



## PA On Track

PA'S LONG RANGE TRANSPORTATION & COMPREHENSIVE FREIGHT MOVEMENT PLAN

# COMPREHENSIVE FREIGHT MOVEMENT PLAN EXECUTIVE SUMMARY



*"Helping businesses move goods from one place  
to another is an integral function of PennDOT."*

-- Leslie S. Richards, PennDOT Secretary of Transportation





# Comprehensive Freight Movement Plan

## Executive Summary

Pennsylvania's multimodal transportation system carries approximately **\$1.6 trillion of goods into, within, out of, and through the state annually**. It carries 7.5 percent of the goods and materials produced, used, or exported by the entire country. Pennsylvania is truly the Keystone State for freight—linking its freight transportation system to consumers across the state, across the country, and throughout the world is critical, both for bringing materials and components to companies that create the final product and for transporting finished goods.

Freight transportation represents a key competitiveness factor for Pennsylvania's businesses. Companies do not compete only on product quality and cost. The transportation networks that serve and support businesses must provide reliable connections to local, regional, and global customers, as well as efficient access to markets, thereby ensuring dependable, cost-efficient, and timely deliveries of goods.

Recognizing the importance of maintaining and enhancing an efficient freight transportation system, *Moving Ahead for Progress in the 21st Century Act* (MAP-21) established a policy to improve the condition and performance of the national freight network. The policy provides a foundation for the U.S. to compete in the global economy and achieve goals related to economic competitiveness and efficiency; congestion; productivity; safety, security, and resilience of freight movement; infrastructure condition; use of advanced technology; performance, innovation, competition, and accountability in the operation and maintenance of the freight network; and environmental impacts. MAP-21 also recommended that states complete a freight plan.

The CFMP is intended to:

- Identify strategies, policies, and locations to improve freight access, interconnectivity, and mobility on Pennsylvania's multimodal transportation system, with the goal of improving its competitive position by attracting, retaining, and expanding industries and jobs
- Help guide the state's investment decisions regarding the infrastructure that supports freight movements

The CFMP was developed in parallel with the 2040 Long Range Transportation Plan (PA on Track). The planning processes emphasized the early, active, and ongoing engagement of stakeholders, metropolitan planning organizations, rural planning organizations, PennDOT district offices and modal bureaus, other state agencies and departments, and PennDOT leadership in:

- Defining the vision, goals, objectives, and performance measures
- Identifying and evaluating the current and future conditions of Pennsylvania's multimodal transportation system
- Identifying future trends and needs and the impacts they have on the transportation system
- Developing a prioritization process, projects, strategies, and policies that may be adopted to improve the transportation system to meet Pennsylvania's defined plan direction

# PENNSYLVANIA FREIGHT BY THE NUMBERS

**5<sup>TH</sup>** Pennsylvania has the fifth-largest highway system in the U.S. with 39,787 centerline miles of roadway. The state's interstates comprise 4.6 percent of the state highway miles, but carry 31.5 percent of the system's traffic.

**LARGEST HIGHWAY SYSTEM IN THE U.S.**



**5<sup>TH</sup>** Pennsylvania has four Class I freight railroads operating on 5,095 miles of track and approximately 3,507 rail-highway crossings in the state. While Class I railroads account for 26 percent of Pennsylvania's total rail miles, they carry approximately 90 percent of rail freight volume.

**LARGEST RAILROAD NETWORK IN THE U.S.**

**3<sup>RD</sup>** LARGEST NUMBER OF BRIDGES IN THE U.S.

With over 25,000 state-owned bridges, Pennsylvania has the third-largest number of bridges in the nation. The average bridge age is 55 years. Pennsylvania has reduced its structurally deficient bridges to the lowest level since 1998, but 15.8 percent remain structurally deficient. The state continues to address bridge conditions with new funding and initiatives, such as the Accelerated Bridge Program and the Rapid Bridge Replacement project.

**28<sup>TH</sup>** IN THE MILEAGE OF INLAND WATERWAYS IN THE U.S.

Pennsylvania has 260 miles of inland waterways, with 151 terminals along the Allegheny, Monongahela, and Ohio rivers.

**1<sup>ST</sup>** Pennsylvania leads the nation in the number of Class III railroads with 34 local railroads and 26 switching or terminal railroads.

**IN NUMBER OF CLASS III RAILROADS**



**LOCKS AND DAMS ARE OVER 50 YEARS OLD**

Two of the three sets of locks and dams on the Ohio River are in very poor condition, two of six sets of locks and dams on the Monongahela River are in poor condition, and six of eight sets of locks and dams on the Allegheny River are either in very poor or poor condition.

**2** OF THE TOP 100 CARGO AIRPORTS IN THE U.S.

Pennsylvania is home to two of the top 100 cargo airports in the U.S. in terms of total tonnage in 2013: Philadelphia (#18) and Pittsburgh (#56). There are 131 public-use aviation facilities in Pennsylvania, which accommodate close to 5,000 based aircraft and handle more than 2 million general aviation aircraft takeoffs and landings.

**11<sup>TH</sup>** IN PORT CARGO TONNAGE HANDLED

Based on 2011 data from the USACE Waterborne Commerce Statistics Center, 87 million tons of foreign and domestic freight were moved by water (inbound, outbound, or within) at a total estimated value of \$58 billion. Approximately 32.6 million tons were foreign trade, virtually all of which came through the Port of Philadelphia.

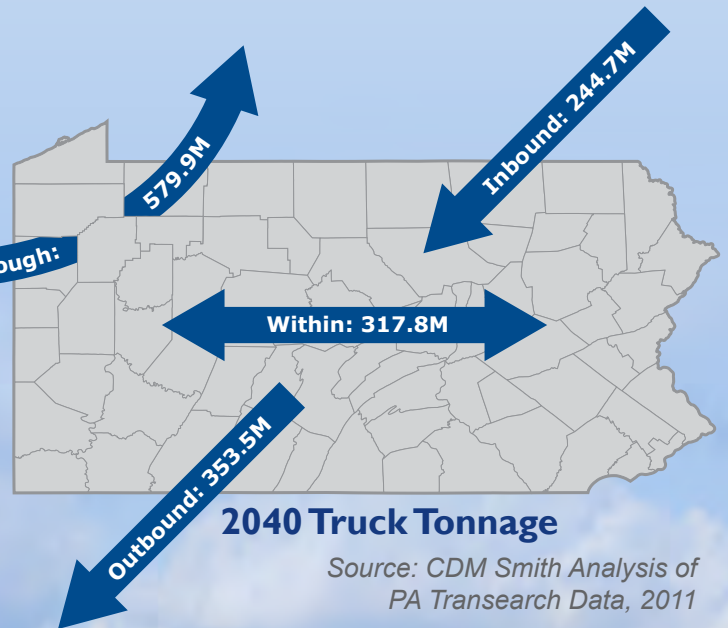
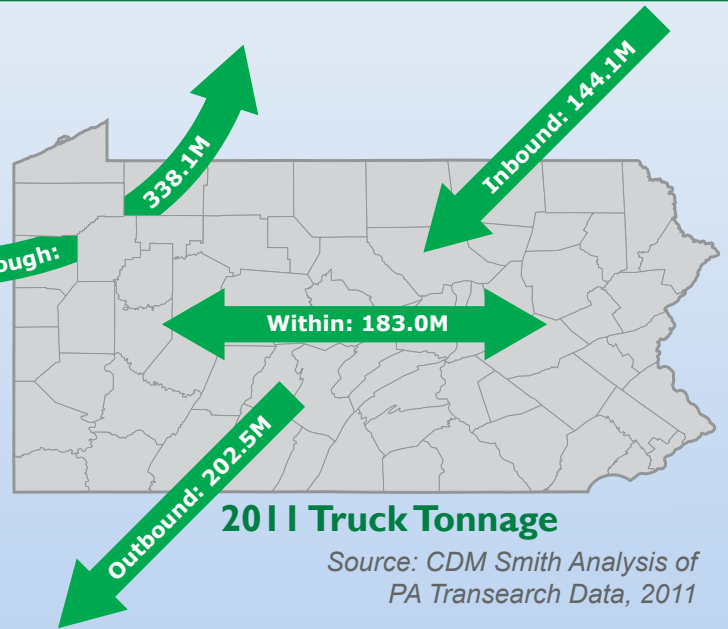
Pennsylvania has three major port regions/districts: Delaware River Ports have 24 terminals and 20 facilities; Pittsburgh Port District has 125 terminals along the Allegheny, Monongahela, and Ohio Rivers; and the Port of Erie has two terminals.

Pennsylvania's economy was originally built on agriculture, coal, and steel and continues to evolve. Our transportation infrastructure needs to be responsive to ongoing changes in the state's economy and how goods need to move across the system. Efficient, reliable, and safe freight transportation is critical to Pennsylvania's economic prosperity. An efficient multimodal and intermodal transportation system reduces transportation and supply chain transaction costs and increases connectivity, reliability, and accessibility to local, regional, and global markets. An efficient freight transportation system supports economic development and fosters the expansion of trade, increases employment and personal income, and improves the quality of life for the people of Pennsylvania.

## TRUCKING

Today, trucks carry millions of tons of commodities into, out of, through, and within Pennsylvania. Analyzing the data indicates that 61 percent of all truck movements across the state's transportation network are contributing to Pennsylvania's economy, as opposed to the 39 percent just passing through.

The top 100 most severe truck bottlenecks, based on a comparison of truck speeds on each segment over the course of the year 2013, are located on major interstates in Philadelphia, Pittsburgh, Harrisburg, and Allentown.



**GROUND FORCE**

Pennsylvania's highway network is the most important element to freight transportation in the Commonwealth.

**76%** by weight

**82%** by value

Approximate percentages of freight traveling into, out of, within and through PA that move

**BY TRUCK**

Source: CDM Smith Analysis of PA TRANSEARCH Data 2011



# RAIL

Pennsylvania is a national leader in the number of freight rail operators. The state is served by four privately owned Class I railroads: Canadian National Railroad, Canadian Pacific Railroad, CSX Transportation, and Norfolk Southern. These railroads function as line-haul carriers, in that they predominantly move freight long distances between terminals over high-density intercity rail lines. While Class I railroads account for 26 percent of the total rail miles in the state, they carry approximately 90 percent of the rail freight volume.

Pennsylvania has two privately owned Class II railroads: the Buffalo & Pittsburgh Railroad (BPRR) and the Wheeling and Lake Erie Railway.

Class III railroads are generally classified as either local railroads known as shortlines or switching or terminal railroads. Pennsylvania leads the nation in the number of Class III railroads, with 34 local railroads and 26 switching or terminal railroads.

## ECONOMIC ENGINE

Pennsylvania's rail freight industry contributes more than \$480 million in wages to the state economy annually.

**\$480** million



in annual wages

Source: American Community Survey



## AVIATION

Shipping freight by air is typically the quickest and most reliable. It is also the most costly transportation mode and is therefore reserved for highly perishable, time-sensitive, or particularly high-value commodities moving distances of at least several hundred miles. Air cargo plays a critical role in supporting Pennsylvania's emerging high-tech and biomedical industries. Connectivity between airports and truck routes is imperative. Trucks transfer these high-value, perishable products and materials to and from their sources of production and consumption to nearby airports.

Pennsylvania's continued investment in its aviation facilities, as well as surrounding highway and rail infrastructure, provides unique opportunities for the state's businesses to minimize transportation costs by leveraging the connectivity of these three modes.

## PORTS AND WATERWAYS

Moving freight by water is one of the lowest cost, most energy-efficient, and most environmentally friendly means of transport per ton. It is, however, typically the slowest and least time-reliable mode. Ports and marine terminals are gateways for waterborne cargo to be imported or exported, providing consumers with access to lower-cost goods and industries with access to raw materials and resources.

Pennsylvania's port terminals handle millions of tons of commodities. To maintain low-cost efficiencies, port and waterway investments will need to accommodate projected growth over the next 25 years.

### HIGH FLYING

Public-use airports contribute significantly to Pennsylvania's economy.



ALT

**300,000** jobs supported

**\$9.2 billion** generated annual payroll

**\$23.6 billion** produced economic activity

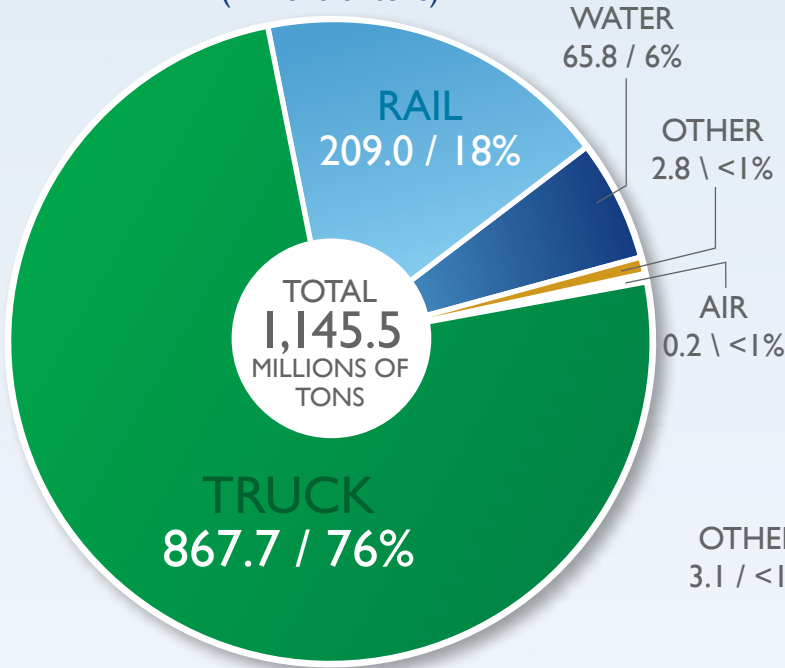
Source: Transportation Performance Report, 2013



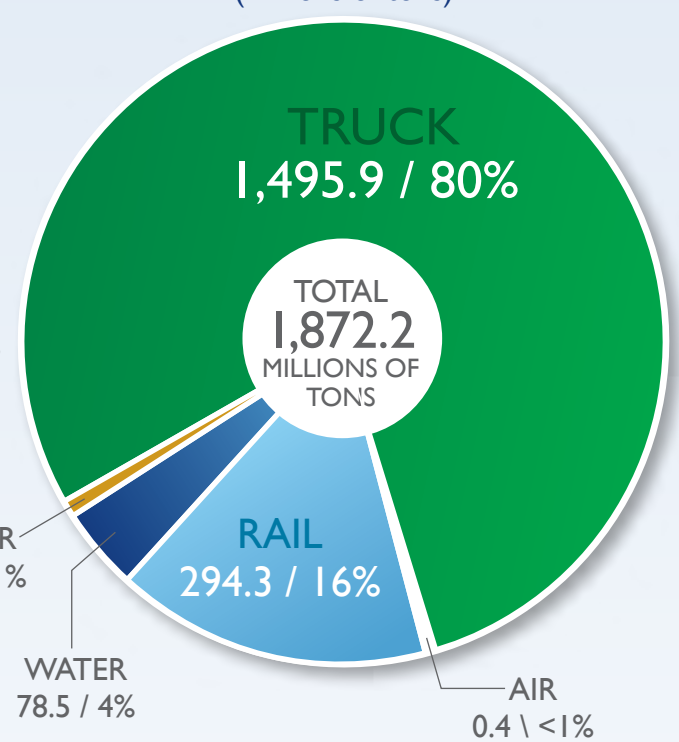
# FREIGHT TONNAGE AND VALUE IN PENNSYLVANIA

Trucks transport the largest share of Pennsylvania freight by weight and value, followed by rail. A combination of waterborne, air, and other freight comprise a minority of freight movements. By 2040, trucks are projected to transport an even larger share of the tonnage and value of Pennsylvania's freight.

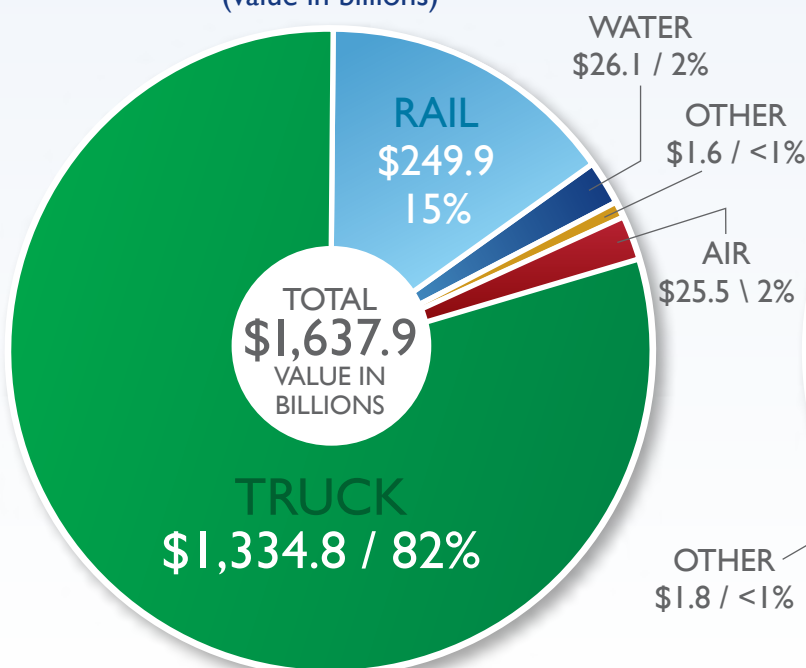
**2011 Freight Moved in Pennsylvania**  
(millions of tons)



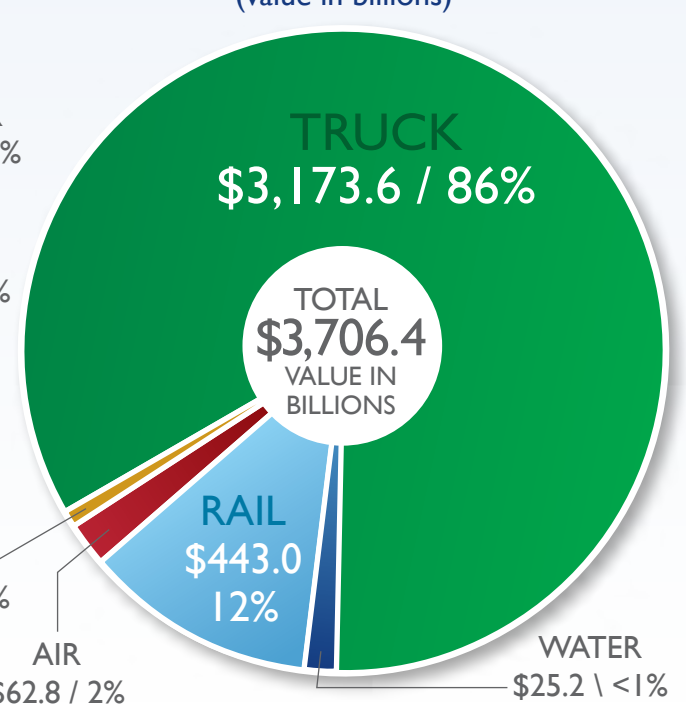
**2040 Freight Moved in Pennsylvania**  
(millions of tons)



**2011 Freight Moved in Pennsylvania**  
(value in billions)



**2040 Freight Moved in Pennsylvania**  
(value in billions)





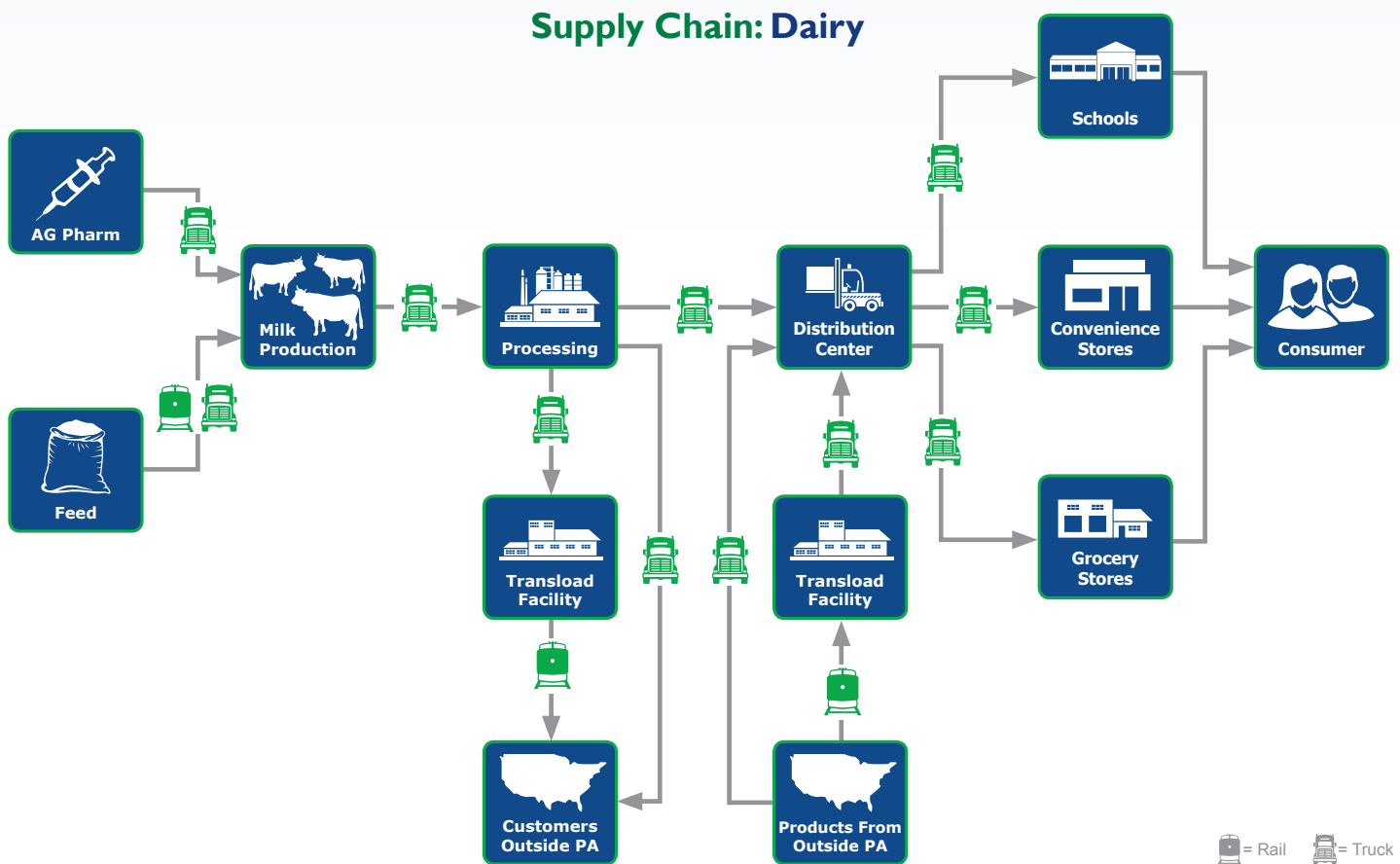
## FREIGHT TRENDS AND ISSUES

Understanding current and future trends and the issues influencing how businesses move its products is critical to maintaining and improving Pennsylvania’s freight transportation network, as well as ensuring it remains an asset to the citizens and supports the state’s economic competitiveness. The following are critical freight trends that impact Pennsylvania’s transportation system:

- Companies today depend more than ever on an integrated, agile, and efficient freight network.**  
 The transportation system must connect companies to customers in a growing number of global markets. Reliability, speed to market, and transportation costs impact their ability to compete. Eleven of the top 26 site selection criteria cited by companies planning to expand or relocate involve transportation; highway accessibility consistently ranks first or second.
- Demand for Pennsylvania agricultural and manufactured food products is increasing.**  
 Pennsylvania is a national leader in agriculture, producing a variety of crops and animal products, as

well as manufactured food products. Pennsylvania’s 2,300 food processing companies contribute \$32 billion to the state’s economy each year, making it fourth in the nation in value-added food production. Food product exports topped \$1.8 billion in 2011, and the local food movement is also a boon for the state’s growers.

- Dairy producers require resilient infrastructure and efficient highway connections to transport milk from farm to market.** Milk tankers make multiple pickups from dairy farms within their service areas. The weight of agricultural equipment is increasingly a concern in terms of axle ratios and equipment size, especially for many rural roadways and bridges. To accommodate these large weights, milk haulers carry special annual permits that allow them to operate trucks at 95,000 pounds. There are many variations in the regulations state to state, and Pennsylvania haulers moving milk into other states may be required to have additional oversize/overweight (OS/OW) permits.



Supply chains that move finished products, such as dairy products, from farm to market depend on modern infrastructure and a reliable transportation system.

- Pennsylvania is a global leader in life sciences.** The state ranks fourth in U.S. life sciences patents for new drugs and vaccines, diagnostic tools, and medical devices and was fourth in research funding from the National Institutes of Health in 2012.
- Weight limitations are an issue for the energy industry.** Pennsylvania is experiencing growth in OS/OW cargo volume, due in part to the increase in the wind turbine industry and cargo associated with natural gas extraction.
- Pennsylvania is a major player in energy production because of the Marcellus and Utica shale formations.** In 2010, the industry supported 140,000 jobs. By 2020 shale gas development could add 570,000 jobs in the state. However, shale gas development seriously impacts roads, bridges, and rail lines in the primarily rural counties where most of this activity occurs.

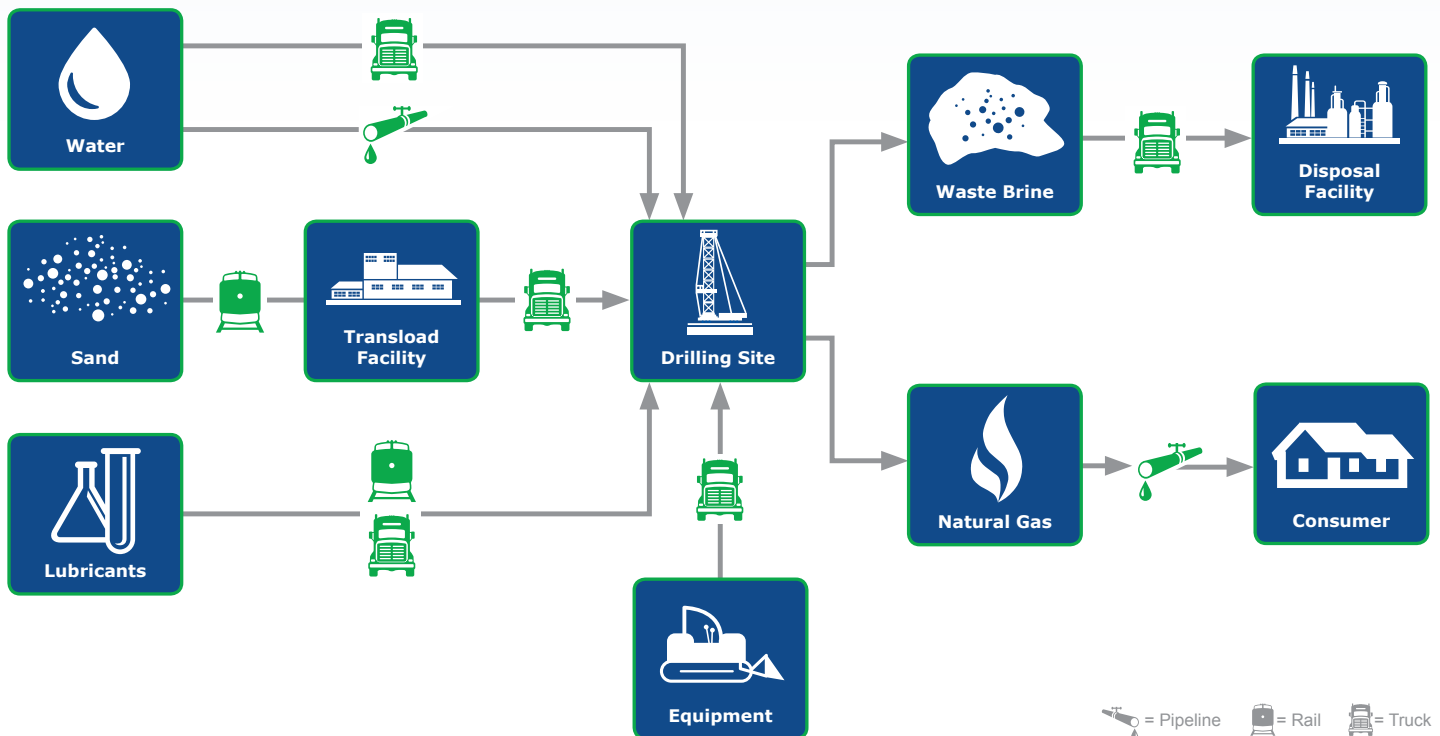
- Increased gas production has put heavy demands on local rural roads.** In many areas of the state, developers have taken on the task of building roads to a higher standard and maintaining them to support their operations. Municipalities have also entered into excess maintenance agreements with shippers to cover costs in excess of normal maintenance caused by use of oversize and overweight vehicles.

**DAMAGED GOODS?**

Respondents to a survey from the American Transportation Research Institute (ATRI) felt mobility in PA was impaired by poor road conditions and congestion.

**29%**  
believed PA was "much worse" than other states

**Supply Chain: Natural Gas**



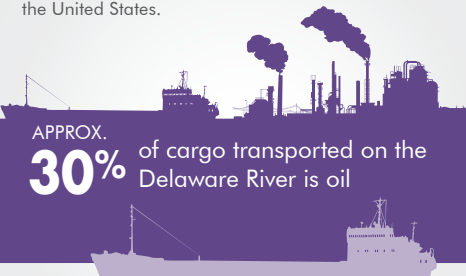
- Global trade will continue to play a significant role in the state's economy.** Demand for U.S. goods is projected to increase for key Pennsylvania industry sectors, including solid state semiconductors, industrial organic chemicals, and primary iron or steel products. Oil and gas exports—largely from Philadelphia refineries—increased 2,605 percent between 2008 and 2013. Nearly 90 percent of Pennsylvania exports in 2011 were from firms with fewer than 500 employees, and one quarter of export companies were located in rural counties.
- Manufacturing remains a major contributor to the state's economy.** Pennsylvania is the sixth-largest manufacturing state, and manufacturing accounts for over 12 percent of gross state product. Manufacturing jobs have increased every year since

2010, and abundant natural gas, powdered metals, and nanotechnology and additive processes, such as 3D printing, are revolutionizing Pennsylvania's manufacturing sector.


- Mode shifts are possible to ensure efficient freight movement.** As freight volumes and highway congestion continue to grow, shippers and carriers will expand their use of alternative supply chain strategies, such as transloading. This will result in an increased demand for rail intermodal facilities and new warehousing.
- Transportation is a growing employment sector in the state, but workers are in short supply.** Pennsylvania currently faces a truck driver shortage, which will become more significant as trucking jobs are expected to grow by 24 percent by 2020. Additionally, a third of U.S. railroad employees were eligible for retirement in 2013, and rail jobs are expected to increase by 10 percent by 2020. Training will be needed to ensure new workers can meet job requirements and maintain the required licenses.

**LIQUID ENERGY**

Refinery operations in greater Philadelphia make the tri-state port complex the second largest oil port in the United States.

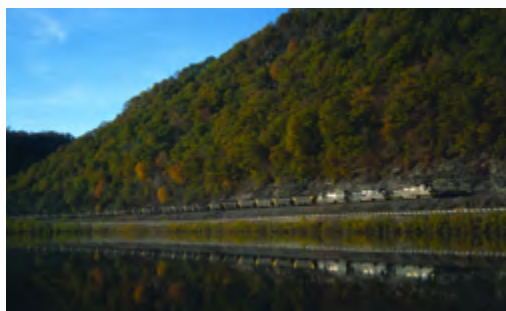


APPROX. **30%** of cargo transported on the Delaware River is oil



It represents nearly **85%** of East Coast imports

Source: American Association of Port Authorities



- Pennsylvania Ports and Waterways require immediate investment.** Pennsylvania is the only state that has all three types of ports: deep water, inland waterway, and Great Lakes. Inland waterways, including the Ohio River system, connect to the ports on the Gulf and provide an efficient, cost-effective means of transporting goods to domestic and international markets. However, much of the critical infrastructure for waterborne transportation is in need of repair. The locks and dams are owned, maintained, and operated by the U.S. Army Corps of Engineers. To ensure our waterways remain a viable transportation option, additional federal funding is essential to address these critical infrastructure needs.
- The lack of available truck parking is a complex problem that will require public-private partnerships.** Trucks carry three quarters of all Pennsylvania freight, and this share is expected to increase through 2040. The lack of truck parking on major shipping routes throughout Pennsylvania has contributed to safety and environmental concerns.
- The Panama Canal is undergoing a \$5.25 billion expansion to accommodate more and larger ships.** Currently expected to be completed in 2016, the expansion will have an impact on demand for U.S. ports, rail service, and highways. Pennsylvania will experience transportation impacts as ships on Panama Canal routes are replaced with larger vessels over time. Out of state ports, such as those

in New York/New Jersey, Baltimore, and Virginia, are also currently used by Pennsylvania businesses and industries and will experience increases in shipments, which will result in additional truck and rail traffic impacting Pennsylvania. In sum, rail and water infrastructure serving the Panama Canal trade routes will need to be monitored to determine if shippers and carriers will shift their supply chains to take advantage of this improved international routing option.

To address these freight trends and issues, Pennsylvania must continue to be nimble and able to adopt policies and programs based on economic, demographic, infrastructure, environmental, and technology changes. Investing in critical transportation improvements and creating a resilient intermodal system is essential because Pennsylvania’s economy depends on the efficient movement of raw materials, components, and finished goods within the state and to and from national and international markets. To sustain a dynamic economy and support the creation of additional jobs, Pennsylvania must continue to reinforce and enhance its competitive business environment, optimizing factors critical to a company’s operations and global competitiveness.



### BARGING IN

The Port of Pittsburgh was the third busiest inland port in the United States in 2011.

The port handled a total of  
**35 MILLION TONS**  
of cargo

Approximately  
**75%** of cargo  
was coal



Source: US ACOE Waterborne Commerce Statistics Center

## RECOMMENDATIONS

The state's freight trends and issues require actions that address critical challenges and help to ensure future generations have an efficient transportation system. The state's transportation system will be called upon over time to facilitate the movement of an ever greater share of people and goods. Pennsylvania cannot effectively be "the Keystone State" if its transportation system cannot sustain the existing and future demands placed upon it. The state has many initiatives in place to maintain and improve system mobility. One such initiative is its Corridor Modernization program—a planning effort for Transportation Systems Management and Operations to optimize the performance of existing infrastructure by implementing systems, services, and projects that preserve capacity and improve the security, safety, and reliability of the state's transportation system. Corridor Modernization will further integrate operations data, performance metrics, and processes into the project planning and programming process.

### Strategies for Addressing Freight Challenges

- **Address** the transport of hazardous materials in business plans, long range transportation plans, and county local hazard mitigation plans
  - **Ensure** highway design accommodates efficient freight movements
  - **Inventory** substandard bridge under-clearances
  - **Optimize** multimodal infrastructure through improved operations
- **Identify** the Multimodal Economic Competitiveness Network in collaboration with the planning partners
  - **Prioritize** and **enhance** intermodal connections ("first and last mile")
  - **Integrate** freight mobility and parking accommodation needs into the Corridor Modernization program
  - **Partner** with private-sector freight carriers to investigate strategies to improve modal efficiency
  - **Advocate** for additional funding for the state's ports, locks, and dams
  - **Raise awareness** of freight's value to the economy and its impacts on the state's transportation infrastructure

To be successful, Pennsylvania needs federal, state, and regional partners working together to confront the challenges of today and tomorrow by making improvements in freight logistics and infrastructure, thus leading to increased speed and efficiency with which freight moves into, out of, and through the state – ultimately benefitting our economy and all transportation flows.



## **STAYING INVOLVED**

---

To learn more about how the long range transportation plan and comprehensive freight movement plan are integrating Pennsylvania's transportation system, please visit [www.paontrack.com](http://www.paontrack.com).

This website features news and updates, access to the plan documents, and interactive ways for residents and businesses to get involved in planning for the future of transportation in Pennsylvania.





# PA On Track

PA'S LONG RANGE TRANSPORTATION &  
COMPREHENSIVE FREIGHT MOVEMENT PLAN

[www.paontrack.com](http://www.paontrack.com)

