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

REGIONAL FREIGHT COMMODITY PROFILE

Machinery, Electronics, and Transportation Equipment

COMMODITY BUNDLE OVERVIEW

This commodity bundle consists of four specific commodity groups: machinery, such as engines or engine parts, farm machinery, and industrial machinery; electronics, such as household appliances, lighting and fixtures, and power supply; motorized vehicles, including automobiles and aircraft; and transportation equipment, such as chassis, cranes, or containers.

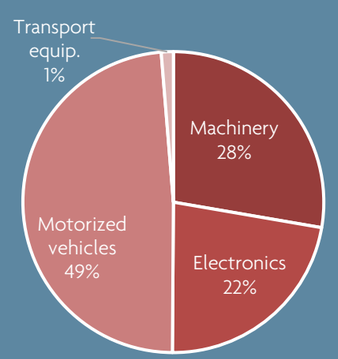
The primary data source for commodity flows reported in this profile is NJTPA's Freight Forecasting Tool, which generates commodity freight data and forecasts for a 2020 base year and 2050 forecast year. This profile describes freight flows between domestic origins and destinations.

Highlights

- 11.6 million tons in 2020, increasing 12 percent to 13.1 million tons in 2050.
- Represents 3 percent of the goods moved in the region by weight and 21 percent by value.
- More than 30 million square feet of warehousing/ distribution center space dedicated to this commodity bundle.
- 86 percent moves by truck, 8 percent by multiple modes (mostly intermodal rail), 2 percent by rail alone, and 4 percent by other modes.

Composition

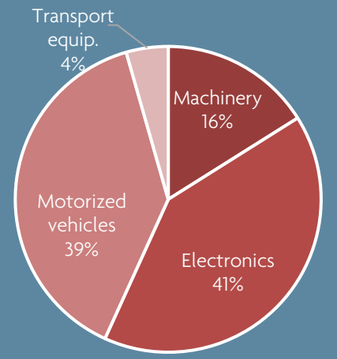
Domestic Tons in 2020



Total Tons: 11.6 million

Source: NJTPA Freight Forecasting Tool, 2020

Domestic Value in 2020



Total Value: $146 billion

Source: NJTPA Freight Forecasting Tool, 2020

Motorized vehicles represent nearly half of the weight of goods in this bundle and 39 percent by value of goods. Electronics represent only 22 percent by weight, but 41 percent by value. Machinery represents a greater share by weight (28 percent) than by value (16 percent).

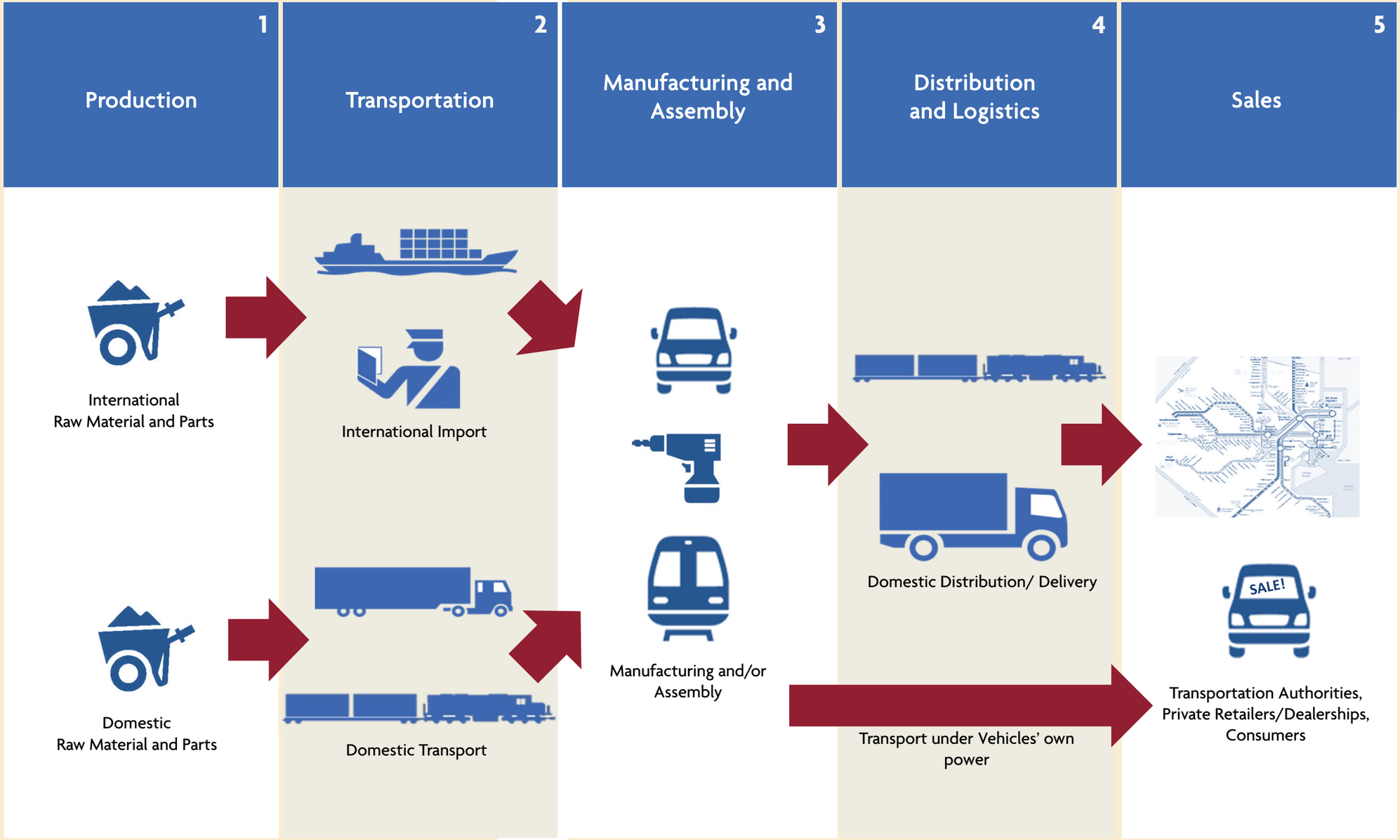
LOGISTICS SUMMARY

The graphic to the right represents the supply chain for the machinery and transportation equipment commodity bundle from initial sourcing of raw material and parts through final delivery to customers.

This supply chain consists of five steps:

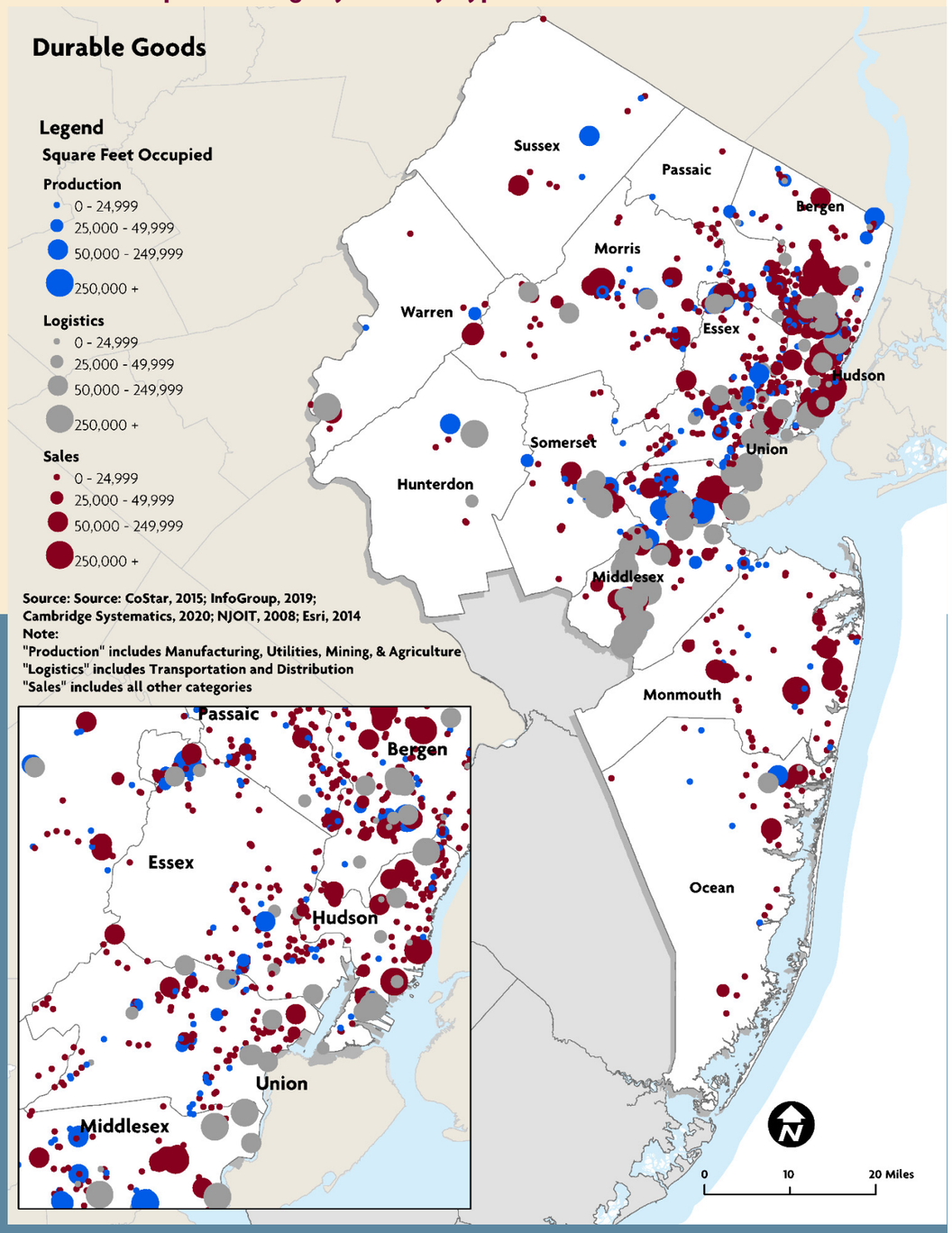
1. International and domestic parts and raw material are produced.
2. International goods are transported by ocean vessel to U.S. Ports-of-Entry where they are inspected by U.S. Customs and transloaded to trucks. Domestically produced material and parts are transported by truck and rail intermodal.
3. Factories manufacture or assemble finished products.
4. Finished goods are distributed to customers by truck or rail, or are moved under the vehicles' own power to their final destination.
5. Shipments are delivered to customers, including consumers and transportation authorities, according to customers' specification.

Note that some products bypass retailer or customer warehousing and distribution centers and move directly from a wholesaler's warehouse to the final user. The e-commerce deliveries are described in the e-commerce commodity bundle profile.



Business Locations by Industry Type

Business Square Footage by Industry Type



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 steps 1 and 3 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 and 4 on the logistics summary chart.
- Sales, represented in Step 5 on the logistics summary chart, including retail, services, and institutional establishments where goods are sold.

Clusters of large production and logistics facilities and smaller sales facilities are located in southern Bergen and Passaic counties, Hudson, eastern Essex and Union counties, northern Middlesex County, and in the vicinity of NJ Turnpike Exit 8A in southern Middlesex County.

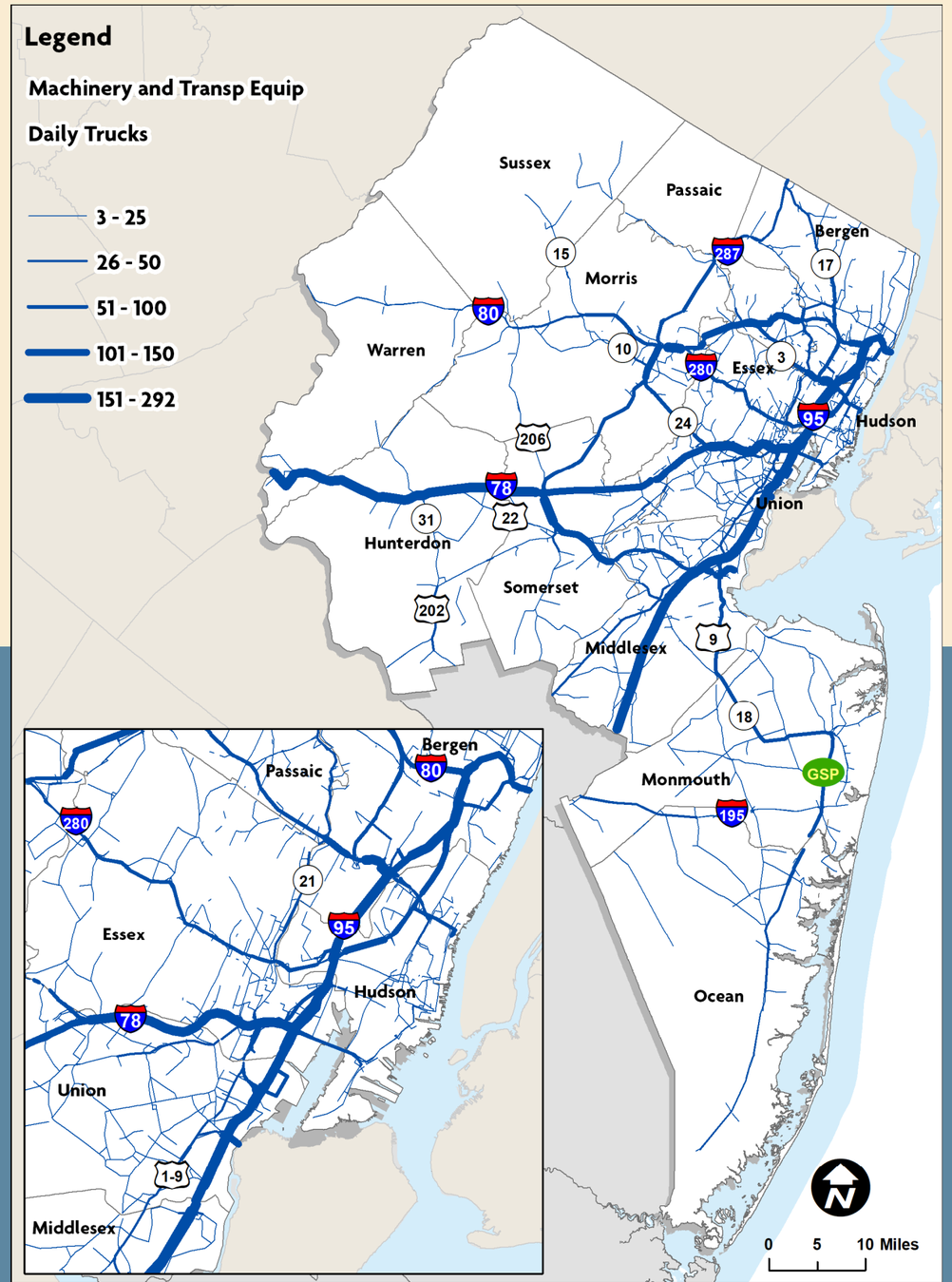
KEY INDUSTRY TRENDS

The following trends are shaping demand for machinery, electronics, and transportation equipment today, and projected demand in the future:

- Tariffs on imports of automobile and automobile parts is expected to increase prices and dampen demand for new autos.
- Distributed manufacturing and 3D printing have been on the rise, aiming to decrease costs associated with production lead times. This trend will likely continue and accelerate with circumstances presented by the COVID-19 crisis.
- Relocation of production (due in part to the trends above) closer to consumers could bring manufacturing jobs to the North Jersey region.
- Before the COVID-19 crisis, the aircraft, marine and railroad equipment wholesale market was expected to grow, albeit at a slower rate than in the past. The COVID-19 crisis has put an end to this growth, and the airline industry is among the hardest hit industrial sector. Moreover, it is also unclear if transit agencies will have bonding capacity for new transit equipment purchases in the short term.

Commodities in this bundle include household appliances, machinery, and transportation equipment such as automobiles and railroad equipment.

Highway Network Utilization, 2020



Source: NJTPA Freight Forecasting Tool, 2020; NJRTM-E, 2019; NJOIT, 2008; Esri, 2014.

HIGHWAY NETWORK FLOWS OF MACHINERY, ELECTRONICS, AND TRANSPORTATION EQUIPMENT

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

Most of the New Jersey Turnpike/Interstate 95, portions of Interstate 78 between Interstate 95 and Route 24, and between Interstate 287 and the Pennsylvania border, and a short segment of Interstate 80 in Morris County carry between 151 and 292 truckloads of goods in this bundle daily in each direction.

Sections of Interstate 78 between Route 24 and Interstate 287, Interstate 80 in Essex and Passaic counties, Interstate 287 in Somerset County, and Route 3 in Bergen County carry between 101 and 150 daily truckloads of goods in this bundle in each direction.

COMMODITY FLOW SUMMARY

Collectively, 11.6 million tons of goods in this bundle, worth nearly $146 billion, moved in the NJTPA region in 2020. By 2050, more than 13 million tons worth more than $164 billion are expected to move in the region. These projections represent 12 percent growth by tons and 13 percent growth by value.

This bundle represented 3 percent of the goods moved in the region by weight and 21 percent by value in 2020. By 2050, this bundle is expected to maintain the same share by weight, but represent a slightly smaller share (20 percent) by value.

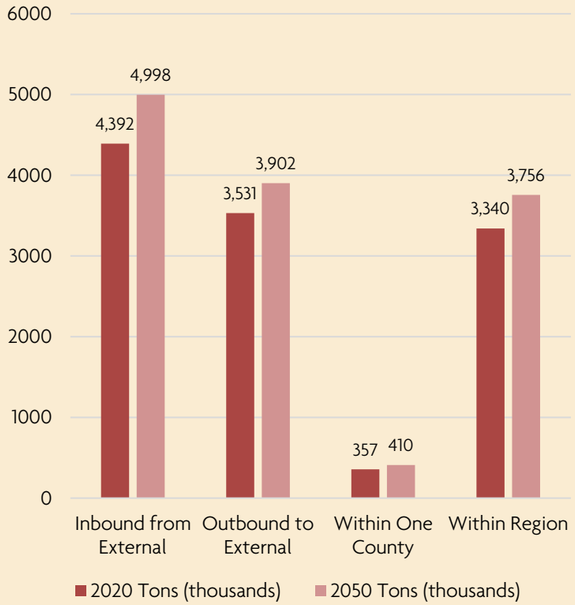
As the table below shows, Motorized vehicles are expected to remain the top commodity in this bundle by weight, and electronics are expected to remain the top commodity by value of goods. Transportation equipment is expected to increase by the greatest proportion (21 percent by weight and value) between 2020 and 2050.

Forecasted Change in Commodity Flows in the Machinery, Electronics, and Transportation Equipment Bundle by Weight and Value, 2020 and 2050

Commodity	2020 Tons (thousands)	2050 Tons (thousands)	2020 Value (millions $)	2050 Value (millions $)	Change in Tons, 2020-2050	Change in Value, 2020-2050
Machinery	3,220	3,562	23,396	26,014	11%	11%
Electronics	2,602	2,923	59,247	66,526	12%	12%
Motorized vehicles	5,647	6,398	56,452	63,933	13%	13%
Transport equip.	151	182	6,446	7,772	21%	21%
Grand Total	**11,620**	**13,066**	**145,541**	**164,245**	**12%**	**13%**

Source: NJTPA Freight Forecasting Tool, 2020

Domestic Tons by Direction, 2020 and 2050



Source: NJTPA Freight Forecasting Tool, 2020

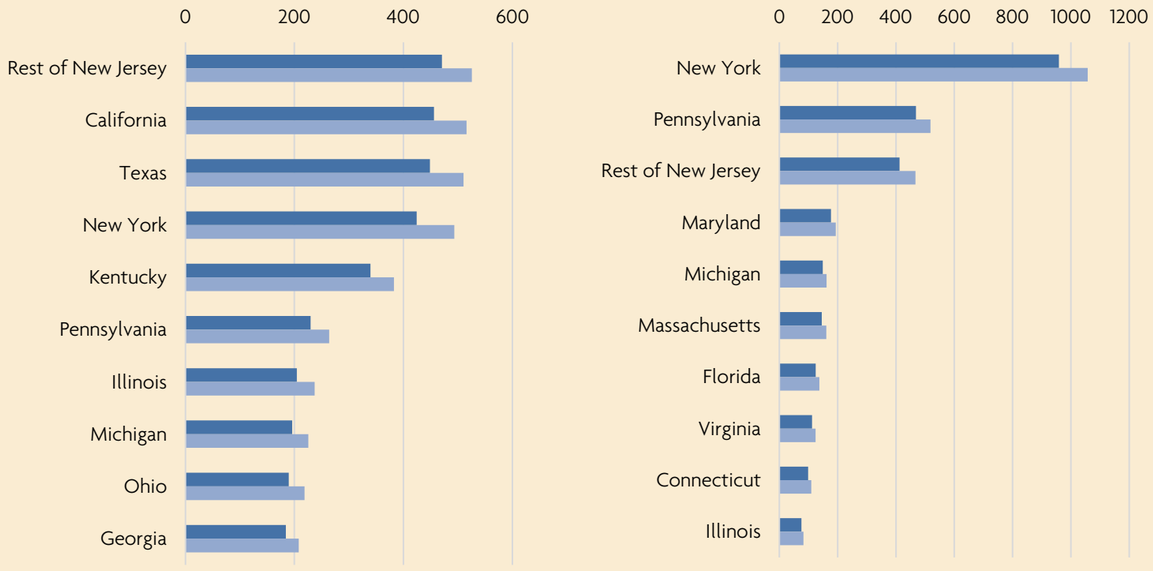
About 4.4 million tons (38 percent of all tons in this bundle) moved into the NJTPA region from origination points outside the region. About 3.5 million tons (30 percent) move outbound, 3.3 million tons (28 percent) move from one NJTPA county to another, and 357,000 tons (3 percent) move within a single county in the region.

More than 70 percent of the goods in this bundle imported to the NJTPA region originate in one of the locations shown in the graph on the next page. More than 400,000 tons originated in each of the following areas: portions of New Jersey outside the NJTPA region, California, Texas, and New York. Among the top inbound trading partners, flows from New York and Illinois are expected to grow fastest (16 percent) and flows from the rest of New Jersey are expected to grow slowest (11 percent)

The graph on the next page also shows the destinations of 77 percent of the goods in this commodity bundle that leave the NJTPA region. New York is the top destination, receiving nearly 1 million tons. Among the top destinations, flows to the rest of New Jersey are expected to grow fastest (13 percent).

Automobiles prepared for export

Top Origins of Inbound Commodities (Left) and Top Destinations of Outbound Commodities (Right), 2020 and 2050

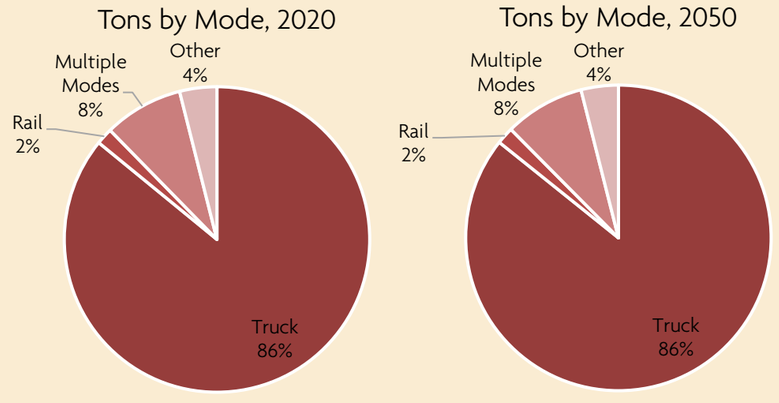


Source: NJTPA Freight Forecasting Tool, 2020

Source: NJTPA Freight Forecasting Tool, 2020

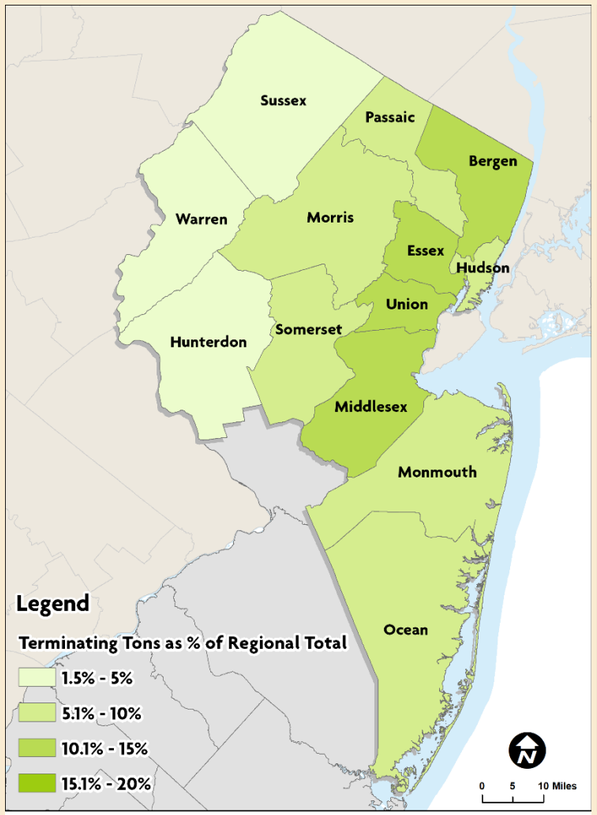
Mode Splits, 2020 and 2050

In 2020, about 86 percent of the machinery, electronics, and transportation equipment commodities moving in the NJTPA region traveled by truck. About 8 percent moved by "multiple modes," primarily intermodal rail and truck. About 2 percent moved by rail alone, and 4 percent by other modes. By 2050, the share of tons moving by each mode is expected to remain similar.



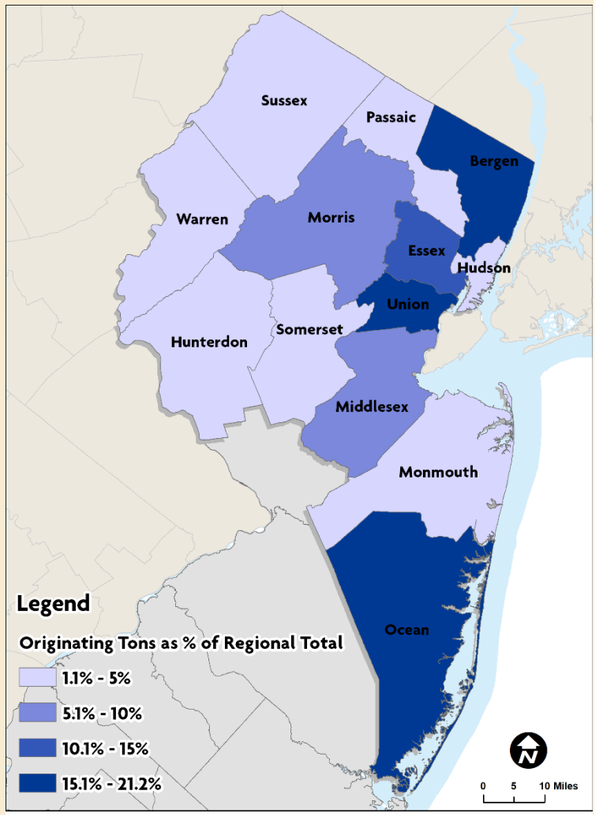
Source: NJTPA Freight Forecasting Tool, 2020

Inbound Domestic Tons by County, 2020



Source: NJTPA Freight Forecasting Tool, 2020; NJRTM-E, 2019; NJOIT, 2008; Esri, 2014.

Outbound Domestic Tons by County, 2020



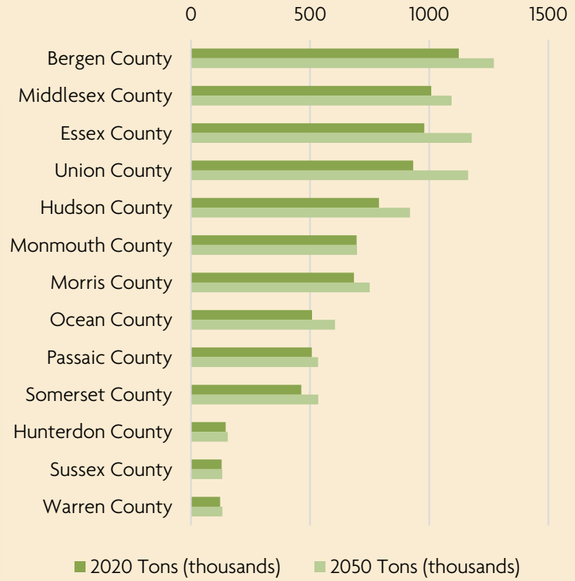
Source: NJTPA Freight Forecasting Tool, 2020; NJRTM-E, 2019; NJOIT, 2008; Esri, 2014.

The maps above and the graphs on the next 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.

About 26 percent of all machinery, electronics, and transportation equipment commodities terminating tonnage in the NJTPA region terminate in Bergen or Middlesex counties, each of which received more than 1 million tons in 2020. Projected growth rates in inbound machinery, electronics, and transportation equipment tonnage between 2020 and 2050 range from 0 percent (Monmouth) to 25 percent (Union County). Essex is expected to surpass Middlesex as the county with the second-highest terminating tonnage by 2050.

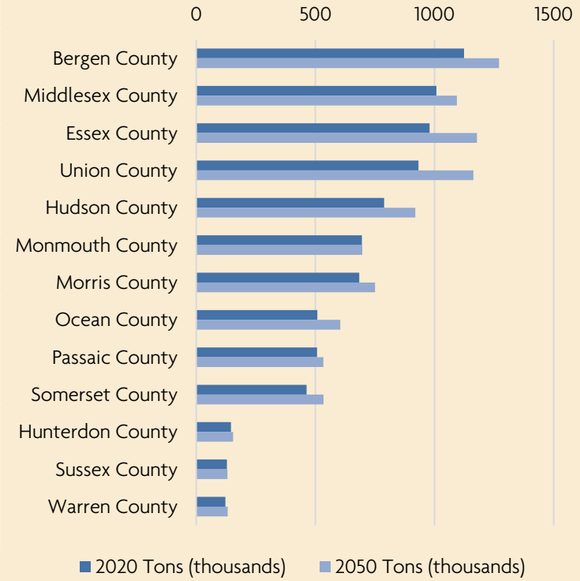
About 54 percent of all originating tonnage in this bundle originate in Essex County. An additional 36 percent of outbound shipments originate in Bergen, Ocean, or Union counties. Projected growth rates in outbound tonnage between 2020 and 2050 range from -3 percent (Monmouth County) to 19 percent (Union County).

Inbound Domestic Tons by County, 2020 and 2050



Source: NJTPA Freight Forecasting Tool, 2020

Outbound Domestic Tons by County, 2020 and 2050



Source: NJTPA Freight Forecasting Tool, 2020

References

For more information on machinery, electronics, and transportation equipment commodity flows and logistics in the North Jersey region and elsewhere, consult the following sources:

- New Jersey Motor Truck Association, www.njmta.wildapricot.org
- Association of Equipment Manufacturers, www.aem.org
- Alliance of Automobile Manufacturers, www.autoalliance.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 6.7 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

Conditions in the goods movement industry have changed over the last several years. The 2050 Freight Industry Level Forecasts Study developed updated information on current and projected freight demand through 2050 for the NJTPA to use in its freight planning activities. This effort built on two previous NJTPA freight planning studies: the 2040 Freight Industry Level Forecasts Study (completed in 2012) and the Regional Freight Commodity Profiles Study (completed in 2015).

This study helps identify locations with concentrations of goods movement activity and where they will occur in the future; the types of commodities that are and will be moving through the region; and where strategic investments should be considered to support economic growth and enhance regional resiliency. The results of this work will serve as background for the NJTPA's next Long Range Transportation Plan as well as freight planning and subregional planning studies.

For further information, please contact Jakub Rowinski, NJTPA Project Manager, at jrowinski@njtpa.org.

This Freight Profile is one of a series of profiles, representing 12 freight commodity bundles in the 13-county NJTPA region.

This document was prepared by the NJTPA with funding from the Federal Transit Administration and the Federal Highway Administration. The NJTPA is solely responsible for its contents.