NJTPA NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY
Defining the Vision. Shaping the Future.

REGIONAL FREIGHT COMMODITY PROFILE

Construction Materials

COMMODITY BUNDLE OVERVIEW

This bundle consists of nonmetallic minerals; clay, concrete, glass, or stone products; lumber or wood products; and metallic ores. Nonmetallic minerals include sand, gravel, stone, and broken stone. Clay, concrete, glass, or stone products include a variety of products made from those materials. Lumber or wood products include dimensional lumber and other wood products excluding furniture. Metallic ores include iron, copper, lead, zinc, and other ores.

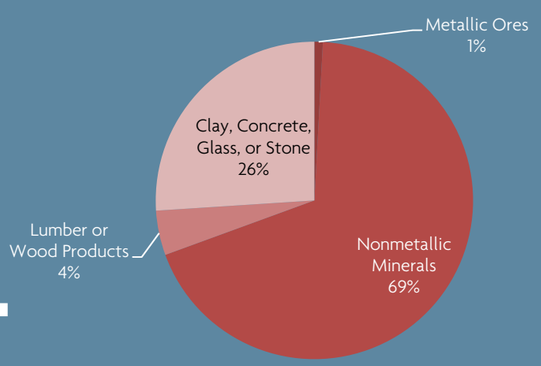
The primary data source for commodity flows reported in this profile is NJTPA's Freight Forecasting Tool, which generates commodity freight data and forecasts for a 2010 base year and 2040 forecast year. This profile describes freight flows between domestic origins and destinations.

Highlights

- 169 million tons in 2010, increasing 35% to 228 million tons in 2040.
- Represents 25.4% of the goods moved in the region by weight and 2.6% by value.
- 1,515 business establishments employing 18,939 people send or receive goods in this commodity bundle.
- More than 11 million square feet of warehousing/ distribution center space dedicated to this bundle.
- 98% moves by truck, 2% by rail, and less than 1% moves by other modes

Composition

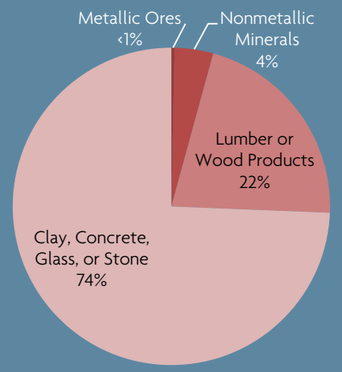
Domestic Tons in 2010



Total Tons: 169 million

Source: NJTPA Freight Forecasting Tool, 2012

Domestic Value in 2010



Total Value: $49 billion

Source: NJTPA Freight Forecasting Tool, 2012

Nonmetallic minerals account for more than two-thirds of construction materials by weight, yet only 4 percent by value. Clay, concrete, glass, or stone products account for about one-quarter of the bundle by weight and almost three-quarters by value.

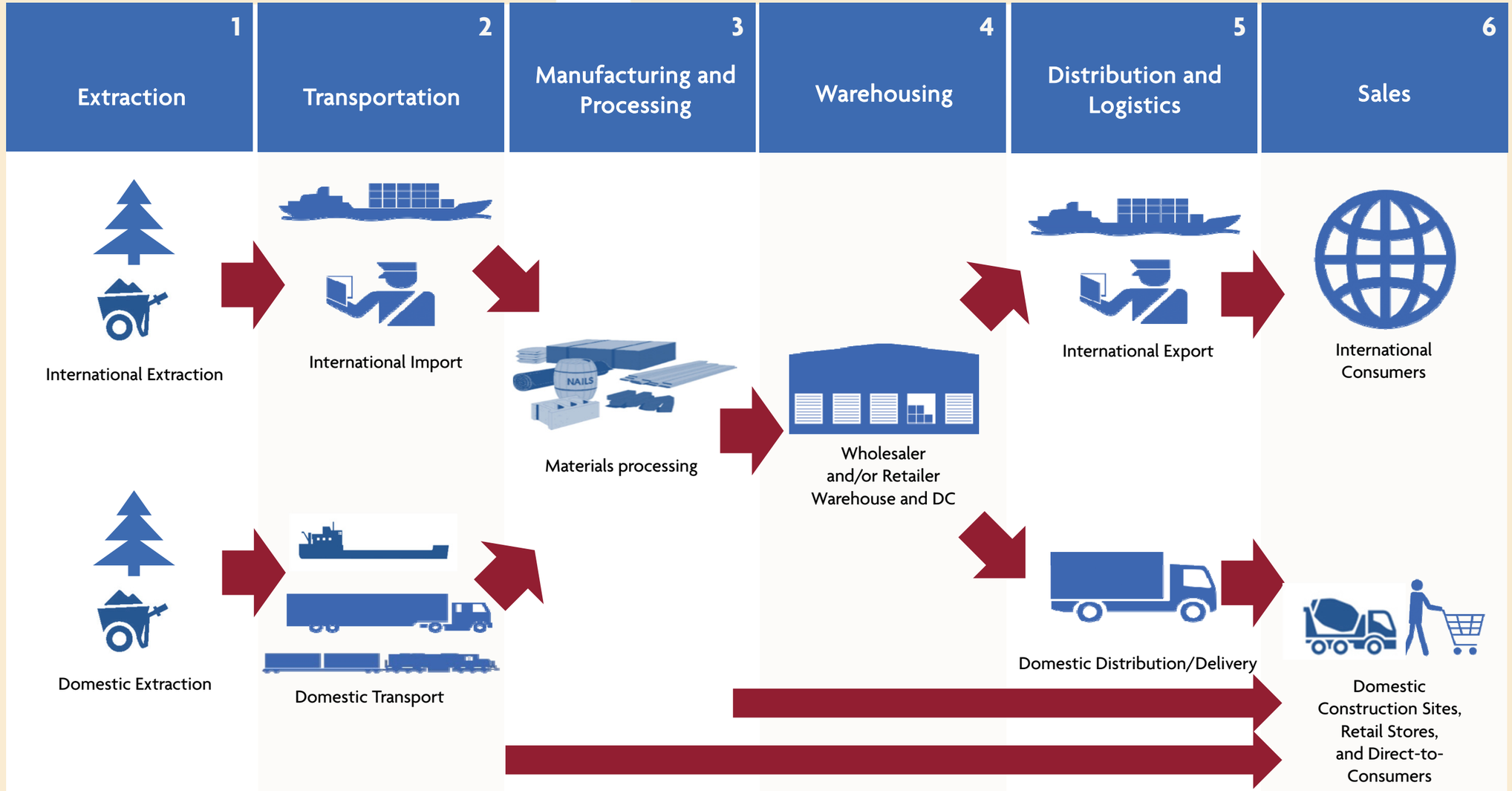
LOGISTICS SUMMARY

The graphic to the right represents the supply chain for the construction material commodity bundle, illustrating the process of collecting raw material from international and domestic sources through distribution of finished product to consumers.

This supply chain consists of six steps:

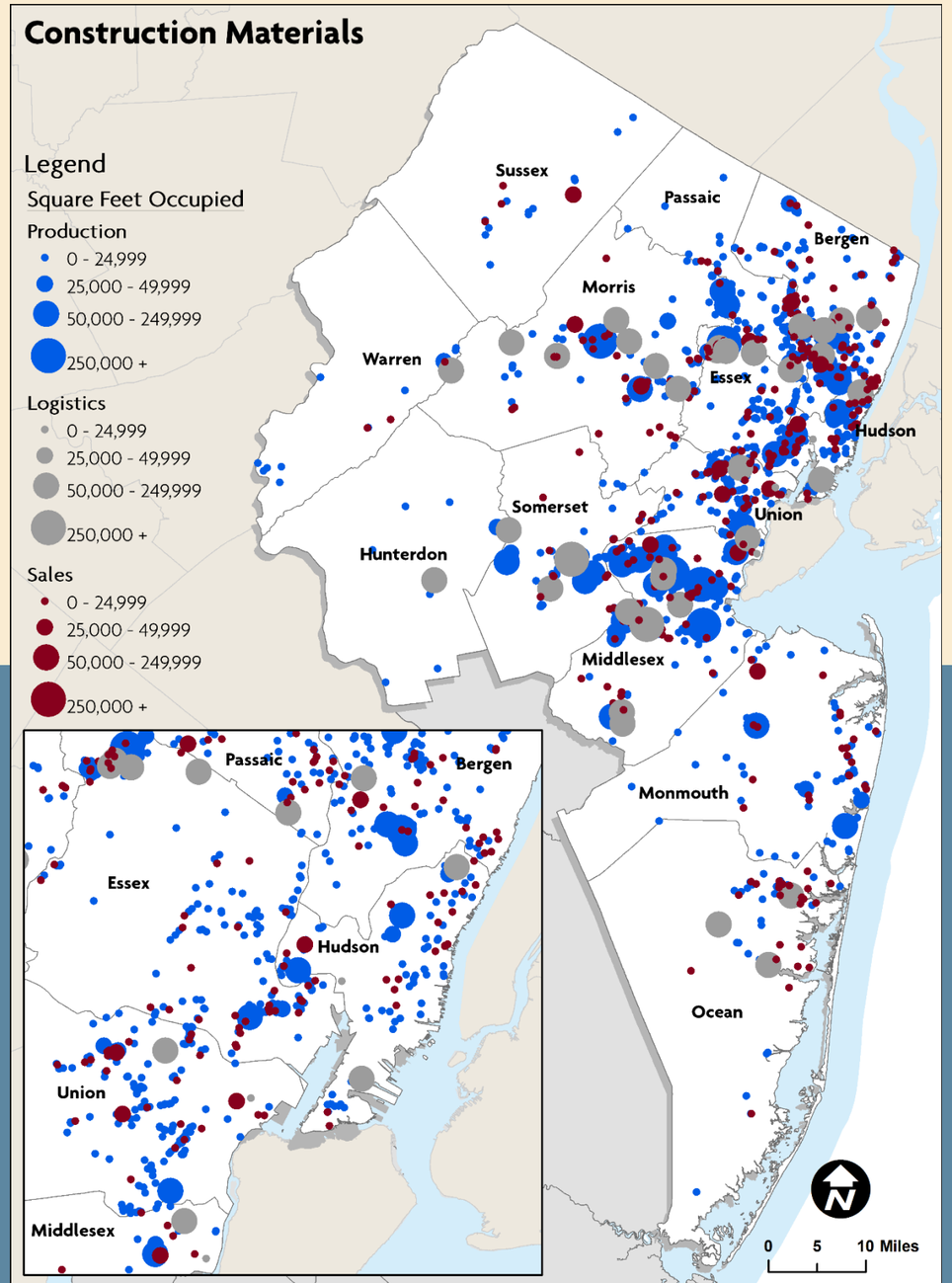
1. International and domestic raw material is extracted and collected.
2. International goods are transported by ocean vessel to U.S. Ports-of-Entry where they are inspected by U.S. Customs and transloaded to truck or rail carload. Domestically produced goods are transported by truck, rail intermodal, and barge.
3. Raw products are processed in a manufacturing facility to produce finished goods.
4. Finished goods move to a wholesaler or retailer distribution center or warehouse for sorting and storage.
5. Products are distributed via one of two routes:
    A. By truck to an export distributor or freight forwarder for export to international customers via ocean vessel.
    B. By truck for domestic delivery to retail establishments and to fulfill direct-to-customer orders.
6. Shipments are delivered to international and domestic customers and construction sites according to customers' specification.

Note that some products skip the processing and warehouse steps and are delivered directly to domestic customers. Other products are distributed directly to customers without moving through a wholesaler or retailer warehouse or distribution center.



Business Locations by Industry Type

Business Square Footage by Industry Type



Source: Co-Star, 2014; NJOIT, 2008; Esri, 2014.
Note: "Production" includes Manufacturing, Utilities, Mining & Agriculture, corresponding to Step 1 in the Logistics Summary on Pages 2-3.
"Logistics" includes Wholesale Trade and Warehousing, corresponding to Steps 2-5 in the Logistics Summary on Pages 2-3.
"Sales" includes Retail, Health Care, and Professional Services, corresponding to Step 6 in the Logistics Summary on Pages 2-3.

BUSINESS LOCATIONS SUMMARY

The map on the previous page illustrates the locations of facilities that ship, handle, or receive commodities in this bundle, including:

- Production facilities such as manufacturing businesses where goods are produced, and correspond to Step 1 in the logistics summary chart on pages 2 and 3.
- Logistics facilities, including warehousing and transportation facilities through which goods are distributed, and correspond to steps 2 through 5 on the logistics summary chart.
- Sales, represented in Step 6 on the logistics summary chart, including retail, services, and institutional establishments where goods are sold.

Clusters of large production and logistics facilities are aligned parallel to the Interstate 80 corridor between southern Bergen County and central Morris County, and in northern Middlesex County and eastern Somerset County near Interstate 287 and Route 22. Hudson, eastern Essex, and eastern Union counties contain a large number of smaller-sized facilities.

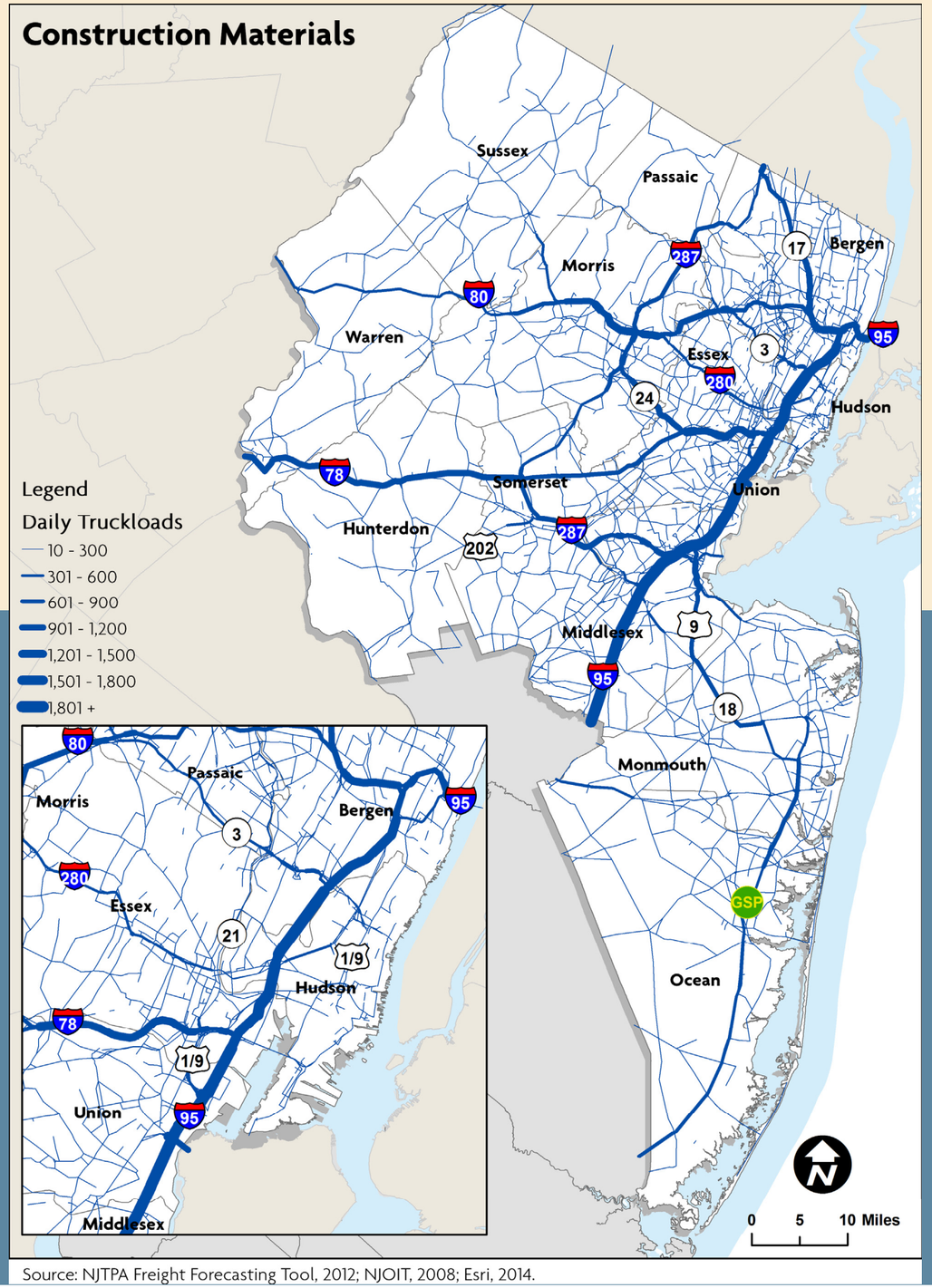
KEY INDUSTRY TRENDS

The following trends are shaping demand for construction materials today, and projected demand in the future:

- Nanomaterials will continue to mature, increasing the energy efficiency, safety, and durability of buildings while also decreasing construction time. For example, carbon nanotubes are replacing steel rebar in cement construction.
- Modular construction and prefabrication off-site are a growing trends. Both methods allow for a compressed construction timeline.
- The demand for energy efficiency will require new building materials and smarter control systems within buildings. Examples including heat wheels and occupancy sensors which can recognize ventilation and heating needs in a room. On-site energy production through solar panels will also grow as the technology matures and the price to build, install, and maintain the system decreases.
- Demand for reclaimed or recycled building materials continues to grow.

Residential and Commercial Construction Sites in the NJTPA Region

Highway Network Utilization, 2010



Source: NJTPA Freight Forecasting Tool, 2012; NJOIT, 2008; Esri, 2014.

HIGHWAY NETWORK FLOWS OF CONSTRUCTION MATERIALS

The map to the left shows the volume of truckloads of goods in this bundle traveling on highway segments in the NJTPA region every day.

The NJ Turnpike between the Middlesex/Mercer county border and Exit 18 in Bergen County carries the greatest volume of trucks. More than 1,800 truckloads of construction materials are transported on this segment each day. Portions of Interstate 78 in Essex and Union counties carry 1,500 to 1,800 truckloads daily. Parts of Interstate 80 near the NJ Turnpike and near Interstate 287 carry 1,200 to 1,500 daily truckloads of construction materials. Between 900 and 1,200 truckloads of construction materials are moved daily on portions of Route 17 in Bergen County; Interstate 80 in Passaic, Essex, and Morris counties; Interstate 78 in Hunterdon and Warren counties; and Route 24 in Union and Morris counties.

COMMODITY FLOW SUMMARY

Collectively, nearly 169 million tons of construction materials, worth $47 billion, moved into, out of, through, or within the NJTPA region in 2010. By 2040, 226 million tons worth nearly $65 billion will move in the region. These projections represent 35 percent growth by tons and 38 percent growth by value.

Construction materials represented 25.4 percent of the goods moved in the region by weight and 2.6 percent by value in 2010. This bundle is expected to grow more slowly than others, composing 24.1 percent of freight by weight and 2.4 percent by value in 2040.

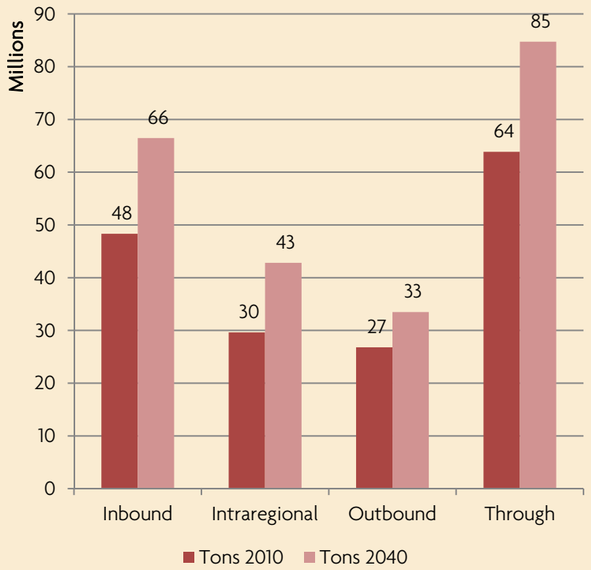
As the table below shows, the top five commodities in this bundle are broken stone or riprap, gravel or sand, concrete products, glass containers, and cut stone or stone products. Together they represent 85 percent of all of the construction materials moved into, out of, or within the NJTPA region by weight.

Commodities in the Construction Materials Commodity Bundle

STCC4	Commodity	Tons (thousands)	Value (millions)	STCC4	Commodity	Tons (thousands)	Value (millions)
1420	Broken Stone or Riprap	38,142	$248	3250	Clay, Brick or Tile	949	$1,559
1440	Gravel or Sand	28,913	$195	2490	Misc Wood Products	927	$590
3270	Concrete Products	12,986	$1,410	1000	Metallic Ores	896	$74
3220	Glass Containers	6,674	$5,890	2410	Primary Forest Materials	847	$49
3280	Cut Stone or Stone Products	2,595	$887	2440	Wood Containers	395	$173
1490	Misc Nonmetallic Minerals, Not Elsewhere Classified	2,171	$316	3260	Vitreous China Plumbing Fixtures	284	$5,983
3240	Portland Cement	1,830	$183	3210	Glass	172	$349
3290	Abrasive Products	1,785	$1,487	1410	Dimension Stone, Quarry	149	<$1
2420	Lumber of Dimension Stock	1,559	$1,501	1090	Misc Metallic Ores	7	$5
1470	Chem or Fertilizer Mineral Crude	1,403	$169	1030	Lead and Zinc Ores	<1	<$1
1450	Clay Ceramic or Refractory Minerals	1,044	$7	1060	Maganese Ores	<1	$1
2430	Millwork or Cabinetwork	1,040	$2,792	3200	Clay, Concrete, Glass, or Stone	<1	<$1

Source: NJTPA Freight Forecasting Tool, 2012
Note: "STCC4" represents the four-digit Standard Transportation Commodity Code (STCC)

Domestic Tons by Direction, 2010 and 2040



About 64 million tons of construction materials (38 percent of all tons in this bundle) passed through the NJTPA region . About 48 million tons (29 percent) of tons are moving inbound, 30 million tons (17 percent) are moving within the region, and 27 million tons (16 percent) are outbound movements.

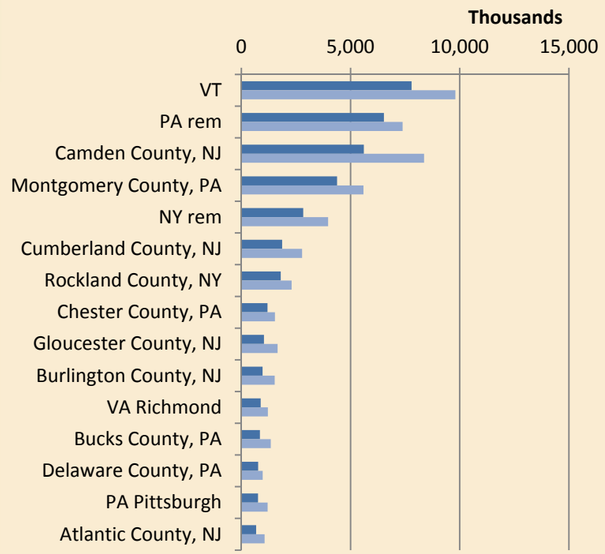
About 79 percent of the construction materials imported to the NJTPA region originate in one of the locations shown in the graph to the right. More than 7.7 million tons originated in Vermont. Among the top origins, flows from Gloucester County are expected to grow fastest (60 percent) and flows from Pennsylvania remainder are expected to grow slowest (13 percent) through 2040.

The locations shown in the far-right graph are the destinations of 74 percent of the goods in this commodity bundle that leave the NJTPA region. Among the top destinations, flows to Bucks County, PA are expected to grow fastest (57 percent) and flows to Northampton County, PA are expected to grow slowest (12 percent) through 2040.

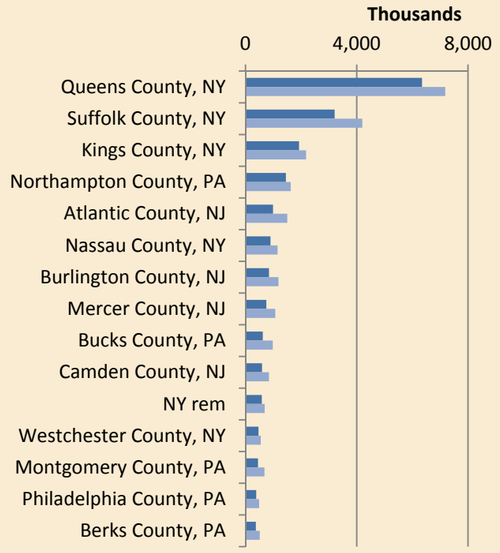
Source: NJTPA Freight Forecasting Tool, 2012

Nearly All Construction Materials in the NJTPA Region are Transported by Truck or Rail

Top Origins of Inbound Commodities (Left) and Top Destinations of Outbound Commodities (Right), 2010 and 2040



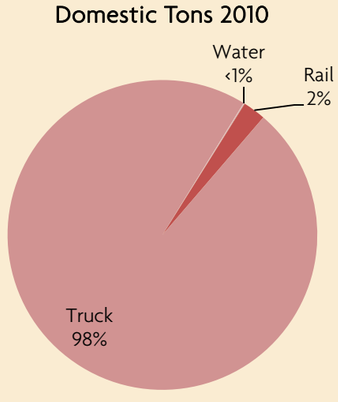
Source: NJTPA Freight Forecasting Tool, 2012
Note: "rem" stands for "remainder," which refers to the portions of a state outside major metropolitan regions.

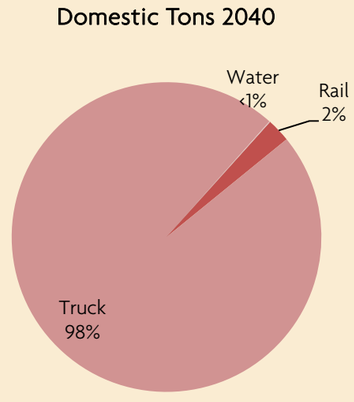


Source: NJTPA Freight Forecasting Tool, 2012
Note: "rem" stands for "remainder," which refers to the portions of a state outside major metropolitan regions.

Mode Splits, 2010 and 2040

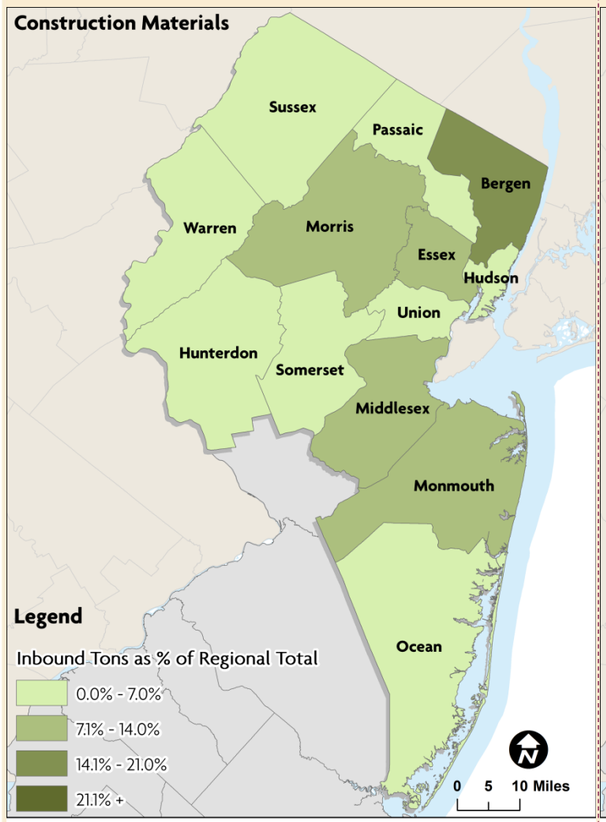
In 2010, about 98 percent of the construction material commodities moving in the NJTPA region traveled by truck. Rail carried about 2 percent, and less than 1 percent moved by water. By 2040, the share of tons moving by each mode is expected to remain similar.





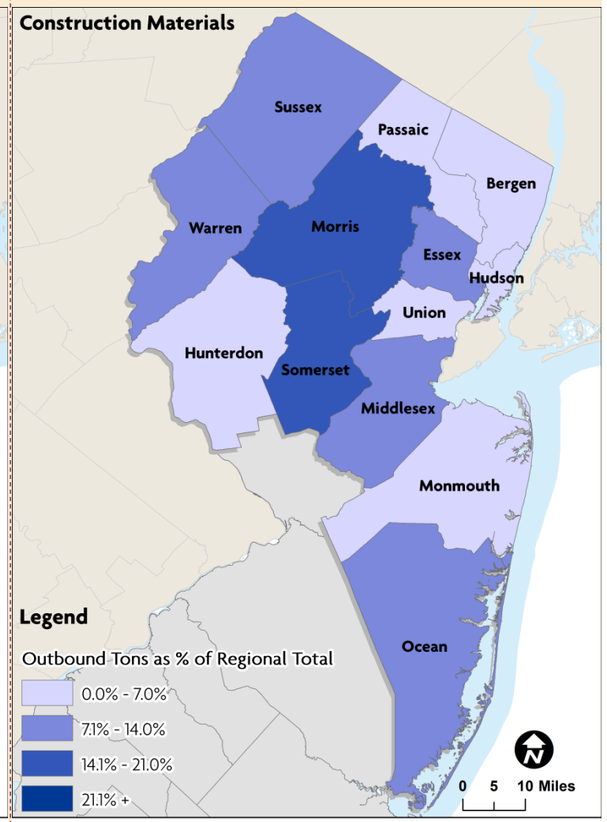
Source: NJTPA Freight Forecasting Tool, 2012

Inbound Domestic Tons by County, 2010



Source: NJTPA Freight Forecasting Tool, 2012; NJOIT, 2008; Esri, 2014.

Outbound Domestic Tons by County, 2010



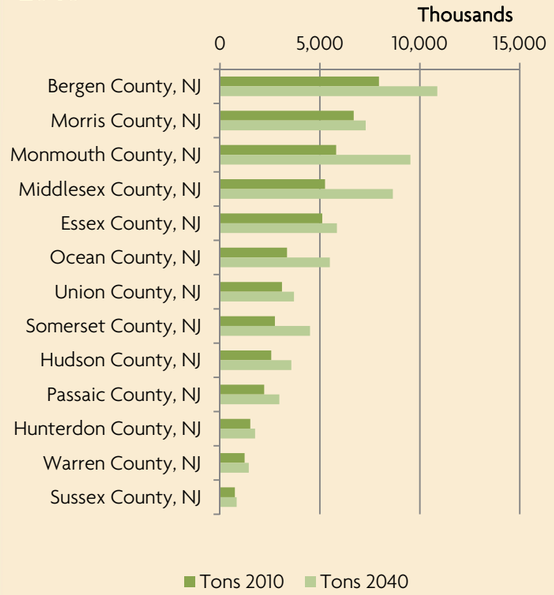
Source: NJTPA Freight Forecasting Tool, 2012; NJOIT, 2008; Esri, 2014.

The maps above and the graphs on the opposite page show the top counties of origin and top counties of destination for goods in this commodity bundle traveling to or from the NJTPA region.

More than 42 percent of all construction materials traveling into the NJTPA region terminate in Bergen, Morris, or Monmouth counties. Projected growth rates in inbound construction materials tonnage between 2010 and 2040 range from 9 percent (Morris County) to 65 percent (Middlesex County).

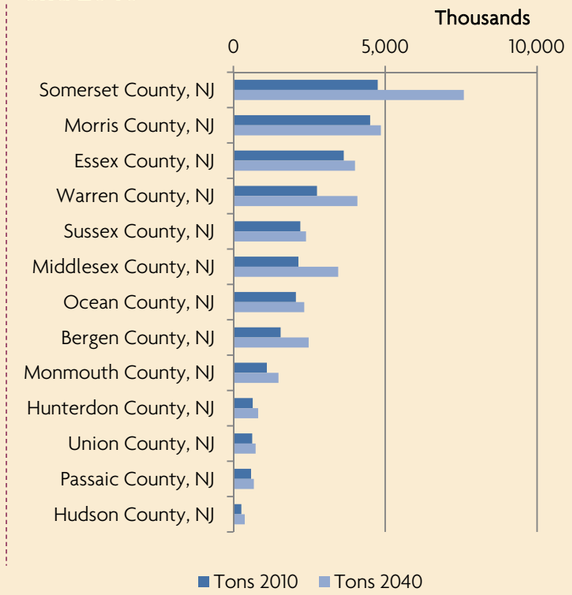
About 48 percent of all construction materials shipped outbound originate in Somerset, Morris, or Essex counties. Projected growth rates in outbound tonnage between 2010 and 2040 range from 8 percent (Morris County) to 61 percent (Ocean County).

Inbound Domestic Tons by County, 2010 and 2040



Source: NJTPA Freight Forecasting Tool, 2012

Outbound Domestic Tons by County, 2010 and 2040



Source: NJTPA Freight Forecasting Tool, 2012

References

For more information on construction materials commodity flows and logistics in the North Jersey region and elsewhere, consult the following sources:

- New Jersey Builders Association, www.njba.org
- New Jersey Building and Construction Trades Council, www.njbctc.org
- Construction Round Table of New Jersey, www.crtnj.org
- Associated Construction Contractors of New Jersey, www.accnj.org
- Bureau of Labor Statistics, U.S. Department of Labor, www.bls.gov.

ABOUT THE NJTPA

The North Jersey Transportation Planning Authority (NJTPA) is the federally authorized Metropolitan Planning Organization for 6.6 million people in the 13-county northern New Jersey region. Each year, the NJTPA oversees the investment of more than $1 billion in federal funding for transportation projects and provides a forum for interagency cooperation and public input into funding decisions. It also sponsors and conducts studies, assists county planning agencies and monitors compliance with national air quality goals.

The NJTPA Board of Trustees includes 15 local elected officials, including one representative from each of the 13 northern New Jersey counties – Bergen, Essex, Hudson, Hunterdon, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren – as well as from the cities of Newark and Jersey City. The Board also includes the Commissioner of the New Jersey Department of Transportation (NJDOT), the Executive Director of NJ TRANSIT, the Chairman of the Port Authority of New York and New Jersey, a Governor's Representative and a Citizens' Representative appointed by the Governor.

ABOUT THE STUDY

The NJTPA regional Freight Commodity Profiles study enhanced the NJTPA's freight modeling tools, analyzed, and identified gaps in existing freight and industry data, collected data and information to fill those gaps, and prepared summary data products, including a set of Regional Commodity Profile documents. In addition to supporting freight planning, these profiles will be used in stakeholder outreach and education. Key work tasks included:

- Enhancement of the NJTPA's Freight Forecasting Tool to produce commodity-specific truck trip tables.
- Identification of "Top 11 Regional Commodity Groups" based upon economic and commodity flow data.
- Collection and analysis of data on each of the commodity groups, including: direction of movement; locations of production, shipping, handling, and receiving centers; modes and routes used to transport the commodities.
- Production of "Regional Commodity Profile" documents for each of the Top 11 Regional Commodity Groups, which summarize the data analysis findings using charts, graphs, maps, and descriptive text.

ABOUT THIS PROFILE

The NJTPA developed a Freight Forecasting Tool (FFT) in 2012, which generates alternative domestic freight forecasts to support transportation, land use, and economic development decisions. The FFT was built by Cambridge Systematics, Inc., using commodity flow data from IHS Global Insight and econometric forecasts from the R/ECON model, produced and managed by the Center for Urban Policy Research at Rutgers University. Cambridge Systematics and Parsons Brinckerhoff enhanced the FFT in 2015 to produce commodity group-specific forecast tables.

The NJTPA conducted research on commodity flows and logistics chains for 11 key "commodity bundles," that move in the North Jersey region, including warehouse and terminal moves, food, apparel, paper and printed materials, waste, construction materials, machinery and transportation equipment, other durable goods, pharmaceuticals, chemicals, and hazardous materials. This profile offers an overview of the components, freight demand, and logistics chain for construction materials moving into, out of, through, and within the North Jersey region.

For further information, please contact Jakub Rowinski, NJTPA Project Manager, at jrowinski@njtpa.org. This document was prepared by the North Jersey Transportation Planning Authority, Inc. with funding from the Federal Transit Administration and the Federal Highway Administration. The NJTPA is solely responsible for its contents.

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