Pennsylvania
State Rail Plan

Pennsylvania State Rail Plan 2020

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2020 Pennsylvania State Rail Plan

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Executive Summary

The 2020 *Pennsylvania State Rail Plan* includes a comprehensive description and assessment of the current rail system, an analysis of the role of rail and integration within the state's transportation system, and a vision for the future of passenger and freight rail in the commonwealth. A Rail Service and Investment Program (RSIP) is included to provide guidelines and identify rail investments needed to achieve Pennsylvania's vision for the rail system in the short (2021–2024) and long range (2025–2045).

This State Rail Plan meets the requirements stated in the Federal Railroad Administration (FRA) State Rail Plan Guidance issued in September 2013, Section 303 of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) (P. L. No. 110-432), and Section 11315 of the Fixing America's Surface Transportation Act of 2015 (FAST Act) (P. L. No. 114-94).

State Rail Vision

The 2020 State Rail Vision was developed through a collaborative effort and is intended to provide the framework for passenger and freight rail improvement projects.

2020 State Rail Vision

Pennsylvania's integrated rail system will provide safe, convenient, reliable, cost-effective connections for people and goods. As a viable alternative to other modes, it will support economic competitiveness, smart growth, environmental sustainability, and resiliency, thereby strengthening Pennsylvania's communities.

To achieve this vision, several goals and supporting objectives have been identified. These goals and objectives provide the framework for the passenger and freight rail improvement projects that constitute the RSIP, the program of investment needs for passenger and freight rail service in Pennsylvania over the next 25 years.

Pennsylvania's Rail System

Passenger Rail

Intercity rail service in Pennsylvania is provided by the National Railroad Passenger Corporation, commonly known as Amtrak, which provides 21,400 route miles of service in 46 states. Main Amtrak routes in Pennsylvania include several long-distance and corridor trains operating on:

- The Amtrak-owned Northeast Corridor (NEC) between Washington, D.C., Philadelphia, New York, and Boston; trains using this route through Pennsylvania include the Acela Express, Northeast Regional, Keystone Service, Vermonter, Palmetto, Carolinian, Crescent, Cardinal, Silver Star, and the Silver Meteor
- CSX's Chicago Line (between the New York-Pennsylvania and Pennsylvania-Ohio borders in Erie County) for the Lake Shore Limited between Chicago, Erie, and New York
- CSX's Keystone Subdivision (between the Maryland-Pennsylvania border and Pittsburgh) and Norfolk Southern's (NS's) Fort Wayne Line (between Pittsburgh and the Pennsylvania-Ohio border) for the Capitol Limited between Washington, D.C., Pittsburgh, and Chicago
- Amtrak's NEC and Keystone Corridor and NS's Pittsburgh Line for the Pennsylvanian between New York, Philadelphia, Harrisburg, and Pittsburgh
- Amtrak's Keystone Corridor for the Keystone Service between Harrisburg, Philadelphia, and New York

Commuter rail service is provided in the Greater Philadelphia region primarily through the Southeastern Pennsylvania Transportation Authority (SEPTA) Regional Rail system, with 280 route miles served by 13 rail lines, as well as New Jersey Transit's Atlantic City Line, which connects 30th Street Station to eight stations in southern New Jersey.

Pennsylvania also hosts 16 heritage and tourist railroads, which offer educational and recreational experiences to riders. Several of these railroads also function as short lines providing rail freight service.

Freight Rail

Pennsylvania's freight rail system comprises more than 5,600 miles of track operated by 63 railroads. The Pennsylvania freight rail network carried an estimated 193.6 million tons of freight in 2017, and inbound and outbound traffic accounted for 25% and 23%, respectively, of the commonwealth's freight rail tonnage. Through freight rail movements

(freight that does not have an origin or a termination in the state but rather travels across the state) comprised 47% of the total freight rail tonnage shipments in Pennsylvania, indicating the relative significance of Pennsylvania as an important link between the East Coast and the Midwest. Intermodal shipments (trailers or containers on flatcars or double-stack cars) dominate Pennsylvania's rail traffic. In addition to intermodal traffic, freight railroads in Pennsylvania move raw materials, such as coal, crude oil, chemicals, nonmetallic minerals, agricultural products, and industrial output such as primary metal products and unassembled automobiles.

Photo: PennDOT

Rail System Needs and Opportunities

The primary need among freight and passenger railroads in Pennsylvania is improved safety. The greatest rail safety needs in Pennsylvania include improving safety at highway-rail at-grade crossings, minimizing derailments, reducing the opportunity for human error, and ensuring tracks are in a state of good repair. In order to address rail safety, Pennsylvania promotes a proactive approach to improve safety involving

personnel training, public outreach, and capital investment as well as supporting federal efforts of regulation and inspection.

Commercial and societal trends, institutional factors, regulations, and evolving technologies that save costs and make rail service more convenient for users present continuing opportunities for Pennsylvania's rail system. Specifically, passenger rail opportunities include supportive local land use planning to enhance mobility, improved station designs to build connectivity and facilitate access, and new funding mechanisms to deliver improved rail systems.

Current market trends for major freight rail-oriented economic sectors offer insights into future freight rail opportunities. Pennsylvania's rail traffic varies across the commonwealth, with the eastern regions dominated by coal, primary metals, and nonmetallic minerals such as gravel and sand, while the western regions are dominated by chemicals or allied products and intermodal traffic. Of particular importance are the three main marine ports—Philadelphia, Pittsburgh, and Erie—which handle a broad range of products in bulk, break-bulk, and intermodal. Thus, domestic and international intermodal traffic, energy, manufacturing, international trade, and consumer market sectors all influence future freight rail system needs and opportunities.

Rail Service and Investment Program

The State Rail Plan identifies an investment of capital projects totaling $6.9 billion between 2021 and 2045 (see Table ES-1). Included in this amount are $1.9 billion worth of vision projects for which implementation dates are yet to be determined. The RSIP includes two components: the passenger rail investment program and the freight rail investment program. The passenger rail component of the RSIP includes 132 passenger rail projects totaling $5.7 billion. The freight rail component of the RSIP consists of 323 projects totaling $1.2 billion from Class I, Class II, and Class III operators. Class I railroads are the largest railroads such as Norfolk Southern and CSX. Class II and III railroads are the commonwealth's regional, short line, and switching roads. However, the majority of the investment needs pertain to the Class III railroads.

Table ES-1 provides a summary of the RSIP projects and costs. It is important to note that several passenger and freight projects do not have known cost estimates. While these projects are included in the total number of projects, they are not reflected in the total cost estimates.

Table ES-1: Rail Service and Investment Program Summary (in Millions of $2020)

	Passenger		Freight		Total	
Time Range	No. of Projects	Cost ($million)	No. of Projects	Cost ($million)	No. of Projects	Cost ($million)
Short-Range (2021–2024)	48	$2,274.7	89	$323.2	137	$2,597.9
Long-Range (2025–2045)	46	$2,208.4	85	$186.2	131	$2,394.6
Vision(1)	38	$1,260.6	149	$655.3	187	$1,915.9
Total	**132**	**$5,743.7**	**323**	**$1,164.7**	**455**	**$6,908.4**

(1) Projects not yet scheduled for construction

The Pennsylvania passenger rail investment program will seek capital funding through all feasible resources. As for the freight rail investment program, Class I railroads generally finance projects themselves using revenue generated through operations. However, due to direct and indirect benefits of freight rail corridors as well as shared infrastructure with some public rail operations, public funding may be needed to complement private sources. This is especially the case for Class III railroads, which may not have as much access to revenue-generated private funds as Class I carriers typically do. Financing plans for the passenger and freight rail investment programs, inclusive of potential funding sources, have been identified as part of the RSIP.

Public and Private Benefits of Rail Investment

The proposed RSIP will result in both public and private benefits, namely increased safety, efficiency, and capacity. With these improvements, industries and individuals who use freight and passenger rail will have an expanded market reach and/or transportation cost savings. For example, passengers may have better access to jobs or educational opportunities. Shippers and consignees may be able to compete in new markets or experience cost savings that can be applied to other parts of their business operations.

Collectively, these changes may generate growth in jobs or productivity gains that foster the commonwealth's economic competitiveness leading to more prosperity. Furthermore, when passengers and freight movements are diverted to rail, the highway transportation network sees reductions in vehicle and passenger miles traveled. These reductions can result in decreased roadway crashes and injuries, less congestion, travel cost and highway maintenance savings, and lower vehicle emissions.

Specifically, passenger rail projects will improve safety by constructing or improving protective devices at rail-highway grade crossings, which will reduce the likelihood of incidents, injuries, fatalities, and property damage between trains and autos, pedestrians, and cyclists. Furthermore, equipment purchases and improvements to facilities, track, control systems, and bridges are anticipated to increase operating efficiencies, reduce maintenance time and expense, improve network reliability, reduce emissions, and improve the overall passenger experience, thus leading to increases in ridership, passenger safety, and security.

Freight projects will achieve similar safety improvements by replacing signal systems at grade crossings, thereby reducing the likelihood of conflicts between rail and highway traffic. Other projects involving maintenance, capacity upgrades at shipper facilities, intermodal site improvements, bridge repairs, expanded yard capacity, track upgrades, and the purchase or rehabilitation of locomotives and freight cars will provide benefits as well. Some of the benefits are:

- Improved reliability
- Lower maintenance costs
- Fulfillment of current market requirements
- Allowance for growth in freight rail traffic to, from, and through the commonwealth
- Cost savings for railroads and shippers
- Saved time
- Increased capacity
- Reduced emissions
- Decreased fuel consumption

Stakeholder and Public Outreach and Integration of State Rail Plans with Other Plans

Coordination and outreach were critical components to the development of this State Rail Plan. PennDOT developed the long-range vision in concert with other Pennsylvania state agencies, state and local elected officials, Rural Planning Organizations (RPOs) and Metropolitan Planning Organizations (MPOs), passenger and freight rail industry representatives, transportation agencies from adjacent states, federal agencies, professional associations, and other stakeholders. PennDOT engaged major stakeholders through a virtual Major Stakeholder Meeting held on April 16, 2020. At the meeting, PennDOT reviewed the purpose of the Pennsylvania State Rail Plan, existing

conditions for passenger and freight rail, and the plan's draft vision, along with its supporting draft goals and objectives. Meeting attendees included representatives from freight railroads, Amtrak, commuter rail service providers, MPOs and RPOs, and local and state government agencies, among others. More than 80 attendees participated in the meeting.

A total of 243 stakeholders completed a Major Stakeholder Survey, which was created to obtain additional stakeholder feedback.

The public was involved through virtual (online) public meetings that occurred upon release of the Draft *2020 Pennsylvania State Rail Plan* (2020 SRP) for public comment and its posting to the plan's website www.planthekeystone.com (PennDOT, 2020 b). Two virtual public meetings and a virtual elected official briefing on the Draft 2020 SRP was held in November 2020, and an online comment form was available to offer comments and feedback via the plan's webpage during the public comment period. Over 230 people attended one of the virtual meetings held on the Draft 2020 SRP and a total of 370 comments were provided via the online comment form and 6 additional comments were provided via email to PennDOT staff. PennDOT acknowledged all comments received during the public comment period and provided responses. Substantive comments were incorporated into the Final 2020 SRP and its analysis.

In addition, the State Rail Plan vision and goals are integrated with other transportation planning efforts in Pennsylvania, neighboring states, and nationally. In particular, PennDOT's *PA On Track*: *Long-Range Transportation Plan and Comprehensive Freight Movement Plan* (PennDOT, 2016 a), was reviewed and incorporated into the 2020 State Rail Plan.

Structure of the *Pennsylvania State Rail Plan*

In compliance with the FRA *State Rail Plan Guidance* (FRA, 2013), the 2020 State Rail Plan is organized into the following chapters and appendices:

Structure of the *Pennsylvania State Rail Plan*

Chapter 1: Current and proposed future role of freight and passenger rail in Pennsylvania's multimodal transportation system. It also identifies how the state is organized to provide political, legal, and financial support to rail development.

Chapter 2: Description and inventory of the existing passenger and freight rail systems, trends and forecasts of factors affecting rail demand and utilization, and the needs and opportunities for freight and passenger railroads in Pennsylvania.

Chapter 3: Summary of known and proposed passenger rail improvements and investments across the commonwealth of Pennsylvania. Proposed improvements and investments include projects for high-speed, intercity, and commuter rail services along Amtrak's Keystone Corridor, Amtrak's Northeast Corridor (NEC) and the Southeastern Pennsylvania Transportation Authority (SEPTA) Regional Rail system.

Chapter 4: Summary of known and proposed freight rail investments based on information received from individual freight railroads, regional planning organizations, and ports.

Chapter 5: Vision, goals, and objectives for the Commonwealth's rail transportation system. There are eight goals, each with their own supporting objectives, that outline the path to achieving the 2020 State Rail Plan Vision. Chapter 5 also details the RSIP. Several studies of pressing rail issues in Pennsylvania are also recommended.

Chapter 6: Efforts made to obtain rail stakeholder and public input on the State Rail Plan, the feedback and comments received, how this feedback was integrated into the plan, and the coordination with other transportation planning programs.

Appendices: References, transload facilities, proposed passenger and freight rail projects, planned Section 130 highway-rail improvement projects, and RSIP passenger and freight analyses.

COVID-19 Pandemic

The 2020 State Rail Plan was prepared between fall 2019 and fall 2020, and therefore, where possible, the plan encompasses the anticipated short- and long-term impacts of the coronavirus 2019 (COVID-19) pandemic on freight and passenger rail. As the preparation of the State Rail Plan continued through 2020, it became apparent that the potential short-term impacts of the virus may change long-term commuting patterns. Unfortunately, the timing of this Plan did not allow for a detailed analysis of these potential changes to passenger and freight rail. Per the FRA guidance, it may be prudent to consider an amendment to the State Rail Plan in the coming years that will be able to analyze these COVID-19 impacts on rail in the commonwealth. Like so many other organizations, PennDOT took necessary measures and precautions in response to COVID-19. As a result, all stakeholder and public outreach for the 2020 State Rail

Plan was conducted virtually through innovative public involvement techniques. It is also worth noting that COVID-19 has also had a major impact on commonwealth and PennDOT revenues. Pennsylvania's prudent and lifesaving response to the health crisis coupled with decreased travel throughout the nation and region significantly reduced the department's gas tax and other revenues. Projected transportation revenue impacts in the short term will mean between $500 and $600 million less for construction and maintenance programs, and over $100 million less available for multimodal initiatives due to COVID-19. PennDOT did receive $407 million in federal COVID relief funds for highways and bridges and while these funds are definitely helpful, they won't cover all of the construction needs of Pennsylvania's roads and bridges. These combined factors may significantly impact future freight and passenger rail investments.

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Table of Contents

List of Appendices

List of Figures

List of Tables

Acronyms and Abbreviations

A

AADT	average annual daily traffic
AAPA	American Association of Port Authorities
AAR	Association of American Railroads
AASHTO	American Association of State Highway Transportation Officials
ABE	Lehigh Valley International Airport
ACS	Amtrak Cities Sprinter
Act 13	Natural Oil & Gas Production Regulation in PA (Act 13 of 2012)
Act 89	Pennsylvania Act 89 of 2013
ADA	Americans with Disabilities Act; All delays related to disabled passengers, wheelchair lifts, guide dogs, etc.
AEO2020	Annual Energy Outlook 2020
AI	Artificial Intelligence
AID	Autonomous Intelligent Driving
ALCO	American Locomotive Company
ALLN	Allentown and Auburn Railroad Company
ALT	Altoona
Amtrak	National Railroad Passenger Corporation
AOR	Aliquippa & Ohio River Railroad
ARC	Appalachian Regional Commission
ARD	Ardmore
AT	autonomous truck
ATRI	American Transportation Research Institute
AVR	Allegheny Valley Railroad Company

B

B&O	Baltimore & Ohio
BBRR	Buckingham Branch Railroad
BCF/D	billion cubic feet per day
BDRV	Belvidere & Delaware River Railway
BFM	Bureau of Fiscal Management
BLE	Bessemer & Lake Erie Railroad
BPRR	Buffalo & Pittsburgh Railroad
BUILD	Better Utilizing Investment to Leverage Development

C

CAR	Car Failure
CARES Act	Coronavirus Aid, Relief, and Economic Security Act
CDP	Capital Development Program
CFA	Commonwealth Financing Authority
CFMP	Comprehensive Freight Movement Plan
CHR	Chestnut Ridge Railway

CMAQ	Congestion Mitigation and Air Quality Improvement Program
CN	Canadian National Railway
CNYK	Central New York Railroad
COFC	container on flatcar
COG	Council of Governments
Conrail	Consolidated Rail
CORY	Columbia and Reading Railway
COT	Coatesville
COV	Connellsville
COVID-19	coronavirus disease 2019
CRCX	Conrail Shared Assets
CRISI	Consolidated Rail Infrastructure and Safety Improvements
CSI	Customer Satisfaction Index
CSX	CSX Transportation
CTI	Delays for meeting or following commuter trains
CWH	Cornwells Heights

D

DCED	Pennsylvania Department of Community and Economic Development
DCS	Signal failure or other signal delays
DHS	Department of Homeland Security
DL	Delaware – Lackawanna Railroad
DLS	Delaware, Lackawaxen & Stourbridge Railroad
DMW	Maintenance-of-way delays
DOCP	Delaware Otsego; DOCP Acquisition
DOT	Department of Transportation
DOW	Downingtown
DSR	Temporary slow orders, except for heat or cold orders
DTR	Delays from detours
DVMT	daily vehicle miles traveled
DVRPC	Delaware Valley Regional Planning Commission

E

EBG	Eastern Berks Gateway Railroad
EBT	East Broad Top Railroad
EBTC	East Broad Top Connecting Railroad
ECP	electronically controlled pneumatic brakes
EEC	East Erie Commercial Railroad
ELT	Elizabethtown
EMU	electric multiple unit
ENG	mechanical failure on engines
EPA	Environmental Protection Agency
ERI	Erie
ERPC	Erie Regional Planning Commission
ESPN	East Penn Railroad
EV	Everett Railroad
EXT	Exton
EZR	Elizabethtown Industrial Railroad

F

FAA	Federal Aviation Administration
FAST Act	Fixing America's Surface Transportation Act of 2015
FDOT	Florida Department of Transportation
FFY	Federal Fiscal Year
FHWA	Federal Highway Administration
FM & P	Fairmont, Morgantown & Pittsburgh
FR	Florida East Coast Railway
FRA	Federal Railroad Administration
FRSA	Federal Railroad Safety Act
FTA	Federal Transit Administration
FTI	Delays from freight trains
FY	Fiscal Year

G

G&W	Genesee & Wyoming
GAO	Government Accountability Office
GDP	Gross Domestic Product
GET	Gettysburg & Northern Railroad
GHG	Greenhouse gases
GIS	geographic information system
GNB	Greensburg
GPS	global positioning system
GV	Genesee Valley Transportation

H

H.R.	House of Representatives
HAR	Harrisburg
HGD	Huntingdon
HGS	High Growth Scenario
HIA	Harrisburg International Airport
HLD	All delays related to passengers, checked-baggage, large groups, etc.
HSIP	Highway Safety Improvement Program

I

INFRA	Infrastructure for Rebuilding America
IRS	Internal Revenue Service
ISPRS	International Society for Photogrammetry and Remote Sensing
ITHR	Ithaca Central Railroad
ITP	Initial Terminal Performance

J

JCTC	Job Creation Tax Credits
JST	Johnstown
JVRR	Juniata Valley Railroad Company

K

KCIP	Keystone Corridor Improvement Project
KJRR	Kiski-Junction Railroad
KRL	Kasgro Rail
kWh	kilowatt-hours

L

LAB	Latrobe
LBCX	Lewisburg and Buffalo Creek Railroad
LED	light-emitting diode
LEW	Lewistown
LGS	Low Growth Scenario
LHN	North Philadelphia
LNC	Lancaster
LOS	Level of Service
LRTP	Long Range Transportation Plan
LRWY	Lehigh Railway
LS	Luzerne & Susquehanna Railroad Company
LTRA	long-term revenue-adequate
LUCY	Loop Through University City
LVR	Landisville Railroad
LVRB	Lehigh Valley Rail Management – Bethlehem
LVRJ	Lehigh Valley Rail Management – Johnstown
LVRR	Lycoming Valley Railroad

M

MADOT	Massachusetts Department of Transportation
MBTA	Massachusetts Bay Transportation Authority
MDT	Harrisburg International Airport
MID	Middletown
MIDH	Middletown & Hummelstown Railroad
MJY	Mount Joy
MMID	Maryland Midland Railway
MNRR	Metro-North Railroad
mph	miles per hour
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
MSUB	Mittal Steel USA Railways-BRVY
MSUS	Mittal Steel U.S.A. Railways-SH
MSUU	Mittal Steel U.S.A. Railways-UMP
MW	Maintenance of Way

N

NAFTA	North America Free Trade Agreement
NBER	Nittany & Bald Eagle Railroad
NCIR	New Castle Industrial Railroad
NDCR	Northampton Development Center Railroad
NEC	Northeast Corridor
NECR	New England Central Railroad
NER	Northeast Regional
NFC	near-field communication
NGL	natural gas liquid
NHFP	National Highway Freight Program
NHRR	New Hope & Ivyland Railroad
NHS	National Historic Site
NHTSA	National Highway Traffic Safety Administration

NJ Transit	New Jersey Transit
NLCD	National Land Cover Database
NS	Norfolk Southern Railway
NSHR	North Shore Railroad
NTSB	National Transportation Safety Board
NYC	New York Central Railroad
NYSW	New York, Susquehanna and Western Railway

O

OCTL	Oil Creek & Titusville Lines
OSHA	Occupational Safety and Health Administration
OTH	lost-on-run, heavy trains, unable to make normal speed, etc.
OTP	on-time performance

P

P3	public-private partnership
PA First	Pennsylvania First
Pa.C.S.	Pennsylvania Consolidated Statute
PAB	Private activity bond
PAM	Pittsburgh, Allegheny, & McKees Rocks Railroad
PAO	Paoli
PAR	Parkesburg
PASDA	Pennsylvania Spatial Data Access
PATCO	Port Authority Transit
PBB	Scheduled bridge and building maintenance
PennDOT	Pennsylvania Department of Transportation
PET	scheduled catenary or other electrical work
PGH	Pittsburgh
PhilaPort	Port of Philadelphia
PHL	Philadelphia International Airport
PHMSA	Pipeline and Hazardous Materials Safety Administration
PHN	North Philadelphia
PIB	Pennsylvania Infrastructure Bank
PIDA	Pennsylvania Industrial Development Authority
PIT	Pittsburgh International Airport
Plan	2020 Pennsylvania State Rail Plan
P.L.	Public Law
PN	Pennsylvania Northeastern Railroad
PNRRA	Pennsylvania Northeast Regional Railroad Authority
POHC	Pittsburgh & Ohio Central Railroad
Port Authority	Port Authority of Allegheny County
PortPitt	Port of Pittsburgh Commission
PREP	Partnerships for Regional Economic Performance
PRIIA	Passenger Rail Investment and Improvement Act of 2008
PRR	Pennsylvania Railroad
PSC	Scheduled communications and signal work

PSCC	Pennsylvania and Southern Railroad
PSICP	Public and Stakeholder Involvement and Communications Plan
PSR	Precision Scheduled Railroading; Scheduled Speed Restrictions
PSWR	Pennsylvania Southwestern Railroad
PTC	Positive Train Control
PTCIP	Positive Train Control Implementation Plan
PTI	delays for meeting or following other passenger trains
PUC	Public Utility Commission

Q

Q3, Q4	3rd quarter, 4th quarter of fiscal year

R

R&D	research and development
RACP	Redevelopment Assistance Capital Program
RBMN	Reading Blue Mountain & Northern Railroad
RFAP	Rail Freight Assistance Program
RJCN	R.J. Corman Railroad / Allentown Lines
RJCP	R.J. Corman Railroad / Pennsylvania Lines
RND	Railroads for National Defense Program
RO/RO	roll-on, roll-off
ROI	return on investment
RPO	Rural Planning Organization
RRIF	Railroad Rehabilitation and Improvement Financing
RRX	Railway-Highway Crossings Program
RSIA	Rail Safety Improvement Act of 2008
RSIP	Rail Service and Investment Program
RTAP	Rail Transportation Assistance Program
RTE	Routing-dispatching delays

S

SARAA	Susquehanna Area Regional Airport Authority
SDP	Strategic Development Plan
Section 130	Rail-Highway Grade Crossing Program
SEDA-COG	Susquehanna Economic Development Association – Council of Governments
SEPTA	Southeastern Pennsylvania Transportation Authority
SFY	State Fiscal Year
SLRS	SMS Lines
SMW	Scheduled maintenance of way work
SRC	Strasburg Railroad
SRP	State Rail Plan
SRPAA	State Rail Plan Approval Authority
SRTA	State Rail Transportation Authority
STB	U.S. Surface Transportation Board

STBG	Surface Transportation Block Grant Program
STIP	Statewide Transportation Improvement Program
STRACNET	Strategic Rail Corridor Network
SVRR	Shamokin Valley Railroad
SVS	Servicing Delays
SWP	Southwest Pennsylvania Railroad
SYS	delays related to crews

T

TAC	Transportation Advisory Committee
TEU	twenty-foot equivalent unit
TIFIA	Transportation Infrastructure Finance and Innovation Act
TIGER	Transportation Investment Generating Economic Recovery
TIP	Transportation Improvement Program
TOD	Transit Oriented Development
TOFC	trailer on flatcar
TRB	Transportation Research Board
TSA	Transportation Security Administration
TYBR	Tyburn Railroad
TYR	Tyrone

U

U.S.C.	U.S. Code
UCIR	Union County Industrial Railroad
UPS	United Parcel Service
URL	Uniform Resource Locator
URR	Union Railroad
USDA	United States Department of Agriculture
USDOT	U.S. Department of Transportation
USMCA	United States-Mexico-Canada Agreement

V

V/C	volume-to-capacity
VMT	vehicle miles traveled
VW	Volkswagen

W

Wabtec	Westinghouse Air Brake Technologies Corporation
WCOR	Wellsboro & Corning Railway
WE	Wheeling & Lake Erie Railway
WNYP	Western New York & Pennsylvania Railroad

X

Y

YOE	year of expenditure
YRC	York Railway
YSRR	Youngstown & Southeastern Railway

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Photo: Dan Davis Photography

1 The Role of Rail in Statewide Transportation

This State Rail Plan (SRP) is an update of the 2015 *Pennsylvania State Rail Plan* (PennDOT, 2015). This SRP meets the requirements stated in the Federal Railroad Administration (FRA) SRP guidance issued in September 2013, Section 303 of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) (P. L. No. 110-432), and Section 11315 of the Fixing America's Surface Transportation Act of 2015 (FAST Act) (P. L. No. 114-94). To that end, this Plan includes a comprehensive description and assessment of the current rail system, an analysis of the role of rail transportation within the state's transportation system, a vision of the future passenger and freight rail systems in the state, and a description of how that vision is integrated into planning for the state's overall multimodal transportation system. Finally, this SRP includes a Rail Service and Investment Program (RSIP) that provides guidelines and lists the rail

investment needs to achieve Pennsylvania's vision for the rail system in the short and long term.

Chapter 1 describes the current and proposed future role of rail in Pennsylvania's multimodal transportation system. It also identifies how the state is organized to provide political, legal, and financial support to rail development.

1.1 Pennsylvania's Goals for a Multimodal Transportation System

PA On Track, the commonwealth's 2016 Long Range Transportation Plan (LRTP) and the Comprehensive Freight Movement Plan (CFMP) (PennDOT, 2016 a), together articulate the state's transportation vision.

State Transportation Vision

Deliver a quality transportation system to support the economy and lifestyles of current and future Pennsylvanians.

To support the state transportation vision, the Pennsylvania Department of Transportation (PennDOT) developed the LRTP and CFMP, which identify the following four goals (see Figure 1-1):

- System Preservation – Preserve transportation assets using sound asset management practices within the limitations of available resources
- Safety – Improve statewide safety for all modes and all users
- Personal and Freight Mobility – Expand and improve system mobility and integrate modal connections
- Stewardship – Increase efficiency through modernization of assets and streamlining of processes

Figure 1-1: *PA On Track's* four goals supporting the State Transportation Vision (PennDOT, 2016)

The LRTP and CFMP also discuss passenger and freight rail needs and priority projects. The

goals of this SRP are consistent with Pennsylvania's goals for a multimodal transportation system as defined in *PA On Track* (PennDOT, 2016 a).

1.2 The Role of Rail Transportation in Pennsylvania

One of the largest railroad systems among the states, Pennsylvania's rail network is as diverse as the commonwealth itself, ranging from high-speed intercity service to transcontinental freight rail systems, to small, short line railroads serving rural areas of the state, and to local switching and terminal railroads.

The history of rail in Pennsylvania stretches back to the 19th century with the 1834 Pennsylvania Main Line of Public Works, which was an integrated canal, inclined plane, and railroad system inspired by New York State's Erie Canal. A watershed event in Pennsylvania's railroad history was the establishment of direct rail service from Pittsburgh to Philadelphia in 1854, made possible by the construction of the Horseshoe Curve located near Altoona, PA. Travel time between the two major cities was reduced from 3 days to 13 hours. Completion of the Horseshoe Curve triggered the Pennsylvania Railroad's (PRR's) rise to its historical status as one of the world's largest and most successful railroads. Other major projects constructed by the PRR included the Altoona Rail Works and improvements in Philadelphia, including 30th Street Station. More recent events include the revival of railroads in the commonwealth through publicly owned passenger service and privately owned freight companies.

1.2.1 Freight Rail

Pennsylvania's freight rail system is composed of more than 5,600 miles of track operated by more than 60 railroads (PennDOT, 2019 a). The Pennsylvania freight rail network carried an estimated 193.6 million tons of freight in 2017 per the U.S. Surface Transportation Board (STB) Confidential Carload Waybill Sample (STB, 2019a). Inbound and outbound traffic accounted for 25% and 23%, respectively, of the state's freight rail tonnage. Through freight rail movements (freight that does not have an origin or a termination in the state, but rather travels through the state) comprised 47% of the total freight rail tonnage shipments in Pennsylvania, indicating the relative significance of Pennsylvania as an important link between the East Coast and the Midwest. In terms of carloads, intermodal shipments (trailers or containers on flatcars or double-stack cars) dominate Pennsylvania's rail traffic.

As of 2017, Pennsylvania ranked 1st among all states in the number of operating railroads, 4th in total railroad mileage, 10th in tons originating in the state, 11th in tons terminating in the state, 8th in the number of carloads originating in the state, and 6th in

the number of carloads terminating within the state. In comparison to other states, Pennsylvania also ranked 8th in total railroad employment (6,152) and 9th in rail wages ($474.1 million) in 2017 (AAR, 2017) (Figure 1-2).

In addition to intermodal traffic, freight railroads in Pennsylvania move raw materials, such as coal, crude oil, chemicals, nonmetallic minerals, agricultural products, and industrial output such as primary metal products and finished automobiles. More detail regarding freight rail movements can be found in Chapter 2.

Figure 1-2: Pennsylvania's rank in freight rail in the United States (AAR, 2017)

1.2.2 Passenger Rail

Intercity service in Pennsylvania is provided by the National Railroad Passenger Corporation, commonly known as Amtrak, which operates 21,400 route miles of service in 46 states, the District of Columbia, and three Canadian provinces (Figure 1-3). Main Amtrak routes in Pennsylvania include several long-distance trains operating on:

- The Amtrak-owned Northeast Corridor (NEC) between Washington, D.C., Philadelphia, New York, and Boston
- CSX's Chicago Line (between the New York-Pennsylvania and Pennsylvania-Ohio borders in Erie County) for the Lake Shore Limited between Chicago, Erie, and New York
- CSX's Keystone Subdivision (between the Maryland-Pennsylvania border and Pittsburgh) and Norfolk Southern's (NS's) Fort Wayne Line (between Pittsburgh and the Pennsylvania-Ohio border) for the Capitol Limited between Washington, D.C., Pittsburgh, and Chicago
- Amtrak's NEC and Keystone Corridor and NS's Pittsburgh Line for the Pennsylvanian between New York, Philadelphia, Harrisburg, and Pittsburgh
- Amtrak's Keystone Corridor for the Keystone Service between Harrisburg, Philadelphia, and New York

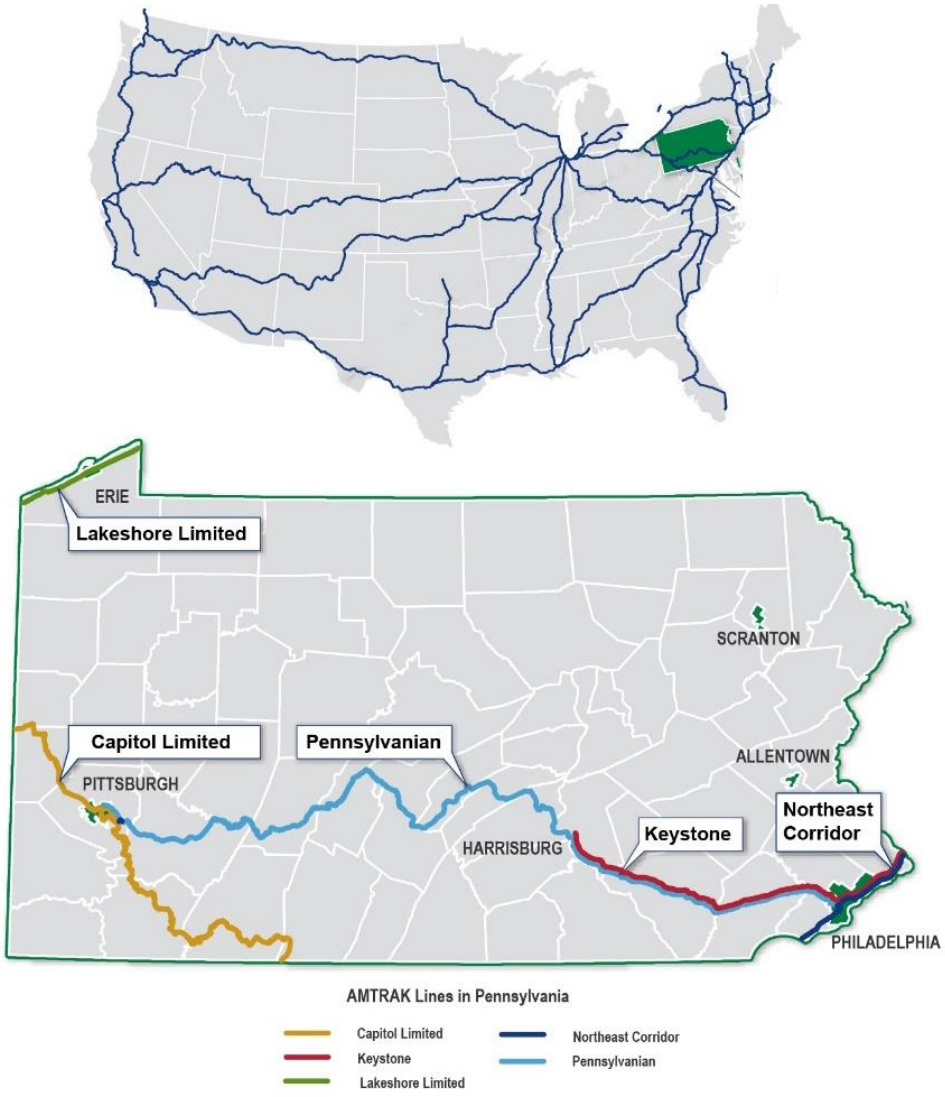


Figure 1-3: Amtrak route in Pennsylvania (FRA, 2019)

Commuter rail service is provided in the Greater Philadelphia region primarily through the Southeastern Pennsylvania Transportation Authority (SEPTA) Regional Rail system, with 280 route miles served by 13 rail lines, as well as New Jersey Transit's Atlantic City Line, which connects 30th Street Station to eight stations in southern New Jersey. New Jersey Transit is New Jersey's public transportation corporation.

Pennsylvania also hosts 16 heritage and tourist railroads, which offer educational and recreational experiences to riders. Heritage railroads serve a mission of providing insight into what railroading was like decades ago when trains were the primary form of transportation for most people. Several of these railroads are also part-time operators of

short line or small freight services. More detail regarding passenger rail operations can be found in Chapter 2.

1.3 Governance Structure for Rail in Pennsylvania

This section provides a high-level summary of the governance of the Pennsylvania rail system, including powers and regulations related to the rail system.

1.3.1 Federal Laws and Powers for Planning, Operating, and Funding Rail Services

The FRA, the Federal Transit Administration (FTA), and the U.S. Surface Transportation Board (STB) each play a role in freight and passenger rail governance.

1.3.1.1 Federal Railroad Administration

From its beginnings in 1966, the FRA has held the primary federal responsibility for enforcing the safe operation of the national rail network. In subsequent years, the agency's portfolio was expanded to encompass other functions, including overseeing a rail research program and administering federal grants to Amtrak. More fundamental changes to the FRA's responsibilities came on approval of the PRIIA, which changed the agency's role from a primary focus on safety to active management of rail policy development and investment, similar to FTA's role with public transit. Central to this change has been PRIIA's requirement for FRA to oversee comprehensive state rail plans, regional passenger rail planning projects (such as NEC FUTURE and CONNECT NEC 2035), and administration of federal grant and loan programs for intercity passenger rail for the states, Amtrak, and other rail operators. The recent FAST Act continues and expands on these FRA responsibilities through various funding, and policy provisions.

Federal law (49 U.S.C. § 22702) and the minimum requirements established by the FRA under 49 U.S.C. § 22702 govern state rail plans, which are required to be updated every 4 years. This SRP is compliant with 49 U.S.C. § 22102, which pertains to a state's eligibility to receive federal financial assistance. Compliance requires, among other things, an adequate plan for rail transportation in the state and a suitable process for updating, revising, and modifying that plan. The SRP and periodic updates fulfill this requirement.

1.3.1.2 Federal Transit Administration

The FTA provides financial and technical assistance to state and local public transit service providers, including commuter railroads. The FTA oversees capital and operating grants to the transit providers and ensures that grant recipients are managing their programs in accordance with federal, statutory, and administrative requirements. Under traditional grant agreements, carried forward in the FAST Act as part of the New Start, Core Capacity, and other similar programs, local stakeholders are typically required to provide a 50% local match to receive federal funds. In this way, the FTA and local project sponsors play a joint role in project development and investment.

1.3.1.3 U.S. Surface Transportation Board

The STB is the federal economic regulatory body for the railroad industry; it is the successor to the Interstate Commerce Commission. The STB settles railroad rate and service disputes and reviews proposed railroad mergers, acquisitions, abandonments, and new line construction. More recently, it has been assigned responsibility for mediating conflicts between passenger operators (including Amtrak and other intercity and commuter rail operators) and track-host freight railroads. This responsibility includes investigating causes of poor on-time performance (OTP), or other intercity passenger rail service quality deficiencies caused by the operator, the track-host railroad, or the managing entity.

1.3.2 State Agencies

The state agencies listed below are involved in the planning, regulation, and financial support of railroads in Pennsylvania. These agencies work closely with local governments, railroads, federal agencies, and other key stakeholders to improve, maintain, and develop rail transportation within the commonwealth.

1.3.2.1 Pennsylvania Department of Transportation

PennDOT is responsible for the state's multimodal transportation network. The PennDOT entities that are involved in rail planning efforts include:

- Bureau of Public Transportation: Responsible for the development, improvement, and promotion of public transportation; provides oversight, funding, and technical assistance to support public transit and rail passenger operations.
- Bureau of Rail, Freight, Ports, and Waterways: Works to improve rail and maritime freight systems, and administers a grant program intended to preserve essential rail freight service where economically feasible and preserve or stimulate

economic development through the generation of new or expanded rail freight service.

- Bureau of Planning and Research: Responsible for the development, management, and implementation of PennDOT's research and local technical assistance programs, transportation systems information, highway travel data collection and performance statistics, and geographic information systems (GIS) for all modes of transportation.
- Public-Private Transportation Partnership Office and Public-Private Partnership (P3) Transportation Board: Develops innovative project delivery and financing models for projects designed to strengthen the transportation network, including rail service.
- Grade Crossing Unit: Acts as a liaison between PennDOT's 11 engineering districts, the Public Utility Commission (PUC), and operating railroads for highway-railroad crossing safety projects and highway/bridge projects involving railroad facilities.

Under Pennsylvania Act 89 of 2013 (74 Pa.C.S.; 75 Pa.C.S.) (Act 89), a new Multimodal Deputate was formed within PennDOT to include local and public transportation, passenger rail, freight rail, ports and waterways, aviation and airports, and biking and walking. Act 89 also created a dedicated Multimodal Transportation Fund, to be managed by PennDOT, that would financially support a "safe and reliable system of public transportation, aviation, ports, rail and bicycle and pedestrian facilities" (74 Pa.C.S. (11)).

PennDOT is the designated State Rail Transportation Authority (SRTA) and State Rail Plan Approval Authority (SRPAA), the latter of which gives the agency the authority to prepare, maintain, coordinate, administer, review, and approve the SRP.

The requirements to maintain eligibility for federal transportation funding are listed in 49 U.S.C. § 22102. PennDOT complies with all of the requirements, which are as follows:

> **(1)** the State has an adequate plan for rail transportation in the State and a suitable process for updating, revising, and modifying the plan;
>
> **(2)** the State plan is administered or coordinated by a designated State authority and provides for a fair distribution of resources;
>
> **(3)** the State authority –
>
> > **(A)** is authorized to develop, promote, supervise, and support safe, adequate, and efficient rail transportation;
> >
> > **(B)** employs or will employ sufficient qualified and trained personnel;

> **(C)** maintains or will maintain adequate programs of investigation, research, promotion, and development with opportunity for public participation; and
>
> **(D)** is designated and directed to take all practicable steps (by itself or with other State authorities) to improve rail transportation safety and reduce energy use and pollution related to transportation.
>
> **(4)** the State has ensured that it maintains or will maintain adequate procedures for financial control, accounting, and performance evaluation for the proper use of assistance provided by the United States Government.

1.3.2.2 Pennsylvania Public Utility Commission

The PUC regulates public utilities in the state, which include transportation utilities. The Rail Safety Section of the PUC has jurisdiction over the safety of public highway-railroad crossings. The PUC also handles complaints and conducts safety inspections at rail facilities for compliance with PUC and FRA regulations concerning track, motive power and equipment, hazardous material, operating practices, and grade crossings.

1.3.2.3 Pennsylvania Department of Community and Economic Development

The Pennsylvania Department of Community and Economic Development (DCED) administers its own Multimodal Transportation Fund (separate from the PennDOT Multimodal Transportation Fund). The DCED Multimodal Transportation Fund provides grants to encourage economic development and ensure a safe and reliable system of transportation is available. Rail-related projects eligible for funding are intercity rail improvements, rail freight sidings, and track rehabilitation or upgrades.

1.3.3 Local Passenger Commuter Rail Agencies

Commuter rail is defined in the National Transit Database glossary as:

> … an electric or diesel propelled railway for urban passenger train service consisting of local travel which operates between a central city and outlying areas. Service must be operated on a regular basis by or under contract with a transit operator for the purpose of transporting passengers within urbanized areas, or between urbanized areas and outlying areas. Commuter rail is generally characterized by multi-trip tickets, specific station-to-station fares, railroad employment practices, relatively long distance between stops, and only 1-2 stations in the central business district (FTA, 2020).

Pennsylvania is served by the Southeastern Pennsylvania Transportation Authority (SEPTA), New Jersey Transit (NJ Transit), and other passenger rail systems.

1.3.3.1 Southeastern Pennsylvania Transportation Authority

SEPTA Regional Rail provides extensive regional commuter service in the Greater Philadelphia metropolitan area. In addition to commuter rail service, SEPTA provides light rail, rapid transit, and bus service throughout the Philadelphia metropolitan area. In SEPTA's Fiscal Year (FY) 2019 (ending June 30, 2019), the agency provided 40 million regional rail passenger trips.

1.3.3.2 New Jersey Transit

New Jersey Transit (NJ Transit) provides commuter rail service in the commonwealth via one of its lines, the Atlantic City Line, which terminates at Philadelphia's 30th Street Station, its only Pennsylvania stop. NJ Transit also provides commuter rail, light rail, and bus service throughout New Jersey, as well as commuter rail into Manhattan, NY. As the Atlantic City Line has just one stop in Pennsylvania, the line is not included in the subsequent SRP analysis.

1.3.3.3 Other Passenger Rail Systems

Other passenger light rail and rapid transit systems exist throughout the state, including those operated by the Port Authority Transit Corporation (PATCO), Port Authority of Allegheny County, and Cambria County Transit Authority. These rail systems are not included in the subsequent SRP analysis as they do not fall under FRA jurisdiction.

1.3.4 Metropolitan Planning Organizations

Federal law requires urbanized areas with populations of 50,000 or greater to establish Metropolitan Planning Organizations (MPOs). The MPOs are responsible for developing and maintaining a Transportation Improvement Program (TIP), which represents 4 years of transportation planning for the MPO region. The TIPs form the basis for the distribution of federal and state transportation funds. The MPOs in Pennsylvania and the counties they serve are listed below.

1.3.5 Rural Planning Organizations

Pennsylvania has established Rural Planning Organizations (RPOs) to function as planning partners in rural areas. Similar to MPOs, RPOs are responsible for developing their region's TIPs. Projects from these TIPs are incorporated into the Statewide Transportation Improvement Program (STIP) and are eligible for federal and state funding. The commonwealth's RPOs are listed below. In addition to these RPOs, Wayne County is an independent county for purposes of transportation planning.

Metropolitan Planning Organizations and the counties they serve

Adams County Transportation Planning Organization
- Adams

Blair County Planning Commission-Altoona Metropolitan Statistical Area (MSA)
- Blair

Centre County MPO
- Centre

Delaware Valley Regional Planning Commission
- Pennsylvania
  - Bucks
  - Chester
  - Delaware
  - Montgomery
  - Philadelphia
- New Jersey
  - Burlington
  - Camden
  - Gloucester
  - Mercer

Erie Area Transportation Study
- Erie

Franklin County MPO
- Franklin

Harrisburg Area Transportation Study
- Cumberland
- Dauphin
- Perry

Johnstown Area Transportation Study/Cambria County MPO
- Cambria
- Portions of Somerset

Lackawanna/Luzerne Transportation Study (Scranton/Wilkes-Barre)
- Lackawanna
- Luzerne

Lancaster Metropolitan Planning Organization
- Lancaster

Lebanon County MPO
- Lebanon

Lehigh Valley Transportation Study
- Lehigh
- Northampton

Northeastern Pennsylvania Alliance
- Carbon
- Monroe
- Pike
- Schuylkill

Reading Area Transportation Study
- Berks

Shenango Valley Area Transportation Study
- Mercer

Southwestern Pennsylvania Commission
- Allegheny
- Armstrong
- Beaver
- Butler
- Fayette
- Greene
- Indiana
- Lawrence
- Washington
- Westmoreland

Susquehanna Economic Development Association – Council of Governments (SEDA-COG)
- Clinton
- Columbia
- Juniata
- Mifflin
- Montour
- Northumberland
- Snyder
- Union

Williamsport Area Transportation Study
- Lycoming

York Area Metropolitan Planning Organization
- York

For more information, see https://www.penndot.gov/ProjectAndPrograms/Planning/Pages/MPO-and-RPO-Contact-List.aspx.

Pennsylvania Rural Planning Organizations and the counties they serve

North Central Pennsylvania Regional Planning and Development Commission

Cameron	Jefferson
Clearfield	McKean
Elk	Potter

Northwest Pennsylvania Regional Planning and Development Commission

Clarion	Venango
Crawford	Warren
Forest	

Northern Tier Regional Planning and Development Commission

Bradford	Tioga
Sullivan	Wyoming
Susquehanna	

Southern Alleghenies Planning and Development Commission

Bedford	Huntingdon
Fulton	Somerset

For more information, see https://www.penndot.gov/ProjectAndPrograms/Planning/Pages/MPO-and-RPO-Contact-List.aspx.

1.3.6 Regional Rail Authorities

There are two major public regional rail authorities in Pennsylvania, both of which own local short line railroads and contract out operations responsibilities to privately owned railroad companies. These are:

- The Susquehanna Economic Development Association–Council of Governments (SEDA-COG) Joint Rail Authority, which owns six short line railroads in central Pennsylvania comprising nearly 200 miles of track and provides freight service.
- The Pennsylvania Northeast Regional Railroad Authority (PNRRA), which owns a system of approximately 100 miles of short line railroad used for freight and passenger excursion service.

1.3.7 Marine Ports

Pennsylvania's ports play an important role in intermodal freight traffic. The commonwealth has three major ports (described below), all with excellent rail connections. PennDOT coordinates port planning through its Bureau of Rail, Freight, Ports and Waterways.

1.3.7.1 Port of Philadelphia

The Port of Philadelphia (PhilaPort) is under the jurisdiction of the Philadelphia Regional Port Authority. The port offers access to the Atlantic Ocean and international shipping via the Delaware River and has connections to two Class I railroads (NS and CSX). In 2018, PhilaPort moved 26.6 million tons of freight (BTS, n.d.a).

1.3.7.2 Port of Pittsburgh

The Port of Pittsburgh (PortPitt) is under the jurisdiction of the Port of Pittsburgh Commission. The port offers access to three major rivers in southwestern Pennsylvania: the Allegheny, Monongahela, and Ohio Rivers. PortPitt is also served by two Class I railroads (NS and CSX). In 2018, PortPitt moved 21.6 million tons of freight (BTS, n.d.b).

1.3.7.3 Port of Erie

The Port of Erie offers access to the Great Lakes and the Saint Lawrence Seaway and is under the jurisdiction of the Erie-Western Pennsylvania Port Authority. The Port of Erie is served by one Class I railroad (CSX). The Port of Erie handles approximately 700,000 tons of material per year (Erie-Western Pennsylvania Port Authority, 2018).

1.4 State's Authority for Grant, Loan, and Public-Private Partnership Funding

PennDOT has the authority to "… provide financial assistance for an efficient and coordinated intercity common carrier surface transportation program, consisting of both intercity passenger rail service and intercity bus service transportation, with the intent of sustaining strong intercity connections …" (74 Pa.C.S. § 1516(c)).

Within the agency, the Bureau of Rail, Freight, Ports and Waterways administers funds for freight rail, and the Bureau of Public Transportation is responsible for administering passenger rail funds. Table 1-1 presents the state's allocation of funds to rail programs over the past 5 years.

Table 1-1: PennDOT Funding for Rail, FY 2014–2019 (in Millions of Dollars)

Funding Source	FY 2014–2015	FY 2015–2016	FY 2016–2017	FY 2017–2018	FY 2018–2019
Freight Capital Grants	$36.1	$35.9	$40.3	$32.0	$23.6
SEPTA Capital	$116.5	$330.7	$326.8	$326.8	$351.7
SEPTA Regional Rail Operating	$88.1	$99.9	$101.1	$121.0	$127.2
Amtrak Capital	$17.8	$42.8	$23.1	$22.7	$37.7
Amtrak Operating	$14.3	$12.7	$14.9	$15.1	$16.1
Total	**$272.8**	**$191.7**	**$506.3**	**$517.6**	**$556.3**

Act 89 provides a dedicated, long-range source of funding for transportation projects. The act supplements prior transportation funding, which was primarily based on gas tax and user fees, by eliminating the cap on the wholesale gas tax and increasing a range of user fees. Act 89 provides an estimated $2.3 billion in additional revenue annually. The legislation also established minimum annual funding levels for freight rail ($10 million) and passenger rail ($8 million) programs.

State funding for public transportation, including SEPTA's Regional Rail system, is provided through the Public Transportation Trust Fund, which includes six major programs, as identified in 74 Pa.C.S Chapter 15:

- Operating Program (74 Pa.C.S. § 1513)
- Asset Improvement Program for Capital Projects (74 Pa.C.S. § 1514)
- New Initiatives Program (74 Pa.C.S. § 1515)
- Programs of Statewide Significance (74 Pa.C.S. § 1516)
- Capital Improvement Program (74 Pa.C.S. § 1517)
- Alternative Energy Program (74 Pa.C.S. § 1517.1)

1.4.1 Pennsylvania Rail Freight Preservation and Improvement Act

The Pennsylvania Rail Freight Preservation and Improvement Act of 1984 (P. L. No. 587, No. 119) provides for Rail Freight Assistance Program (RFAP) and Rail Transportation Assistance Program (RTAP) grants. These programs provide funding for railroads to maintain and improve their infrastructure. Grants totaling $198.6 million were awarded in the most recent 6 fiscal years (2015 through 2020) (Appendix B). Approximately $1.0 million is available for freight rail improvements in the Marcellus Shale region through unconventional well fees per the Natural Oil & Gas Production Regulation in PA (Act 13 of 2012; P. L. 87, No. 13), commonly referred to as Act 13.

1.4.2 The Pennsylvania Infrastructure Bank

The Pennsylvania Infrastructure Bank (PIB), housed within PennDOT, has provided low-interest loans for infrastructure improvements, including transit and freight rail infrastructure, since 1998. The PIB has an annual loan program of $30 million and makes loans to both public and private entities for public infrastructure upgrades. Of this amount, an average of $2 million annually is used for freight rail infrastructure improvement projects.

1.4.3 Public-Private Partnerships

Much of America's rail network was built through cooperation between public and private entities, and this collaboration between the public and private sectors continues to this day. Act 88 of 2012 (P. L. 853, No. 88) (Act 88) allows the state to enter into P3s and created the P3 Transportation Board to guide these investments.

1.4.4 Federal Funding

Federal funding for railroad infrastructure improvements is available through a variety of sources. The U.S. Department of Transportation's (USDOT's) Office of Infrastructure Finance and Innovation provides Better Utilizing Investment to Leverage Development (BUILD) discretionary grants for road, rail, transit, and port projects. The BUILD program replaced the Transportation Investment Generating Economic Recovery (TIGER) grants for multimodal transportation improvements, including railroad improvement projects.

USDOT's Office of the Assistant Secretary for Transportation Policy administers the Infrastructure for Rebuilding America (INFRA) discretionary grant program for projects that address critical issues facing the nation's infrastructure, including railroads.

The FRA administers grants for projects such as high-speed rail infrastructure improvements as well as the Consolidated Rail Infrastructure and Safety Improvements (CRISI) grant program.

The Federal Highway Administration (FHWA) provides grants such as Congestion Mitigation and Air Quality Improvement (CMAQ) for rail projects that reduce air pollution and Section 130 grants to improve the safety of at-grade railroad crossings.

The FTA provides funding such as the Section 5309 Capital Investment Grants program, including New Starts, Small Starts, and Core Capacity Improvements for building new rail lines and expanding existing ones. FTA administers the Section 5337 State of Good Repair Grants Program, which provides capital assistance to transit agencies for maintenance, replacement, and rehabilitation projects of high-intensity fixed guideway and bus systems. FTA also manages the Section 5307 Urban Formula Funding program for transit capital and operating assistance in urbanized areas and for transportation-related planning.

Loan programs are available for rail projects as well. The FRA administers the Railroad Rehabilitation and Improvement Financing (RRIF) program to finance development of railroad infrastructure. Run by the USDOT's Build America Bureau Credit Programs Office, the Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides loans for projects of regional and national significance.

1.5 Summary of Existing Network and Plans

1.5.1 Passenger Rail Network

Pennsylvania's existing passenger rail network consists of intercity and commuter rail services. Intercity rail in Pennsylvania includes the following Amtrak's routes:

- Keystone (New York – Philadelphia – Harrisburg)
- Pennsylvanian (New York – Philadelphia – Harrisburg – Pittsburgh)
- Northeast Regional and Acela, which are part of the NEC (Boston – New York – Philadelphia – Washington, D.C.)
- Lake Shore Limited (Chicago – Erie – New York – Boston)
- Capitol Limited (Chicago – Pittsburgh – Washington, D.C.)
- Other intercity routes using the Northeast Corridor through Pennsylvania include the Palmetto, the Silver Services (Silver Star and Silver Meteor), the Crescent, the Vermonter, the Carolinian, and the Cardinal

Amtrak intercity service served approximately 6.7 million riders in Pennsylvania in Federal Fiscal Year (FFY) 2019 via approximately 120 daily trains (RPA, 2020).[1] Service ranges from high-speed service along the NEC to daily service along the Capitol Limited route through the southwestern corner of the state. More than 4.5 million Amtrak passengers used Philadelphia's 30th Street Station in FFY 2019 (RPA, 2020), making it the third-busiest Amtrak station in the country after Penn Station in New York City and Union Station in Washington, D.C.

Commuter rail consists of SEPTA's 13 Regional Rail lines that serve the five-county Philadelphia region in addition to Trenton, NJ; West Trenton, NJ; Newark, DE; and Wilmington, DE. In State Fiscal Year (SFY) 2019, SEPTA commuter rail service served more than 34 million passengers via 155 stations (SEPTA, 2019b).[2]

Another commuter rail operation, NJ Transit's Atlantic City Line, serves southern New Jersey and terminates at Philadelphia's 30th Street Station. The line shares short sections of track with Amtrak and SEPTA as well as with freight service railroads. As noted previously, it has just one Pennsylvania stop.

[1] Amtrak operates on the Federal Fiscal Year (FFY), which starts October 1.
[2] SEPTA's operates on the State Fiscal Year (SFY), which starts July 1.

Lastly, there are 16 heritage and tourist railroads in Pennsylvania, some of which operate over active short line freight railroads. More detail on these railroads is provided in Chapter 2.

1.5.2 Freight Rail

The state's freight network consists of three types of railroads. Class I railroads are large rail systems typically having thousands of route miles. In Pennsylvania, Class I railroads include Norfolk Southern Railway, Canadian National Railway, and CSX Transportation. Regional or Class II railroads are much smaller and, in Pennsylvania, include the Buffalo & Pittsburgh Railroad; the New York, Susquehanna, and Western Railway; and the Wheeling & Lake Erie Railway. There are 57 local, switching, and terminal railroads in the commonwealth. Local, switching, and terminal railroads are commonly known as short lines or Class III railroads.

Route mileage, excluding trackage rights for each type of freight railroad in Pennsylvania, is shown in Figure 1-4 as a percentage of total freight railroad route mileage in Pennsylvania.

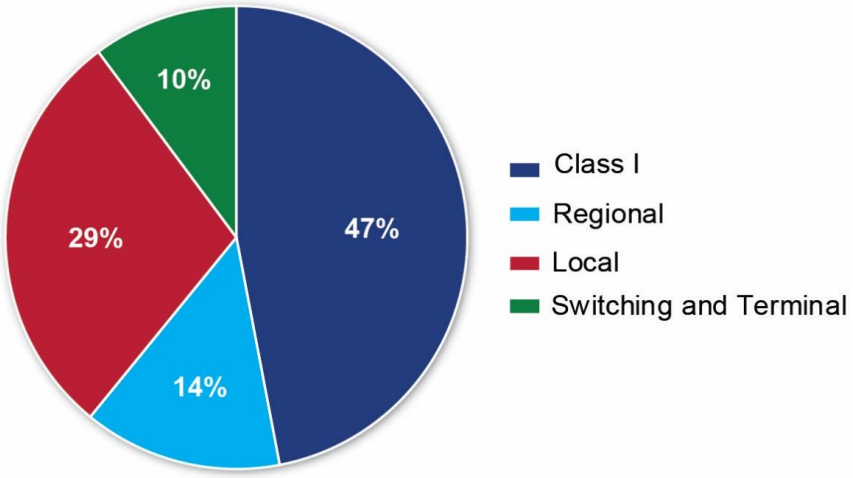


Figure 1-4: Pennsylvania route miles by freight railroad classification (AAR, 2019)

1.5.3 Major Current Studies

The following are major current initiatives and plans that affect rail transportation in the commonwealth.

1.5.3.1 NEC FUTURE

NEC FUTURE is the FRA's comprehensive plan for improving the NEC from Washington, D.C., to Boston, MA. Through NEC FUTURE, the FRA has worked closely

with NEC states, railroads, stakeholders, and the public to define a long-term vision for the corridor's future.

Through the plan's Tier 1 environmental review process, the FRA selected a corridor-wide vision for the NEC that encompasses improvements to grow the role of rail within the transportation system of the Northeastern United States. Shown in Figure 1-5, the Selected Alternative prioritizes a corridor-wide commitment to the existing NEC from Washington, D.C., to Boston, MA, by bringing it to a state of good repair and providing the additional capacity and service enhancements necessary to address passenger rail needs through 2040 and beyond.

Included in its Record of Decision, the FRA identified four components to the Selected Alternative. According to the FRA's project website, the Selected Alternative will do the following (FRA, 2017 a):

- Improve Rail Service: Establish corridor-wide service and performance objectives including travel time and frequency targets, increase travel options, and encourage enhanced service concepts such as regular "clockface" schedules, run-through service at major stations, and common ticketing.
- Modernize NEC Infrastructure: Commit to corridor-wide repair, replacement, and rehabilitation of the existing NEC to bring the corridor into a state of good repair and improved reliability. This commitment supports and acknowledges the importance of ongoing improvements achieved through current projects.
- Expand Rail Capacity: Approve additional infrastructure between Washington, D.C., and New Haven, CT, and between Providence, RI, and Boston, MA, as needed to achieve the service and performance objectives, including investments that add capacity, increase speeds, and eliminate chokepoints. The location and design of additional infrastructure will be defined, and site-specific impacts will be examined during subsequent Tier 2 project studies.
- Study New Haven to Providence Capacity: Require a planning study in Connecticut and Rhode Island to identify additional infrastructure, both on-corridor and off-corridor, as needed to achieve the service and performance objectives. The study will be completed by the states of Connecticut and Rhode Island in coordination with FRA and other appropriate stakeholders.

The next step for NEC FUTURE is CONNECT NEC 2035 is the development of a Strategic Development Plan (SDP) for Phase 1—a service delivery, infrastructure, and funding/financing strategy for advancing the first priority projects. A consultant team is now working closely with the NEC Commission on CONNECT NEC 2035, which is expected to be complete by June 2021.

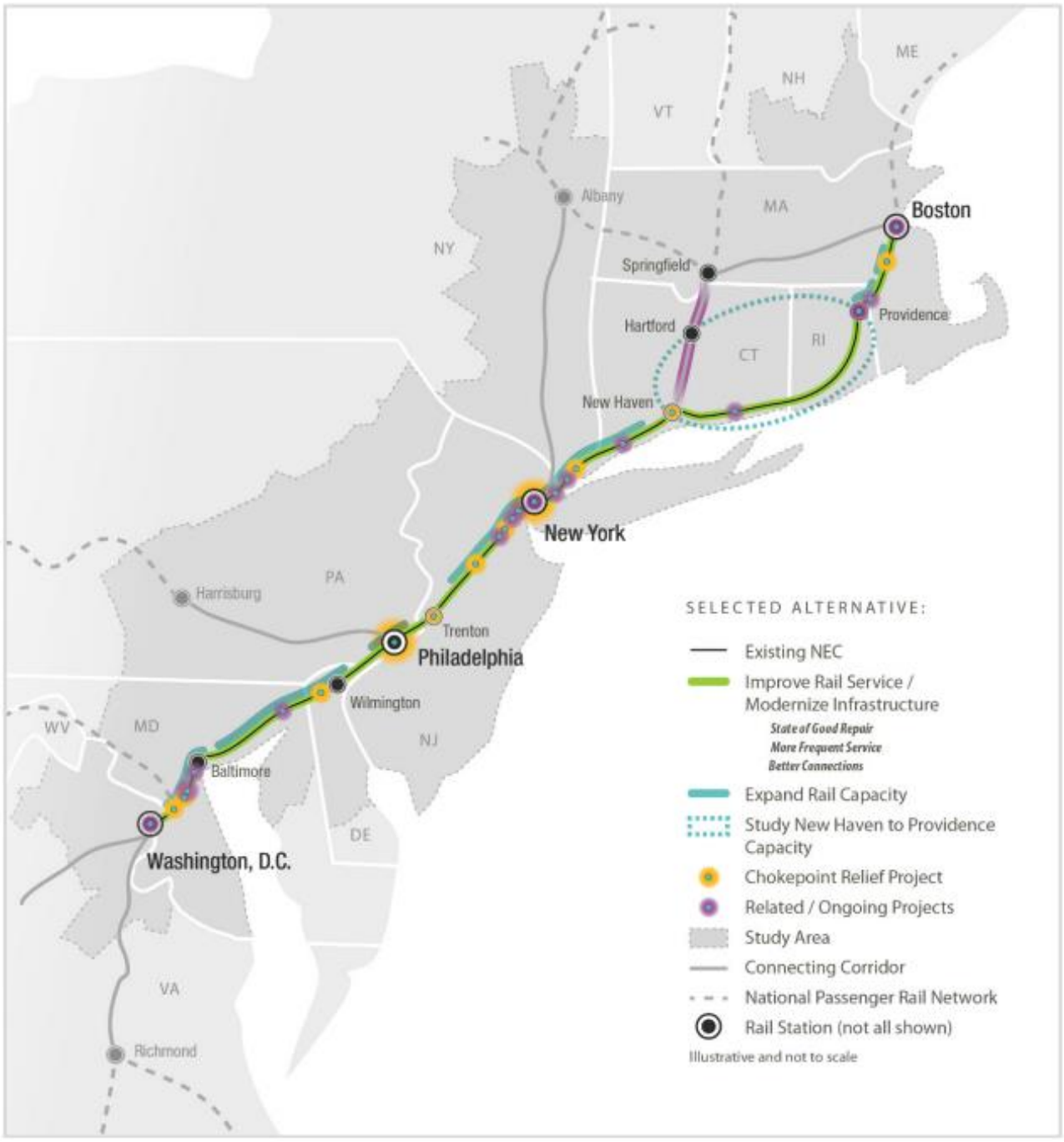


Figure 1-5: NEC FUTURE: Selected Alternative (FRA, 2017 a)

1.5.3.2 Long-Range Transportation Plan

At the time of this writing, PennDOT is beginning its update of the 2016 *PA On Track* LRTP (PennDOT, 2016 a). The LRTP update will address the following priorities: safety, security, and mobility needs of Pennsylvanians; modal alternatives and intermodal connections; the role of transportation in economic development and land use; livability

and sustainability; the movement of goods; state and local system preservation; and the desires of our customers.

1.5.3.3 Comprehensive Freight Movement Plan

PennDOT is also embarking on an update to its 2016 CFMP. The update to the statewide comprehensive freight movement component to the statewide LRTP will consider all modes, recommend capacity enhancements, quantify needs, prioritize projects, and quantify economic opportunities within this critical facet of Pennsylvania's comprehensive transportation system planning endeavor.

Photo: BPRR

2 The State's Existing Rail System

This chapter provides an overview and inventory of Pennsylvania's existing rail system as a baseline for planning and decision making. The chapter includes a discussion of three major aspects of the commonwealth's existing freight rail and passenger rail systems: services as they are today, rail service trends and forecasts, and needs and opportunities.

2.1 Description and Inventory

2.1.1 Passenger and Freight Rail Systems

Passenger rail services in Pennsylvania are primarily provided by two operators: Amtrak and SEPTA. Amtrak provides intercity passenger rail services across the commonwealth and throughout the United States, while SEPTA provides commuter rail services

throughout the Philadelphia metropolitan region. NJ Transit also operates the Atlantic City Line between Atlantic City, NJ, and Philadelphia's 30th Street Station. Sections 2.1.1.1 and 2.1.1.2 provide information about Amtrak and SEPTA, respectively.

There are many freight rail systems operating within Pennsylvania. Three Class I and three Class II freight railroads operate within the commonwealth. Pennsylvania is also home to 57 Class III freight railroads, the most of any U.S. state. Section 2.1.1.3 provides details on the freight rail systems within Pennsylvania.

2.1.1.1 Amtrak

Amtrak runs approximately 120 trains a day through Pennsylvania, with most of the service operating on the Acela Express, Northeast Regional, and Keystone routes. Amtrak also operates two Pennsylvania state-supported medium-distance trains, two non-Pennsylvania state-supported trains, two NEC trains, and seven long-distance trains through Pennsylvania. The routes are shown in Figure 2-1 and described briefly below.

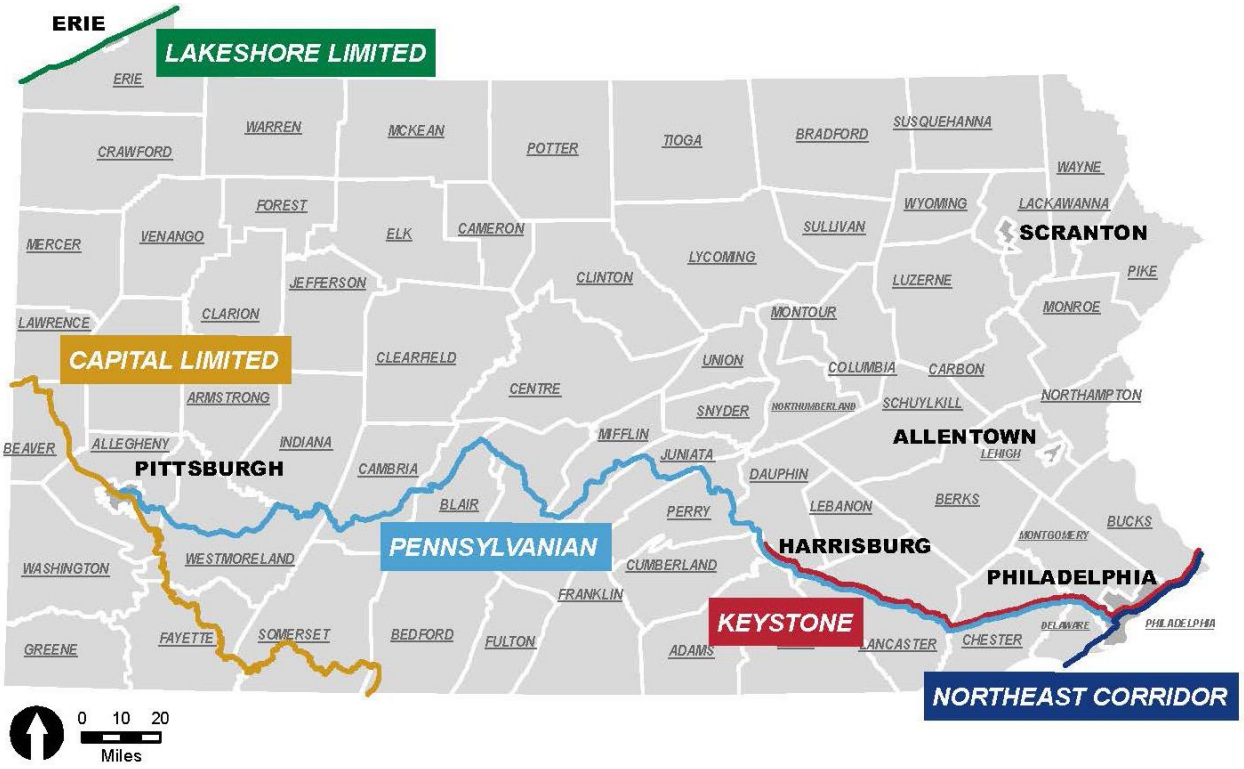


Figure 2-1: Amtrak rail system in Pennsylvania (FRA, 2019)

Pennsylvania state-supported services operating primarily within the state include:

- Keystone: State-supported service between New York and Harrisburg via Philadelphia
- Pennsylvanian: State-supported medium-distance service between New York and Pittsburgh via Philadelphia

Multi-state routes with service through Pennsylvania include the following:

- Acela Service: High-speed service between Boston and Washington, D.C.
- Northeast Regional Service: Service between Boston and Washington, D.C.
- Carolinian: State-supported medium-distance service between New York and Charlotte, NC, via Philadelphia, that is financially supported by the North Carolina Department of Transportation
- Vermonter: State-supported medium-distance service between St. Albans, VT, and Washington, D.C. via Philadelphia, that is primarily financed by the state transportation departments of Vermont, Connecticut, and Massachusetts
- Crescent: Long-distance service operating between New Orleans, LA, and New York via Philadelphia
- Palmetto: Long-distance service operating between Savannah, GA, and New York via Philadelphia
- Silver Meteor: Long-distance service operating between Miami, FL, and New York via Philadelphia and Charleston, SC
- Silver Star: Long-distance service operating between Miami, FL, and New York via Philadelphia and Raleigh, NC
- Capitol Limited: Long-distance service operating between Washington, D.C., and Chicago via Pittsburgh
- Lake Shore Limited: Long-distance service operating between New York and Chicago with a stop in Erie, PA
- Cardinal: Long-distance service operating between New York and Chicago with a stop at 30th Street Station

The key corridors within Pennsylvania include the NEC, Keystone Corridor, Pennsylvanian, Capitol Limited, and Lake Shore Limited.

The NEC is one of the most heavily used railroad corridors in the country, running between Washington, D.C., and Boston and passing through some of the most populous and economically significant cities along the East Coast, including Baltimore,

Wilmington, Philadelphia, New York, New Haven, and Providence. More than 2,100 passenger trains operate on the NEC each weekday. In Pennsylvania, the corridor has stops at Philadelphia's 30th Street Station, North Philadelphia, and Cornwells Heights. Within Pennsylvania, Amtrak and SEPTA operate train service on the Amtrak-owned NEC. NJ Transit operates trains on short segments of the corridor in the commonwealth as well.

The Keystone Corridor runs between Philadelphia and Harrisburg. The Amtrak-owned line is approximately 104 miles long and is utilized by 26 Keystone trains and two Pennsylvanian service trains each weekday. SEPTA also operates the Regional Rail commuter service on this line between 30th Street Station and the Thorndale Station on the Paoli/Thorndale Regional Rail Line. Almost all Amtrak trains running along this corridor continue for an additional 91 miles to New York City, except for a few trains for which passengers must transfer in Philadelphia to access NEC trains to New York.

The Pennsylvanian runs between Pittsburgh and New York City, following the Keystone Corridor between Harrisburg and Philadelphia. The service operates one train in each direction daily. The route is approximately 444 miles, with the segment west of Philadelphia totaling 353 miles. The route west of Harrisburg is operated on tracks owned by NS, and the tracks east of Harrisburg are owned by Amtrak.

The Capitol Limited corridor runs between Washington, D.C., and Chicago and includes a 195-mile stretch of the route passing through Pennsylvania with stops at Connellsville and Pittsburgh. The Capitol Limited provides one train daily in each direction. In Pittsburgh, a connection can be made to the Pennsylvanian, which runs between Pittsburgh and New York City. East of Pittsburgh, the Capitol Limited service runs on tracks owned by CSX, and west of Pittsburgh the service runs on tracks owned by NS.

The Lake Shore Limited provides a connection between Chicago and New York City and Boston. The Lake Shore Limited provides one train daily in each direction. For eastbound trains, the dividing point for the service is at Albany-Rensselaer Station, with one section heading south to New York City and the other heading east to Boston. The segment of the corridor within Pennsylvania is approximately 45 miles long and includes one station stop at Erie. The service operates on tracks owned by CSX.

2.1.1.1.1 Amtrak Ridership

In FFY 2019, 6,664,689 Amtrak passengers boarded and alighted within Pennsylvania, with approximately five million additional passengers traveling through, boarding, and alighting outside of the state (RPA, 2020). Figure 2-2 shows the upward trend in Amtrak boardings and alightings in Pennsylvania. Table 2-1 shows Amtrak route-level ridership

for FFY 2019, while Table 2-2 shows the boardings and alightings by Pennsylvania station for FFY 2019.

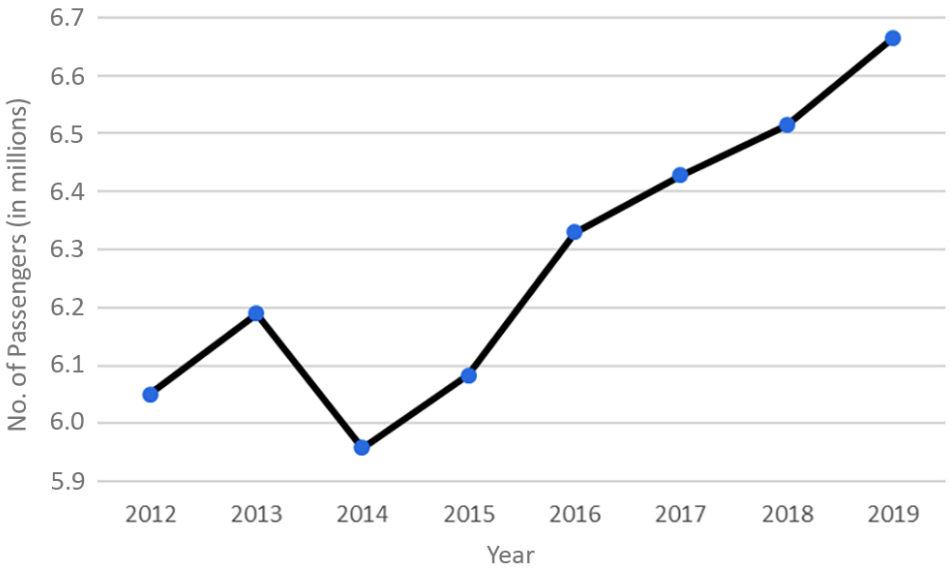


Figure 2-2: Amtrak passengers in Pennsylvania, boardings and alightings, FFY 2012–2019 (RPA, 2020)

Table 2-1: Amtrak Route Ridership, FFY 2019

Amtrak Service	Annual Ridership (in Thousands)
Northeast Regional	8,940.7
Acela Express	3,577.5
Keystone	1,576.0
Silver Star	390.0
Lake Shore Limited	357.7
Silver Meteor	353.5
Palmetto	345.3
Crescent	295.2
Carolinian	244.8
Pennsylvanian	215.1
Capitol Limited	209.6
Cardinal	108.9
Vermonter	99.3

Source: Amtrak (2019a)

Table 2-2: Amtrak Pennsylvania Station Boardings and Alightings, FFY 2019

Code	Station Name	Boardings and Alightings
PHL	Philadelphia 30th Street	4,506,952
LNC	Lancaster	577,506
HAR	Harrisburg	521,043
PAO	Paoli	258,231
EXT	Exton	146,468
PGH	Pittsburgh	129,946
ELT	Elizabethtown	100,519
DOW	Downingtown	81,342
MID	Middletown	67,733
ARD	Ardmore	68,629
MJY	Mount Joy	47,964
PAR	Parkesburg	46,669
JST	Johnstown	18,848
ALT	Altoona	18,689
COT	Coatesville	14,915
ERI	Erie	15,573
GNB	Greensburg	12,645
LEW	Lewistown	8,249
HGD	Huntingdon	5,722
COV	Connellsville	4,864
LAB	Latrobe	4,523
CWH	Cornwells Heights	3,103
TYR	Tyrone	2,588
PHN	North Philadelphia	1,968
	Total	**6,664,689**

Source: FRA (2020)

2.1.1.1.2 Amtrak Operating Agreements and Working Relationships

Amtrak has operating agreements with commuter and freight rail operators throughout Pennsylvania. Commuter rail service provided by SEPTA and NJ Transit operates on Amtrak-owned tracks, and Amtrak operates on freight railroad-owned tracks to provide intercity service.

Amtrak owns the entire Pennsylvania segment of the NEC and the 104-mile segment of the Keystone Corridor between Philadelphia and Harrisburg. SEPTA and NJ Transit operate on segments of Amtrak's NEC. SEPTA also operates on the segments of Amtrak's Keystone Corridor. The Capitol Limited runs on tracks owned by CSX and NS

near Pittsburgh. The Pennsylvanian runs on tracks owned by NS between Harrisburg and Pittsburgh. The Lake Shore Limited operates on tracks owned by CSX.

2.1.1.1.3 Amtrak Station Improvements

The Keystone Corridor Improvement Project (KCIP) is a joint partnership of Amtrak, PennDOT, and SEPTA. Prior to the launch of KCIP in October 2006, corridor enhancements included all-electric train service, increased top speeds (to 110 mph), express service for some trips, and an increase from 11 to 14 weekday trains in each direction.

Since 2006, Amtrak, PennDOT, and SEPTA have continued to make significant investments to improve existing passenger rail stations along the Keystone Corridor, such as:

- Philadelphia (30th Street Station): Installation of more than 80 new, bright, visible signs to direct passengers through the station to their destinations was completed in September 2015.
- Ardmore: Construction is underway of a new station building, including tunnel renovations and new elevators to provide Americans with Disabilities Act (ADA) access, increased passenger amenities, and improved multimodal connectivity. In addition, a proposed parking garage has been designed that would include additional parking while promoting the multimodal connectivity aspect of the new station building. Construction of the parking garage is not currently funded or scheduled.
- Paoli: Phase 1 of three proposed major improvement phases was completed in 2019, which included constructing a new center high-level platform, new elevators and ramps, a pedestrian overpass, parking lot improvements, and ADA improvements to the existing building. Phase 2 will include roadway reconfigurations to improve circulation and safety for motorists, pedestrians, and bicyclists. Construction is expected to begin in 2021. Phase 3 design and construction are not currently funded or scheduled, but plans include a new intermodal transportation center with an additional high-level platform, a new waiting area, a ticket office, enhanced bus facilities, and a parking garage with retail and commercial space.

Paoli Station
Photo: AECOM

- Exton: Renovations completed in 2020 included construction of an ADA-compliant station building on the eastbound (south) side of the tracks, with an indoor waiting area, ticket office, and accessible restrooms. In addition, a new passenger shelter was built on the westbound (north) side. Other improvements include 500-foot-long, high-level (accessible) platforms with canopies and windscreens, the expansion of the westbound parking lot, and construction of an accessible path.
- Downingtown**:** Final design is currently underway on a new station that will be located approximately ½ mile east of the existing station to accommodate ADA requirements. In addition to achieving ADA compliance, improvements to this station will accommodate growing ridership and anchor station-area redevelopment.
- Coatesville**:** A new station is being designed to provide ADA accessibility and improve station function and amenities while supporting station-area revitalization. The station will include a 500-foot-long, high-level (accessible) platform with canopies, seating, elevators, and a pedestrian overpass. The 3rd Avenue and 4th Avenue streetscaping projects surrounding the future station site were completed in 2019 and 2020, respectively, to improve ADA accessibility, expand bicycle and pedestrian facilities, and improve traffic operations.

- Parkesburg**:** Phase 1 design was started in 2019 for station improvements that include high-level platforms with canopies, station lighting, expanded parking, and improved pedestrian and vehicular access.
- Lancaster**:** A station project and a parking lot project were completed in 2013. The 1929 station was rehabilitated to maintain and restore historic elements, modernize building systems, improve space utilization, and enhance ADA accessibility and passenger amenities. The parking lot improvements included increased ADA accessibility and enhanced safety, as well as a new bus canopy, taxi stand, and passenger drop-off area at the station entrance to better facilitate multimodal connections. Reconstruction is underway of the existing Christian Street parking lot and is anticipated to be completed in late 2020. A new Keller Avenue parking lot and a pedestrian accessible route are currently being designed, with construction expected to start in the spring of 2021. The new parking lot will provide more than 200 additional parking spaces, and the pedestrian accessible route will provide additional access to the train station. Design of a pedestrian bridge to connect the Keller Avenue parking lot to the station's existing passenger bridge is a future phase of the project.
- Mount Joy: A parking and streetscape project was completed in 2012 that added more parking spaces, improved accessibility, and included landscaping and a covered walkway. A station improvement project was completed in 2019 that improved ADA accessibility, lighting, and passenger amenities; these improvements include elevator towers, accessible platforms with canopies, and a repaved/restriped parking lot.
- Elizabethtown**:** The Elizabethtown Station project was completed in 2011 and included historic restoration, modernization and replacement of utilities, and construction of high-level accessible platforms with canopies. In 2013, an overflow parking lot was constructed that provides 85 new parking spaces, and in 2015 a pedestrian and bicycle path was completed to connect the station with downtown Elizabethtown.
- Middletown: Construction of a relocated new station with a sheltered platform is underway and is scheduled for completion in late 2021. This new station will provide ADA accessibility and improve multimodal connectivity with designated bus loading zones and on-site parking. Trackwork was completed in mid-2020 and preceded station construction. A parking and pedestrian access project will be completed in conjunction with the new station construction and will add parking capacity, improve traffic flow, and include a crosswalk across Route 230 to connect the station to a college campus.

- Harrisburg: In 2016, ADA improvements by Amtrak included installation of a ramp from the lobby to the passenger bridge waiting area, and an elevator from the passenger bridge to boarding level. In addition, the Market Street Bridge Underpass Improvements project, which was completed in 2016, enhanced the walking route between the station and long-term parking to make it safer and more appealing for pedestrians. Design of a new station roof and an observation room were completed in 2020 and construction is anticipated in the near term, to help bring the station into a state of good repair.
- Johnstown (Keystone West): The roof was replaced, and ADA improvements were made including restroom upgrades and accessible parking and pathways to the station.

2.1.1.2 SEPTA

SEPTA operates a commuter rail network referred to as SEPTA Regional Rail. SEPTA's Regional Rail offers 13 lines with 155 stations serving Philadelphia, Bucks, Chester, Delaware, and Montgomery Counties, as well as service to Newark, DE, and both Trenton and West Trenton, NJ. The variety of destinations and frequent service throughout the week allow passengers to use the system for leisure, shopping, recreation, and other purposes in addition to commuting. The SEPTA Regional Rail system is depicted in Figure 2-3.

For 2019, SEPTA operated a fleet of 396 vehicles on 13 lines over 223 route miles. The majority of route miles are either SEPTA right-of-way (98 miles) or Amtrak right-of-way (101 miles) comprising the Newark, Paoli/Thorndale, and Trenton Lines. The remaining route miles include 17 miles of CSX trackage comprising the West Trenton Line, and 7 miles are owned by the City of Philadelphia comprising the Airport Line. In FY 2019, SEPTA Regional Rail operated 20,694,035 vehicle miles. The system operated frequent peak-period service, with trains running approximately every 30 minutes on various lines. During off-peak periods, including weekends, most of the trains operated approximately every 60 minutes.

2.1.1.2.1 SEPTA Ridership

In FY 2019, SEPTA reported an annual Regional Rail ridership of 34,190,970, a decrease of 0.5% from FY 2018. In 2019, weekday regional rail ridership averaged 119,000 trips. Figure 2-3 illustrates ridership on the entire SEPTA Regional Rail system. Table 2-3 shows the average daily passengers and annual passengers for each branch for FY 2019.

Figure 2-3: SEPTA regional rail system (SEPTA, 2019c)

Table 2-3: SEPTA Branch Ridership, FY 2019

	Passengers	
Branch	**Daily**	**Annual**
Paoli/Thorndale	21,284	6,170,950
Lansdale/Doylestown	17,306	4,970,220
West Trenton	12,031	3,394,380
Manayunk/Norristown	11,486	3,289,470
Media/Elwyn	11,202	3,016,230
Trenton	11,132	3,253,550
Wilmington/Newark	8,917	2,498,350
Warminster	7,667	2,294,350
Airport	4,686	1,518,250
Fox Chase	4,550	1,247,750
Chestnut Hill West	4,463	1,282,680
Chestnut Hill East	3,874	1,124,380
Cynwyd	505	130,410
Total	**119,103**	**34,190,970**

Source: SEPTA (n.d. a)

SEPTA GE Silverliner IV
Photo: AECOM

2.1.1.2.2 SEPTA Fleet

SEPTA has approximately 396 Regional Rail revenue vehicles. Almost all are electric multiple units (EMU), which are self-propelled cars that do not require a locomotive. The majority of EMUs were delivered in the mid-1970s. In 2012, SEPTA placed 120 new Silverliner V EMU rail cars into revenue service. The Silverliner Vs have many passenger-friendly features, such as larger windows, wider aisles, electronic destination signs, and a 2-by-2 seating arrangement for some sections of the car. Silverliner Vs can accommodate up to 109 seated passengers and reach speeds of up to 100 mph. The Silverliner Vs also have a video security system and passenger assistance intercom. The Silverliner V fleet has reduced energy consumption by 1% (or approximately 2 million kWh) and now uses less electricity than the older vehicles. At $0.07/kWh, savings from electricity conservation amounts to $140,000 per year.

SEPTA operates 45 single-level unpowered coaches (trailers) and cab cars, manufactured by Bombardier in 1987 and 1999. The cars are equipped with communication cables to enable a locomotive at one end of the train to be controlled by a cab car at the other, hence, the name "push-pull" equipment.

In 2017, SEPTA awarded a contract to CRRC MA for the purchase of 45 multi-level railcars. These cars are additions to SEPTA's current fleet of 45 push-pull railcars and will address ridership and service capacity needs. The new cars will fully comply with

ADA requirements and federal and state regulations regarding safety features and systems. The multi-level railcars seat approximately 135 passengers. These vehicles come equipped with on-board video surveillance systems. It is currently anticipated that these multi-level railcars will be in revenue service by 2023.

In 2018, SEPTA placed into service 15 new Siemens Amtrak Cities Sprinter (ACS)-64 electric locomotives. These locomotives replaced 30-year-old locomotives. The ACS-64s are more powerful and reliable than the locomotives they replaced. Engineers can monitor the performance of all locomotive systems in real time, and the self-diagnostic feature offers important advantages for the regular maintenance and inspection of these vehicles.

At this time, additional rail vehicle investments are not included in SEPTA's Capital Program.

2.1.1.2.3 SEPTA Regional Rail Lines

Table 2-4 identifies the annual vehicle miles traveled (VMT) for each line on the Regional Rail system for FY 2019.

Table 2-4: SEPTA VMT, FY 2019

Line	VMT	Annual Vehicle hours
Airport	1,051,021	51,788
Chestnut Hill East	782,465	45,515
Chestnut Hill West	736,601	42,857
Lansdale/Doylestown	3,191,948	167,672
Fox Chase	634,788	37,090
Paoli/Thorndale	3,508,674	177,724
Cynwyd	34,836	2,147
West Trenton	2,521,616	108,452
Manayunk/Norristown	1,396,776	53,684
Warminster	1,353,217	67,350
Media/Elwyn	1,099,643	64,484
Wilmington/Newark	1,363,217	94,682
Trenton	3,019,233	119,885

Source: SEPTA (n.d. a)

- Airport Line: The Airport Line operates from Temple University to Philadelphia International Airport and is approximately 11.6 miles one way. Daily average ridership in FY 2019 was 4,686 passengers, making this line the 9th busiest line in the system.

- Chestnut Hill East Line: The Chestnut Hill East Line operates from 30th Street Station to the Chestnut Hill neighborhood in northwest Philadelphia and is approximately 12.2 miles one way. Daily average ridership in FY 2019 of 3,874 ranked this line 12th among SEPTA's lines in passenger ridership.
- Chestnut Hill West Line: The Chestnut Hill West Line operates from Temple University to the west side of the Chestnut Hill neighborhood in northwest Philadelphia and is approximately 14.7 miles one way. The daily average ridership of 4,463 ranked this line 11th among SEPTA's lines.
- Cynwyd Line: The Cynwyd Line operates from Center City Philadelphia to Bala Cynwyd, Montgomery County, and is 6.1 miles one way. At 505 passengers, this line had the lowest average daily ridership of the Regional Rail lines in FY 2019.
- Fox Chase Line: The Fox Chase Line operates from 30th Street Station to northwest Philadelphia and is approximately 12.5 miles one way. At 4,550, daily average ridership in FY 2019 on this line ranked 10th among all SEPTA's lines.
- Lansdale/Doylestown Line: The Lansdale/Doylestown Line operates from Center City Philadelphia to Doylestown, Bucks County, and is approximately 35.8 miles one way. At 17,306 in FY 2019, daily average ridership on this line ranked 2nd among all SEPTA's lines.
- Manayunk/Norristown Line: The Manayunk/Norristown Line operates from Center City Philadelphia to Norristown, Montgomery County, and is approximately 19.5 miles one way. At 11,486, daily average ridership on this line ranked 4th among all SEPTA's lines.
- Media/Elwyn Line: The Media/Elwyn Line operates from Center City Philadelphia to Elwyn, Delaware County, and is approximately 16.5 miles one way. At 11,202, daily average ridership ranked this line 5th among SEPTA's lines.
- Paoli/Thorndale Line: The Paoli/Thorndale Line operates from Center City Philadelphia to Thorndale, Chester County, and is approximately 37.9 miles one way. Daily average ridership of 21,284 ranked this line highest in ridership among SEPTA's lines in FY 2019. The Paoli/Thorndale Line operates on the same tracks as Amtrak's Keystone and Pennsylvanian Services. The Keystone Service has 14 weekday trips between New York and Harrisburg, while one train per day continues westward from Harrisburg, connecting Pittsburgh to New York's Penn Station.
- Trenton Line: The Trenton Line operates from Center City Philadelphia to Trenton, NJ, and is approximately 36.4 miles one way. Daily average ridership of 11,132 ranked this line 6th among SEPTA's lines in FY 2019.

- Warminster Line: The Warminster Line operates from Center City Philadelphia to Warminster, Bucks County, and is approximately 22.3 miles one way. Daily average ridership of 7,667 ranked this line 8th among SEPTA's lines in FY 2019.
- West Trenton Line: The West Trenton Line has 23 stops from Center City Philadelphia to West Trenton, NJ, and is approximately 34.7 miles one way. Daily average ridership of 12,031 in FY 2019 ranked this line 3rd among SEPTA's lines.
- Wilmington/Newark Line: The Wilmington/Newark Line operates from Center City Philadelphia to Newark, DE, and is approximately 41.1 miles one way. Daily average ridership of 8,917 in FY 2019 ranked this line 7th among SEPTA's lines.

2.1.1.2.4 New Jersey Transit

NJ Transit is the primary public transportation system serving the state of New Jersey. The system connects New Jersey to Philadelphia, New York City, and Orange and Rockland Counties in New York. NJ Transit operates commuter rail, light rail, and bus services statewide.

NJ Transit operates the Atlantic City Line between Atlantic City, NJ, and Philadelphia's 30th Street Station. Along with SEPTA, the Atlantic City Line trains share Amtrak's NEC track between 30th Street Station and the Delair Bridge, where they cross the Delaware River into New Jersey and operate on the NJ Transit-owned right-of-way to Atlantic City.

NJ Transit runs 24 weekday daily trains between 4:11 a.m. and 2:24 a.m. On Saturdays, Sundays, and holidays, the Atlantic City Line also runs 24 daily trains, between 4:28 a.m. and 2:24 a.m. Trains operate evenly throughout the day with no peak-period commuter orientation to its schedules. Travel time from Atlantic City to 30th Street Station is approximately 100 minutes.

The Atlantic City Line was shut down entirely from September 4, 2018, to May 12, 2019, for NJ Transit to replace a portion of the track as well as install positive train control. NJ Transit operated bus service along the route while the rail service was shut down. The Atlantic City Line operated at an OTP of 88.3% for SFY 2018.[3] Average weekday boardings for SFY 2018 appear in Table 2-5 (prior to the shutdown of service). Total average weekday boardings for the Atlantic City Line for SFY 2018 were 2,000, which represents a decrease of 29% from SFY 2013's average weekday boardings of 2,800.

[3] NJ Transit operates on State Fiscal years, which start on July 1.

Table 2-5: NJ Transit Atlantic City Line Average Weekday Boardings by Station, SFY 2018

Station	Average Weekday Boardings
Atlantic City	529
Absecon	238
Egg Harbor	129
Hammonton	114
Atco	68
Lindenwold	280
Cherry Hill	142
Pennsauken Transit Center	96
Philadelphia 30th Street Station	470
Total	**2,066**

Source: (NJT, 2019)

2.1.1.2.5 Other Passenger Rail Systems

The focus of the passenger rail sections in this plan is on intercity passenger rail and commuter rail, but other passenger rail services also operate in the state. These include heavy rail, rapid transit, light rail, and inclines, described in this section.

SEPTA

SEPTA operates a 24-mile heavy rail transit network that includes the Broad Street and Market Street subway lines. SEPTA also operates a network of eight trolley lines over a network of 54 route miles, as well as the 13-mile-long Norristown High Speed Line (SEPTA, 2019c).

PATCO

PATCO is a 14-mile rapid transit line operating between Center City Philadelphia, PA, and Lindenwold, NJ, that served 10.5 million passengers in 2018. The line traverses the Delaware River via the Ben Franklin Bridge and is owned and operated by the Delaware River Port Authority.

Port Authority

The Port Authority of Allegheny County (Port Authority) operates a 26-mile light rail system, known as the "T," which includes three lines: the Red Line, the Blue Line – Library, and the Blue Line – South Hills Village. The light rail system carried 7.33 million riders in 2018.

The Port Authority also owns two inclines. The Monongahela Incline is operated by the Port Authority, and the Duquesne Incline is operated by the Society for the Preservation of the Duquesne Heights Incline.

The Port Authority is currently in the midst of NexTransit, Allegheny County's 25-year long range transportation plan. One of the goals of NexTransit is to identify the gaps in connectivity between the existing system and other transportation networks in the commonwealth.

Cambria County Transit Authority

The Cambria County Transit Authority owns and operates the Johnstown Incline, which is the world's steepest vehicular inclined plane, and provided almost 64,000 rides in 2017.

2.1.1.3 Freight Rail

There are 63 freight railroads operating in Pennsylvania. The railroads have been aggregated and sorted by operating class. Relevant information on location, total mileage, branches, and subdivisions, 286,000-pound (286k) gross vehicle weight compatibility, vertical clearances, speed limitations, availability of passing sidings, freight rail connections, and any additional relevant information was also collected, where available.[4]

2.1.1.3.1 Class I Freight Railroads and Subsidiaries

Table 2-6 and Figure 2-4 show the three Class I freight railroads that operate in Pennsylvania.

Table 2-6: Class I Freight Rail Operations in Pennsylvania

Railroad	Reporting Mark	Miles Owned	Miles Operated
Canadian National Railway / Bessemer & Lake Erie Railroad	CN / BLE	139	156
CSX Transportation	CSX	428	1,058
Norfolk Southern Railway	NS	1,700	2,402
Total Class I mileage		**2,267**	**3,616**

Sources: Railroad websites, AAR (2019), and PennDOT (2015)

[4] Compiled information for each railroad, unless otherwise referenced, was gathered from the website of the specific railroad or its parent company.

Canadian National Railway

Canadian National Railway (CN) is a Montreal-based Class I freight railroad and the largest railroad in Canada. In 2018, the railroad's total revenue was approximately $14.3 billion. In addition to operating one of Canada's two transcontinental railroads, CN also maintains a network of services in the midwestern United States and along the Mississippi River corridor between Chicago and New Orleans.

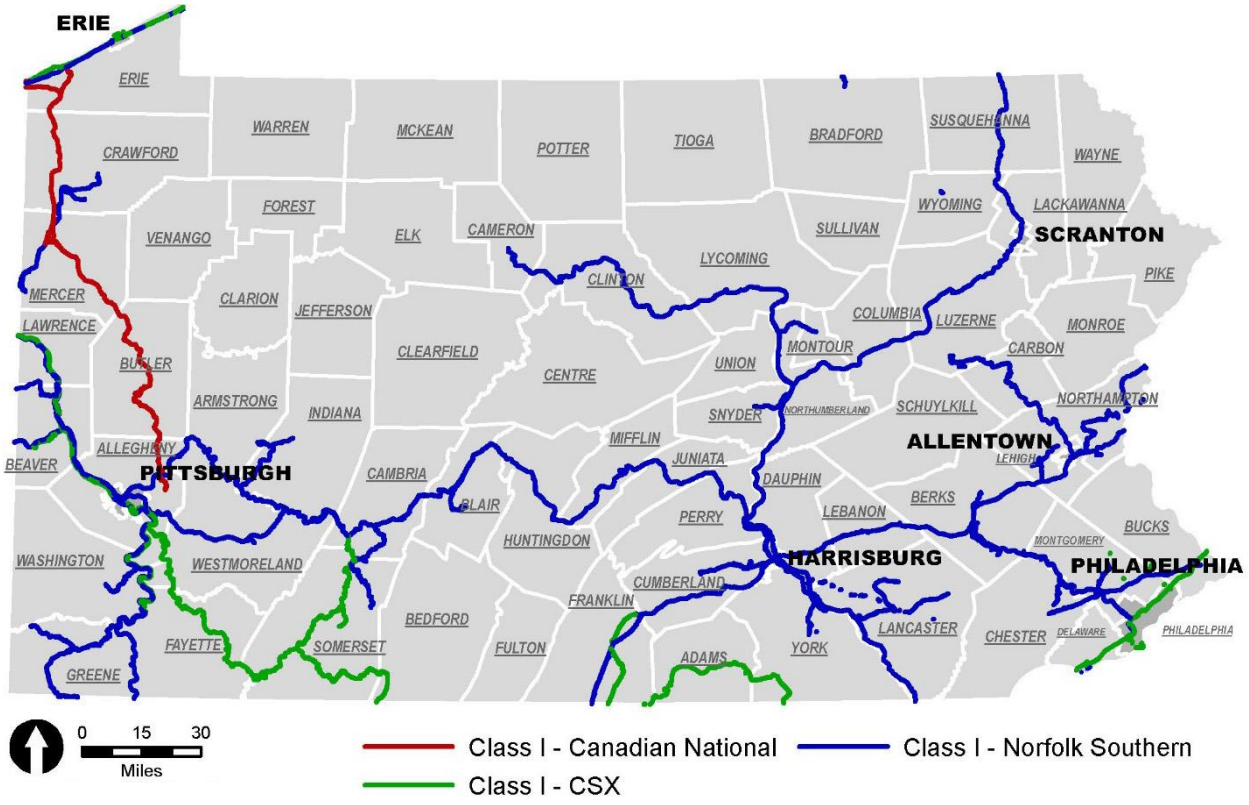


Figure 2-4: Class I freight rail operations in Pennsylvania (FRA, 2019)

Although not contiguous with the rest of its network, CN has owned and operated the Class II Bessemer & Lake Erie Railroad (BLE) since 2004, a result of its acquisition of a group of railroads once owned by U.S. Steel that also included the Elgin, Joliet & Eastern in Chicago and the Duluth, Minnesota & Iron Range Railway in Minnesota (American-Rails.com, n.d.). The 286k-compliant, primarily single-track railroad is 156 miles long and operates between Penn Hills, PA, and Conneaut, OH. The term "286k compliance" refers to the minimum track/roadbed structure capable of supporting rail cars transporting loads up to the latest maximum weight limits approved by the FRA. In addition, the BLE includes two branches that serve Greenville in Mercer County and Wallace Junction from Girard, located to the west of Erie. Connections are available to the Buffalo & Pittsburgh Railroad, CSX, NS, and Union Railroad rail networks.

Photo: AECOM

Metallic ore is the principal commodity type handled by BLE, although other commodities are also transported. CN also owns and operates a rail development facility in West Springfield in Erie County.

CSX Transportation

CSX is one of the two largest Class I railroads operating in the eastern United States. With a total revenue of $12.3 billion in 2018, CSX is the 4th largest North American railroad and the most expansive along the East Coast in terms of geographic coverage. CSX operates in 23 states and serves almost every major metropolitan city in the eastern United States as well as the major North Atlantic ports of New York/New Jersey, Philadelphia, and Baltimore.

Within Pennsylvania, CSX has operations in the following regions:

- Erie County: CSX's New York – Chicago corridor operates via the cities of Buffalo and Chicago. This corridor passes through Erie County and the City of Erie itself. Passenger service is also provided on this corridor by Amtrak's Lake Shore

Limited that links New York, Albany, Cleveland, and Chicago. CSX additionally maintains trackage rights along NS-owned tracks along this corridor.

- Southwestern Pennsylvania: CSX operates a route between Stirling, OH, and Baltimore, MD, that traverses through southwestern Pennsylvania, beginning in New Castle in Lawrence County. The eastward corridor serves Pittsburgh via Beaver County before continuing toward Cumberland and Baltimore, MD. Passenger service is provided over this route by Amtrak's Capitol Limited between Cleveland, Pittsburgh, and Washington, D.C. From Rockwood, a branch operates northward to Johnstown.

- Southeastern Pennsylvania: CSX operates its own route paralleling I-95 between New York, Philadelphia, Baltimore, and Washington, D.C., through Delaware and Bucks Counties. Additional branches (listed in greater detail under CSX's trackage rights operations) operate within Philadelphia and serve the Port of Philadelphia, while other lines in Delaware and Montgomery Counties provide freight service where SEPTA passenger service is also operated.
- Additional Branches: CSX operates routes throughout Pennsylvania, including routes between Lurgan and Chambersburg, between Gettysburg and Hanover along the Baltimore – Frederick corridor, between Creekside and Indiana Junction, and along additional tracks owned by other railroads through trackage rights, as listed below.

CSX also maintains trackage rights over the following railroads in Pennsylvania:

- Buffalo & Pittsburgh Railroad (BPRR): Over a corridor between the Edinburg area of Butler County and the Echo area of Armstrong County
- Norfolk Southern Railway (NS): Trackage rights are maintained in the following routes of the NS network:
  - Over NS's major routes through Erie County
  - Over a route between Lurgan Township in Franklin County and Harrisburg
  - Over a short route to the north of Harrisburg
  - Over a route between Saltsburg and Creekside in Indiana County
  - Over a route between Farrell and Sharon in Mercer County
  - Over portions of NS's Main Line commencing in Morrisville
- Conrail Shared Assets (CRCX): Over tracks in multiple yards and terminals in and around Philadelphia
- Pittsburgh & Ohio Central Railroad (POHC): Over a number of tracks on Neville Island
- SEPTA: Over a route between Norristown and Lansdale
- Additional locations: Trackage rights over a route between Vang Junction and Cambria in Somerset County owned by PBS Coals.

Norfolk Southern Railway

NS is a large Class I railroad operating in the eastern half of the United States. With total operating revenues of $11.5 billion in 2018, NS is the 5th largest North American railroad. In addition to a large presence in the eastern United States, including major seaports, NS provides multiple connections to the western U.S. via connections in Chicago, Kansas City, St. Louis, Memphis, New Orleans, and Dallas. NS's largest international gateway is Norfolk, which is a substantial port for both bulk and intermodal cargo.

Within Pennsylvania, NS has operations in the following regions:

- Philadelphia – Harrisburg – Pittsburgh Main Line: NS's primary corridor in the commonwealth consists of the former Pennsylvania Railroad main line between Pittsburgh and Harrisburg. East of Harrisburg, NS's primary route to reach Philadelphia consists of the former Reading Railroad through Lebanon, Reading, and Norristown. NS also retains trackage rights over Amtrak's former

Pennsylvania Railroad line through Downingtown and Paoli as listed below. Numerous branches serve smaller Pennsylvania communities, including Falls Junction near Philadelphia, Morrisville, Devault, Hollidaysburg, and Central City. Amtrak's Pennsylvanian operates over the entirety of the former Pennsylvania Railroad route between Philadelphia and Pittsburgh. Frequent corridor service is provided between Harrisburg and Philadelphia by Amtrak under contract with PennDOT.

Photo: Norfolk Southern Railway

- Reading – Bethlehem – Easton: This route links Pennsylvania with northern New Jersey and New York. Branches along this corridor serve Evansville, Bath, Jim Thorpe/Hazleton, Rittersville Junction in Bethlehem, Florence Yard in Bethlehem, Stockertown, Martins Creek, and Slateford Junction.
- Harrisburg – Chambersburg – Hagerstown: This route, part of NS's Crescent Corridor linking the northeast with the southeast, serves as the primary link between NS's Pennsylvania route and former Southern Railway routes extending southward from Hagerstown, MD.
- Harrisburg – Perryville: NS operates over the Harrisburg – Perryville corridor that follows the Susquehanna River. Lines branching off from this corridor serve York, Lancaster, Lititz, New Holland, Carlisle, and Steelton in Harrisburg.

- Harrisburg – Sunbury – Scranton – Binghamton, New York: NS operates over the Harrisburg – Sunbury – Scranton – Binghamton corridor paralleling the Susquehanna River. The route from Sunbury to Binghamton and on to Schenectady, NY was acquired from Canadian Pacific in 2015. Additional branches along this corridor service Kreamer, as well as Lanesboro, on service bound for Windsor, NY.
- Sunbury – Williamsport – Emporium: NS operates the Sunbury – Williamsport – Emporium corridor with an additional branch servicing Strawberry Ridge in Derry Township. Service beyond Emporium toward Buffalo is operated by the Western New York & Pennsylvania Railroad on NS-owned tracks.
- Southwestern Pennsylvania: NS operates multiple branches in the Greater Pittsburgh area. From Pittsburgh to points south, branches serve Marianna and Brownsville. Additional service from Brownsville serves Brave and Morgantown, WV. From Pittsburgh to points north, service is operated to Youngstown, while additional branches that are operated from Beaver and Homewood Junction serve Alliance and East Liverpool in Ohio.
- Buchanan – Youngstown: NS operates service along the Buchanan – Youngstown corridor. At Buchanan, connections are available to the Western New York & Pennsylvania Railroad.
- Erie County: NS's Buffalo – Chicago main line traverses Erie County.

NS additionally maintains trackage rights over the following routes:

- Amtrak: Over Amtrak's former Pennsylvania Railroad main line between Philadelphia and Harrisburg
- BPRR: Over a route between Freeport in Armstrong County and Indiana Junction in Jefferson County, and between Erie and Corry in Erie County
- BLE: Over the Bessemer & Lake Railroad's main line between Greenville and Conneaut, OH, and over the Wallace Junction Branch
- CSX: Trackage rights are maintained over the following routes:
  - CSX's main line through southeastern Pennsylvania within Philadelphia
  - Creekside to Indiana Junction
- Lycoming Valley Railroad (LVRR): Muncy – Williamsport – Avis
- Nittany & Bald Eagle Railroad (NBER): Tyrone to Lock Haven
- Additional locations: Trackage rights between Bailey Mine and Waynesburg in Greene County over tracks owned by Consolidation Coal, Central City in Somerset

County over tracks owned by LTC Energy, and Erie harbor in Erie County over tracks owned by West Erie Short Line, Inc.

2.1.1.3.2 Class II Freight Railroads

Table 2-7 and Figure 2-5 show the Class II freight railroads that operate in Pennsylvania.

Table 2-7: Class II Freight Rail Operations in Pennsylvania

Railroad	Reporting Mark	Miles Owned	Miles Operated
Buffalo & Pittsburgh Railroad	BPRR	627	656
New York, Susquehanna and Western Railway	NYSW	0	42
Wheeling & Lake Erie Railway	WE	103	287
	Total	**730**	**985**

Sources: Railroad websites, AAR (2019), and PennDOT (2015)

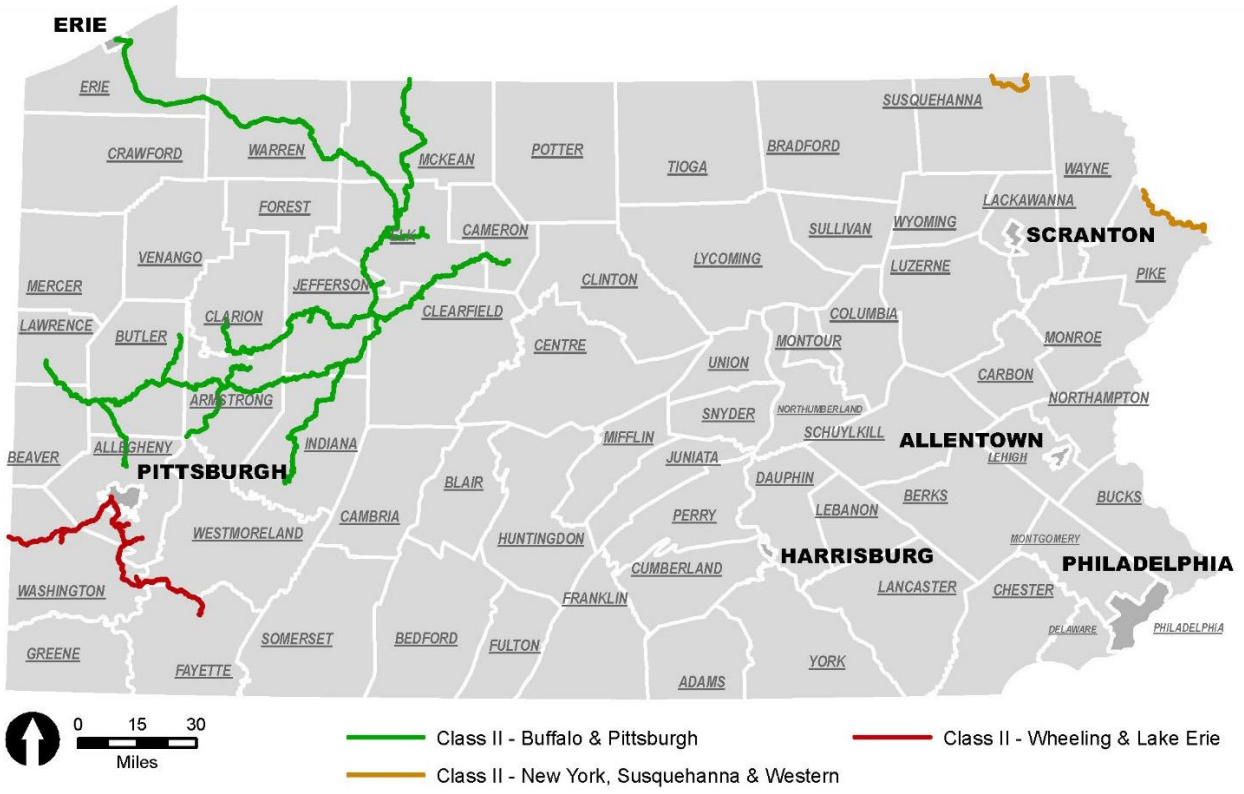


Figure 2-5: Class II freight railroads in the commonwealth (FRA, 2019)

Buffalo & Pittsburgh Railroad

The BPRR is a Class II network made up primarily of former CSX (B&O) lines in western Pennsylvania and western New York and is 627 miles long across the state. The 286k-compliant railroad, owned by Genesee & Wyoming, Inc., is one of Pennsylvania's largest railroads and includes multiple branches. Within Pennsylvania, these branches include:

- Main North-South Corridor: BPRR's main line connects Pittsburgh and Bradford before continuing north into New York toward Buffalo.
- Allison Park Branch in western Pennsylvania: This branch links BPRR's main north-south corridor with the Allegheny Valley Railroad network at Allison Park, to the north of Pittsburgh.
- Driftwood Branch in north-central Pennsylvania: This branch connects the main corridor from DuBois with the NS rail network and points east in Driftwood.
- Erie Branch in northwestern Pennsylvania: This branch connects the main line with CSX and NS in Erie.
- Freeport Branch in western Pennsylvania: This branch connects the main line with NS at Freeport.
- Homer City Branch in western Pennsylvania: This branch connects the main line from Punxsutawney with Homer City and includes a section of track owned by CSX.
- New Castle Branch in western Pennsylvania: This branch connects the main line with CSX and points west in New Castle.
- Petrolia Branch in western Pennsylvania: This branch connects the main line with Petrolia in Butler County. This segment of the network cannot handle 286k railcars.
- St. Mary's Branch in north-central Pennsylvania: This branch connects the main line from Ridgeway to St. Mary's in Elk County.

Photo: BPRR

The BPRR additionally acts as a leasing operator for CSX-owned track between Ellwood City and the Bakerstown area of Allegheny County. Outside of Pennsylvania, the BPRR continues into New York and serves the Salamanca – Orchard Park – Buffalo corridor. In Pennsylvania, connections are available to the Allegheny Valley Railroad, CN, CSX, NS, and Wheeling & Lake Erie Railway rail networks. Key commodities transported include aggregates, agricultural products, chemicals, coal, food, metal, petroleum, and timber and related products.

New York, Susquehanna and Western Railway

The New York, Susquehanna and Western Railway (NYSW) is a Class II rail network operating in New York, New Jersey, and Pennsylvania, and servicing the New York – Binghamton – Syracuse and New York – Binghamton – Utica corridors. The railroad, a subsidiary of the Delaware Otsego based in Cooperstown, NY, consists of more than 400 miles overall. Between Port Jervis, NY, and Binghamton, NY, along the former Erie Railroad main line, the NYSW parallels the Delaware and Susquehanna Rivers, while crossing into and out of Pennsylvania from New York. A total of 42 miles of the railroad are located in Pennsylvania, within Pike and Susquehanna Counties. Between Port Jervis and Binghamton, the NYSW utilizes trackage rights to operate over the NS track. Local service to communities along this corridor is provided by the Central New York Railroad (CNYK), a Class III railroad described in further detail in the following section.

Outside of Pennsylvania, additional connections are available to CSX and NS. Key commodities transported include aggregates, agricultural products, chemicals, food, metal, plastics, timber and related products, as well as motor vehicles.

Wheeling & Lake Erie Railway

The Wheeling & Lake Erie Railway (WE) is a Class II rail network operating in Maryland, West Virginia, Pennsylvania, and Ohio. With its headquarters located in Brewster, OH, the entire railroad consists of 840 miles, of which 575 miles of track are owned and 265 miles are accessed through trackage rights. In Pennsylvania, the railroad traverses southwestern Pennsylvania over the Wheeling, WV – Pittsburgh – Connellsville corridor. Beyond Connellsville, the railroad has trackage rights over CSX-owned tracks toward Cumberland and Hagerstown, MD. Within Pennsylvania, connections are available to the Allegheny Valley Railway, Buffalo & Pittsburgh Railroad, CSX, NS, POHC, Southwest Pennsylvania Railroad (SWP), and Union Railroad (URR) rail networks. Key commodities transported include aggregates, agricultural products, chemicals, coal, metals, petroleum, and timber and related products.

Figure 2-6 is a map of the Class III Railroads in the Commonwealth of Pennsylvania.

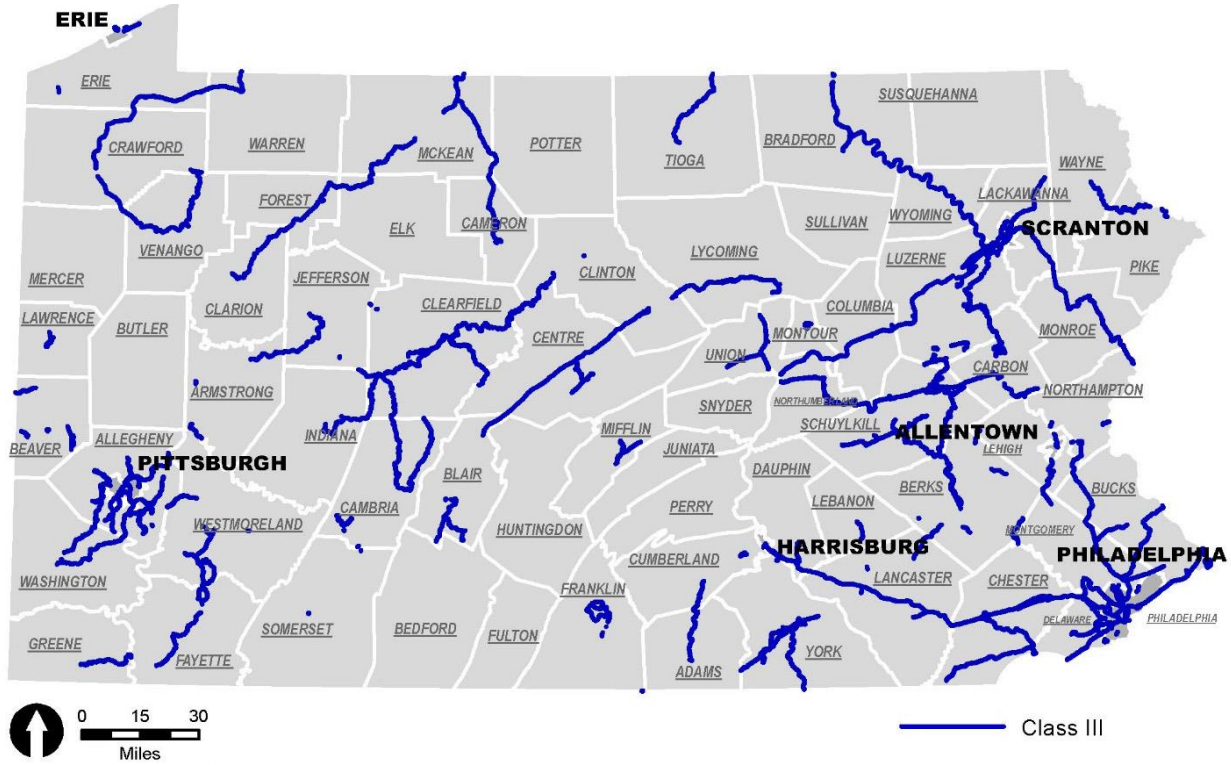


Figure 2-6: Class III freight railroads in the commonwealth (FRA, 2019)

2.1.1.3.3 Class III Freight Railroads – Parent Companies

Most of the freight railroads in Pennsylvania are Class III short line railroads. As of early 2020, there are 57 operating Class III railroads. These railroads are grouped by parent company in Table 2-8. As shown, 22 operate independently of a parent company.

Table 2-8: Class III Freight Rail Operations in Pennsylvania

Reporting Mark / Railroad		Miles Owned	Miles Operated
Parent Company – Alpha Natural Resources			
CM	Cumberland Mine Railroad	17	17
Parent Company – ArcelorMittal			
MSUB	Mittal Steel U.S.A. Railways-BRVY	4	4
MSUS	Mittal Steel U.S.A. Railways-SH	4	4
MSUU	Mittal Steel U.S.A. Railways-UMP	5	5
Parent Company – Carload Express Inc.			
AVR	Allegheny Valley Railroad	77	77
SWP	Southwest Pennsylvania Railroad	66	66
Parent Company – Chesapeake and Delaware			
BDRV	Belvidere & Delaware River Railway	20	2
Parent Company – Colebrookdale Railroad Preservation Trust			
EBG	Eastern Berks Gateway Railroad	9	9
Parent Company– Delaware Otsego			
CNYK	Central New York Railroad	0	42
Parent Company – Genesee & Wyoming			
AOR	Aliquippa & Ohio River Railroad	9	9
MMID	Maryland Midland Railway	0	0
POHC	Pittsburgh & Ohio Central Railroad	38	38
WCOR	Wellsboro & Corning Railway	29	29
YRC	York Railway	42	42
Parent Company – Genesee Valley Transportation			
DL	Delaware – Lackawanna Railroad	88	88
Parent Company – Indiana Boxcar			
YSRR	Youngstown & Southeastern Railway	5	5
Parent Company – Kasgro Rail			
KRL	Kasgro Rail	4	4
Parent Company – McKees Rocks Industrial Enterprises			
PAM	Pittsburgh, Allegheny, & McKees Rocks Railroad	5	5

Reporting Mark / Railroad		Miles Owned	Miles Operated
Parent Company – North Shore Railroad & Affiliates			
JVRR	Juniata Valley Railroad	17	19
LVRR	Lycoming Valley Railroad	49	49
NBER	Nittany & Bald Eagle Railroad	70	142
NSHR	North Shore Railroad	37	67
SVRR	Shamokin Valley Railroad	0	31
UCIR	Union County Industrial Railroad	0	28
Parent Company – Pioneer Railcorp			
GET	Gettysburg & Northern Railroad	27	27
Parent Company – Railroad Enterprise Group			
PSCC	Pennsylvania and Southern Railroad	30	30
Parent Company – R.J. Corman Railroad Group			
RJCN	R.J. Corman Railroad Company / Allentown Lines	2	2
RJCP	R.J. Corman Railroad Company / Pennsylvania Lines	243	243
Parent Company – SMS Rail Service			
SLRS	SMS Rail Service	3	3
Parent Company – Transtar			
URR	Union Railroad Company	22	22
Parent Company – Wabtec			
EEC	East Erie Commercial Railroad	5	5
Parent Company – Watco Transportation Services			
ITHR	Ithaca Central Railroad	1	1
PSWR	Pennsylvania Southwestern Railroad	12	12
Parent Company – 3i			
ESPN	East Penn Railroad	110	110
TYBR	Tyburn Railroad	2	2
Independently Owned Railroads			
ALLN	Allentown and Auburn Railroad	4	4
CORY	Columbia and Reading Railway	3	3
CHR	Chestnut Ridge Railway	5	5
CRCX	Conrail Shared Assets	65	65
DLS	Delaware, Lackawaxen & Stourbridge Railroad	25	25
EBTC	East Broad Top Connecting Railroad	4	4
EZR	Elizabethtown Industrial Railroad	1	1
EV	Everett Railroad	23	23
LVR	Landisville Railroad	1	1
LRWY	Lehigh Railway	0	56
LS	Luzerne & Susquehanna Railroad	60	60

Reporting Mark	Railroad	Miles Owned	Miles Operated
LVRB	Lehigh Valley Rail Management – Bethlehem	5	5
LVRJ	Lehigh Valley Rail Management – Johnstown	19	19
MIDH	Middletown & Hummelstown Railroad	7	7
NCIR	New Castle Industrial Railroad	16	16
NDCR	Northampton Development Center Railroad	1	1
NHRR	New Hope & Ivyland Railroad	19	17
OCTL	Oil Creek & Titusville Lines	17	17
PN	Pennsylvania Northeastern Railroad	0	56
RBMN	Reading Blue Mt. & Northern Railroad	327	327
SRC	Strasburg Railroad	5	5
WNYP	Western New York & Pennsylvania Railroad	159	159
	Total	**1,818**	**2,115**

Source: Individual railroad websites, AAR (2019), and PennDOT (2015)

Alpha Natural Resources

Alpha Natural Resources is a privately held mining company that merged with Contura Energy in 2018. Contura Energy, headquartered in Bristol, TN, operates coal mines in Virginia, West Virginia, and Pennsylvania. Contura Energy is a publicly traded company with a market capitalization of approximately $123 million as of December 2019, making it a relatively small firm (Bloomberg, n.d.b). In its 2019 3rd quarter earnings release, Contura Energy cited challenging market conditions as the reason for diminished demand for metallurgical coal (Contura Energy, 2020).

Cumberland Mine Railroad. Alpha Natural Resources owns the Cumberland Mine Railroad in Pennsylvania. The Cumberland Mine Railroad is a Class III railroad servicing primarily the Cumberland Mine in Greene County in southwestern Pennsylvania. The railroad is 17 miles long and equipped with passing sidings. No direct rail connections are available. However, the eastern end of the railroad terminates at the Labelle River transloading facility, with barge service across the Monongahela River to the NS network just outside Masontown in Fayette County.

ArcelorMittal

ArcelorMittal is a multinational steel manufacturer that operates Class III railroads in Pennsylvania as Mittal Steel U.S.A. Railways. ArcelorMittal is headquartered in Luxembourg, with American operations based in Chicago. The company is publicly traded with a market capitalization of approximately $18.67 billion as of December 2019 (Bloomberg, n.d.a). While the company's Pennsylvania facilities continue to operate under normal conditions with no changes planned or announced, current

macroeconomic conditions have proven to be challenging to domestic steelmakers and processors.

Mittal Steel U.S.A. Railways (MSUB, MSUS, MSUU). ArcelorMittal operates Class III railroads in three Pennsylvania locations: (1) Coatesville, (2) Steelton, and (3) Conshohocken. The three railroads are 4 miles, 3.7 miles, and 4.1 miles long, respectively, and primarily serve ArcelorMittal's steelmaking and finishing facilities in these three municipalities. Tracks along the Steelton branch are owned by NS. Connections are available to NS as well as the Eastern Penn Railroad.

Carload Express

Carload Express is a short line railroad and transportation company based in Oakmont, PA. The company operates four railroads across Delaware, Maryland, Ohio, Pennsylvania, and Virginia. In Pennsylvania, Carload Express operates two railroads totaling 143 miles.

Allegheny Valley Railroad. The Allegheny Valley Railroad (AVR) is a 286k-compliant Class III railroad operating in the greater Pittsburgh area. The railroad is 77 miles long and consists of four branches that together serve the Gibsonia – Pittsburgh – Washington, PA corridor within Allegheny and Washington Counties:

- W&P Subdivision: Operates between Washington, PA and Glenwood Junction in Pittsburgh over CSX-owned tracks
- P&W Subdivision: Operates between Glenwood Junction in Pittsburgh and Gibsonia over CSX-owned tracks
- Allegheny Subdivision: Operates between the 21st Street interchange in Pittsburgh and the Arnold River Terminal
- Brilliant Branch: Connects the Allegheny Subdivision and NS's Home Junction in Pittsburgh

The AVR additionally acts as a leasing operator for CSX-owned trackage between the Bakerstown area of Allegheny County and Pittsburgh. Connections are available to the Buffalo & Pittsburgh Railroad, CSX, NS, and Wheeling & Lake Erie. Key commodities transported include aggregates, chemicals, coal, ethanol, food, retail distribution-related products, and timber and related products.

Southwest Pennsylvania Railroad. The Southwest Pennsylvania Railroad (SWP) is a 286k-compliant Class III railroad operating in southwestern Pennsylvania. The railroad is 66 miles long and includes multiple branches that together serve the Uniontown – Scottsdale – Greensburg corridor within Fayette and Westmoreland Counties:

- FM & P Subdivision: Operates between Smithfield and Connellsville in Fayette County
- Bullskin Branch: Operates between Everson and Bullskin Township in Fayette County over Westmoreland County Industrial Development-owned tracks
- Mount Pleasant Subdivision: Operates between Mount Pleasant and Broad Ford in Westmoreland and Fayette Counties over Westmoreland County Industrial Development-owned tracks
- Yukon Branch: Operates between Waltz and Everson in Westmoreland and Fayette Counties over Westmoreland County Industrial Development -owned tracks
- Radebaugh Subdivision: Operates between Hunker and Greensburg in Westmoreland County over Westmoreland County Industrial Development-owned tracks

Connections are available to CSX, NS, and Wheeling & Lake Erie. Key commodities transported include aggregates, chemicals, coal, ethanol, food, retail distribution-related products, and timber and related products.

Chesapeake and Delaware

Chesapeake and Delaware is a transportation company based in Ringoes, NJ. The company owns four railroads, primarily in New Jersey, including the Belvidere & Delaware River Railway, which operates partially within Pennsylvania.

Belvidere & Delaware River Railway. The Belvidere & Delaware River Railway (BDRV) is a 286k-compliant, 20-mile-long Class III railroad operating on tracks owned by the Belvidere & Lehigh River Railway Company. Although most of the BDRV is located within New Jersey, approximately 1 mile is located in Northampton County, PA, with a western terminus in Easton. Throughout the entire railroad, there is a maximum vertical clearance of 17 feet. Connections are available to the NS rail network in Phillipsburg, NJ. Key commodities transported include aggregates, agricultural products, construction materials, food, retail distribution-related products, timber and related products, and waste. The railroad also hosts seasonal tourist passenger rail service.

Colebrookdale Railroad Preservation Trust. The Colebrookdale Railroad Preservation Trust is a Boyertown-based 501(c)3 non-profit organization created to restore and develop the Civil War-era Colebrookdale Railroad as an active freight utility and heritage tourist railroad. While tourism operations are managed solely by the Trust, freight operations are conducted in partnership with the Redevelopment Authorities of Berks and Montgomery Counties, the Boroughs of Pottstown and Boyertown, PennDOT, and

the United States Department of Housing and Urban Development. Through this partnership, the freight division of the Colebrookdale Railroad is known as the Eastern Berks Gateway Railroad (EBG).

Eastern Berks Gateway Railroad. The EBG is a 9-mile-long railroad operating between Boyertown in Berks County and Pottstown in Montgomery County. Acting as a handling carrier for NS, the EBG connects to the Class I network in Pottstown.

Delaware Otsego

Delaware Otsego is the operating subsidiary of DOCP Acquisition. Based out of Cooperstown, NY, the subsidiary owns CNYK and the New York, Susquehanna and Western Railway. Ownership of DOCP Acquisition consists of NS and CSX at 40% each, and the remaining 20% by others.

Central New York Railroad. CNYK is a 286k-compliant Class III railroad operating local rail service over 123 route miles of former Conrail (Erie) trackage leased from NS. The route connects Binghamton and Port Jervis and runs along the Delaware River for much of its length, serving intermediate towns and customers between the two cities, sharing the route with the NYSW, which provides overhead service. Forty-two miles of the railroad are located in northeastern Pennsylvania. Communities in Pennsylvania served by the railroad include Lackawaxen and Shohola in Pike County and Great Bend and Susquehanna in Susquehanna County. Connections in Pennsylvania are available to the Delaware Lackawaxen & Stourbridge Railroad in Lackawanna. Outside Pennsylvania, additional connections are available to CSX and NS. Key commodities transported include chemicals, food, metals, timber and related products, as well as motor vehicles.

New York, Susquehanna and Western Railway. See the section on Class II freight railroads.

Genesee & Wyoming

Genesee & Wyoming (G&W) is a holding company of railroad properties located in North America, Australia, and Europe. With headquarters in Darien, CT, the firm owns or leases 119 properties in all, with 113 located in North America. In 2018, the firm boasted gross annual revenues of $2.3 billion, $400 million less than the smallest Class I railroad, Kansas City Southern at $2.7 billion. Out of the total gross, $1.36 billion was generated by properties in North America (G&W, 2019).

Publicly held until December 2019, G&W was acquired by Brookfield Infrastructure and GIC, the sovereign fund of Singapore. Brookfield Infrastructure is a limited partnership controlled by Brookfield Asset Management, a publicly held portfolio asset manager

located in Canada. G&W's holdings in Pennsylvania consist of five Class III railroads and the Buffalo & Pittsburgh Class II Railroad, totaling 745 route miles in the commonwealth.

Aliquippa & Ohio River Railroad. Located in Beaver County in western Pennsylvania, the Aliquippa & Ohio River Railroad (AOR) is a 9-mile-long, 286k-compliant Class III railroad. The AOR services primarily multiple industrial parks along the Ohio River in Aliquippa and connects to the CSX rail network. Key commodities transported include aggregates, cement, metals, and plastics.

Buffalo & Pittsburgh Railroad. See the section on Class II freight railroads.

Maryland Midland Railway. The Maryland Midland Railway is a Class III railroad with 81 route miles. The 286k-compliant railroad operates between Highfield, MD, and Emory Grove, MD. Of the 81 route miles, only 0.4 mile passes through Pennsylvania, in Franklin County. Connections are available to CSX in Maryland. Key commodities transported include aggregates, chemicals, and timber and related products.

Pittsburgh & Ohio Central Railroad. The Pittsburgh & Ohio Central Railroad (POHC) is a 286k-compliant Class III carrier operating 38 route miles between Washington and Neville Island in Washington and Allegheny Counties, with an additional branch serving Rennerdale. Connections are available to CSX, NS, and the Pittsburgh, Allegheny, & McKees Rocks Railroad. Key commodities transported include aggregates, chemicals, metals, and timber and related products.

Wellsboro & Corning Railroad. The Wellsboro & Corning Railroad (WCOR) is a Class III railroad operating in New York and Pennsylvania. The railroad is 42 route miles long, of which 29 miles are operated in Pennsylvania between Wellsboro and Lawrenceville in Tioga County over tracks owned by the Growth Resources of Wellsboro Foundation. North of Lawrenceville, the railroad continues into New York with a northern terminus in Corning. Connections are available to NS in Corning, NY. Key commodities transported include aggregates, agricultural products, and chemicals. WCOR's main line trackage is presently limited to 263k.

York Railway. The York Railway (YRC) is a 286k-compliant Class III railroad operating 42 route miles, consisting of multiple branches in York County:

- York – Thomasville – Porters: Operates between York and Porters via Thomasville with connections to CSX
- York – Spring Grove – Hanover: Operates between York and Hanover via Spring Grove with connections to CSX
- York – Hyde: Operates between York and Hyde

- York – East York: Operates between York and East York
- Hanover – Porters: The YRC additionally has trackage rights on CSX tracks between Hanover and Porters

Photo: York Railway

Additional connections are available to the East Penn Railroad and NS in York. Key commodities transported include aggregates, agricultural products, chemicals, coal, food products, metals, and timber and related products.

Genesee Valley Transportation

Genesee Valley Transportation (GV) is a short line railroad and transportation company based out of Batavia, NY. GV operates four Class III railroads across northern and western New York, in addition to one in Pennsylvania:

Delaware – Lackawanna Railroad. At 88 miles long, the Delaware – Lackawanna Railroad (DL) is a Class III railroad operating in Lackawanna, Monroe, Wayne, and Northampton Counties of northeastern Pennsylvania around Scranton that consists of the following segments:

- Scranton – Carbondale Branch: This branch services the Scranton – Carbondale corridor with connections to the NS rail network in Scranton.

- Scranton – Stroudsburg Branch: This branch services the Scranton – Stroudsburg corridor with connections to the NS rail network in Slateford Junction just south of Stroudsburg.
- Little Virginia – Brady (Scranton): This branch connects the other branches to the Luzerne & Susquehanna Railroad in southern Scranton, which services points south, including Wilkes-Barre.

Trackage operated by the DL is owned by the Pennsylvania Northeast Regional Railroad Authority. Key commodities transported include aggregates, chemicals, coal, petroleum, and wood products.

Indiana Boxcar

The Indiana Boxcar is a short line railroad and transportation company based out of Connersville, IN. The company operates four Class III railroads across Indiana, Illinois, Ohio, and Pennsylvania:

Youngstown & Southeastern Railway. The Youngstown & Southeastern Railway (YSRR) is a 286k-compliant Class III railroad operating in Beaver County in western Pennsylvania. Within Pennsylvania, the YSRR operates on tracks owned by the Columbiana County Port Authority based in Ohio. The 36-mile railroad operates in and around Darlington in Beaver County before crossing into Ohio toward Youngstown and Lowellville. Connections are available in Pennsylvania to the CSX and NS rail networks.

Kasgro Rail

Kasgro Rail (KRL) is a rail car manufacturer based in New Castle, PA. Kasgro's operations consist of two key focus areas: new car manufacturing and rail car management. The company works with a variety of freight railroads, including CSX and NS, and is able to design rail cars to meet requested specifications and loading needs. Kasgro owns and operates one railroad:

Kasgro Rail. Kasgro's 3.6-mile Class III railroad connects its primary manufacturing facility in New Castle to CSX. The railroad transports new and used rolling stock for Kasgro's rail car business, as well as related materials.

McKees Rocks Industrial Enterprises

McKees Rocks Industrial Enterprises is a processor and transporter of aggregates and metals based out of McKees Rocks, just to the west of downtown Pittsburgh. The company owns and operates four facilities, one each in McKees Rocks, Washington, and Sayre, PA, and one in Hannibal in southeastern Ohio. The company owns and operates one Class III railroad:

Pittsburgh, Allegheny, & McKees Rocks Railroad. The Pittsburgh, Allegheny, & McKees Rocks Railroad (PAM) is a 5-mile-long Class III railroad primarily servicing the industrial area of McKees Rocks along the Ohio River. Connections are available to the CSX and NS rail networks. Key commodities transported include aggregates, chemicals, and metals.

North Shore Railroad & Affiliates

North Shore Railroad & Affiliates is a short line railroad and transportation company based out of Northumberland, PA. The company operates six Class III railroads in central Pennsylvania totaling 247 route miles.

Juniata Valley Railroad. The Juniata Valley Railroad (JVRR) is a 17-mile-long Class III railroad consisting of multiple small branches operated in the Lewistown area of Mifflin County in central Pennsylvania. Those branches, owned by the SEDA-COG Joint Rail Authority, serve the Lewistown Industrial Park, including the First Quality paper and plastics production facility, a scrap metal yard outside of Lewistown, and the Standard Steel production facility in Burnham to the north of Lewistown. The JVRR additionally has trackage rights over NS between Mount Union in Huntingdon County and Thompsontown in Juniata County. The railroad is equipped with sidings through a transloading facility in Lewistown. Connections are available to NS. Key commodities transported include aggregates, chemicals, metals, oil, and plastics.

Lycoming Valley Railroad. The Lycoming Valley Railroad (LVRR) is a 48.7-mile-long Class III railroad serving the Muncy – Williamsport – Avis corridor in Lycoming and Clinton Counties in north-central Pennsylvania. The railroad is equipped with sidings through multiple transloading facilities. The LVRR additionally has trackage rights over NS between Muncy and Watsontown in Union County. Connections are available to NS, North Shore Railroad, Shamokin Valley Railroad, and Union County Industrial Railroad.

Nittany & Bald Eagle Railroad. The Nittany & Bald Eagle Railroad (NBER) is a 70-mile-long Class III railroad consisting of a primary route connecting Tyrone in Blair County and Lock Haven in Clinton County. At Milesburg in Centre County, a branch connects to Lemont, also located in Centre County. Additional branches are operated at Pleasant Gap in Centre County and between Mill Hall and Castanea in Clinton County. NBER operates over these routes under a lease from the SEDA-COG Joint Rail Authority. The NBER additionally has trackage rights over the NS route between Lock Haven in Clinton County and Driftwood in Cameron County. Connections are available to NS. Key commodities transported include aggregates and coal.

North Shore Railroad. The North Shore Railroad (NSHR) is a 37-mile-long Class III railroad serving the Berwick – Bloomsburg – Danville – Northumberland corridor in

Luzerne, Columbia, Montour, and Northumberland Counties in north-central Pennsylvania. NSHR operates over trackage owned by PPL Susquehanna to provide service to PPL's nuclear power station in Berwick. Connections are available to NS. Key commodities transported include metals and plastics.

Shamokin Valley Railroad. The Shamokin Valley Railroad (SVRR) is a 27.4-mile-long Class III railroad operating between Sunbury and the Locust Gap area of Northumberland County in central Pennsylvania over trackage owned by the SEDA-COG Joint Rail Authority. The SVRR also holds trackage rights over NS in Sunbury. Connections are available to the NS and Reading Blue Mountain & Northern Railroad.

Union County Industrial Railroad. The Union County Industrial Railroad (UCIR) is a 11.5-mile-long Class III railroad operating between Winfield and the Allenwood area of Union County in central Pennsylvania. Between Winfield and West Milton, the UCIR operates over trackage owned by the Lewisburg and Buffalo Creek Railroad (LBCX). Between West Milton and White Deer, trackage is owned by the West Shore Railroad, and between White Deer and Allenwood trackage is owned by the SEDA-COG Joint Rail Authority. Connections are available to the Lycoming Valley Railroad, NS, North Shore Railroad, and Shamokin Valley Railroad.

Pioneer Railcorp

Pioneer Railcorp is a holding company of multiple Class III railroads across the United States. Headquartered in Denver, CO, the firm operates 15 railroads across 12 Midwestern and Southeastern states. In May 2019, Pioneer merged with BRX Transportation Holdings, an affiliate of Brookhaven Capital Partners, through an all stock deal. In Pennsylvania, Pioneer Railcorp operates one railroad, the Gettysburg & Northern Railroad.

Gettysburg & Northern Railroad. The Gettysburg & Northern Railroad (GET) is a 286k-compliant 27-mile-long Class III railroad operating between Gettysburg and Mount Holly Springs in Adams and Cumberland Counties in central Pennsylvania. Connections are available to CSX in Gettysburg and to NS in Mount Holly Springs. Key commodities transported include aggregates, chemicals, and timber and related products.

Railroad Enterprise Group

Railroad Enterprise Group is a short line railroad and transportation company based in Newton, MA. The company operates four Class III railroads in New Jersey, Iowa, Tennessee, and Pennsylvania. The firm is a recent entrant as a short line parent company, with its Iowa and Tennessee operations commencing service in 2019.

Pennsylvania & Southern Railroad. The Pennsylvania & Southern Railroad (PSCC) is a 286k-compliant, 38-mile-long Class III railroad operating primarily in the Chambersburg area of Franklin County in south-central Pennsylvania over trackage owned by the Franklin County General Authority. Most of this network is within the Letterkenny Army Depot. Connections are available to CSX. Key commodities transported and stored include aggregates, agricultural products, chemicals, food, metals, plastics, timber and related products, as well as automobiles and heavy machinery.

R.J. Corman Railroad Group

R.J. Corman Railroad Group is a short line railroad and transportation company based in Nicholasville, KY. The company operates 14 Class III railroads across the Midwest and the southeastern United States. In addition to its short line railroad operations, the company provides materials sales, construction, and emergency management services related to the railroad industry. In Pennsylvania, R.J. Corman Railroad Group operates two railroads.

R.J. Corman Railroad. The R.J. Corman Railroad is a key operating company of the R.J. Corman Railroad Group that operates two Class III railroads across Pennsylvania: Allentown Lines Inc. (RJCN) and Pennsylvania Lines Inc. (RJCP). The Allentown Division is 2 miles long and operates within Allentown with connections available to NS. The Pennsylvania Division is 243 miles long and consists of multiple branches and segments:

- Cresson – Mahaffey: Connects Cresson and Mahaffey in Cambria and Clearfield Counties in western and north-central Pennsylvania
- Cresson – Fallentimber: Connects Cresson and the Fallentimber area in Cambria County in western Pennsylvania
- Mahaffey – Dixonville: Connects Mahaffey and Dixonville in Clearfield and Indiana Counties in western and north-central Pennsylvania
- McGees Mills – Hillman: Connects McGees Mills and Hillman in Clearfield and Indiana Counties in western and north-central Pennsylvania
- Sidney – Bear Run: Connects Sidney and the Bear Run area of Clearfield and Indiana Counties in western and north-central Pennsylvania
- Mahaffey – Clearfield – Keating: Connects Mahaffey – Clearfield – Keating in Clearfield and Clinton Counties in north-central Pennsylvania and includes a connection to NS
- Clearfield – Osceola Mills: Connects Clearfield and Osceola Mills in Clearfield and Centre Counties in north-central Pennsylvania

Key commodities transported include aggregates and coal.

SMS Rail Service

SMS Rail Service is a short line and transportation company based in Logan Township, NJ. The company operates six Class III switching railroads in southern New Jersey, the Capital Region of New York, and Pennsylvania. These railroads primarily serve industrial parks and terminals. Only one of these railroads operates in Pennsylvania as described below.

SMS Lines (SLRS). In Pennsylvania, SMS's railroad operations consist of a 2.5-mile route serving the Penn Warner Industrial Park in Morrisville. The 286k-compliant railroad provides connections to CSX, CRCX, and NS. Key transported commodities include chemicals and metals.

Transtar

Transtar is a subsidiary of United States Steel (U.S. Steel), the United States' second largest steel producer. Headquartered in Pittsburgh, U.S. Steel, a publicly held corporation, had a market capitalization of approximately $2.3 billion in December 2019 (Bloomberg, n.d.c). Although the company has remained profitable, it has faced slowing consumer demand and stiff competition from foreign-produced steel and other domestic producers. These macroeconomic trends have had uncertain and varying effects on steel production and overall demand for freight rail. Transtar serves as U.S. Steel's transport and logistics provider for raw and finished goods. The company operates seven switching operations located in the Midwest, Alabama, Texas, and Pennsylvania. In Pennsylvania, Transtar operates one railroad.

Union Railroad. The Union Railroad (URR) is a 286k-compliant Class III railroad operating over 22 route miles and consisting of the following branches:

- Mifflin Junction – Clairton Junction: Connects Mifflin Junction and Clairton Junction in Allegheny County and has connections to the Wheeling & Lake Erie Railway in Mifflin
- Unity Junction – East Pittsburgh – Clairton: Unity Junction (Plum Township) – East Pittsburgh – Clairton corridor in Allegheny County with connections to CN in Unity Junction and CSX and NS in East Pittsburgh
- Monongahela River Corridor: Services multiple facilities along the Monongahela River between Glenwood Junction (Pittsburgh), Braddock, and McKeesport

Key commodities transported include aggregates, chemicals, coal, metals, and timber and related products.

Wabtec

Westinghouse Air Brake Technologies (Wabtec) is a global supplier of locomotive and rail infrastructure systems, formed out of a merger between the Westinghouse Air Brake and MotivePower Industries in 1999. Headquartered in Wilmerding, PA, Wabtec acquired General Electric's Transportation Unit in February 2019. A publicly traded company, the firm has a market capitalization of approximately $14.3 billion as of December 2019 (Bloomberg, n.d.d). Wabtec operates one Class III railroad in Pennsylvania that was previously operated by General Electric.

East Erie Commercial Railroad. The East Erie Commercial Railroad (EEC) is a Class III railroad located in Erie. At 4.5 miles long, the 286k-compliant railroad primarily services Wabtec's locomotive production facility and includes a track for testing locomotives. Connections are available to the CSX and NS rail networks. Since its acquisition of the GE Transportation assets, Wabtec has secured new labor agreements with the Erie workforce and closed a locomotive manufacturing facility in Idaho, thereby committing to maintaining a substantial presence in Erie (Martin, 2019).

Watco Transportation Services

Watco Transportation Services, headquartered in Pittsburg, KS, is a holding company for multiple railroads in the United States and Australia. Watco, the parent company of Watco Transportation Services, additionally operates ports, terminals, and rail car repair service divisions. Watco Transportation Services' Pennsylvania operations are currently bound to two railroads, including a short section of the Ithaca Central Railroad, one of the company's most recent undertakings, which commenced in December 2018.

Ithaca Central Railroad. The Ithaca & Central Railroad (ITHR) is a 48.8-mile-long Class III railroad operating between Sayre in Bradford County, and Ludlowville, NY, the location of the Cargill Salt Mine. Given Sayre's location in northern Pennsylvania right along the New York border, only approximately 1 mile of the railroad is located in Pennsylvania. These operations occur over tracks leased from NS. Connections are available to NS in Sayre, as well as in Waverly, NY, to the north of Sayre. Key commodities transported include aggregates, coal, and plastics.

Pennsylvania Southwestern Railroad. The Pennsylvania Southwestern Railroad (PSWR) is a 12-mile-long Class III railroad primarily servicing the Allegheny Ludlum Steel Plant in Midland, Beaver County in western Pennsylvania. Connections are available to NS. While the plant itself remains open and operational as of late 2019, it has been at risk of closing in recent years due to the challenging operating environment for the steel industry.

3i

3i is a multi-national British private equity firm headquartered in London. 3i's business model consists of private equity, infrastructure, and corporate assets designed to deliver varying risk-adjusted returns on investments. While core asset holdings are focused on Europe and North America, 3i manages investments across the world. The company is publicly traded and listed on the London Stock Exchange, with a market capitalization of approximately $26 billion as of December 2019 (Bloomberg, n.d.e). In July 2019, 3i acquired Regional Rail, a short line operator of three railroads in Pennsylvania and New York. 3i has also indicated it will use this acquisition for potential additional rail investments. Two of them are in Pennsylvania (East Penn Railroad and Tyburn Railroad).

Photo: ESPN Railroad

East Penn Railroad. The East Penn Railroad (ESPN) is a 110-mile-long Class III railroad that operates throughout southeast Pennsylvania and has the following branches and subdivisions:

- York Branch: Connects York and points east in York County over NS-owned tracks

- Manheim Branch: Connects NS to the Ferrellgas facility in Manheim in Lancaster County
- Lancaster Northern Branch: Connects Ephrata and Sinking Spring in Lancaster and Berks Counties; between Sinking Spring and Reading, the ESPN also has trackage rights over NS-owned tracks
- Perkiomen Branch: Connects Pennsburg and Emmaus in Montgomery, Berks, and Lehigh Counties
- Quakertown Branch: Connects Quakertown and Telford in Bucks and Montgomery Counties over SEPTA-owned tracks; as a result, passenger service is also operated along this branch
- Bristol Branch: Connects an NS line and an industrial park in Bristol, outside of Philadelphia
- Northeast Philadelphia Branch: Connects the NS to the northeastern portion of Philadelphia
- Octoraro Branch: Connects Chadds Ford and Sylmar Junction along the Pennsylvania-Maryland border in Chester County
- Wilmington & Northern Branch: Connects Coatesville in Chester County and Wilmington in Delaware

Connections are available to CSX and NS.

Tyburn Railroad. The Tyburn Railroad (TYBR) is a 286k-compliant Class III railroad operating in Morrisville within Bucks County in eastern Pennsylvania. The railroad is 1.5 miles long and serves as a transloading facility for CSX and NS.

Class III Freight Railroads – Independently Owned

The following Class III freight railroads are independently owned and operated:

Allentown and Auburn Railroad. The Allentown and Auburn Railroad (ALLN) is a Class III railroad operating between Kutztown and Topton within Berks County in eastern Pennsylvania over tracks owned by the Kutztown Transportation Authority. Connections are available to the NS rail network at Topton. Key commodities transported include aggregates and retail distribution-related products. Tourism passenger excursions are also operated over the railroad.

Chestnut Ridge Railway. The Chestnut Ridge Railway (CHR) is a 5-mile-long Class III railroad operating between Palmerton and Little Gap in Carbon County. Connections are available to NS in Palmerton. Key commodities transported include aggregates, metals, and plastics.

Columbia and Reading Railway. The Columbia and Reading Railway (CORY) is a Class III railroad located in Columbia in Lancaster County. At 2.5 miles long, the railroad services some small industries in Columbia. At its eastern terminus, the CORY connects to NS.

Conrail Shared Assets. Conrail Shared Assets (CRCX), a switching and terminal railroad jointly owned by CSX and NS, operates the terminal areas of the formerly independent Conrail Class I railroad in the Detroit area of Michigan, across New Jersey, Staten Island (New York), and in southeastern Pennsylvania around Philadelphia. Consolidated Rail Corporation (Conrail) was created from seven bankrupt or financially distressed carriers in 1976 by the federal government and established as a for-profit Class I railroad in an effort to revitalize rail service in the Northeast and Midwest. The largest entity involved in the transaction was the Penn Central Railroad, itself established just 8 years earlier in a merger of the New York Central Railroad (NYC) and the Pennsylvania Railroad (PRR). In 1997, CSX and NS agreed to acquire Conrail and divide the assets according to a formula under which CSX essentially received the former NYC lines and NS received the former PRR lines making up Conrail's network. The creation of CRCX re-established a degree of competitive access in the tri-state region of New York, New Jersey, and Connecticut. CRCX, now acting as a switching and terminal railroad, operates more than 65 route miles in Pennsylvania consisting of the following segments:

- Fairless Hills – Morrisville: Services the Keystone Industrial Port Complex and the Morrisville area of Bucks County; connections are also available to the CSX and NS rail networks from Fairless Hills
- South Philadelphia: Services multiple yards and corridors in South Philadelphia along tracks owned by the Philadelphia Belt Line Railroad and Philadelphia Industrial Development Corporation
- Tacony – Port of Philadelphia – Nicetown Junction (Philadelphia): Services the northeast riverfront of Philadelphia, including the Port of Philadelphia; connections are also available to the CSX rail network
- SEPTA Corridors: Conrail has trackage rights on SEPTA's Chestnut Hill East and Chestnut Hill West regional rail lines, as well as on segments of the Airport Line
- Amtrak Northeast Corridor: Conrail has trackage rights on Amtrak's NEC from Philadelphia to the Pennsylvania-New Jersey border
- Holmesburg Junction – Bustleton (Philadelphia): Services Northeast Philadelphia along Philadelphia Industrial Development Corporation-owned tracks

- Southwest Philadelphia – Chester – Marcus Hook: Services the Southwest Philadelphia – Chester – Marcus Hook corridor along NS-owned tracks, including an industrial area to the north of Philadelphia International Airport; the portion of this corridor between 60th Street and 90th Street is owned by SEPTA
- South Philadelphia – Tinicum Township: Services industrial areas along the Delaware River between South Philadelphia and Tinicum Township, including areas adjacent to Philadelphia International Airport over NS-owned tracks

Key commodities transported include chemicals, food, metals, petroleum, retail distribution-related products, and timber and related products.

Delaware, Lackawaxen & Stourbridge Railroad. The Delaware, Lackawaxen & Stourbridge Railroad (DLS) is a 25-mile-long Class III railroad operating between Lackawaxen in Pike County and Honesdale in Wayne County. Although primarily a tourist carrier, the railroad is working to attract freight traffic, having operated special runs for potential freight customers in 2018. Key commodities transported include aggregates, agricultural products, and metals. Connections are available to the CNYK and NS.

East Broad Top Connecting Railroad. The East Broad Top Connecting Railroad (EBTC) is a 4-mile-long Class III railroad in Huntingdon County in central Pennsylvania, linking the NS in Mount Union with the Aughwick Creek viaduct. The railroad serves Riverview Industrial Park in Mount Union and features a connection to the 3-foot-gauge East Broad Top Railroad (EBT). The latter ceased freight operations in 1956 but was operated for tourism purposes until 2013. (See further discussion in the Discontinued Operations section.)

Elizabethtown Industrial Railroad. The Elizabethtown Industrial Railroad (EZR) is a Class III railroad located in Elizabethtown in Lancaster County. The railroad is 1 mile long. Connections are available to CSX and NS.

Everett Railroad. The Everett Railroad (EV) is a Class III railroad that connects Martinsburg and Hollidaysburg in Blair County and offers service on a branch line, owned by A.P. Green Industries Incorporated, connecting the East Freedom and Sproul areas of Blair County. The 286k-compliant railroad is 23 miles long and provides connections to NS in Hollidaysburg. The EV has trackage rights over NS in Hollidaysburg. Key commodities transported include aggregates, agricultural products, construction materials, and timber and related products. The railroad also operates excursion passenger service.

Landisville Railroad. The Landisville Railroad (LVR) is a Class III railroad located in Landisville in Lancaster County. The railroad is 1 mile long and provides connections to NS. Key commodities transported include aggregates and timber and related products.

Lehigh Railway. The Lehigh Railway (LRWY) is a Class III railroad operating over 56 route miles on track owned by NS. The railroad links Mehoopany in Wyoming County to the north of Wilkes-Barre to Athens in Bradford County. Connections are available to NS and Reading, Blue Mountain & Northern Railroad. Key commodities transported include aggregates, agricultural products, chemicals, and timber and related products.

Luzerne & Susquehanna Railroad. The Luzerne & Susquehanna Railroad (LS) is a Class III railroad operating in and around Wilkes-Barre in Luzerne and Lackawanna Counties in northeastern Pennsylvania. The 60 route-mile network consists of multiple branches:

- Ashley (Wilkes-Barre) – Pittston Branch: This branch services Wilkes-Barre and Pittston in Luzerne County over tracks owned by the Luzerne County Redevelopment Authority.
- Hillside Junction (Moosic) – Suscon Branch: This branch services Suscon in Luzerne County from Hillside Junction in Moosic, Lackawanna County along tracks owned by the Luzerne County Redevelopment Authority.
- Kingston – Pittston Branch: This branch serves the Kingston – Wyoming – Pittston corridor in Luzerne County over trackage owned by the Luzerne County Redevelopment Authority.
- Pittston – Little Virginia (Moosic) Branch: This branch serves the Pittston – Avoca – Moosic corridor in Luzerne and Lackawanna Counties.

Connections are available to NS and the Reading Blue Mountain & Northern Railroad. Key commodities transported include aggregates, chemicals, metals, and plastics, as well as industrial equipment.

Lehigh Valley Rail Management. Lehigh Valley Rail Management operates NS's Bethlehem Intermodal Yard and two Class III railroads in the Bethlehem (LVRB) and Johnstown (LVRJ) areas. The Bethlehem section is 4.5 miles long and serves multiple rail yards in Bethlehem with connections to NS. The Johnstown section is 19.1 miles long and services multiple facilities in the Johnstown area with connections to CSX and NS. Both sections are 286k compatible.

Middletown & Hummelstown Railroad. The Middletown & Hummelstown Railroad (MIDH) is a Class III railroad operating in and around Middletown in Dauphin County in south-central Pennsylvania. The railroad is 7 miles long and provides connections to

NS. Key commodities transported include agricultural products and plastics. MIDH also operates excursion passenger trains.

New Castle Industrial Railroad. The New Castle Industrial Railroad (NCIR) is a Class III railroad operating in and around New Castle in northwestern Pennsylvania. The railroad is 16 miles long and provides switching operations to local industries. NCIR offers connections to both CSX and NS. Key commodities transported include aggregates, chemicals, metals, and petroleum.

New Hope & Ivyland Railroad. The New Hope & Ivyland Railroad (NHRR) is a Class III railroad operating between New Hope and Warminster in Bucks County in eastern Pennsylvania. The 286k-compatible railroad is 19 miles long and provides connections to the Pennsylvania Northeastern Railroad at Warminster. Holiday and excursion passenger runs are operated over the northernmost segment of the railroad.

Northampton Development Center Railroad. The Northampton Development Center Railroad (NDCR) is a 1.2-mile-long Class III railroad servicing the Northampton Development Center in Northampton, including an on-site transloading facility. NDCR offers connections to NS. Aggregates are primarily transported along the railroad.

Oil Creek & Titusville Lines. The Oil Creek & Titusville Railroad (OCTL) is a Class III railroad operating between Oil City in Venango County and Titusville in Crawford County in western Pennsylvania. The railroad is 17 miles long and provides a link to the Western New York & Pennsylvania Railroad at Oil City. Key commodities transported have included aggregates, agricultural products, petroleum, plastics, and timber and related products. However, at present the railroad is primarily functioning as a tourist railroad. The Oil Creek & Titusville Railroad is owned by the Oil Creek Railway Historical Society.

Pennsylvania Northeastern Railroad. The Pennsylvania Northeastern Railroad (PN) is a Class III railroad operating largely on SEPTA-owned tracks in Philadelphia, Montgomery, and Bucks Counties in southeastern Pennsylvania. While chemical products are the top commodity transported, PN handles a variety of freight. The 286k-compliant railroad operates over 55.5 route miles and consists of the following branches:

- Tabor Junction (Philadelphia) – Quakertown: The main branch of the railroad in Philadelphia, Montgomery, and Bucks Counties, consisting of SEPTA-owned tracks
- Glenside – Warminster: SEPTA-owned tracks in Montgomery and Bucks Counties over which PN provides connections to the New Hope & Ivyland Railroad
- Lansdale – Doylestown: SEPTA-owned tracks in Montgomery and Bucks Counties

- Jenkintown – Neshaminy Falls: SEPTA-owned tracks in Montgomery and Bucks Counties with a connection to CSX

Reading Blue Mountain & Northern Railroad. The Reading Blue Mountain & Northern Railroad (RBMN) is a Class III railroad operating throughout eastern and central Pennsylvania. The railroad is 327 miles long and consists of multiple branches and segments:

- Main Line: The Main Line of the railroad services the Pittston – Jim Thorpe – Mahanoy City (East Mahanoy Junction) – Port Clinton – Reading corridor in Luzerne, Carbon, Schuylkill, and Berks Counties. Additional smaller branches serve Duryea Junction and Crestwood Industrial Park in Luzerne County, as well as Lehighton in Carbon County. The Main Line and its branch lines connect to NS at Reading, Temple, Penobscot, and Leighton. An 18-mile-long portion of the Main Line between Jim Thorpe and Hometown is owned by the Carbon County Railroad Commission.
- Towanda – Monroeton: This branch services Monroeton from Towanda in Bradford County from the Lehigh Railway's Scranton-Corning line over trackage owned by Shaffer's Feed Service Incorporated.
- Mehoopany – Pittston: This branch links Mehoopany – Pittston in Wyoming, Lackawanna, and Luzerne Counties. Service is provided by NS north of Mehoopany.

- Pittston – Scranton: From Pittston, this branch services multiple industrial parks and an intermodal terminal in Scranton. The RBMN also has trackage rights over NS-owned tracks in the Scranton area.
- Good Spring – Port Clinton: This branch serves the Good Spring – Port Clinton corridor in Schuylkill County.
- Westwood (Pottsville) – Minersville: This branch links Pottsville with Minersville in Schuylkill County.
- Schuylkill Haven – Middleport: This branch serves the Schuylkill Haven – Middleport corridor in Schuylkill County.
- Mount Carmel – East Mahanoy Junction: This branch connects Mount Carmel with East Mahanoy Junction in Northumberland and Schuylkill Counties. Additional smaller branches serve Shenandoah and the Morea Industrial Park in Schuylkill County.

Photo: Thomas J. Devaney

- East Mahanoy Junction – Hazleton: This route provides connections to several additional branches. These branch lines serve Delano and West Hazleton in Schuylkill County, and the Humboldt Industrial Park, Hazle Creek, and East Hazleton in Luzerne County. RBMN has trackage rights over NS-owned trackage between Hazleton and Penn Haven Junction in Lehigh Township.

Strasburg Rail. The Strasburg Railroad (SRC) is a Class III railroad operating between Strasburg and Leaman Place in Lancaster County. The railroad is 4.5 miles long and provides connections to NS. Tourism passenger excursions are also operated over the railroad.

Western New York & Pennsylvania Railroad. The Western New York & Pennsylvania Railroad (WNYP) is a Class III carrier operating over a former Erie Railroad main line in western Pennsylvania and western New York. While most of the 330-mile-long railroad is in New York, portions of the railroad are located in Pennsylvania, including a segment with its southern terminus in Rouseville in Venango County. From Rouseville, the

railroad serves Meadville, Union City, and Corry in Crawford and Erie Counties before continuing north into New York state toward Hornell. A branch connects Olean in New York with Emporium in Cameron County, and a smaller branch connects to the International Waxes production facility in Smethport in McKean County. These segments of the railroad operate on tracks owned by NS. The railroad is equipped with sidings through a transloading facility in Port Allegheny. Connections are available to the Buffalo & Pittsburgh Railroad, NS, and Oil Creek & Titusville Railroad. Key commodities transported include aggregates, coal, and chemicals, in addition to other commodities.

2.1.1.4 Rail Authorities

Public rail authorities are organizations that allow government to promote economic development by preserving rail service that may have otherwise been abandoned. Pennsylvania does not have any statewide rail authorities, but there are a handful of local and regional rail authorities. The two major regional freight rail authorities in Pennsylvania are the Pennsylvania Northeast Regional Railroad Authority and SEDA-COG.

2.1.1.4.1 Pennsylvania Northeast Regional Railroad Authority

The Pennsylvania Northeast Regional Railroad Authority (PNRRA) was created in 2006 with the goal of regionalizing the rail assets of northeastern Pennsylvania. PNRRA is a consolidation of two predecessor authorities: Lackawanna County Rail Authority and Monroe County Rail Authority. PNRRA owns approximately 100 miles of short line railroad stretching from Carbondale to Scranton and then turning southeast to East Stroudsburg and the Delaware Water Gap. PNRRA owns the rail assets and properties, while DLS Railroad provides freight services as the operator. The PNRRA aims to develop and expand industry along its regional rail network.

The PNRRA has also partnered with NJ Transit to restore passenger commuter service between Scranton, the Poconos, New Jersey (Hoboken), and New York City through the Lackawanna Cut-Off Passenger Rail Service Restoration Project. An Environmental Assessment was completed in 2006 by NJ Transit, and engineering work continued with the completion of an updated cost analysis that was funded with federal monies from the Appalachian Regional Commission (ARC). Engineering work on the corridor will continue as funding is allocated, and the first 7 miles of the project is under construction. However, as the project completion date is uncertain at this time, this project has been classified as a Vision project for the purposes of this Plan.

2.1.1.4.2 Susquehanna Economic Development Association – Council of Governments Joint Rail Authority

The SEDA-COG Joint Rail Authority was formed in 1983 and owns five short line railroads comprising 200 rail miles in central Pennsylvania. The SEDA-COG Joint Rail Authority works with a competitively selected operator to provide freight services. The Authority's mission is to preserve and foster rail service in central Pennsylvania and to further economic development through retention, improvement, and expansion of the infrastructure and the rail service it supports.

2.1.1.4.3 Minor Rail Authorities

The following entities are rail authorities with localized holdings. The track mileage owned/operated for each rail authority is noted below as well.

- Berks County Redevelopment Authority, 8.6 miles
- Cambria County Transit Authority, 0.7 mile
- Columbiana County Port Authority, 15.2 miles
- Kutztown Transportation Authority, 4.1 miles
- Letterkenny Industrial Development Authority, 25.0 miles
- Luzerne County Redevelopment Authority, 56.0 miles
- Port Authority of Allegheny County, 28.0 miles

2.1.1.5 Freight Traffic Profile

According to the U.S. Surface Transportation Board's (STB's) Confidential Carload Waybill Sample, approximately 193.6 million tons of goods in 4.9 million units were moved by rail in Pennsylvania in 2017 (STB, 2019a). Of these units, 63% were intermodal units and 37% were carloads.

As shown in Table 2-9, 25% of these flows (48 million tons) terminated in Pennsylvania, and 23% of flows originated in the state. Through movements accounted for 47% of all tons moved by rail, meaning that they neither originated nor terminated within the state, a reflection of Pennsylvania's importance as a gateway between the East Coast and the rest of the nation. The remaining 5% were local or intrastate flows, meaning that they began and ended their trips within Pennsylvania. Further details of Pennsylvania rail traffic, including commodities handled, can be found in Section 2.2, Trends and Forecasts.

Table 2-9: 2017 Pennsylvania Rail Flows by Movement Type and Rail Service Type

Movement	Rail Tonnage (millions)	Total Tons (%)	Carloads (in thousands)	Total Carloads (%)	Intermodal Units (in thousands)	Total Intermodal Units (%)
Through	91.4	47%	882.9	49%	1,837.8	59%
Inbound	48.0	25%	445.3	24%	707.7	23%
Outbound	45.4	23%	391.8.0	20%	550.0	18%
Intrastate	8.8	5%	90.2	5%	2.4	<1%
Total	**192.6**	**100%**	**1,795.6**	**100%**	**3,106.7**	**100%**

Source: STB (2019a)

2.1.1.6 Heritage and Tourist Railroads and Museums

Pennsylvania has 17 heritage and tourist railroads and railroad museums that provide riders and visitors an opportunity to experience what traveling by train was like in an age before air travel and interstate highways. These operations, both for-profit and not-for-profit, operate or display vintage rolling stock including steam, diesel-electric, and electric powered vehicles and passenger coaches that once ran on the general rail system or as trolleys and streetcars in cities. Located throughout the commonwealth, these railways and museums help to preserve railroad history and spur economic development by attracting tourism dollars.

2.1.1.6.1 Existing Operations

As of early 2020, the operations include:

- Bellefonte Historical Railroad in Bellefonte is operated by volunteers and welcomes visitors at various times throughout the year. A not-for-profit corporation, the railroad owns several historic pieces of rolling stock, including two Budd Rail Diesel Cars (self-propelled rail passenger cars), a wooden caboose and a snowplow on static display, and four speeder cars (railway maintenance vehicles). Tourist events include speeder rides during the summer, fall foliage viewing trips, and Santa Express rides in December. The railroad has about 1 mile of track.
- Colebrookdale Railroad in Boyertown offers 2-hour rides in vintage railcars. Trains are pulled by historic diesel-electric locomotives. Meals are served on the trains.
- Delaware, Lackawaxen, & Stourbridge Railroad in Honesdale offers seasonal excursion train service, marketed as the Stourbridge Line. Limited weekend service as well as community-related event trains are also offered from Presidents' day through the fall foliage season. Passengers ride in vintage coaches pulled by historic diesel-electric locomotives.

- East Broad Top Railroad, located in Rockhill Furnace, resumed operations in 2020 after having lain dormant since 2011. Trackage is now partially used by the Rockhill Trolley Museum. In February 2020, the railroad was acquired by the East Broad Top Foundation from the Kovalchick family, the EBT's long-time owner. At that time, plans were announced to rehabilitate 5 miles of track from Rockhill Furnace to the wye at Colgate Grove, and to restore locomotives and rolling stock to permit resumption of steam operations in 2021 (Cupper, 2020). Some public activities resumed during summer 2020 (East Broad Top, 2020).
- Everett Railroad in Duncansville offers weekend tourist rides between March and October, along with seasonal trains like the Easter Eggspress trains, Pumpkin Patch trains, the Santa Express, and special events trains. Rolling stock includes vintage coaches pulled by steam locomotives and historic diesel-electric locomotives.
- Lehigh Gorge Scenic Railway in Jim Thorpe offers trips on 8 miles of track along the Lehigh River and into Lehigh Gorge State Park with vintage railroad equipment pulled by diesel-electric locomotives.

Lehigh Gorge Scenic Railway
Photo: AECOM

- Middletown & Hummelstown Railroad in Middletown uses both steam and diesel-electric locomotives for passenger excursions. Vintage coaches date from the 1920s. Passengers board at the 1891-era freight station in Middletown for an 11-mile round-trip excursion along the Swatara Creek and Union Canal. A narrator relates the history of the canal and various spots along the trip. Special events include a murder mystery train and two holiday rides: A Ride the Train with Santa daytime ride and a Polar Express nighttime ride.
- New Hope & Ivyland Railroad, also known as the New Hope Railroad, offers excursions using both steam and diesel-electric locomotives out of New Hope. Trips are 45 to 50 minutes long, with a 90-minute trip to Buckingham on

weekends. The railroad mostly runs vintage former Reading Railroad passenger cars for excursions. Special events include the Grapevine Express, Sunday brunch and dinner trains, a murder mystery train, Fall Foliage trains, and the North Pole Express. The railroad owns 18 miles of track.

- Northern Central Railway is a not-for-profit, Civil War-themed heritage railroad based in New Freedom. A reproduction 4-4-0 steam locomotive hauls passengers over 10 miles of Northern Central Railway track between New Freedom and Hanover Junction. The railroad also operates a diesel-electric locomotive and restored passenger coaches. Themed event trains include the Eggspecially Fun Bunny Run, PA Cowboy Weekend, Ice Princess & Friends Express, and Santa Express.
- Oil Creek & Titusville Railroad in Titusville operates 3-hour excursion trips through historic oil country between June and October on 17 miles of track. Trains are pulled by diesel-electric locomotives as passengers ride in vintage coaches. There are numerous special event trains, including the Peter Cottontail Express, Father's day Special, a murder mystery train, October Fall Foliage trains, a Santa Train, and several others. The Oil Creek & Titusville Railroad is owned by the Oil Creek Railway Historical Society.
- Pennsylvania Trolley Museum in Washington is dedicated to the operation and preservation of streetcars and trolleys from Pennsylvania, as well as from Toledo, New Orleans, and elsewhere. Many of the vehicles have been restored to operating condition. The museum is open weekends during the spring and fall and Tuesday through Sunday during the summer. It is closed on Mondays. Trolleys run on 2 miles of track with loops at both ends. Special events include a Bunny Trolley, a Pumpkin Patch Trolley, and a Santa Trolley, among other rides.
- Railroad Museum of Pennsylvania in Strasburg has more than 100 historic locomotives and railroad cars on display that chronicle American railroad history. Many of the locomotives and cars are part of the historical collection of the former Pennsylvania Railroad. The museum is open year-round, but closed on New Year's Day, Easter Sunday, Christmas, and Thanksgiving. While there are multiple events held through the year, the events take place at the museum rather than on train rides.
- Railways to Yesterday / Rockhill Trolley Museum in Rockhill Furnace is dedicated to the operation and preservation of streetcars and trolleys. Besides trolleys, its collection includes the Liberty Liner, an electric multiple-unit interurban passenger trainset formerly operated by the Philadelphia Suburban Transportation. The museum is open Saturdays and Sundays between Memorial day weekend and

October. Special events include a Pumpkin Patch Trolley, a Terror Trolley, a Polar Bear Express, and Santa's Trolley, among others, that run on 3 miles of track.

- Steamtown National Historic Site (Steamtown NHS) is a railroad museum and heritage railroad in downtown Scranton at the site of the former Scranton yards of the Delaware, Lackawanna and Western Railroad. The museum is home to multiple working steam locomotives and other vintage rolling stock, illustrative of American industrial history. Steamtown NHS is open year-round, and train excursions are available on a seasonal basis. Several special event trains are offered as well.
- Tioga Central Railroad in Wellsboro is a heritage railroad operating on a section of the Wellsboro & Corning Railroad. From June to October, it runs excursions on 34 miles of track north from Wellsboro to Gang Mills, NY. The railroad offers rides in vintage passenger coaches pulled by vintage American Locomotive Company (ALCO) diesel-electric locomotives.
- Wanamaker, Kempton & Southern Railroad, a privately owned heritage railroad company in Kempton, operates tourist trains on about 3 miles of track between Kempton and Wanamaker. Trains operate on weekends between May and November using either diesel-electric or steam engines. There are special event trains as well, including the Santa Claus Special. The railroad is also known as the Hawk Mountain Line, given its proximity to the Hawk Mountain range.
- West Chester Railroad is a privately owned and operated tourist railroad that runs between Market Street in West Chester and the village of Glen Mills. The railroad offers a variety of 90-minute train trips throughout the year on 8 miles of former Pennsylvania Railroad track. It is operated by volunteers. Special event trains include the Christmas Tree Train and Santa's Express.

2.1.1.6.2 Discontinued Operations

In addition, Pennsylvania was home to two heritage / tourist railroads which in recent years have ceased operations in recent years. These are:

- Kiski Junction Railroad (KJRR) in Schenley. This railroad operated scenic tourist trains from June through October, with special holiday-themed rides. However, the tourist operations ceased in 2016. All freight operations have also ceased, as service across the bridge over the Allegheny River has been embargoed. Additionally, all freight business from KJRR's only former freight customer (a former coal mine) has ceased due to closure of the mine's operations.

- Gettysburg Scenic Railway in Gettysburg was also operated as the Pioneer Lines Scenic Railway. The route crosses the Gettysburg battlefields. When operating, the railroad ran a variety of vintage railway equipment. Operations ceased in 2014.

2.1.1.7 Railbanking, Rail Trails, and Rails with Trails

2.1.1.7.1 Decline in Railroad Route Miles

After rising dramatically through the 19th century, railroad mileage in Pennsylvania and throughout the nation has been on a steady decline after peaking in the early 20th century. In 1828, there were 9 miles of railroad in Pennsylvania, and by 1920, almost 12,000 route railroad miles existed. Today, there are about 5,100 miles of rail.

The loss of almost 7,000 route miles in Pennsylvania was largely a product of the rail line abandonment process overseen by the STB. Railroads typically abandon a line if it becomes unprofitable to operate. For example, if the line no longer carries adequate freight volume, due to a decline in shipping activity or traffic reroutes, the operating railroad may cease operations and petition the STB for permission to abandon the line. If the STB concurs with the railroad, the line can be abandoned and the railroad can sell the line, if it owns it fee simple. Otherwise, the ownership of the land may revert to the original underlying landowner, who can sell or develop the land as desired.

Factors that historically drove many railroads to abandon lines included the rise of air travel and the growth of the interstate highway system, both of which influenced passenger and freight rail services. Freight railroads in large part were relieved of the burden of intercity passenger rail operations with the passage of the Rail Passenger Service Act in 1970 and the creation of Amtrak. Furthermore, the large freight railroads have reinvented themselves with:

- The deployment of new cost saving technologies such as unit trains and intermodal operations (trailers and containers on flatcars[5]), which require fewer crew members, less car handling, and lower expenses;
- Operating strategies such as developing busy interstate rail corridors like the CSX National Gateway corridor for consolidating traffic and minimizing costs; and
- Spin-off of secondary and branch line operations to regional and short line operators who can provide freight rail services more profitably.

[5] Trailer on flatcar is often abbreviated TOFC, and container on flatcar handling is often abbreviated COFC. Also, containers are commonly loaded into articulated double-stack cars in which one container is placed on top of the other.

At the same time, commuter rail services like SEPTA and NJ Transit and intercity services sponsored by states like the Keystone Corridor have expanded. As a result, the significant decline of route miles has subsided.

2.1.1.7.2 Railbanking

Not all underutilized or inactive track is abandoned and sold. Established in 1983 as an amendment to Section 8(d) of the National Trails System Act, railbanking provides a means through which a former rail line can be converted for trail use. Specifically, it is a voluntary agreement between a railroad company and a trail agency to use an out-of-service rail corridor as a trail while providing the railroad the right to reinstate rail service on the corridor in the future. According to the Rails-to-Trails Conservancy, this interim trail use of railbanked corridors has preserved thousands of miles of rail corridors throughout the country that would otherwise have been formally abandoned through the STB.

Undeveloped railbanked corridors in Pennsylvania, as of early 2020, include the following:

- Knox & Kane Rail Trail: 69 miles of railbanked line in Clarion, Elk, Forest, and McKean Counties
- Latrobe Industrial Track: 2.4 miles of railbanked line in Westmoreland County
- Borough of Bridgeport to Upper Merrion Township: 2 miles of railbanked line in Montgomery County

In effect, railbanking precludes abandonment and its potential adverse consequences. It can ensure that an inactive rail right-of-way, which could otherwise be abandoned and developed, is preserved indefinitely for future rail transportation. The STB ruled that, as of February 2020, the timeline to negotiate and implement a railbanking agreement will be limited in most cases to a maximum of 4 years.

In all, there are nearly 300 miles of railbanked corridors in Pennsylvania. Most of these have been developed as open rail trails.

2.1.1.7.3 Rail Trails and Rails-with-Trails

A rail trail is a former rail right-of-way, or a portion thereof, converted into a multi-use pathway suitable for walking, cycling, and sometimes horseback riding or even snowmobiling. Typically, rail trails are flat and long and run through historical areas, making them popular with users.

Rail trails can also refer to multi-use pathways located alongside an active rail line. These facilities are known as rails-with-trails. They require an agreement with the operating railroad if the pathway is located on railroad-owned land.

According to the Rails-to-Trails Conservancy, there are 186 rail trails in Pennsylvania totaling 2,099 miles. There are another 677 miles of potential rail trails in Pennsylvania as well as 60 ongoing rail trail projects. A total of 26 rail trails contain a portion of rails-with-trails segments as listed in Table 2-10.

Table 2-10: Open Rails-with-Trails in Pennsylvania

Trail	County	Total Trail Miles	Rails-with-Trail Miles
Great Allegheny Passage	Allegany, Allegheny, Fayette, Somerset, Westmoreland	150	24.2
Stavich Bicycle Trail	Lawrence, Mahoning	10	9
Arboretum Trail	Allegheny	0.8	0.8
Beaver River Trail	Beaver	1	0.33
Bristol Spurline Park	Bucks	2.5	0.43
Chester Valley Trail	Chester, Montgomery	14.8	0.2
Clarion-Little Toby Trail	Elk, Jefferson	18	2.75
Coal & Coke Trail	Westmoreland	6.1	1.9
Cynwyd Heritage Trail	Montgomery	1.8	0.35
D&L Trail	Bucks, Carbon, Lehigh, Luzerne, Northampton	142.2	16
Enola Low Grade Trail	Chester, Lancaster	28.9	6.64
Five Star Trail	Westmoreland	7.8	4.75
Gurney Street Trail	Philadelphia	0.13	0.13
Heritage Rail Trail County Park	York	25.5	20.2
Hoodlebug Trail	Indiana	11.3	0.75
Luzerne County National Recreation Trail	Luzerne	1.8	1.6
McClintock Trail	Venango	9.4	1.9
Montour Trail	Allegheny, Washington	61.5	3.5
Neversink Connector Trail	Berks	1.2	0.2
Northwest Lancaster County River Trail	Lancaster	14.1	5
Oil City Trail	Venango	3	0.74
Pine Creek Rail Trail	Lycoming, Tioga	62	0.8
Schuylkill River Trail	Berks, Chester, Montgomery, Philadelphia, Schuylkill	71.7	10.9
Susquehanna Bikeway	Lycoming	3.2	0.75
Susquehanna River Walk & Timber Trail	Lycoming	4.2	2.15
Three Rivers Heritage Trail	Allegheny	20.5	8.3

Source: Rails-to-Trails Conservancy, January 2020

2.1.2 Stations, Terminals, and Intermodal Connections

Pennsylvania freight facilities are grouped into the following categories: Class I Intermodal Terminals, Transload Facilities, Seaports, Airports, Pipelines, and Major Passenger Stations. These are detailed below.

2.1.2.1 Class I Intermodal Terminals

Figure 2-7 shows the intermodal terminals that facilitate the movement of containerized cargo from one mode to another. Key intermodal terminals servicing CSX and NS are identified below. CN, the third Class I railroad with operations in Pennsylvania, does not operate any intermodal terminals within the commonwealth.[6]

Figure 2-7: Key intermodal terminals serving CSX and NS (FRA, 2019)

2.1.2.1.1 CSX Intermodal Terminals

Three CSX intermodal terminals operate in Pennsylvania. These facilities are located within and adjacent to the three major metropolitan centers of Philadelphia, Harrisburg, and Pittsburgh (CSX, n.d.).

[6] Information on Class I intermodal terminals was retrieved from CSX (n.d.), NS (2020a), (PennDOT (2015), PennDOT (2016), and otherwise as indicated.

- Chambersburg Yard: Operated by CSX, Chambersburg Yard is an 85-acre intermodal terminal supporting rail-to-truck transfers in south-central Pennsylvania along the I-81 corridor.
- Philadelphia Greenwich Yard: Operated by CSX, Philadelphia's Greenwich Yard is a major intermodal terminal adjacent to the Packer Avenue Marine Terminal of the Port of Philadelphia. The terminal supports rail-to-truck transfers, as well as rail-to-vessel transfers via the seaport. The terminal includes 18,000 feet of loading tracks, 2,000 truck parking spaces, and 30,000 feet of supporting tracks.
- Pittsburgh Intermodal Rail Terminal: In addition to the two active terminals, CSX also operated the Pittsburgh Intermodal Rail Terminal. Opened in 2017 and closed in May 2020, the 70-acre facility was constructed on the site of a former Pittsburgh & Lake Erie Rail Yard in Stowe Township west of Pittsburgh. Although developed as part of CSX's National Gateway Initiative to develop a network of double-stack cleared rail and intermodal terminals, a changing market strategy and insufficient traffic volumes resulted in its closure. At present, the terminal is being leased to Shell for freight car storage (Stephens, 2020).

2.1.2.1.2 Norfolk Southern Intermodal Terminals

Seven NS intermodal terminals operate in Pennsylvania. These facilities are located in the following regions and cities: Lehigh Valley, Southeast Pennsylvania/Philadelphia, Harrisburg, Pittsburgh, and Scranton (NS, 2020a).

- Bethlehem Yard: Operated by Lehigh Valley Rail Management for NS, the Bethlehem Yard is a 108-acre intermodal terminal supporting rail-to-truck transfers in the Lehigh Valley region of eastern Pennsylvania. Rail service is provided to Chicago, Kansas City, Los Angeles, Rossville (Tennessee), and St. Louis. Transloading capabilities are also available at the facility.
- Greencastle Intermodal Yard: Operated by NS, the Greencastle Intermodal Yard is a 200-acre intermodal terminal located to the south of Chambersburg in south central Pennsylvania. Opened in 2013, the terminal supports rail-to-truck transfers and serves as a gateway to the mid-Atlantic along the NS rail network. Transloading capabilities are also available at the facility.
  - In early 2019, NS announced that it was halting operations at the facility for at least 1 year. This decision may be attributed to lower-than-expected traffic at the facility as well as an internal assessment and reshuffling of operations. As of late 2019, the facility was not in operation (Nowell, 2019).

- Harrisburg Intermodal Yard: Operated by NS, the Harrisburg Intermodal Yard is an intermodal terminal located at the north end of Harrisburg in central Pennsylvania. Rail-to-truck transfers are supported, and rail service is provided to Chicago, Kansas City, Norfolk, and St. Louis.
- Morrisville Yard: Privately operated for NS, the Morrisville Yard is an intermodal terminal located in Morrisville in southeastern Pennsylvania, across the Delaware River from Trenton, NJ. Rail-to-truck transfers are supported, and rail service is provided to Chicago, Kansas City, Los Angeles, Rossville (Tennessee), and St. Louis. Transloading capabilities are also available at the facility.
- Rutherford Yard – Harrisburg: Operated by NS, the Rutherford Yard is located to the east of Harrisburg in south central Pennsylvania. The terminal supports rail-to-truck transfers and provides rail service to Atlanta, Birmingham, Chicago, Dallas, Jacksonville, and Rossville (Tennessee).
- Pitcairn Yard – Pittsburgh: Privately operated for NS, the Pitcairn Yard is the railroad's Pittsburgh terminal. Rail-to-truck transfers are supported, and rail service is provided to Bayonne (NJ), Chicago, Elizabeth (NJ), and New York City.
- Taylor Yard – Scranton: Operated by NS, the Taylor Yard is located to the south of Scranton in northeastern Pennsylvania. The terminal supports rail-to-truck transfers and provides rail service to Chicago. Transloading capabilities are also available at the facility as of 2017 through NS Thoroughbred Bulk Transfer Terminal operations.

2.1.2.2 Class I Transload Facilities

Transloading entails transferring the goods being shipped between transportation conveyances, rather than transferring the container holding the freight from one mode to the other, as is done with containers and highway trailers. Publicly advertised transload facilities affiliated with CSX and NS, along with those served by other carriers, are identified below.[7]

2.1.2.2.1 CSX

The following CSX rail-to-truck transloading facilities operate in Pennsylvania, in addition to those intermodal terminals listed above with transloading capabilities. All four CSX transloading facilities are operated by TRANSFLO, a subsidiary of CSX (TRANSFLO, 2020).

[7] Information on Class I transload facilities was retrieved from TRANSFLO (2020), NS (2020b), PennDOT (2015), (PennDOT (2016), and as otherwise indicated.

- Butler TRANSFLO Facility: The Butler transloading facility is located in western Pennsylvania between Pittsburgh and Erie. Transloading services are offered for dry bulk, food grade, and liquid commodities. The facility is also capable of processing hazardous materials.
- Chester TRANSFLO Facility: The Chester transloading facility is located in southeastern Pennsylvania between Philadelphia and Wilmington. Transloading services are offered for dry bulk, food grade, and liquid commodities. The facility is also capable of processing hazardous materials.
- Philadelphia TRANSFLO Facility: The Philadelphia transloading facility is located along the Schuylkill River to the south of downtown Philadelphia. Transloading services are offered for dry bulk, food grade, and liquid commodities. The facility is also capable of processing hazardous materials.
- Pittsburgh TRANSFLO Facility: The Pittsburgh transloading facility is located along the Monongahela River to the southeast of downtown Pittsburgh. Transloading services are offered for dry bulk, food grade, and liquid commodities. The facility is also capable of processing hazardous materials.

Norfolk Southern

The following NS transloading facilities operate in Pennsylvania, in addition to those intermodal terminals listed above (NS, 2020b):

- Pittsburgh Thoroughbred Bulk Transfer Terminal: Operated by NS, the Pittsburgh transloading facility is located to the west of downtown Pittsburgh. Transloading services are offered for dry bulk, food grade, and liquid commodities. The facility is also capable of processing hazardous materials.
- Pottstown Thoroughbred Bulk Transfer Terminal: Operated by NS, the Pottstown transloading facility is located in southeastern Pennsylvania to the northwest of Philadelphia. Transloading services are offered for dry bulk, food grade, and liquid commodities. The facility is also capable of processing hazardous materials.

2.1.2.3 Other Transload Facilities

In addition to the transload facilities with Class I railroad affiliations, public transload facilities operated by other parties can be found throughout Pennsylvania. These are listed in Appendix C by county and city, along with relevant information on operations, commodities handled, and special services.

As development of a transload facility typically does not constitute a major investment, one can spring up virtually overnight, only to disappear in a similarly quick fashion when

it fails to meet a market need. All that is required for a transload facility is adequate land with direct rail and highway (and sometimes water) access. Since railroads are subject to federal regulation as interstate carriers, local permitting and approvals are minimal or non-existent for many applications. Thus, the operational transload facilities are in a constant state of change. Those listed in Appendix C were in operation as of the writing of this report.

2.1.2.3.1 Military Strategic Rail Corridor Network: STRACNET

The Department of Defense's Railroads for National Defense Program (RND) has identified more than 36,000 miles of key railroad corridors as being vital for the movement of military supplies and personnel. The STRACNET corridors in Pennsylvania, including their connections, are illustrated in Figure 2-8.

Figure 2-8: STRACNET routes (FRA, 2019)

2.1.2.4 Seaports

Pennsylvania has three major water ports. These are located along the Delaware River in the Philadelphia-Camden-Wilmington Metropolitan Area, within the Greater Pittsburgh Region, and in Erie. Collectively, these facilities comprise an important component of

the commonwealth's freight system and play an especially important role in providing cost-effective global market access in conjunction with freight rail.[8]

2.1.2.4.1 Port of Philadelphia

Located along the Delaware River, the Port of Philadelphia consists of multiple private and public terminals in and around Philadelphia. The Port of Philadelphia's significance can be attributed to a number of economic and geographic factors. Philadelphia is in the middle of the Boston – Washington DC Northeast Corridor, and the Philadelphia Metropolitan Region is one of the largest and wealthiest in the U.S. At the local scale, the Port of Philadelphia provides immediate access to I-95 and I-76, both of which provide access to key markets along the East Coast and points west.

The publicly operated facilities comprising the Port of Philadelphia are referred to as PhilaPort and are managed by the Philadelphia Regional Port Authority. These facilities are primarily located within Philadelphia to the east of the central business district. In 2018, PhilaPort handled more than 26 million tons of cargo, making it the 25th busiest port in the U.S. and 6th largest along the East Coast by tonnage. The port is also the 4th largest gateway to the U.S. for imported goods by value. Additional information on PhilaPort's facilities is provided in the following subsections. In addition to the public PhilaPort facilities, there are a number of privately owned and operated facilities that are located within the Port of Philadelphia complex. See Table 2-11.

Table 2-11: Port of Philadelphia Private Terminal Operators

Operator	Facility	Address
Agway Inc.	Pier 122 South	3501 South Columbus Boulevard, Philadelphia
Kinder Morgan	Tioga Liquid Bulk Terminal	Delaware & Allegheny Avenues, Philadelphia
Kinder Morgan	Fairless Hills Terminal	1 Sinter Road, Fairless Hills
Penn Terminals, Inc.	Eddystone Terminal	1 Saville Avenue, Eddystone
Riverside Construction Materials Inc.	7900 North Radcliffe Street	7900 North Radcliffe Street, Bristol
Contanda Terminals Philadelphia	2900 East Allegheny Avenue	2900 East Allegheny Avenue, Philadelphia

Source: PhilaPort (2016)

[8] Information on Pennsylvania water ports was retrieved from the websites of each port authority and supplemented by information from PennDOT (2015) and PennDOT (2016). Additional sources are included as referenced. Information on annual cargo tonnage was retrieved from the American Association of Port Authorities (AAPA; n.d.).

2.1.2.4.2 Operations and Infrastructure

PhilaPort owns 13 terminal facilities that are leased out to various operators. These are as follows:

- Tioga Marine Terminal: This is the largest marine terminal, consisting of six berths. The terminal handles a wide variety of cargo and has loading platforms for 100 trucks and on-site transfer capabilities for CSX and NS rail services.
- Tioga Liquid Bulk Terminal: This terminal consists of two berths handling chemicals and liquid bulk products.
- 3200 Tioga: This inland facility provides metal recycling and processing.
- Philadelphia Forest Products Center (Piers 80N and 80S): This facility consists of six berths and on-site warehousing providing storage and handling capabilities for forestry products. The terminal also has loading platforms for 74 trucks and on-site transfer capabilities for CSX and NS rail services.
- Pier 82: This terminal consists of two berths handling temperature-controlled products, including 112 refrigerated cargo plugs for refrigerated containers. The pier has loading platforms for 16 trucks and on-site transfer capabilities for CSX and NS rail services.
- Pier 84: This terminal consists of one berth handling internationally grown cocoa imports. The pier has loading platforms for 40 trucks and on-site transfer capabilities for CSX and NS rail services.
- Piers 98 and 100: Portions of Piers 98 and 100 are used for marine-related storage.
- Packer Avenue Marine Terminal: This is a major marine terminal consisting of six berths and seven ship-to-shore cranes. The terminal primarily handles automobiles and containers and has loading platforms for 130 trucks. Transfer capabilities for CSX and NS rail services are located within 1.5 miles of the terminal.
- Philadelphia Auto Processing Facility (Pier 98 Annex): This is a vehicle processing center with on-site transfer capabilities for CSX and NS rail services.
- Pier 122S: This pier consists of one berth handling automobiles. The pier has on-site transfer capabilities for CSX and NS rail services.
- Pier 124S: This pier consists of one berth handling liquid bulk cargo.

- Southport Marine Terminal Complex: This is a 100,000-square-foot vehicle processing facility that officially opened in October 2019. The entire complex consists of 155 acres and includes two car washes.
- Philadelphia Wholesale Produce Market: This temperature-controlled produce terminal provides 686,000 square feet of refrigerated storage and handling capabilities.

Table 2-12 shows the current terminal operators for the public facilities at the Port.

Table 2-12: Port of Philadelphia Public Terminal Operators

Operator	Facility	Address
Delaware River Stevedores	Tioga Marine Terminal	3461 North Delaware Avenue, Philadelphia
Kinder Morgan	Tioga Liquid Bulk Terminal	3301 N. Delaware Avenue, Philadelphia
Camden Iron and Metal	3200 N Tioga	3200 Tioga Street, Philadelphia
Penn Warehousing & Distribution	Philadelphia Forest Products Center (Piers 38/40)	800 South Columbus Boulevard, Philadelphia
Penn Warehousing & Distribution	Philadelphia Forest Products Center (Piers 78/80)	1989 South Columbus Boulevard, Philadelphia
Horizon Stevedoring	Pier 82	2201 South Columbus Boulevard, Philadelphia
Dependable Distribution Services	Pier 84	2401 South Columbus Boulevard, Philadelphia
Astro Holdings, LLC	Piers 98/100	N/A
Greenwich Terminals, LLC	Packer Avenue Marine Terminal	3501 South Columbus Boulevard, Philadelphia
Glovis	Southport Terminal Complex	3501 S. Columbus Boulevard Philadelphia,
T. Parker Host/Eco Energy	Pier 122	3501 South Columbus Boulevard, Philadelphia
T. Parker Host/Eco Energy	Pier 124	3601 South Columbus Boulevard, Philadelphia
Philadelphia Wholesale Produce Market	Philadelphia Wholesale Produce Market	6700 Essington Avenue, Philadelphia

Source: PhilaPort (2016)

Rail Connections

The Tioga Marine Terminal, Philadelphia Forest Product Center, Packer Avenue Marine Terminal, Philadelphia Auto Processing Facility, and Piers 82, 84, and 122S have on-site connections to the two large eastern Class I railroads, CSX and NS.

Mustin Yard

Operated by NS, the Mustin Yard is an intermodal terminal located on the site of Philadelphia's former Naval Yard, adjacent to PhilaPort. The yard is currently utilized by NS for domestic car moves to the Southport Marine Terminal Complex at PhilaPort.

Expansion and Future Plans

As reported in the 2015 *Pennsylvania State Rail Plan*, the U.S. Army Corps of Engineers undertook a channel deepening project along the Delaware River between the Port of Philadelphia and the Delaware Bay. The project has deepened the main channel to 45 feet, allowing for the 14,000 TEU capacity of larger post-Panamax ships.

In 2018, PhilaPort released its *Port Development Plan* as the next phase beyond the Delaware River channel deepening. This second phase consists of a $293 million investment plan to double container and automobile throughput and increase breakbulk volume by 21% through infrastructure upgrades (Philadelphia Regional Port Authority, n.d.).

Most recently in late 2019, PhilaPort opened the $110 million Southport Auto Terminal at the Southport Marine Terminal Complex at the south end of the Port of Philadelphia. The Southport Auto Terminal is the Port of Philadelphia's first new port terminal in 45 years, driven by expected increased demand for foreign vehicles across the United States. The new facility, managed by Glovis America, consists of 155 acres and increases the daily vehicle-processing capacity of the Port of Philadelphia from 600 to 1,000. The facility is directly served by CSX and NS.

In addition, PhilaPort submitted a statement of qualifications in late 2019 to develop the Navy Yards Logistics Center in the 97-acre Mustin District, on the site that formerly housed the Mustin Field Naval Air Station. PhilaPort's plans for the site include three facilities totaling 1.5 million square feet, which would consist of warehousing and office space.

Port of Pittsburgh

The Port of Pittsburgh (also referred to as the Pittsburgh Port District) serves the Greater Pittsburgh Region, Pennsylvania's second largest population and economic center, and is the largest port in western Pennsylvania. Rather than a single location, the Port of Pittsburgh refers to approximately 200 miles of navigable waterways in southwestern Pennsylvania, along with a corresponding network of more than 200 intermodal and transloading terminal and processing facilities. These waterways include the Monongahela River from Pittsburgh to the West Virginia border, the Ohio River from Pittsburgh to the Ohio border, and the Allegheny River from Pittsburgh north to Clarion

and Butler Counties. In 2018, Port of Pittsburgh facilities handled more than 21 million tons of cargo, making the conglomerate the 33rd busiest port overall and 5th busiest inland port in the U.S.

Operations and Infrastructure

The Pittsburgh Port District is supported by the Port of Pittsburgh Commission. The Commission aggregates and provides information about available facilities and services, riverfront and adjacent real estate availability, and relevant funding and incentive programs. In all, the Pittsburgh Port District consists of barge industry suppliers and more than 200 river terminals, including 20 major river terminals with cranes supporting between 50 and 150 tons. Many of the facilities within the Pittsburgh Port District service industry-specific operations, including operations related to timber, metals, chemicals, and energy.

Rail Connections

CN (operating the Bessemer & Lake Erie Railroad), CSX, and NS serve a number of facilities within the Pittsburgh Port District. Class II railroads servicing the District include the Buffalo & Pittsburgh Railroad and Wheeling & Lake Erie Railway. Class III railroads serving the Pittsburgh Port District include the Aliquippa & Ohio River Railroad; Pittsburgh, Allegheny, & McKees Rocks Railroad; Pittsburgh & Ohio Central Railroad; and Union Railroad.

Expansion and Future Plans

Accessing a network of intermodal and transloading facilities operating across three navigable rivers, the port's barge traffic is made possible through a series of locks and dams operated by the U.S. Army Corps of Engineers. According to PennDOT's *2016 Comprehensive Freight Movement Plan* (PennDOT, 2016 a), 17 locks in the Pittsburgh Port District have exceeded their useful life and require replacement. Future plans will likely consist of incrementally replacing these locks and dams. Future plans will likely also include dredging necessary to maintain river widths of at least 300 feet and depths of at least 9 feet to accommodate commercial navigation. As of 2019, there are no plans to increase these widths or depths throughout the Pittsburgh Port District.

2.1.2.4.3 Erie – Western Pennsylvania Port Authority (Port of Erie)

The Erie – Western Pennsylvania Port Authority's Port of Erie, located on Lake Erie, serves the Erie Metropolitan Region, home to Pennsylvania's 4th largest city. In 2019, the Port of Erie handled approximately 695,000 tons. Much of the cargo at the Port of Erie consists of aggregates; manufactured machinery inbound to or outbound from nearby producers including the Erie Sand and Gravel, Wabtec Transportation, and

Donjon Shipbuilding and Repair; project cargo such as windmill parts; and generators for the Pennsylvania Shell ethylene cracker plant. Access to international markets from the Port of Erie is via Lake Ontario and the St. Lawrence Seaway.

Rail Connections

The Port of Erie is accessible from the CSX and NS rail networks operating through Erie County. As noted in PennDOT's *2016 Comprehensive Freight Movement Plan* (PennDOT, 2016 a) and as originally reported in Erie County's *2040 Long Range Transportation Plan,* rail infrastructure at the port consists of only a single track and an obsolete siding and includes no tail track (ERPC, 2015). It is unknown whether any upgrades have been made since the County's plan was originally published.

Expansion and Future Plans

The Port Authority is currently in the permitting process to mitigate approximately 10 acres of wetlands adjacent to the terminal. This land will eventually be used to expand the port in upcoming years.

2.1.2.5 Commercial Airports

There are 127 public airports in Pennsylvania (PennDOT, 2020 a), including 14 commercial airports (FAA, 2020). Further, there are three major airport facilities that are classified by the Federal Aviation Administration (FAA) as hub facilities: (1) Pittsburgh International Airport (medium hub), (2) Harrisburg International Airport (small hub), and (3) Philadelphia International Airport (large hub) (FAA, 2020). There is also a smaller airport, Lehigh Valley International Airport. Currently, direct rail connection is available only at the Philadelphia International Airport; however, the commonwealth's primary airports are potential assets to complement existing rail services and should be considered in future plans of rail service expansion. Each of the four airports described below is in the top 100 domestic airports based on landed tonnage.

2.1.2.5.1 Philadelphia International Airport

Geography

Philadelphia International Airport (PHL) serves the Philadelphia metropolitan region and is located approximately 7 miles southwest of downtown Philadelphia along I-95.

About the Airport

PHL serves 31.7 million passengers annually (PHL, n.d.), making it the 20th busiest airport in the U.S. (PennDOT, 2020 a). The airport has seven terminals and 126 gates and handled nearly 380,000 takeoffs and landings in 2018 (FAA, 2020). It is also the

17th busiest airport by freight volume (FAA, 2019a), transporting more than 550,000 tons of cargo and mail in 2018. PHL experienced a 15% increase in cargo movement from 2017 to 2018 (FAA, 2020).

Rail Connection

SEPTA provides passenger rail service between Center City Philadelphia and PHL via its Airport Regional Rail Line. Additional connections can be made to Amtrak and NJ Transit lines at 30th Street Station. While CSX and NS make limited trips along SEPTA's Airport Regional Rail Line, there is no direct rail freight connection at PHL.

Future Plans

PHL is in the midst of a Capital Development Program (CDP) focused on modernizing the airport complex to improve customer experience, operations, maintenance, and security. The CDP includes major improvements to runways, taxiways, terminal design, and infrastructure.

In 2018, PHL acquired the Henderson Tract, a 135-acre plot of land west of the passenger terminals. PHL plans to convert this tract into the New West Cargo City Development Area with a state-of-the-art 2-million-square-foot cargo handling facility.

2.1.2.5.2 Pittsburgh International Airport

Geography

Pittsburgh International Airport (PIT) is located approximately 20 miles northwest of the City of Pittsburgh. The airport is strategically located on I-376, which provides accessibility to a number of key economic centers within a 500-mile radius in the central and northeast sections of the nation. This location makes the airport an optimal hub for suppliers and distributors throughout the region.

About the Airport

PIT, ranked as the 45th busiest airport (PennDOT, 2020 a), possesses four terminals and 89 gates, and served 9.66 million passengers in 2018, a 7.5% increase from 2017 (Allegheny County Airport Authority, n.d.). PIT is also ranked 46th in cargo tonnage (FAA, 2019a), totaling approximately 78,000 tons in 2018 (Allegheny County Airport Authority, n.d.). In addition, PIT recently added international cargo flights to its services (FAA, 2019b).

Rail Connection

There are currently no direct passenger or freight rail connections to the airport. Freight rail is available along the Ohio River, approximately 5 miles east of the airport.

Future Plans

PIT is working to implement its Terminal Modernization Program. PIT was originally built as a hub facility; however, the airport facilities have not kept up with changing demands. It is much too large in some areas while being capacity-constrained in others. The modernization plan involves a new 51-gate landside terminal to be located adjacent to the renovated airside terminal. The terminal will open in 2023.

2.1.2.5.3 Harrisburg International Airport

Geography

Harrisburg International Airport (MDT) is located in central Pennsylvania, approximately 10 miles southeast of the City of Harrisburg. The airport is adjacent to the Susquehanna River and in close proximity to I-76 (the Pennsylvania Turnpike), I-81, and I-83. MDT is within 125 miles of other larger airports, including Philadelphia International Airport, Baltimore/Washington International Thurgood Marshall Airport, and Washington Dulles International Airport.

About the Airport

The airport is currently owned and operated by the Susquehanna Area Regional Airport Authority and contains three terminals with 12 gates. MDT is the 3rd largest airport in Pennsylvania but is ranked 112th nationwide (PennDOT, 2020 a). Approximately 1.3 million passengers were served at MDT in 2018 (HIA, n.d.). MDT also offers cargo shipping services. At approximately 57,000 tons of total cargo tonnage for 2018 (HIA, n.d.), MDT ranked 64th nationwide as a cargo airport (FAA, 2019a).

Rail

Although an existing rail line actively used by passenger (Amtrak) and freight (NS) operators is located along the northern edge of MDT, no direct rail connections are currently in place. Nevertheless, rail access is relatively close. MDT is located 2 miles from the Middletown Amtrak station and within 15 minutes of the downtown Harrisburg Amtrak station, both on the Keystone route. A new Middletown Amtrak station is currently under construction. Upon completion, the relocated station will be less than 1 mile from MDT. In addition, there are two major intermodal facilities in Harrisburg.

Future Plans

The Susquehanna Area Regional Airport Authority has a Master Plan in place for MDT that provides guidance for the continued improvement of MDT through 2035. The MDT Master Plan proposes utilization of vacant land and buildings, development of cargo and Air National Guard areas, and other airport capital improvements (SARAA, 2016).

2.1.2.5.4 Lehigh Valley International Airport

Geography

Lehigh Valley International Airport (ABE) is located 2 miles northwest of Bethlehem.

About the Airport

Passenger service is available at the airport to a small number of cities in the eastern United States. In 2018, ABE's freight division landed approximately 340,000 tons of cargo, making it the 40th busiest airport in the U.S. for freight operations. Regularly scheduled freight service is operated to and from select cities in the United States, principally by the integrated carriers UPS and FedEx.

Rail

ABE itself is not directly serviced by rail, although NS operates within a few miles of the airport.

Future Plans

In 2019, ABE was awarded more than $20 million in federal grants to support runway improvements, pavement rehabilitations, and other infrastructure improvements.

2.1.2.6 Pipelines

Pipelines are primarily used to transport oil and gas. As of 2018, there were approximately 79,000 miles of pipeline operating throughout Pennsylvania. These pipelines are located throughout the commonwealth but are especially prevalent throughout northern and western Pennsylvania where shale levels are thickest. Use of pipelines has increased significantly since 2000, as natural gas drilling in the Marcellus, Utica, and Upper Devonian Shale regions (encompassing all but southeastern Pennsylvania) has boomed. That drilling and associated pipeline volume is expected to increase in the near future. From these regions, oil and gas are transported to refining and processing complexes. In southeastern Pennsylvania, there are at least three of these facilities: Philadelphia Energy Solutions Refining Complex, Marcus Hook Industrial Complex, and the Trainer Refinery Complex.

Transloading between rail and pipeline is an important operation, in view of the characteristics of the commodities transported. In Pennsylvania, these operations occur throughout much of the commonwealth, given the wide spatial distribution of freight railroads operating in and through shale-drilling regions. The Eddystone Rail Facility, located to the south of Philadelphia and served by Conrail, additionally acts as a key trans-shipment facility within the statewide and national supply chain of oil and gas. The

facility connects the rail network to barges serving refineries in Pennsylvania and New Jersey along the Delaware River.

Overall, PennDOT has limited oversight of Pennsylvania's pipelines, which are regulated at the federal level by the Pipeline and Hazardous Materials Safety Administration (PHMSA). Pennsylvania's Pipeline Infrastructure Task Force is responsible for examining the permitting process, planning, and best practices related to pipeline development.

2.1.2.7 Major Passenger Stations

Both Amtrak's and SEPTA's major stations facilitate intermodal connections with local bus and light rail transit options. The following lists major stations for Amtrak and SEPTA and their corresponding ridership.

2.1.2.7.1 Amtrak Ridership and Stations

Amtrak serves 24 stations within the state of Pennsylvania. The highest ridership of the 24 stations is found at Philadelphia's 30th Street Station, with 4.5 million boardings and alightings in FFY 2019, nearly 68% of the total ridership in the commonwealth. North Philadelphia had the lowest ridership in FFY 2019, with 1,968 boardings and alightings. Total boardings and alightings for all 24 stations for FFY 2019 were 6.67 million. Table 2-13 shows the total annual combined boardings and alightings for each station for FFY 2009 and FFY 2019 as well as the growth over that 10-year period.

30th Street Station
Photo: AECOM

Table 2-13: Amtrak Ridership and Service by Station, FFY 2009 and 2019

Code	Station	FFY 2009	FFY 2019	Total Growth
PHN	North Philadelphia	254	1,968	675%
EXT	Exton	72,914	146,468	101%
PAO	Paoli	138,817	258,231	86%
DOW	Downingtown	51,822	81,342	57%
ARD	Ardmore	47,775	68,629	44%
COT	Coatesville	12,597	14,915	18%
PHL	Philadelphia 30th Street	3,675,761	4,506,952	23%
ERI	Erie	12,668	15,573	23%
MID	Middletown	58,453	67,733	16%
LNC	Lancaster	492,629	577,506	17%
HGD	Huntingdon	5,187	5,722	10%
ELT	Elizabethtown	95,173	100,519	6%
GNB	Greensburg	12,393	12,645	2%
PGH	Pittsburgh	135,642	129,946	–4%
COV	Connellsville	4,481	4,864	9%
PAR	Parkesburg	45,233	46,669	3%
JST	Johnstown	20,485	18,848	–8%
LAB	Latrobe	4,224	4,523	7%
HAR	Harrisburg	539,167	521,043	–3%
LEW	Lewistown	10,118	8,249	–18%
MJY	Mount Joy	56,796	47,964	–16%
TYR	Tyrone	3,573	2,588	–28%
ALT	Altoona	26,669	18,689	–30%
CWH	Cornwells Heights	5,860	3,103	–47%

Source: Amtrak(2009); RPA (2020)

Table 2-14 shows the total daily service offered at each station. Daily frequencies range from 105 trains per day at Philadelphia's 30th Street Station, making it the busiest station in Pennsylvania for both passengers and trains, to two trains per day (i.e., the Pennsylvanian, at stations west of Harrisburg, except for Pittsburgh). Stations on the Keystone route fall in the middle of the range of service offered, with frequencies ranging from 26 to 29 trains per day (in both directions).

Table 2-14: Amtrak Daily Weekday Service by Station, FY 2019

Code	Station Name	Amtrak Service	Trains per Day
ALT	Altoona	Pennsylvanian	2
ARD	Ardmore	Keystone	14
COT	Coatesville	Keystone	15
COV	Connellsville	Capitol Limited	2
CWH	Cornwells Heights	Northeast Regional, Keystone	4
DOW	Downingtown	Keystone	22
ELT	Elizabethtown	Keystone, Pennsylvanian	28
ERI	Erie	Lake Shore Limited	2
EXT	Exton	Keystone, Pennsylvanian	26
GNB	Greensburg	Pennsylvanian	2
HAR	Harrisburg	Keystone, Pennsylvanian	29
HGD	Huntingdon	Pennsylvanian	2
JST	Johnstown	Pennsylvanian	2
LNC	Lancaster	Keystone, Pennsylvanian	28
LAB	Latrobe	Pennsylvanian	2
LEW	Lewistown	Pennsylvanian	2
MID	Middletown	Keystone	23
MJY	Mount Joy	Keystone	18
PAO	Paoli	Keystone, Pennsylvanian	28
PAR	Parkesburg	Keystone	20
PHL	Philadelphia 30th Street	Acela, Northeast Regional, Keystone, Pennsylvanian and other medium and long-distance Trains(1)	105
PHN	North Philadelphia	Northeast Regional, Keystone	5
PGH	Pittsburgh	Capitol Limited, Pennsylvanian	4
TYR	Tyrone	Pennsylvanian	2

Source: Amtrak (n.d. a)

(1) Multi-state medium and long-distance service includes the Carolinian, Vermonter, Crescent, Palmetto, Silver Star, and Silver Meteor

Table 2-15 shows the characteristics of the Pennsylvania Amtrak stations, including location type, transit connections, parking availability, and non-motorized transportation access (i.e., bicycle racks and/or bicycle boxes).

Table 2-15: Amtrak Station Characteristics

Code	Station Name	Location Type	Transit Connections	Parking Availability	Bicycle Access
ALT	Altoona	Rural	Local transit, intercity bus	Paid	No
ARD	Ardmore	Suburban	Local transit	88 paid spaces	No
COT	Coatesville	Suburban	Local transit	38 paid spaces off-site	No
COV	Connellsville	Rural	No	Paid	No
CWH	Cornwells Heights	Suburban	Local transit	1,929 paid spaces	Yes
DOW	Downingtown	Suburban	Local transit	125 paid spaces	Yes
ELT	Elizabethtown	Suburban	Local transit	120 free space	Yes
ERI	Erie	Rural	Local transit	Paid	No
EXT	Exton	Suburban	Local transit	424 paid spaces	No
GNB	Greensburg	Rural	Local transit	Paid	No
HAR	Harrisburg	Urban	Local transit, intercity bus	710 paid spaces	Yes
HGD	Huntingdon	Rural	No	No	No
JST	Johnstown	Rural	Local transit	Paid	No
LNC	Lancaster	Urban	Local transit	80 paid spaces, limited 30-min free parking	Yes
LAB	Latrobe	Rural	Local transit	Paid	No
LEW	Lewistown	Rural	No	Paid	No
MID	Middletown	Suburban	Local transit	75 free spaces	No
MJY	Mount Joy	Suburban	Local transit	85 free spaces	No
PAO	Paoli	Suburban	Local transit	529 paid spaces	Yes
PAR	Parkesburg	Suburban	Local transit	40 free spaces	No
PHL	Philadelphia 30th Street	Urban	Local transit, intercity bus	1,855 paid spaces	Yes
PHN	North Philadelphia	Urban	Local transit	100 paid	No
PGH	Pittsburgh	Urban	Local transit, proximity to intercity bus	991 paid spaces	No
TYR	Tyrone	Rural	No	Paid	No

Sources: PennDOT (2020); Amtrak (2020a)

2.1.2.7.2 SEPTA Ridership and Stations

Boarding and alighting information for SEPTA's top 10 major stations in SFY 2018 are listed in Table 2-16. The stations in Table 2-16 are the top 10 stations in the system in ridership. The four airport terminal stops are counted as one station in the SRP.

Table 2-16: SEPTA Major Station Average Weekday Boardings and Alightings, FY 2018

Major Station	Boardings	Alightings	Line
Suburban Station(1)	25,062	25,062	All
Jefferson Station(1)	12,122	12,122	All except Cynwyd
30th Street Station(1)	9,920	9,920	All
Temple University Station	3,191	2,682	All except Cynwyd
Penn Medicine Station	2,605	2,518	Airport, Media/Elwyn, Wilmington/Newark
Airport Terminal A	400	486	Airport
Airport Terminal B	425	387	Airport
Airport Terminals C & D	418	359	Airport
Airport Terminals E & F	388	289	Airport
Cornwells Heights	1,505	1,394	Trenton
Fox Chase	1,446	1,091	Trenton
Lansdale Station	1,424	1,153	Lansdale/Doylestown
Jenkintown-Wyncote Station	1,246	1,702	Lansdale/Doylestown, Warminster, West Trenton

Source: SEPTA (2019)

(1) SEPTA reports the boardings and alightings as being the same for these three stations. Due to passenger volume, boardings and alightings cannot be conducted on a train-by-train basis. Therefore, passenger counts are conducted in one direction only, with the premise that the daily number of people entering the city will equal those leaving the city.

2.1.2.7.3 Major Stations

Suburban Station

Suburban Station is the busiest station in the SEPTA Regional Rail System, as it serves all 13 Regional Rail Lines. In addition to Regional Rail station stops, it also provides access to the Market-Frankford and Broad Street subway lines, 12 bus routes, and 5 trolley routes.

The station concourse connects to an underground network, with the Regional Rail platforms one level below. SEPTA ticket sales offices, restaurants, and retail shops are located on the first level, as are connections to other SEPTA stations and several Center City buildings. The station is fully ADA accessible with elevators and escalators to access the Regional Rail platforms. There is no SEPTA-operated vehicle parking available, but on-street parking and private parking garages are in the vicinity of the station. There are bicycle racks available at the station in addition to numerous bicycle racks at street level within a few blocks of the station.

Jefferson Station

Jefferson Station is used by all but one (Cynwyd Line) of the Regional Rail lines with connections to the Market-Frankford subway line, the Broad-Ridge subway spur, and 10 bus routes. Like Suburban Station, Jefferson Station is connected to the underground pedestrian network that allows access to the Philadelphia Convention Center and the Fashion District in Philadelphia. There are two SEPTA ticket sales offices with waiting areas. This station does not have parking affiliated with it, but on-street parking and private garages are available in the area for passenger use. On-street non-SEPTA bicycle parking is available. The station is ADA accessible, with platform access by elevator, escalator, or stairs.

30th Street Station

30th Street Station is located in the University City neighborhood of Philadelphia and provides access to both West Philadelphia and Center City. Built during the Great Depression, this station was once used as the headquarters of the Pennsylvania Railroad and is listed on the National Register of Historic Places.

This station is a transportation hub used by all 13 Regional Rail lines, SEPTA's Market-Frankford line, nine SEPTA bus routes, the Loop Through University City (LUCY), five SEPTA trolley routes, and NJ Transit's Atlantic City Line. It provides access to intercity bus carriers Megabus and BoltBus. In addition, 30th Street Station is a major hub for Amtrak, serving as a key point of passenger embarkation/disembarkation for trains operating on the Northeast and Keystone Corridors as well as for trains in Acela Express, Cardinal, Carolinian, Crescent, Silver Service/Palmetto, Pennsylvanian, and Vermonter routes service.

The station is connected to the Cira Centre, a 29-story office high-rise building. It has a large enclosed concourse/waiting area that includes SEPTA, Amtrak, and NJ Transit ticket offices and a number of dining options and services located within the station. There are three elevated Regional Rail platforms and six below-grade platforms for Amtrak and NJ Transit passenger access. Bicycle racks are located directly outside the station. Amtrak owns and operates a parking garage, located adjacent to the station, with 2,100 parking spaces. Rental car and car share options are available in the controlled-access parking lot.

Temple University Station

The Temple University Station is located at the eastern edge of Temple University, offering access to the college campus, North Philadelphia, and Center City. It serves all but one (the Cynwyd Line) of the 13 Regional Rail lines. There are no direct connections to other transit services, but three SEPTA bus routes stop approximately

two blocks from the station. The station has a ticket office. There is no parking available, but there are bicycle racks. This station is ADA accessible.

Penn Medicine Station

Penn Medicine Station (formerly known as University City Station), located in the University City neighborhood of Philadelphia, provides good access to the University of Pennsylvania and the Children's Hospital of Pennsylvania. It is served by three Regional Rail lines, including the Airport Line, Wilmington/Newark Line, and the Media/Elwyn Line. The station also provides access to four SEPTA bus routes (30, 40, 42, and 49) as well as the LUCY. There is a ticket office located inside the station. There is no parking available, but there are bicycle racks. This station is ADA accessible.

SEPTA Airport Terminal Stations

Transit service to the Philadelphia International Airport is provided by the SEPTA Regional Rail Airport Line. This line includes four stations that connect to the six terminals at the airport. The stations are located at Terminal A, Terminal B, Terminals C and D, and Terminals E and F. The Terminals E and F station is the terminus of the Airport Regional Rail line. All stations are surface-level sheltered island platforms with the exception of the Terminal E and F station, which operates as a side platform. There are no ticket offices located at the airport terminal stations.

The stations are all ADA accessible, with stairs, escalators, and elevators connecting the stations to the terminal sky bridge and the terminals' baggage claim areas. All four terminals are also served by three SEPTA bus routes (37, 108, and 115) as well as private shuttle services. Vehicle parking is provided through Philadelphia International Airport, with more than 19,000 parking spaces available in garages, short-term surface lots, and economy lots. There is no bicycle parking available at any terminal station.

Cornwells Heights Station

The Cornwells Heights Station is located in the Cornwells Heights neighborhood of Bensalem Township, Bucks County, northeast of Philadelphia. This station is served by the SEPTA Trenton Line, as well as Amtrak's Keystone and Northeast Regional trains. SEPTA bus routes 78 and 133 are also accessible from this station. The station has a waiting room where passengers may purchase tickets. There is a 1,600-space park-and-ride lot owned by PennDOT and a SEPTA-owned lot with over 300 spaces. The park-and-ride lot, which is the largest in the SEPTA system, has easy access to I-95. The station is ADA accessible. Bicycle racks are available.

Fox Chase Station

The Fox Chase Station, the terminus of the Fox Chase Line, is located in the Fox Chase neighborhood of Philadelphia. It is also served by SEPTA bus routes 18, 24, and 28. Non-SEPTA parking and bicycle racks are available. The station is ADA accessible, and there is a ticket office.

Lansdale Station

The Lansdale Station is located in downtown Lansdale Borough, Montgomery County. It is approximately 34 miles northwest of Center City Philadelphia. The station is served by the Lansdale/Doylestown Regional Rail Line and is accessible to SEPTA bus routes 96 and 132. SEPTA operates a surface lot at the station with 178 spaces and a parking garage with 660 spaces. The abundant parking and easy access from surrounding municipalities make the station a popular stop in Montgomery County. There are also bicycle racks located around the station. Built in 1902, the historic station includes a waiting area, restrooms, and a ticket office.

Jenkintown-Wyncote Station

The Jenkintown-Wyncote Station is located on the border of Jenkintown Borough and the Wyncote neighborhood of Cheltenham Township, Montgomery County. It is served by four lines, including the Airport, Warminster, West Trenton, and Lansdale/Doylestown lines, as well as SEPTA bus route 77. The current station building was built in 1932 and is listed on the National Register of Historic Places. The station currently has two low-level side platforms with a tunnel connecting them. There are currently 97 permit-only spaces and 492 SEPTA parking spaces at this station. Bicycle racks are located at this station.

2.1.3 Passenger Rail Service Objectives

This section lays out the service objectives of Amtrak and SEPTA for intercity and commuter operations on the general railway system in Pennsylvania.

2.1.3.1 Amtrak Intercity Passenger Rail Service Objectives

2.1.3.1.1 Northeast Corridor

In its *Amtrak Five Year Service Line Plans (FY 2020–2024)* (Amtrak, 2019d), Amtrak lays out its key business drivers (i.e., its FFY 2019–2024 service objectives) for its high-speed Acela and Northeast Regional (NER) trains. These objectives are set forth in Table 2-17.

Table 2-17: Northeast Corridor Key Business Drivers

Business Drivers	FFY 2018 Actual	FFY 2024 Goal
Ticket Revenue	$1.242 billion	$1.613 billion
Ridership	12.1 million	14.3 million
Customer Service Index	Acela: 73.8% NER: 76.5%	Acela: 86.4% NER: 87.8%
Initial Terminal Performance (ITP)	Acela: 96% NER: 95%	Acela: 97% NER: 97%
On-time Performance (OTP)	80%	90%
Revenue per Available Seat Mile	$0.3745	$0.4824
Cost per Available Seat Mile	$0.2249	$0.3199
Passenger Miles	$1,990 million	$2,344 million
Average Load Factor	56.6%	67.7%
Cost Recovery	167%	150%

Source: Amtrak (2019d)

Amtrak anticipates that NEC revenues will grow 5% and ridership will grow 18% over the period. Amtrak expects that riders will be more pleased with improvements in service overall, as indicated by the increasing Customer Satisfaction Index (CSI) score, that are expected to result from planned investments in rolling stock upgrades, new food and beverage products, improved on-board announcements, etc.

On the operating side, Initial Terminal Performance (ITP), an index of how well crews get trainsets to the platform and ready for an on-time departure, is expected to improve slightly to 97%. However, at stations along the route, OTP is anticipated to jump noticeably from 80% to 90%.

Financially, the forecasts will be brighter as well. Revenues per seat will go up, while costs per seat will decrease. Also, train passenger travel is projected to increase significantly. Passenger miles, which measure, on average, how far a rider is traveling, will rise over the 5 years as will load factors, measures of how full the trains are. Lastly, revenues will still exceed operating cost by a wide margin in 2024, albeit by not as much as in 2018.

Underlying these service objectives are various improvements to Amtrak trains and infrastructure, which are discussed fully in Chapter 3.

2.1.3.1.2 Keystone Corridor

Amtrak is looking for similar financial and operating performance improvements for its two state-supported operations (the Keystone and the Pennsylvanian). Specific improvements planned for the Keystone Corridor are identified in Chapter 3.

Independent of Amtrak, PennDOT has been focused on improvements within the corridor as well. Such improvements include ADA compliance upgrades and multimodal connectivity at stations along the route. Furthermore, in its 2015 *Pennsylvania State Rail Plan*, PennDOT articulated longer-term objectives of increasing speeds and reducing run time on the corridor.

2.1.3.1.3 Long-Distance Trains

As noted earlier in the chapter, Amtrak operates multiple long-distance trains in Pennsylvania. These trains are operated and financed by Amtrak alone. These include east-west trains: the Lake Shore Limited, the Cardinal, and Capitol Limited; and, north-south trains along the Northeast Corridor: the Silver Star, the Silver Meteor, the Carolinian, the Crescent, the Vermonter, and the Palmetto. For these services, Amtrak also expects increasing ridership and revenue, improving customer satisfaction scores and operating performance, and higher cost recovery. No specific service improvements are anticipated for the long-distance trains.

2.1.3.1.4 SEPTA Commuter Rail Service Objectives

SEPTA Service Standards and Process 2019 (SEPTA, 2019d) identifies several service objectives designed to shape the development of commuter rail services. The objectives include coverages and access, span of service, and frequency.

Coverages and Access

SEPTA considers a station to be well – served (coverage) and accessible if customers:

- Walk up to ¼ mile to a station from home or from a transit stop; or
- Drive to, or are dropped off at, a station that is 5 miles or less from home.

Span of Service

Service begins early in the morning and ends in the late evening at many stations across the SEPTA system. For example, Suburban Station's first arrival and departure is at 7:00 a.m. with the last arrival and departure at 11:00 p.m.

Frequency

SEPTA has also established minimum service frequencies by type of service: peak and off-peak. Weekday peak period commute frequency is every 30 minutes, while off-peak frequency is every 60 minutes. On Saturdays, train frequency is every 60 minutes, while on Sundays, frequency is every 90 minutes.

2.1.3.1.5 On-Time Performance

The OTP goal for SEPTA Regional Rail Service is 90%, with two exceptions:

- Trains marked with a "D" at a certain station in the public timetable can depart that station earlier than the time indicated in the schedule
- Express trains with limited stops may arrive ahead of schedule at the final destination

2.1.3.1.6 Train Loadings

SEPTA's goal is to provide a seat for each passenger who rides Regional Rail. However, at times there will be standees, most frequently during peak commute times. Standees are permitted inside the cars. The maximum number of seats per car for the various Regional Rail vehicle types is noted in Table 2-18.

Table 2-18: Seats on SEPTA Regional Rail Cars

Vehicle Type	Available Seats
Silverliner IV	120
Silverliner V	107-109
Push-Pull Commuter	118-131

Source: SEPTA (2019d)

2.1.3.1.7 Rail Station Amenities

SEPTA has specific requirements for amenities at SEPTA Regional Rail stations that are owned and operated by SEPTA that meet a 500-plus boarding/alighting weekday minimum for passengers traveling in the peak direction. These amenities are:

- Sheltered waiting area
- Benches
- Customer information, including maps and schedule information, etc.
- Escalators and/or elevators at major transportation centers

2.1.3.1.8 Fare-Sales Coverage

SEPTA provides ticket offices at SEPTA Regional Rail stations that are owned and operated by SEPTA and that meet a 500-plus boarding/alighting weekday minimum for passengers traveling in the peak direction.

2.1.4 Performance Evaluation of Intercity Passenger Services

The performance of intercity and commuter passenger services for both Amtrak and SEPTA are evaluated based on financial and operating measures as well as on-time performance. FRA has established specific metrics and standards for both categories which include the following:

- Financial and operating measures:
  - Farebox recovery by route: Percentage of fully allocated operating cost covered by passenger-related revenue
  - Number of passenger-miles per train-mile by route: Represents how full and well-utilized each train is
- OTP measures:
  - Change in effective speed: Represents the impact of delays on meeting the published schedule travel times
  - Percentage of trains with on-time endpoint arrival: Measures the overall delay on the route and how well it recovers from intermediate delays
  - Percent on-time arrival for all stations served: Measures the effectiveness of the trains in keeping to the schedule throughout the route

2.1.4.1 Financial and Operating Measures

Table 2-19 shows the farebox recovery, an indication of how well passenger-related revenue covers operating costs, for Amtrak routes that travel through and within Pennsylvania. Two sets of figures are shown, one that includes state subsidies and one that excludes state subsidies. For both sets of figures, there were a total of five routes that covered an increased percentage of operating costs, three routes that covered the same percentage of operating costs, and five routes that covered a decreased percentage of operating costs. The Northeast Regional and Acela Express routes are the only two routes that fully cover their operating costs with passenger-related revenue. The Keystone Service has decreased its farebox recovery in the last reporting period, with a current rate of 86% including state revenue. Table 2-20 shows the operating ratio for each SEPTA Regional Rail Line.

Table 2-19: Percentage of Fully Allocated Operating Costs Covered by Passenger-Related Revenue

Service	Including State Revenue			Excluding State Revenue		
	July 2016 – June 2018	July 2017 – June 2019	Percent Difference	July 2016 – June 2018	July 2017 – June 2019	Percent Difference
Acela Express						
Acela Express	190%	192%	1.05%	190%	192%	1.05%
Other NEC Corridor Routes						
Keystone Service	90%	86%	–4.44%	78%	79%	1.28%
Northeast Regional	140%	141%	0.71%	140%	141%	0.71%
Non-NEC Corridor Routes / Long Distance Routes						
Capitol Limited	43%	43%	0.00%	43%	43%	0.00%
Carolinian	114%	116%	1.75%	95%	94%	–1.05%
Pennsylvanian	82%	81%	–1.22%	73%	70%	–4.11%
Vermonter	108%	103%	–4.63%	68%	64%	–5.88%
Cardinal	33%	32%	–3.03%	33%	32%	–3.03%
Crescent	43%	44%	2.33%	43%	44%	2.33%
Lake Shore Limited	45%	45%	0.00%	45%	45%	0.00%
Palmetto	87%	81%	–6.90%	87%	81%	–6.90%
Silver Meteor	51%	51%	0.00%	51%	51%	0.00%
Silver Star	48%	51%	6.25%	48%	51%	6.25%

Source: FRA (2019)

Table 2-20: SEPTA Regional Operating Ratio by Line, FY 2019

Line	Operating Ratio	On-Time Performance
Paoli/Thorndale	40%	80%
Lansdale/Doylestown	48%	85%
Media/Elwyn	45%	85%
Trenton	34%	82%
West Trenton	43%	88%
Wilmington/Newark	25%	85%
Manayunk/Norristown	58%	82%
Warminster	35%	96%
Airport	15%	96%
Chestnut Hill West	30%	87%
Fox Chase	34%	93%
Chestnut Hill East	17%	90%
Cynwyd	26%	92%

Sources: Operating ratio and On-time performance from SEPTA (n.d. a)

The second metric, passenger miles per train mile, is shown for Amtrak routes in Table 2-21. All long-distance routes had a decrease in passenger miles per train mile. The largest increase was on the Northeast Regional service, with a 2.92% increase, with the largest decrease (–6.36%) on the Palmetto.

Table 2-21: Passenger Miles per Train Mile for Amtrak

Service	July 2016 – June 2018 (miles)	July 2017 – June 2019 (miles)	Percent Difference
Acela Express			
Acela Express	189	190	0.53%
Other NEC Corridor Routes			
Keystone Service	158	161	1.90%
Northeast Regional	240	247	2.92%
Non-NEC Corridor Routes / Long Distance Routes			
Capitol Limited	181	172	–4.97%
Carolinian	224	216	–3.57%
Pennsylvanian	203	199	–1.97%
Vermonter	145	145	0.00%
Cardinal	117	112	–4.27%
Crescent	136	134	–1.47%
Lake Shore Limited	203	191	–5.91%
Palmetto	173	162	–6.36%
Silver Meteor	202	198	–1.98%
Silver Star	164	160	–2.44%

Source: FRA (2019)

Passenger miles per vehicle mile for the SEPTA Regional Rail System is shown in Table 2-22. Passenger miles are slightly down, and vehicle miles are slightly up, decreasing the ratio of passenger miles per train mile.

Table 2-22: SEPTA Regional Rail Passenger Miles per Vehicle Mile

	SFY 2018	SFY 2019	Percent Difference
Passenger Miles	467,232,100	461,582,000	99%
Vehicle Miles	21,148,200	21,290,155	101%
Ratio	22.1	21.7	98%

Sources: SEPTA (2018); SEPTA (2019b)

2.1.4.2 On-Time Performance

The PRIIA standards for OTP include three factors: (1) change in effective speed, (2) percent on-time endpoint arrival, and (3) percent on-time arrival for all stations served.

For all routes, effective speed is to be no worse than the baseline year, FFY 2008. The PRIIA Metrics and Standards target a quarterly effective speed that is the same or better than what was recorded for FFY 2008.

End-point delay tolerance for Amtrak trains varies by length, ranging from 10 minutes for routes up to 250 miles to 30 minutes for long-distance routes of more than 550 miles. The tolerances also vary based on the route time and year of service, with Acela having a standard of 90 to 95% depending on the year, other NEC routes ranging from 85 to 90%, and all other routes having a standard of 80 to 85%.

Table 2-23 details the results of each of the three OTP tests in the latest available report (3rd quarter FFY 2019) for the Amtrak lines that provide service within Pennsylvania. The majority of non-NEC routes met the standard for Test #1 for effective speed increases but failed on Tests #2 and #3 for OTP. Exceptions to this include the Capitol Limited and the Vermonter, which both met all three standards. Acela, NEC, and Keystone services failed to meet the standard for the effective speed change but met the standards for both OTP tests.

Table 2-23: PRIIA On-Time Performance, FFY 2019

Service	Test 1[(1)]	Test 2[(2)]	Test 3[(3)]
Acela Express			
Standard	>=0	90.0%	90.0%
Acela Express	–4.2	90.2%	90.7%
Other NEC Corridor Routes			
Standard	>=0	85.0%	85.0%
Keystone Service	–2.1	89.9%	95.1%
Northeast Regional	–2.0	86.0%	88.1%
Non-NEC Corridor Routes / Long-Distance Routes			
Standard	>=0	80.0%	80.0%
Capitol Limited	1.6	89.3%	89.2%
Carolinian	–0.6	60.4%	61.3%
Pennsylvanian	–1.1	60.4%	59.9%
Vermonter	3.5	92.9%	80.3%
Cardinal	0.5	47.4%	51.6%
Crescent	–2.8	16.5%	29.1%
Lake Shore Limited	0.3	61.5%	48.4%
Palmetto	0.0	52.2%	58.0%
Silver Meteor	0.5	46.7%	47.9%
Silver Star	–0.1	33.5%	35.9%

Source: FRA (2019)

(1) Test 1: Change in Effective Speed from FFY 2008 Baseline (mph) FFY 2018 4th quarter (Q4) to FY 2019 3rd quarter (Q3)

(2) Test 2: Endpoint OTP FFY 2019 Q3

(3) Test 3: All-Stations OTP FFY 2019 Q3

2.1.4.3 Train Delays

Delays for Amtrak routes can be separated into two categories: (1) issues caused by host railroads and (2) issues caused by Amtrak. These categories assist in the analysis of OTP of Amtrak service, which can be affected by both kinds of problems. The delay codes, explanations used by Amtrak, are shown in Table 2-24, grouped by the responsible party.

Table 2-24: Delay Codes and Explanations for Delays

Responsible Party	Delay Code	Explanation
Host railroad	CTI	Delays for meeting or following commuter trains
	DCS	Signal failure or other signal delays, wayside defect detector false alarms, defective road crossing protection, efficiency tests, drawbridge stuck open
	DMW	Maintenance-of-way delays including holds for track repairs or MW foreman to clear
	DSR	Temporary slow orders, except for heat or cold orders
	DTR	Delays from detours
	FTI	Delays from freight trains
	PBB	Scheduled bridge and building maintenance
	PET	Scheduled catenary or other electrical work
	PSC	Scheduled communications and signal work
	PSR	Scheduled speed restrictions
	PTI	Delays for meeting or following other passenger trains
	RTE	Routing-dispatching delays including diversions, late track bulletins, etc.
Amtrak	ADA	All delays related to disabled passengers, wheelchair lifts, guide dogs, etc.
	CAR	Car Failure
	ENG	Mechanical failure on engines
	HLD	All delays related to passengers, checked baggage, large groups, etc.
	OTH	Lost-on-run, heavy trains, unable to make normal speed, etc.
	SVS	Servicing Delays
	SYS	Delays related to crews including lateness, lone-engineer delays
	SMW	Scheduled Maintenance of Way work

Source: FRA (2019)

The largest host-responsible causes for delay are attributed to freight train interference, commuter train interference, and slow order delays. Host-responsible delays for off-NEC lines are detailed in Table 2-25. The Amtrak-caused delays are driven by factors such as passenger-related delays, scheduled maintenance work, and miscellaneous delays. Table 2-26 shows the off-NEC delays that Amtrak is responsible for by service, while Table 2-27 summarizes the major delays on the NEC.

Table 2-25: Off-NEC Host-Responsible Delays by Service, FFY 2019 Q3 Largest Two Delay Codes

Service[1]	Host	Delay				
		Total[2] (minutes)	Largest Source[3]	Minutes[2]	2nd Largest Source[3]	Minutes[1]
Standard		900				
Acela Express	MNRR	2,078	DSR	929	CTI	798
Northeast Regional (Boston – Washington)	MNRR	2,314	DSR	1,271	CTI	776
Carolinian	CSX	1,406	RTE	321	FTI	320
	NS	872	PTI	289	DCS	202
Pennsylvanian	NS	1,793	FTI	1,198	DCS	273
Vermonter	MADOT	3,442	DSR	3,316	DCS	88
	MNRR	3,179	CTI	1,204	DSR	1,194
	NECR	1,014	DSR	932	DCS	51
Capitol Limited	CSX	955	DSR	285	FTI	281
	NS	2,220	FTI	1,587	PTI	206
Cardinal	BBRR	991	PTI	450	DSR	168
	CSX	731	DSR	253	FTI	192
	NS	1,857	FTI	467	CTI	462
Crescent	NS	1,362	FTI	630	DSR	269
Lake Shore Limited	CSX	876	FTI	335	RTE	184
	MBTA	2,930	CTI	2,120	DCS	337
	MNRR	1,969	CTI	970	DMW	346
	NS	2,228	FTI	1,463	PTI	402
Palmetto	CSX	947	FTI	304	PTI	245
Silver Meteor	CSX	828	FTI	340	PTI	167
	FDOT	2,090	DSR	1,200	CTI	515
	FR	1,709	CTI	539	DCS	469
Silver Star	CSX	885	PTI	252	FTI	199
	FDOT	1,923	DSR	973	CTI	728
	FR	1,096	DCS	383	DSR	334
	NS	1,151	FTI	483	PTI	186

Source: FRA (2019)

(1) The data above reflect all hosts for rail lines that run through Pennsylvania, including hosts outside the state.

(2) Minutes of delay per 10,000 train miles

(3) See Table 2-24 for definitions of delay codes.

Table 2-26: Off-NEC Amtrak-Responsible Delays by Service, FFY 2019 Q3 Largest Two Delay Codes

	Delay				
Service	Total (minutes)[1]	Largest Source[2]	Minutes[1]	2nd Largest Source[2]	Minutes[1]
Standard	325				
Acela Express	143	HLD	39	ENG	33
Northeast Regional (Boston – Washington)	210	HLD	58	ENG	43
Carolinian	525	ADA	152	SYS	148
Pennsylvanian	360	HLD	95	ADA	90
Vermonter	298	OTH	172	ENG	49
Capitol Limited	379	HLD	126	SYS	106
Cardinal	559	SYS	160	OTH	95
Crescent	701	SYS	332	HLD	127
Lake Shore Ltd	400	HLD	151	SYS	116
Palmetto	332	SYS	116	ADA	64
Silver Meteor	493	SYS	147	ADA	115
Silver Star	551	SYS	226	ADA	110

Source: FRA (2019)

(1) Minutes of delay per 10,000 train miles

(2) See Table 2-24 for definitions of delay codes.

Table 2-27: On-NEC Host and Amtrak-Responsible Delays by Service, FFY 2019 Q3 Largest Two Delay Codes

	Delay				
Service	Total (minutes)[1]	Largest Source[2]	Minutes[1]	2nd Largest Source[2]	Minutes[1]
Acela Express					
Standard	265				
Acela Express	221	SMW	51	PSR	37
Other Services					
Standard	475				
Keystone	424	DSR	122	SMW	59
Northeast Regional (Boston –Washington)	234	SMW	33	CTI	29
Cardinal	653	ENG	98	DCS	90
Carolinian	452	SMW	122	SVS	84
Crescent	662	PTI	145	PSR	82
Palmetto	346	CAR	50	ENG	38
Pennsylvanian	601	SMW	138	DSR	137
Silver Meteor	743	SVS	107	ITI	85

Service	Delay				
	Total (minutes)[1]	Largest Source[2]	Minutes[1]	2nd Largest Source[2]	Minutes[1]
Silver Star	469	PTI	98	SMW	89
Vermonter	410	PTI	141	PSR	31

Source: FRA (2019)

(1) Minutes of delay per 10,000 train miles

(2) See Table 2-24 for definitions of delay codes.

2.1.5 Public Financing for State Rail Projects and Services

This section provides an overview of the sources available for funding rail passenger and freight rail projects in Pennsylvania. Transportation funding is extremely complex, with funds coming from the local, state, and federal governments through their tax revenue sources. This section is intended to identify the various funding sources available across the commonwealth and their eligible uses.

2.1.5.1 Operating Support

In FFY 2017, the Keystone Service had fare revenues of $43 million that covered 77% of its reported $55.5 million operating expenses. The Pennsylvanian had fare revenues of $11.9 million that covered 70% of its reported $17.1 million in operating expenses. Pennsylvania pays the shortfall, also known as the operating subsidy, through a combination of the full Multimodal Transportation Fund revenue allotment for passenger rail—$8 million per year—and funds drawn from the Public Transportation Trust Fund that are designated for Programs of Statewide Significance. Intercity passenger rail is one of seven eligible categories for this program's spending (Pennsylvania TAC 2019a).[9]

2.1.5.2 Federal Funding Sources

The FAST Act authorizes funding for surface transportation infrastructure planning and investment over FFY 2016 through 2020. With less than a year until the FAST Act's expiration, Congress has begun work to frame the successor legislation. As a result, while the programs described below reflect the current structure of federal support for rail, there is no guarantee that the programs described below will carry forward in the successor legislation to the FAST Act.

[9] Statistics and information on the structure of Pennsylvania's operating support for state-supported passenger rail are drawn from the Pennsylvania Transportation Advisory Committee 2019 Intercity Passenger Rail Policy Paper titled, *Keystone Connected: Intercity Passenger Rail Success Factors*.

With the exception of a small number of block grant programs that can be used for rail investment, federal support for passenger and freight rail is generally discretionary and frequently awarded on a competitive basis. Block grant funding sources include the National Highway Freight Program (NHFP), the Rail-Highway Grade Crossing (Section 130) Program, the Surface Transportation Block Grant (STBG) Program, and the CMAQ Program.

- NHFP allows a state to obligate up to 10% of these funds for improving the flow of freight into and out of intermodal facilities or rail facilities.
- The Section 130 Program provides funds for the elimination of hazards at railway-highway crossings. Approximately $230 to $245 million in funding is set aside by the FAST Act on an annual basis, which is allocated to states from the Highway Safety Improvement Program (HSIP) apportionment. The predictable nature of designated funds from the Section 130 program for crossing safety facilitates planning and investment in this type of rail improvement.
- The STBG Program offers flexible funding to best address state and local transportation needs. Estimated funding under the FAST Act ranges from $11.5 to $12.1 billion each year and is allocated to states under the authorization from 2016 through 2020.
- CMAQ Improvement funds can be used for surface transportation projects and other related efforts that contribute air quality improvements and provide congestion relief. The FAST Act allocates $2.3 to $2.5 billion in CMAQ funding each year to states under the authorization from 2016 through 2020. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter; non-attainment areas; and for former nonattainment areas that are now in compliance, which are referred to as maintenance areas. Nationally, CMAQ funding has been used successfully to retrofit diesel locomotives.

A variety of dedicated and competitive and discretionary grant programs are available that may also support rail investment. Table 2-28 briefly describes the grant programs that can be used for rail improvements.

Table 2-28: Federal Grant Programs Supporting Rail Investment

Program Name	Type	Use	Agency	Description
Capital Grants to Amtrak	Dedicated	Passenger	FRA	Beginning with FFY 2017, and as a result of the FAST Act, Amtrak's federal grants follow Amtrak's new Account Structure (Sec. 11201 of the FAST Act), with one grant to the NEC Account and one to the National Network Account. The NEC traverses eastern Pennsylvania border to border and is a major rail corridor in the state. Amtrak's investments and those of the states along the NEC are coordinated through the Northeast Corridor Commission, of which Pennsylvania is a member. FRA executes and oversees grant agreements with the National Railroad Passenger Corporation (Amtrak) to provide Amtrak with federal funds appropriated by Congress.
Railroad Safety State Participation Grant Program	Dedicated	Freight and Passenger	FRA	FRA provided grants to all 32 states with Federal Railroad Safety Program State Participation Agreements in FFY 2019 to support the certification of state inspectors to conduct investigative and surveillance activities to ensure that the application and interpretation of federal railroad safety rules, regulations, orders, and standards reflect the same national uniformity. Pennsylvania is one of the 32 state recipients.
Railroad Trespassing Enforcement Grant Program	Competitive Discretionary	Freight and Passenger	FRA	Program provides $150,000 for enforcing railroad-specific laws to reduce rail trespassing incidents and casualties, particularly in areas near railroad trespass hot spots.
Restoration and Enhancement Grants Program	Competitive Discretionary	Passenger	FRA	Program funds operating assistance grants for initiating, restoring, or enhancing intercity rail passenger transportation.
Better Utilizing Investments to Leverage Development (BUILD) formerly Transportation Discretionary Grants (TIGER)	Competitive Discretionary	Freight or Passenger	USDOT	BUILD funding supports roads, bridges, transit, rail, ports or intermodal transportation. The program selection criteria encompass safety, economic competitiveness, quality of life, state of good repair, environmental sustainability, innovation, and partnerships with a broad range of stakeholders. Applications require match funding that varies with urban and rural locations. The maximum grant award was $25 million in recent rounds of selection.

Program Name	Type	Use	Agency	Description
Consolidated Rail Infrastructure and Safety Improvements (CRISI) Program	Competitive Discretionary	Passenger or Freight	FRA	Funds projects that improve the safety, efficiency, and reliability of intercity passenger and freight rail. Funding varies by year. In FFY 2019, the program was funded at just over $244 million. A wide variety of project types can be funded, including but not limited to projects that address congestion or challenges affecting rail service, facilitate ridership growth along heavily traveled rail corridors, and/or improve short line or regional railroad infrastructure. Other example projects include highway-rail grade crossing improvement projects and rail line relocations.
Federal-State Partnership for State of Good Repair Grant Program	Competitive Discretionary	Passenger	FRA	Funds capital projects within the United States to repair, replace, or rehabilitate qualified railroad assets to reduce the state of good repair backlog and improve intercity passenger rail performance. Program funding levels vary by year.
Infrastructure for Rebuilding America (INFRA) Program	Competitive Discretionary	Freight	USDOT	Provides funding assistance to highway and freight projects of national or regional significance. Criteria have evolved over time. The most recent competitive round emphasized four key objectives: (1) supporting economic vitality at the national and regional level, (2) leveraging federal funding to attract non-federal sources of infrastructure investment, (3) deploying innovative technology, encouraging innovative approaches to project delivery/incentivizing the use of innovative financing, and (4) holding grant recipients accountable for their performance. INFRA grants may be used for up to 60% of future eligible project costs. The minimum project size for large projects is the lesser of $100 million or 30% of a state's FFY 2018 federal-aid apportionment. Small projects are defined as projects that do not qualify as large.
Capital Investment Grants – 5309	Competitive Discretionary	Passenger	FTA	Program funds transit capital investments, including heavy rail and commuter rail. Section 5309 funding includes New Starts, Small Starts, and Core Capacity funding. Applications require a multi-year process. The program is most likely to be beneficial to intercity rail in corridors where commuter transit shares a corridor with intercity service.

Sources: USDOT (n.d.-a)

2.1.5.3 Federal Loan Programs and Tax Credits

Federal financing options include the Rail Rehabilitation and Improvement Financing (RRIF) and Transportation Infrastructure Finance and Innovation Act (TIFIA) programs that are available to support freight rail projects.

- RRIF: USDOT is authorized to provide direct loans and loan guarantees up to $35 billion to finance development of railroad infrastructure. Not less than $7 billion is reserved for projects benefiting freight railroads other than Class I carriers. Direct loans can fund up to 100% of a railroad project, with repayment periods of up to 35 years and interest rates equal to the cost of borrowing to the government. A new pilot program called RRIF Express seeks to reduce the time and costs associated with securing loans for short line and regional railroads to modernize aging freight rail infrastructure. Wheeling & Lake Erie Railway, a Class II railroad, and R.J. Corman, a short line railroad, are two companies that have benefitted from the program. Each operate in Pennsylvania and both companies used the loans to expand their fleet of rolling stock, at least in part.
- TIFIA: The TIFIA program provides federal credit assistance to eligible surface transportation projects, including highway, transit, intercity passenger rail, some types of freight rail, and intermodal freight-transfer facilities on terms acceptable to USDOT. There is a rolling application process with significant requirements. The three types of credit assistance are (1) secured loans, (2) loan guarantees, and (3) lines of credit to fill market gaps and leverage substantial private co-investment by providing supplemental or subordinate debt. The loans are repaid through dedicated revenue sources that secure the project obligations. Projects eligible for assistance under U.S.C. title 23 or chapter 53 of U.S.C. title 49 include international bridges and tunnels, intercity passenger bus and rail facilities and vehicles, public freight rail projects, private freight rail projects that provide public benefit for highway users, and modification projects to facilitate transfer and access into and out of a port. A TIFIA line of credit may cover up to 33% of the total project cost. TIFIA loans may cover up to 49% of the total project cost. Pennsylvania has not used the TIFIA program to date.
- IRS Tax Credit: Section 45G of the Internal Revenue Code created an incentive for short line railroads to invest in track rehabilitation by providing a tax credit of 50 cents for every dollar the railroad spends on track improvements. The maximum credit amount allowed is $3,500 per mile of track. The program was renewed for 2 years in 2018. American short line railroad advocacy groups are working to convince Congress to continue the program going forward.

2.1.5.4 State Funding Programs

Pennsylvania offers state-funded support for rail through a number of programs that allow the commonwealth to work with private railroads and other public agencies to improve the rail transportation system.[10] Pennsylvania programs are outlined below.

- Act 89: Signed into law in November 2013, Act 89 provides a significant, long-range source of funding for transportation projects. The act supplements prior transportation funding, which was primarily based on gas tax and user fees, by eliminating the cap on the wholesale gas tax and increasing a range of user fees. Act 89 provides an estimated $2.3 billion in additional revenue annually. The legislation also established minimum annual funding levels for freight rail ($10 million) and passenger rail ($8 million) programs.
- Public Transportation Trust Fund: State funding for public transportation, including SEPTA's Regional Rail system, is provided through the Public Transportation Trust Fund, which includes six major programs, as identified in 74 Pa.C.S.:
  - Operating Program (74 Pa.C.S. § 1513)
  - Asset Improvement Program for Capital Projects (74 Pa.C.S. § 1514)
  - Capital Improvement Program (74 Pa.C.S. § 1517)
  - Alternative Energy Program (74 Pa.C.S. § 1517.1)
  - New Initiatives Program (74 Pa.C.S. § 1515)
  - Programs of Statewide Significance (74 Pa.C.S. § 1516)
- Rail Transportation Assistance Program (RTAP): This is an annual reimbursement-grant program that has a current funding allocation of $30 million for maintenance and construction. It provides financial assistance to railroads and users of the rail freight transportation system for rail freight maintenance and construction projects. Entities with an authorization in a current Capital Budget Act are eligible to apply. Maximum state funding is 70% of the total project cost, but it shall not exceed the line item amount authorized by the specific capital budget bill containing the budget authorization. See Appendix B for the projects that were awarded RTAP grants in fiscal years 2015-2020.
- Rail Freight Assistance Program (RFAP): This reimbursement-grant program has an annual funding stream of $10 million from Act 89 funding. In addition, $1 million in RFAP is available for Marcellus Shale-related projects. This fund was created by

[10] As delineated in the *Pennsylvania Grant & Resource Directory, 2018-2019* (Pennsylvania House of Representatives Democratic Caucus, 2018).

Act 13 to support rail service related to the shipping of Marcellus Shale products. The program's objective is to provide financial assistance for investment in rail freight infrastructure to preserve rail freight service and stimulate economic development. Maximum project funding is the lesser of $700,000 or 70% of the actual total project cost. It is a competitive program in which projects are scored, ranked, and awarded funding based on evaluation of project benefits to Pennsylvania's rail freight system and to economic development. See Appendix B for the projects that were awarded RFAP grants in fiscal years 2015-2020

- Pennsylvania Infrastructure Bank (PIB) for Rail Freight Projects: Unlike the other programs outlined in this section, this is a loan fund rather than a grant program. It provides flexible financing opportunities for eligible transportation improvement projects. The interest rate on PIB loans is fixed at one-half the prime lending rate with terms up to 10 years. Construction and rehabilitation projects are eligible.

The commonwealth also provides a comprehensive economic development funding package through other agencies that may be combined with traditional PennDOT sources. Several of such programs are administered through the Department of DCED. These include the following:

- Infrastructure and Facilities Improvement Program: The Pennsylvania DCED provides this multi-year grant to assist with the payment of debt service. Grants range from $200,000 a year for 10 years, to $1 million per year for 20 years.
- Tax Increment Financing Guarantee Program: The Commonwealth Financing Authority (CFA) administers this program in accordance with the Tax Increment Financing Act of July 11, 1990, for the development, redevelopment, and revitalization of brownfield and greenfield sites.
- Business in Out Sites: This program provides loans and grants with no ceiling amount, but grants may not exceed $4 million or 40% of the total combined grand and loan award (whichever is less) for site development and business, infrastructure, land, and building development.
- Multimodal Transportation Fund: The CFA administers this grant program to encourage economic development and ensure transportation to residents. Grants are available to projects with a total cost of $100,000 or more and provide a maximum award of $3 million per project.

Other economic development programs offered through other commonwealth agencies include:

- Pennsylvania First (PA First): A comprehensive funding tool created to facilitate increased investment and job creation within the state. It offers grants, loans, and loan guarantees for equipment, infrastructure, land acquisition, and site work.
- Job Creation Tax Credits (JCTC) Program: Provides a $1,000-per-job tax credit to create new jobs in the state within 3 years. Requires the creation of at least 25 new jobs or expansion of the existing workforce by at least 20%.
- Redevelopment Assistance Capital Program (RACP): Administered by the Office of Budget, funds may be used for constructing regional economic improvement projects that have regional or multi-jurisdictional impact.
- Pennsylvania Industrial Development Authority (PIDA): Provides low-interest loans and credit lines for eligible businesses to create and retain full-time jobs. Funds can also be used for the development of industrial parks and multi-tenant facilities.

2.1.5.5 Local Funding Support

Counties and cities have limited financial resources for making capital improvements, but still may be able to contribute modestly to project funding. Examples may include donating a publicly owned right-of-way, contributing a portion of tax revenues, or implementing special taxing districts and utilizing value capture. Value capture is a type of public financing that claims some fraction (up to 100%) of the value that public infrastructure generates for private landowners. Pennsylvania established the Transit Revitalization Investment District Act in 2004 and revised it in 2016.

2.1.5.6 Public-Private Partnerships

Act 88 allows the state to enter into P3s and created the P3 Transportation Board to guide these investments. Not only do P3s provide capital that would otherwise be inaccessible, but they also facilitate more rapid capital investment at a comparable or even lower financing cost. In addition, some P3 agreements may shift some project risk to the private sector.

2.1.5.7 Other Private Sources

In some instances, user fees may be charged to users of the rail asset, providing a revenue stream to cover the cost of operating and maintaining the facility, with the balance applied to repaying construction debt. In addition, there may be opportunities to sell and lease back assets from Pennsylvania. The utilization of some rail assets may decline with the railroads' evolving network patterns and changing traffic volumes, and

some railroads, such as smaller short lines, may lack the short-term investment capital needed to upgrade and sustain roadbeds, structures, and equipment for optimal operation. In such cases, the railroad could sell the asset to the state, which could then repurpose it or lease the right to use it, providing a revenue stream to the state (after accounting for the capital expense). Because the state would enter into a contractual agreement with the lessee for a set period of time, the rental income would help to offset the expense of the railroad purchase. Such arrangements can help maintain service in lower traffic areas of the state that might be less profitable and considered for closure by a private railroad.

2.1.6 Safety and Security

2.1.6.1 Safety and Security Oversight and Mandates

Railroad safety is a top priority for all involved parties, including the commonwealth, railroad owners and operators, and local and federal agencies. This section describes the agencies working to ensure railroad safety, the progress that has been made nationally and within Pennsylvania, and programs that are continuing to promote railroad safety.

2.1.6.1.1 Rail Safety Agencies

The agencies listed below provide different levels of safety oversight and regulation. A brief description of each agency's responsibilities is provided below, while Table 2-29 expands on each agency's authorities and responsibilities.

Table 2-29: Rail Safety Agency Summary

Agency	Authorities/Responsibilities
FRA	• Develop and enforce basic operating rules for train safety, tank car safety, rail equipment safety, highway-rail grade crossing safety, and trespass prevention. • Conduct research and development to ensure the safe, efficient, and reliable movement of people and goods. • Perform track inspections. • Collect and analyze rail accident/incident data from the railroads. • Oversee the movement of hazardous materials, employee hours of service regulations, and signal and train control regulations. • Manage funding programs for rail improvements, including safety improvements.

Agency	Authorities/Responsibilities
PHMSA	• Regulate and enact rules aimed at improving the safe movement of hazardous materials. • Permit, inspect, and enforce safety of hazardous materials. • Collect data on the movement of hazardous materials.
DHS/TSA	• Coordinate with rail operators and owners to protect critical rail infrastructure and the people who use it. • Conduct rail security research and development. • Conduct rail security training. • Track hazardous materials shipments.
NTSB	• Investigate any rail accidents that result in at least one fatality or major property damage. • Recommend ideas that may prevent future accidents and set safety priorities.
PUC	• Handle proceedings pertaining to the abolition, alteration, construction, relocation, or suspension of public highway-railroad crossings. • Perform track inspections in coordination with the FRA.

Sources: FRA (2020); PHMSA (n.d.); TSA (n.d.-a); NTSB (n.d.-a); Pennsylvania PUC (n.d.)

Federal Railroad Administration

The FRA's Office of Railroad Safety is the primary regulatory body responsible for promoting and enforcing rail safety regulations. These regulations include basic operating rules for train safety, tank car safety, rail equipment safety, highway-rail grade crossing safety, and trespass prevention.

Pipeline and Hazardous Materials Safety Administration

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is a division of USDOT and is responsible for regulating and ensuring the safe and secure movement of hazardous materials by all modes of transportation, including railroads. Specifically, the PHMSA in coordination with FRA regulates the rail transportation of poisonous by inhalation materials carried in tank cars. A 2009 regulation, "Hazardous Materials: Improving the Safety of Railroad Tank Car Transportation of Hazardous Materials," mandates commodity-specific improvements in safety features and design standards for newly manufactured DOT-specification tank cars. The regulation also imposes a 50-mph maximum speed restriction on all loaded poisonous by inhalation tank cars and allows for an increased gross weight of tank cars to accommodate enhanced safety measures.[11]

[11] 74 *Fed. Reg.* 1770–1802 (Jan. 13, 2009).

Department of Homeland Security and Transportation Security Administration

The Transportation Security Administration (TSA) is housed within the Department of Homeland Security (DHS) and is responsible for protecting the nation's transportation systems to ensure freedom of movement for people and commerce (TSA, n.d.-a). TSA works with industry leaders and other government partners to reduce threats to the freight rail network by producing security actions, procedures, and informational materials for the rail industry. In addition, TSA works with passenger rail systems to ensure the safety and security of millions of passengers across the nation who use one of the 6,000 transit systems in the United States. As part of this role, the TSA funds surface transportation security grants to owners and operators of all passenger rail systems and freight rail carriers that transport rail-sensitive security materials through high-density population areas (TSA, n.d.-b).

National Transportation Safety Board

The National Transportation Safety Board (NTSB) is an independent agency responsible for investigating all rail accidents that result in at least one fatality or major property damage (NTSB, n.d.a). While the NTSB can both make recommendations aimed at preventing future accidents and set safety priorities, it has no funding or regulatory enforcement authority.

Pennsylvania Public Utility Commission

The PUC has regulatory and safety oversight over passenger railroads, freight railroads, and all highway-rail crossings in Pennsylvania. It is responsible for coordinating with the FRA to ensure that railroads comply with federal railroad safety regulations. In addition, the PUC has exclusive jurisdiction over all highway-railroad crossing projects.

2.1.6.1.2 Rail Safety Mandates

Rail Safety Improvement Act of 2008

In response to several fatal rail accidents between 2002 and 2008, Congress passed the Rail Safety Improvement Act of 2008 (RSIA). These regulations govern different areas related to railroad safety, such as hours of service requirements for railroad workers, positive train control implementation, standards for track inspections, certification of locomotive conductors, and safety at highway-rail grade crossings. The legislation increases penalties for violations of safety laws and gives the FRA more enforcement tools. The legislation also contains provisions to improve the conditions of rail bridges and tunnels.

Federal Railroad Safety Act of 1970

The Federal Railroad Safety Act (FRSA) was enacted to promote safety in all areas of railroad operations. The regulations that were established are meant to reduce railroad-related accidents, reduce deaths and injuries, and reduce damage to property caused by accidents involving any carrier of hazardous materials.

FRSA also protects individuals working for railroad carriers from retaliation for reporting potential safety or security violations to their employers or to the government. In 2007, FRSA was amended to transfer authority for railroad carrier worker whistleblower protections to the Occupational Safety and Health Administration (OSHA). The law was most recently amended in 2008 to specifically prohibit discipline of employees for requesting medical treatment or for following medical treatment orders.

2.1.6.1.3 Americans with Disabilities Act

ADA and the ADA Amendments Act of 2008 were created to ensure safe and accessible transportation to all U.S. citizens. The FRA and state of Pennsylvania work to provide passenger rail service that accommodates the safety of disabled passengers on trains and at stations.

2.1.6.1.4 Title 66 Pennsylvania Consolidated Statutes, Chapter 27

This statute mandates that no alteration should be made to any public highway-railroad crossing within the commonwealth without first obtaining approval from the Pennsylvania PUC.

2.1.6.1.5 Rail Accident and Incident Statistics

The following section is a statistical review of rail safety in Pennsylvania over the past decade. It addresses the rail accident and incident trends and provides details as to the type of rail accidents, those affected, and causes. Accident and incident statistics discussed below are from the accident database maintained by the FRA. Among FRA's responsibilities is oversight for safety on the general rail system of the U.S. Figure 2-9 shows statistics for the total number of rail accidents and incidents in Pennsylvania over the past 10 calendar years. These totals include train accidents, highway-rail incidents, and other incidents. These categories are defined and discussed in detail below.

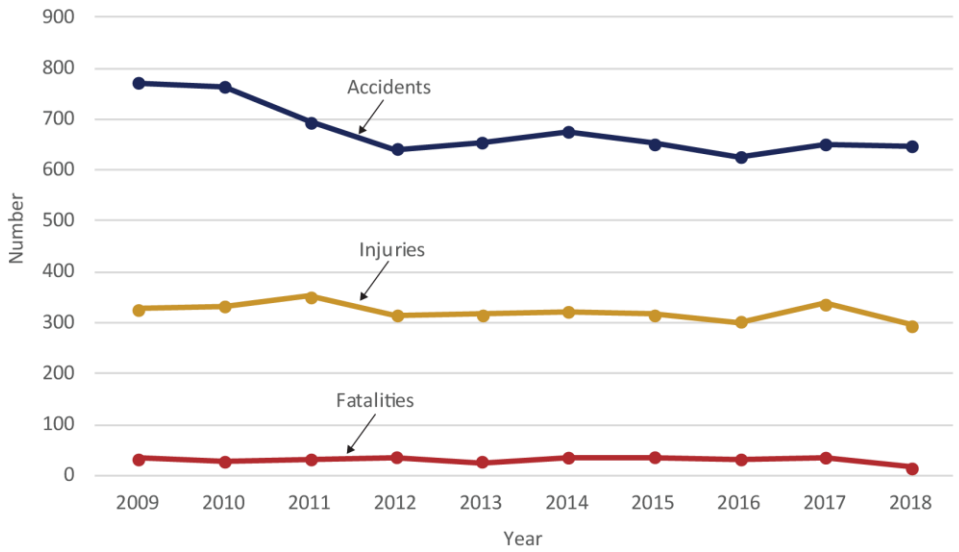


Figure 2-9: Rail accidents, fatalities, and injuries in Pennsylvania (2009–2018)

Total rail accidents/incidents in Pennsylvania have decreased between 2009 and 2018, as have deaths and injuries. The first half of the decade saw an average of 705 incidents, 30 fatalities, and 329 injuries, while the most recent 5-year period saw averages of 651 total incidents, 30 fatalities, and 314 injuries. The following sections discuss the various types of rail accidents and incidents in more detail.

2.1.6.1.6 Train Accidents

Train accidents include train derailments, collisions, and other events involving on-track rail equipment that result in fatalities, injuries, or monetary damage above a threshold set by FRA. Train accident statistics in the state over the past decade are provided in Figure 2-10.

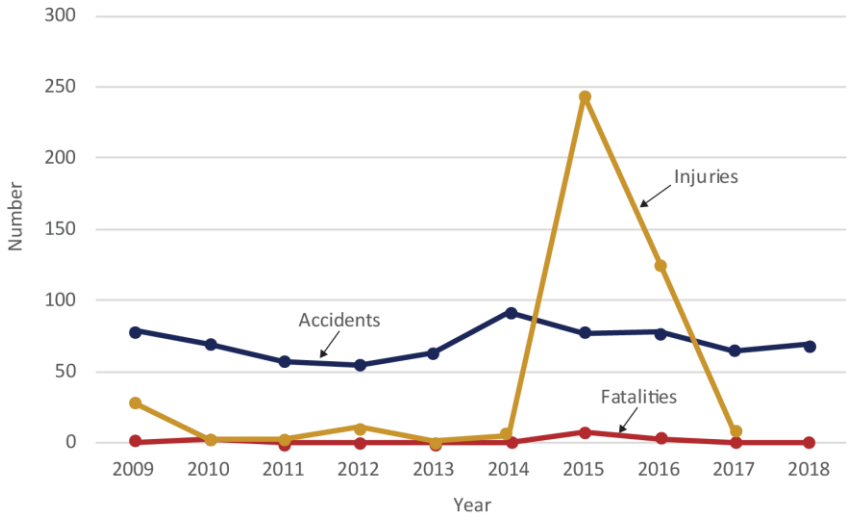


Figure 2-10: Train accidents, fatalities, and injuries in Pennsylvania (2009–2018)

Figure 2-11 provides more detailed information regarding the types, locations, and causes of the train accidents over the past decade. In the topmost chart, derailments are shown to have been the dominant type of rail accidents in the commonwealth over the past 10 years. As shown in the middle figure, most accidents occurred on yard tracks as opposed to main line tracks. Human error and track defects were the leading causes of train accidents over the past decade, while motive power/equipment, signal defects, and miscellaneous causes comprised lesser shares of rail accidents in Pennsylvania.

2.1.6.2 Highway-Rail Accidents

Figure 2-12 shows the number of highway-rail grade crossing incidents, fatalities, and injuries occurring at all at-grade crossings (public and private) over the past decade. These figures show a general increase in number of total incidents and deaths comparing the initial and latter 5-year segments, with total incidents rising 9%, deaths remaining unchanged, and injuries rising 38%. The incidents at public crossings increased 4% from the initial to the latter period.

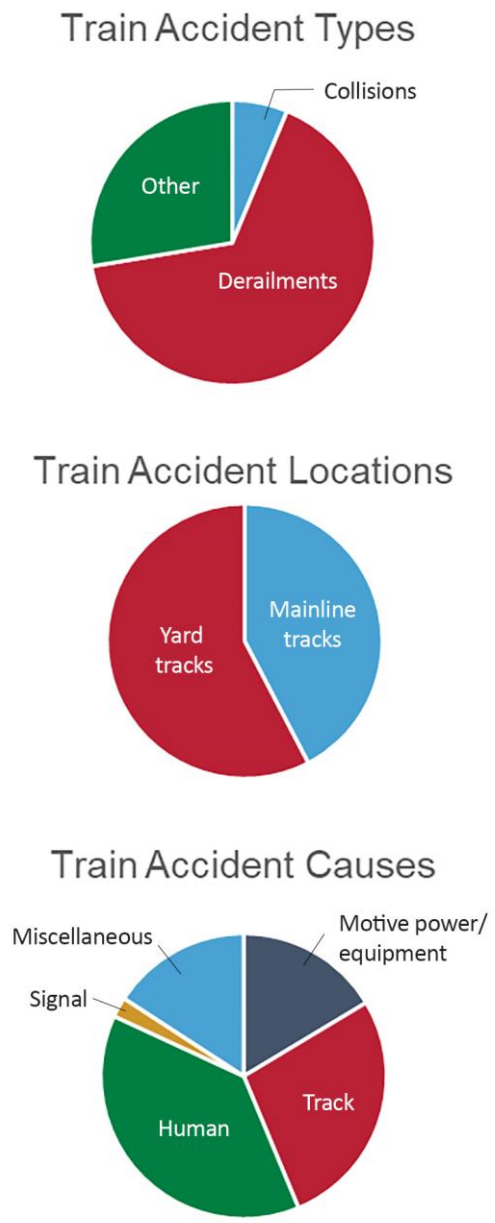


Figure 2-11: Train accident types, locations, and causes in Pennsylvania (2009–2018) (FRA, 2020 a)

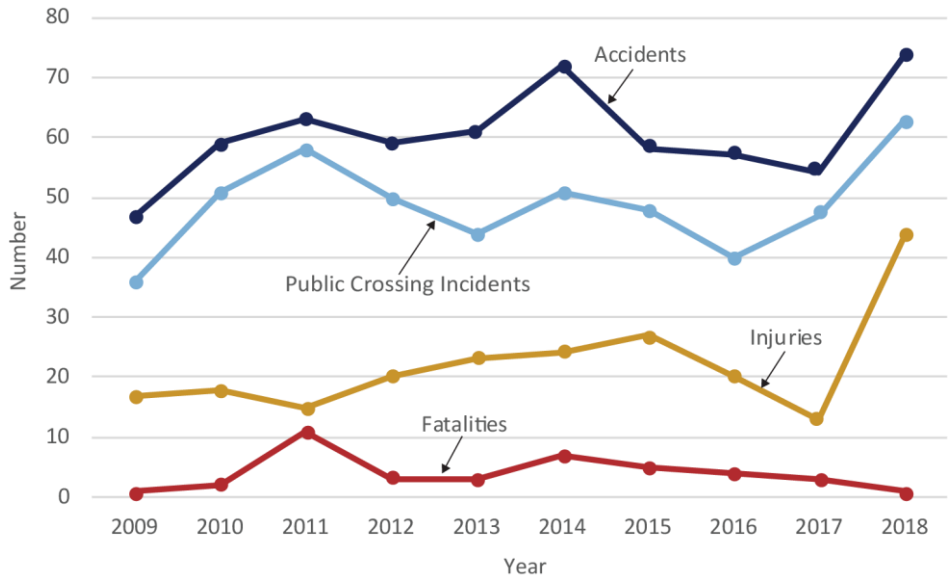


Figure 2-12: Highway-rail accidents, fatalities, injuries, and public crossing incidents in Pennsylvania (2009–2018)

2.1.6.2.1 Other Rail Incidents

Other rail incidents include events other than train accidents or crossing incidents that caused death or injury to any person. Most fatalities in this category are due to rail trespassers. Other events that generally lead to injuries in this category include activities such as getting on or off equipment, doing maintenance work, throwing switches, setting handbrakes, and falling. Rail passenger-related casualties can include boarding or alighting from standing trains or platforms. Statistics for this category of rail incidents are shown in Figure 2-13.

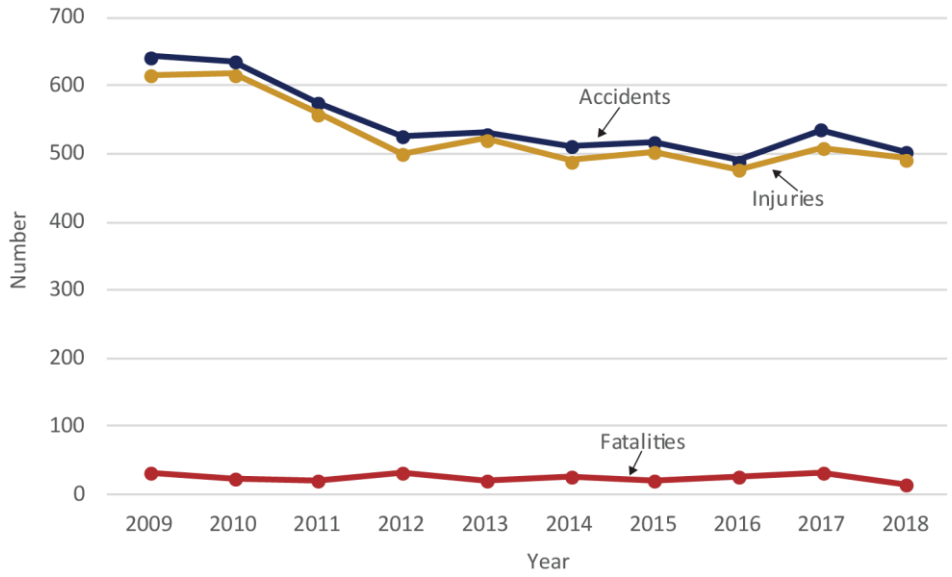


Figure 2-13: Other rail accidents, fatalities, and injuries in Pennsylvania (2009–2018)

2.1.6.2.2 Highway-Rail At-Grade Crossing Safety in Pennsylvania

In all, there are 3,554 public at-grade highway-rail crossings in Pennsylvania (FRA, 2020 b). Public at-grade crossings in the commonwealth have various levels of grade crossing warning devices. Table 2-30 shows the type of warning equipment and the number of crossings equipped with each. The warning devices are shown in decreasing order of warning effectiveness from left to right.

Table 2-30: Crossing Safety Devices at Public Crossings in Pennsylvania

	Active Warning Devices				Passive Warning Devices		Special Warning Systems	Other	None	Total Crossings
	4-Quad Gates	Gates	Bells	Flashing Lights	Cross Bucks	Stop Signs				
Number of crossings	8	1,037	64	1,011	1,115	169	64	9	77	3,554

Source: FRA (2020)

These figures show that over half (59%) of all public at-grade crossings in Pennsylvania have what are considered active warning devices such as gates, bells, and flashing lights; the remainder have special, passive, other, or no warning systems. Of the 77 crossings with no warning devices, 13 are in Philadelphia County.

2.1.6.3 Safety and Security Programs and Projects

2.1.6.3.1 Operation Lifesaver

Operation Lifesaver is a nationwide non-profit organization with a mission to end collisions, injuries, and fatalities at, on, and around railroad tracks and at highway-rail grade crossings. The program coordinates a nationwide network of volunteers who work to educate people about rail safety. Operation Lifesaver, Inc. partners with federal transportation agencies, national transportation organizations, railroads, and safety engineering and rail supply companies to achieve its mission.

2.1.6.3.2 Federal Railway-Highway Crossings (Section 130) Program

FHWA administers the Railway-Highway Crossings Program, also known as the Section 130 Program. The Section 130 Program provides funds for the elimination of hazards and the improvement of safety at railway-highway crossings. The program, funded by the FAST Act, has allocated an estimated $7.2 million to Pennsylvania for FFY 2020.

As a requirement of the program, states must submit an annual report on the progress and effectiveness of program implementation. The report includes the number of

projects undertaken, the nature of each improvement, and an assessment of the effectiveness of each safety improvements.

2.1.7 Economic and Environmental Impacts

Passenger and freight movement are important elements of a regional and national economy, as more efficient modes and routes result in improved logistics, reduced transportation costs, and better access to jobs and educational opportunities. These cost savings can then be reallocated to growth, as well as providing better jobs and higher wages.

Public investment in rail offers Pennsylvania travelers and businesses a cost-effective and environmentally friendly means to move people and products that support the economy's operation. Passenger rail transportation is a reliable and efficient alternative in congested travel corridors, while freight rail offers a cost-effective means to move heavy cargo and divert trucks from highways, thereby making highways safer for the truck and auto travelers that remain.

For freight, diverting truck shipments to rail results in savings in shipping costs, reduction in pavement deterioration (i.e., wear and tear on roads), and decrease in congestion delay (travel time impacts for other vehicles based on the number of trucks on the road). For passenger rail, diverted ridership from auto travel results in impacts such as more direct rail operator jobs, increased purchases of goods and services, and increased tourist spending, as well as increased safety, congestion relief, and emissions reductions.

Passenger rail services in Pennsylvania are provided by Amtrak and SEPTA. According to 2017 data,[12] Amtrak spent more than $228 million in Pennsylvania and employed 2,764 residents (Amtrak, 2017). Wages totaled nearly $220 million for an average wage of approximately $79,600 (Amtrak, 2017). SEPTA directly employs approximately 9,400 people across all modes and annually supports a total of 23,370 employees across Pennsylvania with $1.7 billion in earnings (SEPTA, 2018a). Freight railroads employed about 6,200 in 2017, with average wages and benefits of $110,720 (AAR, 2019).

In addition to the direct economic impacts of jobs and earnings, broader social impacts from the use of rail in the commonwealth include reduced congestion, improved safety, increased trade and economic development, improved air quality, and land use and community impacts. The following sections describe the impacts of rail in Pennsylvania.

[12] Salary data figures are not reported in the *Amtrak Fact Sheet, Fiscal Year 2018: Commonwealth of Pennsylvania*.

2.1.7.1 Congestion Mitigation

Rail is a competitive mode for some truck and personal motor vehicle traffic. Freight rail facilities across the commonwealth provide opportunities for products to be transported by train instead of truck. The availability of rail can result in a reduction in truck vehicle miles traveled (VMT) on Pennsylvania's local and interstate routes and benefit the remaining users by reducing the marginal cost of congestion born by those vehicles.

A secondary impact of diverting auto and truck traffic to rail is the resultant increased capacity of the highway. The availability of rail as an alternative to truck transport along a particular corridor effectively increases the highway's capacity without a need for incremental investment in additional lane miles or implementation of traffic management techniques.

Additional highway capacity from shifting trucks to rail would be particularly beneficial along the I-80 and I-70/I-76 corridors, which connect a number of the state's population centers and are already heavily utilized by trucks. Pennsylvania has freight-dependent industries[13] that rely on the efficiency of the transportation network to access international markets by way of the state's ports and other domestic and international markets. Industries such as agriculture anchor the non-metropolitan portions of the state and depend heavily on the rail and highway networks to stay competitive.

The majority of the state's economic growth has occurred in the southeastern portion of the state, which contains important highway and rail corridors. Despite the declining populations in some metropolitan areas of Pennsylvania, the demand for freight continues to grow, placing additional demand on resources to construct, operate, and maintain infrastructure investments that efficiently connect freight to consumers. With limited financial resources for constructing and maintaining all capital investments, there is the risk of transportation infrastructure falling into a state of disrepair. When transportation infrastructure is not maintained, performance on those assets deteriorates, contributing to decreased productivity and tempered economic growth, as businesses must spend resources on mitigating rising operating costs instead of increasing wages and employment (The Boston Foundation, 2013).

2.1.7.2 Safety Impacts

The diversion from auto and truck traffic to rail reduces the likelihood of crashes and the associated deaths, injuries, and property damage on the state's roadways. PennDOT statistics report 128,420 crashes in the state for 2018, including 1,190 deaths and

[13] Agriculture, forestry, fishing, and hunting; mining; construction; manufacturing; wholesale trade; retail trade; transportation; and warehousing.

78,219 injuries. While this is the 14th lowest number of crashes recorded in Pennsylvania since 1950, it amounts to one fatality every 7 hours and nine injuries every hour. The commonwealth's rate of death per 100 million vehicle miles is 1.17 (PennDOT, 2018 a), higher than the national rate of 1.13 (NHTSA, 2019).

For passenger rail, there were 5 passenger fatalities and 1,380 injured persons nationally in 2018 (USDOT, n.d.-b), demonstrating that passenger rail is a safe mode of transportation. The Class I railroads experienced 138 fatalities in 2018 nationally (USDOT, n.d.-b); this includes train accidents, highway-railroad grade crossing incidents, and other incidents. Non-fatal injuries totaled 2,201 (FRA, 2020 a). Encouraging diversion to rail therefore improves transportation safety overall.

Conflicts at highway-railroad grade crossings are also a safety concern for the driving public. Pennsylvania has 3,554 public at-grade crossings (FRA, 2020 b) and reducing the number of potential conflict points is an ongoing and important endeavor nationally as well as within Pennsylvania. The Railway-Highway Crossings Program (RRX) is funded at approximately $7 million annually, providing funding for more than 80 projects for 2019 through 2022 across Pennsylvania (PennDOT, 2018 b).

2.1.7.3 Trade and Economic Development

Pennsylvania's passenger and freight traffic have increased along with the growing demands of the state's economy. As the economy evolves, prioritizing and selecting the best-suited modes of travel is critical to fostering the state's long-term economic competitiveness. Transportation infrastructure is an investment with a long useful life that plays an important role in shaping the state's future economy. Thoughtful investments made now will have the potential to yield economic benefits for years to come. Existing rail corridors connect the commonwealth's economic centers to one another and to major economic centers beyond Pennsylvania's borders and create vital transportation alternatives for shippers and passengers.

The freight rail system in Pennsylvania comprises more than 5,000 miles of rail trackage operated by 63 railroads, including three Class I railroads (CSX, Canadian National, and Norfolk Southern) (AAR, 2019). The system provides service to ports and population centers and to industries including agriculture, plastics, natural gas, and manufacturing. By providing transportation services to many important industries in Pennsylvania, the railroads support employment in the industries they serve. The railroad industry provides direct employment for about 6,200 Pennsylvania residents (AAR, 2019). Wages and benefits for freight rail transportation in Pennsylvania totaled $681 million, or an average of about $110,720 per job in 2017 (AAR, 2019).

Although the U.S. and Pennsylvania economies are less dependent on goods production than they once were, shipping of finished and unfinished goods is still vital to the economy, particularly as transportation networks through Pennsylvania connect East Coast ports to population centers in the Midwest and beyond. Freight-dependent industries[14] contributed $223,097 million to Gross Domestic Product (GDP) for the state in 2018, up 30% from 2010. These industries represent 28% of the state's GDP in total (Bureau of Economic Analysis, 2020).[15] The rail network provides more efficient movement of goods at a lower cost than trucking, and therefore contributes to each rail-shipping industry's competitiveness and profitability.

Investments in freight rail operations and infrastructure of short line railroads and railroad operators in small urban and rural areas is of vital importance for balancing economic growth throughout the state. Investments in rail freight tend to be concentrated around Class I corridors and major population centers; however, small investments in short lines can help preserve and grow employment in areas of the state that may be experiencing declining populations and jobs. Without the numerous short lines in the state, existing customers could be forced to relocate facilities elsewhere (AAR, 2019). Relocating facilities, potentially to urbanized areas, could contribute to further employment loss in rural Pennsylvania.

Passenger rail usage in Pennsylvania totaled 6.6 million boardings and alightings in 2018, up 1% from 2017. The most popular station is Philadelphia 30th Street, with more than 4.4 million boardings and alightings, while Lancaster, Harrisburg, and Paoli also show high ridership (Amtrak, 2019b). Amtrak, which has a corporate presence at the 30th Street Station in Philadelphia, employed 2,764 Pennsylvania residents in 2017 and distributed wages totaling nearly $220 million for an average wage of approximately $79,600 per job (Amtrak, 2017) (Figure 2-14).

Pennsylvania's major population centers of Pittsburgh and Philadelphia are on opposite sides of the state, but both have important rail connections to other regional economies. Philadelphia, the anchor city in southeastern Pennsylvania, has ready access to the major East Coast cities of Washington, D.C., and New York via passenger rail service provided by Amtrak. Southeastern Pennsylvania is the state's economic center, with 41% of the commonwealth's economic activity and 32% of the population within the five counties (SEPTA, 2018a). Southeastern Pennsylvania generated $10.8 billion in tax revenues in 2018, representing 36% of the total revenues in the Pennsylvania general fund (SEPTA, 2018a). Conversely, Pittsburgh is an important metropolitan area and

[14] Agriculture, forestry, fishing, and hunting; mining; construction; manufacturing; wholesale trade; retail trade; transportation; and warehousing.
[15] In 2019 dollars.

gateway to the Midwest, with passenger and freight rail connections to Cleveland, OH. The state's rail network offers a relief to highway traffic by providing an alternative mode for the transport of both passengers and freight.

Figure 2-14: Amtrak's economic impact in Pennsylvania (Amtrak, 2017; Amtrak, 2019b)

2.1.7.4 Air Quality, Energy Use, and Climate Change Impacts

Rail is one of the most fuel-efficient modes for both freight and passenger travel. It has been demonstrated that freight rail is as much as four times more fuel efficient than trucks (AAR, 2020b). In 2019, U.S. freight railroads on average moved one ton of freight an average of 473 miles per gallon of fuel (AAR, 2020b). Travel by intercity passenger rail uses less energy per passenger mile and achieves a higher efficiency in passenger miles per gallon than travel by air, private automobile, or transit bus (ABA, 2014).

Fuel cost savings attainable through the use of rail for the movement of freight rather than truck translates to transportation cost savings for shippers and manufacturers who can then pass along a portion of these savings to consumers and potentially expand operations to create additional employment opportunities. Therefore, fuel-efficient freight movement can help keep pricing competitive for shippers and customers.

Shifting freight from truck to rail contributes not only to fuel cost savings, but also to improved environmental quality. The burning of fossil fuels produces greenhouse gases (GHG) that have been shown to contribute to climate change. Because railroad locomotives consume less fuel per ton-mile than do trucks, GHG is reduced when goods travel by rail rather than by truck. As such, by switching from truck to rail, shippers can utilize a mode that emits fewer pollutants per ton-mile moved and in doing so, help contribute to a cleaner environment.

In 2008, the U.S. Environmental Protection Agency (EPA) issued new locomotive emission standards. EPA estimates that these new standards when fully implemented will cut particulate matter emissions by as much as 90% and nitrogen oxide emissions by as much as 80% (EPA, n.d.). Together, a shift by operators toward more environmentally friendly locomotives and the diversion of auto and truck traffic to rail will help Pennsylvania meet higher air quality standards. Currently, portions of southeast and southwest Pennsylvania are in non-attainment for 8-hour ozone, particulate matter, sulfur dioxide, and lead (EPA, 2020).

In addition to emissions, other possible environmental impacts from rail are noise and vibration from trains, including noise from the mandatory use of locomotive horns approaching at-grade crossings. Most future changes in rail traffic (e.g., volume, speed) will occur along existing railroad corridors or in rail yards, and therefore will result in impacts that are typically minor increases to existing noise levels. Transitioning to Tier 4 locomotives can mitigate some emissions impacts. Other mitigation options can be implemented in specific locations, where warranted. These mitigation strategies could include the relocation of trackwork away from sensitive areas and/or the use of special ballast and ties that can help diminish noise and vibration impacts.

Finally, the Commonwealth has experienced changes in weather patterns resulting in increased rainfall, rockslides, high winds, and tornadoes in recent years. Pennsylvania experienced its wettest 4 years on record between 2015 and 2019 with more than 198 inches of rainfall (Penn Live, 2019a). Extreme weather and flooding events pose a risk to many sectors of the economy, including but not limited to agriculture and transportation. The impacts to Pennsylvanians in terms of safety, mobility, and recovery and maintenance costs therefore continue to increase. Climate change and other factors have affected the Commonwealth's forests, which are responsible for 10% of the nation's hardwood output. The combination of extreme events and climate change could have damaging effects on Pennsylvania's economy over the long term.

2.1.7.5 Land Use and Community Impacts

The consideration of beneficial rail impacts within municipal comprehensive land use planning can ensure long-term success for shippers and passengers. The implications of efficient land use planning are long-term and have impacts on both station areas and to the wider region. This section describes how the state's land use planning efforts consider rail and the potential community impacts.

One of the goals of the *2015 Pennsylvania State Rail Plan* (PennDOT, 2015) was to enhance the quality of life in Pennsylvania through the development of compatible land uses along rail lines that are consistent with smart growth and supportive of rail use. However, due in part to the fragmented nature of Pennsylvania's jurisdictions,

coordinated planning to enhance rail connectivity is difficult. Challenges noted in the 2015 plan include a lack of comprehensive planning across municipalities, accessibility and application of land use management tools, inefficient development patterns that do not encourage transit-oriented development, and short-sighted development decisions that do not consider cumulative impacts. Improved coordination between land use and transportation planning at the state and local levels is needed, as well as consideration of shippers' long-term needs.

The I-81/I-78 corridor is an important industrial market with over 300 million square feet of inventory as of 2019 (Cushman & Wakefield, 2019). Freight rail-served businesses will continue to try to locate adjacent to existing rail in commercial or industrial zones such as the I-81/I-78 corridor. Any new industry that would require rail service would likewise locate along existing rail corridors. Rail has a particularly notable impact on adjacent land uses due to noise concerns; this impact is less of a nuisance in industrial and commercial zones but can negatively affect property values for immediately adjacent residential properties. Freight trains, particularly those operating overnight and near grade crossings, result in noise pollution from the locomotives and their horns. Literature has shown that the noise results in lower property values within the range of horn noise (Bellinger, 2006), thereby impacting tax revenues for the jurisdiction. While passenger trains also contribute to noise pollution, they operate during daytime hours and can move through the impacted areas faster than freight trains, reducing the nuisance.

Passenger rail usually has positive land use impacts, since most stops are within existing urbanized areas where passenger rail supports higher-density land uses. Most municipalities with passenger rail service are supportive of the service and include provision for the service and for growth opportunities in their local land use plans. Specifically, Philadelphia and Harrisburg have recent plans for redeveloping the immediate station areas. *Philadelphia's 30th Street Station District Plan* (PennDOT et al., 2016 b), finalized in 2016, is a master plan developed to guide future projects in the station area through 2040. The 175-acre area is owned by Amtrak, Brandywine Realty Trust, Drexel University, and SEPTA. The plan aims to ensure that development in the area contributes to a vibrant community, supports multimodal connectivity, and creates a memorable place of identity and character (Amtrak et al., 2016). Figure 2-15 shows a rendering of the plan from the north.

Figure 2-15: Rendering: View from the north (Amtrak et al., 2016)

Similarly, in 2016 PennDOT led the Harrisburg Transportation Center's Transit Oriented Development (TOD) to engage the community in identifying potential redevelopment opportunities in the area north and east of the station. The four-block area has potential for TOD and mixed-use development to encourage rail ridership. Improvements include renovation of the station building, improvements to a nearby stream, expansion of the intercity bus facility, streetscaping, a pedestrian bridge, and a pedestrian plaza (Michael Baker International, 2020). From Harrisburg, Amtrak's Pennsylvanian line offers connections to Philadelphia and Pittsburgh.

Passenger rail can contribute to healthier communities by having stations in more mixed-use environments that promote walking and transit. For passenger rail, land use plays an important role in determining whether development around station areas encourages or discourages ridership. In addition to reducing congestion and improving safety, passenger rail also offers health and recreational benefits to passenger rail users. Research by Rundle et al. (2007) has shown that obesity rates are inversely related to the use of alternative transportation modes, such as walking, cycling, and transit, including rail. A 2014 study published in *Preventive Medicine*, an international scholarly journal, found that participants who switched from driving to walking, cycling, or using transit showed improvements in their psychological well-being, among other benefits (Martin et al., 2014).

Rail supports an efficient travel network, which, in turn, contributes to the tourism industry. Tourism is one of the most important industries in the state. Tourists spend $41 billion annually, thereby supporting more than 490,000 jobs and generating

$4.3 billion in state taxes (Pennsylvania Department of Community and Economic Development, n.d.-a). Pennsylvania's passenger rail system, with 13 intercity rail routes serving 24 stations statewide, enables tourists to visit a variety of Pennsylvania's cities and towns by rail. In 2016, Amtrak estimated that 53% of total riders in the state were tourists, and 9% would not have made the trip if not for the availability of Amtrak service (Amtrak, n.d. b). Tourists can enjoy local sights, restaurants, shopping, and other activities that result in generating revenue and supporting local jobs. The commonwealth's heritage railroads and museums are major tourist attractions as well and bring tourist dollars that benefit local economies.

Finally, access to passenger rail service allows increased mobility, especially for those with limited transportation options. In particular, low-income and elderly passengers may depend on rail transit to access work, school, daily errands and appointments, or to take recreational trips. The state's elderly population has increased 16.3% from 2010 to 2017, a rate more than 20 times faster than Pennsylvania's overall population growth of 0.8% (PennState Harrisburg, 2020). Nationally, Pennsylvania has the 5th largest population of those 65 and older (PennState Harrisburg, 2020). This segment of the population will continue to grow, with the state's elderly dependency ratio increasing from 30 dependent elderly persons for every 100 working age persons in 2017 to 38 by 2030 (PennState Harrisburg, 2020). The availability of passenger rail services provides the transportation disadvantaged populations with access to more locations, activities, and potential employment options, which benefits them by improving their quality of life and well-being and encouraging a more active lifestyle.

2.2 Trends and Forecasts

2.2.1 Demographic and Economic Growth Factors

The demographic and economic factors discussed below are important elements when considering transportation planning strategies for passenger and freight rail in the commonwealth.

The economic picture for Pennsylvania, and for the world, changed in early 2020 with the emergence of the coronavirus disease 2019 (COVID-19) pandemic. This section, where possible, includes considerations from the global pandemic on demographic and economic growth factors.

2.2.1.1 Population

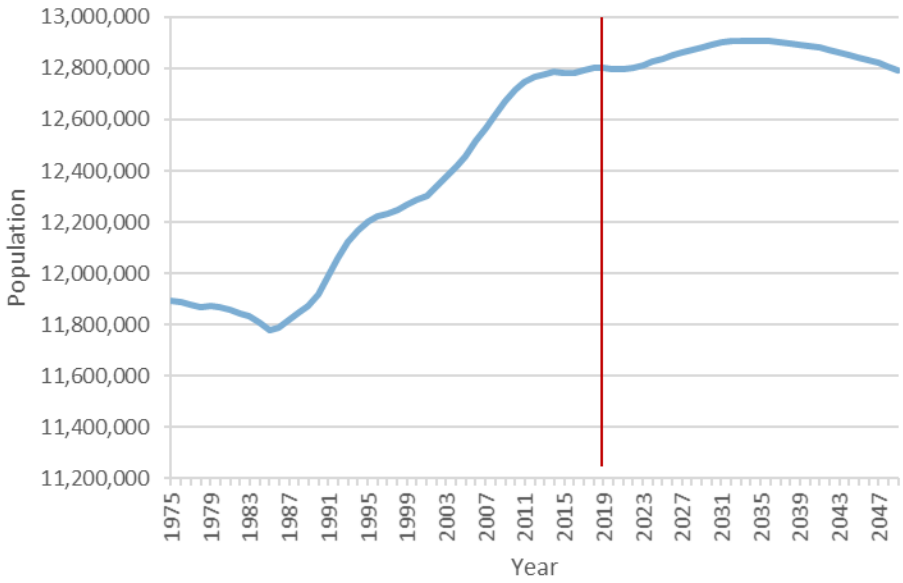
Pennsylvania is the 5th largest state in terms of population, with more than 12.8 million residents as of 2019 (U.S. Census Bureau, 2020). Table 2-31 shows the population change in Pennsylvania compared to the United States, the Northeast region, and neighboring states over the last 10 years. This table provides context for Pennsylvania's population changes in comparison to that of its neighboring states and the United States overall.

Table 2-31: Population Estimates and Change, 2010–2019

Geographic Area	Population Estimate		2010–2019 Change	
	April 1, 2010	July 1, 2019	Number	Percent
Pennsylvania	12,702,868	12,801,989	99,121	0.8%
United States	308,758,105	328,239,523	19,481,418	6.3%
Northeast	55,318,443	55,982,803	664,360	1.2%
Delaware	897,937	973,764	75,827	8.4%
Maryland	5,773,794	6,045,680	271,886	4.7%
New Jersey	8,791,978	8,882,190	90,212	1.0%
New York	19,378,144	19,453,561	75,417	0.4%
Ohio	11,536,751	11,689,100	152,349	1.3%
West Virginia	1,853,018	1,792,147	–60,871	–3.3%

Source: U.S. Census Bureau (2020)

Pennsylvania's population growth has been slow for several years as a result of out-migration to other states and declining birth rates. Net in-migration from outside the United States remains a source of population gains for Pennsylvania, which is partly due to the presence of major research universities that attract a global student body. Future total population is projected to peak in 2034 at approximately 12.9 million and then begin a slow decline (Figure 2-16) (IHS Markit, 2020).



Note: The red line indicates the historical end date of the data presented. In this case all population data beyond 2019 Quarter 2 is forecasted.

Figure 2-16: Pennsylvania total population (IHS Markit, 2020; U.S. Census Bureau, 2019)

One factor contributing to a potential future decline in Pennsylvania's overall population is an increasing senior population. The proportion of residents aged 65 or older currently makes up the second largest age group in Pennsylvania, and this age group is on the rise. When a population largely consists of seniors, the population tends to see lower birthrates and a natural decrease (i.e., the number of deaths outweighs the number of births). With a large population of seniors in the state, robust passenger rail service can provide improved and continued mobility opportunities to this age group. Table 2-32 shows the age distribution of Pennsylvania's population.

Table 2-32: Pennsylvania Age Distribution

Age Group	Percent of Population, 2018	Average Annual Percent Change	
		2013–2018	2018–2023[(1)]
0–24	29.7%	–0.8%	–0.5%
25–34	13.3%	1.1%	–0.8%
35–44	11.7%	–0.4%	0.9%
45–54	12.9%	–2.1%	–0.9%
55–64	14.1%	0.8%	–0.8%
65+	18.2%	2.2%	2.1%

Source: IHS Markit (2020)
[(1)] Forecasted

As shown in Figure 2-17, the southeast and south-central regions, Lehigh Valley, Centre County, and Butler County experienced positive population growth rates over the last 10 years. The remaining portions of the state experienced negative growth rates, with Cambria and Cameron Counties having the sharpest declines.

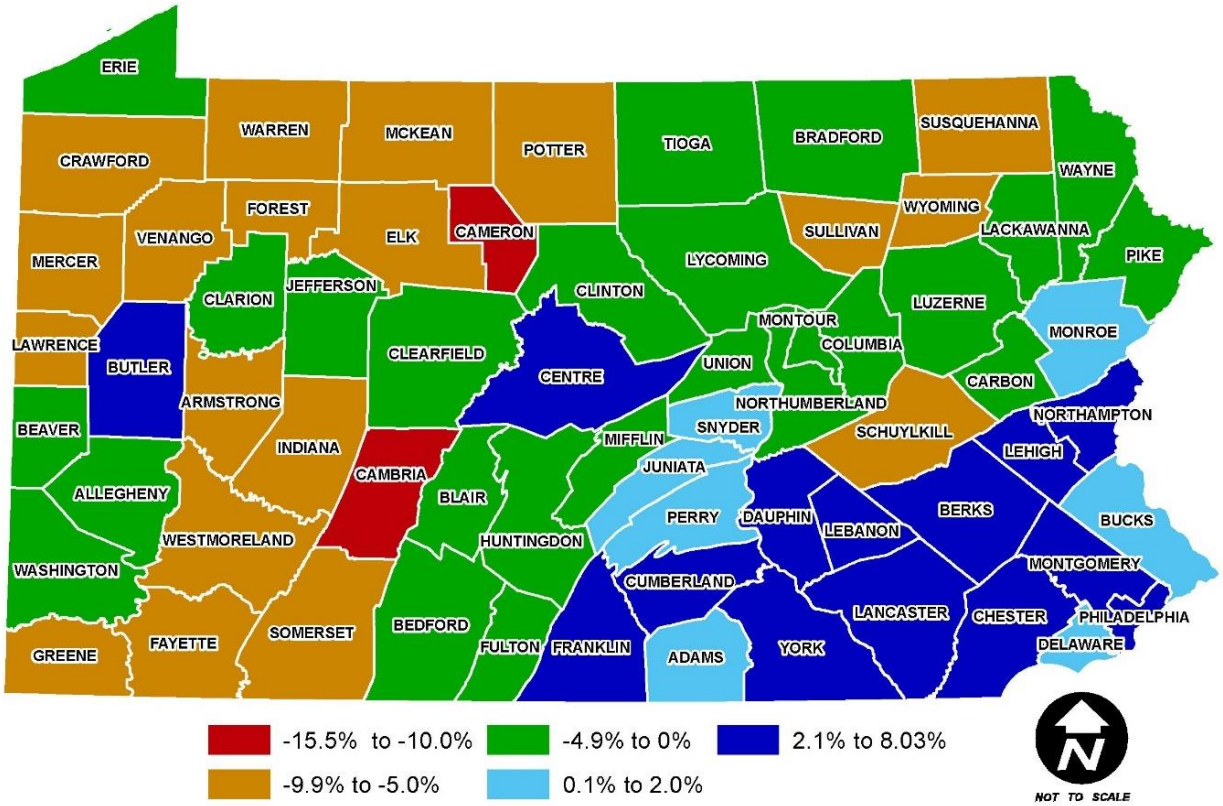


Figure 2-17: Pennsylvania population growth rate by county, 2010–2020 (IHS Markit, 2020; U.S. Census Bureau, 2018)

Figure 2-18 shows the projected population growth rates for the next 25 years. In this future scenario, Cambria and Cameron Counties will continue to see 10% or greater declines and are joined by Elk and Fayette Counties. Meanwhile, population growth will be widely distributed, particularly in the eastern and central portions of the state. Population growth rates are predicted to be the most pronounced in Cumberland and Forest Counties.

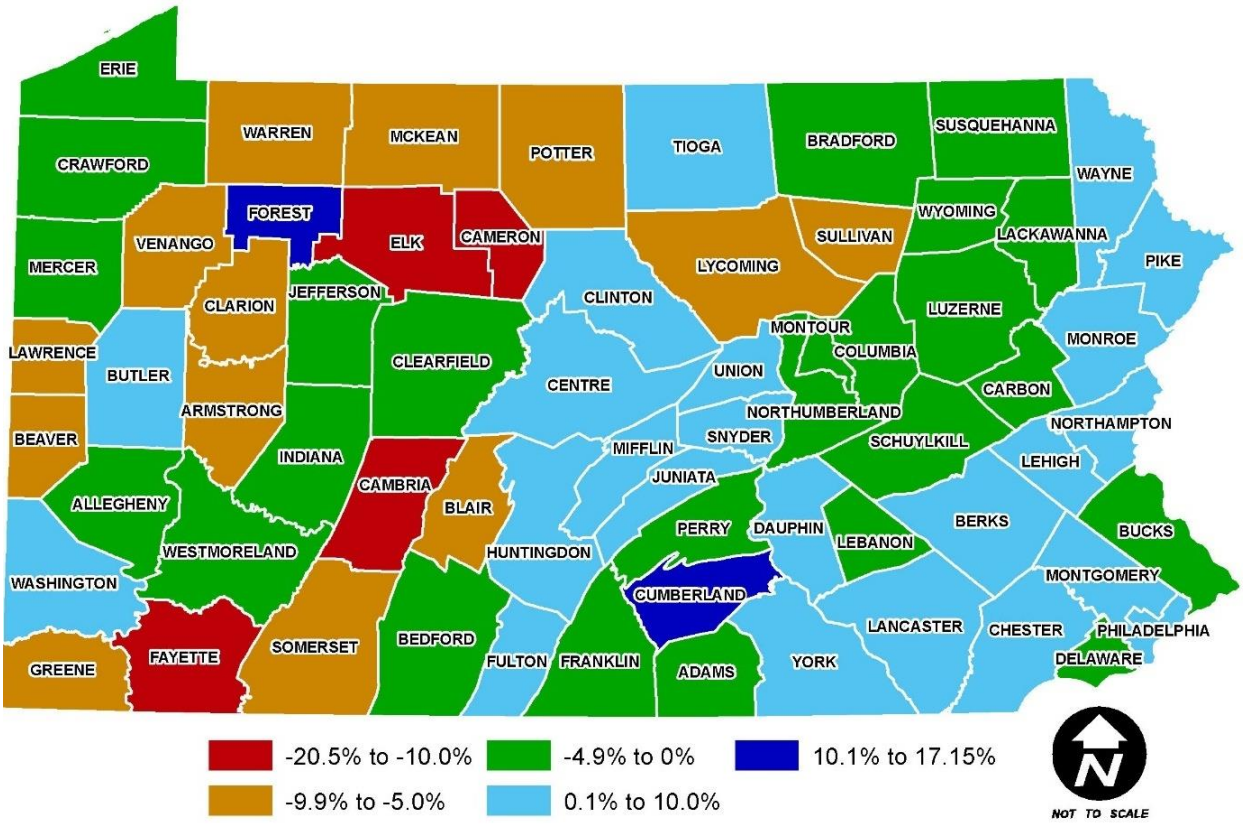


Figure 2-18: Pennsylvania population growth rate by county, 2020–2045 (IHS Markit, 2020; U.S. Census Bureau, 2018)

2.2.1.2 Employment

Virtually all sectors of Pennsylvania's economy have been affected by the COVID-19 pandemic. As of July 1, 2020, over 2.2 million Pennsylvanians had filed unemployment claims as a result of the pandemic (Commonwealth of Pennsylvania, 2020b). Lower-wage workers, especially those in leisure and hospitality, retail, and other services, were hit particularly hard because their work depends on customer interactions. Other businesses, such as manufacturing and construction, remained partially open. The impact on healthcare had been mixed, with overwhelming demand for emergency and acute care being partly offset by the short-term cessation of elective and preventive treatments.

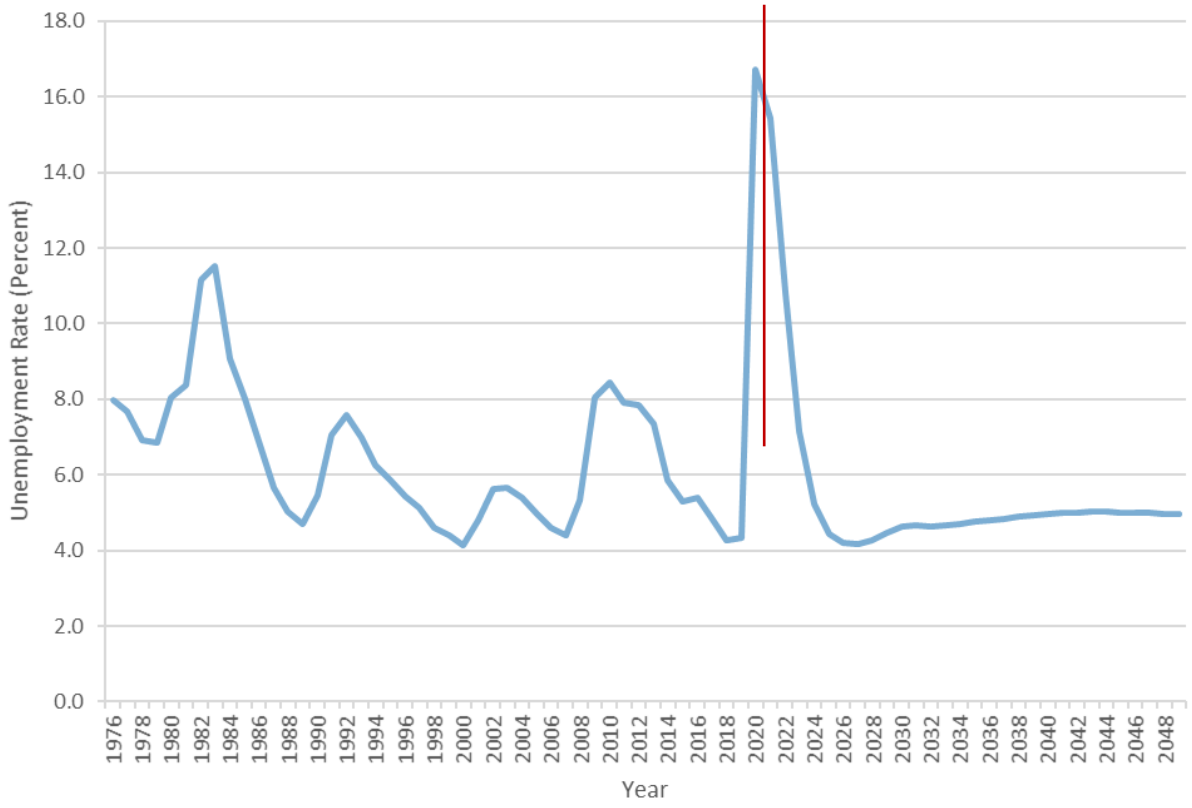
The COVID-19 pandemic also led to the temporary closure of school buildings and daycare centers across the commonwealth, and also idled thousands of workers in activities such as food service, housekeeping, and maintenance of schools (Pennsylvania Department of Labor & Industry, 2020).

As of the May 2020 Pennsylvania Department of Labor & Industry employment situation report, Pennsylvania's unemployment rate was 13.1% in May, which is comparable to

the national rate of 13.3%. Between May 2019 and May 2020, the commonwealth's unemployment rate increased by 8.9 percentage points. Comparably, the national unemployment rate was up 9.7 points between May 2019 and May 2020 (Pennsylvania Department of Labor & Industry, 2020). Figure 2-19 shows the historical and projected unemployment rates in Pennsylvania. Unemployment is expected to peak in 2020 at 16.7% and then decrease over the next few years, finally stabilizing between 4 and 5% in 2026.

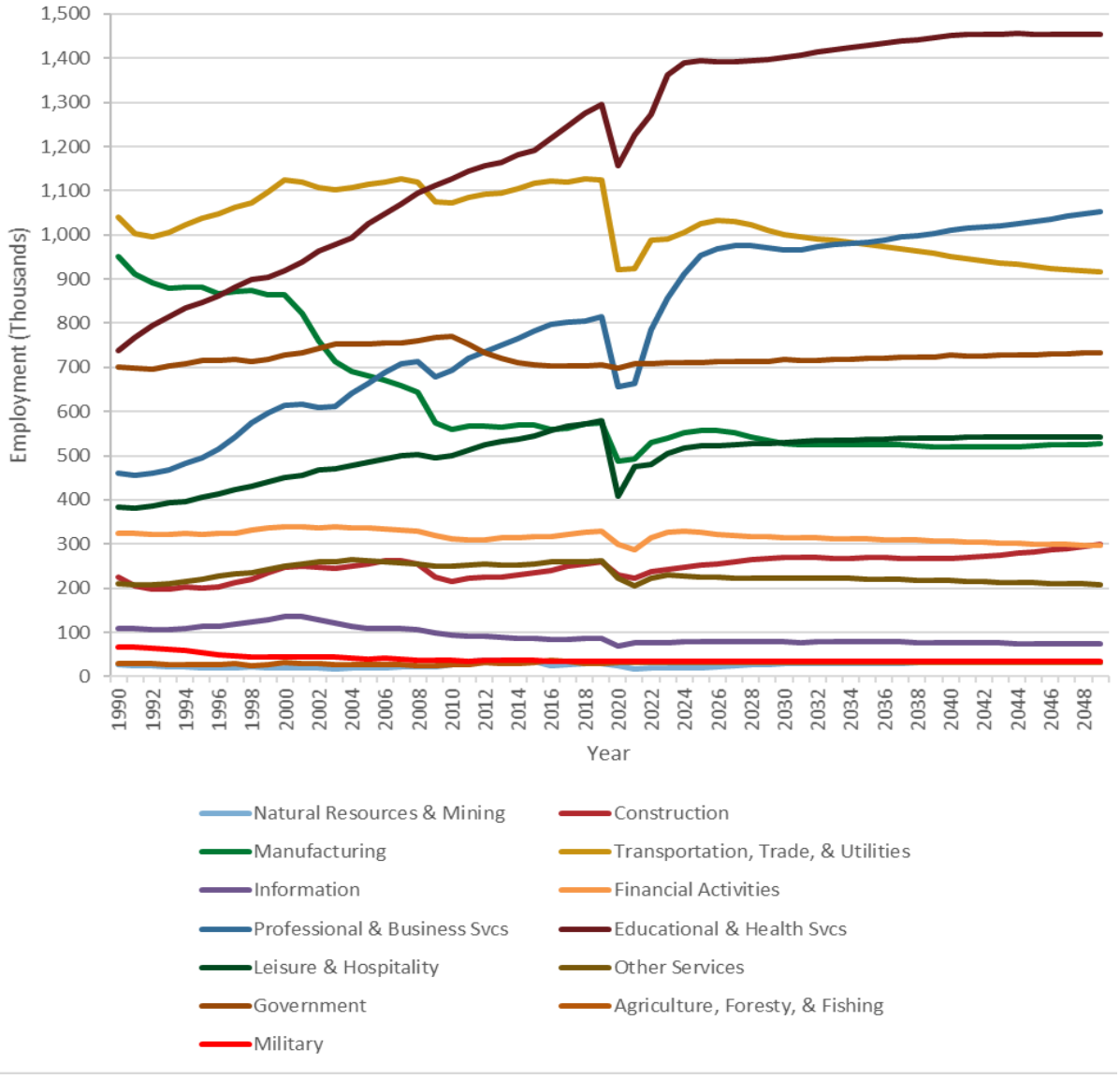
As shown in Figure 2-20, employment in all industries, with the exception of the Military, has recently experienced, and will continue to experience, a decline. Employment in Educational, Health, Professional, and Business Services is expected to rebound the fastest. Professional and Business Services include professional, scientific, and technical services; management of companies and enterprises; administrative and support services; and waste management and remediation services. Educational and Health Services include educational services, health care, and social assistance activities. Overall, the Health Care sector will likely continue to see increased demand created by expanded insurance coverage via the Affordable Care Act. Additionally, Pennsylvania is home to many top research hospitals that draw patients from outside the state. The commonwealth's education providers, especially its notable research universities, not only provide employment on campus, but also help to nurture new businesses. The Pittsburgh region has seen rapid growth in high-tech fields such as software development and robotics, thanks in part to the presence of its universities and the graduates they produce (U.S. Census Bureau, 2020).

Employment in Transportation, Trade, and Utilities, which includes transportation, warehousing, utilities, retail trade, and wholesale trade, is projected to decline from its peak in 2019 at 1,125,100 to 916,080 by 2049.



Note: The red line indicates the historical end date of the data presented. In this case all unemployment rates beyond 2020 Quarter 1 are forecasted.

Figure 2-19: Pennsylvania unemployment rates
(IHS Markit, 2020; U.S. Census Bureau, 2019)



Note: The historical end date of the data presented varies between 2018 Quarter 4 and 2020 Quarter 1. All employment numbers beyond 2018 Quarter 4 or 2020 Quarter 1 are forecasted.

Figure 2-20: Pennsylvania employment by economic activity sector (IHS Markit, 2020; U.S. Bureau of Labor Statistics, 2019; U.S. Bureau of Economic Analysis, 2018)

2.2.1.2.1 Short-Term Employment Trends

Between January 2016 and October 2019, approximately 20,000 jobs lost and 1,100 jobs gained were reported over the same period. The following details recent, significant employment losses and opportunities in Pennsylvania.

- Amazon is building an order-fulfillment center near the Pittsburgh International Airport that could provide more than 800 jobs. The facility is to be a "non-sortable" fulfillment center, which means it will handle larger items such as patio furniture and outdoor equipment. The facility is expected to open in late 2020.

- Merck and Johnson & Johnson both announced layoffs in the Philadelphia area between the fall of 2019 and January 2020. Merck is reducing its staff affiliated with its offices in Lansdale and Upper Gwynedd by around 500, although not all of the affected employees work locally. Johnson & Johnson is letting go of 297 employees at its Wayne facility because the company has discontinued the product line manufactured there.
- The Philadelphia Energy Solutions refinery in Philadelphia, the largest refinery on the East Coast, closed after an explosion in one of its alkylation units on June 21, 2019. The shutdown has taken 335,000 barrels per day of refining capacity offline and resulted in the direct loss of more than 1,000 jobs. The plant also employed well over that number of contractors at various times through the year to perform maintenance and other tasks.
- Philadelphia's Hahnemann University Hospital closed in September 2019, which resulted in the loss of 2,500 jobs.
- The construction of natural gas pipelines is starting to wind down as takeaway capacity meets current demand. Persistent low prices for natural gas are putting downward pressure on well-drilling and completion, which will limit further construction employment gains from the energy sector.
- Construction work continues on the massive ethane cracker plant in Beaver County. The plant is expected to create up to 6,000 construction jobs and, once open, will employ about 600 permanent employees (Royal Dutch Shell, 2020).
- The Three Mile Island nuclear power plant began closing in September 2019. The plant has had trouble competing on price, particularly against natural gas-fired plants. The plant employed 675 workers, and approximately 300 are keeping their jobs during the first phase of decommissioning, but by 2022, only 50 will remain employed (IHS Markit, 2020).
- Riverbend Foods closed its North Side plant in Pittsburgh in July 2019, resulting in the loss of 400 jobs. The plant produced private-label consumer goods, including soup and baby food, for Walmart, Kroger, Giant Eagle, and other stores.
- Bayer is in the process of consolidating its administrative practices, which includes closing its Robinson site in the Pittsburgh area. The decision will result in the loss of 600 jobs, mostly in finance, accounting, legal, and technology roles. At one point, the office had been the North American headquarters for Bayer, but that role was moved to New Jersey in 2012 (IHS Markit, 2020).

2.2.1.2.2 Long-Term Employment Trends

For the long term, technology is emerging as an important employment field according to IHS Markit data. The following significant future employment opportunities in Pennsylvania, which are all centered on Pittsburgh, have been identified (IHS Markit, 2020).

- Honeywell has chosen Pittsburgh's Strip District to be the home of a technology center to develop artificial intelligence applications, machine learning, and advanced robotics for use in warehouses. Named Honeywell Robotics, the center will work with artificial intelligence researchers at Carnegie Mellon's National Robotics Engineering Center to develop new technologies.
- In October 2019, Pittsburgh International Airport announced plans to build a hub for additive manufacturing (also known as 3-D printing) on I-95 acres near the airport. The goal is to provide a campus that can furnish all aspects of the additive manufacturing process, including the needed component powders. The facility has one tenant signed, which will supply and recycle argon and other gases used in the process.
- Pittsburgh-based Argo AI, the autonomous vehicle startup, continues to attract large investments from major automakers. The company had already secured $1 billion from Ford and recently got an investment of $2.6 billion in capital and assets from Volkswagen (VW) Group. This is part of a broader alliance between VW and Ford to develop autonomous and electric vehicles. VW's investment includes $1 billion in capital plus the transfer of its own self-driving subsidiary, Autonomous Intelligent Driving (AID), valued at $1.6 billion. The AID team will remain in Munich, Germany, and become Argo's European headquarters.
- Aurora, a developer of self-driving vehicle technology with locations in Pittsburgh and Silicon Valley, has reached deals to produce vehicles for Volkswagen and Hyundai. The company plans to add engineers and other skilled workers at its Pittsburgh research center.

2.2.1.3 Personal Income

The combination of job losses due to COVID-19 and reduced hours for others who remain employed through the pandemic, along with reduced bonuses and other variable compensation, will result in wage disbursements for 2020 below the 2019 level. On the other hand, various payments from the federal and state governments, including unemployment benefits and one-time stimulus checks, will allow overall personal income to continue to rise from 2019 to 2020 (Table 2-33).

Table 2-33: Pennsylvania Personal Income Indicators

Indicator	2016	2017	2018	2019	2020	2021	2022	2023
Per capita personal income (thousand $)	$51.6	$53.1	$56.3	$58.8	$59.6	$60.1	$62.7	$65.1
Per capita personal income (% change)	2.4%	3.0%	5.8%	4.5%	1.4%	0.7%	4.5%	3.8%
Average annual wage (thousand $)	$52.8	$54.4	$56.1	$58	$59.8	$61.8	$63.2	$64.8
Average annual wage (% change)	0.5%	3.0%	3.1%	3.3%	3.2%	3.4%	2.3%	2.4%
Wage disbursements (million $)	$312,526	$325,049	$339,164	$353,566	$329,750	$357,015	$378,892	$395,694
Wage disbursements (% change)	1.3%	4.0%	4.3%	4.2%	–6.7%	8.3%	6.1%	4.4%

Sources: IHS Markit (2020); U.S. Bureau of Economic Analysis (2019)
Note: The historical end date of the data presented is 2019 Quarter 4. All income indicator numbers beyond 2019 are forecasted.

Counties with the highest per capita income in the commonwealth are highlighted in Figure 2-21 (U.S. Census Bureau, 2020).

Median household income in Pennsylvania in 2018 was $60,902 and is expected to continue the trend upward through 2049 (Figure 2-22).

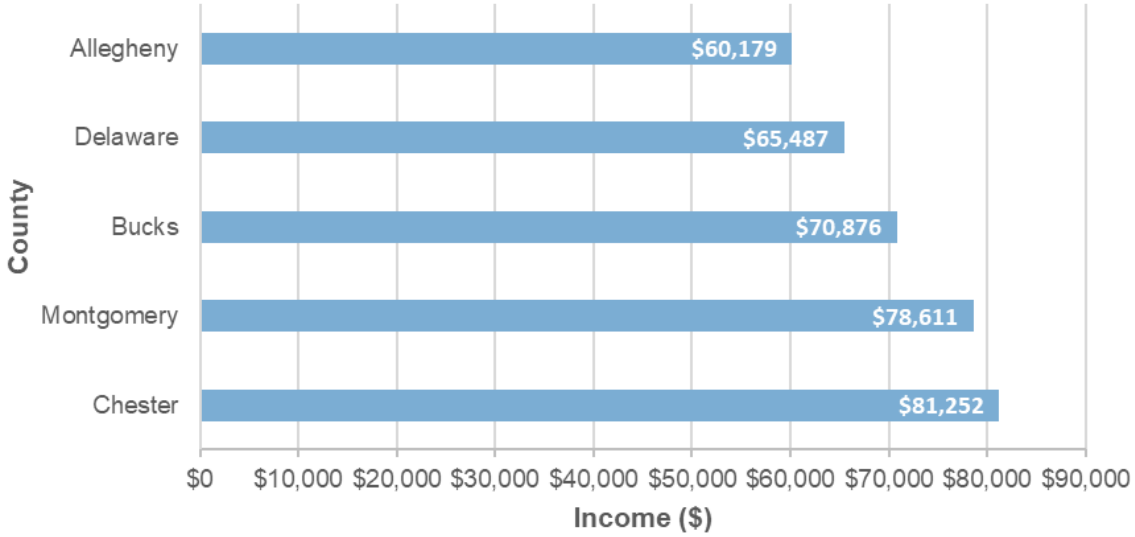
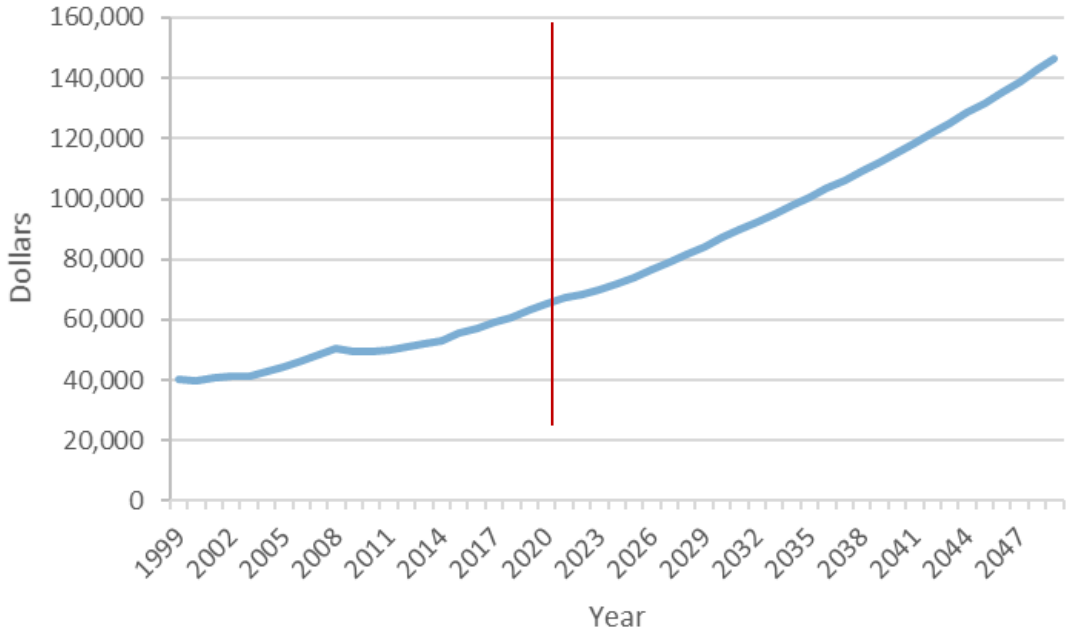


Figure 2-21: Pennsylvania's top counties by per capita income (2018)
(IHS Markit, 2020; U.S. Bureau of Economic Analysis, 2018)



Sources:
Note: The red line indicates the historical end date of the data presented. In this case all income beyond 2018 Quarter 4 is forecasted.

Figure 2-22: Pennsylvania median household income
(IHS Markit, 2020; U.S. Bureau of Economic Analysis, 2019)

2.2.2 Freight Demand and Growth

2.2.2.1 General Macroeconomic Forecast Trends and Outlook

An IHS macroeconomic forecast developed around April 2020 provided perspective on growth trends of Pennsylvania's economy and industries. Global energy markets are facing their own calamity, partly due to lost demand from the recent COVID-19 pandemic but also due to a struggle for global market share between Saudi Arabia and Russia that began around the same time. The initial impact was reflected in oil prices, but natural gas and coal are being dragged down as well. A reduction in oil production will also bring down natural gas production (some natural gas is produced along with oil), but that reduction will not be enough to offset lost demand for energy overall. Drilling of new natural gas wells was already pulling back in Pennsylvania due to low prices, while coal production for now has been stop-and-start as companies deal with protecting worker health and low demand.

The medium- to long-term outlook is more uncertain than usual due to the impact of the pandemic, as it is unknown when businesses will return closer to normal. Most sectors are expected to be able to get back to work by the end of 2020 at the latest, with the level of activity depending more on product demand than on supply-side restrictions. The leisure and hospitality sector stands out as the main industry facing long-term fallout; this will affect most parts of the commonwealth to some degree, with the Philadelphia region likely to suffer the greatest impact. However, the commonwealth's strong presence in the healthcare sector, along with specializations such as artificial intelligence and robotics, will provide solid sources of growth for uncertain times.

The Marcellus Shale natural gas deposit is a long-term asset for the commonwealth and region, although drilling activity has slowed to a crawl due to low prices for natural gas. The buildout of infrastructure to get the gas to market continues, with construction of pipelines, compressing stations, and processing facilities. Development of natural gas continues to be one of the biggest factors in Pennsylvania's economic outlook. Although direct employment in natural resources and mining is a small part of total jobs in the commonwealth, its rapidly rising location quotient helps to illustrate the growth seen in the last few years. More important to the economy at all levels are the related jobs created in other sectors, such as construction, chemicals, transportation, and professional services. Pennsylvania's manufacturers have already benefitted from demand for steel and equipment being used to drill the wells and connect them to demand centers via new pipelines; in the longer term, the commonwealth's competitiveness in manufacturing should be enhanced by the decreased costs of energy and petrochemical feedstocks coming from beneath the state.

Some regions of Pennsylvania, especially the Pittsburgh area, have become magnets for high-tech jobs such as software development. The commonwealth's numerous high-quality research universities are certainly playing a role in this development. Tech giants Google and eBay have recently moved into the area, while Westinghouse is in the process of expanding its headquarters in the region.

2.2.2.2 Future Freight Rail Movements

The future needs of Pennsylvania's rail freight system are substantially driven by what future rail demand might look like. This section presents potential future demand for freight rail in the commonwealth for the plan year of 2045. This forecast provides a baseline against which future demand for rail can be considered, and thus is not only a reflection of current macroeconomic trends, but also the current trends in logistics, distribution, and sourcing within the freight-dependent economic sectors. However, there can and may be significant changes in the rail industry, economic composition, logistics, public policy, and other factors that can affect the general demand for goods movement. In addition to the Baseline forecast, two alternate scenarios were forecasted for the rail commodity flows to represent a range of possible futures: a Low Growth Scenario (LGS), and a High Growth Scenario (HGS).

In 2017, 193.6 million tons of freight in 4.9 million railcars moved over Pennsylvania's rail transportation system. By 2045 under the Baseline forecast, Pennsylvania's freight rail system is projected to carry more than 182 million tons of freight in 5.4 million railcars, or a decrease of 6% by tonnage and an increase of 11% by rail units. The decline in rail tons is mainly due to a projected 80% decline in coal traffic. If coal traffic is excluded from the total rail tons, tonnage of the remaining commodities is actually projected to increase moderately at 18% from 147 million tons in 2017 to 173 million tons in 2045.

The LGS projects a decline in rail tons to 159 million tons, or 18% decline, and a minimal increase in railcars to 5 million railcars, or 1% growth. The HGS projects growth to 213 million tons, or 10% growth, and an increase to 5.9 million railcars, or 19% growth by 2045. Figure 2-23 shows the forecasted tonnage and rail units for the three scenarios. Figure 2-24 shows the existing and projected future rail tons for inbound, outbound, intrastate, and passthrough flows.

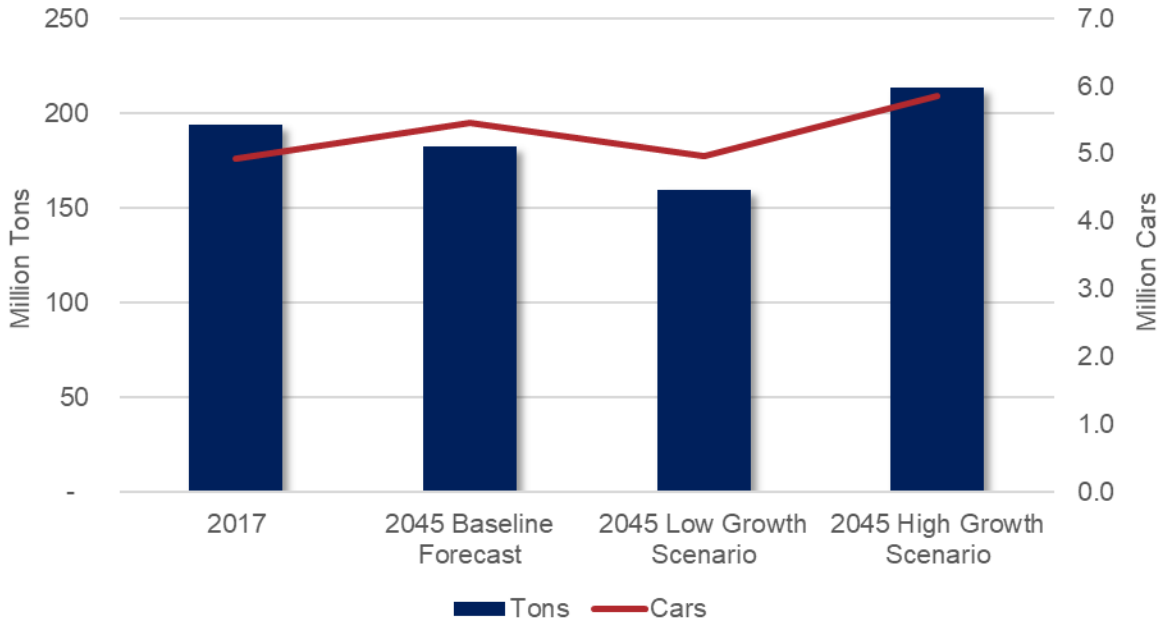


Figure 2-23: Annual rail tons and cars, 2017–2045
(DVRPC, 2018); IHS Markit Analysis, 2020)

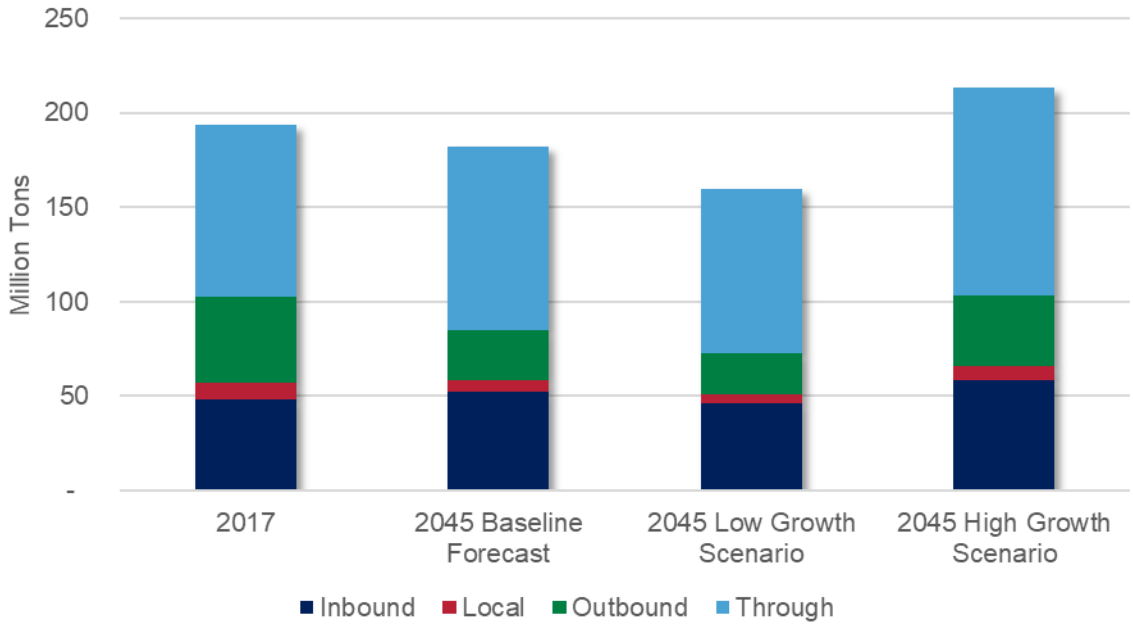


Figure 2-24: Annual rail tons by movement direction, 2017–2045
(DVRPC, 2018); IHS Markit Analysis, 2020)

The top 10 commodities for 2017 moved to, from, and within Pennsylvania by rail, and the corresponding 2045 projections are shown in Figure 2-25. These commodity flows account for 88%, or 90.3 million tons, of the total rail tons in 2017 and are projected to account for 84% of the projected total rail tons in 2045 (or 71.5 million tons). These

flows exclude through traffic, or traffic that does not originate or terminate in the commonwealth.

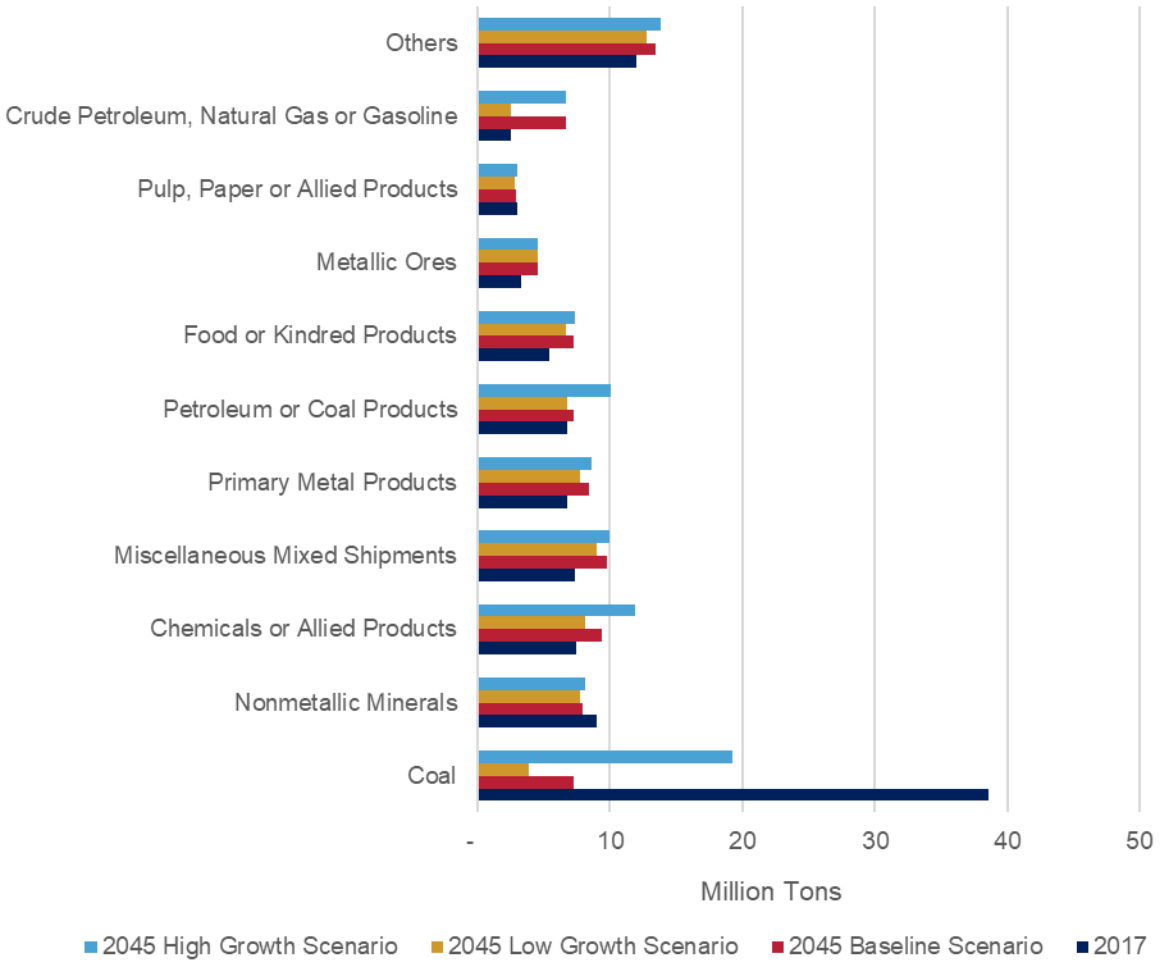


Figure 2-25: Top rail commodities (excluding through), 2017–2045
(DVRPC, 2018; IHS Markit Analysis, 2020

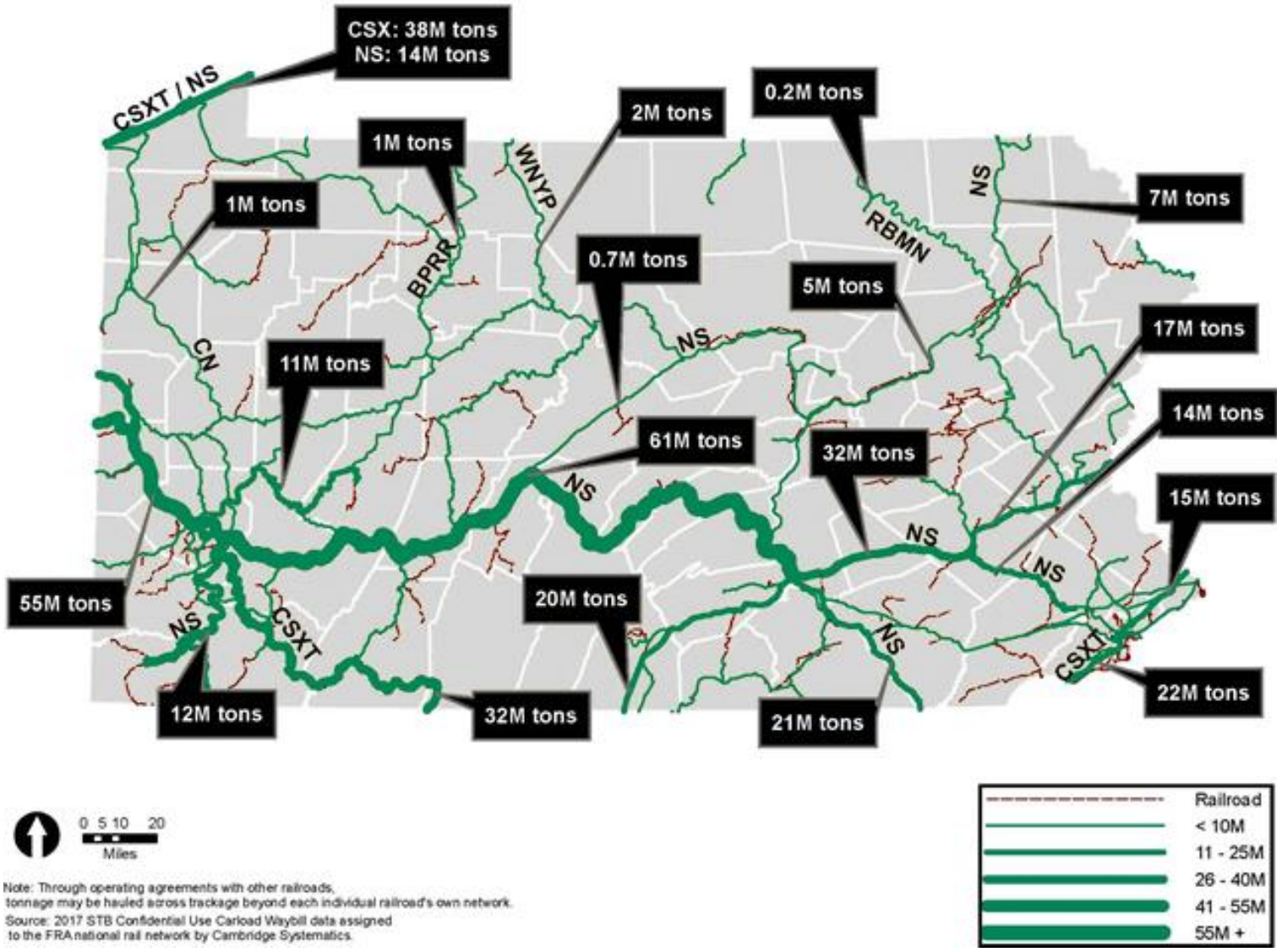
Though coal was the top commodity in 2017, it is not expected to continue to be the top commodity by 2045, with a projected 81% decline over the next 25 years, according to the Baseline forecast scenario. The LGS projects a 90% decrease and the HGS projects a 50% decrease. The coal industry has taken a beating from a combination of competition from low-priced natural gas, rapidly declining costs of renewable energy sources such as wind and solar for electric power generation, and regulatory pressures to reduce GHG and other pollutants released into the atmosphere from the burning of coal. Coal prices will rise at times to balance short-term supply and demand, but the demand base is expected to continue to shrink due to scheduled closures of coal-burning electricity generating stations.

The expected trends for the rest of the top rail commodity flows over the next decades include a modest decline for nonmetallic minerals (including stone, riprap, gravel, and sand) and pulp, paper, and allied products. Worth noting is the projected 157% increase in rail shipments of crude petroleum, natural gas, or gasoline shipments from 2.6 million tons in 2017 to 6.7 million tons by 2045 in both the Baseline and High Growth scenarios (Figure 2-25).

Figure 2-26 shows the 2017 freight tonnage, while Figure 2-27, Figure 2-28, and Figure 2-29 show the Baseline, Low Growth, and High Growth forecasted annual tonnage flow on Pennsylvania's rail system in 2045.

In 2017, freight on the Main Line corridor west of Harrisburg owned and operated by NS parallel to I-76, increased to 61 million tons. By 2045, this corridor is projected to carry up to 60 million tons. The Erie corridor, where CSX and NS operate relatively adjacent rail lines between the Ohio state line and the New York state line parallel to I-90, collectively carried 52 million tons in 2017. By 2045, 53 million tons are projected to be moved on the Erie corridor. In 2017, approximately 32 million tons were moved on the NS Crescent corridor east of Harrisburg, and by 2045 up to 38 million tons are projected to move on this NS corridor. The Southeast corridor, which runs parallel to I-95 between the Delaware state line and the New Jersey state line via Philadelphia, and which hosts both NS and CSX service on parallel lines, in 2017 carried up to 22 million tons, and by 2045 is projected to carry 23 million tons.

Figure 2-28 and Figure 2-29 show the forecasted ranges provided by the Low Growth and High Growth scenarios. In general, the rail lines most impacted by the projections of the alternate scenarios, such as in the southwestern and southeastern regions of the commonwealth, carry energy products such as coal, petroleum and coal products, and crude petroleum, natural gas, or gasoline.



Note: Through operating agreements with other railroads, tonnage may be hauled across trackage beyond each individual railroad's own network.
Source: 2017 STB Confidential Use Carload Waybill data assigned to the FRA national rail network by Cambridge Systematics.

Figure 2-26: Rail tonnage flows, 2017

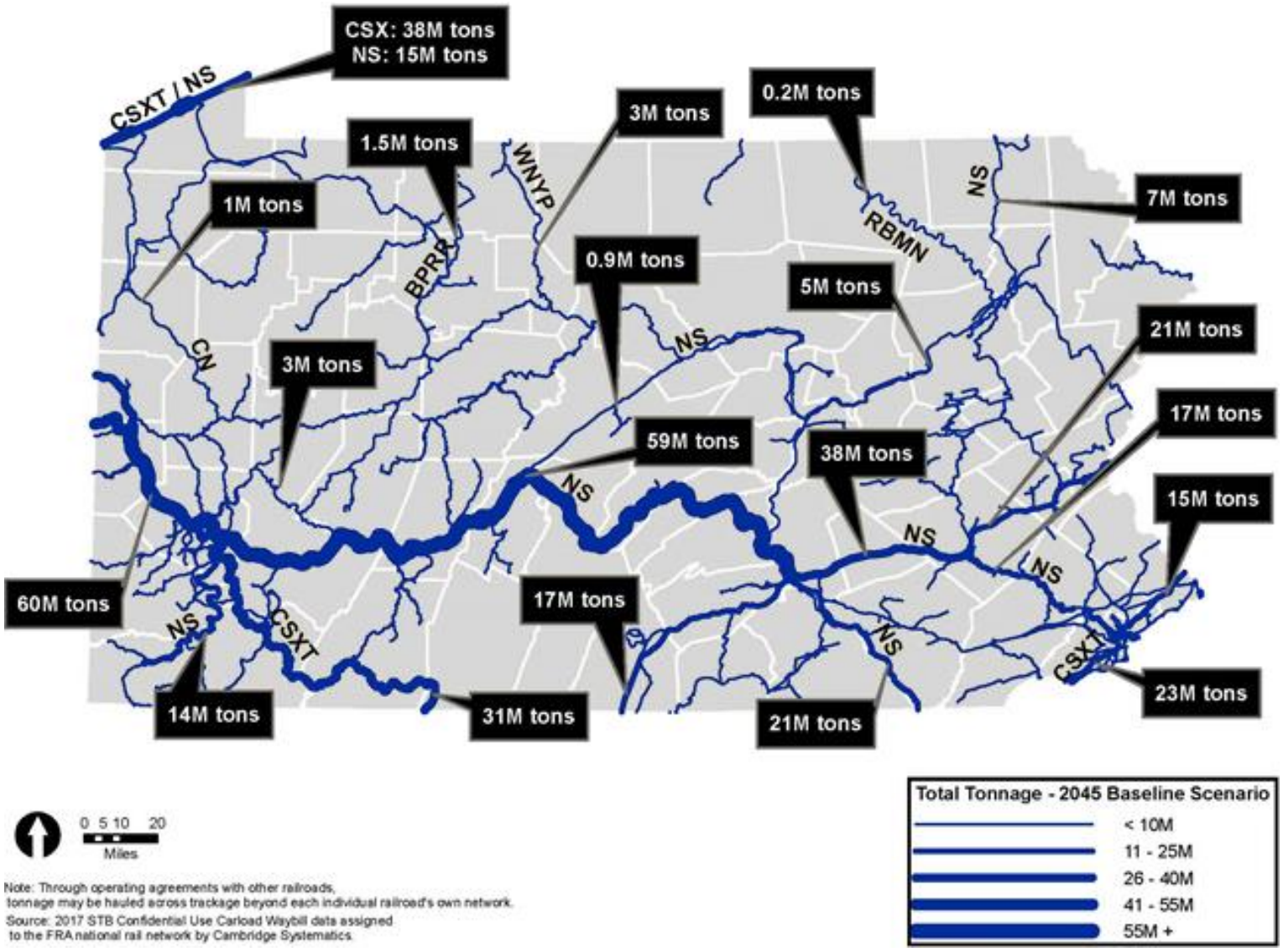


Figure 2-27: Rail tonnage flows, 2045 Baseline Scenario

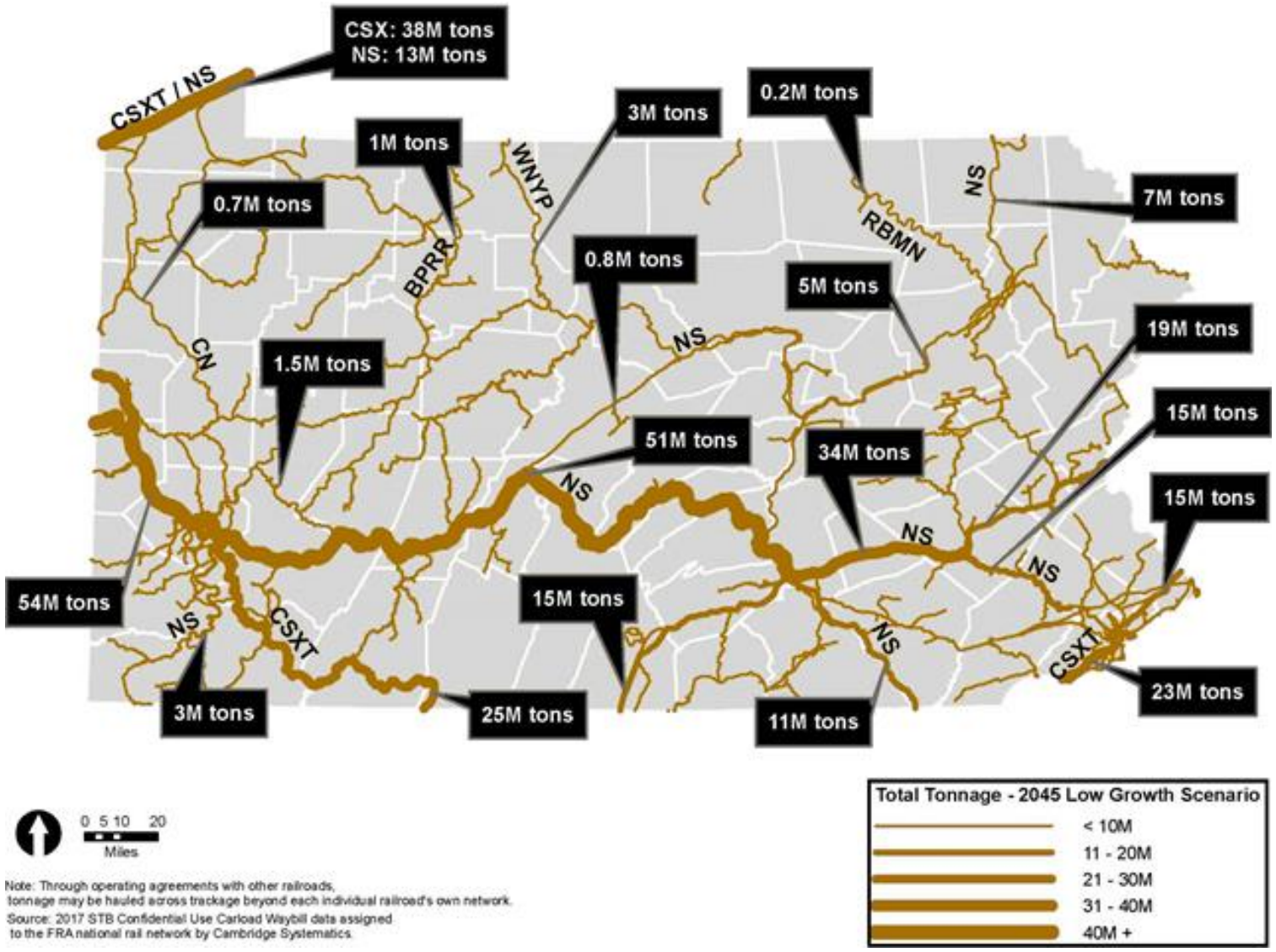
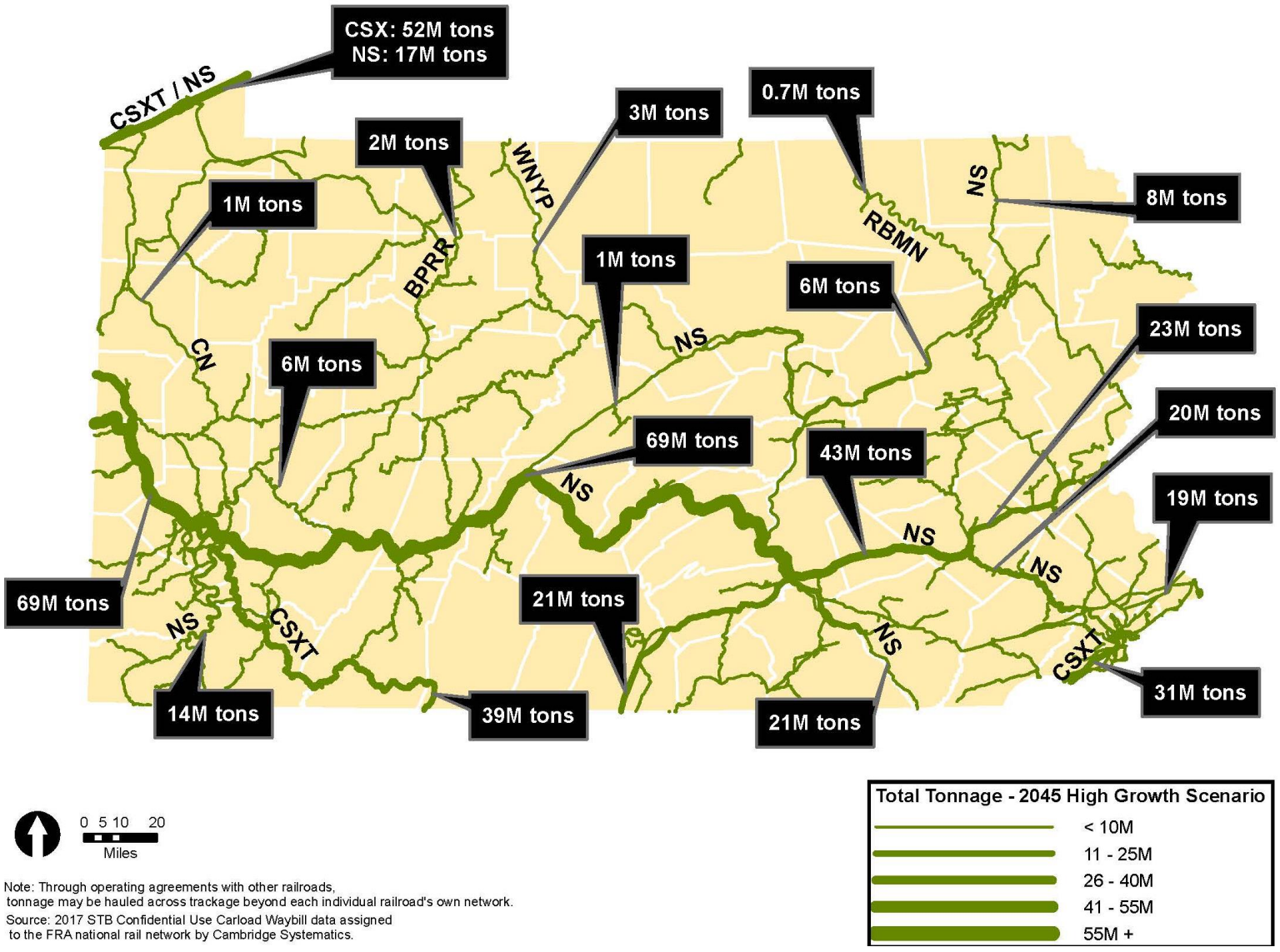


Figure 2-28: Rail tonnage flows, 2045 Low Growth Scenario



Note: Through operating agreements with other railroads, tonnage may be hauled across trackage beyond each individual railroad's own network.

Source: 2017 STB Confidential Use Carload Waybill data assigned to the FRA national rail network by Cambridge Systematics.

Figure 2-29: Rail tonnage flows, 2045 High Growth Scenario

2.2.3 Passenger Rail Demand and Growth

2.2.3.1 Amtrak

Amtrak's intercity passenger rail service in Pennsylvania includes approximately 120 trains a day, with 24 different stations along the following train service lines: Pennsylvanian, Keystone Service, Capitol Limited, Lake Shore Limited, Acela Express, Cardinal, Carolinian, Crescent, Palmetto, the Silver Services, and Vermonter. Table 2-34 summarizes projected station ridership growth for FFY 2025. Ridership and growth projections are based on route-level projections developed by Amtrak, based on the routes utilizing each station. Route-level projected growth rates were applied to FFY 2018 station ridership numbers to estimate the FFY 2025 station-level ridership projections. These projections were developed prior to the COVID-19 pandemic, and travel behavior changes as a result of the pandemic were not considered or captured in the projections. Rail ridership could potentially increase or decrease, as total travel is likely to go down at least temporarily, but travelers could be more likely to travel by train versus airplane.

All stations are projected to have an increase in ridership between FFY 2019 and FFY 2025. Stations along the Pennsylvanian and Keystone Service routes are projected to have the largest growth (this includes all stations in Table 2-34, except Connellsville on the Capitol Limited route and Erie on the Lake Shore Limited route). The increase in ridership is linked to adding a 14th weekday round trip on the Keystone in FFY 2023 and a second roundtrip on the Pennsylvanian anticipated to begin in FFY 2024, based on the *Amtrak Five Year Service Line Plan*. The ridership forecast produced by Amtrak yields a projected 8% increase in ridership for the Keystone in FFY 2023 and a projected 64% increase in Pennsylvanian ridership in FFY 2024, when they go into service and assumes the full ridership demand (i.e. there is not a ramp-up period for ridership, because these are already existing services). The proposed additional service for the Pennsylvanian is currently being evaluated by Norfolk Southern, the owner of the rail line. The projected ridership includes anticipated changes in the service offered, such as the second Pennsylvanian round trip.

Total growth for all Pennsylvania Amtrak stations is projected to grow 21% from FFY 2019 to FFY 2025.

Table 2-34: Amtrak Projected Ridership by Station

Station	FFY 2014	FFY 2019	Projected FFY 2025	Growth Rate FFY 2014–2019	Growth Rate FFY 2019–2025
North Philadelphia	644	1,968	2,173	206%	10%
Cornwells Heights	2,093	3,103	3,910	48%	26%
Paoli	169,181	258,231	294,848	53%	14%
Downingtown	59,950	81,342	97,056	36%	19%
Exton	106,165	146,468	181,401	38%	24%
Philadelphia 30th Street	3,901,459	4,506,952	5,321,580	16%	18%
Ardmore	56,641	68,629	76,107	21%	11%
Lancaster	522,644	577,506	716,160	10%	24%
Coatesville	15,566	14,915	19,737	–4%	32%
Harrisburg	491,539	521,043	646,454	6%	24%
Middletown	66,604	67,733	80,987	2%	20%
Mount Joy	46,391	47,964	54,545	3%	14%
Pittsburgh	146,155	129,946	243,992	–11%	88%
Lewistown	9,375	8,249	15,264	–12%	85%
Elizabethtown	108,380	100,519	126,126	–7%	25%
Parkesburg	49,642	46,669	52,916	–6%	13%
Connellsville	4,925	4,864	5,247	–1%	8%
Latrobe	4,631	4,523	4,843	–2%	7%
Johnstown	22,931	18,848	23,361	–18%	24%
Huntingdon	6,801	5,722	10,144	–16%	77%
Tyrone	3,346	2,588	4,972	–23%	92%
Greensburg	15,023	12,645	22,243	–16%	76%
Erie	18,312	15,573	16,131	–15%	4%
Altoona	26,088	18,689	34,437	–28%	84%
Total	**5,854,486**	**6,664,689**	**8,054,634**	**14%**	**21%**

Sources: Amtrak (2014); RPA (2020); Amtrak (n.d. c)
Note: FY 2025 was estimated using *Amtrak Five- Year Service Line Plans, Fiscal Years 2020–2025 (Base + Five Year Strategic Plan)* (Amtrak, n.d. c)

2.2.3.2 SEPTA

The SEPTA Regional Rail network is a commuter passenger rail service that operates 13 regional rail lines with 155 stations across the Philadelphia metropolitan area. SEPTA Regional Rail serves Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties, as well as service to Newark, DE, and Trenton and West Trenton, NJ. Table 2-35 and Table 2-36 summarize the Delaware Valley Regional Planning Commission (DVRPC) projected average weekday ridership from 2020 to 2045 for the 13 rail lines. Table 2-35 projections are in person trips, and Table 2-36 projections are in

passenger miles. The SEPTA ridership projections do not consider the effects of the COVID-19 pandemic on commuting patterns, as the long-term effects are currently unknown.

According to DVRPC, the SEPTA Regional Rail network is projected to grow 7.3% from 2020 to 2045 in person trips and 5.2% in passenger miles, even though the average trip length is expected to decrease by 0.2 mile.

Table 2-35: SEPTA Projected Ridership (Person Trips), 2020–2045

	Ridership (Person Trips)				
				Difference 2020–2045	
Regional Rail Line	**2020**	**2040**	**2045**	**Value**	**Percent**
Airport	5,540	5,890	5,980	440	7.9%
Chestnut Hill East	4,940	5,280	5,360	420	8.5%
Chestnut Hill West	4,970	5,300	5,380	410	8.2%
Cynwyd	580	590	600	20	3.4%
Lansdale/Doylestown	16,020	16,590	16,730	710	4.4%
Media/Elwyn	11,100	12,180	12,450	1,350	12.2%
Fox Chase	4,960	5,030	5,040	80	1.6%
Manayunk/ Norristown	9,840	10,450	10,600	760	7.7%
Paoli/Thorndale	20,960	22,920	23,420	2,460	11.7%
Trenton	11,090	11,500	11,600	510	4.6%
Warminster	9,430	9,940	10,070	640	6.8%
Wilmington/Newark	9,990	10,400	10,500	510	5.1%
West Trenton	10,810	11,140	11,230	420	3.9%
Total	120,230	127,210	128,960	8,730	7.3%

Source: DVRPC (2020)
Note: The DVRPC Regional Travel Forecast was prepared in April 2019 as part of the FY 2020 Air Quality Conformity Demonstration.

Table 2-36: SEPTA Projected Ridership (Passenger Miles), 2020–2045

Regional Rail Line	2020		2040		2045		2020–2045 Difference		
	Average Trip (miles)	Passenger Miles	Average Trip (miles)	Passenger Miles	Average Trip (miles)	Passenger miles	Average Trip (miles)	Passenger Miles	
								Abs.	%
Airport	8.4	46,536	8.4	49,476	8.4	50,232	0.0	3,696	7.9%
Chestnut Hill East	8.8	43,472	8.8	46,464	8.8	47,168	0.0	3,696	8.5%
Chestnut Hill West	8.4	41,748	8.4	44,520	8.4	45,192	0.0	3,444	8.2%
Cynwyd	5.0	2,900	5.0	2,950	5.0	3,000	0.0	100	3.4%
Lansdale/Doylestown	15.1	241,902	15.2	252,168	15.2	254,296	0.1	12,394	5.1%
Media/Elwyn	8.5	94,350	8.1	98,658	8.0	99,600	–0.5	5,250	5.6%
Fox Chase	9.2	45,632	9.2	46,276	9.3	46,872	0.1	1,240	2.7%
Manayunk/Norristown	10.0	98,400	10.2	106,590	10.2	108,120	0.2	9,720	9.9%
Paoli/Thorndale	13.2	276,672	12.6	288,792	12.5	292,750	–0.7	16,078	5.8%
Trenton	19.8	219,582	19.7	226,550	19.7	228,520	–0.1	8,938	4.1%
Warminster	12.9	121,647	12.7	126,238	12.7	127,889	–0.2	6,242	5.1%
Wilmington/Newark	13.8	137,862	13.3	138,320	13.2	138,600	–0.6	738	0.5%
West Trenton	16.5	178,365	16.7	186,038	16.7	187,541	0.2	9,176	5.1%
Average	**12.9**	—	**12.7**	—	**12.6**	—	**-0.2**	—	**5.2%**
Total	—	**1,549,068**	—	**1,613,040**	—	**1,629,780**	—	**80,712**	

Source: DVRPC (2020)
Note: The DVRPC Regional Travel Forecast was prepared in April 2019 as part of the FY 2020 Air Quality Conformity Demonstration.

2.2.4 Fuel Cost

2.2.4.1 Trends

Average retail gas prices over the past decade in the U.S. and in Pennsylvania ranged from a high of $3.99 per gallon in April 2011 to a low of $1.69 per gallon in February 2016 (Figure 2-30). Over the same period, average on-highway No. 2 diesel[16] prices ranged from $4.31 per gallon in March 2014 to $2.00 per gallon in February 2016 (Figure 2-31). Overall, gas and diesel prices are lower now than they were 10 years ago. Statewide and regional averages have generally mirrored national averages; however, Pennsylvania prices have been consistently above U.S. averages in recent years. This difference is due to the relatively high tax rate that Pennsylvania levies for fuel. As of January 2020, Pennsylvania's gas tax is $0.576 per gallon, and the diesel fuel tax is $0.741 per gallon (Commonwealth of Pennsylvania, 2020a). In contrast, the national average of state-levied taxes for gasoline is $0.2976 per gallon and $0.3178 per gallon for diesel (U.S. Energy Information Administration, 2020).

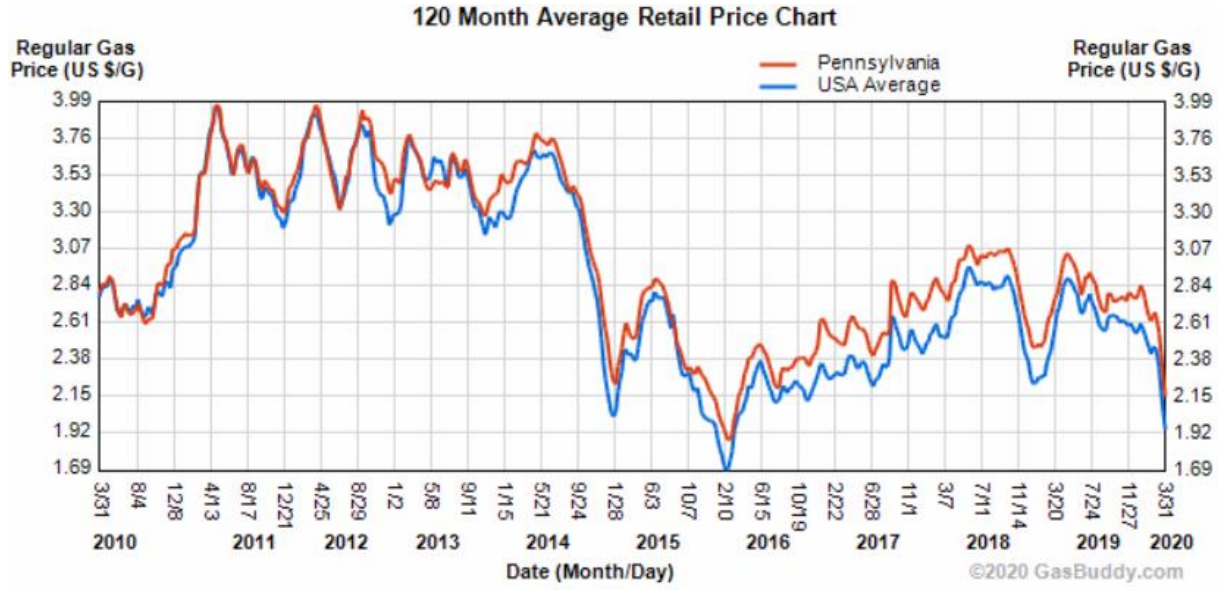


Figure 2-30: United States and Pennsylvania average retail gas prices (GasBuddy, 2020)

[16] No. 2 diesel is used by automobiles and trucks.

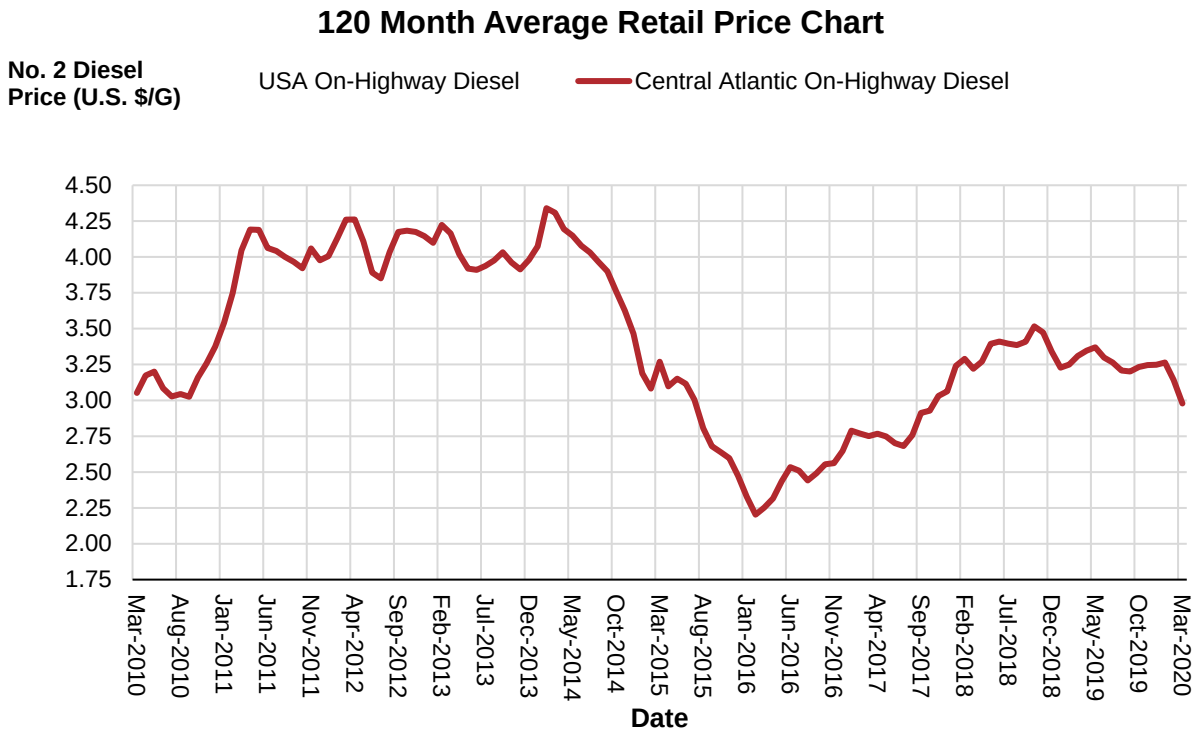


Figure 2-31: United States and Central Atlantic average retail diesel prices (U.S. Energy Information Administration, 2020c)

2.2.4.2 Forecast

According to the U.S. Energy Information Administration, prices for gas and diesel fuel are projected to rise modestly through 2050 (Figure 2-32). The reference case noted in is a reasonable baseline. The projected reference case cost of gasoline in 2050 is $3.43 per gallon, while the projected reference case cost of diesel in 2050 is $3.88 per gallon (U.S. Energy Information Administration, 2020c). However, it is important to note that these projections were made prior to the COVID-19 pandemic, which has resulted in reduced demand, general economic slowdown, and an oversupply of oil. Over the near term, the price of oil, and thus fuel, will likely stabilize at much lower levels than projected.

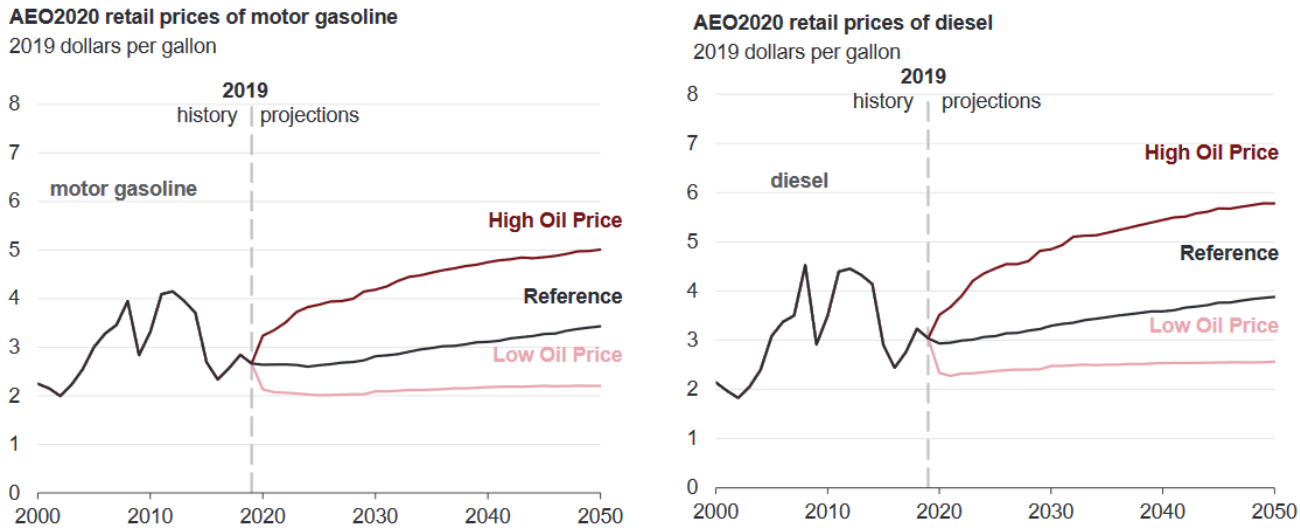


Figure 2-32: Annual Energy Outlook 2020 (AEO 2020) retail fuel price projections (U.S. Energy Information Administration, 2020b)

2.2.4.3 Effects

A 2014 study by the Mineta Transportation Institute examined the net effects of gasoline prices on transit ridership in urban areas. The study found a positive correlation between increased gas prices and increased public transit ridership, including heavy rail, light rail, and commuter rail. Specifically, commuter rail ridership was projected to markedly increase during peak periods when gasoline prices exceed $3 per gallon (Iseki and Ali, 2014). Accordingly, as fuel prices increase in the future, travelers will likely look to public transit modes, including passenger rail, for their transportation needs.

However, according to the Amtrak Sustainability Report FY 2018, locomotive diesel was Amtrak's second largest operating expense after personnel (Amtrak, 2018). Therefore, fuel price increases could also potentially affect the profitability, competitiveness, and affordability of Amtrak service. Amtrak continues to strive to improve fuel efficiency and sustainability (Amtrak, 2019c).

Technological advances and new operating practices, such as Precision Scheduled Railroading, have enabled the rail industry to be the most fuel-efficient mode to move freight over land. On average, trains are four times more fuel efficient than trucks. In addition, U.S. freight railroads can transport 1 ton of freight an average of 470 miles per gallon of fuel (AAR, 2020b). Furthermore, in a 2018 study by the American Association of State Highway Transportation Officials (AASHTO), of commodities that can typically utilize either rail or truck for freight movement, officials found that the estimated shipping cost was $0.108 per ton-mile by truck, while for rail, it was approximately 23% lower at $0.083 per ton-mile (AASHTO, 2018).

2.2.5 Rail Congestion Trends

Train volumes, performance, and potential bottlenecks of Pennsylvania's rail network were examined through a high-level capacity analysis for the 2017 base year, and three scenarios of varying growth levels (Baseline Scenario, LGS, and HGS) through 2045. This analysis entailed comparing historical and projected traffic volumes against the existing practical capacity of each main line segment, as determined by their essential physical attributes (number of tracks and signaling system). The intent of this analysis was to examine how freight traffic growth would influence rail network performance, and where bottlenecks are likely to occur. The analysis does not reflect any planned changes in either intercity or regional passenger rail services; any capacity required for such services was assumed to be provided to maintain base year service performance. Furthermore, the capacity of rail terminals and yards, which affect overall system performance, was not examined. The lack of accessible data would have made such analysis difficult; more importantly, variations in operational strategy affect the capacity of yards and terminals in a manner whereby a high-level analysis would not produce robust results.

Rail network segment volumes were compared to the practical capacities to calculate volume-to-capacity (V/C) ratios, which were expressed as Level of Service (LOS) grades. The LOS grades and descriptions correspond generally to the LOS grades used in highway system capacity and investment requirements studies (FHWA, 2017). The V/C ratios and the corresponding LOS grades are listed in Table 2-37.

Table 2-37: LOS Grades and Volume-to-Capacity Ratios

LOS Grade	Volume/ Capacity Ratio	Description
A	0.0 to 0.2	**Below Capacity.** Low to moderate train flows with capacity to accommodate maintenance and recover from incidents
B	0.2 to 0.4	
C	0.4 to 0.7	
D	0.7 to 0.8	**Near Capacity.** Heavy train flow with moderate capacity to accommodate maintenance and recover from incidents
E	0.8 to 1.0	**At Capacity.** Very heavy train flow with limited capacity to accommodate maintenance and recover from incidents
F	> 1.00	**Above Capacity.** Unstable flows; service breakdown conditions

Source: AAR (2007)

Figure 2-33 shows the major rail corridors in Pennsylvania that were evaluated for the LOS analysis. Figure 2-34 shows the distribution of mainline rail miles and train miles by LOS grade for 2017 and the 2045 forecast scenarios. The results of the analysis are summarized in Figure 2-34 and visually represented on the rail network in Figure 2-35, Figure 2-36, Figure 2-37, and Figure 2-38 for existing conditions (2017) and future conditions (2045 Baseline, Low Growth and High Growth scenarios), respectively. These tables and figures indicate current and future demands for capacity and the resulting congestion, absent any operational changes and/or investments to increase capacity.

Figure 2-34 shows the LOS estimates by corridor, and Table 2-39 lists base and forecast train counts and the practical capacity.

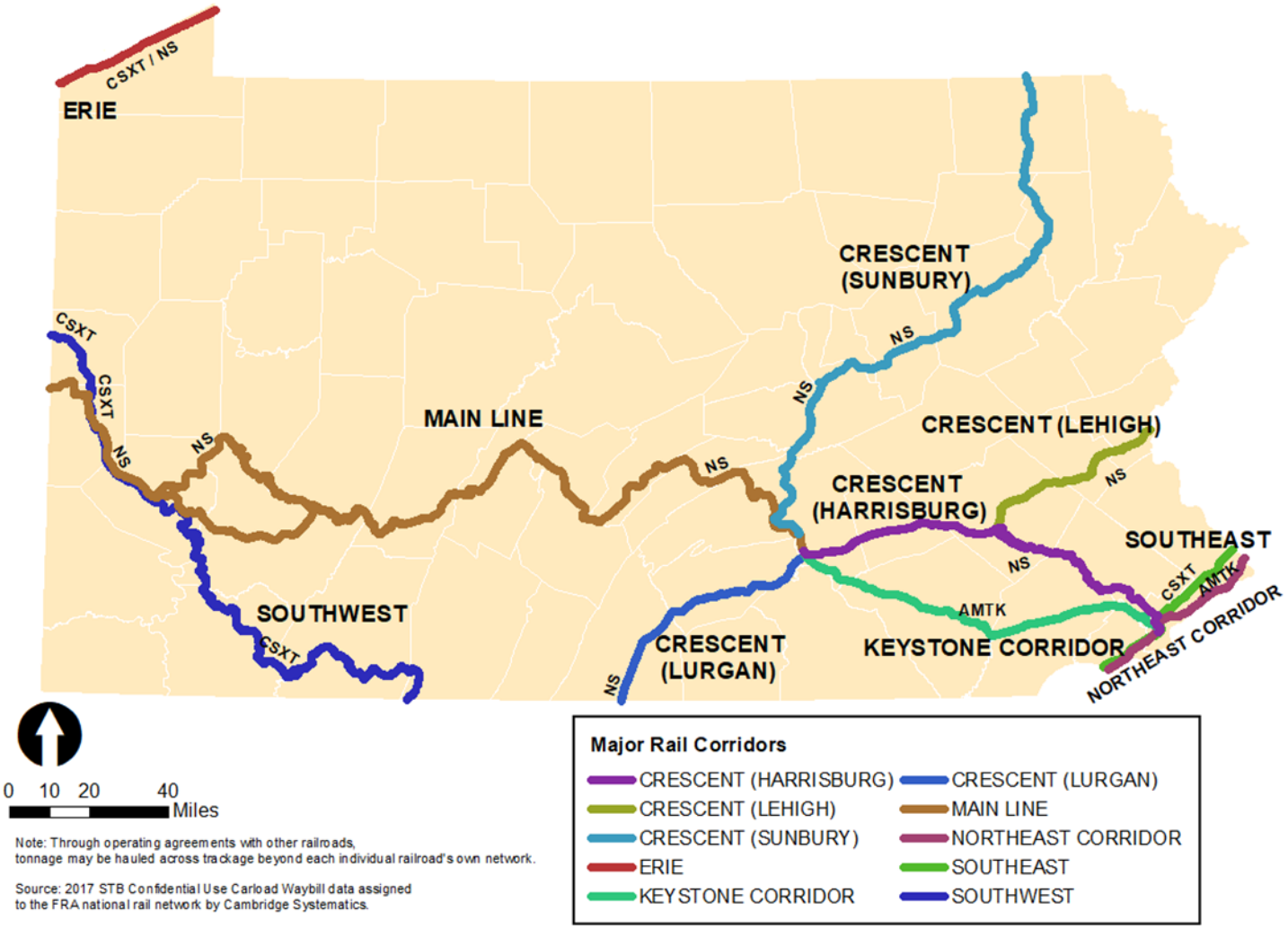
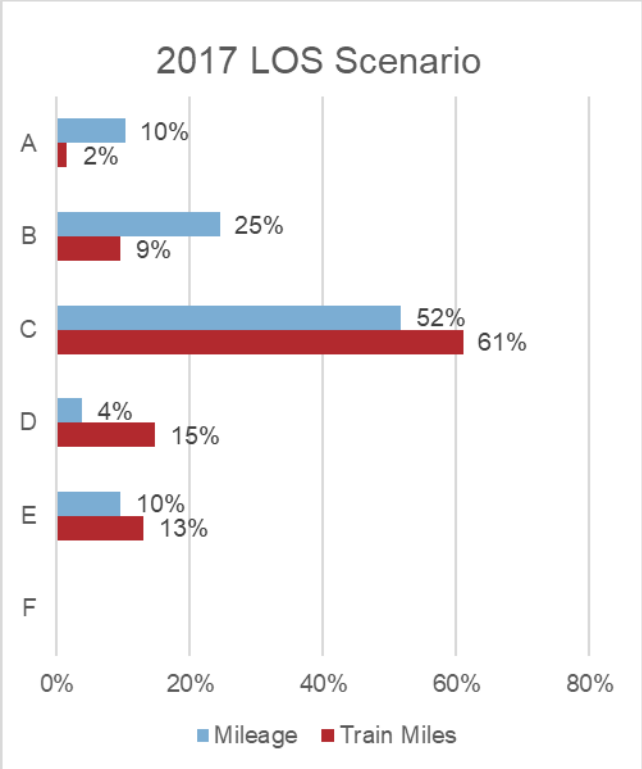
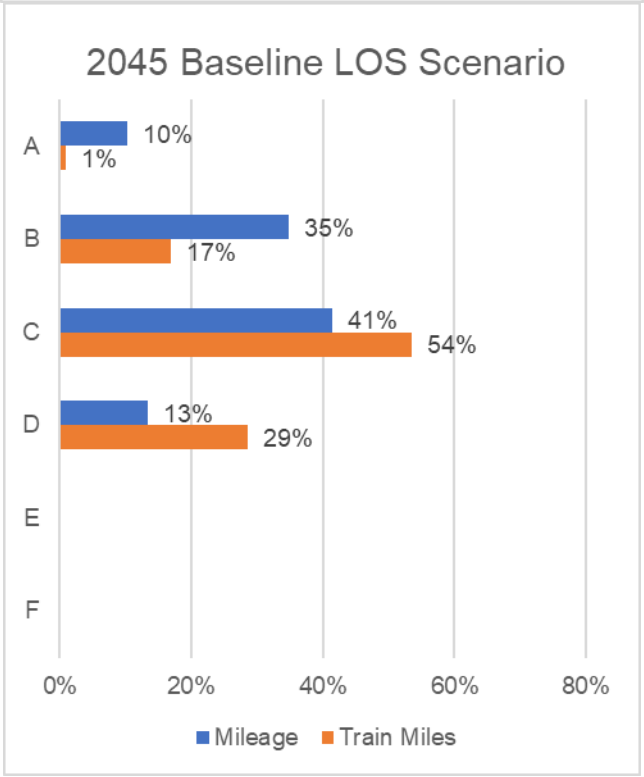


Figure 2-33: Major freight rail corridors in Pennsylvania


2017 LOS Scenario
A
B
C
D
E
F
10%
2%
25%
9%
52%
61%
4%
15%
10%
13%
0%
20%
40%
60%
80%
Mileage
Train Miles


2045 Baseline LOS Scenario
A
B
C
D
E
F
10%
1%
35%
17%
41%
54%
13%
29%
0%
20%
40%
60%
80%
Mileage
Train Miles

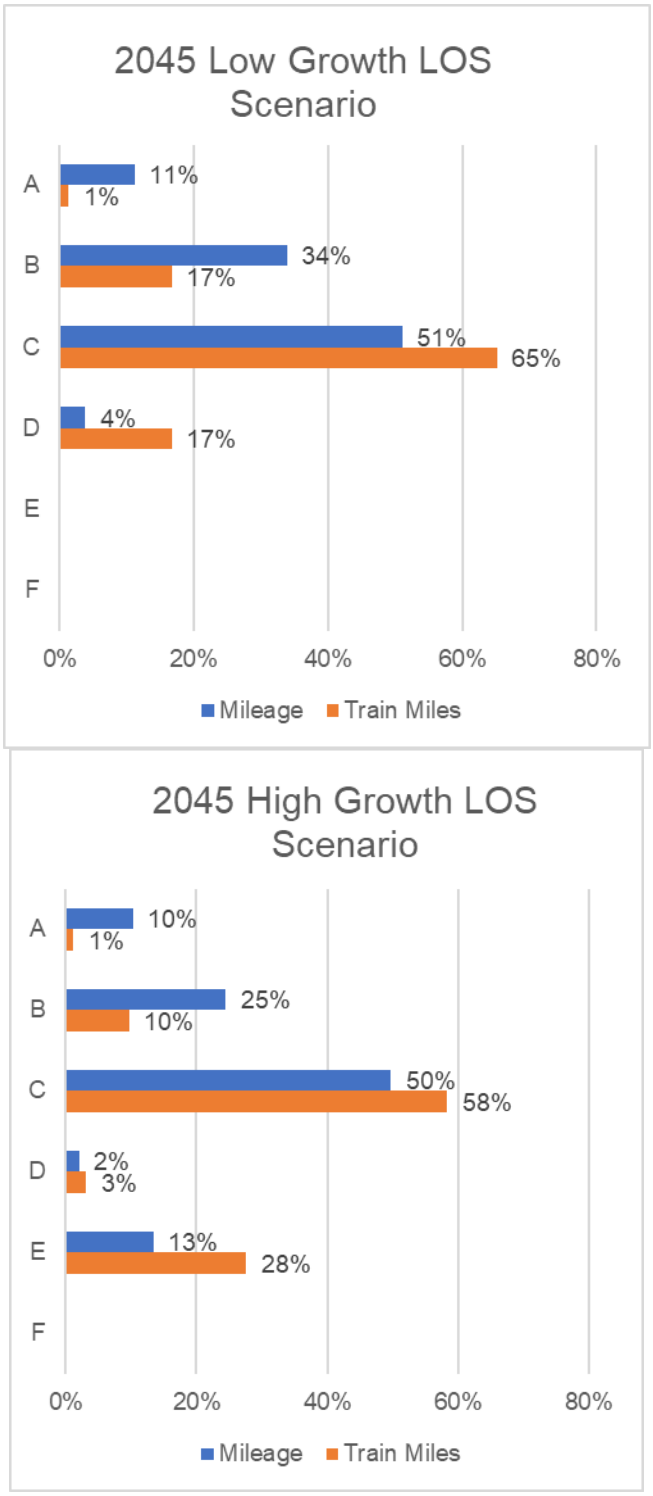


Figure 2-34: Percentage of train miles and rail miles by LOS Grade, 2017 and 2045 scenarios

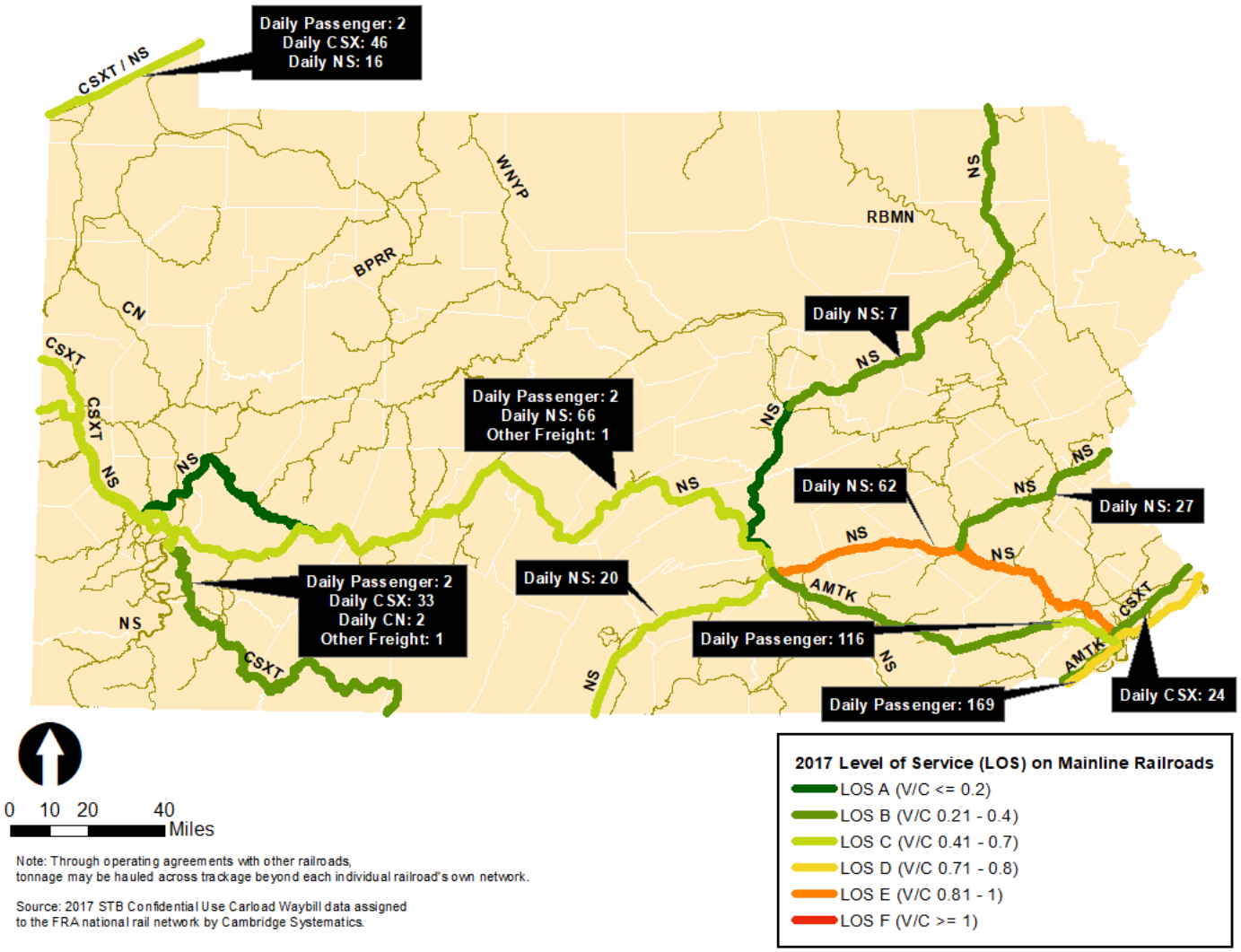


Figure 2-35: 2017 LOS

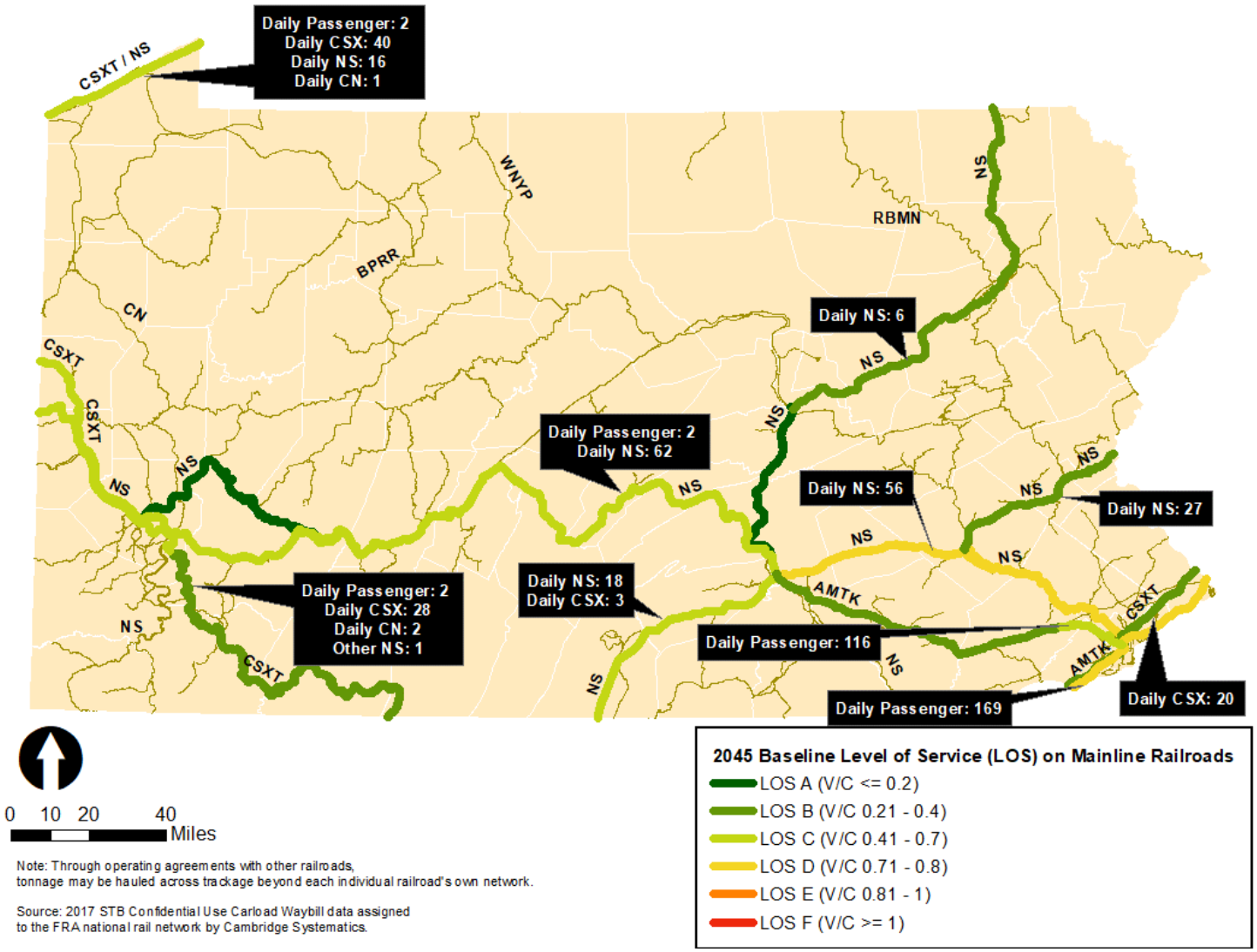


Figure 2-36: 2045 Baseline Scenario LOS

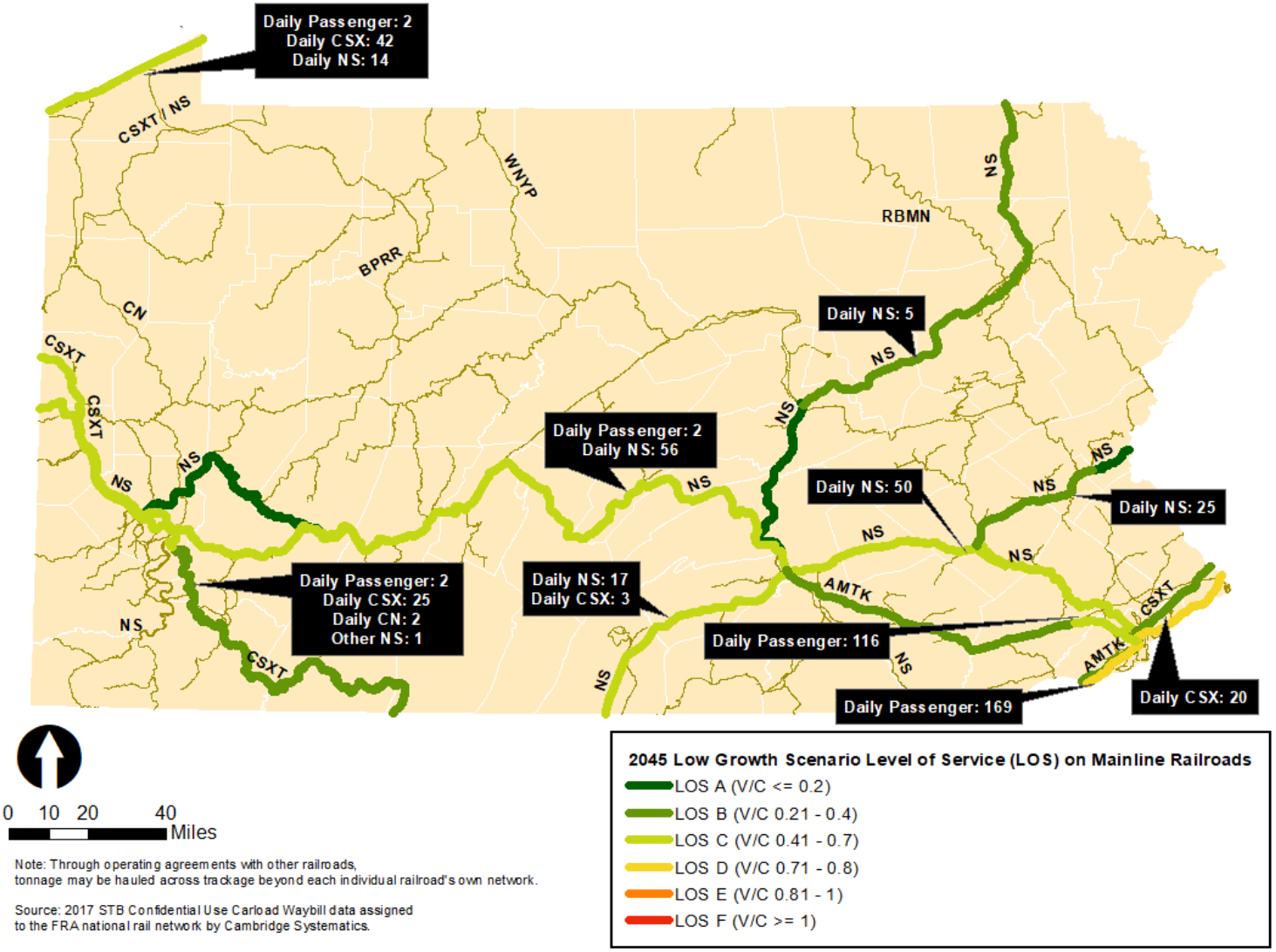


Figure 2-37: 2045 Low Growth Scenario LOS

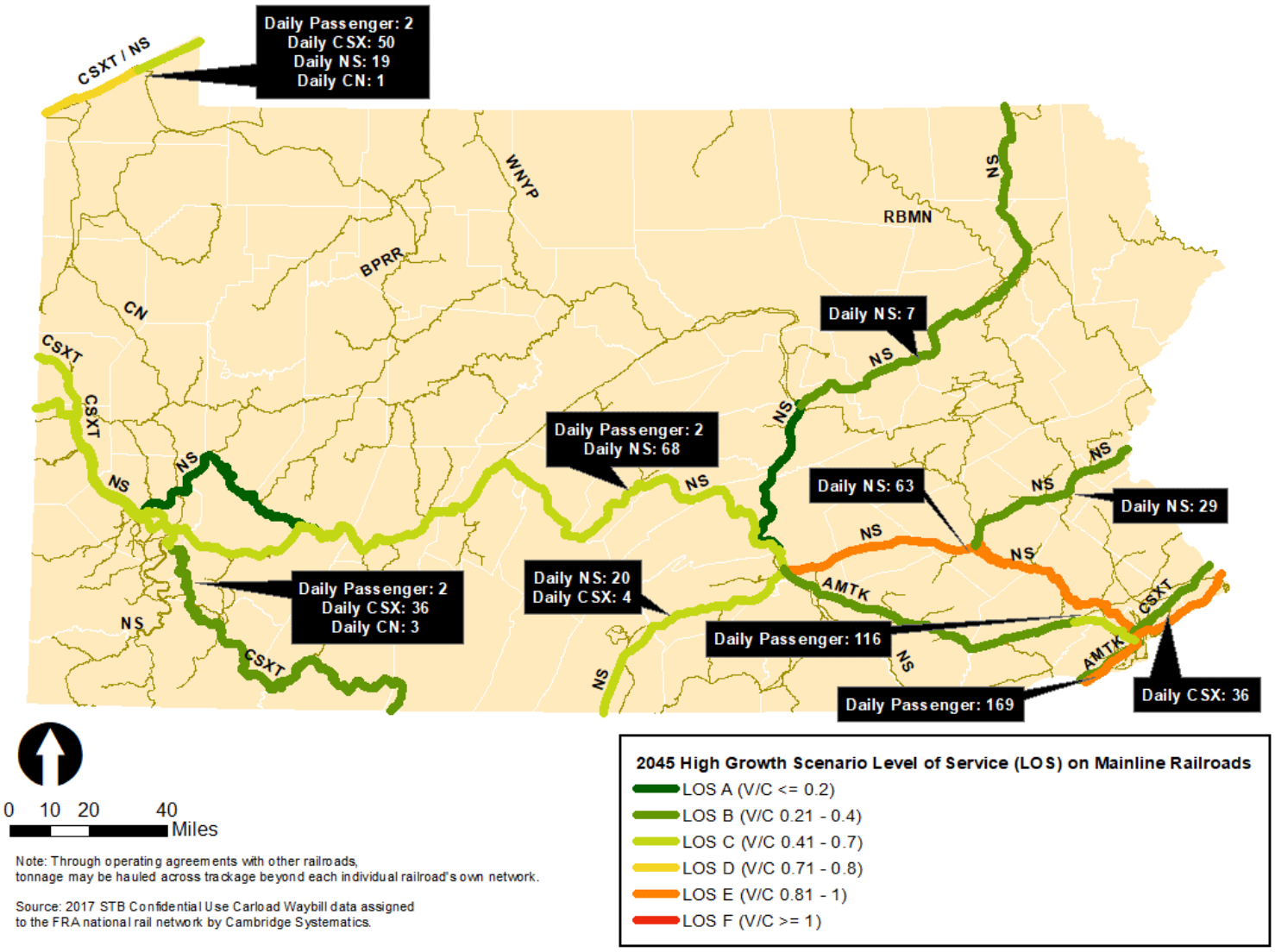


Figure 2-38: 2045 High Growth Scenario LOS

Table 2-38: LOS Grades for Base and Forecast Year Scenarios

Corridor	Length (miles)	2020 State Rail Plan Update LOS[1]			
		2017	2045 Baseline	2045 LGS	2045 HGS
Main Line	407	C	C	C	C
Erie	44	C	C	C	D
Northeast Corridor	48	D	D	D	E
Southeast	49	B	B	B	B
Southwest	125	C	C	C	C
Crescent (Harrisburg)	134	E	D	C	E
Keystone Corridor	105	C	C	C	C
Crescent (Lehigh)	54	B	B	B	B
Crescent (Sunbury)	181	B	B	B	B
Crescent (Lurgan)	67	C	C	C	C

(1) See Table 2-41 for definitions of LOS grades.

Table 2-39: Projected Train Volumes, 2016–2045

Name of Corridor	Daily Trains								Practical Capacity Max Daily Trains
	2016		2045 Baseline		2045 LGS		2045 HGS		
	Passenger	Freight	Passenger	Freight	Passenger	Freight	Passenger	Freight	
NS Main Line	2	67	2	62	2	57	2	68	105
Erie	2	62	2	57	2	56	2	70	107
Keystone Corridor	116	0	116	0	116	0	116	0	89
Southeast	0	24	0	20	0	20	0	26	105
Southwest	2	36	2	32	2	30	2	39	75
Crescent (Harrisburg)	0	62	0	56	0	50	0	63	73
Northeast Corridor	169	12	169	11	169	11	169	16	230
Crescent (Lehigh)	0	27	0	28	0	25	0	29	77
Crescent (Sunbury)	0	7	0	6	0	6	0	7	25
Crescent (Lurgan)	0	23	0	21	0	20	0	24	41

While there are no corridors in Pennsylvania where LOS is at level F, or insufficient to accommodate existing demand, the Harrisburg portion of Norfolk Southern's Crescent corridor, which connects Philadelphia and Harrisburg via Redding, operated at LOS E in 2018. Pennsylvania's busiest rail corridor, the Northeast Corridor, operates at LOS D currently, primarily due to high passenger train volumes from a combination of Amtrak's Northeast Corridor services and SEPTA's Trenton and Wilmington/Newark Regional Rail lines. While freight traffic only makes up a small proportion of volume on the Northeast Corridor, an increase in freight activity is projected to shift the corridor to LOS E in the 2045 HGS, assuming passenger traffic stays constant. However, as of 2017, the majority of the major rail corridors in Pennsylvania are operating at below capacity conditions, primarily at LOS C. Fifty-two percent of network mileage and 61% of train mileage operated at LOS C.

LOS improves slightly from 2017 to the 2045 Baseline Scenario due to minimal freight volume growth and continuing gains in freight train capacity. This capacity gain is the result of the deployment of more efficient rolling stock, which includes completion of the adoption of 286k railcars where possible and new car designs that increase the capacity per linear foot. Significant advances continue to be made in car designs that optimize capacity within the available clearance envelopes.

The 2045 scenarios project a decline in train volumes due to the anticipated decline in coal traffic. In the baseline forecast scenario, the Crescent (Harrisburg) corridor improves to LOS D. Similarly, even the LGS LOS across the major rail corridors changes only slightly, with the Crescent (Harrisburg) LOS decreasing to Level C.

In contrast, under the HGS, not only does the Crescent (Harrisburg) corridor revert to LOS E, but the Erie corridor degrades to LOS D and the Northeast Corridor to LOS E as a result of increasing freight traffic. Thirty-one percent of train mile segments would be near or at capacity (LOS D or E) in this scenario, the highest of any of the three forecast scenarios presented. While the HGS only represents a modest increase in freight train volumes over the 2017 Baseline for most corridors, the Erie corridor is projected to increase by 13% to 70 trains per day, making it the busiest freight rail corridor under high growth conditions.

2.2.6 Highway and Airport Congestion Trends

Evaluation of existing congestion conditions on Pennsylvania's roads and in the Commonwealth's airports as components of the larger transportation network indicates that other modes of transportation can be promoted to alleviate that congestion. In Pennsylvania, the most effective alternate transportation mode to highways and airports is the rail system.

2.2.6.1 Highways

Traffic volumes are an indicator of congestion and can be measured by the daily vehicle miles traveled (DVMT) and average annual daily traffic (AADT). DVMT indicates the daily mileage traveled by all motor vehicles. AADT represents the typical daily number of vehicles traveling on a road segment for all days in the week over a 1-year period. Furthermore, the mean AADT is the weighted average of AADTs for all segments of a subject road.

According to 2018 highway statistics, the interstates that have the highest mean AADT are I-76 and the interstates around Philadelphia: I-95, I-276, I-476, and I-676. In addition, the highways with the highest DVMT are also the highways with the most miles in the commonwealth: I-76, I-79, I-80, I-81, and I-476. Figure 2-39 shows a map of Pennsylvania's interstates with the highest traffic volumes.

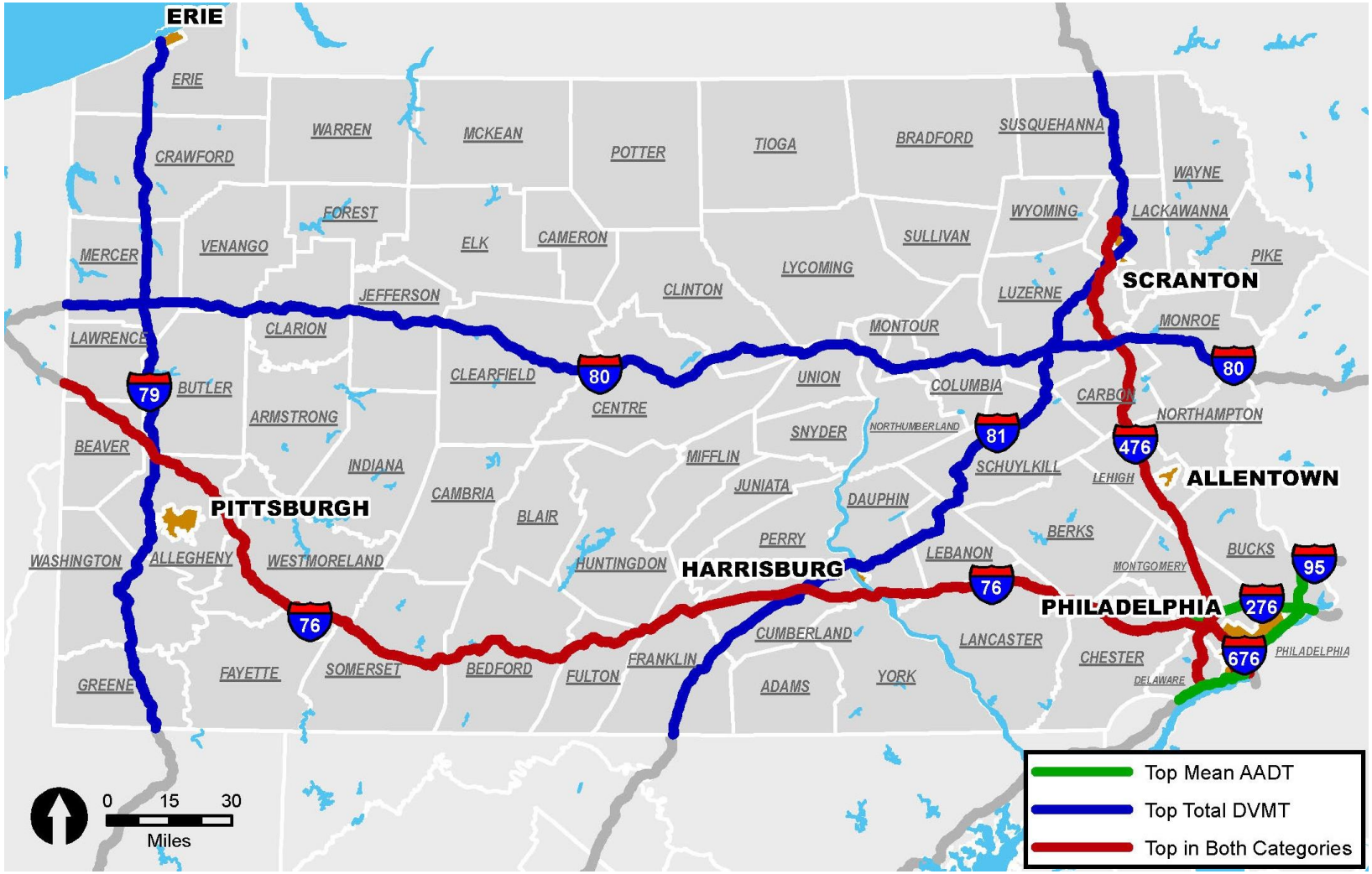


Figure 2-39: 2018 top DVMT and mean AADT on Pennsylvania's interstates (PennDOT, 2018 c)

Furthermore, Pennsylvania's location along the U.S. East Coast with access to New England, the Mid-Atlantic, and the Midwest makes it ideal as a major trucking and freight distribution hub. Statewide in 2018, trucks made up 36% of total interstate DVMT and 28% of total DVMT on all highways.

The American Transportation Research Institute (ATRI) has identified the top 100 truck bottlenecks in the U.S. in 2019, five of which are in Pennsylvania (see Table 2-40**)**.

Table 2-40: ATRI Top 100 Truck Bottlenecks in Pennsylvania

City	Route	National Congestion Rank (Out of 100)
Philadelphia	I-76 at I-676	38
Harrisburg	I-81 at I-83	62
Philadelphia	I-476 at I-95	63
Philadelphia	I-76 at I-476	77
Harrisburg	Route 581 at I-83	92

In addition, according to the 2016 update of PennDOT's Comprehensive Freight Movement Plan (PennDOT, 2016 a), roadways projected to experience high truck freight volumes in 2040 include major east-west interstate highways: I-76, I-78, I-80, and I-90; and north-south interstates in the eastern and western regions of the commonwealth: I-79, I-81, I-95, and I-476.

In summary, cross-state interstates and interstates surrounding the city centers of Philadelphia, Harrisburg, and Pittsburgh experience the highest traffic volumes. Truck traffic bottlenecks are also significant, with congestion-related bottlenecks occurring around Philadelphia and Harrisburg. Congestion on these key facilities is likely to worsen with rising automobile and truck VMT.

2.2.6.2 Airports

Pennsylvania has 14 commercial airports. In 2018, these airports handled approximately 21.7 million enplanements and landed 4.1 billion pounds of freight (FAA, 2019b). Philadelphia International Airport (PHL) is the busiest commercial airport in Pennsylvania in terms of both enplanements and freight (by weight) landed. PIT is second in terms of enplanements followed by MDT. Lehigh Valley International Airport in Allentown has far fewer enplanements than Pittsburgh or Harrisburg, but it handles more freight (by weight), second to PHL.

According to the 2016 *Pennsylvania Statewide Airport System Plan* (PennDOT, 2016 c), enplanements at the commonwealth's commercial airports are predicted to reach

26.7 million in 2036, a 23% increase from 2018. The plan also projected an increase of 17% in commercial aircraft operations between 2016 and 2036.

Pennsylvania's commercial airports in Philadelphia, Harrisburg, Pittsburgh, and Allentown convey the bulk of passenger and freight air travel. Travel demand is forecasted to increase. However, congestion at these airports does not appear to be a critical issue at this time.

2.2.7 Land Use Trends

According to the National Land Cover Database's (NLCD's) most recent data release in 2016, land use in Pennsylvania is divided into 15 cover types (Table 2-41). Forest cover (deciduous forest, evergreen forest, and mixed forest) dominates Pennsylvania, covering approximately 61% of the state. Agriculture is the next largest land use with cultivated crops and hay/pasture covering approximately 22%. Developed areas cover approximately 12% of the state (USGS and MRLC, 2019; Homer et al., 2020).

Table 2-41: Pennsylvania Land Use, 2016

Land Use Type	Acres	Percent Cover
Barren Land	129,590	0.45%
Cultivated Crops	2,581,770	8.90%
Deciduous Forest	13,328,518	45.97%
Developed, High Intensity	179,872	0.62%
Developed, Low Intensity	918,506	3.17%
Developed, Medium Intensity	423,645	1.46%
Developed, Open Space	2,027,704	6.99%
Emergent Herbaceous Wetlands	65,279	0.23%
Evergreen Forest	535,050	1.85%
Hay/Pasture	3,710,489	12.80%
Herbaceous	215,949	0.74%
Mixed Forest	3,806,288	13.13%
Open Water	336,322	1.16%
Shrub/Scrub	297,739	1.03%
Woody Wetlands	435,978	1.50%
Total	**28,992,698**	**100.00%**

Source: USGS and MRLC (2019)

The 2016 NLCD data was compared to previous data collected between 2001 and 2013 to develop a land cover change index. Based on this analysis, Pennsylvania has seen very minimal land use changes between 2001 and 2016 (Table 2-42). Approximately

96% of the state has experienced no change during this 15-year period. Forest land use types have seen a 1.87% change (decline), while the remaining land use types have seen changes of less than 1% (USGS and MRLC, 2019; Homer et al., 2020). Note that the total land acreage displayed in Table 2-42 differs from that displayed in Table 2-41 due to rounding.

Table 2-42: Pennsylvania Land Use Change, 2001–2016

Land Use Change	Acres	Percent Change[1]
Agriculture Within Class[2]	169,015	0.58%
Barren Land	4,411	0.02%
Cultivated Crops	30,354	0.10%
Developed, Combined	205,960	0.71%
Emergent Herbaceous Wetland	21,929	0.08%
Forest, Combined	541,420	1.87%
Hay/Pasture	96,927	0.33%
Herbaceous and Scrub/Shrub, Combined	5	0.00002%
No Change	27,852,742	96.07%
Open Water	46,004	0.16%
Wetland Within Class[3]	23,890	0.08%
Woody Wetland	8	0.00003%
Total	**28,992,666**	100.00%

Source: USGS and MRLC (2019)

(1) Land use change is reported as a positive percent change for all categories regardless of whether an area was converted from or to another land use.

(2) Agriculture within class change refers to a change between cultivated crop and pasture/hay.

(3) Wetland within class change refers to a change between emergent herbaceous wetland and woody wetland.

Natural gas exploration is a land use trend that continues to evolve in Pennsylvania. Natural gas development is expanding, although development appears to have slowed since the initial boom in 2009 (Figure 2-40). The Utica and Marcellus Shale formations and subsequent natural gas development primarily occur in more rural and heavily forested parts of the state (i.e., the northern tier, north-central, central, northwest, and southwest regions) (Pennsylvania Department of Environmental Protection, 2020). It is likely that tree-clearing associated with natural gas development has contributed to the overall decline of forests, as noted above.

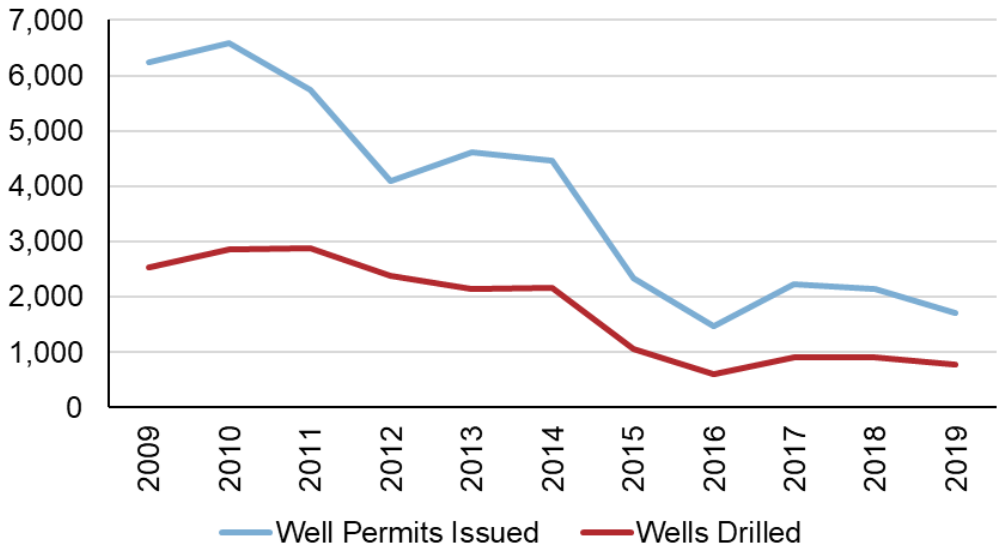


Figure 2-40: Pennsylvania natural gas development, 2009–2019 (Pennsylvania Department of Environmental Protection, 2020)

Regional land use trends in the southeast portion of the state have been identified by the DVRPC. *Connections 2045 Plan for Greater Philadelphia* (DVRPC, 2018a) is DRVPC's long-range plan for the Greater Philadelphia region and covers a nine-county area in Pennsylvania and New Jersey. The plan identifies rapid suburbanization as a regional land use trend that has led to increased reliance on driving, more congestion, reduction in open space and farmland, impacts to air and water quality, and an increased need for infrastructure and services. To manage the growth, preservation of open spaces has been made a priority. The amount of protected public and private open space increased between 2002 and 2016. However, agricultural lands decreased between 1995 and 2015 (DVRPC, 2018).

2.3 Needs and Opportunities

There are continuing needs to increase safety through evolving technologies making rail service safer and more convenient for users. Ongoing trends in freight and passenger rail transportation have implications for the commonwealth. Opportunities exist to increase passenger rail ridership through supportive local land use planning and station designs that facilitate connectivity and improve access. Lastly, PennDOT can look for ways to enhance its rail program to help fund rail improvements.

2.3.1 Safety

In general, rail accidents, deaths, and injuries in Pennsylvania have decreased over the past decade (2009 through 2018). Nevertheless, the total number of accidents, deaths, and injuries that occurred over this time, including the most recent year reported (2018), are notable. A total of 647 accidents, 17 deaths, and 295 injuries occurred in 2018. Train accidents include train derailments, collisions, and other events involving on-track rail equipment that result in fatalities, injuries, or monetary damage above a threshold set by FRA. Most train accidents between 2009 and 2018 occurred on yard tracks rather than mainline tracks. Human error and track defects were the leading causes of these train accidents. Derailments were the leading type of train accident, encompassing 66% of all train accidents between 2009 and 2018.

Pennsylvania also experienced a decline in other types of rail incidents involving activities such as rail trespassing, maintenance work, throwing switches, setting handbrakes, and falling between 2009 and 2018. Unfortunately, in contrast, the number of accidents, injuries, and incidents at highway-rail grade crossings (public and private) increased between 2009 and 2018. In 2018, there were 74 accidents, 1 death, 44 injuries, and 63 public crossing incidents.

As these statistics demonstrate, the greatest rail safety needs in Pennsylvania include improving safety at highway-rail at-grade crossings, minimizing derailments, reducing the opportunity for human error, and ensuring tracks are kept in a state of good repair.

Pennsylvania supports the FRA as the primary agency responsible for promoting and overseeing rail safety in Pennsylvania. In order to address rail safety, Pennsylvania promotes a proactive approach to improve safety involve regulation, inspection, personnel training, public outreach, and capital investment. Specifically, these efforts include:

- Positive train control (PTC) implementation
- Rail at-grade crossing and trespassing prevention outreach
- Human factor/worker protection
- Administration of funding for rail infrastructure upgrades across the nation, including the Northeast Corridor
- Tank car enhancements for transporting flammable liquids
- Routine inspections of hazardous materials, motive power and equipment, operating practices, signal and train control, and track
- Railroad safety and customer training, including training of state safety inspectors

- Accident and employee fatality investigations and reporting
- Partnerships between labor, management, and the agency that address systemic initiatives
- Development and implementation of safety rules and standards

PTC is a system designed to prevent train-to-train collisions, derailments caused by excessive speeds, unauthorized train movements in work zones, and the movement of trains through switches left in the wrong position (FCC, 2020). Thus, implementation of PTC would aid in addressing two of the most critical safety needs: (1) minimizing derailments and (2) reducing human error.

Recent progress has been made in the elimination of highway-rail at-grade crossings. For example, Amtrak's Keystone Corridor is now a sealed corridor between Philadelphia and Harrisburg with no public or private at-grade crossings. However, as mentioned above, highway-rail at-grade crossings remain one of the most critical safety issues in Pennsylvania. One of PennDOT's statewide initiatives is the elimination of vehicular at-grade crossings, where feasible. PennDOT is working to accomplish this through the Railway-Highway Grade Crossing (Section 130) Program. Pennsylvania's Statewide Transportation Improvement Program (STIP) for FFY 2019–2022 prioritizes over 80 projects at locations with the highest hazard ratings per the FRA Web Accident Prediction System or other locations with local or railroad safety concerns. These locations also include areas with increased train traffic, near-miss history, or antiquated warning devices. These projects will be funded through the Section 130 Program (PennDOT, 2018 b). Private freight companies also have roles to play in improving or eliminating highway-rail at-grade crossings, and continued cooperation is essential. PennDOT will continue its rail crossing safety investments through the Section 130 Program to supplement ongoing private railroad investment to improve and eliminate at-grade crossings.

2.3.2 Trends in Freight Transportation and Implications for the State Rail Network

2.3.2.1 Market Trends

This section reviews current market trends for major rail-oriented economic sectors in the Commonwealth of Pennsylvania including domestic and international intermodal traffic; the energy, manufacturing, international trade; and consumer market sectors. These trends have implications for the future of rail transportation in the state. For example, petrochemical-related shipments may rise, offsetting some of the declines in coal shipments.

Pennsylvania's rail traffic varies across the commonwealth, with the eastern regions dominated by coal, primary metals, and nonmetallic minerals such as gravel and sand, while the western regions are dominated by chemicals or allied products and intermodal traffic. Of particular importance are the three main shipping ports, Philadelphia, Pittsburgh, and Erie, which handle a broad range of bulk, break-bulk, and intermodal products.

2.3.2.1.1 Energy Sectors

Pennsylvania is a leading East Coast supplier of coal, natural gas, electricity, and refined petroleum products to industries within the state as well as throughout the nation. This is because the commonwealth has extensive fossil energy resources in two key areas. The Appalachian Mountains, which run diagonally southwest to northeast through Pennsylvania, hold rich coal resources. In addition, the Marcellus Shale (Figure 2-41) deposits follow the arc of the mountains and comprise the largest natural gas field in the U.S. (U.S. Energy Information Administration, 2020a). Due to its geographic diversity and abundance of energy resources, Pennsylvania is one of the most important states from a regional and national energy landscape perspective, and its impacts on the broader freight-intensive economy and transportation systems are far-reaching.

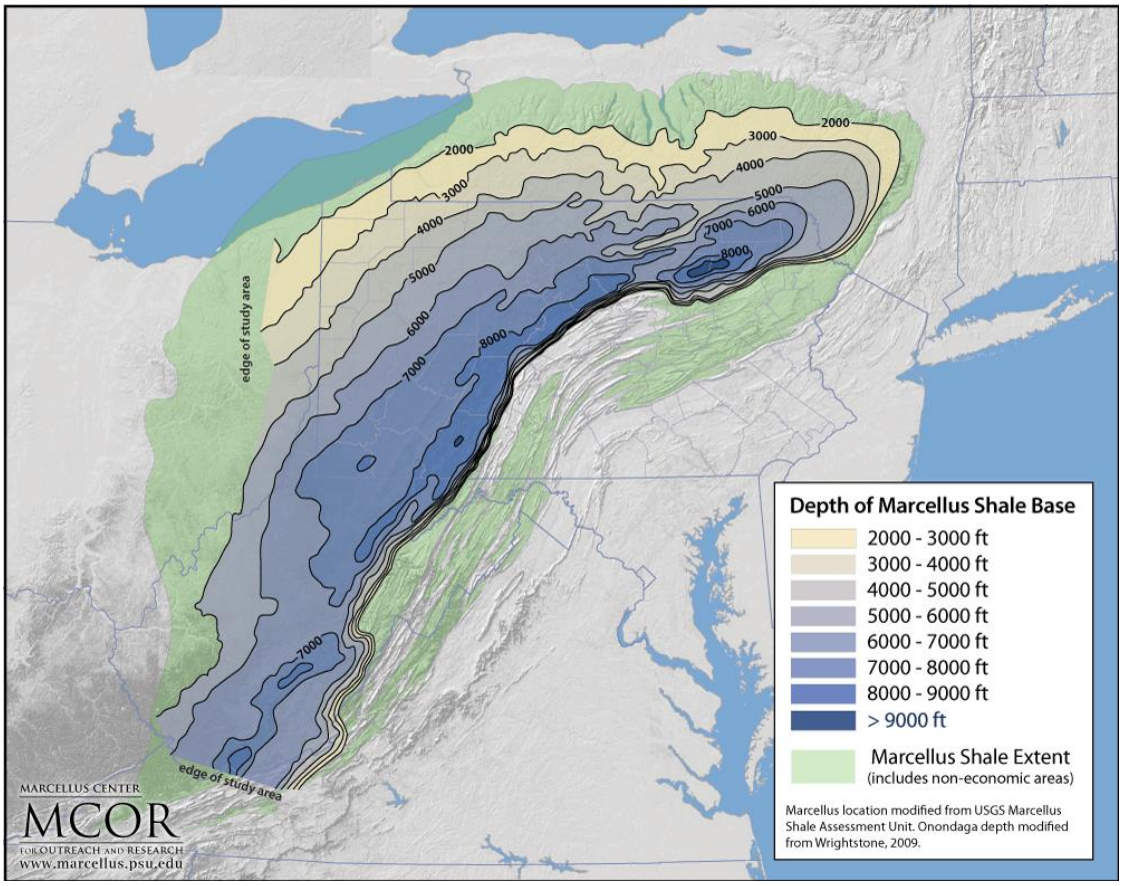


Figure 2-41: Depth to Marcellus Shale base (PennState, 2020)

Natural Gas

Following the uptick in hydraulic fracturing and other newly developed methods of extraction in the Marcellus Shale, natural gas reserves in Pennsylvania tripled between 2011 and 2017. Pennsylvania's natural gas production reached 6.2 trillion cubic feet in 2018, almost 11 times more than 2010, making it the first time the state's annual marketed natural gas exceeded 6 trillion cubic feet, This was equal to about one-fifth of total U.S. gas production, keeping Pennsylvania the second largest natural gas producer in the nation, after Texas (U.S. Energy Information Administration, 2020a).

Figure 2-42 shows natural gas production in the top-producing states since 2000. In total, the Marcellus Shale play is estimated to hold proven reserves of around 77 trillion cubic feet of natural gas (CSIS, 2018). Figure 2-41 is a map of the extent and depth of the Marcellus Shale across Pennsylvania and neighboring states.

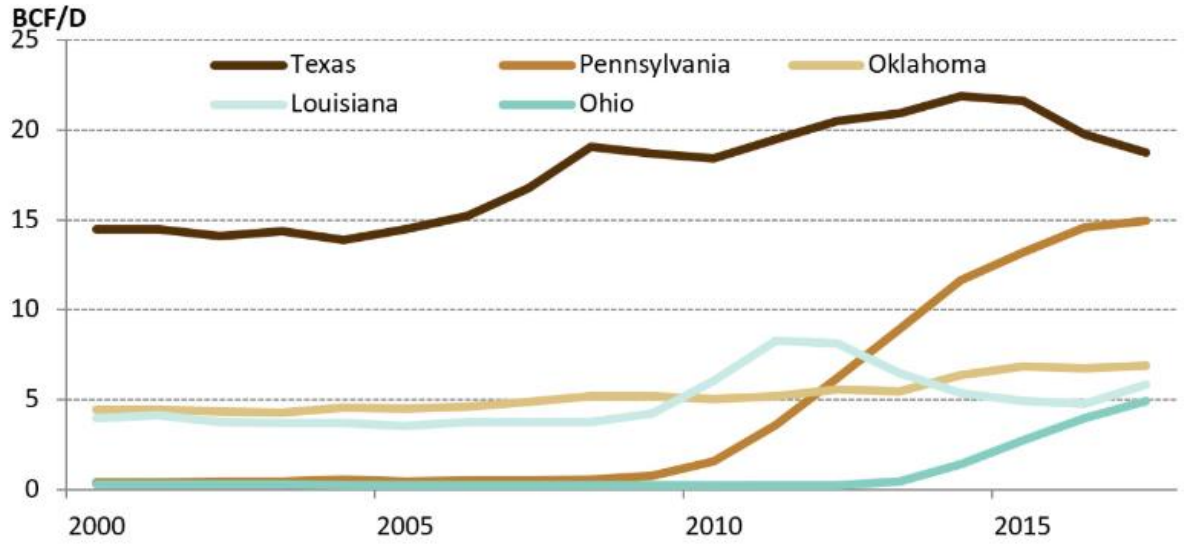


Figure 2-42: Natural gas production in select U.S. states (CSIS, 2018)

Several pipeline projects have been constructed in recent years that have enabled Marcellus Shale natural gas producers to transport their product to additional markets. Pipeline projects constructed or planned include the Rockies Express Zone 3 expansion, which entered into service in October 2016 to move natural gas westward from southwest Pennsylvania, and the Algonquin Incremental Market pipeline, which began operating in December 2016 and primarily moves natural gas from northeastern Pennsylvania into New England. Most of the natural gas transported by pipeline from Pennsylvania goes to New Jersey, New York, Maryland, Ohio, and West Virginia (U.S. Energy Information Administration, 2020a).

Photo: Norfolk Southern Railway

This immense growth in natural gas production has also led to other opportunities, most notably growth in the production of natural gas liquids (NGLs) such as ethane and propane. Ethane from natural gas can be converted to produce polyethylene, a common plastics resin, while propane can be converted into polypropylene, which is a highly versatile plastics resin (IHS Markit, 2017). Existing natural gas producers are building processing plants to extract these higher-priced NGLs from natural gas and pipelines for eventual transport to North American markets, and ports on the East Coast and Gulf Coast for export (U.S. Energy Information Administration, 2020a). These NGLs have the potential to boost the state economy

through the construction and operation of petrochemical facilities that utilize these products to produce widely used plastic materials and other chemicals. Developing Pennsylvania as a hub for petrochemical development would not only offer benefits to local industries throughout the region that are reliant on imports of plastics, chemicals, and other materials, but would increase opportunities for exports as well (CSIS, 2018). IHS Markit forecasts increased production trends for both natural gas and NGLs through at least 2030, as well as $2.7 billion to $3.7 billion in investments in NGL assets. This growth and investment promise to attract additional cracker plants and petrochemical and plastics manufacturing, all freight-intensive industries that utilize rail extensively (IHS Markit, n.d.).

Petroleum

Although Pennsylvania was home to the first U.S. commercial oil well in 1859, its crude oil reserves are modest compared to other oil-producing states. Today, the commonwealth has a handful of refineries that produce some crude oil, mainly paraffin-based crude oil used for making lubricants. In 2019 the largest refinery on the East Coast, Philadelphia Energy Solutions, located on the Delaware River in south Philadelphia, experienced an explosion and fire. This refinery, with a daily capacity of 335,000 barrels, was receiving one daily trainload of crude oil both from North Dakota's Bakken region and international producers (Forbes, 2020). But, as a result of extensive fire damage, the refinery owner decided to halt operations permanently (U.S. Energy Information Administration, 2020a). There remains another large refinery in southwest Philadelphia known as Trainer Refinery, owned by Delta Airlines, that processes 185,000 barrels of crude oil per day into jet fuel, motor gasoline, diesel fuel, and heating oil (Monroe Energy, 2020). There are also small refineries located in northwestern Pennsylvania, including one that processes crude oil into motor gasoline, diesel fuel, heating oil, and asphalts, and another that processes crude oil into motor gasoline, fuel oil, and waxes and specialty products like resin blends and camping fuel. In addition to petroleum products from local refineries, Pennsylvania receives gasoline, diesel, and jet fuel via the Colonial Pipeline that moves refined petroleum products from the Texas Gulf Coast to 11 southern and Mid-Atlantic states (U.S. Energy Information Administration, 2020a).

There are various environmental regulations in place to reduce emissions, particularly in southeastern Pennsylvania, including Philadelphia, that require the addition of ethanol to gasoline fuels used in internal combustion engines. Although most ethanol is transported to Pennsylvania from the Midwest by rail, the ethanol production plant operated by Pennsylvania Grain Processing in Clearfield, PA, is the largest on the East

Coast, producing about 110 million gallons of ethanol per year (Pennsylvania Grain Processing, 2020).

Coal

Pennsylvania is the third-largest coal-producing state in the U.S. and has substantial reserves of bituminous coal, which is used to generate electricity and produce coke for steelmaking. Most of the coal reserves are concentrated in northeast Pennsylvania, except for Bailey Mine, which is located in southwestern Pennsylvania near the West Virginia border. In addition to being a major producer, Pennsylvania is also a major coal consumer. Eighty percent of coal consumed is burned for electricity generation, while the rest is used for steelmaking and other industrial uses. Almost half the coal consumed by Pennsylvania's power plants and industrial plants is brought in from nearby states. Coal in Pennsylvania is moved by rail, barge, and truck (U.S. Energy Information Administration, 2020a).

However, it is important to note that the U.S. coal industry is declining nationwide due to the availability of lower-cost natural gas, a growing renewable energy sector, and environmental regulations designed to reduce greenhouse gas emissions. Many coal-fired electricity generating plants across the country are shutting down as operations become increasingly uneconomical. Bituminous coal production in Pennsylvania has seen a modest increase in recent years but is significantly lower than the levels seen at the beginning of this century, as shown in Figure 2-43, suggesting that state production trends may follow the rest of the nation. Since 2010, 15 Pennsylvania coal plants have been retired (Penn Live, 2019b). As of early 2020, 17 active coal power plants remained in operation (U.S. Energy Information Administration, 2020a). The latest plant to shut down was the Bruce Mansfield Power Plant in Shippingport, PA, which closed in November 2019 and was the largest coal-fired plant in the state (Quartz, 2019).

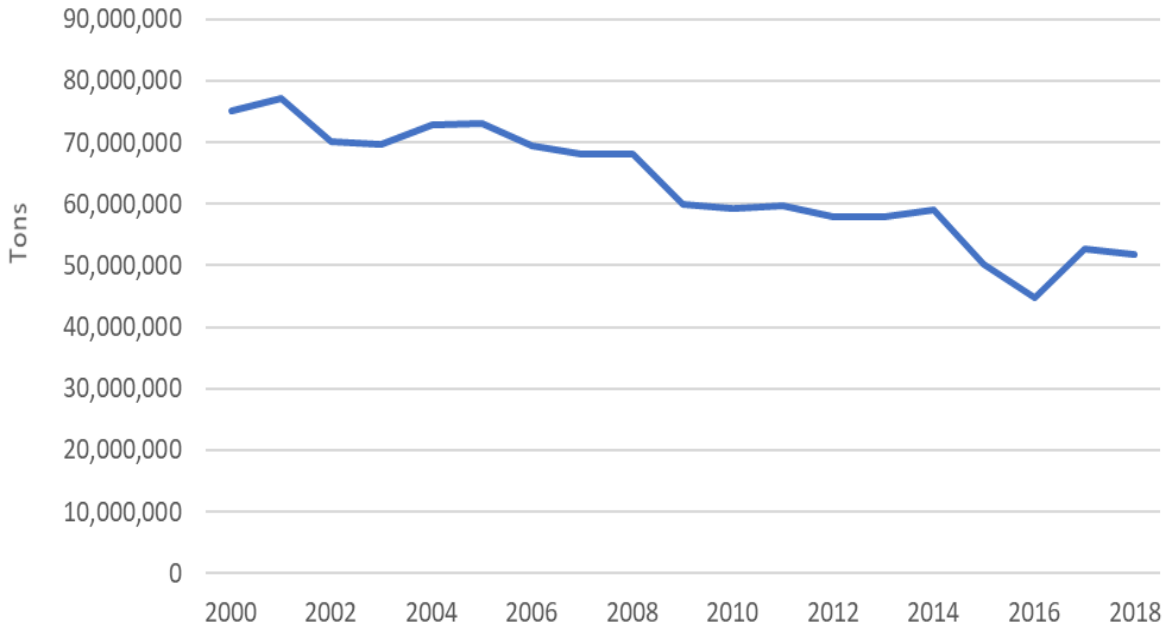


Figure 2-43: Total production of bituminous coal in Pennsylvania, 2000–2018 (Pennsylvania Department of Environmental Protection, 2018)

2.3.2.1.2 Manufacturing

Pennsylvania has a strong historic legacy in various manufacturing sectors, most notably steel. In 2018, Pennsylvania was the 8th largest manufacturing state in terms of Gross Regional Product. This sector saw an increase of 5% between 2016 and 2017 (Allegheny Conference on Community Development, 2019a). In 2018, fabricated metal products was Pennsylvania's top manufacturing sector in terms of employment, followed by food manufacturing, machinery manufacturing, chemical manufacturing, and plastics and rubber products manufacturing (Pennsylvania Department of Community and Economic Development, n.d.-b). Goods manufactured in Pennsylvania comprise about 87% of the state's exported goods, which are primarily shipped to Canada (28%), Mexico (12%), China (6%), and the United Kingdom (6%) (National Association of Manufacturers, n.d.). In 2017, manufacturing exports were valued at $38.7 billion, which was 6.2% higher than in 2016. Top exports included chemicals, which comprised 20.3% of total exports, followed by machinery, computer and electronic products, and transportation equipment (Allegheny Conference on Community Development, 2019b).

The value of Pennsylvania's manufacturing sector output has increased dramatically in recent years to highest-ever levels, as shown in Figure 2-44. This growth is likely driven by the increased production of NGLs such as ethane and propane, which are processed from natural gas to become high-value plastics resins known as polyethylene and polypropylene, respectively. This is evident in Figure 2-45, which shows Pennsylvania's top manufacturing sectors in terms of output. Chemicals was the top sector in 2017,

totaling $17.7 billion, followed by food, beverage, and tobacco products ($10.5 billion) and fabricated metal products ($7.7 billion).

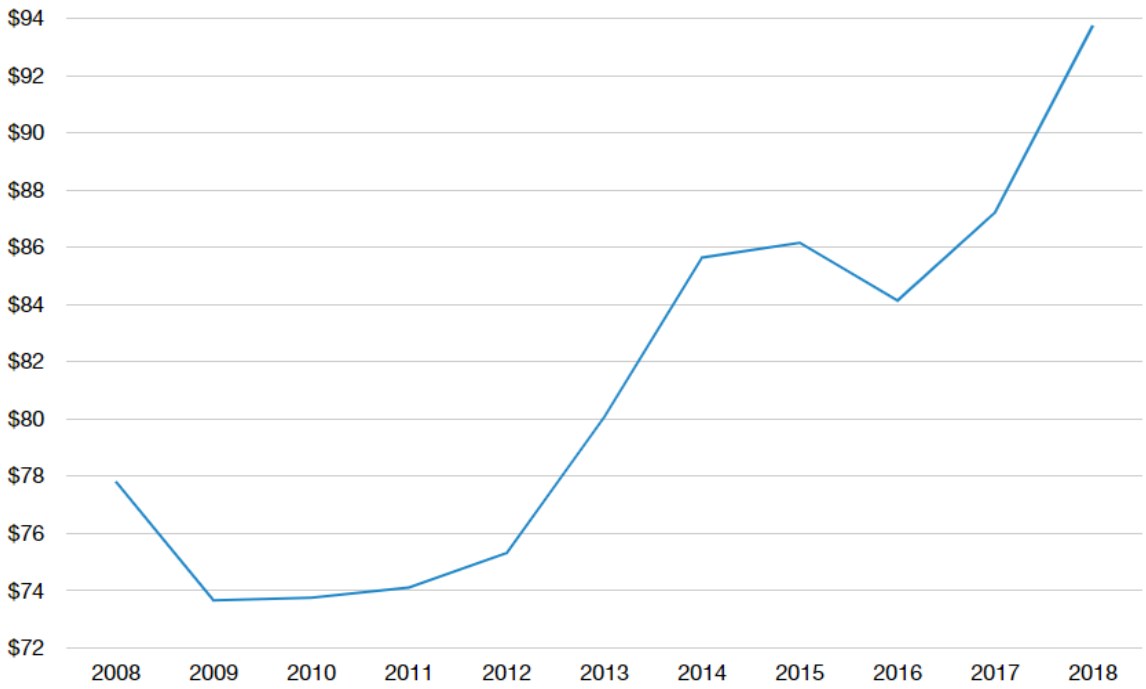


Figure 2-44: Pennsylvania manufacturing output (in billions of dollars), 2008–2018 (National Association of Manufacturers, n.d.)

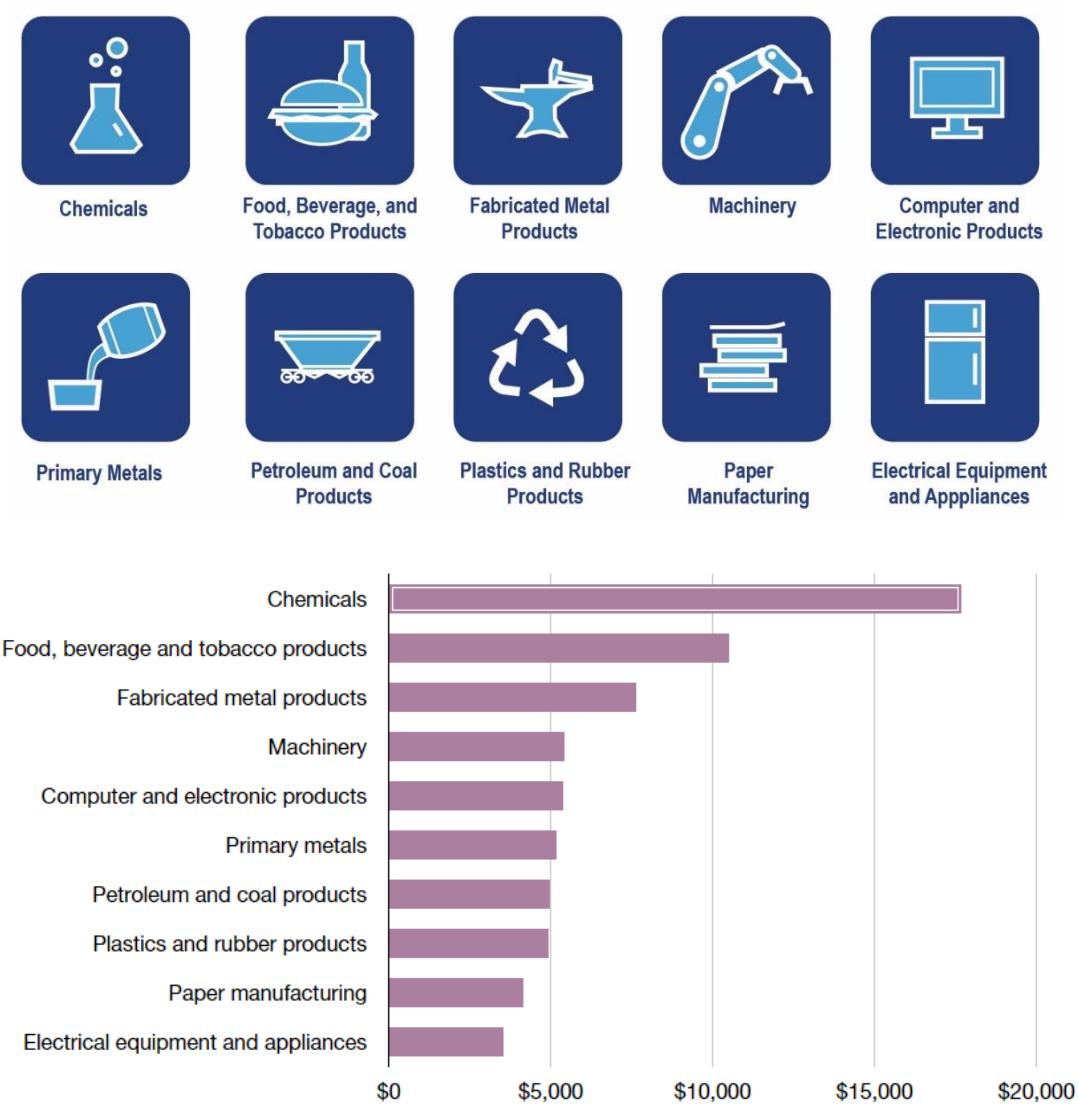


Figure 2-45: Top Pennsylvania manufacturing sectors (in millions of dollars), 2017 (National Association of Manufacturers, n.d.)

Manufacturing is also a strong focus of the state's workforce development policies and is an element of five of the 12 identified industry clusters that the Pennsylvania Department of Labor and Industry identified as key priorities (Pennsylvania Department of Labor and Industry CWIA, n.d.). These five industry clusters include:

- The Advanced Manufacturing cluster primarily consists of durable goods manufacturing in four subsectors, including chemicals, rubber and plastics, electronics, metals, and vehicles and vehicle equipment.
- The Agriculture and Food Production cluster primarily consists of growing food crops and livestock and wholesale distribution of these products. However, this

cluster is strongly supported by the refrigerated warehousing and fertilizer manufacturing sectors.

- The Bio-Medical cluster includes industries that develop and use technology to enhance medical research, and includes research laboratories, pharmaceutical manufacturing, surgical and medical equipment manufacturing, and imaging centers.
- The Energy cluster includes industries associated with the production and distribution of energy, as well as the waste disposal industries associated with remediation and environmental cleanup related to energy production. This cluster supports a variety of industries from petroleum refineries to battery manufacturing to generator manufacturing.
- The Wood, Wood Products, and Publishing cluster includes lumber and production elements from raw material to finished product, and includes subsectors including truss manufacturing, stationary product manufacturing, and printing machinery and equipment manufacturing.

2.3.2.1.3 Intermodal Trends

Intermodal rail services involve the transport of shipping containers and truck trailers by trains loaded at specially designed intermodal terminals. The market for intermodal shipping has grown rapidly in recent decades in Pennsylvania and nationally. Shippers and receivers increasingly rely on intermodal connections between Pennsylvania's rail, highway, airports, ports, waterways, and pipeline networks to move freight. Traditional bulk products, such as corn and other grains, and break-bulk cargo shipped in barrels, drums, or bags, are increasingly using intermodal containers, particularly for international shipping. This allows them to leverage the available modal flexibility and helps to ensure product integrity in a manner that is difficult to accomplish with conventional bulk shipping.

Intermodal freight rail shipping requires the availability of an intermodal facility that can handle container and trailer shipments. Pennsylvania has one of the highest densities of intermodal facilities in the nation. The greater Harrisburg area is home to three major Norfolk Southern (NS) Railroad yards, and the Philadelphia and Pittsburgh metropolitan areas host multiple large NS and CSX intermodal yards. The most recent intermodal investment in Pennsylvania is CSX's Pittsburgh intermodal rail terminal located in McKees Rocks, which opened in September 2017 but ceased intermodal operations in 2020 and subsequently leased the 70-acre property to Shell. There has been noteworthy growth in intermodal activity in and along the I-81 corridor around

Harrisburg, which has become one of the most significant logistics hubs in the entire mid-Atlantic region, second only to northern New Jersey.

There is also a significant amount of intermodal activity occurring at the Port of Philadelphia, which hosts three container facilities, three roll-on/roll-off (RO/RO) facilities, six break-bulk facilities, and two liquid bulk facilities. Containers are shipped up the Delaware River to the Port from countries all over the world, including frozen beef from Australia, furniture from Sweden, automobiles from South Korea, and cocoa beans from West Africa. Exports include industrial equipment, machinery, agricultural products, computers, and pharmaceuticals. In 2017, the Port reported that 29% of its tonnage is containerized, 25% is refrigerated cargo, 21% is liquid bulk products, with the remaining 25% comprising automobiles, forest products, cocoa beans, and steel (PhilaPort, 2017). Major markets are container cargo, automotive, refrigerated cargoes, forest products, and break-bulk and bulk cargoes (PhilaPort 2017). The Port's facilities are serviced by two Class I railroads: CSX and NS. CSX provides daily service between Philadelphia and major Midwestern, Southern, and Southeastern U.S. destinations. NS provides double-stack intermodal service from Philadelphia to major Midwest destinations and to Canada.

2.3.2.1.4 Consumer Trends

The recent explosive growth of e-commerce, coupled with the decline of traditional brick-and-mortar retail, has changed the retail, warehousing, and distribution landscape across the country. Warehouses, distribution centers, and fulfillment centers together comprise an enormous real estate market with ever-increasing demand so that companies are able to meet the demand for storing goods that are shipped directly to their customers. Because online shoppers have come to expect same-day and next-day delivery options as standard, retailers and logistics providers are choosing to locate close to large metropolitan areas in order to deliver orders within the expected timeframe.

In Pennsylvania, the I-78/I-81 corridor, which includes the Lehigh Valley and parts of Central Pennsylvania, is particularly attractive given the solid roadway network, the proximity to the New York metropolitan region, the abundant workforce, the relatively low taxes compared to New Jersey, and the ability to reach up to 80% of the U.S. population within 24 hours (Transport Topics, 2017). Figure 2-46 shows key urban centers within 150 miles of the I-78/I-81 corridor. This high demand has attracted speculative developers who are building facilities to take advantage of higher rents and land values. The I-78/I-81 corridor already includes a number of facilities that individually exceed one million square feet, including Kohler, Ames True Temper, DHL, Whirlpool, and Amazon (Penn Live, 2019c). In April 2017, Ace Hardware took over a

1.1 million square-foot cross-dock warehouse at the Lebanon Valley Distribution Center in Fredericksburg, PA, to serve as a fulfillment center for items ordered on the company's website that are shipped for free to customers within 1 or 2 days (Transport Topics, 2017).

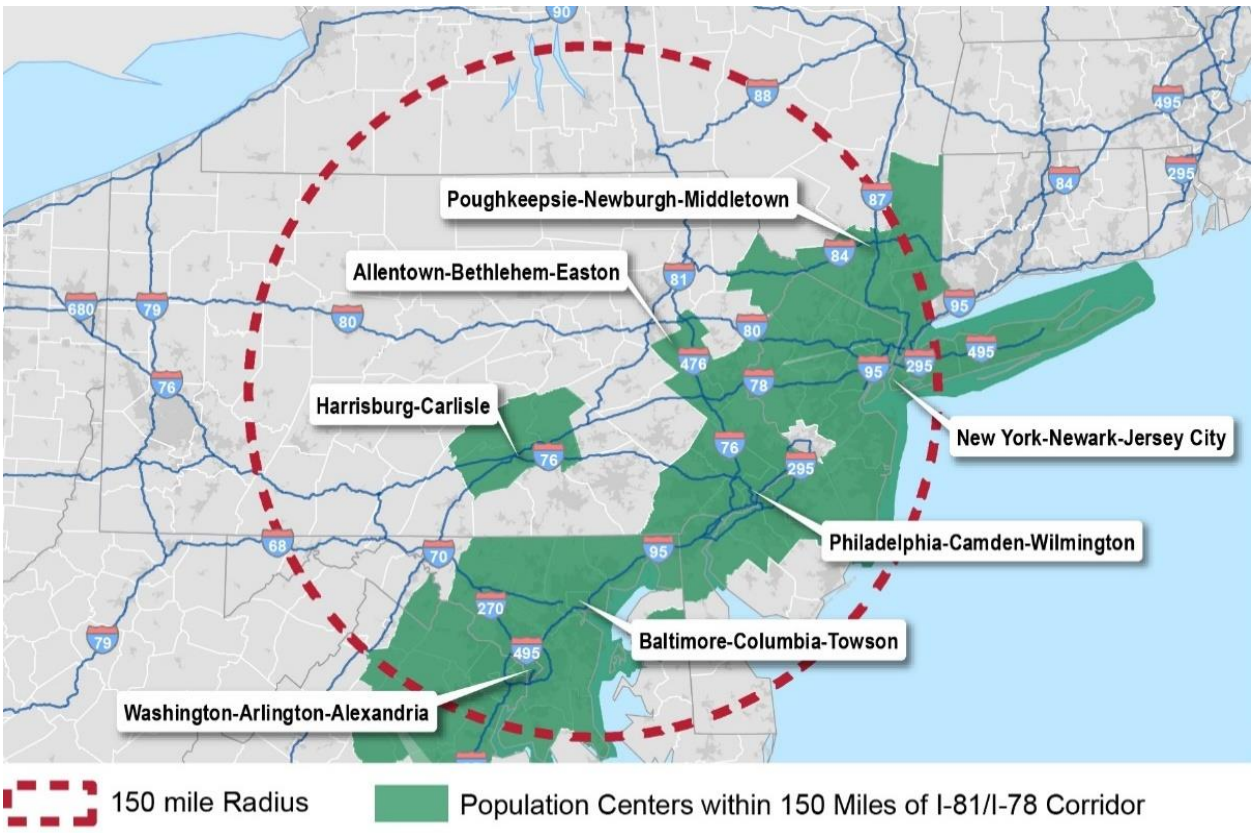


Figure 2-46: The I-78/I-81 Corridor (PASDA; Esri, 2020)

These changing consumer trends are putting additional pressure on a trucking industry that already faces challenges of a national truck driver shortage, hours of service regulations, and increasing operating costs.

2.3.2.1.5 International Trade

This section summarizes the international markets that access Pennsylvania's seaports as well as the two most important trade deals shaping U.S. international trade: the United States-Mexico-Canada Agreement (USMCA) and the United States-China Trade Deal.

Seaports

Pennsylvania has three major shipping ports: (1) Philadelphia, (2) Pittsburgh, and (3) Erie. Each port has a unique competitive advantage as a major port in the state.

Pennsylvania has a deep-water port in Philadelphia, a busy inland port in Pittsburgh, and a Great Lakes port in Erie with international access through the St. Lawrence Seaway.

The Port of Philadelphia is Pennsylvania's largest port. It is located at the southeastern shoreline within the City of Philadelphia, along the Delaware River. Its central location along the Northeast Corridor allows direct commerce with the country's largest and most lucrative marketplace. The port is directly accessible to more major cities by rail and truck than any other port in the United States, allowing for efficient and timely deliveries. The port is close to Marine Highway M-95, which parallels the East Coast of the United States from Maine to Florida. A map of the U.S. Marine Highway system is shown in Figure 2-47.

Figure 2-47: U.S. Marine Highway System (U.S. Maritime Administration, n.d.)

In recent decades, the port has specialized in handling break-bulk and bulk cargoes, with container volumes shifting toward New York/New Jersey and the Virginia Tidewater ports. In part this due to a previous channel depth of 40 feet on the Delaware River,

which limited the maximum fully loaded vessel size to 6,000 twenty-foot equivalent units (TEUs). A further competitive challenge for the Port is the additional sailing time required to traverse Chesapeake Bay and the Delaware River to reach Philadelphia. However, nearing completion is a project to increase channel depth to 45 feet, which will allow the handling of containerships with up to 14,000 TEU in capacity.

The Port of Pittsburgh is a busy inland waterway port that spans 12 counties and encompasses 200 miles of commercially navigable waterways in southwestern Pennsylvania over three major rivers: the Allegheny, the Monongahela, and the Ohio. The Port supports over 200 river terminals and barge industry service suppliers, including privately owned public river terminals, and is served by the CSX, NS, and CN (operating the Bessemer & Lake Erie Railroad) Class I railroads, and Class II and III railroads. Pittsburgh is considered to be the start of the Federal Marine Highway, which extends from Kansas City and connects with both the Mississippi River and the Intracoastal Waterway, reaching both domestic and foreign markets.

The Port of Erie is Pennsylvania's only port on the Great Lakes. It is located along the southeastern shore of Lake Erie in a naturally formed bay sheltered by Presque Isle to its north. The 29-foot-deep harbor entrance channel between the Port of Erie and Presque Isle is served by ocean-going freighter ships via the St. Lawrence Seaway. The Port of Erie's central location between New York and Chicago provides a 300-mile radius to one-third of the United States population. It is also within relative proximity to Detroit and several Canadian port cities.

United States-Mexico-Canada Agreement

USMCA, effectively an update of the 25-year-old North America Free Trade Agreement (NAFTA), was signed into law on January 29, 2020. The new agreement includes some key changes to laws on intellectual property protection, the internet, investment, state-owned enterprises, and currency. One key change to avoid tariffs was raising the percentage of a motor vehicle's parts that must be produced in North American from 62.5% under NAFTA to 75% under USMCA. The intention of this provision was to incentivize automakers to source fewer parts from countries such as Germany, Japan, South Korea, or China for an "Assembled in Mexico" car. The agreement also requires 70% of a vehicle's steel and aluminum to originate in North America, with steel being both melted and poured on the continent (Swanson and Tankersley, 2020). These rules are expected to boost parts production in North America but raise car prices for consumers. Some economists also predict that the new requirements for goods to qualify as North American will complicate the supply chains for multi-national firms, such as European auto manufacturers that assemble in North America, potentially making

manufacturing for the automobile industry in the U.S. less competitive (Mauldin and Leary, 2020).

USMCA also includes provisions that require Mexico to enact legal changes to address forced labor and violence against workers and allow for independent unions and labor courts. The intention of these provisions is to level the playing field for workers in the U.S., Canada, and Mexico. The International Trade Commission estimated that, if the changes are successful, the agreement will increase wages for Mexico's unionized workers and decrease their pay gap with American workers (Swanson and Tankersley, 2020). If this occurs, it may lead to increased manufacturing across a variety of sectors that currently compete with inexpensive Mexican labor.

Another element of the USMCA that will impact U.S. industries is expanded market access for exports of dairy, poultry, and eggs to Canada. Canada will provide new tariff rate quotas for the U.S. for products including milk, cheese, cream, yogurt, ice cream, and other dairy products. Canada will also provide new tariff rate quotas for animal products such as chicken, eggs and egg products, and turkey (Office of the United States Trade Representative, n.d.). These changes will likely to lead to increased production and shipment of these agricultural products between the U.S. and Canada.

United States-China Trade Deal

After a tumultuous 2-year trade war, the U.S. and China signed a "Phase I" trade deal on January 15, 2020, to remove some U.S. tariffs on Chinese goods in exchange for a commitment from China to purchase more American farm, energy, and manufactured goods. The agreement would keep U.S. tariffs in place on approximately $370 billion in Chinese goods, or about 75% of Chinese imports to the U.S. (Davis et al., 2020). This is expected to lead to an increase of $200 billion in purchases of American products and services over the next 2 years, a significant uptick from the $130 billion in U.S. goods and $56 billion in U.S. services in 2017 (Reuters, 2020). The proposed increases in imports by category are shown in Figure 2-48.

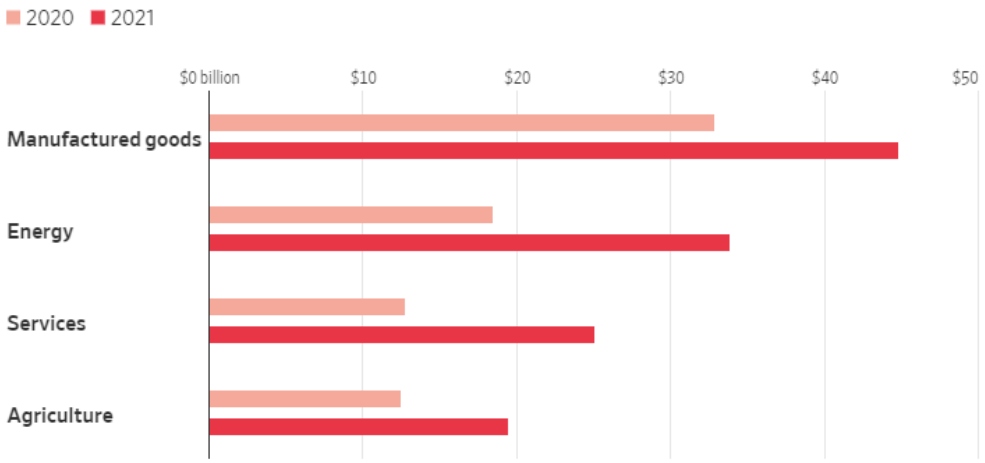


Figure 2-48: Proposed increases in imports by category, the United States-China trade deal (in billions of dollars) (Davis et al., 2020)

The U.S. has also agreed to halve the tariff rate it imposed in September 2019 to 7.5%, which had an impact on a $120 billion list of Chinese goods. The 25% tariff that the U.S. put in place in March 2018 on $250 billion in Chinese goods will remain unchanged in the short term but is expected to be rolled back as part of another negotiation at a later time. In response, China has suspended a 25% tariff on U.S.-made automobiles (Reuters, 2020).

Another element of the trade deal includes significant changes to China's agricultural policies. China has agreed to eliminate certain health standards and relax licensing, inspection, and registration rules that have blocked or obstructed American agricultural goods from reaching Chinese consumers. This will most significantly impact products such as meat, poultry, pet food, seafood, animal feed, baby formula, and dairy (Davis et al., 2020).

Although it appears these changes will benefit American farmers and manufacturers through 2022, it is unclear whether China will continue to purchase U.S. products at the same rate after 2 years. It is also unclear what will happen to China's existing contracts with other countries on products that are expected to be purchased from the U.S., such as soybeans (Davis et al. (2020). This uncertainty has the potential to hurt U.S. farmers and manufacturers in the long term. In addition, it is still unclear how and whether any agreement with China would be enforced (Davis et al., 2020).

2.3.2.2 Institutional Factors

Since the regulatory reforms of the early 1980s, the railroad industry has undergone substantial changes, which provide important context for current developments. Prior to the mid-2010s, this evolution can be described as consisting of two distinct periods:

- From 1980 through the mid-1990s, railroads underwent a formative period of revival. Regulatory reforms greatly increased their ability to set rates and services, enter and leave markets, and undertake mergers. This new flexibility was combined with aggressive cost reduction, adoption of new technologies, mergers, line spin-offs, and abandonments. Altogether, the result was vastly improved asset productivity. Widespread implementation of unit trains to move bulk goods and the rise in intermodal traffic driven by imports brought the railroads new traffic that replaced domestic carload traffic that was being lost either to economic change or other modes.
- The late 1990s through the mid-2010s represented a period of financial strength and growth. Contributing to this success was expansion in the core traffic base, rising trucking costs, and benefits from a consolidated industry consisting of seven major railroads across North America. Productivity gains continued, as revenues doubled through a combination of reduced intra-modal competition and increasing costs faced by their modal competitors. Intermodal shipment continued its robust growth; coal reached peak volumes and a global commodities boom drove increases in other bulk traffic. As a result, railroad capital investments hit record levels.

Since the mid-2010s, the trends have been more ambiguous. The longstanding upward trajectory of traffic volumes and financial performance that began in 1980 leveled off, and the institutional conditions driving the rail industry have shifted. Traffic volumes have become increasingly volatile, while uneven financial results have brought to bear renewed pressures from investors to improve on their generally strong financial performance. As a result, this changed environment is inducing a transition among the freight railroads that may be as fundamental as that of the 1980s.

The following subsections discuss recent market trends and institutional factors affecting rail industry strategy, and how those factors may influence the industry's ability and willingness to pursue new opportunities and investments.

2.3.2.2.1 Current Trends

Railway business decision-makers in today's environment face volatility and uncertainty about future markets and modal competition. Since 2010, the railway industry has experienced shifting traffic patterns and flat growth, even with the broad upturn in traffic that began in late 2016. Between 2010 and 2017, carload volumes were flat, declining an average of 0.2% per year, while tonnages have declined on an average of 1.7% per year. The relative difference between carload volume and tonnage declines reflects the continuing shift to the far lower carrying capacity of intermodal trailers and containers versus conventional railcars.

Despite the recent gains, total carloads have yet to achieve pre-recession 2008 levels, with the Class I railroads originating about 3.5 million fewer carloads in 2017 than the peak year of 2006. This trend is evident in Figure 2-49, which shows annual carload traffic volumes by commodity averaged over 5-year increments between 1981 and 2017 for all Class I railroads. The drop in both carload as well as tonnage, as shown in Figure 2-50, can largely be attributed to a 40% decline in coal tonnage since 2008, although some other bulk commodities also experienced declining volumes.

The continued shift from mostly heavy bulk commodities like coal to less dense commodities such as intermodal is evident in Figure 2-51, which compares the average number of tons per carload for each primary commodity group between the years 1981 and 2017. Overall, for all commodities combined, the average tons per car is declining, a reflection of the growing portion of intermodal traffic and its lower unit capacity than conventional railcars. On the other hand, bulk commodities increased in tons per carload between 1981 and 2017. Heavy bulk products such as coal, nonmetallic minerals, stone, and primary metal products increased the most, due to the industry-wide adoption of higher capacity railcars that began in 1995.[17] At that time, the railroad industry increased the standard maximum weight from 263k to 286k for gross vehicle weight. The only commodities experiencing a decline in tons per car over the past 36 years are paper, other, transportation equipment, and intermodal traffic. These shipments are often limited by volume rather than weight.[18]

[17] AAR Standard S-259 (S-259) allowing 286k railcars in unrestricted interchange became effective January 1, 1995.

[18] The decrease in average tons shipped per carload for these commodities could be caused by a different mix of products being shipped. An influx in large and relatively light products would lower average tons per carload.

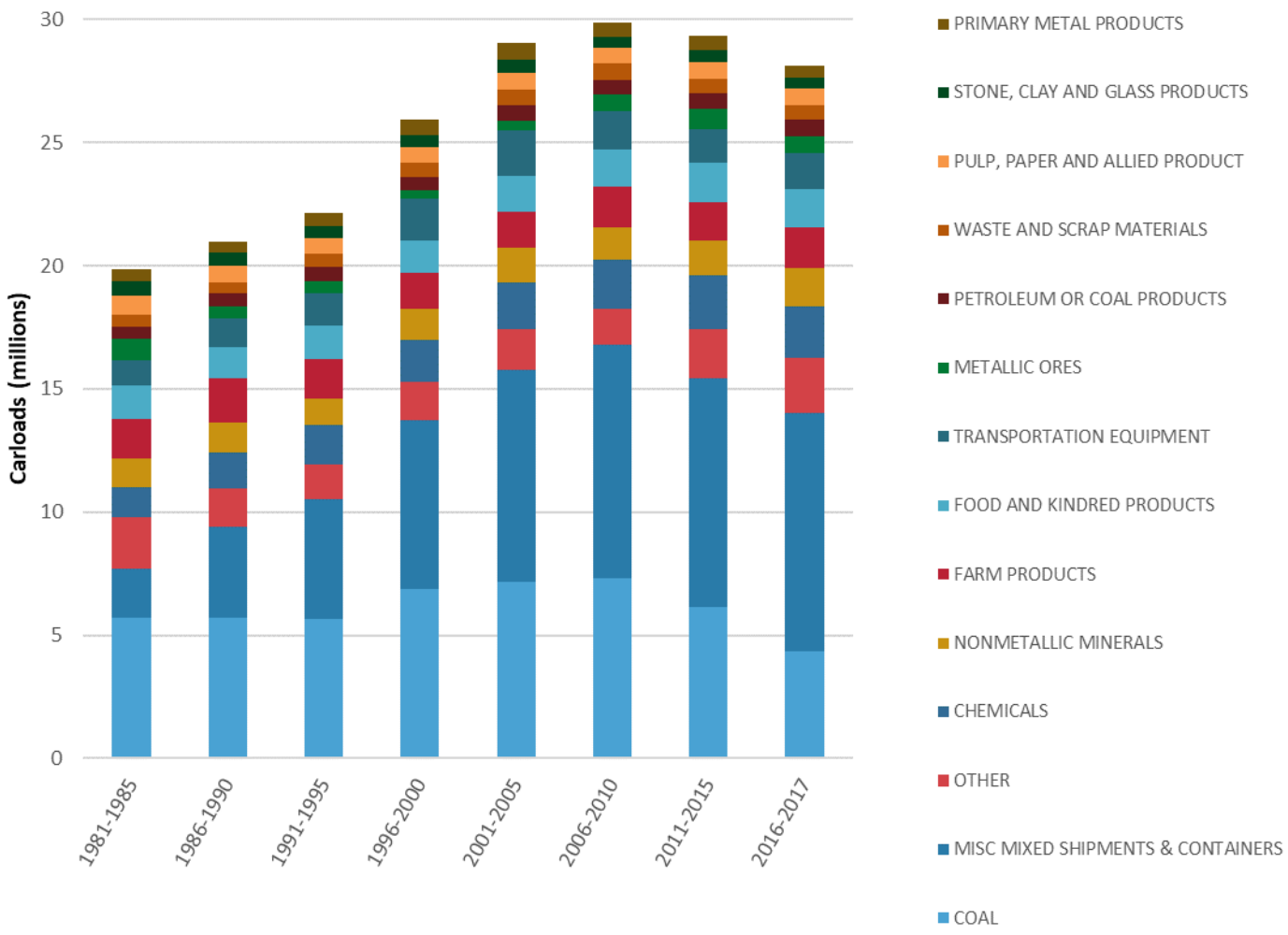


Figure 2-49: Class I annualized carload trends in 5-year increments by major commodity, 1981–2017 (STB, n.d.)

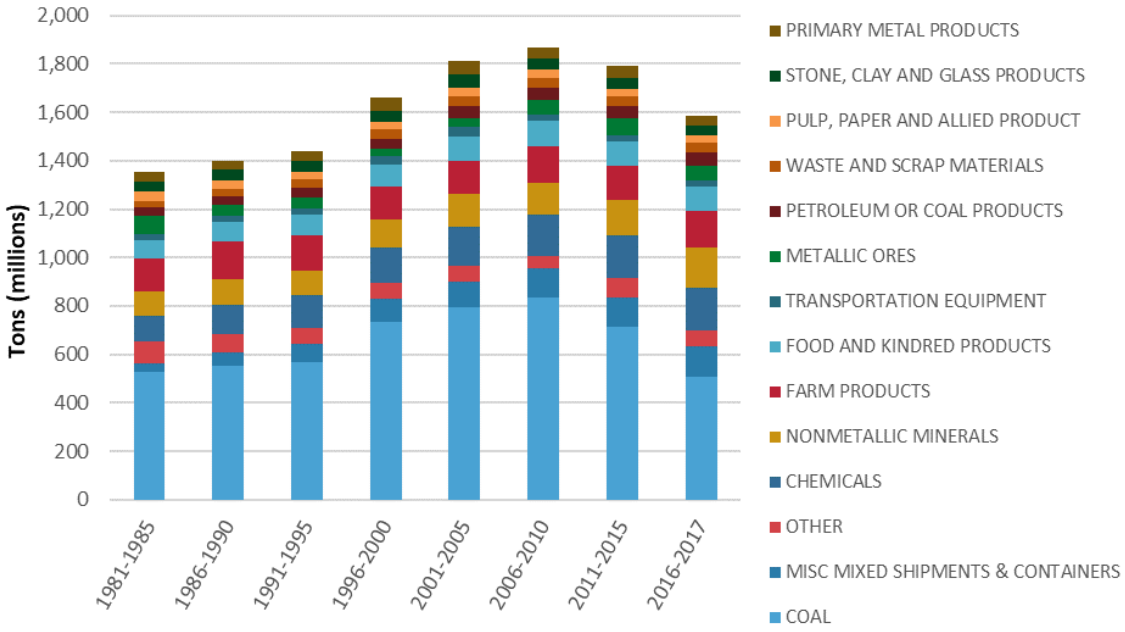


Figure 2-50: Class I annualized tonnage trends in 5-year increments by major commodity, 1981–2017 (STB, n.d.)

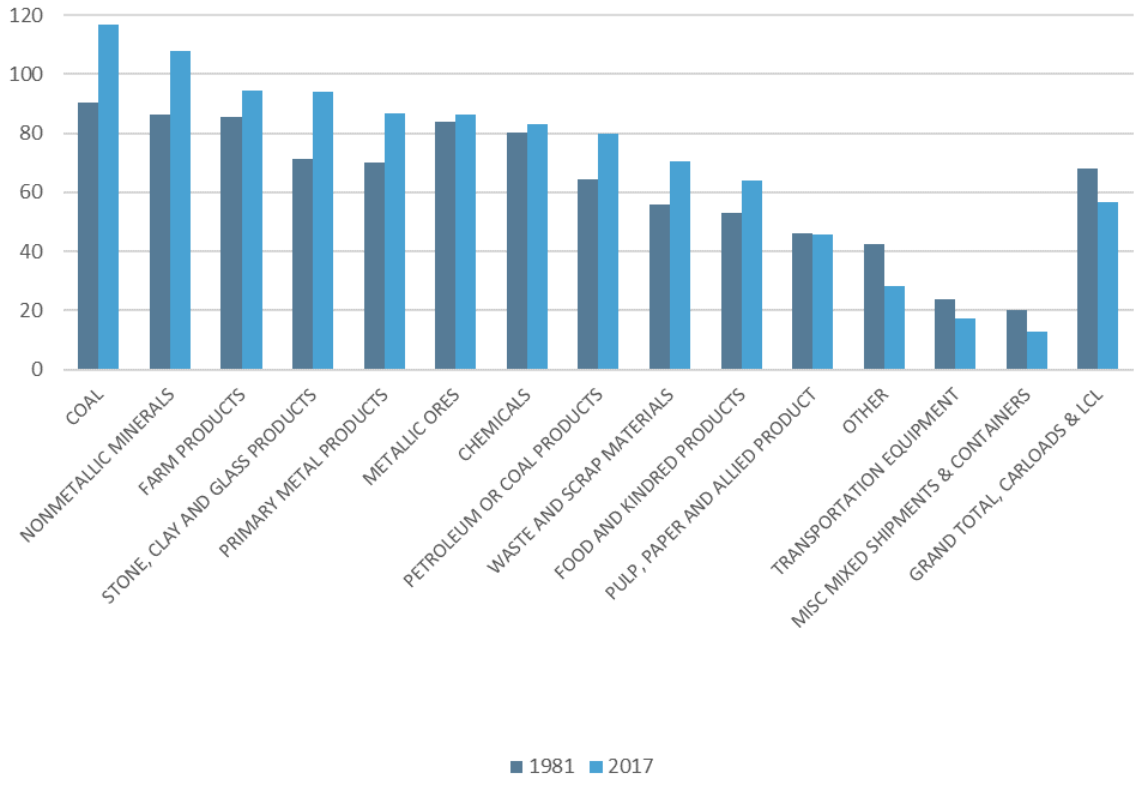
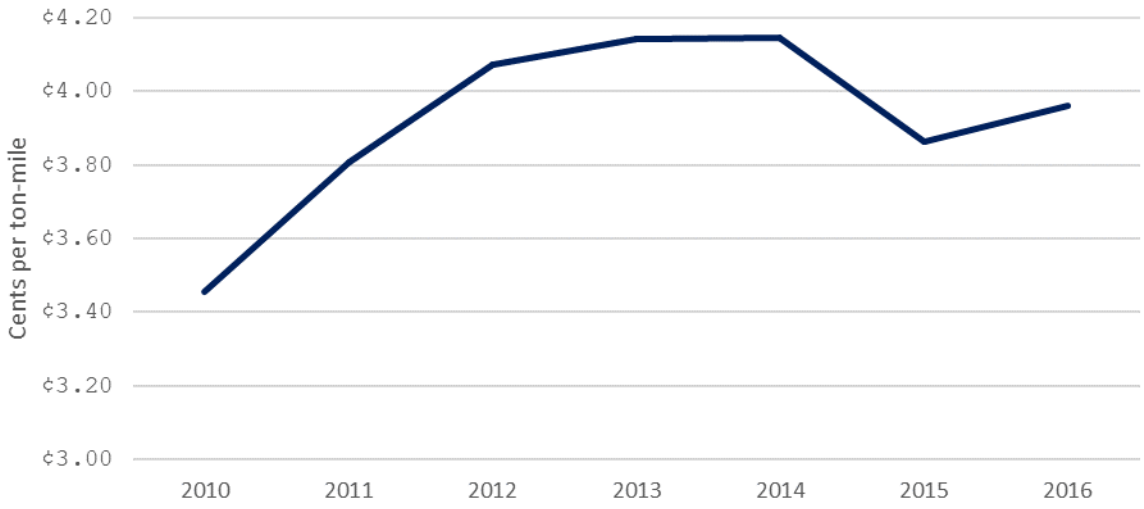


Figure 2-51: Class I average tons per carload by major commodity, 1981 and 2017 (STB, n.d.)

Coal as a source of traffic has been declining since 2008, as electricity production began to shift from coal to natural gas, solar, and wind. Between 2010 and 2016, the transport of crude oil rose and declined rapidly, a volatile market that is also modally competitive. Crude oil produced high margins for railroads, and thus became an important element to maintaining profitability to offset the drop-in coal traffic, their leading source of revenue. While oil producers can leverage the flexibility that rail provides in accessing markets across North America, pipeline transport is usually more cost effective. Thus, when the crude oil supply exceeds pipeline capacity, the demand for transporting crude by rail increases. That was the case between 2010 and 2014, when high oil prices and rapidly expanding production in the Bakken region of North Dakota and Saskatchewan, as well as the tar sands of northern Alberta, caused production to far exceed pipeline capacity. Since then, production growth abated and several large oil pipeline projects were advanced, including Keystone XL, Enbridge Line 3 replacement, and KM TMX.

Pricing strategy has a direct bearing on traffic development. From 1981 through 2004, rates trended downward in response to a combination of inter- and intra-modal competition, and changes in supply chains and railroad service offerings. After 2004, railroads moved to increase rates, and the gap between the pricing of rail transportation and competing modes diminished (Figure 2-52). As a result, profitability increased about 400% between 2004 and 2014. As rail rates have increased, the relative discount between rail and truck pricing shrank. This contributed in part to the decline in rail volumes that occurred between 2010 and 2016, but the trend reversed in 2017 as capacity in trucking became tight and costs increased as a result of higher fuel costs, labor shortages, and declining productivity (Stifel, Transportation and Logistics Advisors, 2017).



Note: Rail rates are based on the nominal revenue (cents) per ton-mile

Figure 2-52: Average U.S. rail rates, 2010–2016 (FHWA / BTS, n.d.a)

The current struggles of the trucking industry are not enough for railroads to maintain their market position. To drive future growth, there is a need for new strategies. Such changes include re-examining existing services, developing new service offerings, and creating new channels that align with modern supply chain needs. The growth or decline of traffic that is suitable for railway delivery and the industry's ability to compete with other modes of transportation are the key institutional factors that will drive the success of the railway industry.

2.3.2.2.2 Institutional Factors Affecting Railway Investment

The willingness of railroads as private entities to provide service and reinvest in their operations is driven by expectations of financial returns. Financial performance, within the industry, and in comparison to other sectors, directly influences the ability of the industry to adapt and invest.

The railroad industry is very capital-intensive, with about three to five times more revenue going into equipment and infrastructure than is typical of other heavy industries. Following the 2008–2009 recession, railroads made record capital investments, peaking in 2015 at $30.3 billion, approximately 46% greater than in 2010 ($20.7 billion) (AAR, n.d.b). When traffic began to drop in late 2014, the high stock prices placed intense pressure on rail carriers to further boost their financial performance. They responded by cutting operating costs, which has a direct effect on service, and holding back capital investment (Machalaba, 2018). In 2016 ($25.9 billion) and 2017 ($24.8 billion), capital investments were 15 to 18% lower than 2015 spending and roughly equivalent to the 2012 and 2013 levels. As a result, when rail traffic started

to rebound, operational performance declined across the board at most of the Class I railroads, with the Union Pacific, NS, and CN being particularly hard hit (U.S. Surface Transportation Board, 2018). Least affected was BNSF Railway, which is effectively privately held as a unit of Berkshire Hathaway.

This recent experience is consistent with prior similar situations during periods of traffic declines. A decision to pull back costs by cutting capital investments and operating budgets and narrowing business development to established markets is easy to explain to investors. Opting to spend funds on the possibility of growth through service improvements and entering new markets is far more difficult to defend to investors due to uncertainty as well as their focus on near-term outcomes.

The possibility of further consolidation of the seven Class I railways within the U.S. is also a looming driver in decisions. Pressures to improve financial and operational performance continue to bring about arguments that further consolidation would provide significant benefits to investors and shippers. Others believe that the benefits related to consolidation have already been realized, and that further consolidation would produce few or no gains, or even be detrimental. In this context, the flurry of activity around potential combinations that occurred during 2015 and 2016 diminished by 2017 as a result of management changes improved financial performance and chronic service issues that plagued the industry. The topic of further consolidation of the Class I railroads will continue to be a recurring one. Wall Street, rather than railroad management, will drive this discussion, as most railroad managers have come to view large mergers as risky and disruptive from a regulatory, economic, and institutional standpoint.

2.3.2.2.3 Institutional Factors Affecting Business Development

While railroads must obtain new sources of traffic, the industry's pursuit of new business opportunities is driven by a need to be financially conservative and risk averse. To capture additional business, railroads can first look to make changes in service frequency and reliability in markets where they already have a strong presence. Long-term freight transportation demand is expected to grow 41% between 2015 and 2045 (FHWA/BTS, n.d.b). In the next 5 years, rail traffic growth may be seen in domestic intermodal shifting from truck to rail and increasing international intermodal. In addition to potential growth in the international and domestic intermodal sectors, chemicals, construction materials, and agricultural products are all sectors that can be targeted for future growth.

Opportunities may be more promising in expanding domestic intermodal and re-emphasizing carload (manifest) service due to limited prospects for the movement of bulk commodities in unit train volumes. Once the mainstay of railroading, manifest

service has been on a continuous downward trajectory since World War II, and now represents less than half of all rail traffic on both a tonnage and carload basis. While reducing manifest train service has saved Class I railroads labor costs and increased asset productivity, it has also made an already slow service even less attractive. Manifest traffic is operationally more complex than point-to-point service. It requires frequent switching, repeated assembly of cars into trains, and multiple transfers among carriers as the traffic traverses the national rail system. This makes it more challenging to achieve and maintain high reliability than the point-to-point operations that are typical of bulk unit trains and intermodal services.

With short lines heavily reliant on manifest traffic, their commitment remains steadfast. Class I railroads have broadly varying perspectives on the future of manifest service, ranging from commitment to ambivalence. Nevertheless, with the decline in bulk traffic, railroads have expressed some renewed interest in attracting less-than-trainload traffic. In part, the manifest network continues to handle some high revenue commodities such as chemicals that would be lost if carriers chose to completely abandon carload service. However, the current approach to manifest traffic is very different from that of the past. Where carriers once pursued a broad range of business, today, manifest service has become a specialty product for customers that can leverage the higher capacity of railcars to gain significant cost savings over truck or intermodal service. Manifest service can be combined with direct rail service or transloading, which maintains the benefits of low line-haul costs by rail with last-mile access over the road.

Another growth opportunity for railroads is short-haul intermodal service. While the market for long-haul intermodal service is largely mature, considerable potential remains for shorter hauls. In 2015, rail delivery was the principal mode for shipments transported between 750 and 2,000 miles. However, most goods moved far shorter distances. Movements less than 250 miles accounted for 66.6% of the weight for all shipments within the United States. Shipments transported between 250 and 500 miles represented 17% of the tonnage, and shipments transported between 750 and 2,000 miles accounted for 14% (Figure 2-53).[19] With sufficient density, short-haul intermodal can be service competitive and profitable, but it does require investment that railroads have generally been reluctant to make.

[19] See Figure 2-1, Value, Tonnage, and Ton-Miles of Freight by Distance: 2015, in *Freight Facts and Figures 2017*, (BTS, 2018).

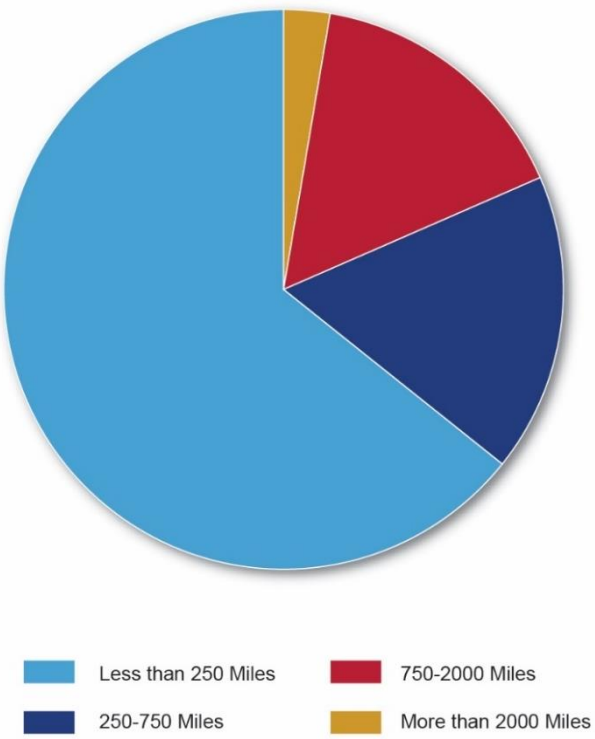


Figure 2-53: Percentage of shipment tonnage by distance traveled (BTS, 2018)

2.3.2.3 Key Regulatory Issues

Railways were the first industry subject to economic regulation by the federal government, starting with the passage of the Interstate Commerce Act of 1887. By the 1970s, a discriminatory regulatory regime helped to drive the privately owned railroads to the brink of insolvency. The Staggers Rail Act of 1980 (49 U.S.C. 10101 note) (Staggers Act) was key to the survival of railroads in the U.S. because it greatly reduced economic regulation of the industry, allowing the railroads flexibility in setting prices, entering and exiting markets, and restructuring ownership of the network. Railroad regulation is a constantly evolving process, of which there are several active issues and proceedings relevant to Pennsylvania. These are outlined in this section.

2.3.2.3.1 Economic, Modal, and LOS Rule Making

Regulation affecting the rail industry, including rates, provision of service, competitive actions, abandonments, line sales, and mergers, is overseen by the STB. Several pending STB proceedings could significantly change the economic landscape of rail delivery.

Reciprocal Switching: Filed in 2011 by the National Industrial Transportation League, *Ex Parte* 711 would allow a competing carrier to gain access to an industry that is served by only one carrier (i.e., a "captive shipper") that is located within 30 miles of the

interchange point under specific conditions. Proponents believe that this expanded access would restore some competitive balance in a rail industry that has come to be dominated by seven large Class I carriers. The large railroads are strongly opposed to this proposal. They believe that implementation would substantially complicate operations, and reduce revenues and profitability, thereby diminishing their ability to make the investments necessary to keep up with capacity needs and competitive service requirements. On July 27, 2016, the STB issued a finding proposing Reciprocal Switching as a new rule. The proposed rule made it possible for shippers to obtain reciprocal switching under certain conditions where it is practicable for a railroad to provide the service and in the public interest. Since the proposal was released, the STB has taken no further action (National Industrial Transportation League, 2011).

Differential Pricing: Specifically permitted in the Staggers Act, differential pricing allows railroads to charge different rates to different customers (AAR, n.d.a). Though there is no specific STB proceeding regarding differential pricing, it is a common concern among shippers who believe that rail rates are excessive. Shippers who have competitive options, either across modes or between multiple rail carriers, generally face lower transportation costs than those who do not. Railroads argue that while these customers may pay lower rates, the revenue that the railroads earn from handling this business contributes to the overall cost of providing service, thus reducing the rates charged to customers who do not have intra- or intermodal options. Railroads further argue that differential rates have enabled them to serve and maintain an expansive North American network that would otherwise not be possible. The subject of many academic and trade association studies, differential pricing (also often referred to as Ramsey Pricing) is a complex topic, and one where it would be extremely difficult to achieve any kind of consensus around not only the impacts, but more importantly any alternatives.

Revenue Adequacy: As set forth in the Staggers Act, revenue adequacy is calculated by the STB to assess the financial health of individual railroads, which affects the railroads' specific abilities to set rates for regulated commodities. Few Class I railroads were found to be revenue-adequate using the STB's methodology until after 2010, when most of the Class I carriers started to cross the threshold regularly if not consistently. As a result of this continued financial improvement, the STB initiated *Ex Parte* 772 in 2014 to explore the methodology for determining railroad revenue adequacy. Revenue adequacy calculations were designed to measure the financial health of railroads, and STB as the regulator was left to grapple with developing an equitable approach for regulating rates once revenue adequacy was achieved.

In addition, the Staggers Act does not specify how long a railroad must be revenue adequate before it is subject to more stringent economic regulation. Not surprisingly, the positions taken by shippers and the railroads are diametrically opposed. The railroads

argue that using revenue adequacy as reason to limit rail rates contradicts the idea of an open market, while shippers argue that the railroads' characteristics as a utility call for regulation of rates to prevent excessive returns. The STB has been exploring this topic with its own initiatives and with *ex parte* communications that were explicitly permitted in a March 2018 decision. In September 2019, the STB held a public hearing following the findings of the its internal Rate Reform Task Force. The purpose of the hearing was to request public input on the definition of long-term revenue adequacy, a potential rate increase constraint for long-term revenue-adequate (LTRA) carriers, suspension of bottleneck protections for LTRA carriers, and potential simplifications for stand-alone cost rate review methodology for LTRA carriers (STB, 2019c).

Expanding Access to Rate Relief: Initiated by the STB in 2016, *Ex Parte* 665 (Sub-No. 2) is related to the rate regulation review of the rail transportation of grain and similar products. A 2006 U.S. Government Accountability Office (GAO) study (as well as studies conducted by the United States Department of Agriculture [USDA]) concluded that shippers of grain received much less benefit from the Staggers Act compared to other shippers, and that many grain shippers deserved accessible rate review. In September 2019, the STB proposed a new procedure for challenging the reasonableness of railroad rates in smaller cases (STB, 2019d). In this procedure, the STB would decide a case by selecting either the complainant's or the defendant's final offer, subjected to an expedited procedure schedule that adhered to firm deadlines. Comments on the proposed rule were due by November 12, 2019 and reply comments were due by January 10, 2020. Thus far, no decision has been issued by the STB.

Review of Commodity, Boxcar, and Trailer on Flatcar / Container on Flatcar (TOFC/COFC) Exemptions: Also initiated in 2016 through *Ex Parte* 704 (Sub-No. 1) the STB proposed to revoke class exemptions on select commodities because the class exemptions were no longer in the public interest. This change would re-impose oversight of rates by the STB over commodities and classes of traffic that were assumed to be inter- and intra-modally competitive. The railroads would have to report tariffs to help the STB determine whether there are any railroad abuses of market power. Thus far, no decision has been issued by the STB for this case.

2.3.2.3.2 Safety

Regulation affecting safety is overseen principally by the FRA. The FRA has several recent and/or pending regulatory issues that could affect railroads.

Electronically Controlled Pneumatic Brakes (ECP) Brake Rule: USDOT's 2015 rulemaking to improve safety related to transporting high-hazard flammable materials by rail (Docket No. PHMSA-2012-0082 [HM-251]) mandated adoption of ECP brakes under certain circumstances. Subsequently, the GAO reviewed FRA's data and studies, and

the Transportation Research Board (TRB) concluded that it could not say that ECP were more effective (TRB, 2017). This dampened the USDOT's drive to require ECP brakes, and the rule was fully withdrawn on September 24, 2018 (USDOT, 2018). However, it should be noted that ECP brakes provide operational benefits that, when combined with next-generation PTC, have the potential increase track capacity and improve train handling.

Evaluation of Safety-Sensitive Personnel for Moderate to Severe Obstructive Sleep Apnea: This rule, proposed in March 2016 as FRA-2015-0111, would require that locomotive engineers be tested for sleep apnea and be removed from duty if tested positive. Although considered discriminatory by opponents, there is substantial evidence indicating that sleep apnea has caused several major accidents (FRA, 2017 c). The FRA suspended further action on this rulemaking on August 4, 2017.[20]

Train Crew Size: In 2014, FRA proposed rulemaking FRA-2014-0033 with the intent of requiring a minimum of two crew members for most train operations, even though single-person head-end crews have been common for years in passenger service and some freight operations. The rule allowed exceptions for one-person crews in operations that the FRA believes do not pose significant safety risks. In the notice of proposed rulemaking, the FRA conceded that it did not have data to suggest that two-person crews are associated with higher levels of safety than one-person crews. However, anecdotal evidence of rail incidents led them to consider two-person crews as a safer operation (FRA, 2016). Although most train operations do already call for two crew members, railroads were resistant to being required to have a minimum of two crew members. They saw the mandate as an excessive regulation that would prevent them from making common sense operational decisions based on actual conditions. In May 2019, the FRA withdrew the proposed rulemaking after deciding that there is no direct safety connection between train crew staffing and accidents, and that such a rule would unnecessarily impede rail operations (FRA, n.d. a). However, in early 2020 several states indicated that they were considering whether to require freight trains to have a minimum crew size, which they claim would make operations safer. These states include Virginia, Missouri, New York, and Wyoming (*Altoona Mirror,* 2019). Pennsylvania legislators introduced a bill in 2016 to require at least two crew members in the cab of freight trains but have not taken further action (*Altoona Mirror,* 2019). Crew size will be one of the topics over which rail management and rail operating labor will be negotiating for a new contract, a process that was kicked off in early 2020 (Wilner, 2020).

[20] FRA Docket FRA–2015–0111. "Evaluation of Safety Sensitive Personnel for Moderate-to-Severe Obstructive Sleep Apnea." https://s3.amazonaws.com/public-inspection.federalregister.gov/2017-16451.pdf.

Regulatory Reform: Executive Order 13777, issued February 24, 2017, mandates government agencies to improve implementation of regulatory reform initiatives and policies. The Executive Order also mandates the evaluation of existing regulations to identify regulations for repeal, replacement, or modification consistent with applicable law. This Executive Order has affected rail regulation as new regulations (such as the proposed sleep apnea rule abandoned in 2017) are conflated with the efforts to repeal and consolidate existing regulations.

Positive Train Control: This federally mandated technology, which can prevent certain types of train accidents, holds the promise of enhanced safety and in the longer-term increased capacity of rail lines where implemented. PTC is discussed further below.

2.3.2.3.3 Legislation

Truck Size and Weight: A perennial issue, the federal maximum weight for standard highway tractor combinations, has been set to 80,000 pounds since 1983, and long combination vehicles were limited to certain highways located primarily in Western U.S. since 1991. However, over the last 20 years, individual states have given exemptions for weight limits to various industries, and the pressure to broadly increase weight limits at the federal level has grown increasingly intense. The economic impact on the rail industry of a nationwide increase in truck size and weight has been a matter of contentious discussion for many years. However, any significant changes in truck size and weight beyond current limits that are broadly applicable will provide productivity gains to trucking firms that will tilt modal economics more toward highway transport. Short lines are likely to bear the brunt of these impacts disproportionately, given their heavy orientation toward small-volume carload traffic. One study found that an increase in truck weight from 80,000 to 97,000 pounds could reduce merchandise traffic volumes by 44%, and overall rail traffic by 19% (AAR, 2020a). This issue may arise again as part of the FAST Act reauthorization when it ends after FFY 2020.

The *Truck Weight Exemptions: A Pennsylvania Transportation Advisory Committee Policy Impact Study* (Pennsylvania TAC, 2020), approved by the Pennsylvania State Transportation Commission in August 2020, assessed the complex range of impacts of two decades of overweight truck permitting. These include damage to state and local infrastructure, economic benefits as well as negative consequences, mode shift results, and safety concerns, among others. The study included an independent and objective analysis and acknowledges that rail freight and trucking have fundamentally different cost structures and infrastructure. A change in weight restrictions for trucks can undercut rail's competitive advantage for certain commodities and customers, to a point where some regional and short line railroads may be driven out of business.

The study does not contain recommendations; however, it was intentionally broad to begin framing the issues and impacts of truck weight exemptions. The study identified nine key topic areas, or findings, that would need to be examined further in separate studies. Finding 7 relates directly to Pennsylvania railroads: *Pennsylvania's rail freight operators, particularly regional and short lines*, are placed at a competitive disadvantage by some truck weight exemptions. The analysis concluded with the following:

- Railroads excel in moving heavy, bulky loads long distances. Overweight truck permitting reduces rail's competitive advantage with regard to heavy freight.
- The competitive balance between rail freight and truck freight is shaped by the major differences in their cost structures.
- Issuing special hauling permits appears to provide the trucking industry with a shipping cost advantage.
- Some transload operations may be impacted—positively or negatively—by overweight permitting.
- Increasing truck weight limits may be at odds with private- and public-sector investment in rail infrastructure.
- Not all origins and destinations are readily accessible by rail; therefore, overweight permitting in many cases is not posing a competitive disadvantage to rail.

The study provides considerations for moving forward, including a broader understanding of the total positive and negative impacts of truck weight exemptions—particularly the economic impacts across industries and modes and the adverse impacts that cannot readily be quantified in dollar terms.

Tax Credit Bill: Short lines, which often struggle to maintain their infrastructure, have secured tax credits for right-of-way investment. Known as 45G, the short line industry has received this credit only on a year-to-year basis, upon approval of Congress. In June 2019, the House of Representatives extended 45G through January 1, 2021, within the Taxpayer Certainty and Disaster Tax Relief Act (H.R. 3301, Section 112) (Vantuono, 2019). Short lines benefit the nation's rail network by operating and maintaining rail corridors that would otherwise have been abandoned by the larger railroads, which helps keep the U.S. rail network expansive and accessible. To maintain competitiveness, railroads across the country have been upgrading tracks to allow 286k railcars, a standard that was adopted by the Class I railroads in 1995. Since short lines already struggle with capital funding, upgrading track to fit with the standard traffic load is an important but challenging task to maintain long-term viability.

Safe Freight Acts: This proposal for mandatory two-person crews has shown up in both an FRA proposed rulemaking and as legislation in the U.S. Congress, as well as various

state legislatures. The rule proposed by the FRA is much more detailed in the application of a two-person crew than the Safe Freight Act (S. 2360) proposed to the Senate by U.S. Senator Heidi Heitkamp of North Dakota in January 2018 and the various bills proposed by U.S. Representative Don Young of Alaska—the latest of which is the Safe Freight Act of 2019 (H.R. 1748) proposed March 2019. Both bills received numerous cosponsors and were subsequently referred to committee.

Training Rule: As a part of the 2008 Rail Safety Improvement Act (RSIA), railroads are required to submit various employer-training programs to the FRA for approval in an effort to ensure a minimum standard for railroad safety programs. Two program deadlines have already passed: the Roadway Maintenance Machines in January 2015 and Submit Programs in January 2020 for Class I railroads. The remaining implementation deadlines are coming up between September 2020 and December 2025 for three other topics, including Designate Existing Employees (Grandfathering), Start Refresher, and Complete Refresher. Deadlines vary for Class I railroads, all other railroads, and railroad contractors (FRA, n.d. b).

STB Composition: As part of the Surface Transportation Board Reauthorization Act of 2015, the STB was authorized to expanded from three to five persons. The Congressional intent of this expansion was to bring more voices to the STB's decision-making. Filling these two new seats as well as appointing replacements for departing board members have proceeded slowly. There are currently three members on the board, two of whom were sworn into office in January 2019. In the meantime, the STB has postponed resolving a number of controversial issues, including the *ex parte* cases cited above.

2.3.3 Trends in Passenger Rail Transportation and Implications

This section discusses the overall passenger rail trends in Pennsylvania and the potential for increasing ridership by responding to changes in travel patterns. Key trends identified in the Pennsylvania passenger rail system include the following:

- Millennial approach to travel: Younger generations are shifting to more urban locations, not owning a car, and using ridesharing services. This trend complements rail service for longer distance travel and underscores the importance of denser, mixed-use land use development around stations and multimodal connections at stations.
- The Keystone Service: This is a competitive mode versus the Pennsylvania Turnpike from Harrisburg to Philadelphia. As automobile congestion increases, rail becomes more attractive, and Keystone ridership has experienced the greatest growth amongst Amtrak's Pennsylvania services.

- Changing land use patterns: Various changes in land use development have the potential to increase rail ridership. Businesses are looking to expand offices to Pennsylvania locations such as Lancaster, and intercity rail would complement reverse commute trips. Development around stations such as Philadelphia's 30th Street Station is revitalizing the areas and creating new rail markets.
- Encouraging bicycle use: The first- and last-mile issue can be remedied by accommodating bicycle use. Increasing availability of bicycle-check and bicycle racks on Amtrak rail cars is adding to ridership growth. As of 2020, the Pennsylvanian Service offers bicycle transport in the luggage car, and the Keystone Service provides carry-on bicycle service. Bike-sharing and other bike amenities at stations facilitate multimodal connections.
- Coordination with public transit providers: A focused and strategic effort is being made to work with public transit agencies to help maintain park-and-ride lots and coordinate service provides improved station access for daily commuters.

2.3.3.1 Amtrak Passenger Growth

Amtrak provides intercity passenger rail service in Pennsylvania with approximately 120 trains per day serving 24 stations across the state. Over the past 5 years, Amtrak ridership has increased at the route level for all Pennsylvania routes except for the Pennsylvanian and the Lake Shore Limited routes, which saw a 5% and 9% decrease in ridership, respectively, as shown in Table 2-43. Amtrak forecasts that growth will increase for all of these routes looking forward to FFY 2025, with the highest growth rate of 76% on the Pennsylvanian due to a proposed second round trip to be identified for potential implementation in FFY 2024. This proposed additional service is reliant on capacity-related requirements identified by Norfolk Southern, owner of the line. The additional roundtrip in 2024 was identified by Amtrak without consideration of any capital improvements that may need to be completed as a result of additional study and analysis by Norfolk Southern. It is also important to note that the ongoing COVID-19 pandemic has triggered major declines in Amtrak ridership. In response, Amtrak is planning for substantially reduced frequencies for its long-distance services. The long-term effect of the pandemic on Amtrak ridership is unknowable at the current time and the projections in this section do not reflect the impact of COVID-19. A full recovery could conceivably take years.

Table 2-43: Amtrak Ridership Growth by Route

Route	Ridership (in thousands)		FFY 2014–25 Growth Rate	Projected FFY 2025 Ridership (in thousands)	FFY 2019–25 Growth Rate
	FFY 2014	FFY 2019			
Acela	3,471.2	3,577.5	3%	5,046.7	41%
Northeast Regional	8,156.2	8,940.7	10%	9,246.9	3%
Keystone Service	1,314.3	1,576.0	20%	1,809.6	15%
Pennsylvanian	227.0	215.1	–5%	377.9	76%
Lake Shore Limited	391.6	357.7	–9%	364.0	2%

Source: Amtrak (n.d. c)

Table 2-44 summarizes station-level current ridership changes and projected growth based on route-level projections by Amtrak. Stations that saw ridership growth in FFY 2019 were all found on the Keystone route and the Northeast Regional route, with stations surrounding Philadelphia experiencing the greatest growth in absolute ridership numbers and growth rate. Stations served only by the Pennsylvanian and Lake Shore Limited experienced the biggest loss in ridership. By applying the route-level growth rates to FFY 2018 ridership numbers, the FFY 2025 station-level ridership can be estimated. All stations are projected to see growth, with Pennsylvanian and Keystone stations experiencing the highest rates.

Table 2-44: Amtrak Ridership Growth by Station

Code	Station	FFY 2014	FFY 2019	FFY 2014-2019 Growth Rate	Projected FFY 2025	FFY 2019-2025 Growth Rate
PHN	North Philadelphia	644	1,968	206%	2,173	10%
CWH	Cornwells Heights	2,093	3,103	48%	3,910	26%
PAO	Paoli	169,181	258,231	53%	294,848	14%
DOW	Downingtown	59,950	81,342	36%	97,056	19%
EXT	Exton	106,165	146,468	38%	181,401	24%
PHL	Philadelphia 30th Street	3,901,459	4,506,952	16%	5,321,580	18%
ARD	Ardmore	56,641	68,629	21%	76,107	11%
LNC	Lancaster	522,644	577,506	10%	716,160	24%
COT	Coatesville	15,566	14,915	-4%	19,737	32%
HAR	Harrisburg	491,539	521,043	6%	646,454	24%
MID	Middletown	66,604	67,733	2%	80,987	20%
MJY	Mount Joy	46,391	47,964	3%	54,545	14%
PGH	Pittsburgh	146,155	129,946	-11%	243,992	88%
LEW	Lewistown	9,375	8,249	-12%	15,264	85%

Code	Station	FFY 2014	FFY 2019	FFY 2014–2019 Growth Rate	Projected FFY 2025	FFY 2019–2025 Growth Rate
ELT	Elizabethtown	108,380	100,519	-7%	126,126	25%
PAR	Parkesburg	49,642	46,669	-6%	52,916	13%
COV	Connellsville	4,925	4,864	-1%	5,247	8%
LAB	Latrobe	4,631	4,523	-2%	4,843	7%
JST	Johnstown	22,931	18,848	-18%	23,361	24%
HGD	Huntingdon	6,801	5,722	-16%	10,144	77%
TYR	Tyrone	3,346	2,588	-23%	4,972	92%
GNB	Greensburg	15,023	12,645	-16%	22,243	76%
ERI	Erie	18,312	15,573	-15%	16,131	4%
ALT	Altoona	26,088	18,689	-28%	34,437	84%
	Total	**5,854,486**	**6,664,689**	**14%**	**8,054,634**	**21%**

Sources: Amtrak (2014); RPA (2020);
Note: FFY 2025 was estimated using *Amtrak Five-Year Service Line Plans*, *Fiscal Years 2020–2025 (Base + Five-Year Strategic Plan*) (Amtrak, n.d. c).

2.3.3.2 SEPTA Regional Rail Passenger Growth

SEPTA operates a regional commuter passenger rail service in Pennsylvania offering 13 Regional Rail lines with 154 stations serving the City of Philadelphia; Bucks, Chester, Delaware, and Montgomery Counties; as well as Newark, DE, and Trenton and West Trenton, NJ. Table 2-45 summarizes SEPTA Regional Rail line annual ridership growth from SFY 2014 to SFY 2019. Overall, there was a 3% decrease in SEPTA Regional Rail ridership, with the Manayunk/Norristown, Media/Elwyn, Lansdale/Doylestown, and Paoli/Thorndale Lines experiencing an increase in ridership.

Table 2-45: SEPTA Regional Rail Annual Ridership Growth

Branch	SFY 2014	SFY 2019	Growth Rate
Warminster	2,476,132	2,294,350	–7%
Manayunk/Norristown	2,911,854	3,289,470	13%
Media/Elwyn	2,840,305	3,016,230	6%
Lansdale/Doylestown	4,682,402	4,970,220	6%
Paoli/Thorndale	6,008,243	6,170,950	3%
Trenton	3,271,655	3,253,550	0%
West Trenton	3,468,772	3,394,380	–2%
Wilmington/Newark	2,695,065	2,498,350	–7%
Fox Chase	1,412,119	1,247,750	–12%
Cynwyd	158,711	130,410	–18%
Chestnut Hill West	1,609,198	1,282,680	–20%

Branch	SFY 2014	SFY 2019	Growth Rate
Airport	2,116,435	1,518,250	–28%
Chestnut Hill East	1,603,551	1,124,380	–30%
Total Regional Rail	**35,254,442**	**34,190,970**	**–3%**

Source: SEPTA (2013, 2020)

2.3.4 Positive Train Control and Other Technologies Affecting Rail Transportation

2.3.4.1 Positive Train Control Implementation Status in Pennsylvania

This section discusses various technological and operating innovations likely to affect freight and passenger railroads well into the future.

PTC is a federally mandated railroad safety improvement that all passenger railroads and Class I freight railroads must implement. PTC is a communication-based / processor-based train control technology that provides a system capable of reliably and functionally preventing train-to-train collisions, over-speed derailments, incursions into established work zone limits, and the movement of a train through a main line switch in the improper position. Lines requiring PTC include Class I railroad main lines that handle any poisonous-inhalation-hazardous materials and any railroad main lines over which regularly scheduled intercity passenger or commuter rail services are provided. Also, Class I main lines that exceed 5 million gross tons per year are subject to the PTC statute, even if no passenger rail service is operated or poisonous/hazardous materials traffic is carried.

RSIA mandated that PTC be implemented across a significant portion of the nation's rail industry by December 31, 2015. In late 2015, the deadline was extended to the end of 2018, with the possibility for 2 additional years if certain requirements are met. The new legislation, the PTC Enforcement and Implementation Act, required that railroads submit a revised PTC Implementation Plan (PTCIP) by January 26, 2016, outlining when and how the railroad would have a system fully installed and activated.

A critical concern for short lines operating over Class I trackage equipped with PTC is that continued access will be contingent on using PTC-equipped locomotives, which short lines may not have. While the FRA allows exemptions from this requirement under some circumstances, individual track owners (usually Class I railroads) may impose more stringent requirements. PTC for short lines is very costly, with a single installation on an older locomotive costing in excess of $100,000. Once locomotive PTC systems are operational, short lines will incur recurring costs for back-office services necessary to support PTC.

All three Class I railroads operating in Pennsylvania (NS, CSX, and CN) anticipate full implementation of PTC where required by the end of 2020.

Amtrak reported that PTC is in operation on the Philadelphia to Harrisburg line and on the Northeast Corridor. PTC is also in operation on the CSX Erie West Subdivision, host to the Lake Shore Limited. PTC will be deployed on the NS lines hosting the Pennsylvanian and the Capitol Limited by the end of 2020.

SEPTA reported that implementation of PTC on SEPTA Regional Rail Lines is complete, except for where Regional Rail lines transition to Amtrak's Northeast Corridor. SEPTA and Amtrak are continuing coordination to resolve deployment issues.

Beyond the potential for enhancing safety, PTC also holds the promise of boosting rail line capacity. As opposed to traditional fixed block systems, where trains can only enter a block or track segment once an opposing train has passed or a preceding train has exited the block, trains become essentially a moveable block with PTC. Accordingly, distances between trains can be reduced with no risk to safety. PTC can thus handle more trains on a given segment of infrastructure, diminishing the need to invest in new capacity for increases in volume. Realization of this promise, however, is still several years away.

2.3.4.2 Autonomous Trucks

Forecasts of increasing trucking volumes, a truck driver labor shortage, and more stringent hours-of-service regulation are three main spurs leading to investment in autonomous trucks (ATs). The AT technology continues to develop, promising a means to satisfy a growing demand while reducing costs at the same time.

Autonomous highway technologies entail a range of capabilities and are in various levels of development across the globe. Closest to commercial viability is truck platooning, which uses wireless technology to link multiple trucks together. Only the truck leading the platoon is occupied by a driver, who controls and monitors the entire set of trucks. When the platoon needs to slow or accelerate, the collected group reacts simultaneously. European regulators expect truck platooning to be introduced in limited fashion in 2022. Volvo and FedEx are currently testing truck platooning in the U.S. on public roads in North Carolina. The Oregon Department of Transportation has also given permission for the testing of truck platooning technology on public roads.

In Pennsylvania, the legislature passed Act 117 in 2018, which allows up to three vehicles to platoon together on public highways if they have submitted a Platoon Operations Plan. Since then, there have been instances of autonomous vehicles operating in the state. In December 2019, an autonomous truck from a shipping hub in Tulare, CA, drove 2,800 miles to deliver a refrigerated trailer of 4,000 pounds of Land

O'Lakes butter to Quakertown, PA. This movement was the first fully autonomous cross-country commercial trip made in the U.S.

AT could be both a benefit and a challenge to railways. Lower labor costs could make trucking more cost competitive, allowing it to divert more service-sensitive traffic from railroads in mid- to long hauls. However, railroads could respond with similar technological advances, such as reducing the train crew size from two to one or, eventually, fully autonomous operation once PTC has been fully deployed, a simpler problem to solve on the railway than on the highway. AT could also complement the railroad industry, which could use the technology to operate trucks in rail yards and intermodal yards, as well as ports and other industrial sites.

The implications of AT to freight railroads may be existential in that AT can erode the key competitive advantage trains have over trucks today. Shipping by train tends to be less expensive than by truck over longer distances. An oft-quoted rule of thumb is that for trips of 500 miles or greater, trains are more competitive than trucks. The main culprit driving higher trucking costs is labor, followed by fuel; marginal trucking costs of labor and fuel were 43 and 22%, respectively, in 2017.

With the advent of AT, however, the cost advantage of trains will be reduced. As a consequence, shippers may choose driverless trucks for their loads instead of trains. Intermodal traffic, which requires a truck haul to and from the rail intermodal facility, is perhaps the most vulnerable to diversion. That is, the load could simply skip the rail haul and keep moving by truck. Heavy bulk traffic like grain and coal, which might originate with a rail move, is a less likely target for an AT diversion.

With AT moving forward, railroads must develop strategies to cope with a potential diversion of traffic from rail to truck, as shippers seek to exploit all the advantages that AT can deliver. While one strategy might integrate AT with a rail operation, another might be a response in kind, as noted in the following section.

2.3.4.3 Autonomous Trains

Trains without locomotive engineers are a proven technology. Remote-control locomotives have been commonly used by railroads since the 1980s. In specific areas, such as yards, a locomotive engineer may control a remote-control locomotive from a waistband pack. This allows a locomotive engineer to control a train from outside the cab, thus offering the potential for increased productivity and lower staffing levels. If the locomotive loses communications with the remote control, it stops automatically. Being able to operate the train from outside the cab improves the operational efficiency of working within a yard.

It is unlikely that future yard operations will be fully autonomous due to the physical work that it takes to build and operate trains (e.g., throwing manual switches, attaching air hoses, and engaging hand brakes).

The autonomous train technology is also deployed on main lines. Rio Tinto Mining in Western Australia runs an increasing number of driverless trains on its 1,100-mile rail network. Facing a threat from AT, U.S. railroads could find a use for this technology, which could help protect their markets, particularly intermodal, by lowering costs.

Indeed, the railroads' work on deploying PTC systems is paving the way toward even more automation that may one day reduce the number of engineers in locomotive cabs. The prospect of greater automation unnerves rail labor due to potential elimination of many jobs (Pressman, 2019).

Autonomous trains can provide cost savings for passenger operators as well. However, these services generally have operating costs greater than fare revenue. Cost savings will likely result mostly in reductions of required operating subsidies rather than in reduction in passenger fares.

2.3.4.4 Longer Trains

Longer trains allow more freight to be moved by fewer crews, improving labor productivity. Distributed power, the technology that has allowed railroads to increase the length of trains, was initially developed in the 1960s. This technology features locomotives in two or more locations across the length of the train and allows a single engineer to remotely control all of the units. The distribution of locomotive power can provide for the safe handling of longer trains through improved braking and mitigation of in-train forces that raise the risk of derailments. This technique is how railroads can move trains of 10,000 feet long or longer, which has become common practice in North America.

A key concern with long trains is the limitation on the length of time that at-grade rail/highway crossings can be occupied. While a 10,000-foot train going 60 miles per hour would take 2 minutes to clear a crossing, at 10 miles per hour it would take 12 minutes, a long time for waiting vehicles. Investors have advocated for longer trains as a means of reducing operating costs and minimizing capital needs. While long trains can function well with high-volume bulk and container contents, their suitability for service-sensitive operations is debatable. Long trains take longer to build and break down, and their immense length can complicate and slow down operations in terminals as well as along main lines. Furthermore, rectifying *en route* breakdowns can take far longer, potentially causing disruptive network delays.

2.3.4.5 Global Positioning System

Around the world railroads are utilizing global positioning systems (GPS) to monitor, in real time, the movement of locomotives, rail cars, maintenance vehicles, and wayside equipment (GPS.gov, n.d.). GPS improves rail safety, security, and operational effectiveness when combined with other sensors, computers, and communications systems. These GPS-driven systems help reduce accidents, delays, and operating costs, while increasing track capacity, customer satisfaction, and cost effectiveness.

As noted above, U.S. passenger and freight railroads are deploying GPS-based PTC systems, which give dispatchers and passengers accurate information on train location and station arrival times. GPS enables the automation of track surveying, mapping, and inspection systems in ways that enhance the speed and accuracy of the work. In so doing, they shave work time, cut costs, and enhance safety.

Furthermore, railroads use GPS to synchronize the timing of railroad communication systems, including data transmissions for PTC; voice contact between locomotive engineers and dispatchers; and intermodal communications among trains, rail stations, ports, and airports.

As for the future, technologists are investigating how to integrate GPS into vehicle-to-vehicle communication systems that could mutually warn locomotive engineers and motorists of impending collisions at highway-rail crossings.

Rail Pulse is a newly-formed joint venture between PennDOT, Norfolk Southern, Genesee & Wyoming, Watco Transportation Services, and other North American rail companies to create a new technology platform (NS, 2020c). The venture was awarded a federal Consolidated Rail Infrastructure and Safety Improvements (CRISI) grant in the fall of 2020 (FRA, 2020 c). A railcar onboard GPS sensor system will be developed and deployed to provide real-time information on individual railcar movements and condition. The Rail Pulse platform will then be able to showcase that data to all users, including shippers, car owners, and railroads. Rail Pulse will improve visibility and tracking of rail shipments across the rail network while ensuring the safety and security of proprietary car-owner data. The platform will have industry-wide safety and operations benefits. For instance, early phases of the platform will incorporate hand brake and impact data which will provide important safety data. Additional telematics capabilities will include data capture to support real-time track-level visibility, whether doors or hatches are open, whether the car is loaded or partially loaded, and other key performance metrics. Future capabilities, such as onboard bearing temperature and wheel impact detection sensors, are envisioned as the technology evolves. Rail Pulse will bolster freight rail's market competitiveness and enable operators to better manage incidents and

maintenance needs. The full-service platform is anticipated to be available to the North American railcar industry by the end of 2022.

2.3.4.6 Electronic Fare Payment Systems

The first medium for fare payment in American transit and railroading was cash. People would pay station clerks cash for paper tickets that conductors on trains subsequently punched. A later innovation was transit tokens, which riders dropped into turnstiles and cashboxes to gain entry to subways, trolleys, and buses. Generally, the tokens could be purchased conveniently at nearby grocery and convenience stores as well as at transit stations.

In the 1960s and 1970s, major transit agencies around the U.S. implemented a new innovation: paper tickets with magnetic strips. At a station, riders would purchase tickets of a certain value from a ticket vending machine and then swipe it at fare gates upon entering the system and again when exiting. The value of the trip was automatically deducted from the ticket. Ten-ride, monthly, and other discount passes were also available. Commuter and intercity rail services continued to rely on conventional paper tickets and passes purchased at stations or through the mail.

Around 2010, digitization came to transit and rail fare payment. Fare cards were introduced, which riders could purchase at certain retailers or online. Riders would tap their cards on a transponder when boarding buses or trains and tap when leaving, whereby the fare amount was deducted from the card. Riders could add cash value to the card and thus free themselves entirely from paper ticket purchases. Riders could also register their cards and thus protect their stored value if cards were stolen or misplaced. An example of such a fare card is the SEPTA Key card, a reloadable, contactless chip card that offers a host of options for seamless travel and the self-serve flexibility of loading/reloading SEPTA fares to match riders' travel needs. Card holders can reload fares through the SEPTA Key website, at station fare kiosks, the SEPTA Key Customer Call Center, SEPTA sales offices and from external sales outlets. The Key card can be set up with auto-load to automatically purchase a rider's most frequent fare.

Another example is Port Authority's ConnectCard, which has been in usage since 2013, providing much of the same functionality as the SEPTA Key card. The ConnectCard has helped the Port Authority reduce fare evasion, is environmentally friendly and uses more reliable equipment. The ConnectCard can support daily, weekly, monthly and annual passes for passengers.

More recently, transit agencies, along with commuter railroads and some intercity services, have initiated mobile ticketing apps, whereby riders can purchase trips with smart phones. These apps are linked to bank or debit cards, and riders' fares are

automatically deducted from riders' bank accounts. Smart phone apps require phone users to pass their phones by transponders using near-field communication (NFC) to pay their fares. A fare checker on a train can scan a rider's cell phone to verify that the fare has been paid.

As for the future, the trend in simplifying how people pay for their trips will continue to evolve, driven by a desire for more convenience. One likely development will be more interoperability; for example, a rider in City A will be able to use his/her transit-specific mobility app to pay for a trip on transit in City B, with money transferring from one transit agency to the other automatically. Another development may allow a rider to research an entire trip on a smart phone, including first- and last-mile connections, and pay for it all on that phone, which will transmit the fare payment information to carriers all along the route.

While such innovations will be attractive for those with smart phones, equity concerns will require solutions for people without them. The solution in such cases will likely require transit agencies to provide a paper ticket option or replenishable fare cards.

2.3.4.7 Harnessing the Potential of Big Data and Artificial Intelligence

Big data includes anything that can be electronically captured. PTC information, rail car and container location information, locomotive event recorder information, signal data, highway traffic counts, customer billing, customer inquiries, satellite imagery, weather data, gate downtimes, and customs data are all now routinely obtainable.

For railroads, the challenge will be deciding what information is relevant and what decisions can be made using it. As a result of PTC deployment and ongoing digitization of routine business functions, there is now more data available than railroads know how to use. Nevertheless, railroads have every incentive to learn how to make use of the information they are collecting. Big data holds the promise of making the railroads more responsive to market conditions, which will help grow revenue and big data can help in finetuning operations, enhancing safety, and trimming costs.

It is likely that research and development (R&D) of best uses of big data is going to be funded by the railroads themselves, simply because the railroad market for big data research is not extensive. For example, there are about 26,000 locomotives on Class I systems in the U.S. versus over 200 million cars and trucks. One potential avenue for R&D might be through the AAR, to which the larger North American railroads are members.

Another opportunity for railroads is decision-making on big data through artificial intelligence (AI). AI refers to the simulation of intelligent behavior in computers. AI applications could be found in many functions performed by railroad employees

themselves today, such as deciding where maintenance of track and structures is most needed and which railcars are most in need of repair, optimizing train contents to minimize costs, and so on. AI could make decisions on collected big data. Again, harnessing the potential of AI will likely be incumbent on the railroad industry and individual railroads.

2.3.4.8 Higher Costs for Freight Rail Access

It is reasonable to assume that freight railroads will remain open to sharing their corridors with new passenger services, provided issues related to capacity and liability can be resolved. There is a major incentive for freight railroads to do so. In shared-use corridors, maintenance becomes a shared cost, allowing the host freight railroad's operating cost to be reduced.

Key to a successful shared-use operation is ensuring sufficient capacity to allow fluid freight and passenger operations well into the future. In this respect, freight railroads are likely to take the long view. Looking well into the future, they may see significantly increased freight train volumes and insist on building in significantly more capacity than passenger rail sponsors might anticipate. Accordingly, the price of access will be high, particularly in areas where it is costly to build capacity, such as across a waterway where a new bridge will be needed, or in an urban environment, where the rail right-of-way may be constrained by adjacent developed land.

2.3.4.9 Morphing of Precision Scheduled Railroading

Precision Schedule Railroading (PSR) is a strategy employing regular train departures and point-to-point operations to speed deliveries and reduce car handling. The goal is faster transit times and lower costs. The strategy has been adopted by almost all of North America's major railroads.

PSR is achieved through consolidating networks, abandoning less efficient services and lines, and shifting traffic from hub-and-spoke operations (which rely on freight yards) to origin-destination movements (which eliminate the need for intermediate yarding). It allows for longer trains, increased average wagon velocity, and reduced terminal dwell times (Barrow, 2019). Reductions in locomotive and railcar requirements are a result as well.

Because the industry is under extreme pressure from investors, PSR appears to bring operational efficiencies significant enough to improve profits. However, many shippers have complained that PSR has forced them to reorganize their operations to receive and dispatch cars outside normal business hours or different days. Some shippers have reported receiving high volumes of cars at a time, more than they are capable of

handling at a given time and exceeding their capacity for timely loading or unloading. This result can expose shippers to incurring substantial demurrage charges when they are unable to handle the cars in a timely manner (Barrow, 2019).

Furthermore, there have been substantial impacts on the Class I railroad workforce. In 2019, more than 20,000 rail workers in the U.S. lost their jobs (Long, 2020). With a vision of streamlining operations in order to expedite traffic, railroads have cut employment and closed yards where trains were once processed. With point-to-point operations, intermediate yard handling is less important.

Although the railroad industry has seen strong growth in financial performance since the implementation of PSR, it is unclear to what extent these gains are directly attributable to PSR exclusively as opposed to the effects of increasing rates or other market factors. As overall freight demand continues to rise, shippers are increasingly looking for alternatives to move their goods quickly, efficiently, and cost-effectively. It will be some time before the full impact of PSR is realized, specifically whether Class I railroads can sustain their strong financial performance while maintaining assets and service quality at a sufficiently competitive level (Long, 2020).

The foregoing is to say that the net effect of PSR is controversial. While systems are finetuned in accordance with PSR goals, the flexibility to respond to changing market conditions has been diminished. There are fewer handling facilities and fewer workers. Furthermore, the resulting rail operation tends to best fit the needs of major shippers, especially shippers who can deliver large or even unit train volumes. The end result can be a flatter revenue profile, but one with lower costs and greater profits. But while profits may be higher now, it is a certainty that shippers and shipping patterns will change over time.

Railroads will need to respond to changing market conditions. This reality may well mean that railroads will be adding back some of the system flexibility that they purged to cut costs with PSR. Adding back flexibility with strategic investments in yards, track, equipment, and workers will mean bigger capital and operating budgets. However, railroads will have little choice but to pay the price if they seek to offer the returns that their investors will surely continue to demand.

2.3.5 Land Use Planning

Pennsylvania has over 2,500 municipalities. Many are small, rural, or sparsely populated. Due to the number of local government units, it can be difficult to assess and plan for land use as it relates to rail service and infrastructure needs and opportunities. Beginning at the municipal level, many municipalities have developed their own comprehensive plans to plan for their future land use vision. Those that do not have

comprehensive plans may be covered through multi-municipal or county plans. Rural Planning Organizations (RPOs) and Metropolitan Planning Organizations (MPOs) take local, multi-municipal, and county comprehensive plans into consideration in an effort to enhance the integration of transportation and land use planning with economic development.

Historically, economic development and land use planning have not lined up with transportation plans. Local land use planning often failed to consider freight transportation, and inefficient development patterns did not encourage transit-oriented development (TOD) to support passenger rail. Similarly, transportation planning did not always consider land use plans. Coordinating land use planning with freight and passenger rail in mind can help avoid conflicting land uses and improve overall mobility and access to rail. Counties, municipalities, and trail organizations should coordinate with railroads where future trails will interact with rail corridors within their communities. Ongoing coordination between land use and transportation planning at the state, regional, and local levels is essential to support efficient use of rail transportation.

2.3.6 Trends in Passenger Rail Station Design

Section 2.3.3 describes the passenger rail trends Pennsylvania is currently experiencing, combined with ridership growth. This section discusses the trends in passenger rail station design. Improvements to passenger stations along the Pennsylvania rail system, particularly on the Keystone Corridor, are needed to bring stations to a state of good repair and ADA compliance. Many Keystone stations have been recently improved or are currently under design and/or construction.

There has been significant research into the travel patterns of millennials. This research shows common patterns of population migrations of younger millennials to urban areas (Lee et al., 2019), which is associated with lower car ownership and an increase in ridesharing (Venu et al., 2016). While there are some differing conclusions about what is causing these trends, such as living in urban areas, income and recession impacts, and delaying marriage and raising a family (Knittel and Murphy, 2019), these trends influence passenger rail through land use development around stations. One example currently being carried out at Philadelphia's 30th Street Station, and multimodal connections are being implemented to address the first- and last-mile issue of how passengers get to their final destination.

Encouraging bicycle use has been a growing trend in passenger rail planning. Amtrak has been retrofitting trains to add bicycle racks, including, starting in October 2019, the addition of a checked baggage car that allows bicycles on the Pennsylvanian (Knittel and Murphy, 2019). The first few months of this new service saw significant bicycle

ticketing. Another priority has been increasing bike-sharing access at stations and capital investments in bike amenities at stations, as discussed in Section 2.1.2.7. Expanded bicycle carry-on service was added to the Keystone Service in September 2020.

Additionally, the Pennsylvania Transportation Advisory Committee (TAC) has identified the following seven trends, technologies, and influences specifically for Pennsylvania passenger rail (Pennsylvania TAC, 2019b):

- Population migration to urban areas, increasing the intercity passenger rail market
- Ride-hailing (transportation network companies), providing first- and last-mile connections
- Connected and automated vehicle technology, providing real-time information on mode choices and convenient ticketing
- Environment, encouraging public support through environmental benefits
- Intercity buses, serving as extensions of rail service
- National and state policy, allowing greater flexibility and funding for states that could help expand intercity rail
- Transportation innovations such as maglev and hyperloop, which could eventually make traditional rail obsolete

2.3.6.1 Multimodal Connections

To address the first- and last-mile connections and changing travel patterns, current station design typically includes a multimodal connection component, ensuring that both redeveloped and new stations have appropriate connections. Elements included in the Keystone Corridor Improvement Project typically addressed all connecting modes:

- All modes: Garages and roadway reconfigurations to improve flow for all modes
- Auto: Increased and new parking, either through new lots or parking, drop-off areas near station entrances
- Bus: Designated loading and unloading zones, with passenger amenities like canopies
- Taxis and ridesharing: Designated drop-off and pick-up zones, taxi stands
- Active transportation: Safe pathways connecting to surrounding development, pedestrian tunnels and bridges, lighting, bike-sharing facilities, increased ability to check bikes on trains

Current and future station improvement projects consider and enhance the multimodal connectivity of the station to the surrounding community.

2.3.6.2 Station Modernization and On-Site Access


Photo: PennDOT

Many of the Pennsylvania stations require modernization to bring them up to the standards of the Amtrak guidelines, including accessibility, as described below, and the buildings themselves, such as the mechanical systems. New stations are typically designed with high-level platforms, and platform replacement can be part of the station modernization as well.

An important component affecting all areas of the station is accessibility, including bringing stations into compliance with ADA requirements and with Amtrak guidelines. This includes elements such as ramps, elevators, accessible parking spaces, restroom renovations, and curb cuts.

The *Amtrak Station Program and Planning Guide* provides guidance for future Amtrak station redevelopment. With a variety of station types and functions, this document outlines Amtrak systems, station categories, programming specifications, site analysis, and existing station and platform conditions to guide the unique design requirements for Amtrak station development.

2.3.6.3 Station Area Redevelopment

Increasingly, new and redeveloped station projects are accompanied by station area redevelopment, which encourages both residential and commercial land use and transit-oriented development. A prime example of this is the *Philadelphia 30th Street Station District Plan* (PennDOT et al., 2016 b), which is a joint planning effort to develop a long-term comprehensive vision for the future station surroundings, involving multiple area stakeholders and ensuring the creation of an implementable plan that would fulfill the following goals (phillydistrict.com, 2019):

- Build a vibrant community full of opportunities to live, learn, work, and play.
- Celebrate 30th Street Station as a premier multimodal transportation hub where people can seamlessly connect to resources and attractions in the local community, the city, and the region.
- Create a high-quality network of active, attractive, and safe places to welcome residents and visitors into a place of memorable identity and character.

The main entrance portico and signage for Philadelphia's 30th Street Station is shown in Figure 2-54.

Figure 2-54: Philadelphia's 30th Street Station (AECOM)

2.3.7 Potential Enhancements to PennDOT Rail Program to Fund Rail Improvements

The planning, implementation, and delivery of future upgrades, improvements, and new construction of Pennsylvania rail projects will require significant capital investment. Within the context of consistently constrained budgets, there is a need to implement innovative funding and financing in order to deliver these projects. Innovative funding and financing of rail projects generally comprises the creative combination of several public and private streams of funding. This section provides an overview of creative and innovative funding and financing mechanisms within P3s that can be used across transit, passenger rail, and freight rail and that may be applicable to future Pennsylvania capital rail improvements.

2.3.7.1 Use of Public-Private Partnerships to Deliver Capital Rail Projects

The suitability of different innovative funding and financing mechanisms depends on the specific attributes of the proposed candidate project as well as the parties involved in the delivery of the project. However, the common characteristic of most innovations in the funding of rail project delivery and operation is that they take place within the context of a P3. P3s are contractual agreements between a public agency and private sector entity to deliver (and potentially operate and maintain) a rail project. Generally, a P3 will have the private sector entity involved in at least one of, though often all, three aspects of the project: (1) project delivery (design and construction), (2) operations and maintenance, and (3) project financing. In general, the private sector is more efficient and innovative in the development, delivery, operation, and maintenance of rail projects.

Implementing the procurement and delivery of rail projects via P3s requires the state to establish a legal and policy framework. To address this, Pennsylvania approved Act 88 in 2012, a statutory tool that enables the Commonwealth of Pennsylvania and other public entities to "enter into agreements with the private sector to participate in the delivery, maintenance, and financing of transportation related projects" (Commonwealth of Pennsylvania, 2014, p. 3). Act 88 provides for both solicited (originated by public entity) and unsolicited (originated by private entity) transportation projects, including multimodal and intermodal projects. Each project is screened by the P3 Office and presented to the P3 Transportation Board for approval. Upon approval, the public entity may begin the procurement process. Act 88 stipulates that ownership of the underlying transportation facility being developed or improved in a transit or passenger rail P3 must be retained by the public entity and therefore would rarely apply to freight projects.

While P3s have become relatively common in the delivery of passenger rail and transit projects, P3s are also applicable to freight rail project implementation. This is true for several reasons. As the FHWA notes in *Financing Freight Improvements*:

> … the private sector is heavily invested in freight transportation, whether it is through ownership of infrastructure or by facilitating the movement of goods. Second, unlike other transportation investments, much of the freight investments are on private property, which makes it difficult for allocation of public funding. Third, the efficient movement of goods is important to both the private and public sector. Overall, the creation of partnerships can facilitate freight investments by leveraging scarce resources, and accelerating the benefits realized through these investments (FHWA, 2007, p. 54).

A common barrier to project implementation by the private sector is the high costs of financing projects. Entering into a P3 with the public sector entities allows private sector partners to access debt at lower borrowing rates as well as utilize and issue tax exempt

bonds. P3s generally allow for more rapid movement of capital into a project—and thus more rapid completion of projects—in a manner that transfers the allocation of certain risks from the public sector to the private sector entities. The reallocation of risk can take place in the delivery model, during the operation of the project, or both. Private sector investment will be drawn to projects that provide the highest potential returns adjusted for risk. In light of the current economic climate and the associated historically low rates for bonds and borrowing at the time of this writing, there are greater opportunities for advancing capital projects.

An overview of the most common models of P3 used for rail projects is shown in Table 2-46.

Table 2-46: Types of P3 Models for Rail Capital Projects

P3 Model	Description
Concessionaire Agreement/ Private Contract Fee Services	Public sector transfers the responsibility for services that would be typically performed in-house (such as operations and maintenance) to the private sector. Concessionaire receives long-term contract and availability payment for undertaking these services.
Design-Build	Combines two separate services into single contract. The public sector owns the facility under construction, and retains responsibility for financing, operating, and maintaining the project. Project owner generally has completed preliminary engineering, design, and project definition to 20% before letting the project for bids.
Design-Bid-Build	Separates design and construction responsibilities by awarding them to an independent private design engineer and a separate private contractor. The design engineering firm is responsible for completing the final project design, including plans, specifications, and supporting documentation. During the bidding phase, contractors submit competitive bids, which are reviewed by the public entity. Once a contractor is selected (based on the lowest bid), the project moves into the construction phase. Once construction is completed, the facility is operated and maintained by the public sector. Project design and construction are financed by the public sector.
Design-Build-Finance-Operate	Responsibilities for designing, building, financing, and operating are bundled together and transferred to private sector partners. Partly or wholly financed by debt that is backed by revenue sources dedicated to the project. Direct user fees are the most common revenue source. Future revenues are leveraged to issue bonds or other debt that provide funds for capital and project development costs. Funding is supplemented by public sector grants. Private sector contributions are in the form of cash equity or contributions in kind, such as right-of-way. Ownership of the infrastructure remains in the public sector.

P3 Model	Description
Build-Own-Operate	Private company is granted the right to develop, finance, design, build, own, operate, and maintain a transportation project for a specified concession period. Public sector involvement is limited to ensuring performance of the concession provisions.
Design-Build-Finance-Operate-Maintain and Design-Build-Own-Operate-Transfer	Combines design-build with operations and maintenance. A single contract is awarded to a private entity that would design, construct, and operate/maintain the project. Once the contract expires, the facility is turned over to the public owner. The public sector can decide whether to extend or rebid the operations and maintenance contract or take over the operations and maintenance responsibilities. For this model, the financing responsibility is retained by the public sector.

Sources: FHWA, n.d.

Generally, private sector entities interested in participating in a P3 will look to access, and eventually increase, user fees. For example, a private entity (or consortium) may agree to build, restore, or improve track or facilities in exchange for a long-term concessionaire agreement in which that private sector participant takes financial risk in return for the right to charge user fees. Steady and increasing user fees are generally associated with projects on existing or proposed network segments with high passenger ridership or high volumes of freight traffic. For this reason, P3s generally do not target rural or lower volume rail lines, which must rely on alternative innovative financing mechanisms (Altman et al., 2015). A P3 mechanism often utilized for small rail projects, those in rural areas, or on lower volume rail lines is the lease-back agreement. In this mechanism, the public sector will purchase rail assets and then lease them back to the operators. Usually targeting freight rail improvements for short line railroads (which tend to be capital poor), lease-back agreements provide a revenue stream for the public sector owner with the revenue being used to pay financing costs associated with the borrowed funds used to deliver the capital improvements.

Private activity bonds (PABs) are a popular mechanism used in P3s by private sector entities. Congress approved the limited use of PABs for transportation projects, and they can only be applied to intercity rail facilities. Private sector partners (as well as public sector entities) can also access low-cost financing through Pennsylvania's Infrastructure Bank (PIB), a state program similar to TIFIA providing low-interest loans for transportation infrastructure programs. Depreciation is also a major factor in attracting private sector entities to participate in a rail P3 where they retain ownership of the infrastructure assets. The private sector can depreciate the value of its physical assets, which in turn can have a significant impact on a rail project's forecast return on investment (ROI), thereby affecting the return on investment.

Lastly, private-sector participants can contribute to the funding and financing of a project through direct cash equity or in-kind contributions. In the case of in-kind contributions, private railroad entities donate land or professional services, which are included as part of the project costs.


Photo: PennDOT

3 Proposed Passenger Rail Improvements and Investments

This chapter summarizes known and proposed passenger rail improvements and investments in Pennsylvania identified as part of this State Rail Plan. Identified are both intercity passenger rail and commuter rail projects.

3.1 Project Identification

A total of 132 passenger rail improvements and investments has been identified as part of this SRP. “Improvements” refers to upgrades to existing infrastructure and operations. “Investments” refers to new infrastructure and other capital projects to improve for the future. Proposed improvements and investments include projects for high-speed, intercity, and commuter rail services along Amtrak’s Keystone Corridor, Amtrak’s NEC,

and the SEPTA Regional Rail system. All proposed projects and details were gathered from PennDOT and Amtrak, and publicly available reports and resources, such as:

- Plan the Keystone website (Planthekeystone.com) (PennDOT, 2020 b)[21]
- NEC Capital Investment Plan (FFY 2020–2024), (NEC, 2019)
- SEPTA Capital Program (SFY 2021–2032), (SEPTA, 2020 a)

The NEC Capital Investment Plan documents planned and ongoing capital investments for FFY 2020–2024 on the NEC. The SEPTA Capital Program documents planned and ongoing investments for Fiscal Years 2021–2032 and includes projects across the entire SEPTA public transportation system. However, only projects relevant to the Regional Rail system were included in this report.

Projects were characterized by the type of issues they addressed, including:

- Increasing ADA accessibility
- Safety improvements
- Increasing capacity
- Improving operational efficiencies
- Improving parking
- Increasing multimodal connections
- System reliability
- Addressing climate change
- Reducing travel time

The complete passenger rail project list is included in Appendix D, with a summary of the number of projects by service type, corridor, and cost provided in Table 3-1. The service types include Intercity Amtrak projects, Commuter SEPTA projects—both Intercity and Commuter—as well as Other, which includes vision projects for future commuter rail service as well as highway projects that impact rail lines but are not rail-specific projects. Projects specified for construction from 2021 onward are all included in the listings that follow. Division of projects by short-range and long-range (years 2025 to 2045) is presented in Chapter 5. Key projects for each corridor are summarized in the following sections.

[21] Accessed on March 20, 2020

Table 3-1: Passenger Rail Projects Summary, 2021–2045

Service Type	Corridor	Number of Projects	Total Estimated Cost (in Millions of Dollars)
Intercity	Keystone Corridor	12	$151.0
	NEC/Keystone	1	$250.0
	Other	1	(1)
Commuter	Keystone Corridor	63	$3,035.2
	Other	4	$983.0(1)
Intercity and Commuter	Northeast Corridor	14	$874.0
	Keystone Corridor	18	$372.9
Other	Various	19	(2)
Total		**132**	**$5,666.1**

Source: NEC, 2019; SEPTA, 2020; Plan the Keystone website

(1) Long-term vision projects that do not all have associated costs

(2) Projects not included in the analysis because they are not rail-specific projects

During the data gathering and public comment periods of the State Rail Plan process, several visionary passenger rail projects were highlighted to PennDOT. The visionary projects vary with respect to their current status, ranging from a statement of a conceptual need to completed feasibility studies with estimated costs evaluations. The following paragraphs provide brief descriptions of these individual projects, as well as a current status. The municipal and public support for many of these projects is significant and poignant for future planning exercises within the commonwealth. These visionary projects are outlined below:

- Phoenixville Passenger Rail Service Restoration

  In 2020, the Phoenixville Mayor's Task Force on Rail Transportation completed a study regarding the restoration of passenger rail service between the Norristown Transportation Center and Phoenixville Borough. This study found that the capital costs for the restoration of the service would be approximately $130 million with additional costs for operating and maintenance. According to the study, more than $350 million dollars of economic benefits over 30 years would be generated as a result of the investment in the restoration project. The stated potential benefits include property value appreciation, travel time savings and productive time for passengers who would use passenger rail rather than auto. The reduction of vehicle-miles traveled over 30 years would provide benefits in traffic congestion, air pollution and wear on Route 422. One major hurdle for this plan is the required negotiation and agreement for additional service with Norfolk Southern,

the owner of the line. Based upon this study, Phoenixville submitted a grant application to the FRA in order to continue the planning and property acquisition for this project.

- Reading Passenger Rail Service Restoration

  Both Berks Alliance and PennDOT have recently completed separate studies to assess the possibility of restoring passenger rail service between Philadelphia and Reading. PennDOT's study was released in December 2020 and is available for review on the Plan the Keystone website (PennDOT, 2020 b). PennDOT's analysis explored feasible service alternatives, capital improvements, and next steps required to initiate service. The estimated annual operating and maintenance costs range from $18 to $25 million, while estimated capital costs are significant. A sample investment scenario was developed which represents a higher level of service: a single-seat ride on dual-mode equipment from Reading to Philadelphia and a dedicated third track on the corridor between Norristown and Reading to greatly reduce potential freight conflicts. The total capital cost for the sample investment package is approximately $818 million; however, this is not an all-inclusive estimate. One of the costliest capital improvements is the widening of the Black Rock Tunnel. The tunnel was constructed in 1835, is very narrow, and can only safely accommodate a single track. Similar to the Phoenixville Passenger Rail initiative, a major hurdle for this plan is the required negotiation and agreement with Norfolk Southern, the owner of the line. Overall, the analysis suggests that while restored passenger rail service to Reading has the potential to attract significant ridership volumes, further detailed analysis must be conducted related to equipment, infrastructure constraints, and operational limitations (PennDOT, 2020 c).

- Lackawanna Cut-off Passenger Rail Restoration

  The Lackawanna Cut-off Project would restore passenger rail service between Scranton and Hoboken, New Jersey. This would allow commuters in northeast Pennsylvania to access the New York City metropolitan area. A prior study in 2006 estimated the project cost to be $551 million, which included approximately 21 miles of missing track reinstallation, two major bridge upgrades, eight new train stations, two new maintenance shops, and other related improvements. The high cost estimate proved to be a challenge in advancing the project. A more recent study, completed in December 2019, focused only on the necessary infrastructure improvements to complete the 133 miles of continuous rail between Scranton and Hoboken. The estimated project cost was determined to be nearly $289 million. The 2020 study was initiated and sponsored by the PNRAA and U.S.

Representative Matt Cartwright of Pennsylvania's 8th Congressional District. The project sponsors are looking to develop a new passenger study to determine potential ridership numbers as a next step (Access NEPA, 2020).

- Monessen Mid-Mon Valley Commuter Rail Service

  The Mayor of the City of Monessen's Strategic Plan includes the creation of a regional passenger rail system to connect the Mon Valley and Mid-Mon Valley corridor communities to the existing subway system in Pittsburgh. The Mayor's plan notes the new passenger service could run on existing freight lines (City of Monessen, 2020). This is a long-term vision project without initial evaluation or funding identified at this time.

- Additional Keystone Service - Western Pennsylvania

  In comparison to Keystone Service east of Harrisburg, similar investment has not occurred west of Harrisburg primarily due to funding limitations and the complexities surrounding the private ownership of existing stations and the Keystone West rail corridor itself. There has been long-standing advocacy for increased passenger rail service west of Harrisburg, which has been supported through various studies and evaluations of the corridor over the last decade. Most recently, the Department has initiated a capacity study through Norfolk Southern to consider an additional daily passenger train between Harrisburg and Pittsburgh. The results of this study will determine any required capital improvements and the capability for Amtrak to provide the additional Pennsylvanian train service.

3.2 Northeast Corridor (Amtrak)

Amtrak's NEC provides intercity rail service to major metropolitan areas between Washington, D.C. and Boston, including Philadelphia and New York. Amtrak owns most of the NEC and all of the line in Pennsylvania. Many Amtrak services and SEPTA services use the NEC, with some Amtrak services going beyond the NEC. Below is a list of services along the NEC that utilize the Philadelphia 30th Street Station:

- Northeast Corridor services
  - Acela
  - Northeast Regional
- State-supported services
  - Keystone

  - Pennsylvanian
  - Vermonter
- Long-distance services
  - Palmetto
  - Silver Meteor
  - Silver Star
  - Carolinian
  - Cardinal
  - Crescent
- Commuter services
  - SEPTA Regional Rail
  - New Jersey Transit

One significant passenger rail improvement initiative in Pennsylvania along the NEC is the Philadelphia 30th Street Station Investment and Development Program, which is part of the *Philadelphia 30th Street Station District P*lan (PennDOT et al., 2016 b). The Philadelphia 30th Street Station connects the NEC to the Keystone Corridor, and is also served by SEPTA, a partner on the project. The location of the 30th Street Station along the NEC, and the corresponding distances to other stations along the corridor, are shown in Figure 3-1. The implementation of the Philadelphia 30th Street Station Program would provide many benefits to the public, such as increased capacity, improved customer experience, connectivity, safety, and economic development.

The Philadelphia 30th Street Station Program and other proposed projects along the NEC are also included as part of FRA's NEC FUTURE and Amtrak's Next-Generation program, both described in more detail in the following sections.

Figure 3-1: Philadelphia on the Northeast Corridor (PennDOT et al., 2016 b)

3.2.1 NEC FUTURE

NEC FUTURE is the FRA's comprehensive planning effort to define, evaluate, and prioritize future investments in the NEC, and was completed in 2017. The planning effort established an investment plan for the NEC, which if implemented, will improve the capacity and reliability of passenger rail service in the Northeast for both

commuter/regional and intercity trips in a manner that will meet mobility needs as the region's pollution and employment continue to grow. This work is encompassed in the National Environmental Policy Act Tier 1 Environmental Impact Statement and a Record of Decision, which are being used to develop the Service Development Plan as part of the ongoing CONNECT NEC 2035 project.

Based on the Record of Decision for NEC FUTURE, plans within Pennsylvania include system upgrades to increase the maximum speed along the NEC, increase connectivity with the Regional Rail system, and implement state of good repair projects. The operating speed for the existing NEC is 160 mph, but new segments are expected to be designed for operating speeds of 220 mph. NEC FUTURE will result in the following public benefits (FRA, 2017 b):

- Improve Rail Service: More frequent trains, decreased trip time, more jobs accessible within a 45-minute train ride[22]
- Expand Rail Capacity: Increase speeds, eliminate chokepoints
- Modernize NEC Infrastructure: Bring to state of good repair, increase reliability
- Environmental Benefits: Net decrease in emissions of pollutant and greenhouse gases, decrease in total energy use

3.2.2 Next-Generation

Twenty-eight Next-Generation high-speed trains will replace the equipment currently used to provide Amtrak's premium Acela Express service along the NEC beginning in 2021 (Amtrak, n.d. e). This program is in coordination with the FRA and NEC FUTURE, and will offer similar public benefits. The fleet of trains will initially operate along the NEC at speeds up to 160 mph, with capabilities of reaching 186 mph. The capability to increase to 186 mph allows Amtrak to maximize utility of future NEC improvements in Pennsylvania that are included in the NEC FUTURE Record of Decision, as well as improve service to riders transferring onto the NEC from the Keystone Corridor. The $2.45 billion procurement of Next-Generation trains will increase capacity; improve safety, passenger service, and connectively; and reduce environmental impact. Passenger service will be enhanced with increased passenger seats, modern amenities, improved food services, and more reliable service.

[22] 112% increase for Philadelphia 30th Street https://www.fra.dot.gov/necfuture/pdfs/feis/summary.pdf.

3.3 Keystone Corridor (Amtrak)

Amtrak's Keystone Corridor is a 104-mile intercity passenger rail line that branches off the NEC from Philadelphia to Harrisburg, also known as Keystone East. The entire Keystone Corridor stretches from Philadelphia to Pittsburgh, with the portion from Harrisburg and Pittsburgh referred to as Keystone West, which is owned by Norfolk Southern.

As part of the KCIP, PennDOT initiated the "Plan the Keystone" and "Access the Keystone" initiatives in 2009 to improve passenger rail stations and access to the stations along Amtrak's Keystone Corridor. The Plan the Keystone initiative includes rehabilitation or replacement of 12 stations between Philadelphia and Harrisburg, with the primary goal of achieving ADA compliance while complementing local revitalization projects. Access the Keystone efforts are intended to improve passenger access to the station.

The stations listed below are included in KCIP. All stations between Philadelphia and Downingtown are also served by SEPTA Regional Rail commuter service.

- Philadelphia (30th Street Station)
- Ardmore
- Paoli (high-level platforms and parking project completed in 2019)
- Exton (completed Spring 2020)
- Downingtown
- Coatesville
- Parkesburg
- Lancaster (station rehabilitation completed in 2013[23])
- Mount Joy (completed in 2019)
- Elizabethtown (completed in 2011)
- Middletown
- Harrisburg

Five ADA-accessible station projects have been completed; the others are in either the planning, design, or construction phase. Figure 3-2 shows an example of one of the completed station improvement projects, located in Mount Joy. The Keystone Corridor

[23] Additional work is planned to increase parking opportunities and add a pedestrian bridge.

stations' ADA accessibility and interlocking improvements are Pennsylvania's most significant projects.

Figure 3-2: Mount Joy Station Improvement Project (PennDOT)

3.4 Regional Rail (SEPTA)

The SEPTA Regional Rail system serves the Philadelphia metropolitan area, including areas in New Jersey and Delaware, shown in Figure 3-3.

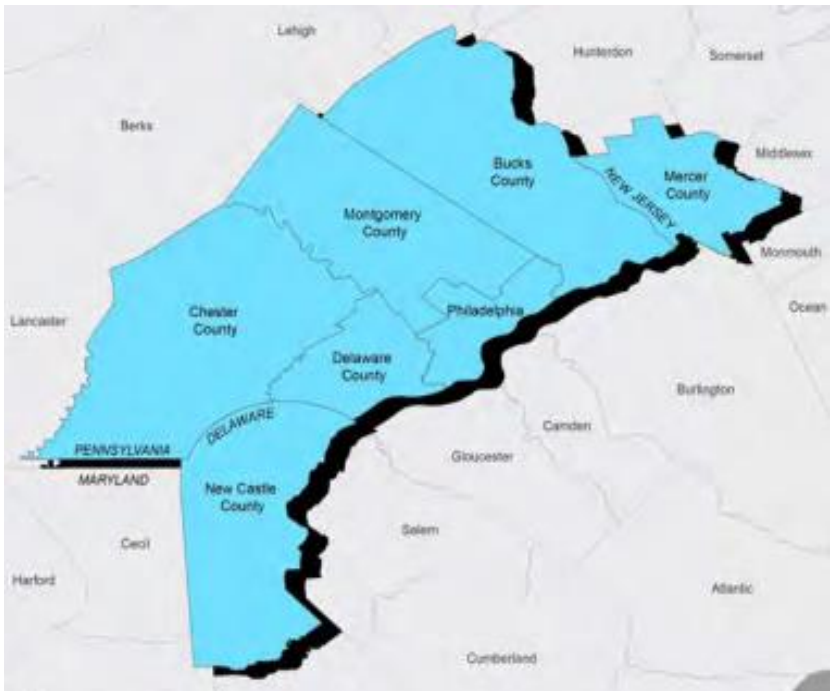


Figure 3-3: SEPTA Regional Rail coverage (SEPTA, 2020 a)

SEPTA's capital program focuses on projects that support sustainability, ridership growth, customer experience, safety and security, achieving a state of good repair,

emerging technologies, building business partnerships, and human capital development. Examples of rail projects that address these goals are (SEPTA, 2020 a):

- Elwyn to Middletown/US Route 1 Service Restoration Project: The project will restore service from the existing Media/Elwyn Regional Rail Line terminus at Elwyn to a new terminus at US Route 1 in Middletown Township, Delaware County, DE. The project will restore bridges, tracks, signal, and catenary systems, and construct a new station building and parking deck at the new terminus. This project will also include the installation of a bi-directional signal system and communications system improvements, including PTC. The project is currently in construction and is expected to be completed in 2023.
- Railroad Substations Improvement Program: This program will bring 90- to 100-year-old substations up to modern standards of reliability and performance through the replacement of existing equipment with state-of-the-art safety, communications, and relay protection systems, and the provision of additional power and reliability.
- Southwest Connection Improvement Project: The project will reconfigure and rebuild signals, track, catenary and interlockings from 30th Street Station to Arsenal Interlocking and include new PTC systems.
- Regional Rail Multi-Level Car Acquisition: Addresses growing ridership and service needs. The new fleet will be ADA-compliant and have enhanced passenger amenities. This acquisition will be in addition to the current 45 push-pull railcars. It is currently anticipated that these multi-level railcars will be in revenue service by 2023.

3.5 Routes without Proposed Projects

In addition to the routes discussed above, there are two long-distance routes without any currently proposed projects or investments, based on publicly available information. These routes are:

- Capitol Limited: Service operates daily between Chicago and Washington, D.C., with a stop in Pittsburgh.
- Lake Shore Limited: Service operates daily between Chicago and New York City, with a stop in Erie.

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Horseshoe Curve, Altoona
Photo: PennDOT

4 Proposed Freight Rail Improvements and Investments

This chapter describes known and proposed projects that could address the freight rail and rail safety needs of Pennsylvania. An overview of projects identified by Pennsylvania railroads and other participants in the outreach activities conducted during the development of this State Rail Plan is provided below.

4.1 Project Identification

This chapter summarizes proposed freight rail investments in Pennsylvania identified as part of this SRP. These projects were identified using a multifaceted process. The initial list of projects was developed as part of the stakeholder outreach conducted during Phase I of the SRP update completed in 2018. As part of this outreach effort, many of

Pennsylvania's freight-intensive firms, railroads, and economic development organizations were invited to participate in Phase I using a series of letters, surveys, emails, phone calls, and site visits. Based on input from stakeholder outreach, the need for investments included:

- Creating or improving access
- Adding or expanding sidings or interchange tracks
- Improving rail yards
- Improving bridges
- Creating or expanding transload terminals
- Rehabilitating existing tracks

Information was collected and developed for each project, including a project description, project category, location, schedule, estimated cost, and industries impacted. The second step in identifying potential projects included direct outreach to all the railroad carriers in the commonwealth. A list of projects identified in earlier work that PennDOT completed in 2018 and from the 2015 SRP (PennDOT, 2015) was shared with the railroads. The railroads were asked to review the list and provide an update to reflect projects completed or changed, and to add any new projects not identified on the list. Twenty-six railroads out of 63 responded with updated project lists. Projects from the 2015 SRP were not carried over to the 2020 SRP unless the railroads indicated the projects should be included.

Planning Partners from MPOs and RPOs were also engaged for input on rail projects planned in their regions. Eight regional planning organizations responded with updated project lists. Additionally, Port of Pittsburgh (Freeport Terminals) and PhilaPort provided input on improvements and projects to be incorporated into the project list.

In addition to requesting input from the railroads, investment plans from regional authorities and state grant program awards were reviewed. These included RFAP, RTAP, and Multimodal Transportation Fund.

Unlike passenger rail service, most freight rail service in the commonwealth is provided by private companies. Freight railroads build, own, and operate the majority of their infrastructure through privately sourced financing. Per FRA guidance, these companies are not obligated to include their capital investment plans in the SRP, and the study team did not receive lists of potential projects from all Class I, II, and III railroads. As a result, there will be additional capital investments made by the carriers using private funding that are not currently known, and not captured in this SRP's investment

program. Furthermore, particularly with the Class I railroads, they generally will only report capital needs for projects where public investment participation is considered.

The contents of this chapter are based on information received from individual freight railroads, regional planning organizations (MPOs/RPOs), and ports, and therefore should not be considered a comprehensive picture of projected investments to support freight rail service across Pennsylvania. For a substantial number of projects, no cost estimate was provided, and even where they were available, their level of development varies greatly, from a preliminary cost estimate to detailed engineering.

4.2 Projects by Regions

For purposes of reporting, projects were grouped by region and by type. The seven project types are as follows:

1. Accelerated Maintenance includes state of good repair projects necessary to maintain a competitive service and market relevance for both track and civil works. This includes addressing deferred maintenance, such as stabilizing bridges, waterproofing tunnels, and tie and rail replacement programs. These can also include investments necessary to upgrade track and structures to economically support the handling of 286k freight cars, generally a necessity for a railroad that intends to stay in business.
2. Civil Work Improvements include bridge- and tunnel-related operations and capacity, such as bridge and tunnel replacements, and bridge and tunnel reconstructions to allow for double-stack trains.
3. Track Improvements entail track-related operations and capacity projects, such as double tracking, rehabilitation of existing track, reconstructing segments, new siding, and increasing track capacity.
4. Terminal Improvements, including intermodal, transload, and yard facility projects, terminal capacity expansions, and building or upgrading terminal track.
5. Rolling Stock Improvements, including locomotive emissions reduction efforts and freight car rehabilitation. Typical locomotive investments include the acquisition of low-emissions switching engines, and the retrofitting of locomotives with auxiliary power units, which allows idle units to be shut down and readily restarted in cold weather.
6. Providing Access to Existing or New Customer, such as new connections to new or existing commercial and industrial developments, and intermodal and transload

facilities. This entails projects that are intended to attract specific business that is currently not being shipped by the proposing railroad, such as adding a siding, capacity upgrades at shipper facilities, and intermodal site improvements.

7. At-grade Crossing Safety Improvements includes track and crossing signal systems replacements and upgrades.

Reflecting Pennsylvania's distinct economic geographies, proposed freight projects were grouped by region as defined in the DCED's 10 Partnerships for Regional Economic Performance (PREP) regions. These ten regions are as defined in Table 4-1 and displayed in Figure 4-1.

Table 4-1: Pennsylvania PREP Regions by Counties Served

PREP Region	Counties Served
Northwest	Erie, Crawford, Warren, Mercer, Venango, Forest, Clarion, Lawrence
North Central	McKean, Potter, Elk, Cameron, Jefferson, Clearfield
Northern Tier	Tioga, Bradford, Susquehanna, Sullivan, Wyoming
Northeast	Wayne, Lackawanna, Luzerne, Pike, Monroe, Carbon, Schuylkill
Central	Lycoming, Clinton, Centre, Union, Northumberland, Montour, Columbia, Snyder, Mifflin, Juniata
Lehigh Valley	Lehigh, Northampton
Southwest	Beaver, Butler, Armstrong, Indiana, Allegheny, Westmoreland, Washington, Greene, Fayette
Southern Alleghenies	Cambria, Blair, Huntingdon, Somerset, Bedford, Fulton
South Central	Perry, Dauphin, Cumberland, Lebanon, Franklin, Adams, York, Lancaster
Southeast	Berks, Bucks, Montgomery, Chester, Delaware, Philadelphia

Source: (Pennsylvania Community and Economic Development, n.d.-c)

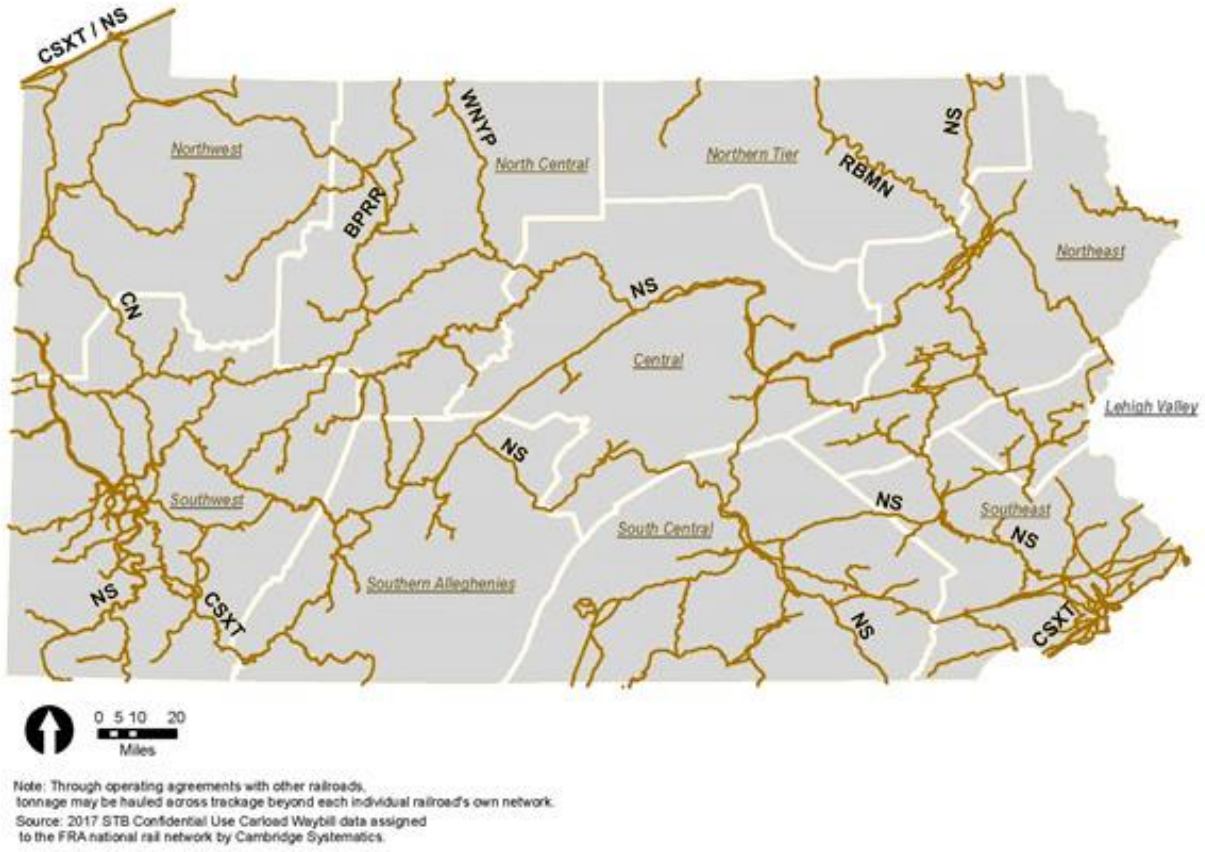

Figure 4-1: Pennsylvania PREP regions (Pennsylvania Department of Economic and Community Development, n.d.-c)

The project list in Appendix E consists of identified Section 130 projects. The project list in Appendix F consists of a project description, project type, the rail carrier(s) on which the improvement will occur, the primary county where the project would be located, and the estimated cost, where available. A summary of the projects specified for construction from 2021 onward are all included in the following tables. Details on short-range (2021 to 2024) and long-range projects (2025 to 2045) are presented in the investment plan in Chapter 5.

Proposed projects by railroad class are summarized in Table 4-2. A total of 323 projects was identified, of which 257 have a cost estimate associated with them. In total, these projects represent an estimated cost of $1.16 billion, of which 63% are associated with Class III railroads, 34% with Class I railroads, and 3% with Class II railroads.

Table 4-2: Freight Rail Projects Summary, 2021–2045

Rail Operator	Number of Projects	Total Estimated Cost (in Millions of Dollars)
Class I	44	$400,918
Class II	7	$35,380
Class III	272	$728,385
Total	**323**	**$1,164,683**

The primary purpose of the improvements is summarized in Table 4-3. Of these various improvement types, the largest share of the expenditures at 37% are accelerated maintenance projects, followed by investments to provide access to existing or new customers at 17%, to improve civil works at 16%, terminal improvements and track improvements at 13% each, rolling stock improvements at 3%, and grade crossing improvements at 1% of the total estimated expenditures.

Table 4-3: Freight Rail Projects Summary by Improvement Type, 2021–2045

Project Type	Number of Projects	Total Estimated Cost (in Millions of Dollars)
Accelerated Maintenance	129	$434,338
Access Existing or New Customers	62	$196,877
Improve Civil Works	20	$190,669
Improve Terminal	47	$154,451
Improve Track	37	$148,240
Rolling Stock	5	$33,997
Grade Crossing	23	$6,111
Grand Total	**323**	**$1,164,683**

Table 4-4 summarizes the proposed investment types by geographical region. The specific projects by region are detailed in Appendix F. The Southeast (29%), Southwest (24%), and Central (21%) regions account for 73% of the total estimated expenditures or $855 million for 230 projects.

Table 4-4: Freight Rail Projects Summary by Region

Region	Project Type	Number of Projects	Total Estimated Cost (in Millions of Dollars)
Central	Accelerated Maintenance	50	$48,508
	Access Existing or New Customers	8	$28,126
	Improve Civil Works	5	$101,440
	Improve Terminal	8	$12,092
	Improve Track	3	$4,783
	Central Total	74	$194,949
North Central	Accelerated Maintenance	13	$16,912
	Access Existing or New Customers	1	$0
	Improve Civil Works	2	$11,359
	North Central Total	16	$28,271
Northeast	Accelerated Maintenance	6	$7,367
	Access Existing or New Customers	5	$12,502
	Grade Crossing	1	$1,261
	Improve Terminal	8	$26,826
	Improve Track	3	$1,552
	Rolling Stock	1	$222
	Northeast Total	24	$49,729
Northern Tier	Accelerated Maintenance	2	$24,760
	Access Existing or New Customers	7	$30,846
	Improve Terminal	3	$7,091
	Northern Tier Total	12	$62,697
Northwest	Access Existing or New Customers	9	$5,002
	Improve Civil Works	5	$21,563
	Improve Terminal	1	$0
	Improve Track	1	$2,310
	Northwest Total	16	$28,874
South Central	Accelerated Maintenance	1	$346
	Access Existing or New Customers	3	$21,294
	Improve Civil Works	2	$0
	Improve Terminal	5	$45,594
	Improve Track	4	$27,200
	South Central Total	15	$94,434
Southeast	Accelerated Maintenance	40	$183,271
	Access Existing or New Customers	7	$48,070
	Grade Crossing	22	$4,850
	Improve Civil Works	2	$0
	Improve Terminal	11	$18,720
	Improve Track	16	$45,073

Region	Project Type	Number of Projects	Total Estimated Cost (in Millions of Dollars)
	Rolling Stock	4	$33,775
	Southeast Total	102	$333,759
Southern Alleghenies	Accelerated Maintenance	4	$26,977
	Access Existing or New Customers	5	$18,229
	Improve Terminal	1	$154
	Southern Alleghenies Total	10	$45,360
Southwest	Accelerated Maintenance	12	$76,198
	Access Existing or New Customers	17	$32,809
	Improve Civil Works	4	$56,307
	Improve Terminal	10	$43,975
	Improve Track	10	$67,322
	Southwest Total	53	$276,611
Central & Northeast	Accelerated Maintenance	1	$50,000
	Central, Northeast Total	1	$50,000
	Grand Total	**323**	**$1,164,683**

Photo: Dan Davis Photography

5 Rail Service and Investment Program

This chapter describes Pennsylvania's Rail Service and Investment Program (RSIP), inclusive of three major parts. First is the commonwealth's long-term vision for rail service and its role in the statewide multimodal transportation system. Second is a description of the public and private benefits to the commonwealth of the proposed passenger and freight projects. Third is a summary of the passenger and freight capital projects making up the RSIP. The RSIP is organized as short-range (2021 to 2024) and long-range (2025 to 2045). The chapter also includes a listing of rail studies to be completed over the next 4 years.

5.1 Vision, Goals, and Objectives

The commonwealth's 2020 State Rail Vision includes both freight and passenger rail and was developed with stakeholder and public input.

2020 State Rail Vision

Pennsylvania's integrated rail system will provide safe, convenient, reliable, cost-effective connections for people and goods. As a viable alternative to other modes, it will support economic competitiveness, smart growth, environmental sustainability, and resiliency, thereby strengthening Pennsylvania's communities

The 2020 State Rail Vision is consistent with the 2015 State Rail Vision, while emphasizing integration and resiliency, which are key considerations for current and future rail transportation. It is essential for rail transportation to embrace integration and resiliency as related to climate change and other unexpected impacts to continue to provide the quality of service expected by the state's citizens and meet prospective long-range needs.

To achieve this vision, the following goals and their supporting objectives have been identified.

1. Bring the priority rail system[24] to a state of good repair and maintain it.
    a. Preserve rail rights-of-way for future railroad use.
    b. Invest in rail system infrastructure to bring the system to a state of good repair.
    c. Upgrade the rail system infrastructure and equipment to meet current standards.
    d. Maintain Pennsylvania's rail system infrastructure in a state of good repair.
2. Develop an integrated rail system.
    a. Develop core rail infrastructure that efficiently handles current and prospective needs.

[24] Priority rail system refers to the rail system in the commonwealth that predominantly addresses the intercity passenger and freight demands.

   b. Balance passenger and freight rail needs in the shared corridors.
   c. Improve coordination among freight, passenger, and commuter rail systems.
   d. Provide seamless connections between passenger modes.
   e. Provide seamless connections between freight modes.
   f. Increase intermodal freight traffic.
   g. Complete links to connect the state's major urban areas.
   h. Integrate Pennsylvania's rail system with the national rail system.
   i. Provide access to large cities and gateways throughout North America.
   j. Improve access to the commuter and intercity rail system.
3. Support the future needs of residents and businesses.
   a. Increase the capacity of rail infrastructure to move passenger and freight traffic.
   b. Develop an equitable use of rail infrastructure by passenger and freight rail.
   c. Advance a market-responsive and -competitive freight rail system.
   d. Enhance rail access to increase the competitiveness of the commonwealth's navigable waterways, ports, and airports.
4. Enhance the quality of life in Pennsylvania.
   a. Mitigate highway congestion.
   b. Develop compatible land uses along rail lines that are consistent with smart growth and supportive of rail-oriented uses.
   c. Increase economic development opportunities in communities by advancing investments in rail.
   d. Enhance the competitiveness of the rail system compared to other modes.
5. Ensure personal safety and infrastructure security.
   a. Improve the safety of pedestrians and vehicles where there are at-grade crossings. Consider conversion of at-grade crossings to grade-separated crossings.
   b. Improve the security of rail passengers on rail vehicles and at stations, consistent with federal and state policy.
   c. Enhance the security of rail rights-of-way and rail infrastructure.

   d. Promote sealed corridors and close or consolidate crossings, wherever practical. Where not practical, ensure there are crossing gates at all at-grade crossings on passenger routes.

6. Support energy efficiency, environmental sustainability, and resiliency.
   a. Improve air quality through reduced emissions by investing in rail transportation.
   b. Reduce energy use.
   c. Investigate the risks and impacts of climate change on rail lines and identify potential mitigation and resiliency improvements.
7. Identify stable and predictable funding.
   a. Pursue funding for increased investments to the rail system.
   b. Create greater funding balance between rail and highway modes.
   c. Enact legislation that supports the development and financing of the state's rail system.
8. Build public support for rail system services and assets.
   a. Educate the public about the railroad system and operations.
   b. Garner support and cooperation for rail service through metropolitan planning organizations, rural planning organizations, and regional / local governments.
   c. Demonstrate the benefits of moving people and goods by rail.
   d. Advocate for a national transportation policy and plan.

To realize this State Rail Vision, the SRP identifies an investment of capital projects totaling $6.9 billion between 2021 and 2045, as indicated in Figure 5-1.

5.2 Program Coordination

The long-range vision was developed in concert with other Pennsylvania state agencies, state and local elected officials, rural and metropolitan planning organizations, passenger and freight rail industry representatives, transportation agencies from adjacent states, federal agencies, professional associations, and other stakeholders. As such, the vision is integrated with other transportation planning efforts in Pennsylvania, neighboring states, and nationally. See Chapter 6 for more details on how stakeholders were involved in the development and coordination of Pennsylvania's 2020 SRP Vision and RSIP.

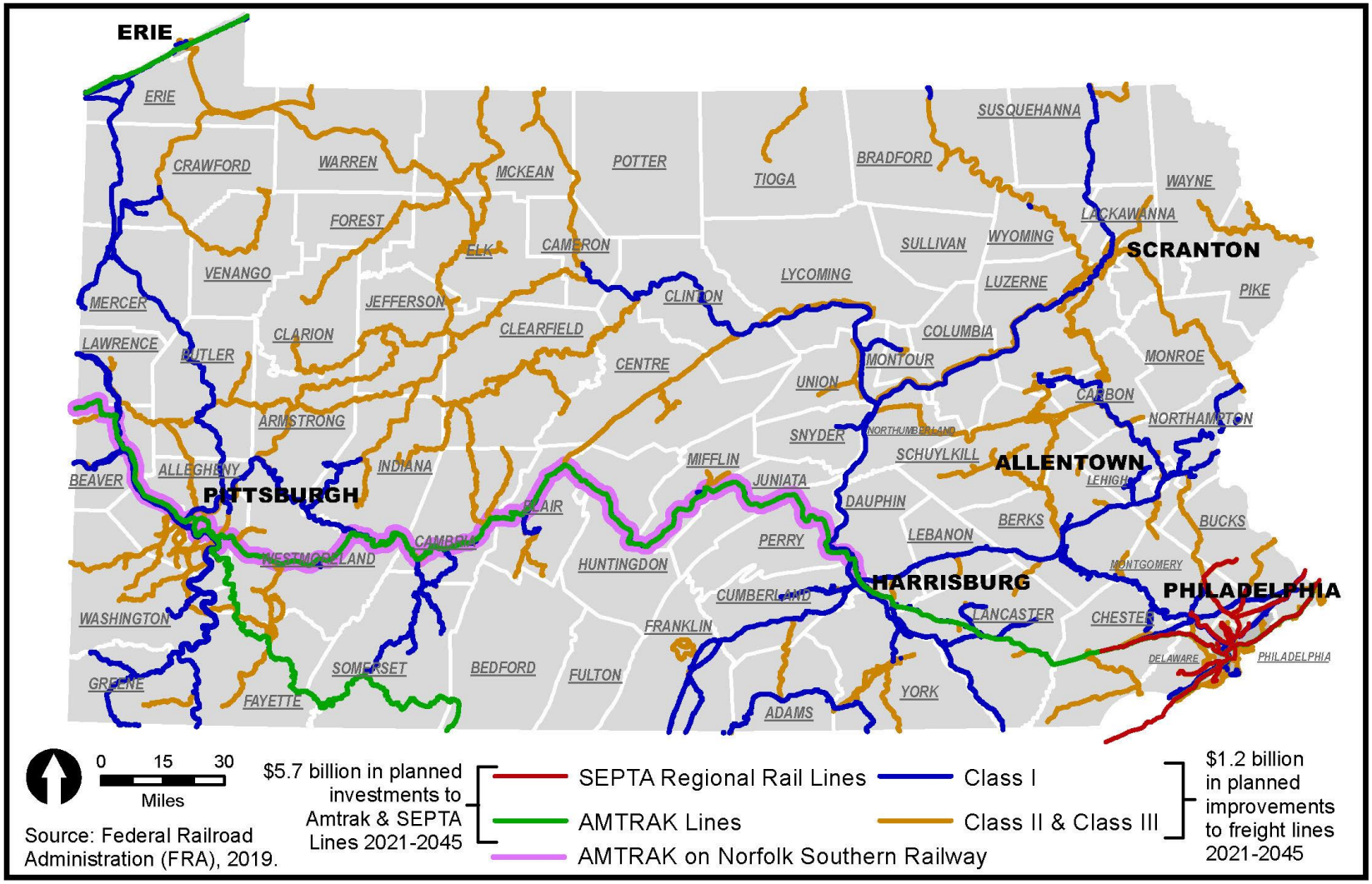

Figure 5-1: Pennsylvania Rail Vision (2021–2045)

The following transportation planning documents were reviewed for consistency with the 2020 SRP vision, goals, and RSIP:

- *PA On Track, PA's Long Range Transportation Plan & Comprehensive Freight Movement Plan,* (PennDOT, 2016 a). See Section 1.1 for a summary of the statewide transportation vision and goals.
- The State Transportation Commission's *2019 Twelve Year Program* (STC, 2019a).
- *Pennsylvania's Statewide Transportation Improvement Program FFY 2019–2022* (PennDOT, 2018 b)
- *Rail Freight and the Commonwealth's Economy* (PennDOT, 2018 d), which is a study of the RFAP and the RTAP. The study evaluated completed projects for effectiveness in achieving the long-range strategic goals for rail, and also identified candidate projects that would benefit Pennsylvania's economic and transportation infrastructure.
- *Pennsylvania Statewide Airport System Plan* (PennDOT, 2016 c); see Section 2.2.6.2.
- Delaware Valley Regional Planning Commission's long-range plan for the Greater Philadelphia region, *Connections 2045 Plan for Greater Philadelphia* (DVRPC, 2018a).
- Southwestern Pennsylvania Commission's long-range transportation plan for the Pittsburgh metropolitan area, *SmartMoves for a Changing Region* (SPC, 2019).
- FUTURELV: The Regional Plan (LVPC, 2019), the combined comprehensive plan and long-range transportation plan for the Allentown metropolitan area developed jointly by the Lehigh Valley Planning Commission and Lehigh Valley Transportation Study (MPO Planning Partner).
- NEC FUTURE (FRA, 2017 b) (see Section 3.2.1) and *NEC Capital Investment Plan (Fiscal Years 2020-2024)* (Amtrak, 2020b) (see Chapter 3).
- *SEPTA Fiscal Year 2021 Capital Budget and Fiscal Years 2021 – 2032 Capital Program* (SEPTA, 2020 a); see Chapter 3.
- *Philadelphia 30th Street Station District Plan* (PennDOT et al., 2016 b); see Sections 2.1.1.1 and 3.

Additionally, the following neighboring state rail transportation plans were consulted:

- New Jersey Transit's *NJT2030 A 10-year Strategic Plan* (NJT, 2020a) and *A Five Year Capital Plan* (NJT, 2020b), and the New Jersey Department of

Transportation's *Freight Rail Strategic Plan* (NJ DOT, 2014). The freight rail plan is expected to be updated in 2022.

- Delaware Department of Transportation's *Delaware State Rail Plan* (DelDOT, 2011).
- Maryland Department of Transportation's *Maryland Statewide Rail Plan* (MDOT, 2015) and *Maryland Strategic Goods Movement Plan* (MDOT, 2017). Maryland is currently initiating an update to its state rail plan.
- West Virginia Department of Transportation's *West Virginia State Rail Plan, Final Report* (WVDOT, 2013) and draft *2020 West Virginia State Rail Plan Update* (WVDOT, 2020) documents.
- Ohio Rail Development Commission's *Draft State of Ohio Rail Plan* (2019).
- New York State Department of Transportation's *New York State Rail Plan: Strategies for a New Age* (NYSDOT, 2009). New York does not have an updated state rail plan.

Review of these published plans was complemented with telephone interviews with planners and rail specialists from the adjacent state transportation agencies. The discussions centered around how PennDOT can work with neighboring state agencies to improve rail transportation service and connections across state lines and achieve each state's respective vision.

Finally, the FRA's *National Rail Plan: Moving Forward. A Progress Report* (FRA, 2010) was assessed. The national plan has two separate visions for two rail systems: (1) a high-speed and intercity passenger rail system and (2) a high-performing freight rail system. The goal for the nation's passenger rail system is to connect communities with high-speed and intercity passenger rail where population densities and competitive trip times create markets for success. FRA's vision includes a tiered approach for core express corridors, regional corridors, emerging/feeder routes, and community connections. National freight rail system goals include supporting the current freight rail market share and growth and developing strategies to attract 50% of all shipments 500 miles or greater to intermodal rail. Pennsylvania's 2020 SRP vision, goals, and objectives are consistent with and support the national rail plan.

5.3 Rail Agencies

PennDOT serves as the commonwealth's primary rail agency through its multimodal transportation functions. The deputate is responsible for programs in the following areas (see Section 1.3.2.1 for more information):

- Local and public transportation through the Bureau of Public Transportation
- Passenger and freight rail and water freight transportation through the Bureau of Rail, Freight, Ports and Waterways
- Airports through the Bureau of Aviation
- Active transportation (bicycle and pedestrian) through the Multimodal Office

In addition, the Pennsylvania State Transportation Commission serves as PennDOT's board of directors and provides a high-level evaluation of Pennsylvania's transportation system and policy-driven direction for the preservation, restoration, and expansion of transportation facilities and services (STC, 2019b). The Pennsylvania TAC supports the State Transportation Commission and PennDOT on policies and investments for all modes of transportation. The Rail Freight Advisory Committee supports the Bureau of Rail, Freight, Ports, and Waterways through advisement on rail freight transportation program activities.

In addition, the commonwealth initiates studies to address specific rail-related questions, which could potentially lead to new policies or programs. For instance, a new review of the feasibility of added passenger rail service in western Pennsylvania, specifically between Altoona and Pittsburgh, was initiated. The *Altoona – Pittsburgh Passenger Rail Study Final Report* was issued in June 2019 (WSP, 2019). Another example is the 2019 *Intercity Passenger Rail Success Factors Report* (Pennsylvania TAC, 2019b), which examined intercity rail within the broader context of intercity transportation trends, and identified transportation, cost, economic, and other factors necessary to sustain new or expanded intercity passenger rail service in Pennsylvania. Lastly, the 2020 TAC *Truck Weight Exemptions Study* (Pennsylvania TAC, 2020) evaluated the wide range of impacts and implications, including rail impacts, created by several decades of truck weight exemptions.

At present, there are no known proposed changes from state departments, legislators, or elected officials to the existing state rail agency organization, policies, or programs in the short or long term. The current system of state, regional, and local government support of passenger and freight rail is well adapted to assessing, planning, funding, and implementing publicly supported passenger and freight rail policies, programs, and investments.

5.4 Program Effects

The proposed passenger and freight projects would result in both public and private benefits to the Commonwealth of Pennsylvania. As discussed in Chapter 2, passenger and freight movement are important elements of a regional and national economy. As this movement becomes more efficient, the industries in Pennsylvania that use freight and passenger rail benefit through expanded market reach or transportation cost savings. For example, passengers may have better access to jobs or educational opportunities. Shippers and consignees may be able to compete in new markets, or experience cost savings that can be applied to other parts of their business operations. Collectively, these changes may generate growth in jobs or productivity gains that foster the commonwealth's economic prosperity.

Public investment in rail offers Pennsylvania's residents and businesses a cost-effective and environmentally friendly means to move people and products that supports the economy's operation. Passenger rail is a reliable and efficient alternative in congested travel corridors, while freight rail offers a cost-effective means to move large volumes of freight, and diverts trucks from highways—benefiting both the truck and auto travelers that remain. Benefits of modal diversion to rail are shown in Figure 5-2.

This section describes the expected benefits of the program of rail projects presented in Chapters 3 and 4. Potential program effects include direct benefits to the rail network and other competing transportation modes such as increased rail capacity, reduced congestion, improved safety, improved environmental quality, efficiencies through modal diversion, and regional economic development benefits through the market response to these travel market changes. Program effects are summarized for short-range projects expected to occur over the first 4 years of the program (2021 to 2024) and long-range projects (2025 to 2045) by category. The costs by category and in total are also displayed. Table 5-1 and Table 5-2 show the program effects for the short-range and long-range passenger rail programs, respectively. Freight rail short- and long-range program effects are presented in Table 5-3 and Table 5-4, respectively.

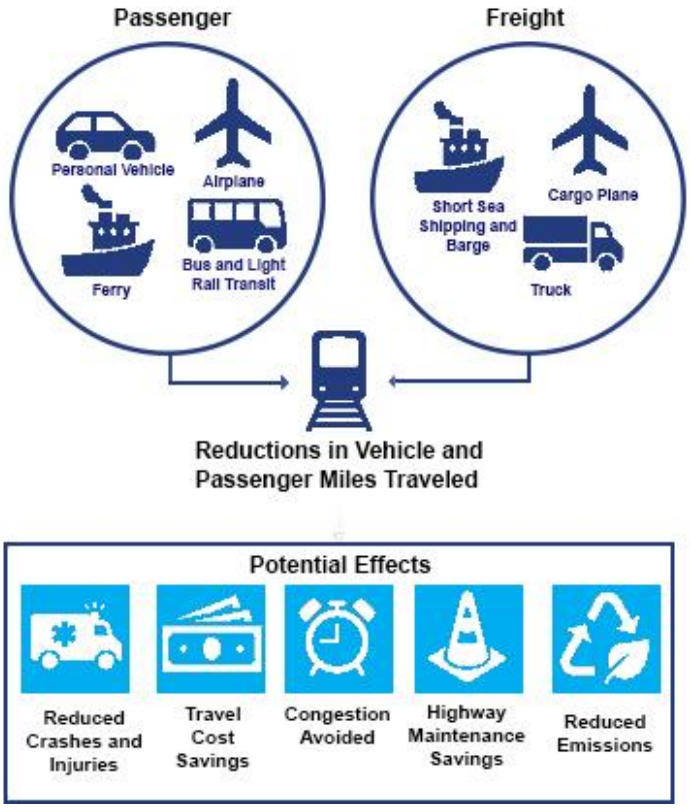

Figure 5-2: Benefits of modal diversion to rail

The costs of the 48 short-range passenger projects total $2.3 billion, and the costs of the 89 short-range freight projects total $323 million. The costs of the 46 long-range passenger projects total $2.2 billion, and the costs of the 85 long-range freight projects total $186 million. The other highway and bridge projects with rail activity and vision passenger and freight rail projects total approximately $1.3 billion and $655 million, respectively.

5.4.1 Passenger Program

To summarize the effects of the passenger rail program, the project list was sorted by project category for the short and long ranges. Project categories were assigned based on the primary purpose of the project. The effects, typically positive and therefore denoted as benefits, associated with the project categories are described in more detail below and displayed in tabular format. The tables present the projects within each category and their estimated timing, costs, benefits, and distribution of benefits to the regions.

For passenger projects, the four categories include:

- Safety: Safety is a benefit resulting from projects that construct or improve protective devices at rail-highway grade crossings. Such projects reduce the likelihood of interactions between autos, pedestrians, and cyclists with trains, thereby reducing incidents resulting in injuries, fatalities, and property damage. In addition, projects that attract additional rail riders from automobiles result in safety benefits by reducing highway congestion and transferring vehicle miles traveled from a more dangerous mode (auto) to a safer one (rail).[25]
- Rolling Stock: Rail equipment purchases may result in state of good repair and efficiencies for the system operators. By investing in new or improved rolling stock (such as passenger coaches, electric multi-unit cars, and locomotives), system operators may spend less on upkeep and maintenance expenses on aging equipment, and the network reliability increases. In addition, new equipment may pollute less, therefore providing emissions savings for the nation.
- Facilities: Examples of facility improvement projects include passenger station reconstruction or rehabilitation. Such projects may result in operating efficiencies (as in the case of platform improvements) and improved passenger experience, and therefore lead to increases in ridership and passenger safety and security.
- Track, Control Systems, and Bridges: Projects that improve track, control systems, and bridges can result in train operating efficiencies and travel time savings, benefiting passengers and operators, and may also result in spillover benefits to the wider rail network, particularly for passenger systems that operate over freight routes.

The passenger rail program offers projects that benefit the commonwealth's transportation system through providing public and private benefits to users and non-users alike. Users of passenger rail may divert from other modes of transportation, including transit, highway, air, and potential maritime modes such as ferries, as shown in Figure 5-3. Although the potential for diverting passengers from air to rail is limited, in some corridors such as the Northeast Corridor and Keystone Corridor, the modes are competitive in both travel time and cost. There are environmental and safety benefits to

[25] In 2018, the Bureau of Transportation Statistics reported 10,046 total accidents for railroads and 6,658,000 passenger car accidents. Note that "railroads" considers freight and passenger rail operations, including commuter rail and Amtrak both at grade crossings and elsewhere. Comparing crash rates, in 2019 the fatality rate for passenger rail was 0 (zero) per 100 million passenger train-miles. 2019 motor vehicle fatalities were 1.10 per 100 million vehicle miles traveled.
Sources:
BTS, 2020
BTS, n.d.
NHTSA, 2020

diverting to rail because trains are capable of transporting large numbers of passengers more safely and fuel efficiently than many other modes. There are also potentially travel cost savings, particularly for travelers switching from air to rail. Non-users benefit from the modal diversion through emissions savings across the commonwealth, increased highway capacity when drivers switch from auto to rail, and reductions in highway maintenance costs. Many of the equipment, facility, track, control systems, and bridge projects increase rail capacity and/or efficiency, offering mobility and connectivity for employment in the commonwealth, which thereby supports the economy.

Table 5-1 and Table 5-2 show the program effects for the short- and long-range passenger rail programs by project category. In the two tables, checkmarks are used to denote when a project category has an effect; effects may be positive or negative. In general, many of the effects are similar across the project categories, with slight deviations.

For example, all projects have an effect on the state's transportation system because otherwise there would not be a need to make the capital investment. In general, transportation projects deliver positive effects, as denoted by providing public and private benefits. The remaining figures list more specific effects that the projects may provide, including:

- Rail capacity and congestion
- Transportation system capacity, congestion, safety, and resiliency
- Effects on local transit, highway, aviation, and maritime modes
- Environmental, economic, and employment impacts
- Distribution of benefits to regions

Projects that have an effect on rail capacity and congestion are checked; as seen in Table 5-1, safety projects do not have this effect, but do have an effect on transportation system safety, and therefore the next box is checked. These same denotations are used for the freight projects in Section 5.4.2.

In addition to the short- and long-range project lists by category, there are passenger rail projects that are highway and bridge related; others are not yet scheduled for construction and are considered vision projects. In total, there are 38 projects, of which many are road bridges over Amtrak or SEPTA lines, and Amtrak interlocking projects. The anticipated benefits of these other projects are summarized in Table 5-1. Figure 5-3 displays the distribution of benefits by regions where passenger projects are located across the commonwealth.

Table 5-1: Short-Range Passenger Rail Program (2021–2024)

	Project Type				
Program Effects	**Safety**	**Equipment**	**Facilities**	**Track, Control Systems, and Bridges**	**Other Highway and Bridge Projects with Rail Activity**
State's Transportation System	X	X	X	X	X
Public and Private Benefits	X	X	X	X	X
Rail Capacity and Congestion		X		X	X
Transportation System Capacity, Congestion, Safety, and Resiliency	X	X	X	X	X
Local Transit, Highway, Aviation, and Maritime Modes	X	X	X	X	X
Environmental, Economic, and Employment Impacts		X	X	X	X
Total Cost (in millions of 2020 dollars)	**$296.5**	**$577.1**	**$488.4**	**$912.8**	**$1,260.6**

Table 5-2: Long-Range Passenger Rail Program (2025–2045)

	Project Type		
Program Effect	**Equipment**	**Facilities**	**Track, Control Systems, and Bridges**
State's Transportation System	X	X	X
Public and Private Benefits	X	X	X
Rail Capacity and Congestion	X		X
Transportation System Capacity, Congestion, Safety, and Resiliency	X	X	X
Effects on Local Transit, Highway, Aviation, and Maritime Modes	X	X	X
Environmental, Economic, and Employment Impacts	X	X	X
Total Cost (in millions of 2020 dollars)	**$934.7**	**$1,038.4**	**$235.3**

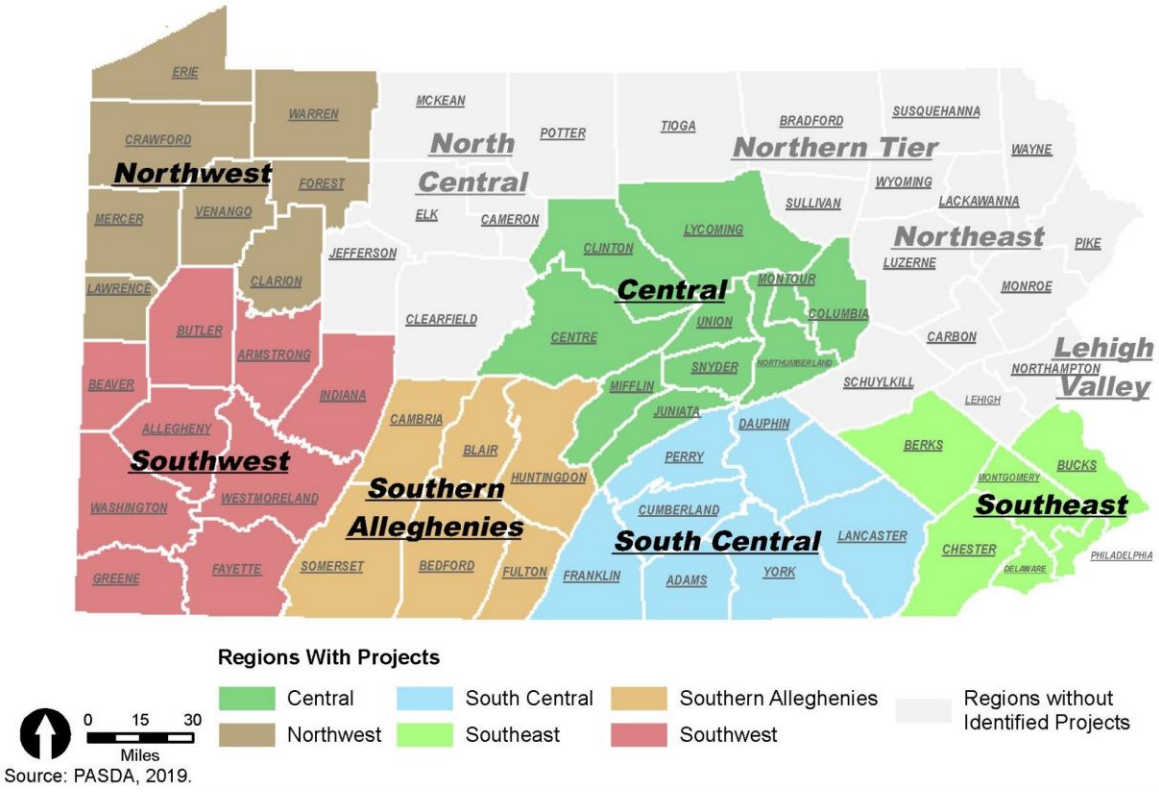

Figure 5-3: Distribution of benefits to regions for the Passenger Program (PASDA, 2019)

5.4.2 Freight Program

The project list includes projects for Class I, Class II, and Class III (short line) railroads across the commonwealth for seven primary purposes, as described in this section. The majority of the projects presented pertain to the short lines.

To summarize the effects of the freight rail program, the project list was sorted by project category for the short- and long-range. Project categories were assigned based on the primary purpose of the project. The typical benefits associated with the project categories are described in more detail below, and displayed in tabular format. The tables present the projects in each category, and their estimated timing, costs, benefits, and distribution of benefits to the regions.

For freight projects, the seven categories (defined in Chapter 4) are:

- Accelerated Maintenance
- Access Existing or New Customers
- Grade Crossing
- Improve Civil Works
- Improve Terminal

- Improve Track
- Rolling Stock

The freight rail program results in projects that impact the commonwealth's transportation system through providing public and private benefits to users and non-users. Users of freight rail may divert shipments from trucking and potentially air and maritime modes, as shown in Figure 5-4. Because trains transport large volumes of freight over long distances more fuel efficiently and more safely than many other modes, there are environmental and safety benefits to diverting shipments to rail. Typically, rates for shipping by rail are lower than for truck, particularly over longer distances, thus providing cost savings for shippers switching from truck to rail. On average, one rail car can take three to four trucks off of the road, freeing up highway capacity; heavy trucks also cause substantially more damage to roads than automobiles due to their weight, and use more fuel per ton mile than trains. Non-users therefore benefit from the modal diversion of truck to rail through reduced highway congestion, and reductions in highway maintenance costs, reliance on fossil fuels, and emissions.

Many of the proposed projects increase rail capacity either through new track, upgraded weight limits, reconstructed bridges and overpasses to accommodate double-stacking, or other facility and system improvements that improve integration and operations. Improvements to integration and operations reduce congestion, improve safety, and offer greater access for shippers and employment in the state, further supporting the commonwealth's economy.

Freight rail short- and long-range program effects are presented in Table 5-3 and Table 5-4**,** based on project category. In addition to the short- and long-range project lists by category, there are many vision projects that are not yet scheduled for construction. There are 149 freight vision projects that are not scheduled for construction, including 37 accelerated maintenance, 49 access existing or new customers, three grade crossing, 15 improve civil works, 25 improve terminal, 16 improve track, and four rolling stock projects. These projects are located in every region of the state except for the Lehigh Valley, and cost $655 million. Figure 5-4 displays the regions where freight projects are located across the commonwealth.

Table 5-3: Short-Range Freight Rail Program (2021–2024)

	Project Type					
Program Effect	**Accelerated Maintenance**	**Access Existing or New Customers**	**Grade Crossing**	**Improve Civil Works**	**Improve Terminal**	**Improve Tracks**
The State's Transportation System	X	X	X	X	X	X
Public and Private Benefits	X	X	X		X	X
Rail Capacity and Congestion	X	X		X	X	X
Transportation System Capacity, Congestion, Safety, and Resiliency	X	X	X	X	X	X
Local Transit, Highway, Aviation, and Maritime Modes	X	X	X	X	X	X
Environmental, Economic, and Employment Impacts	X	X			X	X
Total Cost (in millions of 2020 dollars)	**$187.0**	**$74.4**	**$0.0**	**$32.2**	**$14.6**	**$15.0**

Table 5-4: Long-Range Freight Rail Program (2025–2045)

	Project Type						
Program Effect	**Accelerated Maintenance**	**Access Existing or New Customers**	**Grade Crossing**	**Improve Civil Works**	**Improve Terminal**	**Improve Tracks**	**Rolling Stock**
The State's Transportation System	X	X	X	X	X	X	X
Public and Private Benefits	X	X	X		X	X	X
Rail Capacity and Congestion	X	X		X	X	X	X
Transportation System Capacity, Congestion, Safety, and Resiliency	X	X	X	X	X	X	X
Local Transit, Highway, Aviation, and Maritime Modes	X	X	X	X	X	X	
Environmental, Economic, and Employment Impacts	X	X			X	X	X
Total Cost (in millions of 2020 dollars)	**$83.9**	**$30.5**	**$0.7**	**$9.5**	**$20.6**	**$40.8**	**$0.2**

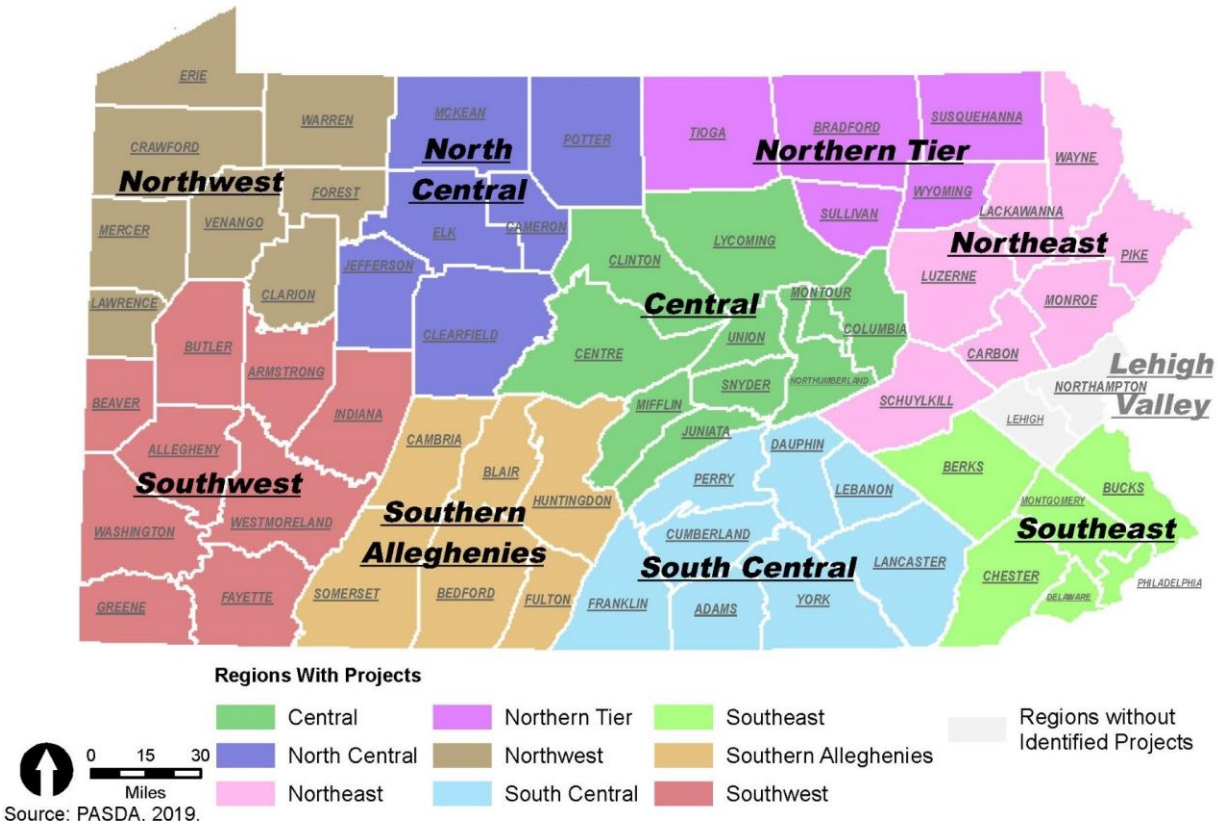

Figure 5-4: Distribution of benefits to regions for the Freight Program (PASDA, 2019)

5.5 Passenger Element

5.5.1 Passenger Rail Capital Project Summary

This section summarizes the passenger rail capital projects for the RSIP. The RSIP consists of 94 projects that were organized as either short-range (2021 to 2024) or long-range (2025 to 2045) projects. Additionally, there are 38 vision projects for which implementation timelines have not yet been specified, making a total of 132 projects for all passenger rail capital needs. The total known estimate for the short-range, long-range, and vision passenger projects is approximately $5.7 billion, as shown in Table 5-5. Short-range and long-range projects only amount to approximately $4.5 billion.

Table 5-5: Number and Cost of Passenger Rail Projects

Time Frame	Number of Projects	Cost (in Millions of 2020 Dollars)	Percent
Short term	48	$2,274.7	39.6%
Long term	46	$2,208.4	38.4%
Vision	38	$1,260.6	21.9%
Total	**132**	**$5,743.7**	**100%**

As described in Section 5.4, projects in the RSIP were categorized under equipment, facilities, safety, and track control systems and bridges. Figure 5-5 provides a summary of the distribution of the cost and number of projects included in the RSIP.

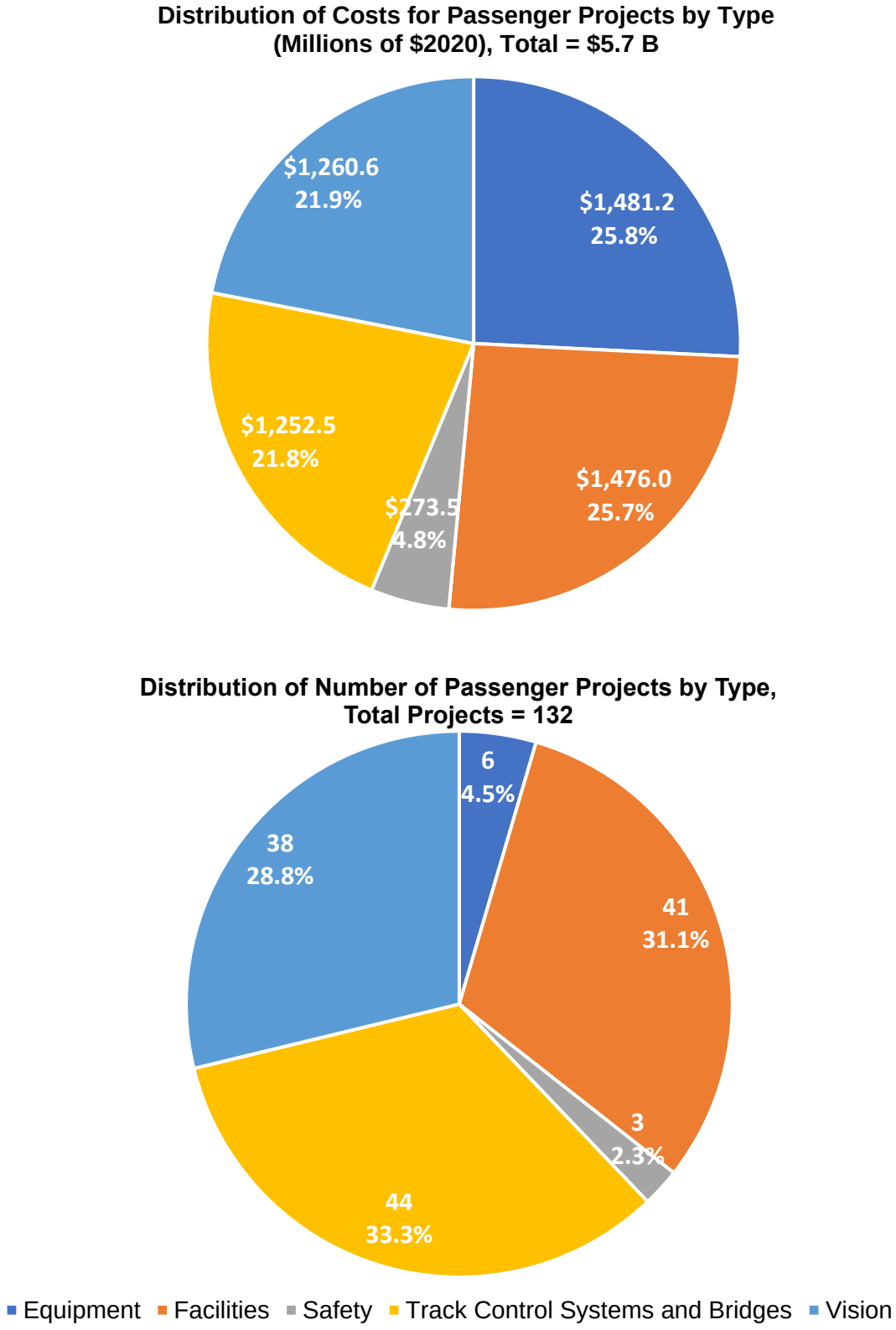

Figure 5-5: Summary of passenger rail projects by type, short-range, long-range, and vision

5.5.2 Short-Range Passenger Rail Capital Project Costs

The passenger rail capital projects are distributed along three corridors: Amtrak Keystone, Amtrak Northeast Corridor Service Line and SEPTA Regional Rail.

The short-range passenger rail capital program comprises a total of 48 projects with a total estimated amount of approximately $2.3 billion. Approximately 73.4% ($1.7 billion) of the total amount is attributed to SEPTA Regional Rail projects. The majority of the short-range projects consist of track control systems and bridges, which make up almost half of the total cost estimate. Equipment, facilities, and safety projects along the other corridors make up the difference. It is worth noting that some multi-year projects starting before 2021 may have some portions of project costs already funded.

Table 5-6 summarizes the distribution of short-range passenger rail capital projects scheduled for implementation on the three corridors. Projects listed under both Keystone and Regional Rail represent shared projects on those corridors.

Appendix G provides a detailed spending plan for all the short-range passenger rail projects.

Table 5-6: Summary of Short-Range Capital Projects for Passenger Rail (in Millions of 2020 Dollars)

Corridor	Equipment	Facilities	Safety	Track Control Systems and Bridges	Total Cost	Percent of Total
Keystone	$0.0	$151.0	$0.0	$130.0	$281.0	12.35%
NEC	$0.0	$0.0	$67.0	$90.0	$157.0	6.90%
Regional Rail	$546.5	$286.6	$206.5	$630.7	$1,670.2	73.43%
Keystone, Regional Rail	$0.0	$0.0	$0.0	$166.5	$166.5	7.32%
Total Cost	**$546.5**	**$437.6**	**$273.5**	**$1,017.2**	**$2,274.7**	**100.0%**
Percent of Total	**24.0%**	**19.2%**	**12.0%**	**44.7%**	**100.0%**	

5.5.3 Long-Range Passenger Rail Capital Project Costs

The total estimate of identified long-range capital investment needs from 2025 to 2045 is approximately $2.2 billion. This amount does not include projects for which costs are yet to be determined. Unlike the short-range projects, the majority of long-range project costs are associated with facility investment needs. Furthermore, the long-range projects consist of several projects that are jointly sponsored by carriers as shown in Table 5-7. Figure 5-6 and Figure 5-7 summarize the long-range capital projects by project type and service type. Appendix G provides a detailed listing for all the identified long-range passenger rail projects.

Table 5-7: Summary of Long-Range Capital Projects for Passenger Rail by Project Type and Service Type (in Millions of 2020 Dollars)

Corridor/Project Type	Equipment	Facilities	Track Control Systems and Bridges	Total Cost	Percent of Total
Keystone		$0.0	$0.0	$0.0	0.0%
Regional Rail	$684.7	$445.0	$235.3	$1,365.0	61.8%
Keystone, NEC	$250.0			$250.0	11.3%
Regional Rail, NEC		$517.0		$517.0	23.4%
Keystone, Regional Rail		$76.4	$0.0	$76.4	3.5%
Total Cost	**$934.7**	**$1,038.4**	**$235.3**	**$2,208.4**	**100.0%**
Percent of Total	**42.3%**	**47.0%**	**10.7%**	**100.0%**	

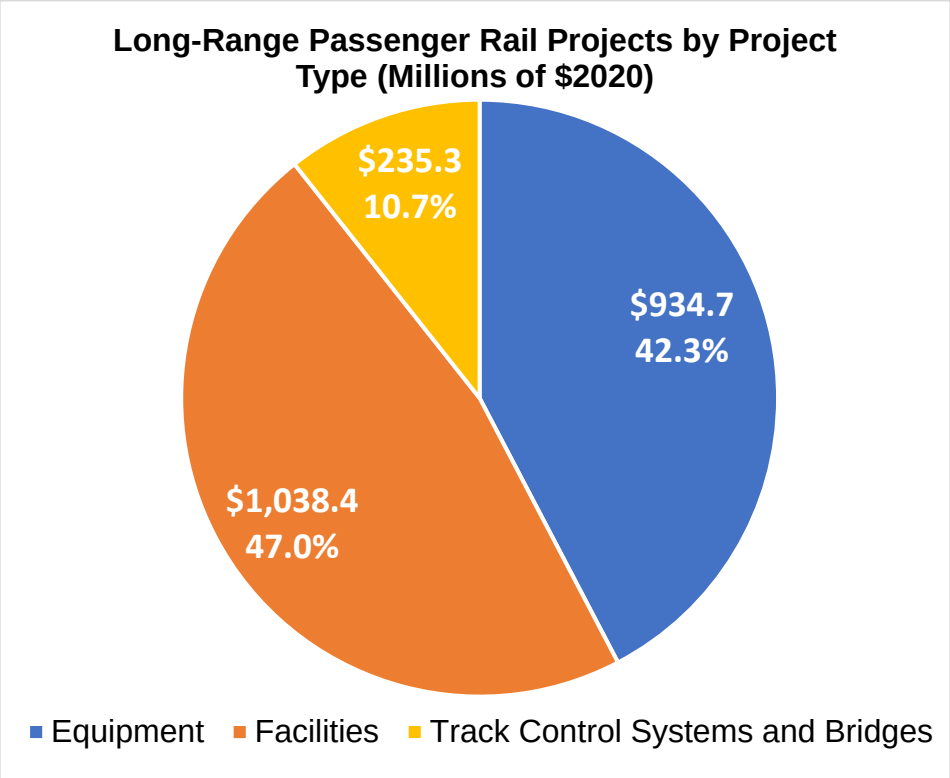

Figure 5-6: Long-range passenger rail projects by project type

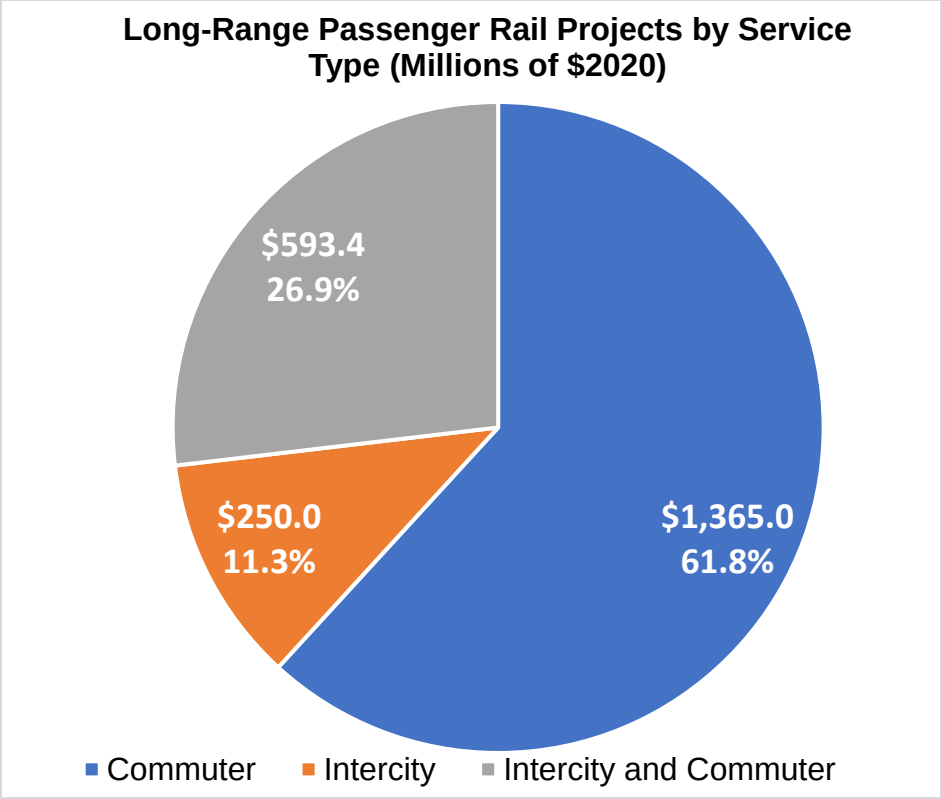

Figure 5-7: Long-range passenger rail projects by service type

5.5.4 Passenger Rail Capital Financing Plan

Nationally, the outlook for passenger rail funding is sensitive to public transportation and fiscal policy, because the public value of regional, statewide, and interstate passenger rail services is widely recognized, and funded through public revenues. For new service projects (such as expansions of the regional rail system), the availability of capital funding may be a matter of transportation funding policy. The Pennsylvania passenger rail investment program relies on available sources of capital funding provided through all feasible resources.

Table 5-8 summarizes the core state funding sources for capital projects in millions of year of expenditure (YOE) dollars. The core funding for SFY 2021 to SFY 2024 is projected to be $147 million. These estimates include considerations for potential COVID-19 pandemic impacts on revenue based on the best estimates for Bureau of Fiscal Management (BFM) and are subject to change.

Table 5-8: Summary Projection for Core State Funding Sources for Passenger Rail Capital Projects (in Millions of YOE Dollars)

Core Funding Source	SFY 2020–2021	SFY 2021–2022	SFY 2022–2023	SFY 2023–2024	Total
Public Transportation Trust Fund/ 1516 Passenger Rail	$46.5	$44.9	$32.1	$23.7	$147.2
Total	**$46.5**	**$44.9**	**$32.1**	**$23.7**	**$147.2**

Source: Pennsylvania Department of Transportation (2020)
Note: Rail capital funding is competitive and not guaranteed.

5.5.4.1 Amtrak

Amtrak funds its capital program through a combination of federal, state, and local sources. Federal grant sources include FAST Act Section 11101 Grants, as well as other grants from the FRA, FTA, and Department of Homeland Security. Amtrak also receives capital payments from PRIIA 209.

Amtrak's Northeast Corridor Commission Program is often regarded as self-sustaining from passenger revenues "above the rails" (i.e., including revenue equipment). Amtrak uses yield management techniques to maximize revenues in a market competing against highway and air travel, and it will manage its competitive position as the impacts on market share of the novel coronavirus unfold. The sources of capital revenue, including the additional funding for the NEC infrastructure, are integrated into the Amtrak national financial program, which includes federal funding, as well as proceeds from joint development at high-value assets such as 30th Street Station and the surrounding railroad properties. SEPTA and Amtrak jointly fund some of the assets used by SEPTA Regional Rail Service under funding arrangements coordinated by the NEC.

Keystone Service is supported by state and passenger-related revenue. Act 89 funding was designed to provide stable support for Keystone Services. Table 5-9 summarizes Amtrak's project capital funding sources for its state-supported routes. The table includes funding for all states, including Pennsylvania.

Table 5-9: Summary of Capital Funding Sources for Amtrak's State-Supported Lines, All States (in millions of YOE dollars)

Funding Source	2021	2022	2023	2024	Total
PRIIA 209 Capital	$68.3	$60.7	$62.0	$92.7	$283.7
Other State/Local Mutual Benefit	$3.7	$11.4	$1.9	$2.9	$19.9
Prior Year Carryover Capital Grant Funds	$8.8	$4.3	$7.3	$0.0	$20.4
FAST Act § 11101, Grants	$0.0	$0.0	$0.0	$0.0	$0.0
Operating	$65.1	$64.6	$63.7	$62.7	$256.1

Funding Source	2021	2022	2023	2024	Total
Capital	$231.6	$250.7	$366.0	$321.1	$1,169.4
Other Federal Grants	$2.2	$1.7	$2.2	$2.2	$8.3
Total Estimated Federal Grants	**$379.7**	**$393.4**	**$503.1**	**$481.6**	**$1,757.8**

Source: Amtrak (2019d)

5.5.4.2 SEPTA

SEPTA's capital rail funding is provided from dedicated state funding under the Section 1514 program of Act 89, several federal sources, and local sources. According to SEPTA's annual SFY 2021 Capital Budget, state sources are projected to make up 55% of total capital funds, amounting to $349.3 million. The remainder of the capital program will be funded through federal funds at 34% ($219.3 million), SEPTA capital financing at 9% ($60 million), and local funds at 2% ($11.65 million) (SEPTA, 2020 a).

SEPTA receives 69.4% of the statewide capital funds allocated to transit authorities. Act 89 requires the Pennsylvania Turnpike Commission to contribute a total of $450 million annually to PennDOT for funding a multitude of programs. The turnpike funding provides the majority of the Section 1514 Asset Improvement Program. Turnpike transfer funds are scheduled to be replaced with sales and use tax revenues starting in July 2022.

SEPTA receives federal funding from several programs that can be used to advance rail projects. Under the FTA, funding is provided from programs including Section 5307 Urbanized Area Formula, Section 5340 Growing States, and Section 5337 State of Good Repair programs.

Other federal funding sources include Federal Emergency Management Agency Transit Security Grant Program and FHWA funds.

Summarized below are brief descriptions of the available federal funding sources:

- FTA Section 5307: Urbanized Area Formula Program that funds transit capital projects.
- FTA Section 5340: The Growing State and High-Density States Formula Program funds allocated based on population forecasts and density. SEPTA receives Growing States program funding.
- FTA Section 5337: The State of Good Repair Program, which funds high-intensity fixed guideway and high-intensity motorbus capital projects.
- FHWA funds are available under cross-modal flexible funding provisions for use in transit investments.

- Act 89, FTA, and FHWA funds require a local match, which SEPTA secures from the five surrounding counties it serves: Bucks, Chester, Delaware, Montgomery, and Philadelphia.

5.5.4.3 Capital Financing Programs

The preceding sources of revenue are largely public funding sources. In some cases, these resources can be leveraged through public financing to accelerate the expenditure of funds, and there are also sources of public financing available to enhance the leverage of any available stream of reliable funding. The two primary programs are the TIFIA and its companion, the RRIF, which are available tools for SEPTA and Amtrak to finance project needs. In addition, the commonwealth has access to competitive Private Activity Bonds. For major projects, there is a possibility of private sources of financing under P3s, often repaid through availability payments over the life of the assets.

5.5.5 Short-Range Passenger Rail Capital Project Financing Plan

The projects for the short-range capital plan are those identified by the operating agencies as having a high likelihood of being funded. As discussed in prior sections in this chapter, passenger rail capital projects may be funded through a combination of federal, state, and local sources. In Pennsylvania, state sources provide the majority of this capital funding. Table 5-10 summarizes the short-range passenger rail capital project costs for 2021 to 2024.

Table 5-10: Summary of Short-Range Passenger Rail Capital Projects (in millions of YOE dollars)

Project Type	2021[1]	2022	2023	2024	Total (YOE)[1] 2021–2024
Equipment	$89.0	$309.9	$91.7	$94.5	$585.2
Facilities	$184.9	$64.8	$175.4	$41.1	$466.2
Safety	$281.7	$0.0	$0.0	$0.0	$281.7
Track Control Systems and Bridges	$350.8	$176.3	$474.5	$85.7	$1,087.3
Total (YOE)[2]	**$906.5**	**$551.1**	**$741.6**	**$221.2**	**$2,420.4**

(1) Projects scheduled for implementation in 2020 are assumed to have already been funded at the time of this RSIP.

(2) YOE dollars assume a 3% annual increase in project cost due to inflation.

Table 5-11 provides a summary of funding sources for funding short-range passenger rail capital projects. Detailed project lists can be found in Appendix G.

Table 5-11: Summary of Funding Sources for Short-Range Passenger Rail Capital Projects (in millions of dollars)

Core Funding Source	2021	2022	2023	2024	Total
Public Transportation Trust Fund/ 1516 Passenger Rail	$46.5	$44.9	$32.1	$23.7	$147
Amtrak (State-supported lines) Capital Funds[1]	$376.1	$381.9	$501.2	$478.8	$1,738.1
Total (YOE)	**$422.60**	**$426.80**	**$533.30**	**$502.50**	**$1,885.10**

Source: Amtrak (2019d)
(1) Amtrak estimates are based on Amtrak (2019d). Excludes other state/local mutual benefits.

5.5.6 Operating Financing Plan

It is important to ensure that funds are adequate to support the operation and maintenance of the passenger rail system. Operating funding has been a major challenge in the recent history of passenger rail.

5.5.6.1 Amtrak

The operating budget is funded through a mix of passenger-related revenue, commercial revenue, and contractual contributions. Passenger-related revenue includes tickets, charter/special trains, and food and beverage. Contractual contributions include PRIIA 209 operating payments, PRIIA 212 operating payments, commuter operations, reimbursable contracts, and access revenue. Commercial revenue sources include real estate and parking. A small portion of operating costs may also be covered by other sources such as insurance revenue and co-branded revenue. Table 5-12 summarizes Amtrak's operating funding projection for state-supported lines from 2021 to 2024.

Table 5-12: Summary of Operating Funding Sources for Amtrak State-Supported Service Lines, All States (in millions of dollars)

Operating Funding Source	2021	2022	2023	2024	Total
Passenger-Related Revenue					
Ticket Revenue (adjusted)	$590.5	$606.8	$623.1	$641.0	$2,461.4
Charter/Special Trains	$2.5	$2.5	$2.5	$2.5	$10.1
Food and Beverage	$31.1	$31.6	$32.1	$32.7	$127.6
Contractual Contribution					
PRIIA 209 Operating	$244.9	$248.5	$252.3	$256.0	$1,001.7
All Other Revenue	$11.3	$11.5	$11.7	$12.0	$46.5
Total Operating Sources	**$880.2**	**$900.9**	**$921.8**	**$944.2**	**$3,647.1**

Source: Amtrak (2019d)

Amtrak NEC and Keystone Services generate a larger proportion of their operating funds from internal sources than does SEPTA service. NEC service, in particular, covers a major share of its costs. However, Keystone Service is primarily reliant on state funding for its operations. With the onset of the COVID-19 pandemic and subsequent changes in commuting patterns, total impact on the stability of these sources is yet to be determined.

5.5.6.2 SEPTA

State funding has made up close to one-half of the total operating expense of SEPTA. Although SEPTA rail service, particularly regional rail service, generates a larger percentage of its expense from fares and other internal sources than does bus or paratransit service, the modes are somewhat interdependent. After state funding, internally generated funds have been the next highest source of operating revenue, followed by local tax revenues and federal assistance (largely limited to maintenance expense). Although it remains to be seen how the public experience of the COVID-19 pandemic will change commuting, these will remain the primary sources of operating revenues, although the proportions may change.

Table 5-13 summarizes SEPTA's pre-COVID-19 short-range projections for operating revenue. Total revenue from directly generated sources will be subsidized by federal, state, and local funds.

Table 5-13: Summary Projections for SEPTA's Operating Revenue and Subsidies (in millions of dollars)

Revenue Source	2021	2022	2023	2024	Total
Passenger Revenue	$480.6	$485.4	$490.2	$515.2	$1,971.4
Shared Ride Revenue	$16.3	$16.4	$16.6	$16.8	$66.1
Other Income	$44.9	$45.4	$45.9	$46.3	$182.5
Total	**$541.8**	**$547.2**	**$552.7**	**$578.3**	**$2,220.0**
Operating Subsidy					
Federal	$93.0	$93.1	$93.8	$94.6	$374.5
State	$779.9	$815.5	$848.9	$867.9	$3,311.5
Local	$113.4	$117.3	$123.7	$126.4	$479.4
Other	$3.7	$4.4	$4.5	$4.5	$17.8
Total Subsidy	**$989.2**	**$1,030.3**	**$1,070.9**	**$1,092.8**	**$4,183.2**

Source: SEPTA, 2019
Given the uncertainties surrounding the health and economic recovery rate of the region and taking into consideration the delayed implementation of the fare increase, it is clear that actual ridership and operating revenue ultimately realized in Fiscal Year 2021 will differ from the adopted baseline budget. The remaining Coronavirus Aid, Relief, and Economic Security Act (CARES Act) operating subsidies that SEPTA is eligible to receive, careful management of operating expenses, and aligning services to more closely matched ridership requirements, should enable the Authority to mitigate operating shortfalls that will occur during Fiscal Year 2021.

5.6 Freight Element

5.6.1 Freight Rail Capital Projects Summary

This section summarizes the freight rail capital projects for the RSIP. As described in Chapter 4, projects included in the SRP were developed through coordination with various stakeholders to identify investment projects that would enhance the freight rail network. These projects were gathered from the commonwealth's railroads and other rail stakeholders and organized according to their anticipated implementation horizon. Projects scheduled for implementation within the first 4 years were included in the short-range freight rail capital plan, which is from 2021 to 2024. Projects scheduled for implementation between 2025 and 2045 were organized under the long-range plan. Additionally, there were 149 vision projects planned for future implementation. Descriptions of project types, railroad class, and regional distributions are described in Chapter 4.

The plan for freight rail investments consists of 323 projects representing Class I, Class II, and Class III operators. More than 80% of the total count of projects are planned by Class III railroads. Together, the combined known capital need for freight rail investments for 2021 to 2045 is estimated at $1.16 billion.

Table 5-14 provides a summary of all projects included in the plan. Table 5-15 provides a summary of projects included in the freight rail capital plan for both the short-range and long-range (2021 to 2045). Table 5-16 summarizes vision projects.

Table 5-14: Summary of Freight Rail Projects by Railroad Class (Short-Range, Long-Range and Vision Projects)

Railroad Class	Number of Projects	Percent	Estimated Cost (in millions of 2020 dollars)	Percent
Class I	44	13.6%	$400.9	34.4%
Class II	7	2.2%	$35.4	3.0%
Class III	272	84.2%	$728.4	62.5%
Total	**323**	**100.0%**	**$1,164.7**	**100.0%**

Table 5-15: Short-Range and Long-Range Freight Rail Capital Needs by Project Type, 2021–2045 (in millions of 2020 dollars)

Project Category	Class I	Class II	Class III	Total Project Cost	Percent by Category
Accelerated Maintenance	$0.0	$0.0	$270.9	$270.9	53.2%
Access Existing or New Customers	$27.1	$0.0	$77.8	$104.9	20.6%
Grade Crossing	$0.0	$0.0	$0.7	$0.7	0.1%
Improve Civil Works	$30.0	$0.0	$11.7	$41.7	8.2%
Improve Terminal	$7.0	$0.0	$28.3	$35.3	6.9%
Improve Track	$2.2	$20.0	$33.6	$55.8	11.0%
Rolling Stock	$0.0	$0.0	$0.2	$0.2	0.0%
Class Distribution	**$66.3**	**$20.0**	**$423.1**	**$509.4**	**100%**
Percent by Class	13.0%	3.9%	83.1%	100.0%	

Note: Table excludes 149 vision projects

Table 5-16: Summary of Vision Projects Included in the State Rail Plan (in millions of 2020 dollars)

Project Category	Class I	Class II	Class III	Total Project Cost	Percent by Category
Accelerated Maintenance	$95.0	$1.2	$67.2	$163	24.9%
Access Existing or New Customers	$12.0	$0.0	$80.0	$92	14.0%
Grade Crossing	$0.0	$0.0	$5.5	$5	0.8%
Improve Civil Works	$105.1	$0.0	$43.9	$149	22.7%
Improve Terminal	$72.6	$0.0	$46.6	$119	18.2%
Improve Track	$50.0	$14.2	$28.3	$92	14.1%
Rolling Stock	$0.0	$0.0	$33.8	$34	5.2%
Class Distribution	**$334.6**	**$15.4**	**$305.3**	**$655.3**	**100.0%**
Percent by Class	**51.1%**	**2.3%**	**46.6%**	**100.0%**	
Total Number of Projects	**38**	**6**	**105**	**149**	

In addition, grade crossing safety projects have been collected from PennDOT's programmed FHWA Section 130 projects, as well as from the freight railroads. These include crossing signal improvements, such as warning devices, yield signs, LED upgrades, and circuitry upgrades. There are 80 projects programmed between 2021 and 2024 for near-term grade crossing safety projects totaling $34.8 million. For the long-term grade crossing safety projects between 2025 through 2045, there are 13 projects programmed totaling $12.7 million (see Appendix E). Although we included these projects in Appendix E for informational purposes, the 93 grade crossing safety

projects were not included in this SRP's financial analysis, as they are highway programmed projects.

5.6.2 Freight Rail Financing Plan

Investment in the freight rail network would yield significant benefits for the Pennsylvania economy, as well as the nation at large. The sections that follow identify 323 individual projects totaling approximately $1.2 billion in estimated capital costs. These include short-range, long-range and vision projects. There are also some projects for which costs have not yet been determined; therefore, the actual cost for the state's freight rail needs through 2045 may exceed $1.2 billion. The sections that follow also present a strategy for financing the short-range and long-range elements of the RSIP for freight rail.

5.6.2.1 Short-Range Capital Project Funding Needs (2021–2024)

This section describes the financial plan for the 89 short-range freight rail projects. The total known estimated 4-year financial need for the SRP's capital funding plan is $323.2 million (in 2020 dollars). The total known estimated amount comprises 15.3% ($49.3 million) Class I projects and 84.7% ($273.9 million) Class III projects. Notably, there are no short-range freight rail needs identified by Class II operators. Additionally, there are 19 Class III projects with costs that are yet to be estimated by the railroads. Therefore, the total funding need for the short-range capital program could exceed the estimated $323.2 million. Figure 5-8 shows a summary of the number of projects and costs for the short-range freight rail capital needs by project type in 2020 dollars.

A significant proportion (57.9%) of the short-range needs is categorized as Accelerated Maintenance. These are projects aimed at achieving a state of good repair to meet current market requirements.

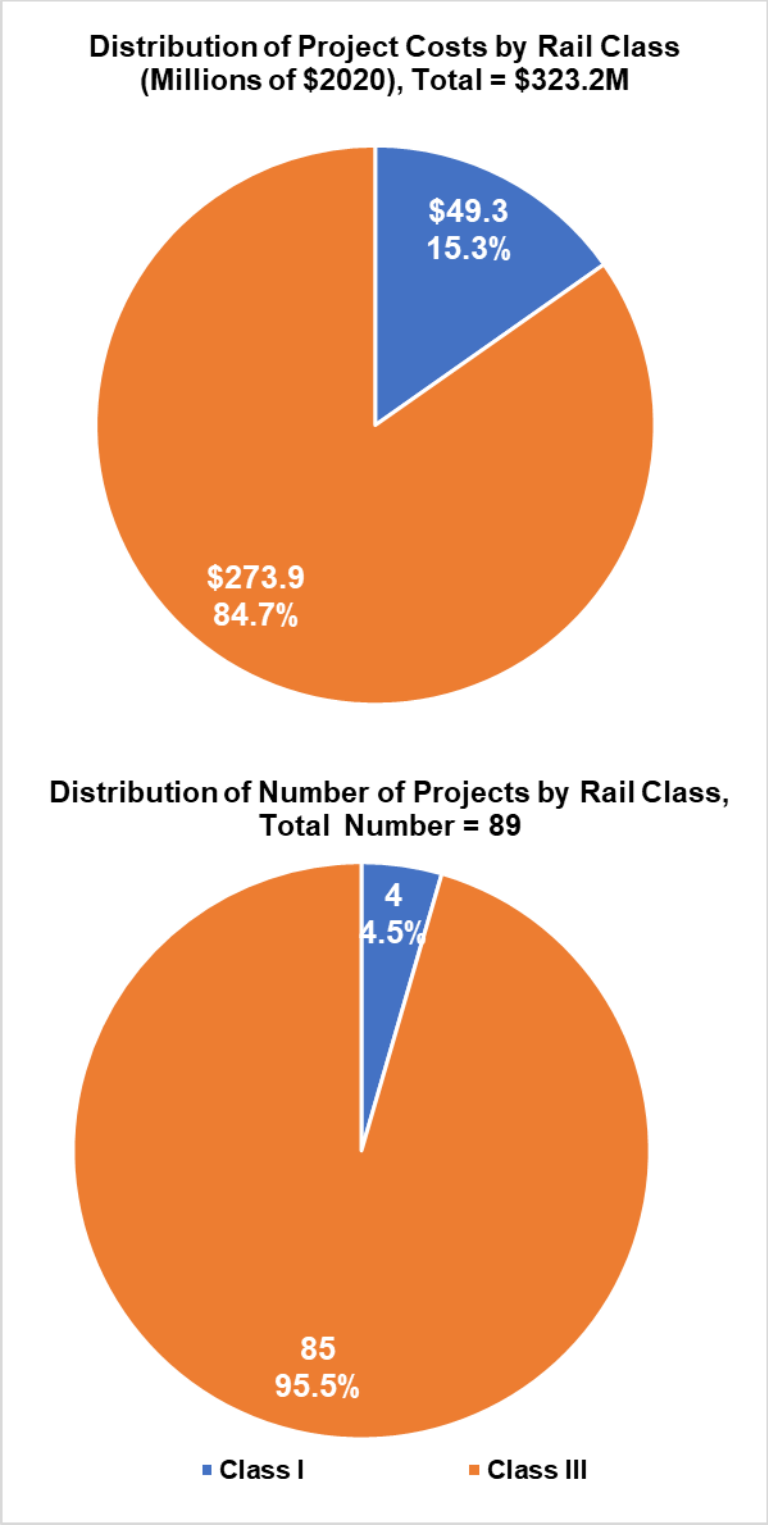

Figure 5-8: Distribution of number and estimated costs for short-range freight rail projects by class, 2021–2024 (in millions of 2020 dollars)

As described previously, freight rail projects were categorized under six project types: Accelerated Maintenance, Access Existing or New Customers, Grade Crossing, Improve Civil Works, Improve Terminal, and Improve Track. Figure 5-9 and Table 2-17 further summarize the short-range projects by type and class to show the distribution of capital needs for freight rail across the commonwealth. Detailed lists of needs for the short-range projects in the RSIP are provided in Appendix H, organized by project type. Table 5-18 provides a summary of the short-range funding needs by project type.

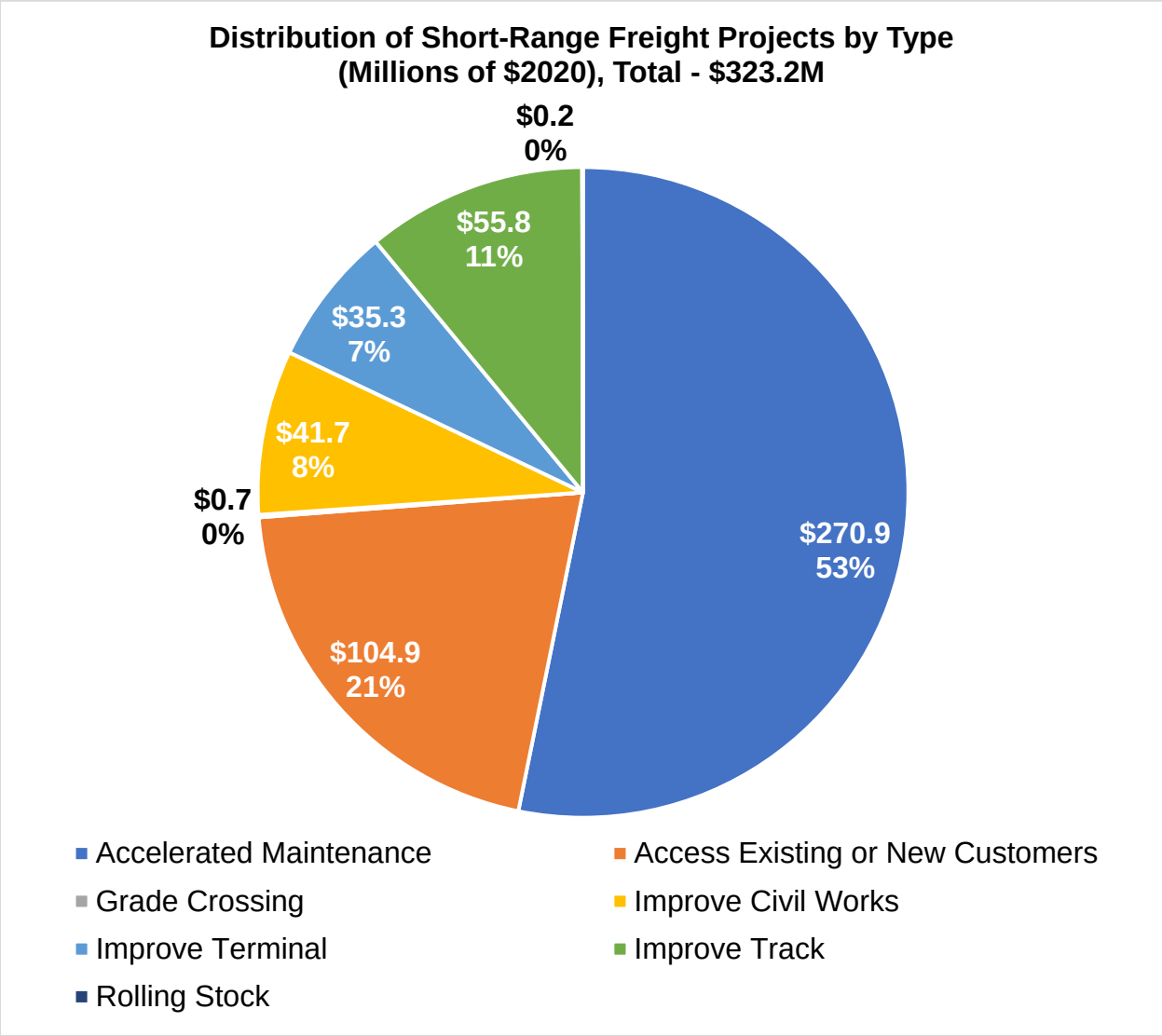

Figure 5-9: Summary of short-range freight rail capital needs by project type, 2021–2024 (in millions of 2020 dollars)

Table 5-17: Summary of Short-Range Freight Rail Capital Needs by Project Type and Class, 2021–2024 (in Millions of 2020 dollars)

Project Type	Class I	Class III	Total Cost	Percentage by Category
Accelerated Maintenance	$0.0	$187.0	$187.0	57.9%
Access Existing or New Customers	$17.1	$57.3	$74.4	23.0%
Grade Crossing	$0.0	$0.0	$0.0	0.0%
Improve Civil Works	$30.0	$2.2	$32.2	10.0%
Improve Terminal	$0.0	$14.6	$14.6	4.5%
Improve Track	$2.2	$12.8	$15.0	4.6%
Class Distribution	**$49.3**	**$273.9**	**$323.2**	**100%**
Percentage by Class	**15.3%**	**84.7%**	**100.0%**	

Note: No projects were identified for Class II railroads

In estimating the annual project costs over the four-year period (2021-2024), the annual costs below are expressed in Year of Expenditure dollars (YOE) to account of inflation and potential escalation in costs.

Table 5-18: Short-Range Freight Rail RSIP Analysis, 2021–2024 (in millions of YOE dollars)

Project Type	2021	2022	2023	2024	Total 2021–2024 Cost (YOE)[1]
Accelerated Maintenance	$13.0	$35.1	$10.7	$147.3	$206.1
Access Existing or New Customers	$20.7	$18.7	$18.1	$13.7	$71.2
Grade Crossing	$0.0	$0.0	$0.0	$0.0	$0.0
Improve Civil Works	$1.6	$0.0	$33.4	$0.0	$35.1
Improve Terminal	$2.3	$2.5	$5.3	$4.1	$14.1
Improve Track	$1.1	$2.6	$2.7	$9.3	$15.8
Estimated Need	**$38.8**	**$58.9**	**$70.3**	**$174.3**	**$342.3**

(1) YOE dollars calculated by assuming a 3% annual increase in project cost

Many of the projects listed in the short-range RSIP are Class III railroad projects, which rely on a substantial amount of public funding. Table 5-19 provides the best-known estimate of projected state funding for these projects. These funds are not guaranteed, because the commonwealth's freight rail funding programs are competitive. This table includes adjustments to reflect potential COVID-19 pandemic impacts on revenue based on the best estimates from PennDOT BFM, and is subject to change.

Due to the inclusion of projects without cost estimates, additional state and local funds or resources, private funding, or other innovative funding would need to be identified to fill any funding gaps.

Table 5-19: Estimated State Funding Dedicated to Freight Rail Capital Projects, 2021–2024 (in millions of YOE dollars)

Funding Source	2021	2022	2023	2024	Total
Marcellus Shale Rail Freight	$1.0	$1.0	$1.0	$1.0	$4.0
RTAP/ Capital Budget Rail Freight	$30.0	$30.0	$30.0	$30.0	$120.0
Total	**$31.0**	**$31.0**	**$31.0**	**$31.0**	**$124.0**

Table 5-20 shows a funding analysis based on the aforementioned funding contingencies. It is worth noting that year 2024 has significantly higher freight rail needs due to a single large project costing approximately $123 million scheduled for implementation in 2024. Due to the inclusion of projects without known cost estimates, additional state and local funds or resources, private funding, or other innovative funding would need to be identified to fill any funding gaps.

Table 5-20: Short-Range Freight Rail RSIP Analysis, 2021–2024 (in millions of YOE dollars)

	2021	2022	2023	2024	Total 2021–2024 Cost (YOE)
Estimated Freight Rail Needs	$38.8	$56.8	$70.3	$174.3	$340.2
Estimated Available State Funding(1)	$31.0	$31.0	$31.0	$31.0	$124.0
Estimated Difference	**($7.8)**	**($25.8)**	**($39.3)**	**($143.3)**	**($216.2)**

(1) State freight rail funding programs are competitive and not guaranteed.

5.6.2.2 Long-Range Freight Rail Capital Project Funding Needs (2025–2045)

The long-range freight rail capital needs consist of projects programmed for implementation between 2025 and 2045. The total known cost estimate of project needs is $186.2 million. Similar to the short-range needs, most long-range projects were identified by Class III operators, with the total proportion of funding for long-range projects amounting to $149.2 million (80.1%). The remaining projects are about equally divided between Class I and Class II operators. Table 5-21 summarizes the long-range investment needs by project type and railroad class.

Table 5-21: Estimated Cost of Long-Range Freight Rail Projects by Type and Class, 2025–2045 (in millions of 2020 dollars)

Project Type	Class I	Class II	Class III	Total Projects	Percentage by Category
Accelerated Maintenance	$0.0	$0.0	$83.9	$83.9	45.1%
Access Existing or New Customers	$10.0	$0.0	$20.5	$30.5	16.4%
Grade Crossing	$0.0	$0.0	$0.7	$0.7	0.3%
Improve Civil Works	$0.0	$0.0	$9.5	$9.5	5.1%
Improve Terminal	$7.0	$0.0	$13.6	$20.6	11.1%
Improve Track	$0.0	$20.0	$20.8	$40.8	21.9%
Rolling Stock	$0.0	$0.0	$0.2	$0.2	0.1%
Class Distribution	**$17.0**	**$20.0**	**$149.2**	**$186.2**	**100.0%**
Percentage by Class	**9.1%**	**10.7%**	**80.1%**	**100.0%**	

5.6.2.3 Long-Range Freight Rail Capital Project Financing Plan (2025–2045)

The total cost estimate (based on estimates provided) of long-range needs for the 20-year capital plan from 2025 to 2045 is $186.2 million. Assuming PennDOT's existing sources of dedicated freight rail funding remain intact and mirror recent historical levels over the long-term, it is anticipated that these funds may be available to support funding needs, serve as matching funds for federal grants and loans, and to leverage private investments.

Federal discretionary grant programs serve as viable options for funding long-range needs. As a rigorous and merit-based program, the BUILD program provides capital funding to public entities such as states, municipalities, counties, port authorities, tribal governments, MPOs, and others. Over the last 3 years, the TIGER/BUILD program funded projects amounting to $500 million for TIGER IX, $1.5 billion for BUILD FFY 2018, $900 million for BUILD in FFY 2019, and $1 billion in FFY 2020. Furthermore, the Rail Line Relocation and Improvement Program described in Chapter 2 may also be leveraged to fund long-range capital needs.

Similar to the short-range project needs, there are a few long-range freight rail projects with estimated costs yet to be determined. As a result, the actual cost of long-range portions of the RSIP may be much higher than the estimates provided. Details for all the long-range freight rail capital plan projects are included in Appendix H.

5.6.2.4 Available State Funding Sources

To realize the full effects and benefits of the commonwealth's freight rail network, PennDOT has coordinated with more than 60 freight railroads and regional and local

agencies to develop projects to enhance the state's freight rail network. Freight rail projects are funded through a variety of mechanisms at the federal and state levels. Generally, Class I railroads mainly finance projects themselves using revenue generated through operations. However, due to direct and indirect benefits of freight rail corridors, as well as shared infrastructure with some public rail operations, public funding may be needed to complement private sources. Furthermore, Class III/short lines may not have as much access to private funds as Class I carriers typically do.

Since 1984, the commonwealth of Pennsylvania has provided significant state funding for freight rail investments through a combination of grants, loans, and other financing methods. The RFAP and the RTAP form the two major sources of state funding for freight rail. Complete descriptions of the RFAP, RTAP, and other available sources of state funding are provided in Chapter 2. Below is a summary list of other available sources:

- Pennsylvania Infrastructure Bank (PIB) Loans
- Act 13 Impact Fee for Marcellus Shale Region
- DCED economic development programs:
  - Infrastructure and Facilities Improvement Program: Pennsylvania Department of Community and Economic Development provides this multi-year grant to assist with the payment of debt service. Grants range from $200,000 a year for 10 years, to $1 million per year for 20 years.
  - Tax Increment Financing Guarantee Program: The CFA administers this program in accordance with the Tax Increment Financing Act of July 11, 1990, for the development, redevelopment, and revitalization of brown- and green-field sites.
  - Business in Our Sites: Loans and grants with no ceiling amount, but grants may not exceed $4 million or 40% of the total combined grant and loan award (whichever is less) for site development and business, infrastructure, land, and building development.
- Other economic development programs:
  - Pennsylvania First (PA First): A comprehensive funding tool created to facilitate increased investment and job creation within the state. It offers grants, loans and loan guarantees for equipment, infrastructure, land acquisition, and site work.

- Job Creation Tax Credits (JCTC) Program: Provides $1,000-per-job tax credit to create new jobs in the state within 3 years. Requires the creation of at least 25 new jobs or expansion of the existing workforce by at least 20%.
- Redevelopment Assistance Capital Program (RACP): Administered by the Office of Budget, funds may be used for constructing regional economic improvement projects that have regional or multi-jurisdictional impact.
- Pennsylvania Industrial Development Authority (PIDA): Provides low-interest state loans and credit lines for eligible business to create and retain full-time jobs. The program is also for the development of industrial parks and multi-tenant facilities.

5.6.2.5 Available Federal Funding Sources

Federal programs may be characterized as (1) funding programs or (2) financing tools. Funding programs are those that target specific types of projects to address freight transportation needs. These include several competitive discretionary grant programs provided through the FRA. Funding from public sources generally requires a match or in-kind benefits from the applicant.

Financing tools include options such as loans, credit enhancement, and tax-exempt financing programs. Loans and credit enhancement programs provide a means for public and private resources to be leveraged by states to stimulate capital investment in infrastructure. Available local financing programs offer tax relief or other types of tax benefits for investments directed at improving efficiency or increasing capacity of the freight transportation system by either reducing or eliminating taxes on interest paid by investors.

Some federal funding mechanisms are listed below. A complete listing of available sources with detailed descriptions is provided in Chapter 2.

- CMAQ Program.
- Federal-State Partnership for State of Good Repair Grant Program
- BUILD Transportation Discretionary Grant Program
- CRISI
- Rail Line Relocation and Improvement Program
- Railroad Rehabilitation and Improvement Financing (RRIF)
- Railroad Rehabilitation and Improvement Financing Express

5.7 Rail Studies and Reports

Various rail studies and reports have been completed within the last 4 years and are listed in Table 5-22.

Table 5-22: Recently Completed Rail Studies (Includes Vision Projects Not Currently Funded for Implementation)

Study	Lead Agency	Description
Rail Freight and the Commonwealth's Economy (2018)	PennDOT	Evaluated the effectiveness of the Rail Freight Assistance Program (RFAP) and the Rail Transportation Assistance Program (RTAP). An analysis of RFAP and RTAP projects against long-term strategic goals and confirmed that the projects have directly supported Pennsylvania's rail freight infrastructure to maintain economic competitiveness, improve safety, and strengthen the transportation system.
Altoona to Pittsburgh Commuter Rail Study (2019)	PennDOT	Analyzed potential service levels and associated ridership estimates, as well as infrastructure needs and estimated capital costs to support passenger rail/commuter service on the 117-mile corridor between Altoona and Pittsburgh, owned by Norfolk Southern (NS).
Reading to Philadelphia Passenger Rail Analysis (PennDOT, 2020 c)	PennDOT	Summarizes the various efforts to date to restore rail service, identifies the key infrastructure and institutional challenges, estimates costs and ridership, and defines the necessary approvals and operational requirements associated with this NS owned rail corridor.
Restoring Passenger Rail Service to Berks County (2020)	Berks Alliance	Provides a pre-feasibility level of understanding of the basics of operating a passenger rail service from Reading to Philadelphia, including the ability to provide direct rail connections to New York and Washington, D.C.
Johnstown Amtrak Station Reuse Study (2017)	PennDOT	Report developed to assist the City of Johnstown and the Johnstown Area Heritage Association with identifying economically realistic and implementable new use opportunities for the train station while enhancing its current role as an Amtrak passenger rail facility.
Lewistown Junction Station Conceptual Design and Analysis (2020)	PennDOT	Study to assess the operational and facility needs to support improved passenger rail service and multimodal transportation connectivity for the Lewistown Amtrak Station.
Intercity Passenger Rail Study (2019)	Pennsylvania TAC	Study profiled several potential intercity passenger rail corridors in Pennsylvania. The study recommended establishing funding and financing strategies for the new services, preserving corridors, building on the Keystone Corridor's success, among other things.

Study	Lead Agency	Description
Risks to Transportation Funding in Pennsylvania (2019)	Pennsylvania TAC	Study looked at the risks to federal and state funding sources for transportation projects and the impacts of reductions in funding. The study found that alternative state transportation funding sources and mechanisms may be required to meet needs.
Amtrak NEC FUTURE (2017)	FRA	Study was the FRA's comprehensive planning effort to define, evaluate and prioritize future investments in the Northeast Corridor (NEC). It established an investment plan for the NEC to improve the capacity and reliability of passenger rail service in the Northeast, for both commuter/regional and intercity trips.
30th Street Station District Plan (2016)	Amtrak, Brandywine Realty Trust, Drexel University, PennDOT and SEPTA	Plan is a long-range, joint master planning effort to develop a comprehensive vision for the future of the 30th Street Station District in the year 2050 and beyond. The plan calls for approximately 18 million square feet of development implemented in seven overarching phases spread out over 35 years, from 2016 to 2050.
Ivy Ridge Station: Creating a Hub for Multimodal Development (2017a)	DVRPC	Study looked at development potential of the station given changes in surrounding land use and increasing service and ridership on SEPTA Regional Rail's Manayunk/Norristown Line. The study recommended a series of phased physical improvements around the station, coupled with coordinated policy initiatives to encourage mixed-use development.
Radnor Station Connectivity (2017c)	DVRPC	Study evaluated the feasibility and benefits of consolidating two SEPTA rail stations to improve the connection between the Paoli/Thorndale Regional Rail Line and the Norristown High Speed Line in Radnor Township. The study concluded that current demand for transfers between the two rail stations is too low and future demand too uncertain to justify the high capital cost of station consolidation.
Philadelphia Zoo Passenger Rail (2017b)	DVRPC	Conducted on behalf of SEPTA, study looked at the ridership potential assuming a SEPTA Regional Rail stop at the zoo on the Paoli/Thorndale Line, as well as for a monorail connecting the zoon to 30th Street Station.
Station Area Planning for the Norristown High Speed Line Extension to King of Prussia (2018b)	DVRPC	Study identified and evaluated strategies designed to enhance pedestrian and bicycle access to the proposed stations on the extension of the Norristown High Speed Line to King of Prussia. The Norristown Line is a light rapid transit line, separate from SEPTA Regional Rail.

Over the next 4 years, PennDOT will embark on various studies pertinent to its passenger and freight rail systems. These studies are listed in Table 5-23.

Table 5-23: Potential Future Studies by PennDOT (over the Next 4 Years)

Study	Agency	Description
Impact of Changes in the Energy Market on Short Lines	PennDOT	Marcellus Shale industry analysts anticipate a decline in extraction during the decade of the 2020s, leaving many short lines with a diminishing traffic base. The impacts of this decline and the potential for new traffic to replace this business will be considered by the Department.
Strategic Role for Intercity Passenger Rail	PennDOT	Travel by rail may have advantages over air travel with respect to concerns related to COVID-19. PennDOT will explore the role that intercity passenger rail provides Pennsylvanians, and how the attractiveness of the mode can be enhanced to increase ridership.

5.8 Summary of Passenger and Freight Rail Capital Program

Approximately 91% of the total combined short-range passenger and freight rail capital program needs are for planned investments in the passenger rail network. The majority of the passenger rail projects that need funding in the near-term are equipment-related projects, which shows that funds are being directed to maintain the existing system rather than expanding it. Equipment purchases support state of good repair and efficiencies for the system operators. By investing in new or improved equipment, system operators may spend less on upkeep and maintenance expenses for aging equipment, and the network reliability increases. A summary of the projects appears in Table 5-24.

Projects identified in the program will be funded through a combination of public and private funds, with freight rail projects mainly funded by the private sector. Public-sector funds will be available through various federal, state, and local sources, including grants, loans, and financing mechanisms.

Table 5-24: Summary of Short-Range Passenger and Freight Rail Project Needs (in millions of YOE dollars)

Project Type	Number of Projects	2021	2022	2023	2024	Total Cost (YOE)
Passenger Projects						
Equipment	4	$89.0	$309.9	$91.7	$94.5	$585.2
Facilities	17	$184.9	$64.8	$175.4	$41.1	$466.2
Safety	3	$281.7	$0.0	$0.0	$0.0	$281.7
Track Control Systems and Bridges	24	$350.8	$176.3	$474.5	$85.7	$1,087.3
Total	**48**	$906.5	$551.1	**$741.6**	**$221.2**	**$2,420.4**
Freight Projects						
Accelerated Maintenance	45	$13.0	$33.0	$10.7	$147.3	$204.0
Access Existing or New Customers	8	$20.7	$18.7	$18.1	$13.7	$71.2
Grade Crossing	18	$0.0	$0.0	$0.0	$0.0	$0.0
Improve Civil Works	4	$1.6	$0.0	$33.4	$0.0	$35.1
Improve Terminal	7	$2.3	$2.5	$5.3	$4.1	$14.1
Improve Track	7	$1.1	$2.6	$2.7	$9.3	$15.8
Total	**89**	**$38.8**	**$56.8**	**$70.3**	**$174.3**	**$340.2**
Total Passenger and Freight	**137**	**$945.3**	**$607.9**	**$811.9**	**$395.5**	**$2,760.6**

The total long-range capital funding need for passenger projects is approximately $2.2 billion. Majority of the total investment needs have been identified for equipment and facility projects. The total capital funding need for long-range freight rail projects is $186.2 million. The majority of the identified investment needs are for Class III railroads which typically require more public funding support.

Long-range passenger and freight rail projects will be primarily funded through a combination of competitive grants, state allocations, private funding, and innovative financing tools. Table 5-25 and Table 5-26 summarize the long-range passenger rail and freight rail capital needs, respectively.

Table 5-25: Summary of Long-Range Passenger Project Needs (in millions of 2020 dollars)

Project Type	Number of Projects	Estimated Cost	Percent of Cost
Equipment	2	$934.7	42.3%
Facilities	24	$1,038.4	47.0%
Track Control Systems and Bridges	20	$235.3	10.7%
Total	**46**	**$2,208.4**	**100.0%**

Table 5-26: Summary of Long-Range Freight Rail Project Needs (in millions of 2020 dollars)

Railroad Class	Number of Projects	Estimated Cost	Percent of Cost
Class I	2	$17.0	9.1%
Class II	1	$20.0	10.7%
Class III	82	$149.2	80.1%
Total	**85**	**$186.2**	**100.0%**

In addition to the short-range and long-range passenger projects, there are other highway and bridge projects related to rail activity totaling $95.2 million. Furthermore, vision projects for passenger rail and freight rail amount to approximately of $1.3 billion and $655.3 million, respectively.

This 2020 SRP was prepared between fall 2019 and fall 2020; therefore, where possible, the SRP encompasses the anticipated short- and longer-term impacts of the COVID-19 pandemic on freight and passenger rail. As the preparation of the State Rail Plan continued through 2020, it became apparent that the potential short-term impacts of the virus may change long-term commuting patterns. Unfortunately, the timing of this Plan did not allow for a detailed analysis of these potential changes to passenger and freight rail. Per the FRA guidance, it may be prudent to consider an amendment to the State Rail Plan in the coming years that will be able to analyze these COVID -19 impacts on rail in the commonwealth. Like so many other organizations, PennDOT had taken necessary measures and precautions in response to COVID-19. As a result, all stakeholder and public outreach for the 2020 SRP was conducted virtually through innovative public involvement techniques. It is also worth noting that COVID-19 has also had a major impact on commonwealth and PennDOT revenues. Pennsylvania's prudent and lifesaving response to the health crisis, coupled with decreased travel throughout the nation and region, significantly reduced the department's gas tax and other revenues. Projected transportation revenue impacts in the short term will mean between $500 and $600 million less in construction and maintenance programs, and over $100 million less available for multimodal initiatives due to COVID-19. PennDOT did receive $407 million in federal COVID relief funds for highways and bridges and while these funds are definitely helpful, they won't cover all of the construction needs of Pennsylvania's roads and bridges. These combined factors may significantly impact future freight and passenger rail investments.

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Photo: BPRR

6 Coordination and Outreach

This chapter describes the efforts made to obtain rail stakeholder and public input into the development of this *2020 Pennsylvania State Rail Plan* (2020 SRP). At the outset of this planning process, PennDOT made a major commitment to wide-ranging stakeholder and public involvement that informed all aspects of its SRP.

Rail stakeholders are those agencies, enterprises, or persons who have a vested interest in the operation and performance of the commonwealth's rail system. These include the railroads, rail shippers, rail passengers and their advocates, planning partners in Metropolitan Planning Organizations and Rural Planning Organizations (MPOs and RPOs), economic development and business interests, state agencies and local governments, transit agencies, and transportation planners in neighboring states.

Outreach to these stakeholders and the public informed all areas of this plan. Stakeholder and public comments served to validate the Pennsylvania state rail plan vision and its supporting goals and objectives, helped to identify rail needs and potential

improvement projects, and served to clarify rail policies and passenger rail service objectives providing for improved rail service in the future.

6.1 Approach to Public and Agency Coordination

A wide spectrum of channels was used to obtain stakeholder and public input to shape this SRP. The principal channels are described below.

6.1.1 Plan the Keystone Website

To provide an easy way for the public and rail stakeholders to stay abreast of the development of the 2020 SRP, the "Pennsylvania State Rail Plan" section of the Plan the Keystone website (www.planthekeystone.com) (PennDOT, 2020 b) has been updated periodically throughout the planning process. The webpage provides overview of the planning process including stakeholder and public outreach activities, public meeting presentations, plan information, and during the comment period on the Draft SRP offered a link to the public comment form. All communications to the public, elected officials and rail stakeholders provided the website link and communicated that the SRP's website was the centralized location to go to for plan information. The Draft SRP document was posted and made available for a 30-day public comment period that began on November 2, 2020 and ended on December 2, 2020. Additionally, the website was the primary mechanism by which public comment could be provided on the Draft SRP through the provision of an online comment form. Data on website usage indicated that over 3,000 hits were registered to the webpage for the comment period on the Draft SRP. This is significant volume increase from typical website activity that ranges in the low hundreds. The Final SRP will be posted on this website.

6.1.2 Stakeholder, Agency, and Public Engagement

As part of the effort to engage stakeholders and agencies, all passenger and freight railroads in Pennsylvania were solicited for information on their systems, as well as on their planned improvements and needs. In addition, MPOs and RPOs as well as local and state government agencies, rail advocacy groups, and business and economic development interests were engaged as stakeholders in the planning process. The public engagement process included an elected official virtual briefing and two statewide virtual public meetings that were held following the issuance of the Draft SRP, during the comment period in the fall of 2020. Also, an online comment form was available during the Draft SRP comment period via the website that provided a means for the public to offer comment on the plan document and their views as to rail

infrastructure, operational needs, and rail-related opportunities that could improve both transportation and economic development in Pennsylvania.

6.2 Coordination with Neighboring States

Pennsylvania is at the nexus of east-west and north-south freight rail and passenger rail services. Because these rail services connect to the states of Ohio, West Virginia, Maryland, New Jersey, Delaware, and New York, PennDOT rail planners interact with their counterparts in the other state DOTs and state rail authorities to share perspectives on service and infrastructure issues. On account of these shared interests, input from neighboring states was sought for this SRP update. The process by which neighboring states were engaged and the issues that the states reported are captured in the sections that follow.

6.3 Coordination with Stakeholders and the General Public

This section describes how the outreach to the diverse group of stakeholders and to the public was conducted. Outreach began with the inception of the SRP update in the fall of 2019 and continued through the Draft SRP released for public comment in the fall of 2020 and finalization in Winter 2021. See Appendix I for the materials presented and feedback received during the stakeholder and public engagement activities.

6.3.1 Major Stakeholder Meeting

A virtual Major Stakeholder Meeting was held April 16, 2020. Although initially scheduled as a half-day, in-person meeting for March 2020, the Major Stakeholder Meeting was rescheduled and held as a virtual meeting in response to the COVID-19 pandemic. At the meeting, PennDOT rail planners and their consultants gave a presentation on the purpose of the *Pennsylvania State Rail Plan*, existing conditions for passenger and freight rail, and the plan's draft vision, along with its supporting draft goals and objectives. PennDOT solicited comments from the attending stakeholders as to what the 2020 SRP should try to accomplish and collected stakeholder thoughts regarding the plan's draft vision, goals, and objectives. The meeting included a question and answer session via the online meeting's chat function. Meeting attendees included representatives from freight railroads, Amtrak, commuter rail service providers, MPOs

and RPOs, and local and state government agencies, among others. Over 80 attendees participated in the meeting.

6.3.2 Major Stakeholder Online Survey

Another opportunity by which stakeholder input into the *Pennsylvania State Rail Plan* was gathered was through the development and implementation of an online Major Stakeholder Survey. A specific URL was obtained and registered for access to the survey: www.PAStateRailPlan.com.

The survey went live on March 6, 2020 and remained available until close of business on May 15, 2020. PennDOT rail planners advised major stakeholders via email communications of the availability of the online survey on March 6 and continued to send reminders periodically via email to encourage participation. Additionally, the availability of the survey and its URL were communicated on slides presented at the April Major Stakeholders Meeting and during the meeting dialogue. A total of 243 stakeholders completed the survey.

6.3.3 Virtual Public Meetings and Elected Officials Briefing

Two virtual public meetings and a virtual elected official briefing on the Draft 2020 SRP were held in fall of 2020 during the public comment period on the plan. PennDOT announced the meetings through a press release, advertisements in ten major city newspapers, social media posts, emails to elected officials, stakeholders and Planning Partners, and through information posted to the Plan the Keystone website (www.planthekeystone.com) (PennDOT, 2020 b). At the virtual meetings, PennDOT rail planners and their consultants gave a presentation on the key aspects of the Draft 2020 SRP. Over 230 people attended one of the virtual meetings held on the Draft 2020 SRP. The virtual meetings included a question and answer session via the online meeting's chat function. PennDOT also solicited comments on the draft plan at the virtual meetings.

6.3.4 Online Comment Form

In order to seek input and feedback from a broad cross-section of the public, an online comment form was developed and offered on the website during the comment period on the Draft 2020 SRP. PennDOT announced the online comment form and the draft plan's comment period through a press release and a communications campaign using both traditional media as well as social media. The online comment form was accessed through a link on the Plan the Keystone website. The comment form was available throughout the duration of the comment period on the draft plan. A total of 370 comments were gathered via the online comment form. Additionally, six (6) comments

were received at PennDOT via email. PennDOT acknowledged all comments received during the public comment period and provided responses. Substantive comments were incorporated into the Final 2020 SRP and its analysis.

6.3.5 Railroad Outreach

6.3.5.1 Freight Railroads

The freight railroads outreach was conducted in two phases.

Initial outreach was conducted over 6 months (April to September) in 2018 through the Phase I of the SRP development. This effort focused on rail and its impacts on the economy. PennDOT's Bureau of Rail, Freight, Ports and Waterways sent 20 invitations to freight railroad owners and operators that represent 31 railroads to participate in the outreach process. These 31 railroads represent a mix of Class I, II, and III railroads that operate throughout the commonwealth. The invitations asked potential participants to identify capital rail improvements that would promote economic development, increase rail freight capacity, and improve operations.

The outreach invitation requested follow-up telephone conferences for individual interviews to discuss potential freight rail projects/improvements that affect the individual railroads and/or focus on promoting business expansion. This outreach identified the following potential freight rail projects/improvements:

- New rail sidings, tracks, restoration of out-of-service routes/abandoned rail links
- New or restored track connections between rail lines/rail carriers
- New or expanded rail, rail/ruck transfer and/or intermodal terminals
- Replacement of structures that restrict rail traffic flow by weight or clearances

Respondents were asked to indicate whether an on-site visit could be conducted to review the potential project(s) or further discuss potential opportunities.

Twenty-eight railroads proposed 70 potential freight rail projects, improvements, or opportunities ranging from industrial access/development to additional/expanded sides or interchange tracks. The projects presented by the railroads ranged from those with an immediate or near-term need for construction to those with a longer-term need or potential.

The second phase of freight railroad outreach was conducted over 4 months (March-June) in 2020. A list of projects including Phase I projects, as well as the projects identified in the 2015 *Pennsylvania State Rail Plan,* were sent out to all railroad carriers in the commonwealth to be reviewed and updated directly by the railroads. The

railroads were asked to identify projects that had been completed, removed, or had changed, and to add any new projects anticipated through 2045. Twenty-five railroads responded with updated project lists. Additionally, input on projects was collected from the MPO/RPO Planning Partners. Projects from the 2015 plan were not carried over to the 2020 plan unless the railroads indicated otherwise.

Projects resulting from the second phase of the outreach were classified into the following seven improvement types:

- Accelerated maintenance: State of good repair (SOGR) projects for both track and civil works
- Civil work improvements: Bridge and tunnel related operations and capacity
- Track improvements: Track-related operations and capacity
- Terminal improvement: Intermodal, transload, and yard facility
- Rolling stock improvements: Locomotive emissions reduction efforts and freight car rehabilitation
- Providing access to existing or new customers: For example, new connections to new or existing commercial and industrial developments, and intermodal and transload facilities
- At-grade crossing rehabilitation/improvement: Track and crossing signal systems replacements and upgrades

6.3.5.2 Passenger Railroads

Likewise, managers from Amtrak and SEPTA Regional Rail were interviewed for their perspectives as the intercity carrier and commuter service operators in Pennsylvania. Also, various reports on Amtrak and SEPTA operations and capital plans were reviewed.

6.3.6 Freight Shipper Outreach

Freight shipper engagement was conducted over 6 months (April to September) in 2018 as part of the Phase I of the update of the 2020 SRP. The engagement with shippers (i.e., rail freight customers) examined barriers to using rail, potential project types that will improve rail use/business, and potential actions the commonwealth can take to make businesses more successful. A list of 25 shippers was developed for targeted outreach based on the following criteria:

- Previous participation in the RFAP and/or the RTAP between 2016 and 2017
- Size of the business

- Geographic location across the commonwealth

PennDOT's Bureau of Rail, Freight, Ports and Waterways sent 25 invitations to shippers to participate in the outreach process. The invitations included a survey that asked about their use of rail to ship freight in the commonwealth. Shippers had the option to fill out the survey and/or opt for a phone interview, with an additional option to elect for additional engagement throughout the upcoming months of the study.

The objective of the survey was to identify issues that impact rail freight shipping, thus revealing potential needs from their perspective. The questions in the survey centered around two major perspectives related to rail freight:

- Business: Location, infrastructure/administrative barriers, logistics, and labor
- Economic development: Industry changes, commodity flow, and potential infrastructure investments

The survey also asked about shippers' relationship with rail and trucking providers, their perspective on doing/expanding business within the commonwealth, and their suggestions on rail-related projects that could make their business more successful. Of the 25 shippers contacted, 7 provided completed surveys. Key findings and common themes identified from the engagement are as follows:

- Additional infrastructure: A need for new capital projects/improvements that increase operational capacity and throughput of the rail freight lines (e.g., new track, scales, siding)
- Bridge weight: A need to address inadequacies in bridge weight capacity and design
- Communication / relationship: A need to simplify and strengthen business ties between shippers and railroads to increase service reliability and/or rail use within the commonwealth
- Cost: The use of rail freight to move goods is cost prohibitive compared to other modes
- General rehabilitation: Need for investments to help maintain and revitalize current rail lines
- Inbound shipping: Inbound shipments are greater than outbound shipments via rail

6.3.7 Port Outreach

Pennsylvania ports include PhilaPort, Port of Erie, and Port of Pittsburgh. All three ports were engaged via email and telephone in April 2020 to request input on the ports' existing operations, future development plans, and rail access needs and opportunities.

Input from Port of Erie and PhilaPort was incorporated into the ports' description and inventory section of Chapter 2. Additionally, Port of Pittsburgh and PhilaPort provided input on improvements and projects that are incorporated into the RSIP in Chapter 5.

6.3.8 Economic Development Outreach

Stakeholder engagement occurred over 6 months (April to September) in 2018 and included outreach with commonwealth agencies and regional/local economic development organizations that specialize in encouraging economic competitiveness throughout Pennsylvania. The purpose of the economic development engagement was to identify industry sectors requiring rail freight transportation services, specific investment locations, and/or projects with rail freight linkages, and barriers to completing rail infrastructure projects/improvements.

Economic development outreach was conducted in two phases. Initial outreach was conducted through Pennsylvania DCED's 10 PREP regions. Each PREP region coordinates with economic development organizations, workforce development groups, transportation providers, and planning agencies across Pennsylvania. The following questions were then asked of participants:

1. What rail freight projects/improvements would improve the economy in your region?
2. Which industry cluster(s) would be impacted?
3. For each project/improvement:
    a. Where (county, municipality, site)
    b. Description of improvement(s), railroad owner/operator
    c. Potential economic benefits (local/regional/state/national)
        i. Job creation and retention
        ii. Investment
        iii. Quality of life
        iv. Other
4. What are the barriers to completing rail infrastructure projects/improvements? Please describe any political, legal, environmental, workforce, technology, transportation, or other barriers.

Responses were received until the end of May 2018, and a total of 30 potential projects/improvements were identified. The second phase of this outreach was

conducted with county economic development organizations from June through September 2018, yielding an additional 27 potential projects.

Through this outreach effort, several factors emerged that should frame funding and capital investment strategies targeting rail freight infrastructure:

- Fifty-seven potential rail projects and improvements were identified by economic development organizations (only 33 of which are reflected in the project list due to redundancies, changes in development, etc.).
- Two-hundred-and-six rail-served sites were identified for future economic development, and 14 retired coal-fired power plant facilities were identified. Each of these locations requires further outreach and assessment to identify potential environmental and infrastructure barriers.

6.3.9 Outreach to Neighboring States

State rail planners from Ohio, West Virginia, Maryland, New Jersey, Delaware, and New York were contacted via email to be interviewed via conference call in May and June of 2020 with regard to rail service they share with Pennsylvania. An interview guide was developed for PennDOT's use in the outreach. At the request of some state rail planners, the interview guide was re-arranged to work as a questionnaire that could be emailed and completed prior to the interview. The interview goals were to obtain a clear understanding of bi-state rail transportation needs, challenges, and opportunities as perceived by adjacent state rail planners. Interviews were conducted or completed questionnaires were received from New York, Maryland, and New Jersey.

6.4 Issues Raised During the Planning Process

This section discusses the comments received from the diverse stakeholder groups and the public about issues, concerns, and aspirations relative to Pennsylvania's rail system. See Appendix I for details on the feedback received from stakeholders and the public.

6.4.1 Comments from Freight Railroads

Twenty-eight railroads in the Phase I outreach and 25 railroads in the Phase II outreach proposed freight rail projects, improvements, or opportunities ranging from industrial access/development to additional/expanded sides or interchange tracks. Based on the railroads' responses the following potential improvements and needs were identified:

- Additional / Expanded Sidings or Interchange Tracks: Construction of new sidings, extension of existing sidings, or improvements to the interchange tracks between railroads that will improve railroad interchange operations
- Bridge Replacement/Upgrades: Replacement of old railroad bridges or extensive repairs/strengthening to allow for 286k maximum gross weight of rail cars
- Industrial Access / Development: Providing new or restored rail access to industrial sites, including the creation of industrial development sites within existing rail access
- Transload Terminal: Development of new transload terminals with rail (truck/river/air) or expansion of existing transload terminals with rail access
- Upgrade Existing Line: Construction of tracks on former rail roadbeds or the rehabilitation/replacement of existing tracks to allow for heavier loads (i.e., 286k maximum gross weight)
- Yard Reconfiguration/Expansion: Construction of new yard tracks, switches within yards, yard run-around tracks, or reconfiguration of existing yard tracks to allow for more storage and improve operations
- Rolling Stock Improvements: These include locomotive emissions reduction efforts and freight car rehabilitation

More detail on freight railroad needs appear in Chapter 2 and Chapter 4.

6.4.2 Comments from Amtrak

Amtrak management stressed the need for increasing on-time performance and increasing customer satisfaction, through both phone conversations and official planning documents. These improvements are to be accomplished through investments in both Amtrak trains and infrastructure, primarily on the Northeast Corridor and Keystone Corridor, particularly through long-term plans such as CONNECT NEC 2035 and Next-Generation; improvements will focus on replacing the Acela high-speed trains. More detail on Amtrak needs appears in Chapter 2 and Chapter 3.

6.4.3 Comments from SEPTA

Through email exchanges and referring to key SEPTA planning documents, SEPTA management cited the need for meeting several service objectives, including increasing station accessibility and station amenities particularly focused on ADA accessibility, maintaining performance from a span of service, frequency, and on-time performance perspective, and providing adequate seating for riders. More detail on SEPTA needs appears in Chapter 2 and Chapter 3.

6.4.4 Comments from Major Stakeholder Online Survey

In all, 243 individuals submitted responses to the major stakeholders' online survey conducted as part of the State Rail Plan. Responses came from all regions of the commonwealth, but half (126) of the responses were in the Southwestern Pennsylvania/Pittsburgh metro area (by zip code) and 60% of the respondents classified themselves as private citizens.

Key findings were obtained from the survey regarding the importance of and use of Amtrak, SEPTA and freight rail as well as overall priorities for rail investment and feedback on the plan's vision statement and supporting goals.

Most respondents (71%) indicated passenger rail is very important, and 83% of respondents indicated improvement or expansion of passenger rail is very important. More than half of respondents (56%) said that they lived within 30 minutes of an Amtrak station. The top three most important aspects of Amtrak passenger rail service, by an overwhelming majority, were: quality of service, frequency of service, and affordable fares. Of the 243 respondents, 175 of them (72%) cited choosing Amtrak passenger rail in order to avoid driving. The next top two reasons why respondents choose to use Amtrak were on-train productivity/comfort and to save time. Multiple "other" responses cited environmental benefits of rail instead of driving contribute to their choice. Most respondents would choose to emphasize expanding existing Amtrak passenger rail service (87%); however, all selections were close in ranking when respondents were asked to choose an aspect of Amtrak service that should be emphasized in the 2020 *Pennsylvania State Rail Plan*.

The majority of respondents (67%) do not use SEPTA's commuter rail service. Of those that do, "leisure trips" was the top response for why they use SEPTA. It is important to note that most respondents to the survey did not provide a Zip Code for the Philadelphia metro area; therefore, the majority of respondents are not located within SEPTA's service area for commuting. The most important aspects of SEPTA's commuter rail service to respondents were frequency of service and to avoid congestion and delays. The most popular response for primary utilization of SEPTA's commuter rail service was to avoid driving. The second choice was to save time. Expanding existing commuter rail service was the most frequent choice when asked how SEPTA's commuter rail service should be emphasized in the 2020 *Pennsylvania State Rail Plan* (selected by 50% of respondents). However, many respondents did not express an opinion (42%).

Freight rail service was very important to 62% of respondents. The majority of respondents (56%) were very interested in the expansion of freight rail service in Pennsylvania. The top three important areas for improving freight rail transportation

were: to reduce highway congestion, truck traffic diversions from highway to rail, and enhanced economic development.

When asked where the commonwealth should focus on rail investment, there were more responses in favor of passenger rail than freight rail improvements or other areas of improvement, with the top cited areas being new passenger service (74%) and existing passenger service improvements (66%). There were over 100 specific projects/recommendations from survey participants, and more than 60 different comments were provided. While stakeholders also had some constructive feedback on the vision statement and goals, they were largely in favor of the proposed vision statement and goals (having no additional feedback or offering positive feedback). Furthermore, the specific project recommendations from the survey were taken into consideration. Some, such as ADA accessibility and interlocking improvements on the passenger rail network, are included in the list of rail improvements (see Chapter 3). However, many of the projects require further definition and detail prior to their consideration for inclusion in the RSIP.

6.4.5 Comments from the Major Stakeholder Meeting

Over 80 stakeholders attended this virtual meeting held in April 2020. Stakeholders included representatives from freight railroads, Amtrak, commuter rail service providers like SEPTA and NJ Transit, representatives from MPOs and RPOs, and local and state government agencies, among others.

Stakeholders were primarily concerned about three broad topics:

- Ensuring that communications were occurring between the 2020 *Pennsylvania State Rail Plan* team with other standing organizations supported by PennDOT, such as the Freight Work Group, that cross-sharing of rail project information with MPOs/RPOs would occur, and that information from recent rail studies would be incorporated into the *Pennsylvania State Rail Plan*.
- Suggesting the use of clarifying language noting that closed or grade-separated crossings offer the greatest level of safety and that future rail projects investigate potential impacts to bicycle / pedestrian mobility.
- Regarding environmental goals and objectives, consider adding the assessment of effects of projects on a community's physical environment and also adding measures or strategies to reduce the carbon footprint of rail operations.

6.4.6 Comments from the Public Meetings

One round of two statewide virtual public meetings were held in November 2020 during the public comment period of the Draft *Pennsylvania State Rail Plan*. A total of 370 comments were gathered via the online comment form offered on the plan's website. Additionally, six (6) comments were received at PennDOT via email. PennDOT acknowledged all comments received during the public comment period and provided responses. Substantive comments were incorporated into the Final 2020 SRP and its analysis. The following summarizes comments received:

- Passenger rail service expansion including broad general statements regarding expanded passenger rail service in the Pennsylvania without reference to a specific location or geographic area; service between Reading and Philadelphia; service west of Harrisburg including greater connectivity between Pittsburgh and its suburbs; increased passenger rail connectivity to Philadelphia; restoration of passenger rail service to Scranton and northeast Pennsylvania; passenger rail connections to the Lehigh Valley of Pennsylvania both within Pennsylvania and to neighboring states of New York and New Jersey; extending the existing SEPTA Regional Rail line service from Norristown to Phoenixville, Royersford, and Pottstown; general statements for expanded SEPTA Regional Rail service; reestablishing service on SEPTA's Media-Elwyn Regional Rail line to West Chester Borough; and alternate passenger rail routes over the Delaware River between Philadelphia and New Jersey.
- Corrective information on planned freight rail projects.
- Expanded freight and passenger rail service related comments including general comments for expanded rail without reference to a specific location or geographic area; general comments on expanded rail service to Philadelphia but without specifying a project or other terminal service point; Lehigh Valley rail service for increased freight and passenger rail connectivity to/from the Lehigh Valley; suggestions for passenger rail projects to be advanced and suggestions for passenger and freight rail spending policies; and comments regarding need for expanded passenger service and recognition of limited freight capacity.
- Comments from Planning Partners on project status, analysis data used and corrective information.
- General comments in support of the Draft *Pennsylvania State Rail Plan.*

6.4.7 Comments from Neighboring States

As noted in Section 6.2, neighboring states were engaged during the preparation of this state rail plan, and feedback was obtained from New York, Maryland, and New Jersey. The following summarizes the comments received and how they were incorporated into the 2020 *Pennsylvania State Rail Plan*, if applicable:

- Consider a role in either the vision, goals, or objectives for emerging technologies. While emerging technologies are not specifically mentioned, technological advances will likely aid in achieving all aspects of the vision, goals, and objectives.
- All agreed that resiliency is an important component for rail and should be included in the vision and goals of the *Pennsylvania State Rail Plan*. As stated in Section 5.1, the vision includes resiliency.
- All stated that the density of Pennsylvania's freight rail network along with the highest number of short lines in the nation is a great strength of the Pennsylvania freight rail system.
- A key weakness noted by New Jersey is the Delair Bridge over the Delaware River, a bridge that connects southern New Jersey with the Greater Philadelphia area and is the only freight rail access between these two points. It is currently used by Conrail as well as NJ Transit's Atlantic City Rail Line for passenger rail service. The critical need is that the bridge infrastructure is aged. It is a double-track vertical lift span bridge with mechanical problems occurring with the bridge openings/closings. Often these problems cause delays to trains. Additionally, the approach spans are not rated for 286k loads. Strengthening infrastructure to allow for larger, heavier loads would increase rail productivity. The freight program described in Section 5.4.2 includes projects whereby the main goal is the efficient handling of modern 286k railcars.
- Both New Jersey and New York thought that Pennsylvania's key travel corridors are served well by passenger rail; however, a weakness is seen to exist in northeastern Pennsylvania. Addressing this will require significant funding and commitment from more than just the commonwealth of Pennsylvania.
- All asserted that there is a need to be able to leverage federal funding for cooperative efforts across multiple states to address rail improvements of regional significance that would benefit interstate travel and multi-state economic development.

Comments on the Draft *Pennsylvania State Rail Plan* that may be received from neighboring states following the issuance of the Draft *Pennsylvania State Rail Plan* will appear here in this section of the plan.

6.5 Recommendations from Stakeholders and the Public

Comments received during the Major Stakeholder Meeting helped update the 2020 *Pennsylvania State Rail Plan* vision and its supporting goals and objectives. Comments from railroads and MPOs/RPOs helped to identify projects now listed in the Rail Service and Investment Program. Substantive comments received from the public, elected officials, stakeholders and Planning Partners from the virtual meetings and during the public comment period on the Draft *Pennsylvania State Rail Plan* helped to update information contained in Chapters 1 through 5. See Appendix I for the stakeholder and public comments received and PennDOT's responses.

6.6 Coordination with Other Transportation Planning Programs

As described previously, the PennDOT Multimodal Transportation Deputate is responsible for rail-related planning and project funding assistance for freight, passenger and commuter rail operations within the commonwealth—efforts that include the development of this *Pennsylvania State Rail Plan*.

Numerous offices within PennDOT were involved and consulted in the preparation of this state rail plan, including the bureaus responsible for local and public transportation, ports and waterways, aviation and airports, and planning. Additionally, input was sought from other Pennsylvania state agencies, such as the Public Utility Commission, Department of Community and Economic Development, Department of Environmental Protection, State Historic Preservation Office, and the Department of Conservation and Natural Resources as well as MPO/RPO Planning Partners.

Information was shared among these agencies and organizations, primarily through the Plan the Keystone website, Major Stakeholder Meeting, Major Stakeholder Survey, and the Draft *Pennsylvania State Rail Plan* public comment period, as described above. In this way, state rail planning is coordinated with other transportation planning programs and activities in the commonwealth.

Likewise, this coordination is reciprocal regarding the preparation of the other transportation plans in the commonwealth, including the following:

- Transportation Improvement Programs (TIPs), which are adopted at the regional level by the MPOs and RPOs

- The *Statewide Transportation Improvement Program*, which is a combination of the regional TIPs (PennDOT, 2018 b)
- The State Transportation Commission's *2019 Twelve Year Program* (STC, 2019a), which is a multimodal, fiscally constrained program of transportation improvements spanning a 12-year period for the entire commonwealth
- Regional long-range transportation plans developed by the MPOs and RPOs
- The *Statewide Long-Range Transportation Plan and Comprehensive Freight Management Plan* developed by PennDOT (PennDOT, 2016 a)