MORPC Rapid Speed Transportation Initiative

Draft Purpose and Need Statement

Chicago-Columbus-Pittsburgh Passenger Rail

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MORPC
MID-OHIO REGIONAL PLANNING COMMISSION

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1.0 Introduction and Background

This document presents a discussion of issues related to the goals of, and objectives for, the Mid-Ohio Regional Planning Commission's (MORPC's) Rapid Speed Transportation Initiative (RSTI) passenger rail study ("the Project"). The Project proposes to connect Chicago and Pittsburgh via Fort Wayne IN, Lima OH, Kenton OH, Marysville OH, and Columbus OH with reliable passenger rail transportation (see Figure 1).

This Draft Goals and Objectives Report requires public and stakeholder involvement before it can be used in the environmental review process for a future construction project, to ensure that the goals and problems to be addressed accurately reflect the goals and needs of affected residents, businesses, and other stakeholders.

A Goals and Objectives discussion helps to guide the development and eventual selection of route alignments and service plans for a project by defining the problems to be solved by the project, and identifying what the project is trying to achieve.

Sections below describe:

- Project history
- Project goals and objectives
- The need for the Project, summarizing existing transportation issues and trends

1.1. Project History and Associated Planning Studies

The passenger rail project started in 2012, when Fort Wayne, Lima, and Columbus pooled funds for a feasibility study between Chicago and Columbus via Fort Wayne.[1] In 2016 MORPC, the metropolitan planning organization (MPO) for the Columbus metropolitan area, along with other partners in Ohio and Indiana, began exploring the idea of passenger rail transportation options to connect the Columbus region to Chicago to serve its expanding population. This Project, in part, is a response to ongoing planning work in Illinois and Indiana to connect Chicago through Ft. Wayne to Lima. Before contracting with a consultant to begin the more formal planning work, MORPC made a decision to extend this analysis eastward to Pittsburgh, given the high demand for trips to and from Pittsburgh, and the potential to extend even further east to connect with Amtrak's Northeast Corridor (NEC), which carries higher speed Acela service (which reaches 135 mph between New York and Washington DC). Another factor driving the extension to Pittsburgh is the existence of an approximately 150-mile state-owned railroad alignment, the Panhandle Line, that extends from Columbus OH to Mingo Junction OH. Mingo Junction is on the eastern edge of Ohio, 42 miles driving distance from Pittsburgh.

[1] This study, Northern Indiana/Ohio Passenger Rail Corridor Feasibility Study and Business Plan, carried out by the consultant company TEMS, was completed in 2013. Available at http://niprarail.org/wp-content/uploads/2018/03/Northern-Indiana-Ohio-Passenger-Rail-Corridor-Feasibility-Study-and-Business-Plan-Executive-Summary.pdf.

The two ongoing studies examining the western part of the RSTI passenger rail corridor (west of Lima) are:

- The Northern Indiana Passenger Rail Corridor Project, examining alternatives for using existing freight rail corridors for passenger service between Tolleston IN (near Gary IN) and Lima.
- The "South of the Lake" study between Chicago and Tolleston, which investigates the best way to get into the busy Chicago region from Indiana.

The RSTI passenger rail project will incorporate the findings of these two studies as part of this Project, and will explore options to continue these efforts eastward from Lima to Pittsburgh through Marysville and Columbus.

Information on these two studies is presented, along with other related past and ongoing studies, in the Existing Conditions Report.

Project Partners

In addition to collaborating with the Northeast Indiana Passenger Rail Association, MORPC has taken the lead on coordinating Ohio-based partners in the RSTI Passenger Rail project, with funding support from the following partners:

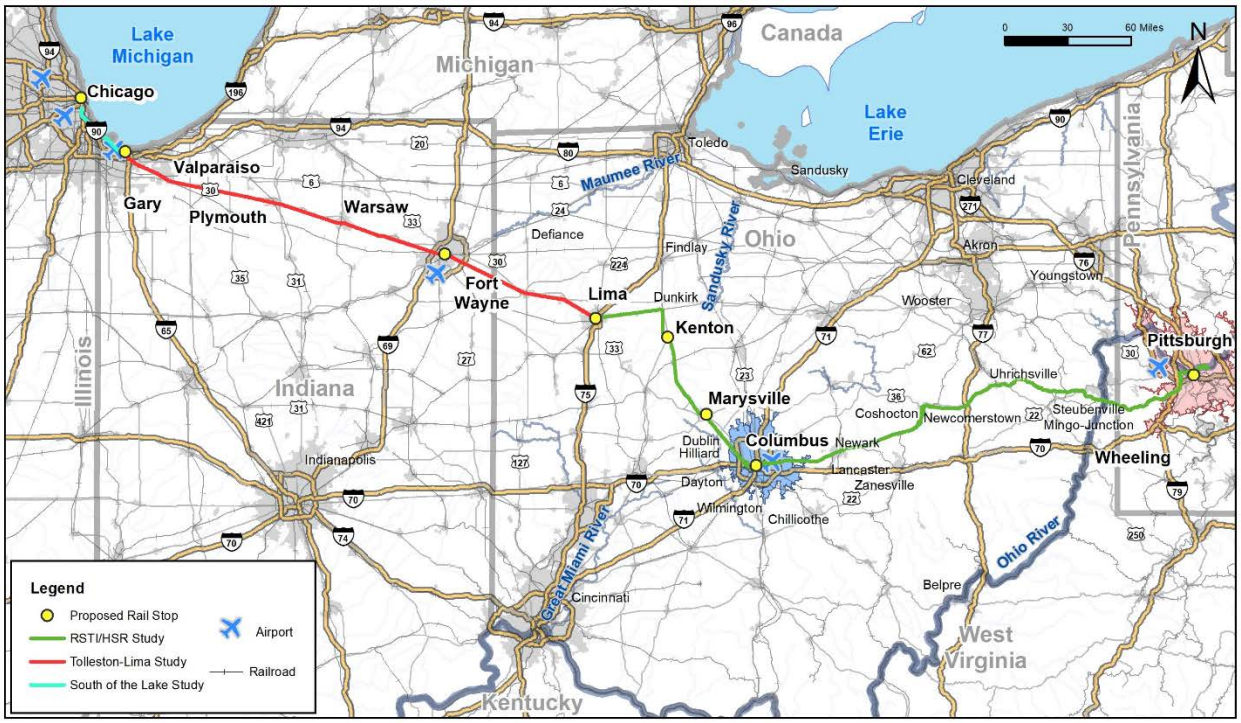
- City of Columbus
- City of Marysville
- City of Lima
- City of Kenton
- City of Dublin
- Union County

Rapid Speed Transportation Initiative

MORPC's overall Rapid Speed Transportation Initiative (RSTI) includes two projects: a hyperloop[2] feasibility study, and an examination of conventional (steel wheel on steel rail) passenger rail service (this Project). MORPC's overall goal is to enhance the transportation options and opportunities available to the residents of the central Ohio region, as well as all residents of the corridor.

[2] Hyperloop is a new mode of transportation that moves freight and people quickly, safely, on-demand and direct from origin to destination. Passengers and cargo are loaded into the hyperloop vehicle and accelerate gradually via electric propulsion through a low-pressure tube. The vehicle floats above the track using magnetic levitation and glides at airline spe eds for long distances due to ultra-low aerodynamic drag. The autonomous, enclosed hyperloop system will have no direct carbon emissions, and will be built on columns or tunneled below ground.

Figure 1: RSTI Passenger Rail Project Corridor



Source: WSP

The RSTI projects are currently in the planning/feasibility phase, and have not yet moved into the environmental phase. This current phase will provide a foundation for initiating future environmental work, which will follow the federal National Environmental Policy Act (NEPA), where the costs, benefits, and environmental impacts of a reasonable set of project alternatives are assessed, and public input is utilized to select a preferred alternative.

Two separate planning/feasibility studies are being carried out for RSTI – one for passenger rail, and one for hyperloop – because of the very different characteristics of the two technologies, including:

- **Speed and Alignment Requirements.** The speeds are substantially different: 79-110 mph anticipated for passenger rail in this corridor compared to cruising speeds over 500 mph for hyperloop, resulting in very different curvature requirements for the alignments.
- **Freight Use.** The hyperloop feasibility study will explore the technology's potential for carrying freight. There is no need for passenger rail to carry much freight, as speeds are comparable to existing truck service, and there is existing freight rail service along this corridor.
- **Station Stop Locations.** Passenger rail will have multiple stops between Chicago and Pittsburgh, and this study is specifically committed to passenger rail stations in Lima, Marysville, Kenton, and Columbus, as well as the Indiana station locations identified in the Northern Indiana Passenger Rail Corridor Project. While hyperloop technology also allows for multiple stops or "portals," the capital investment required for a hyperloop portal is likely to be greater than what is needed for conventional rail, and hyperloop will therefore likely have much fewer portals between Chicago and Pittsburgh.

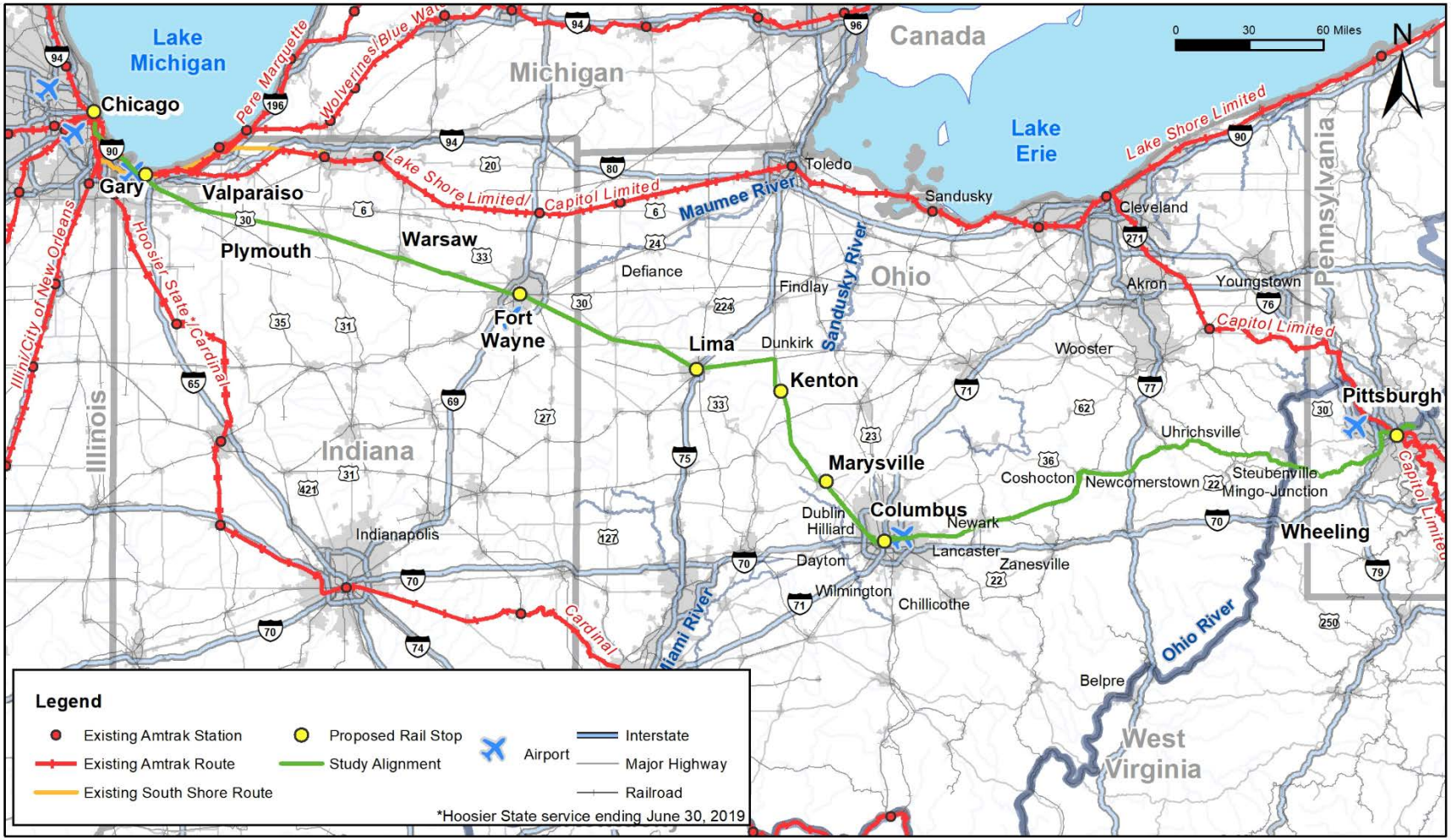
- **Separation from Freight Rail Operations.** Passenger rail can utilize existing freight rail corridors, and possibly existing track, with appropriate infrastructure upgrades. Hyperloop requires a low-pressure tube with magnetic-levitation track and vehicles, making it incompatible with existing track, and necessitating total grade separation from freight rail activities.

The hyperloop component of the RSTI uses proprietary technology that is still under development. The expectation is that the two technologies will serve separate travel markets in the corridor, use independent right-of-way for much of the corridor, and offer distinct opportunities for improvement phasing. These factors add to the argument for separate planning studies and environmental documents for the two technologies.

1.2. Passenger Rail Service Background

There is currently no passenger rail service that serves the Lima-Columbus-Pittsburgh market. While Chicago and Pittsburgh are served by Amtrak routes, including service from Chicago to Pittsburgh via Cleveland, all passenger rail service to Columbus, Marysville, Kenton, and Lima ended more than 40 years ago. As a result, residents are left with fewer options for convenient, safe, affordable, and reliable intercity travel. Existing Amtrak routes are shown in red in Figure 2.

Figure 2: Amtrak Routes in RSTI States



Source: WSP

1.3. Regional Rail Planning Studies

Prior passenger rail planning studies provide the basis for the RSTI passenger rail project, particularly the planning work done to develop passenger rail along the corridor, including the 2013 feasibility study and the Ohio Hub study (which examined a number of passenger rail corridors in the state of Ohio). This section summarizes two multi-state Midwestern regional rail network studies to provide context. Along with Figure 2 above, these multi-state studies show how passenger rail service in this corridor would connect to the larger national passenger rail network, both existing and planned. These and other rail studies are described in the Existing Conditions Report.

Midwest Regional Rail Initiative (MWRRI)/Midwest Regional Rail System (MWRRS)

In 1996, nine Midwest states[3] including Illinois, Indiana, and Ohio, in partnership with the Federal Rail Administration (FRA), initiated the Midwest Regional Rail Initiative (MWRRI), a cooperative, multi-agency initiative to develop a 21st century passenger rail system in the Midwest centered on Chicago. In 2000, the MWRRI developed an initial series of service concepts into the Midwest Regional Rail System (MWRRS) in order to establish a coordinated regional network for expanding Midwest intercity passenger rail. Planning for the MWRRS addressed a wide range of issues including infrastructure and operational requirements, market demand, financing alternatives, institutional arrangements, and system-wide costs and benefits. Figure 3 depicts the 12-state passenger rail system was proposed by MWRRI in 2006.

The MWRRI recommendations included:

- Operation of a hub and spoke passenger rail system centered on Chicago
- Use of 3,000 miles of existing rail right-of-way to connect rural and urban areas
- Track and signal improvements and introduction of modern trains operating at speeds up to 110 mph
- Provision of multi-modal connections to improve system access
- Improvement in frequency, reliability, speed, and on-time performance

[3] The nine states were Indiana, Illinois, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin.

Figure 3: Proposed Midwest Regional Rail System



Source: Midwest Regional Rail Initiative, Midwest Regional Rail System, 2000.

In 2004, the MWRRI updated the estimates of MWRRS capital costs as well as ridership, revenue, and operating costs. This update further assessed freight rail capacity and needs, and also refined routes, travel times, and operating speeds to minimize capital costs while maximizing ridership and revenues.

In 2009, FRA's High Speed Intercity Passenger Rail Program (HSIPR) provided an opportunity to implement a number of the state-supported corridors that are identified in the MWRRS. Eight Midwestern states and the City of Chicago entered into a Memorandum of Understanding in July 2009 for the purpose of coordinating individual applications to the FRA for funding established by the American Recovery and Reinvestment Act of 2009 (ARRA) to develop the Chicago Hub/Midwest High-Speed Rail Corridor.

Midwest Regional Rail Planning Study (MWRRP)

The ongoing Midwest Regional Rail Planning Study (MWRRP) continues the MWRRI's efforts, and builds on FRA's long history of coordinated, multi-state planning in the Midwest region. MWRRP provides a rigorous analytical, policy, and governance framework to establish a 40-year framework incorporating regional priorities, outlining investment needs, identifying additional studies, and developing an implementation strategy to advance projects in a network context. The study is following a multi-pronged strategy that includes extensive outreach and engagement efforts, and is employing a suite of analytic

planning tools and best practices on issues of funding, financing, and governance of a multi-jurisdictional rail network.

Encompassing 12 states in the Midwest,[4] the study provides further inputs for the national rail planning effort. Figure 4 presents the RSTI passenger rail corridor and its relationship to the overall MWRRP draft rail network. Once completed, the MWRRP final network will be available online at www.midwestrailplan.org.

Figure 4: Current Draft Midwest Regional Rail Network



Source: Federal Railroad Administration, Draft Midwest Regional Rail Plan, 2018.

The corridor between Columbus and Pittsburgh was identified as a Network Independent/Small Market/Future Corridor. In Ohio, the Pittsburgh to Cleveland corridor had greater ridership and more significant network impacts than the Pittsburgh-Columbus corridor and thus was included in the study's CONNECT ridership model testing. However, the Pittsburgh to Columbus corridor showed regional significance and was identified as a potential future corridor. This classification represents a corridor that "has local and/or regional importance and could be advanced by another entity, including a state, MPO, or other organization."

Together, the network corridors are expected to attract an estimated 43 to 54 million annual linked trips at full build-out in 2055. Assuming the full network vision is implemented, the study's estimated annual corridor ridership in the year 2055 for the Chicago-to-Columbus corridor is 1.9 million.

[4] The 12 states are Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

2.0 Project Goals and Objectives

2.1. Project Need

The Project is intended to address the following shortcomings:

- **Existing transportation options do not meet corridor travel needs.** As outlined below, current air service along the corridor can be expensive compared to other modes, and while the travel times from airport-to-airport are much shorter than drive times, air travel involves wait times for security procedures, parking, and reaching downtown centers. Bus service is low cost, but is also infrequent, and slower than auto travel times. Auto travel is not available to individuals who cannot drive and can be difficult or expensive for individuals who do not own a private vehicle. In addition, there is no direct interstate service between Columbus and Chicago.
- **Existing transportation options are not reliable.** Auto and bus travel is subject to traffic congestion and weather-related delay. Air travel is also subject to weather-related delays.
- **Safety is a concern for existing vehicle travel.** Autos, and to a lesser extent buses, are subject to the typical safety concerns of vehicle travel, including accidents from speeding, distracted driving, and weather-related issues. Snow and ice conditions are not uncommon along this corridor.
- **Existing transportation options have relatively high environmental impacts.** Compared to rail, air and vehicle travel have higher emissions per passenger, and utilize more energy, which could be reduced with a shift to high-occupancy rail transportation.
- **Economic competitiveness.** Safe, reliable, and convenient linkages to other metropolitan areas are critical for economic development. This is true both for large cities, with numerous businesses and higher demand for inter-city travel, as well as for smaller cities which have a smaller economic base, and are often dependent on the economies of nearby metropolitan areas.

Each of these issues is described in more detail below, with supporting data and trends where available.

2.2. Project Goals

The goal of the Project is to address the issues discussed in the previous section, using reliable passenger rail to connect the corridor cities. Specifically, the goals are:

1. Provide an alternative to private auto travel and air service for inter-city passenger travel
2. Support economic competitiveness and economic development, particularly for smaller cities along the corridor
3. Provide convenient, reliable travel access to station city centers
4. Provide attractive travel times competitive with auto travel
5. Improve safety of intercity travel between corridor cities
6. Maintain cost-effectiveness by maximizing use of existing rail infrastructure

A secondary goal of this project is to coordinate this project with other public and private passenger rail efforts to help ensure that this project connects to other existing and future passenger rail corridors where feasible, and that it does not preclude development of other passenger rail projects. The "network benefits" of connecting to other rail services (e.g., Chicago-to-St. Louis, Pittsburgh-to-New York) greatly increases ridership and other benefits of passenger rail, such as economic development and reduced auto and airplane emissions.

2.3. Transportation Conditions

This section describes the travel conditions and related issues that currently exist in the corridor. The needs are demonstrated with quantitative support where available.

Existing Transportation Modes

The current transportation alternatives do not meet the business and personal trip needs that exist in the corridor. There are an estimated 1.5 million inter-city trips annually in the corridor, growing to 1.86 million by 2040. The current and future mode split between air and auto is shown in Table 1 and Table 2, with air travel having a higher mode share for longer trips. Table 2 shows the expected passenger flows for the year 2040 assuming there continues to be no passenger rail services between the three cities.

Table 1: 2015 Passenger Flows By Mode for Sample Trips

Origin/Destination Pairing	Auto	Airline	Total
Chicago-Columbus	190,562	414,750	605,312
Chicago-Pittsburgh	26,597	396,600	423,197
Columbus- Pittsburgh	479,973	0	479,973
Total	697,132	811,350	1,508,482

Source: Auto: Ohio Statewide Traffic Forecasting Model

Table 2: 2040 Passenger Flows By Mode for Sample Trips

Origin/Destination Pairing	Auto	Airline	Total
Chicago-Columbus	239,632	521,548	761,180
Chicago-Pittsburgh	32,635	486,628	519,263
Columbus- Pittsburgh	577,407	0	577,407
Total	849,674	1,008,176	1,857,850

Source: Auto: Ohio Statewide Traffic Forecasting Model; Airline: applied an average growth rate on the 2015 flows based on the population growths specified in the latest MPO plans for the three cities.

The following sections discuss existing travel modes in the corridor.

Rail Service

As mentioned above, there is currently no passenger rail service along the corridor. Only Chicago and Pittsburgh currently have intercity passenger rail service (Figure 2) via service on other routes. Other corridor cities, including Warsaw IN, Fort Wayne, Lima, Marysville, and Columbus, do not have any passenger rail service. There is commuter rail service on the South Shore Line (NICTD) between Chicago and Gary, heading further east along Lake Michigan, north of the Project corridor (visible in Figure 2). NICTD service runs 21 round trips on weekdays, with more limited service on weekends and holidays.

Chicago is served by a number of intercity rail routes, but none travel along the Project corridor. Amtrak's Capitol Limited service runs daily between Chicago and Pittsburgh, but it runs near the northern boundary of Indiana and Ohio, north of the Project corridor, towards Cleveland, before turning south to reach Pittsburgh.

Pittsburgh is also served by the Pennsylvanian passenger rail route, heading east through Harrisburg and Philadelphia to New York.

Some sources have estimated that Columbus is the second-largest metro area in the US, after Las Vegas, that has no passenger rail service.[5]

Bus Service

Intercity bus service is currently available on two Greyhound routes between Chicago and Pittsburgh; one goes through Cleveland similar to Amtrak passenger rail service and the other goes through Columbus, Ohio and requires a transfer in Indianapolis.

Due to the indirect routing, travel times for some corridor trips are much longer than auto travel, as shown in Table 3.

[5] https://en.wikipedia.org/wiki/List_of_major_cities_in_U.S._lacking_inter-city_rail_service

Table 3: Comparison of Auto and Bus Travel Times

Trip	Intercity Bus Travel Time (trip duration in hours & minutes)	Auto Travel Time (shortest route, without traffic)	Added Time Required for Bus Travel (in hours & minutes)
Chicago-Columbus	7h 50min to 8h 55min (7 trips daily)	5h 35min	2h 15min (minimum)
Chicago-Pittsburgh	9h 50min to 12h 30min (4 trips daily)	7h 13min	2h 37min (minimum)
Fort Wayne to Pittsburgh	11h 45min (1 trip daily)	5h 08min	6h 37min
Chicago-Lima	5h 55min (1 trip daily)	4h 05min	1h 50min
Lima-Columbus	1 trip daily is 1h 55min 1 trip daily is 4h 10min (SB) or 3h 25min (NB)	1h 37min	1h 48min (minimum)
Columbus-Pittsburgh	3h 25min to 7h 10min (5 trips daily)	2h 55min	0h 30min (minimum)

Source: Greyhound online reservation system for scheduled service, 11/6/2018.

In addition to slow travel times, existing bus service along the corridor is generally infrequent (many city pairs are served once daily at inconvenient times), and stations/vehicles do not offer high-level amenities.

Highway

As Table 1 above shows, almost half (46%) of the passenger trips between the origin and destination pairs of Chicago and Columbus, Chicago and Pittsburgh, and Columbus and Pittsburgh are made by private automobile.

While auto can be a convenient mode for shorter trips (e.g., Columbus to Lima or Lima to Fort Wayne), it is also less safe than air or rail travel, and susceptible to delays resulting from accidents, peak-hour congestion, and weather conditions. It is also a mode that is not available to individuals who have mobility impairments, are too young to drive or have retired their licenses, or who cannot afford to own or rent a vehicle.

Bus travel is available to individuals who cannot drive or choose not to drive, but this mode is also susceptible to the same delays and uncertainty as private autos.

Peak hour traffic in Columbus, Pittsburgh, and Chicago are described in more detail in the Existing Conditions document. In general, road congestion slows travel speeds and adds to travel times, particularly when accessing city centers. Even during off-peak (uncongested) periods, the time required to locate parking in central business districts can reduce the convenience of auto travel. Another factor reducing the convenience of auto travel in this corridor is that there is no direct Interstate connection between Chicago, Fort Wayne, Lima, and Columbus (see Figure 1). This forces drivers to drive on slower roads that are often narrower and less safe.

Air Travel

Air travel between cities in the corridor can be expensive compared to other modes, particularly for travel to airports at smaller cities along the corridor which don't have regularly-scheduled passenger flights. Only the airports in Chicago (MDW & ORD), Fort Wayne (FWA), Columbus (CMH) and Pittsburgh (PIT) currently have regularly scheduled passenger service.

A recent one-day survey of the lowest price air tickets between the three largest cities in this corridor showed that air travel can be cost-competitive with single-occupant auto travel, particularly over longer distances. Although if two or more people are traveling, auto travel is typically the lower cost option.

Table 4: 2015 Lowest-Cost Flights Compared to Auto Travel Costs

From	To	Roundtrip Air Cost (lowest fare)	Miles by car (one-way)	Comparable Auto Trip (round trip)
Chicago (ORD)	Pittsburgh (PIT)	$229	460	$534
Chicago (ORD)	Columbus (CMH)	$203	324	$376
Columbus (CMH	Pittsburgh (PIT)	$227	185	$215

Source: Flight cost data was collected on Travelocity on November 30,2018 for December 13, 2018 departure and December 20, 2018 return. Lowest priced tickets were selected.

Auto trip costs use the 2019 Internal Revenue Service rate for business travel of 58 cents per mile.

Costs of tolls (for auto trips) and non-fare air travel costs (airport parking, rental car at destination, luggage fees) are not included.

Air travel times are typically the shortest of any mode. However, this is not always the case, particularly for Fort Wayne's airport, which does not have direct flights to Columbus or Pittsburgh. Further, no direct air service is currently available between Columbus and Pittsburgh, and intermediate corridor communities need to travel to a regional hub in order to make corridor trips by air. These intermediate communities would thus especially benefit from passenger rail service.

Even on direct, non-stop flights, air travel times are affected by wait times for security procedures, car rental pickup, and parking, as well as "last-mile" travel to city centers, which are the final destination of many intercity personal and business trips.

Comparison of Rail to Existing Travel Modes

As discussed above, existing modes have problems with reliability, and cost/accessibility. With the proper infrastructure in place to support it, rail is inherently more reliable than existing modes. Private auto and bus travel is subject to slowdowns from weather, crashes, and daily commuter congestion, and air travel is also susceptible to weather-related delays and other occurrences beyond the control of transportation operators. Fixed guideway modes like intercity passenger rail are able to perform better in a variety of conditions. And particularly where passenger rail has exclusive tracks (that is, the route is not shared with freight railroad traffic), passenger rail is also less vulnerable to delay than highway-based modes, including delays caused by accidents.

Further, the distances between many of the corridor cities are too short to develop an air market, yet too long to efficiently drive on a regular basis – an ideal market gap for passenger rail to fill.

Increased Future Travel Demand

Continuing population and employment growth in the corridor is expected to increase travel demand. This will intensify congestion on existing travel facilities such as roads and airports, and add to the demand for non-auto travel options.

As the tables below show, the three largest metro areas in the corridor are expected to grow over the next two decades, with a stable, slightly negative population trend in the Lima region. Overall, these four areas will add 2.6 million residents, and 1.0 million new jobs.

Table 5: 2015-2040 Population of Key Corridor Cities

Metro Region	Population		Growth 2015-2040	
	2015	2040	Persons	Percentage
Chicago Metro	8,524,670	10,249,300	1,724,630	20.2%
Fort Wayne/Allen County, IN	370,226	408,694	38,468	10.4%
Lima/Allen County, Ohio	106,240	102,892	-3,348	-3.2%
Central Ohio	2,301,465	2,856,072	554,607	24.1%
Pittsburgh Metro	2,572,995	2,911,667	338,672	13.2%
Total	**13,875,596**	**16,528,625**	**2,653,029**	**19.1%**

Source: Current (as of late 2018) population projections from the Chicago, Fort Wayne, Columbus, and Pittsburgh MPOs6, and the Lima-Allen County 2040 Long Range Transportation Plan Update. Central Ohio 2015 data is imputed from 2010 and 2018 estimates.

Table 6: 2015-2040 Employment in Key Corridor Cities

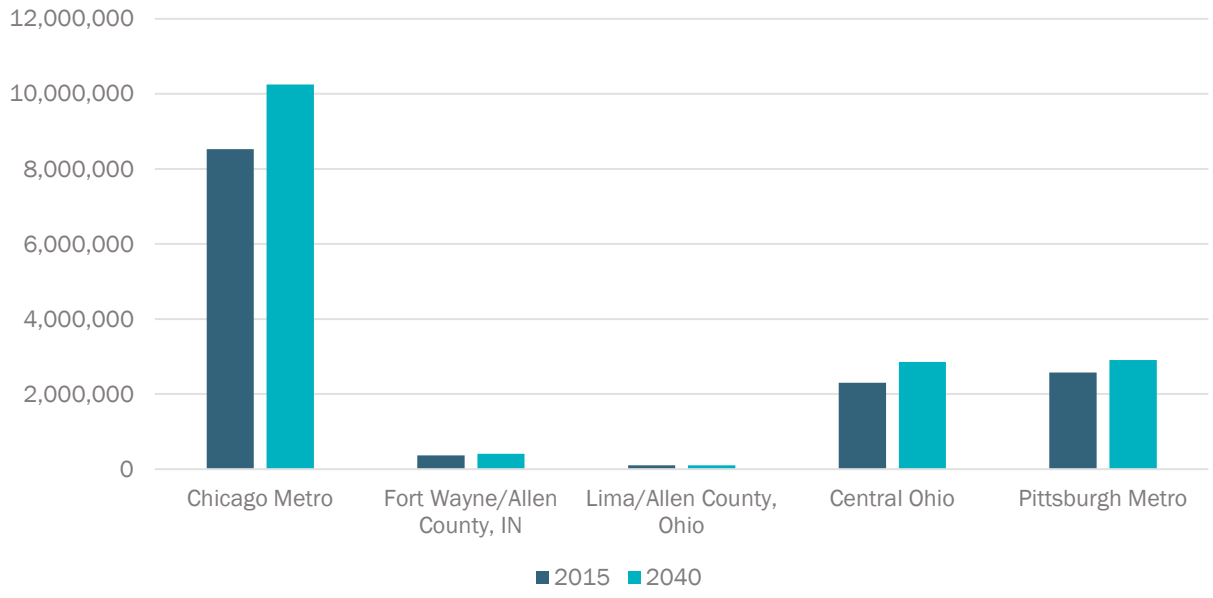
Metro Region	Employment		Growth 2015-2040	
	2015	2040	Jobs	Percentage
Chicago Metro	4,085,553	4,710,024	624,471	15.3%
Fort Wayne/Allen County, IN	194,564	236,670	42,106	21.6%
Lima/Allen County, Ohio	64,978	73,022	8,044	12.4%
Central Ohio	1,196,303	1,394,823	198,520	16.6%
Pittsburgh Metro	1,597,589	1,797,150	199,561	12.5%
Total	**7,138,987**	**8,211,689**	**1,072,702**	**15.0%**

Source: Current (as of late 2018) employment projections from the Chicago, Fort Wayne, Columbus, and Pittsburgh MPOs, and the Lima-Allen County 2040 Long Range Transportation Plan Update. Central Ohio 2018 data is used in place of unavailable 2015 data, and Lima data from 2016 is also used.

[6] The Metropolitan Planning Organizations (MPOs) used for these data sources are: Chicago Metropolitan Agency for Planning (CMAP), Mid-Ohio Regional Planning Commission (MORPC), Lima-Allen County Regional Planning Commission (LACRPC), Northeastern Indiana Regional Coordinating Council (NIRCC), and Southwestern Pennsylvania Commission (SPC).

The Chicago region, the largest population and employment center in the corridor, will add the largest number of residents and jobs, while Columbus will see the highest percentage growth rates among the four areas.

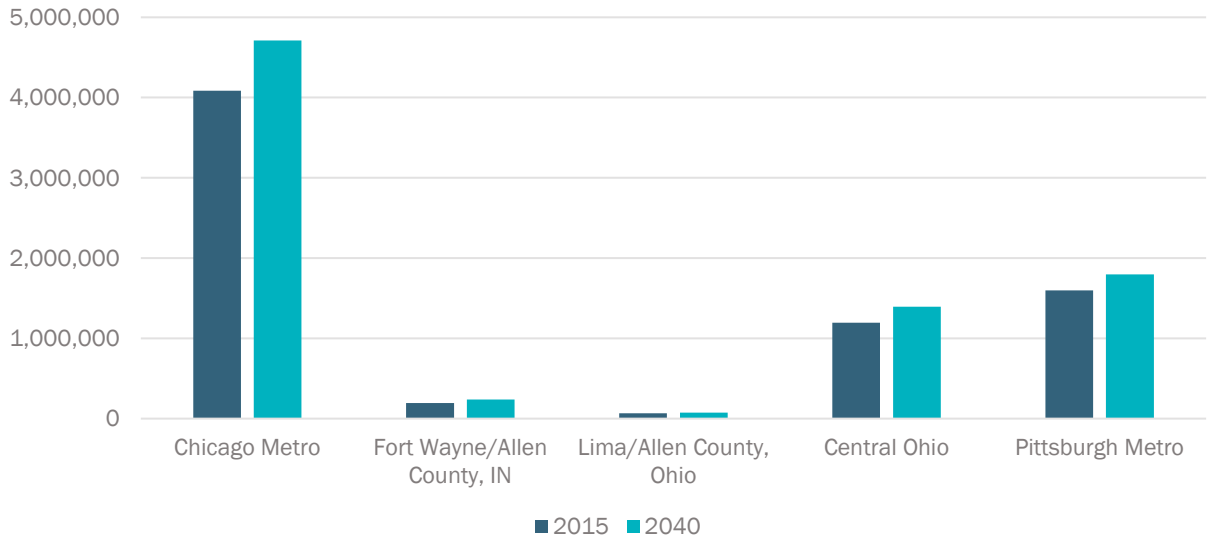
Figure 5: Major Metropolitan Area Population, 2015-2040



Source: Current (as of late 2018) population projections from the Chicago, Fort Wayne, Columbus, and Pittsburgh MPOs7, and the Lima-Allen County 2040 Long Range Transportation Plan Update. Central Ohio 2015 data is imputed from 2010 and 2018 estimates.

Figure 6: Major Metropolitan Area Employment, 2015-2040

[7] The Metropolitan Planning Organizations (MPOs) used for these data sources are: Chicago Metropolitan Agency for Planning (CMAP), Mid-Ohio Regional Planning Commission (MORPC), Lima-Allen County Regional Planning Commission (LACRPC), Northeastern Indiana Regional Coordinating Council (NIRCC), and Southwestern Pennsylvania Commission (SPC).



Source: Current (as of late 2018) employment projections from the Chicago, Fort Wayne, Columbus, and Pittsburgh MPOs, and the Lima-Allen County 2040 Long Range Transportation Plan Update. Central Ohio 2018 data is used in place of unavailable 2015 data, and Lima data from 2016 is also used.

Section 2 of the Existing Conditions Report provides detailed maps of the corridor's projected population and employment densities in 2040.

Beyond the travel demand growth resulting from these projected increases in population and employment, there may also be growth in non-auto travel demand resulting from a shift in travel patterns, discussed below.

Need for Alternative Travel Options

Travel options that don't require use of a personal automobile are a vital component of a region's mobility, with a range of benefits including economic development, environmental protection, travel flexibility, and overall safety. These benefits will become even more important as the corridor's population ages.

Alternative options are needed for individuals who cannot drive, whose incomes cannot support vehicle ownership, or who choose to live without a vehicle. Some sources predict that with the growth of the sharing economy and the introduction of self-driving cars, American households will own fewer cars overall, with an increase in the number of zero-car households, particularly near city centers.[8] This would increase the demand for non-auto modes, such as passenger rail, for intercity travel.

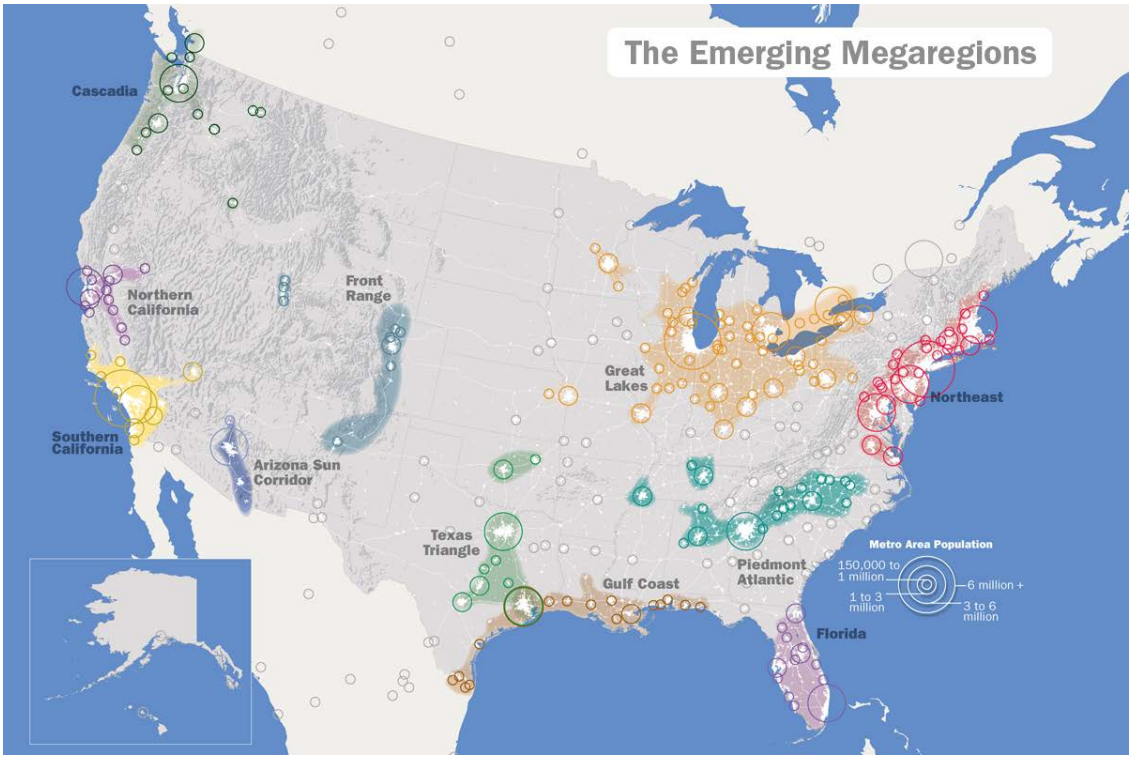
Support Economic Competitiveness

The Chicago-Columbus-Pittsburgh corridor runs through the center of the eastern Great Lakes Mega Region (see Figure 7), linking the largest employment center in the region (metro Chicago) with two growing employment centers (Columbus and Pittsburgh). The term "mega-region" or "megapolitan region" is used to describe economic regions composed of multiple metropolitan areas that are

[8] PwC (Price Waterhouse Coopers), January 2018: https://press.pwc.com/News-releases/by-2030--the-transport-sector-will-require-138-million-fewer-cars-in-europe-and-the-us/s/a624f0b2-453d-45a0-9615-f4995aaaa6cb

economically inter-dependent. Providing fast, reliable, accessible transportation between large and small cities in this region will make both business and personal travel more efficient, enhancing economic competitiveness for businesses and quality of life for residents. Intercity transportation improvements support the competitiveness of individual cities within the corridor, as well as the megaregion as a whole, in attracting business and talent.

Figure 7: Map of U.S. Megaregions



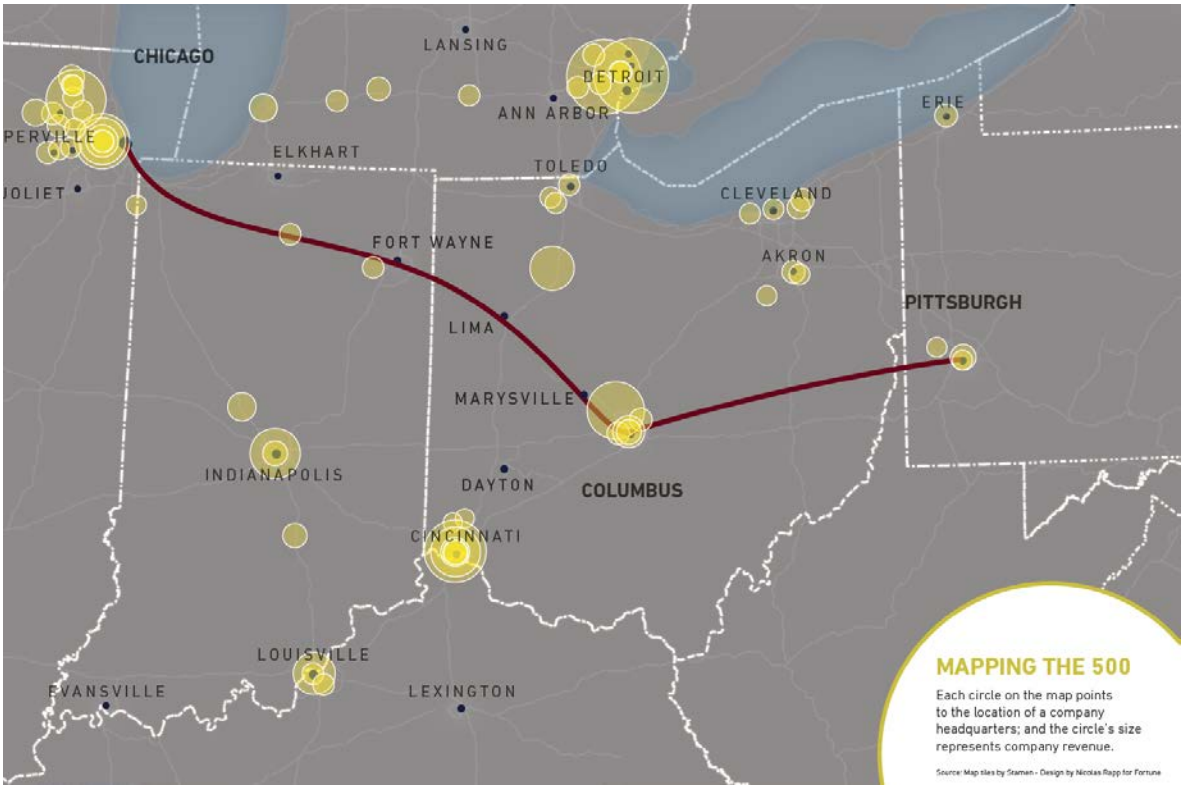
Source: Regional Plan Association

Easy movement of people and goods is essential to a vibrant economy. Throughout history, cities have arisen around rivers, harbors, canals, and railroads, and more recently interstates. Efficient transportation has a strong effect in attracting and accelerating development. Fast and reliable movement of people remains critical today, particularly with so many globally-connected businesses.

Access between cities is also important for quality of life, making it easier for individuals to reach healthcare, education, and other opportunities throughout their region. A robust transportation system will become increasingly important as the major metro areas in the corridor continue to grow as previously discussed. For smaller cities along the corridor, some of which have slowly growing or even shrinking population or employment bases, intercity mobility may be even more vital as a means of ensuring that residents and businesses have multiple options (including reliable passenger rail service) to access the business and other opportunities in the growing metro areas of the corridor.

Figure 8 below shows the major company headquarters in cities along the corridor. Appendix B of the Existing Conditions Report contains a list of major employers.

Figure 8: Major Company Headquarters in the RSTI Passenger Rail Corridor



Source: Map tiles by Stamen, Design by Nicholas Rapp for Fortune; http://fortune.com/fortune500/visualizations/

Safety

As shown in Table 7, traveling by car is the least safe of the major modes of intercity passenger transportation, and is by far the most common mode of travel. Measured in terms of fatalities per passenger-miles carried, the highway fatality rate is nearly 17 times higher than the rail fatality rate. Air travel has the lowest fatality rate.

Highway travel comprises the vast majority of trips within the corridor, and has the capacity to serve much of the travel demand in the corridor. However, with the highest fatality rate, travelers are choosing a less safe mode of transportation. In some cases this is because of the service provided – auto is a very convenient mode for many corridor residents – but it is also because in many cases there is limited or no other choice.

Table 7. Fatality Rates by Mode (2000-2009)

Mode	Fatalities	Passenger Miles (Billions)	Fatalities per Billion Passenger Miles
Auto (driver or passenger)	301,399	41,403	7.28
Commuter Rail and Amtrak	70	163	0.43
Bus (bus holding more than ten passengers, transit, inter-city, school or charter)	304	2,806	0.11
Air (passenger on commercial aviation)	474	7,290	0.07

Source: Savage, Ian, Northwestern University, Comparing the Fatality Risks in United States Transportation Across Modes and Over Time, Supplemental Data Appendix, published in Research in Transportation Economics: The Economics of Transportation safety, volume 43(1) pages 9-22, 2013.

Air Quality and Energy Use

Rail can be more energy-efficient than modes such as air and auto, which typically means reduced emissions.

Table 8 shows an estimate of per-passenger energy usage for different modes of travel. These are national estimates – per-passenger energy use varies substantially based on how many passengers are in a car, plane, or train, fuel efficiency, and how direct a route is between origin and destination.

Energy use is typically tied to emissions, and based on Table 8 rail could therefore be assumed to have lower emissions per passenger than other modes. However, here again there are many variables, including the exact model and power source of the train engine, plane, or vehicle, and the speeds at which they are driven. Even electric cars and trains produce emissions, depending on the source of the electricity (e.g., wind turbine, coal-burning power plant, natural gas power plant).

Additionally, as discussed in the Existing Conditions Report, the Chicago, Columbus, and Pittsburgh metropolitan areas are ozone, particulate matter, and/or sulfur dioxide nonattainment zones of which intercity passenger rail would help alleviate.

Table 8. Passenger Travel and Energy Use

Mode	Passenger Miles (Millions)	Btu per Vehicle Mile	Btu per Passenger Mile
Cars	2,238,169	4,526	2,939
Air	661,991	266,640	2,320
Amtrak	6,520	31,958	1,551

Source: Transportation Energy Data Book, Edition 37-2018.

Notes:

1. **Data is for 2016.**
2. **Air covers all energy use on domestic certificated carrier flights (that is, not including general aviation). Energy use is therefore somewhat inflated, as some fuel is used to carry cargo.**
3. **Data for cars assumes 1.54 persons per vehicle.**
4. **Amtrak information utilizes data from AAR Railroad Facts, 2017 Edition, Washington DC, 2017.**