroad Corporation <http://www.alaskarailroad.com>

During World War II, the railroad played an important role in the war effort by hauling military and civilian supplies and materials to and from Whittier, a military port and fuel depot. Due to the heavy use of the railway, Congress approved a \$100 million rehabilitation program after the war.

**Exhibit 44 — Unique Modes: Alaska Railroad PMT**



The Alaska Railroad experienced another challenge in the mid-1960s when an earthquake caused \$30 million in damage. The 9.2 magnitude earthquake, known as the Great Alaskan Earthquake, is the strongest recorded in North America and the second strongest in recorded history.

In 1984, Governor Sheffield signed legislation creating the Alaska Railroad Corporation. Shortly thereafter, the State of Alaska purchased the railroad from the federal government. The Alaska Railroad continues to provide freight and passenger services today.

The Alaska Railroad Corporation provided 20,184,054 passenger miles of service in Report Year 2013. This service accounted for approximately 12 percent of the total unique mode PMT.



### Cable Car

The cable car (CC) mode operates on a railway propelled by underground cables. While several cities operated cable cars in the past, the San Francisco cable car system is the last system in operation in the country today, and has received recognition as a National Historic Landmark.

**Exhibit 45 — San Francisco Cable Car**



Source: [http://de.wikipedia.org/wiki/San\\_Francisco\\_Cable\\_Cars](http://de.wikipedia.org/wiki/San_Francisco_Cable_Cars)

This system is one of two National Historic Landmarks that move — the other is New Orleans' St. Charles Streetcar line.

Andrew Smith Hallidie created the first cable railway in San Francisco known as the Clay Street Hill Railroad. Clay Street provided the template for San Francisco's cable car system that exists today.

Prior to cable cars, people used horses to move passengers and supplies up and down San Francisco's steep streets. Throughout the late

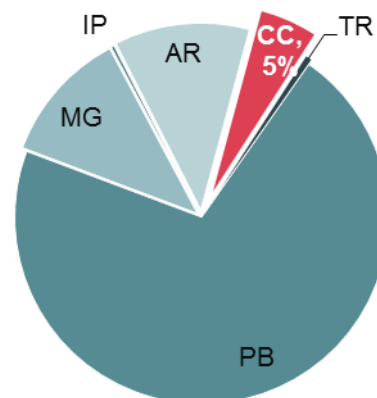
1800s, San Francisco converted from horse operations to cable cars, reaching 23 operating lines by 1890. There are three cable car lines still in operation today: Powell-Mason, Powell-Hyde, and California.

San Francisco's cable cars move using centralized, powerful electric motors that replaced the original steam powered engines. These engines move large wheels that pull the underground cables through the streets. Each car requires two operators on board in order for the cable car to move safely and efficiently — a grip operator and a conductor.

The cable car system employs "grips" that extend through the vehicle and directly clench and release the cable underground. This gripping action is performed by grip operators, or gripmen, through a ratchet lever. This procedure allows the cars to coast over crossing cables and brake whenever necessary. Conductors are responsible for fare collection, boarding management, and control over the rear wheel brakes.

The San Francisco Municipal Railway operates the cable cars and reports the data to the NTD. In Report Year 2013, San Francisco's cable cars provided 8,497,218 passenger miles of service, making up 5 percent of total unique modes PMT.

**Exhibit 46 — Unique Modes: Cable Car PMT**



172 Million Total Unique Modes PMT

## Inclined Plane

An inclined plane (IP), commonly referred to as a funicular railway, is a mode of transit that operates on a railway over steep slopes and grades. Moving cables power the vehicles, which have the ability to move both up and down the grade. An inclined plane differs from a cable car in that the cable is permanently attached to the inclined plane vehicle.

There are three NTD reporters that provide information for inclined planes: Cambria County Transit Authority (CCTA), Port Authority of Allegheny County (PAAC), and Chattanooga Area Regional Transportation Authority (CARTA).

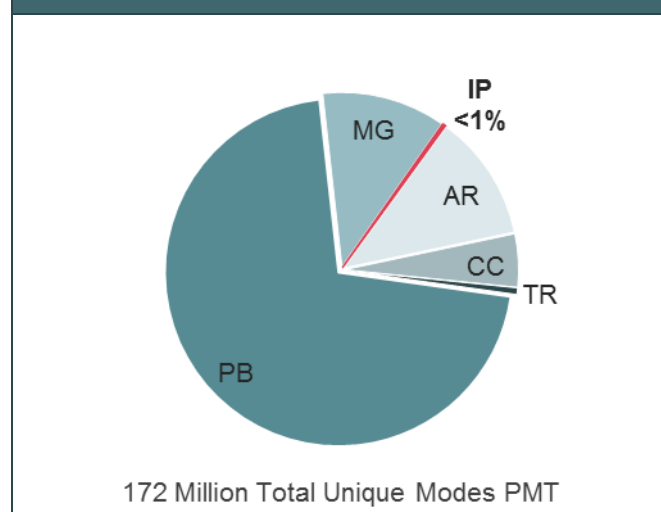
PAAC owns and operates the Monongahela Incline, also known as the 'Mon Incline', which is the oldest continuously operating inclined plane in the country. John Endres built the inclined plane in 1870 in response to the rapid expanse of Pittsburgh. As the factories and mills grew on flats near the river, people built houses nearby on top of Mount Washington. The construction of the incline facilitated further development and accessibility to the area.

**Exhibit 47 — Monongahela Incline**



Source: [http://en.wikipedia.org/wiki/Monongahela\\_Incline](http://en.wikipedia.org/wiki/Monongahela_Incline)

**Exhibit 48 — Unique Modes: Inclined Plane PMT**



CCTA owns and operates the Johnstown Inclined Plane, another transit service rich in history. This incline is 117-years-old and carries nearly 100,000 riders each year.

Lookout Mountain Incline Railway is the inclined plane operated by CARTA. Located in Chattanooga, Tennessee, this incline began operation in 1895 and today, is one of the world's steepest passenger railways.

Inclined planes operate using two cars that attach to a cable. This cable runs through a pulley at the top of the grade. The two cars run simultaneously, one car moves up the

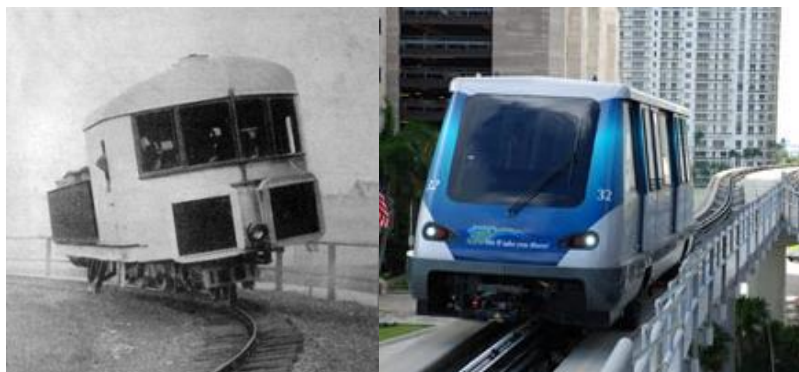
incline while the other moves down. This procedure allows the cars to counterbalance, therefore minimizing the energy required to propel the car going up the incline.

The inclined plane mode generates the smallest amount of passenger miles traveled of all NTD transit modes. During Report Year 2013, the IP passengers traveled 480,648 miles.

### Monorail/Automated Guideway

Automated Guideway (MG) is a type of public transit system where trains operate over a single electric rail. Automated guideway systems are typically above grade, or elevated, and may either operate over or suspend from the central beam. Many airports utilize automated guideway systems for transferring passengers to and from terminals.

**Exhibit 49 — Louis Brennan's Gyrocar & Miami-Dade Metromover**



Sources: <http://en.wikipedia.org/wiki/Monorail> / <http://www.miamidade.gov/transit/metromover.asp>

Henry Palmer invented and patented one of the earliest monorail designs in 1821. Since that time, many engineers experimented with a single rail system as a cheaper alternative to existing rail transport.

In 1903, Louis Brennan patented a gyroscopically

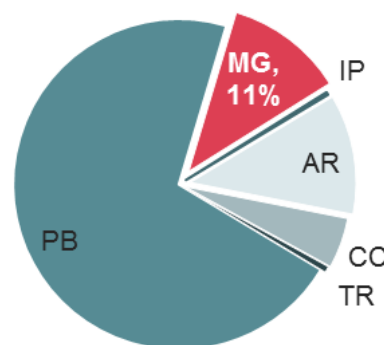
balanced monorail, or gyrocar, as shown in Exhibit 49. While he intended to use this system for military purposes, it did not move past the prototype stage.

Since then, automated guideway systems have become significantly more modern. Today's automated guideway systems straddle center beams that support and guide the train, and use pneumatic, or air-filled, rubber tires. The electric motors use third rails or contact wires that power the straddle beam to propel the trains forward.

Automated guideway systems benefit from being elevated above normal traffic, allowing them to operate free of congestion and pedestrians. Additionally, monorail systems are typically quiet and environmentally friendly due to their electrical propulsion, and costs tend to be lower than tunneling options.

There are six agencies that reported data for automated guideway services to the NTD in Report Year 2013: City of Seattle – Seattle Center Monorail Transit, WVU – Morgantown Personal Rapid Transit, Miami-Dade Transit, Detroit Transportation Corporation, Jacksonville Transit Authority, and Las Vegas Monorail Company. Automated guideway systems provided approximately 11 percent of the 172 million unique mode passenger miles of service during Report Year 2013, or 19.8 million PMT.

**Exhibit 50 — Unique Modes: Monorail PMT**



172 Million Total Unique Modes PMT

## Públicos

The Público system (PB) is a transit mode unique to Puerto Rico, and provides fixed route services predominantly in Puerto Rico's urbanized areas. The Público system is the largest public transportation system in Puerto Rico.

Públicos are similar to informal transport systems operated in developing countries. The biggest distinction between the Público service and other transit modes is the way in which Públicos operate. Drivers own their vehicle and are given exclusive rights to the route where they provide service. The drivers, or route owners, are responsible for their service and operate as independent business units. Besides maintaining the vehicles and routes, drivers must determine their schedule and supply the funds to run the service.

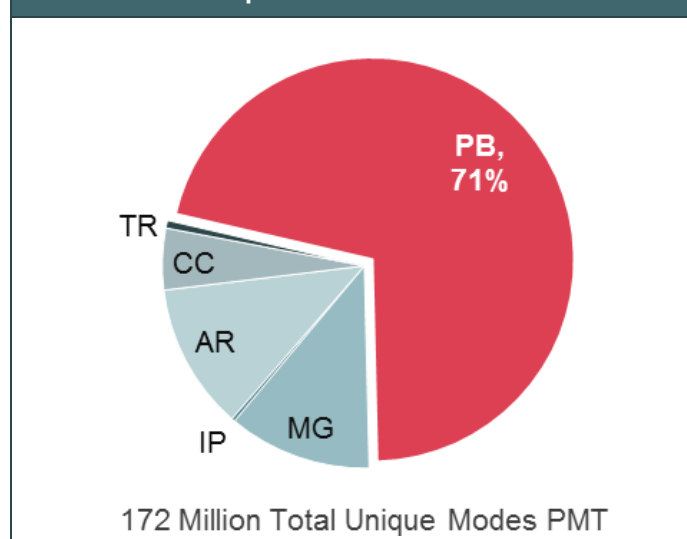
Puerto Rico Highway and Transportation Authority (PRHTA) manages the Público service and grants permission to potential drivers. Before a driver can begin operation, they must obtain permission from PRHTA for the route. PRHTA surveys the area and determines if there is a need for transit. If approved, PRHTA franchises the rights for that particular route to the prospective operator.

There are currently over 2,800 operators providing Público service. In some cases, drivers may have rights to multiple routes and employ others to operate the service on their behalf.

Exhibit 51 — Público



Exhibit 52 — Unique Modes: Público PMT



The drivers operate entirely from revenues earned from passenger fares. PRHTA does not provide drivers with operating or capital assistance.

Drivers collect and report their financial and service data to PRHTA, who subsequently reports it to the NTD under the Público mode.

Públicos account for 71 percent of the passenger miles traveled by unique transit modes in the U.S. This translates to 122,570,478 PMT out of the 172 million unique modes' PMT.