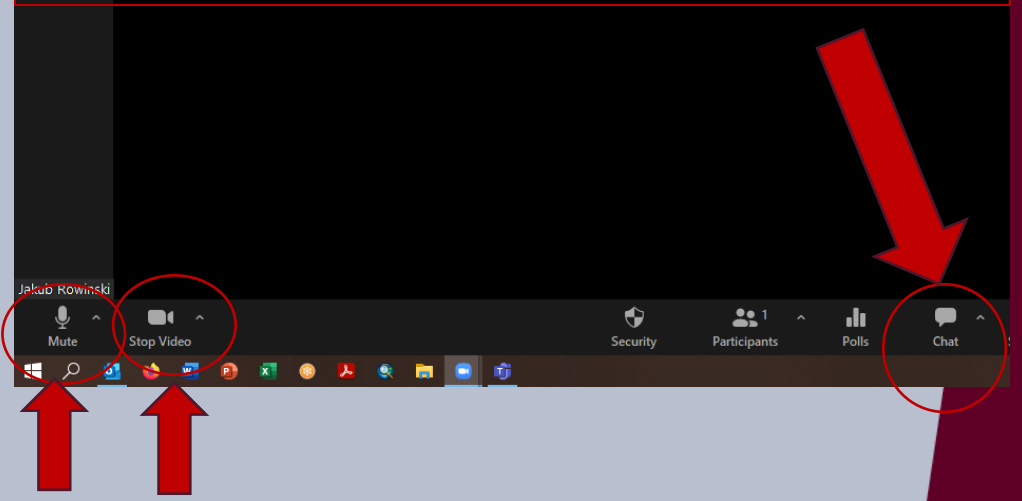
June 16 Freight Initiatives Committee Agenda

- Roll Call
- Approval of Minutes
- Update on NJTPA Freight Division Activities
- Presentation: NJTPA's 2050 Freight Industry Level Forecasts Update
  - Chris Lamm, Principal, Cambridge Systematics
  - Jack Glodek, Transportation Analyst, Cambridge Systematics
- Two-Minute Reports on Freight Activities from Committee Members
- Next Meeting: Monday, August 18, 2025
- Adjournment

Please use the Chat box to ask questions during the presentations and if requesting credits, please post your name and email, followed by either AICP or PE with your NJ PE license number



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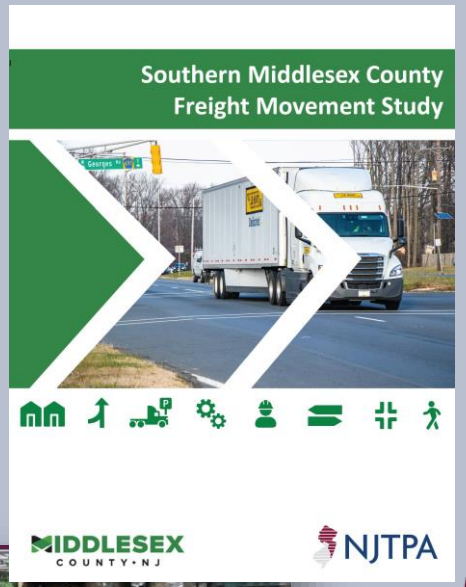
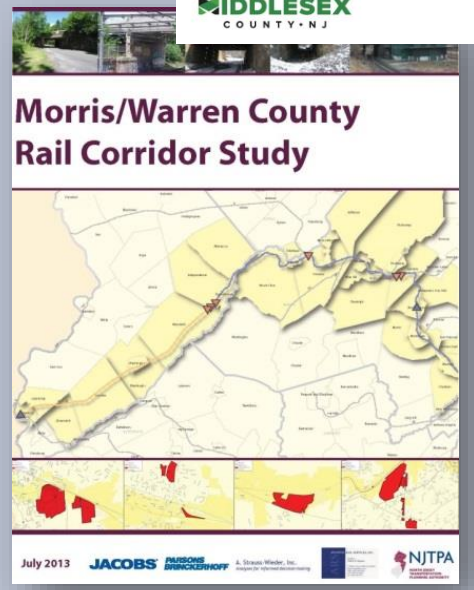
Freight Concept Development Program

- FY 2025 FCDP Studies
  - Southern Middlesex County North-South Truck Corridor Project in Cranbury and Monroe, Middlesex County
  - East Hanover Avenue Bridge Catenary Rail Clearance Project in Morris Plains and Morris Township, Morris County
  - Preliminary Screening for Plate F Vertical Rail Clearance in Perth Amboy
  - FCDP Support
- Data Collection Continues
- Base Mapping Underway
- June 2027 Completion





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Presentation

NJTPA's 2050 Freight Industry Level Forecasts Update

- Chris Lamm, Principal, Cambridge Systematics
- Jack Glodek, Transportation Analyst, Cambridge Systematics

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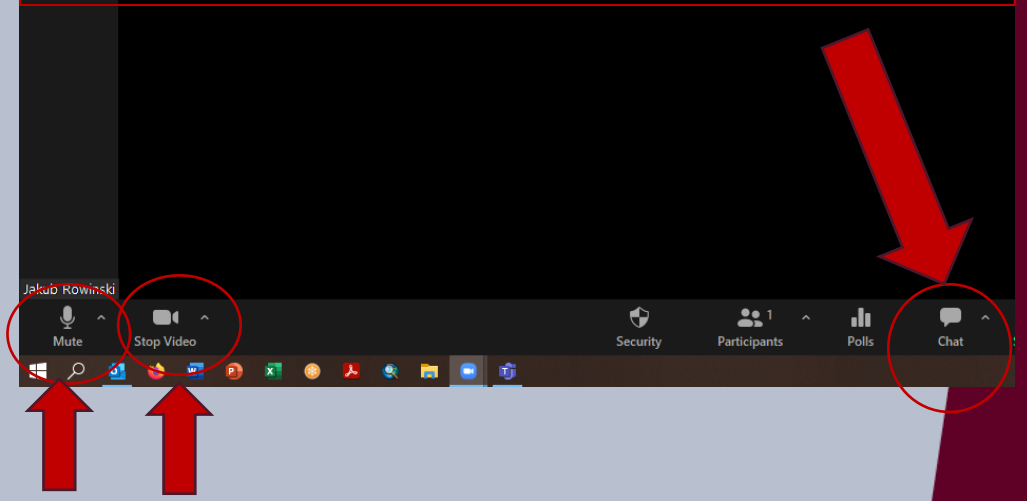

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Freight Initiatives Committee Meeting

2050 Freight Industry Level Forecasts Update

Chris Lamm, Cambridge Systematics

Jack Glodek, Cambridge Systematics

Jakub Rowinski, NJTPA

June 16, 2025

NJTPA NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY

Agenda

- Study Overview
- Commodity Flows
- E-Commerce Trip Table Development and Forecasting
- Business Establishment Database
- Freight Forecasting Tool Updates & Enhancements
- Public Data Dashboards

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Study Overview

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Evolution of NJTPA Freight Forecasting Studies

2040 Freight Industry Level Forecasts Study (2012)

Highlights:

- First-generation Freight Forecasting Tool (Excel)
- Transearch commodity flow data, R/ECON economic forecasts
- Regional and subregional freight profiles

Regional Freight Commodity Profiles Study (2015)

Highlights:

- Enhanced FFT to allow user selection of specific commodity groups ("bundles")
- FFT outputs at commodity bundle level
- Commodity profiles for 11 commodity bundles

2050 Freight Industry Level Forecasts Study (2020)

Highlights:

- Next-generation FFT processing Freight Analysis Framework (FAF) commodity flow data and Moody's economic forecasts
- FFT transitioned from Excel to R
- E-Commerce trip table is estimated using consumer research data and last-mile carrier logistics intel
- New suite of regional, subregional, and commodity profiles

2050 Freight Industry Level Forecasts Update (2025)

Highlights:

- **FFT updated with latest FAF and Moody's data and forecasts**
- **FAF disaggregated for all 15 subregions**
- **R code and user interface updated and improved**
- **New data to inform e-commerce delivery trip table development**
- **New "what if" scenarios developed to account for new and emerging trends**
- **Story map "profile" of regional, subregional, and commodity bundles**

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Study Goals & Objectives

- **Update NJTPA's Freight Forecasting Tool (FFT):**
  - Forecast to 2050, extend to 2055
  - Develop new what/if scenarios
- **Key Inputs:**
  - Disaggregate FAF to county level – including port flows
  - Enhance e-commerce (direct-to-consumer) trip table estimation approach
- **Study Products:**
  - Updated FFT
  - Dynamic data dashboards – replaces the static profiles from previous studies

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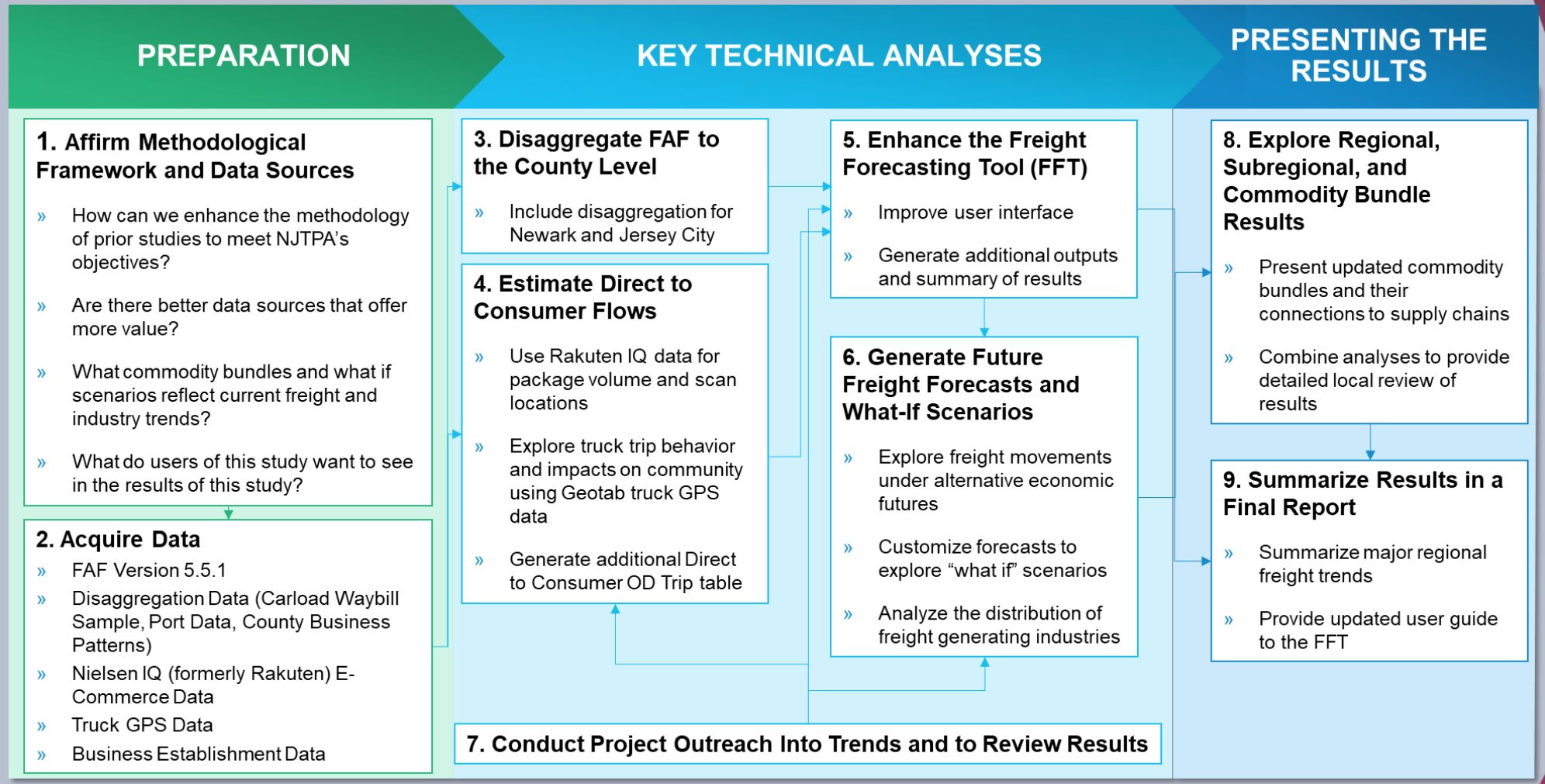
Highlights of the Methodological Approach



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Commodity Flows

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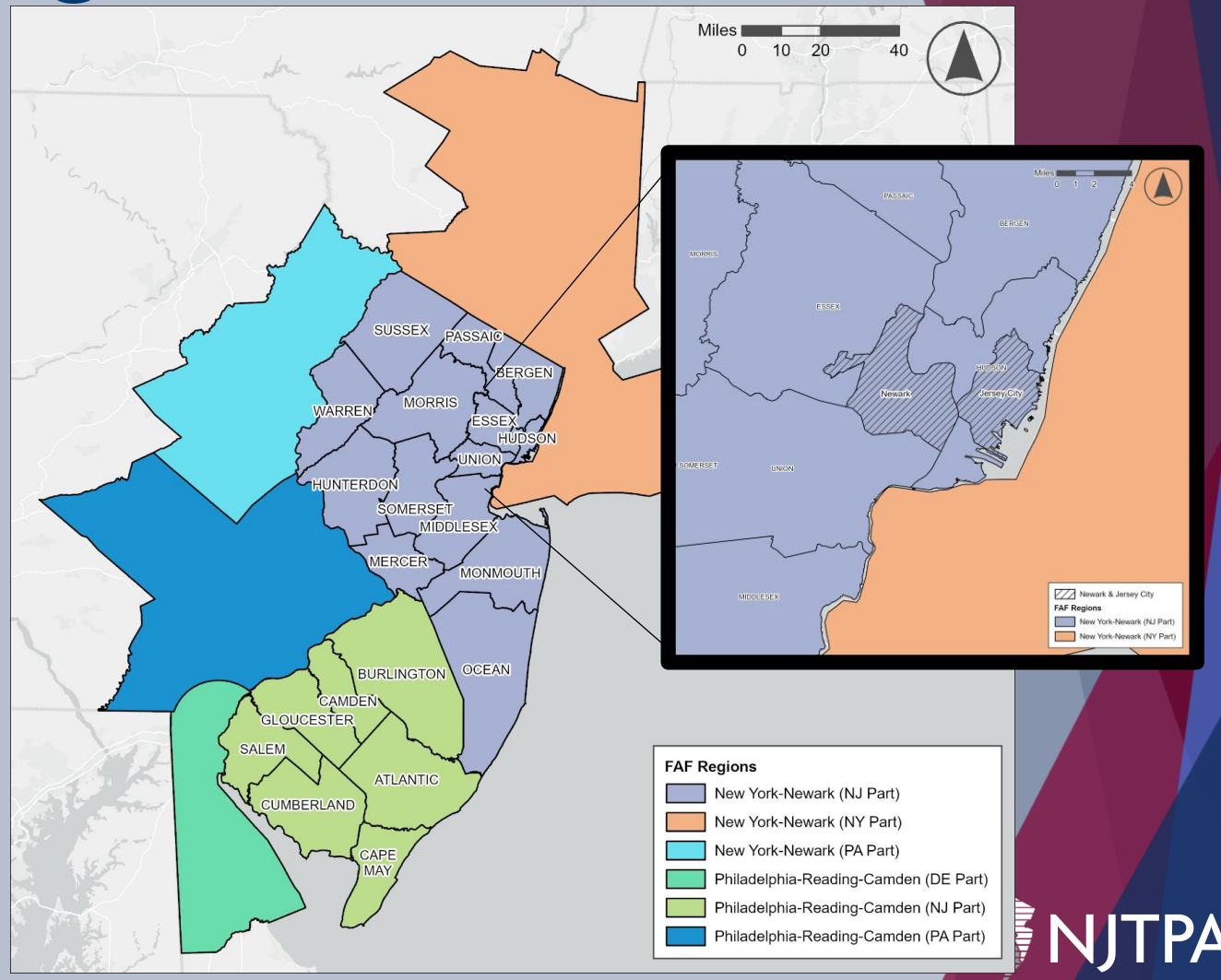
Freight Analysis Framework (FAF) Disaggregation

- FAF is a USDOT data product
- Large geographic zones necessitate disaggregation:
  - Counties in addition to Newark & Jersey City
  - Employment by NAICS (counties)
  - Zip code employment (sub-county)



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FAF Disaggregation (Ports)

Port flows are rolled up into "Port of NY/NJ - New Jersey side“, but terminals are in multiple counties

- Containerized & bulk freight distributed by terminal land area
- Motor vehicles assigned to Newark/Essex County
- Energy allocated:
  - 80% Middlesex
  - 20% Union

Marine Terminal Land Area Share

Principal Port	County Name	County FIPS	FAF Region	Land Area Share
Port Newark	Essex County	34013	341	21%
Port Jersey	Hudson County	34017	341	19%
Port Elizabeth	Union County	34039	341	60%

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Commodity Bundles

NJTPA Commodity Bundles		FAF Commodity Codes	
Number	Description	SCTG	Description
1	**Durable Consumer Products and Direct-to-Consumer**	39	Furniture
		40	Misc. mfg. prods.
		43	Mixed freight
		X	Direct to Consumer
2	**Food and Non-Durable Consumer Products**	6	Milled grain prods.
		7	Other foodstuffs
		8	Alcoholic beverages
		9	Tobacco prods.
		30	Textiles / Leather
3	**Agriculture, Meat, and Fish**	1	Live animals/fish
		2	Cereal grains
		3	Other ag prods.
		4	Animal feed
		5	Meat/seafood
4	**Wood and paper goods**	25	Logs
		26	Wood prods.
		27	Newsprint/paper
		28	Paper articles
		29	Printed prods.
5	**Waste**	41	Waste/scrap

NJTPA Commodity Bundles		FAF Commodity Codes	
Number	Description	SCTG	Description
6	**Aggregates**	10	Building stone
		11	Natural sands
		12	Gravel
		13	Nonmetallic minerals
		14	Metallic ores
		31	Nonmetal min. prods.
		32	Base metals
		33	Articles-base metal
7	**Machinery, Electronics, & Transportation Equipment**	34	Machinery
		35	Electronics
		36	Motorized vehicles
		37	Transport equip.
		38	*Precision instruments*
8	**Natural Gas**	19	Natural gas and other fossil products
9	**Other Energy Products**	15	Coal
		16	Crude petroleum
		17	Gasoline
		18	Fuel oils
10	**Pharmaceutical Drugs**	21	Pharmaceuticals
11	**Chemicals**	20	Basic chemicals
		22	Fertilizers
		23	Chemical prods.
		24	Plastics/rubber

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E-Commerce Trip Table Development & Forecasting

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E-Commerce Forecast and Trip Table Development

- Last-mile deliveries associated with e-commerce are not in FAF
- 2050 FILF Study (2020) was a first attempt
- New data are now available to aid in improving the process

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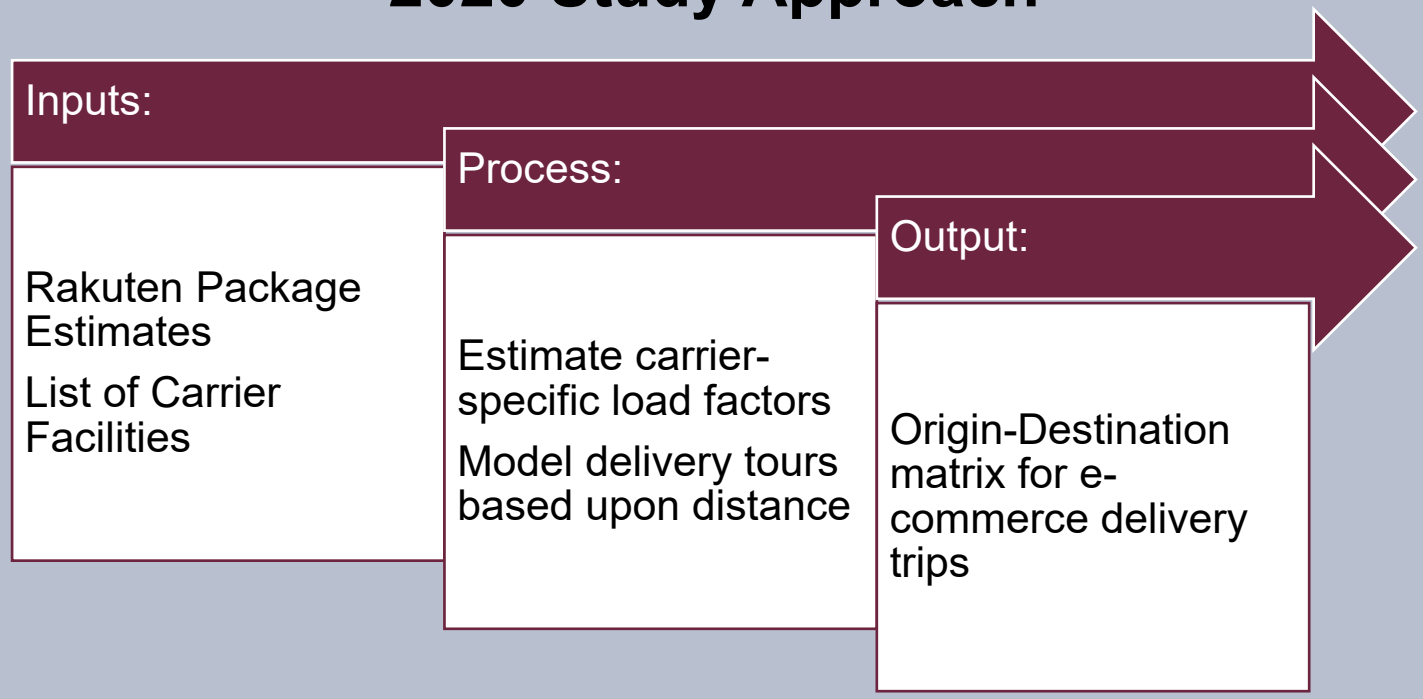
New Data, Improved Method

2020 Study Approach



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New Data, Improved Method

2025 Study Approach

Inputs:

- Nielsen Package Estimates
- List of carrier facilities
- Sample of scan history
- LOCUS Truck delivery tour sample
- Truck trip generation factors by facility type

Process:

- Estimate carrier-specific load factors
- Profile last 3 scans for each carrier
- Review sample of delivery tour trip patterns
- Model delivery tours based upon distance
- Compare facility trip generation to Gen Factors
- Forecast future demand based upon retail industry dynamics and demographic forecasts

Output:

IMPROVED Origin-Destination matrix for e-commerce delivery trips

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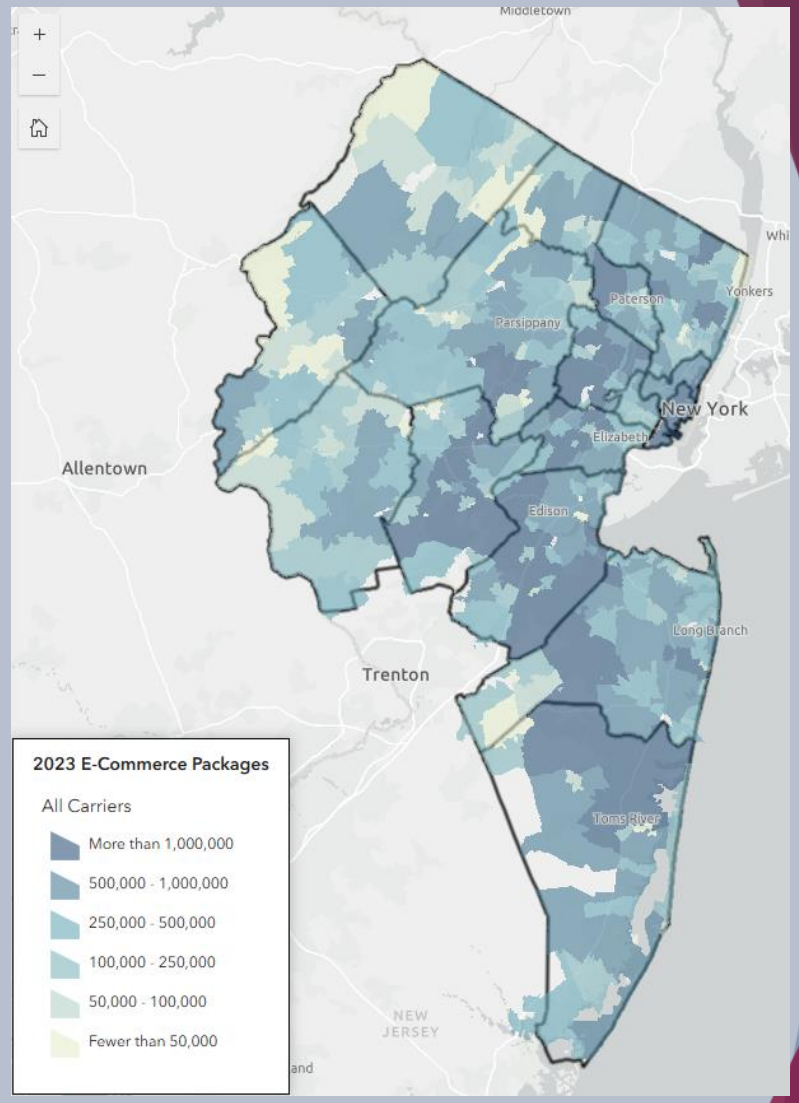
E-Commerce Demand

- Package count increased **237%** (2018-2023); compared to 217% nationally
- 10 zip codes had **2 million+** packages delivered:
  1. 07030 (Hoboken)
  2. 07302 (Downtown JC)
  3. 07470 (Wayne)
  4. 08753 (Toms River)
  5. 07003 (Bloomfield)
  6. 07090 (Westfield)
  7. 07666 (Teaneck)
  8. 08701 (Lakewood)
  9. 07960 (Morristown)
  10. 07726 (Manalapan, Marlboro)

220M packages in 2023



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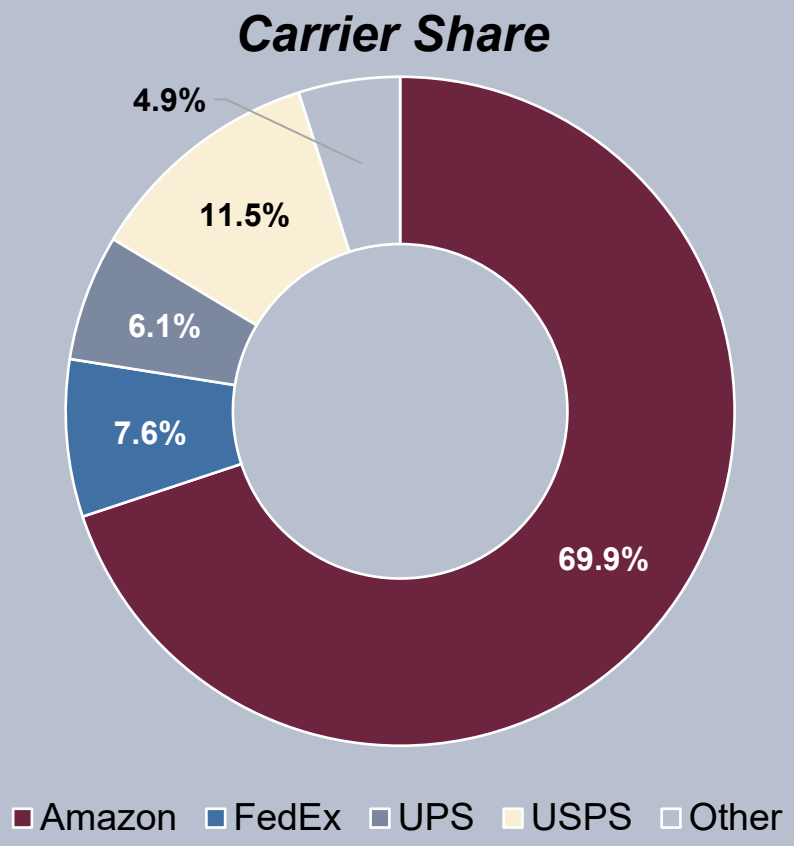
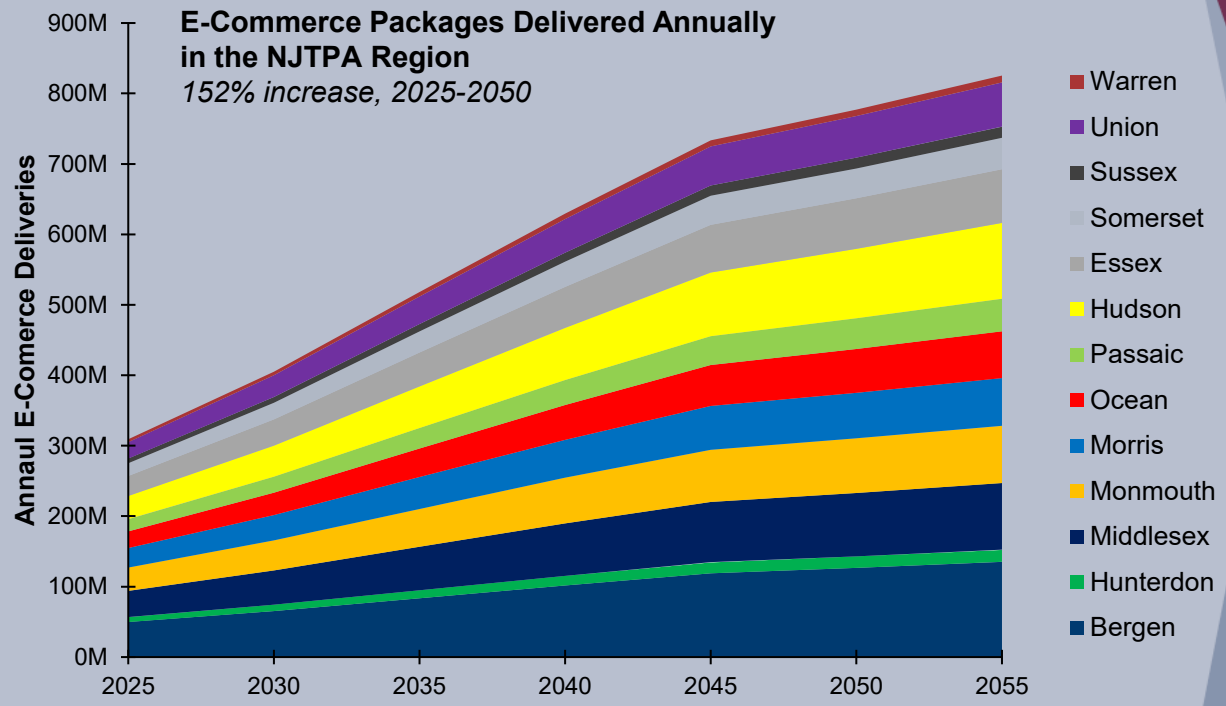
E-Commerce Demand in NJTPA Region





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E-Commerce Movement

- E-commerce packages slowly propagate throughout East Coast
  - Image going backwards in time

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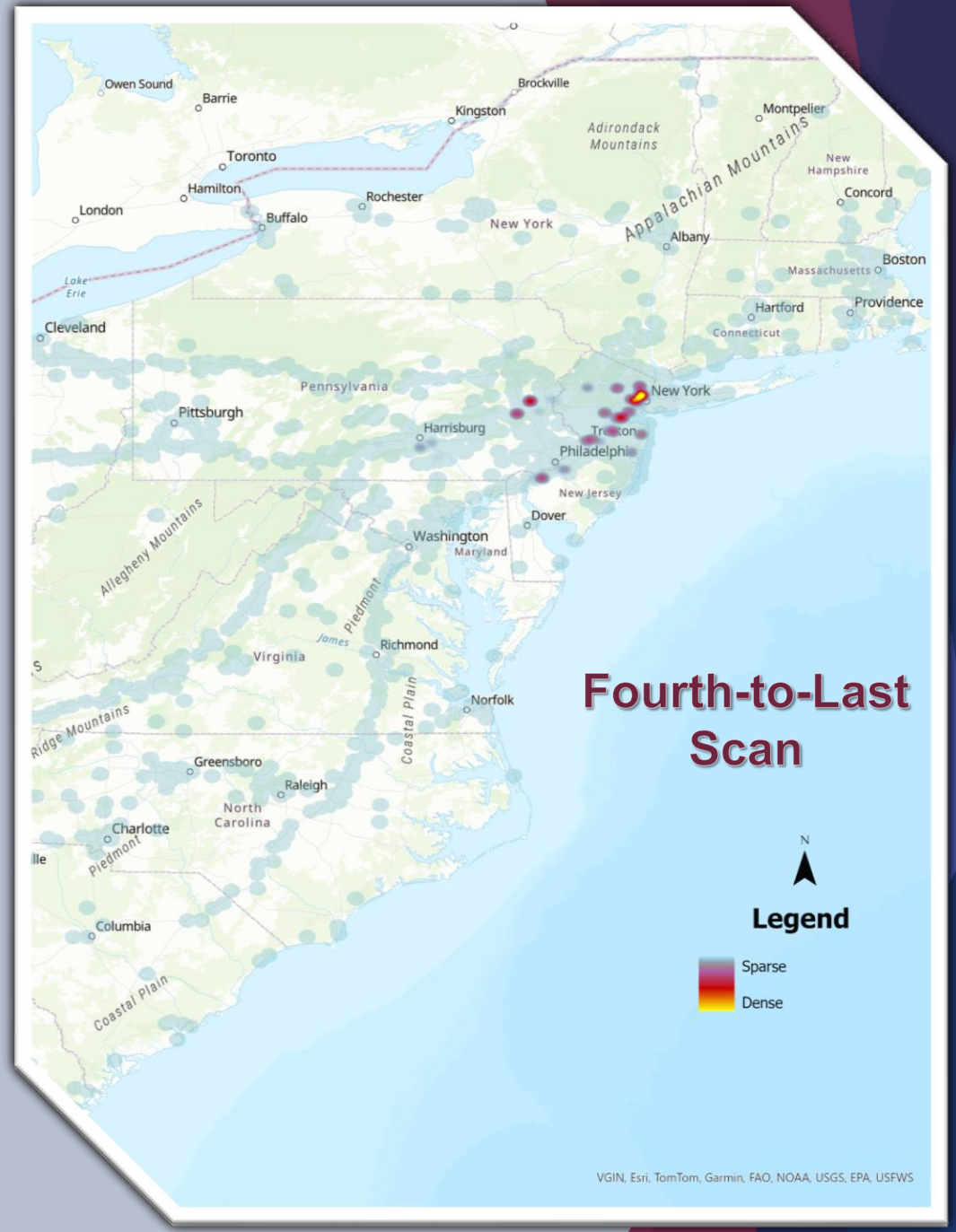

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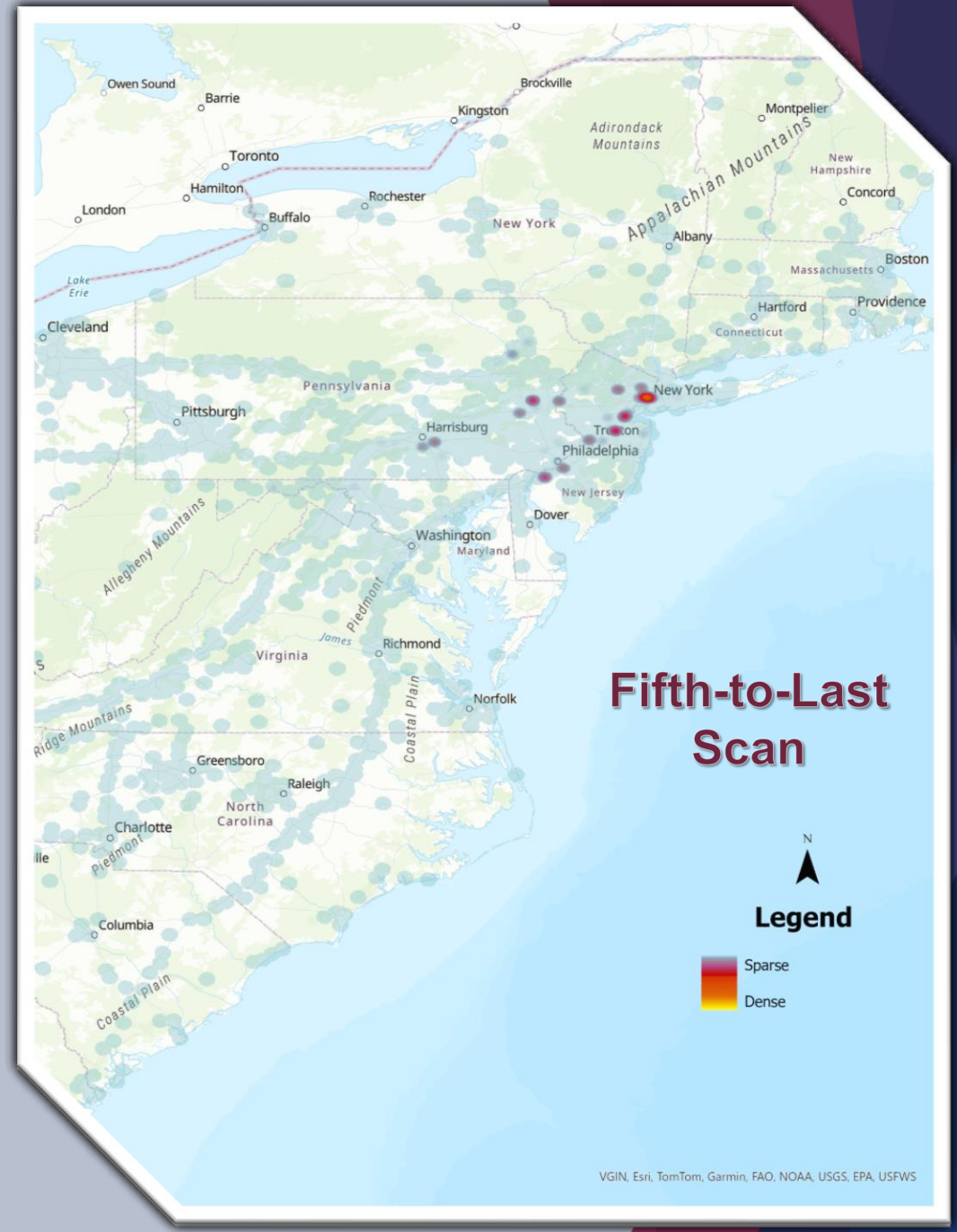
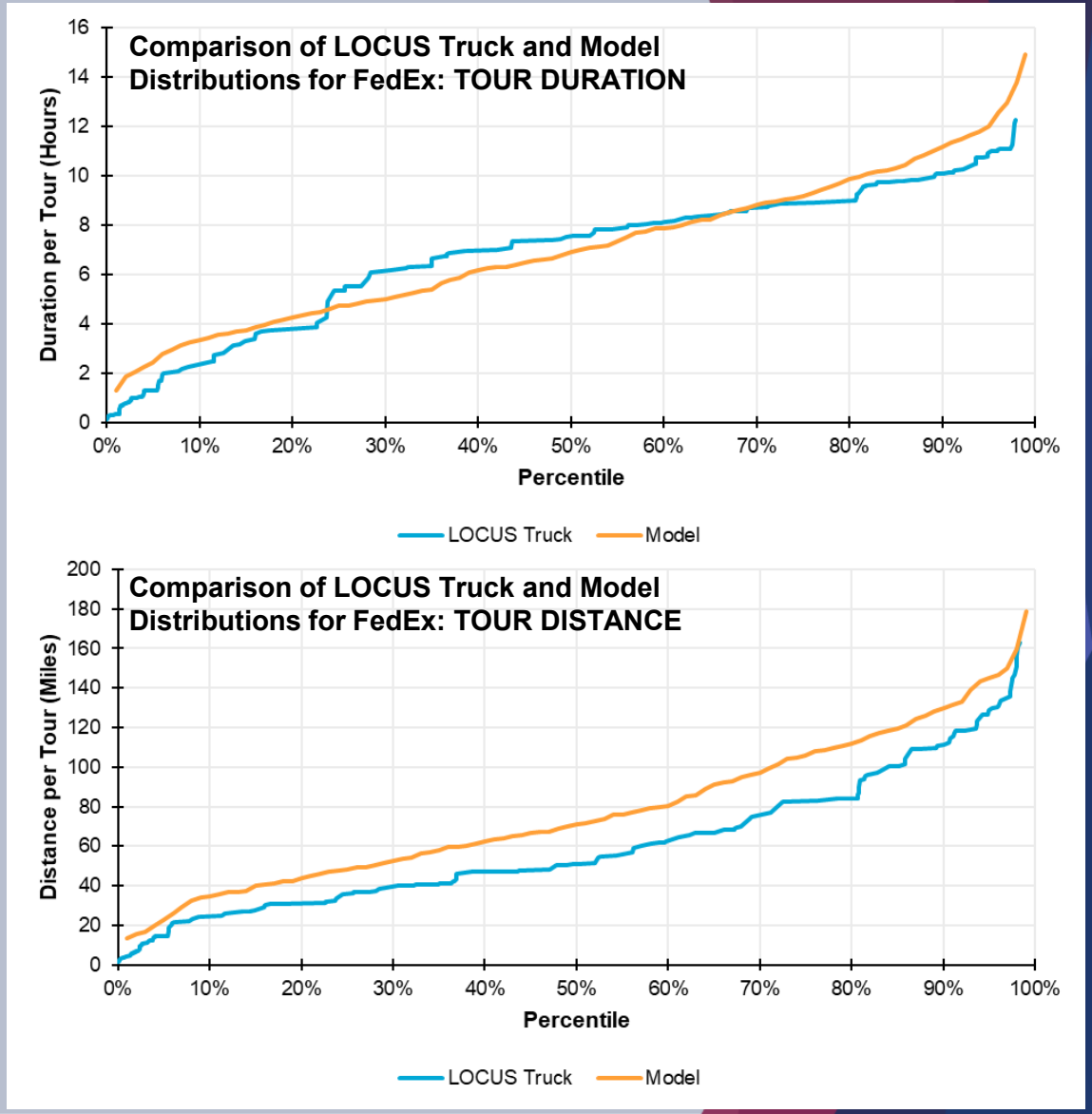


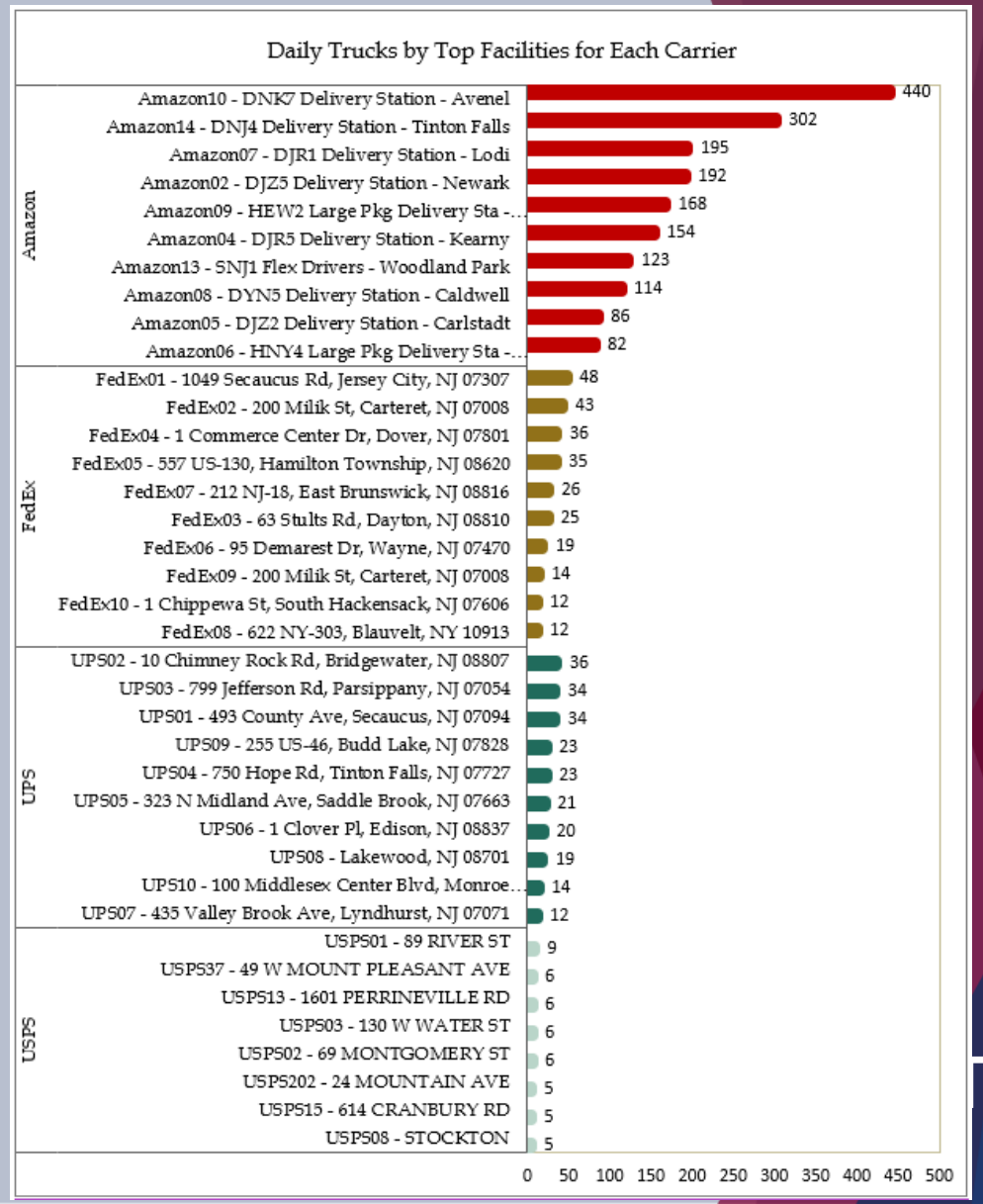
Modeling Trips and Tours

- Carrier facility locations and package allocation to zip codes using scan history
- Clustering and tour formation
  - Stop density differs by residential density
  - Clustering algorithm to define truck tours
  - Stop sequencing and optimization using nearest neighbor
  - Truck speeds and stop times used in lieu of skims
  - Model calibrated, compared to LOCUS delivery vehicle GPS data



Modeling Trips and Tours

- Daily trucks by tour origin (aka, estimated delivery trip generation) for each facility
  - Graph shows top ten facilities for each major carrier



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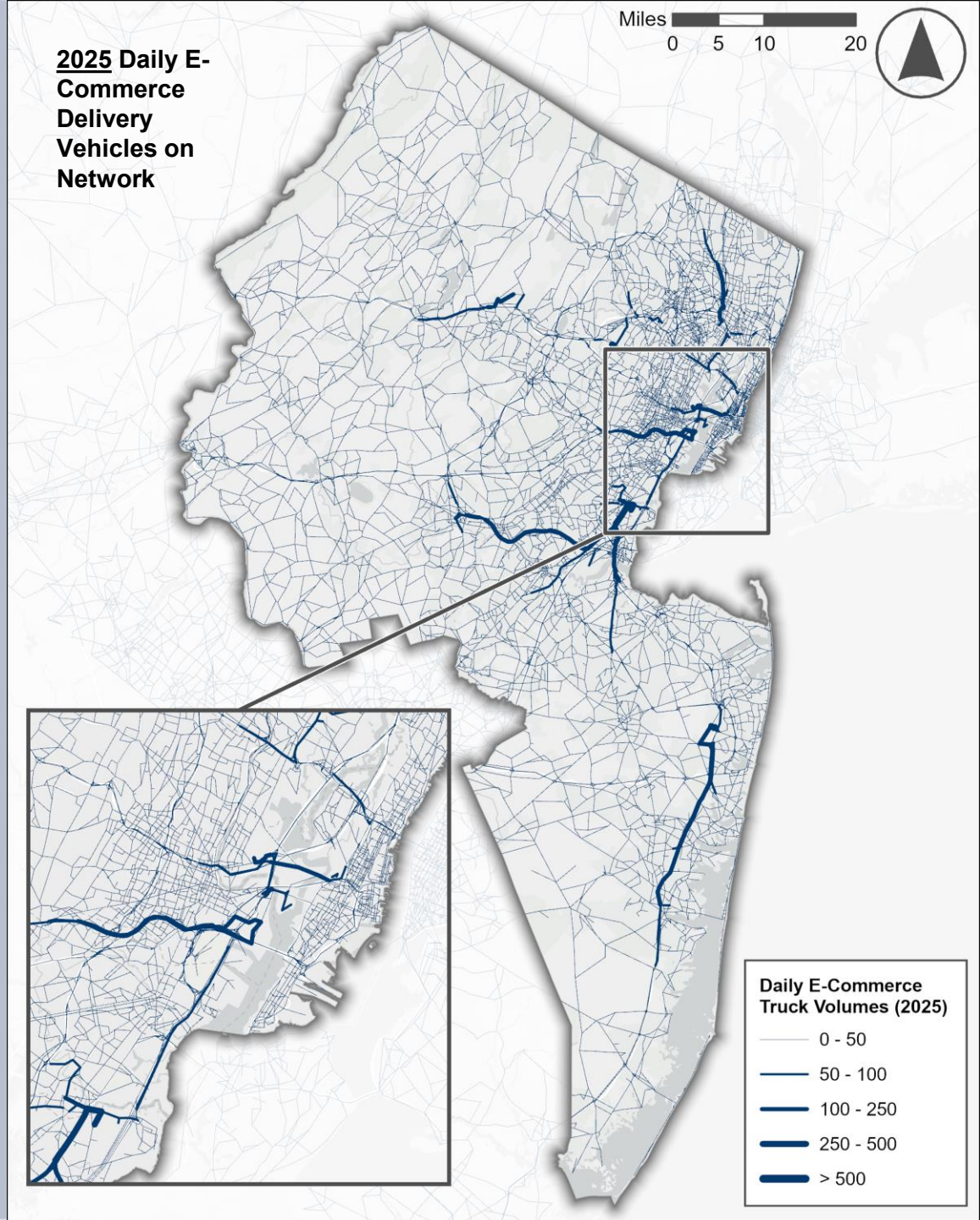
Assignment to the NJRTM-E Network

- Most of the tours go into residential areas and minor roads and streets
- But the major interstate and state highways provide important connections between the carrier facilities and delivery locations



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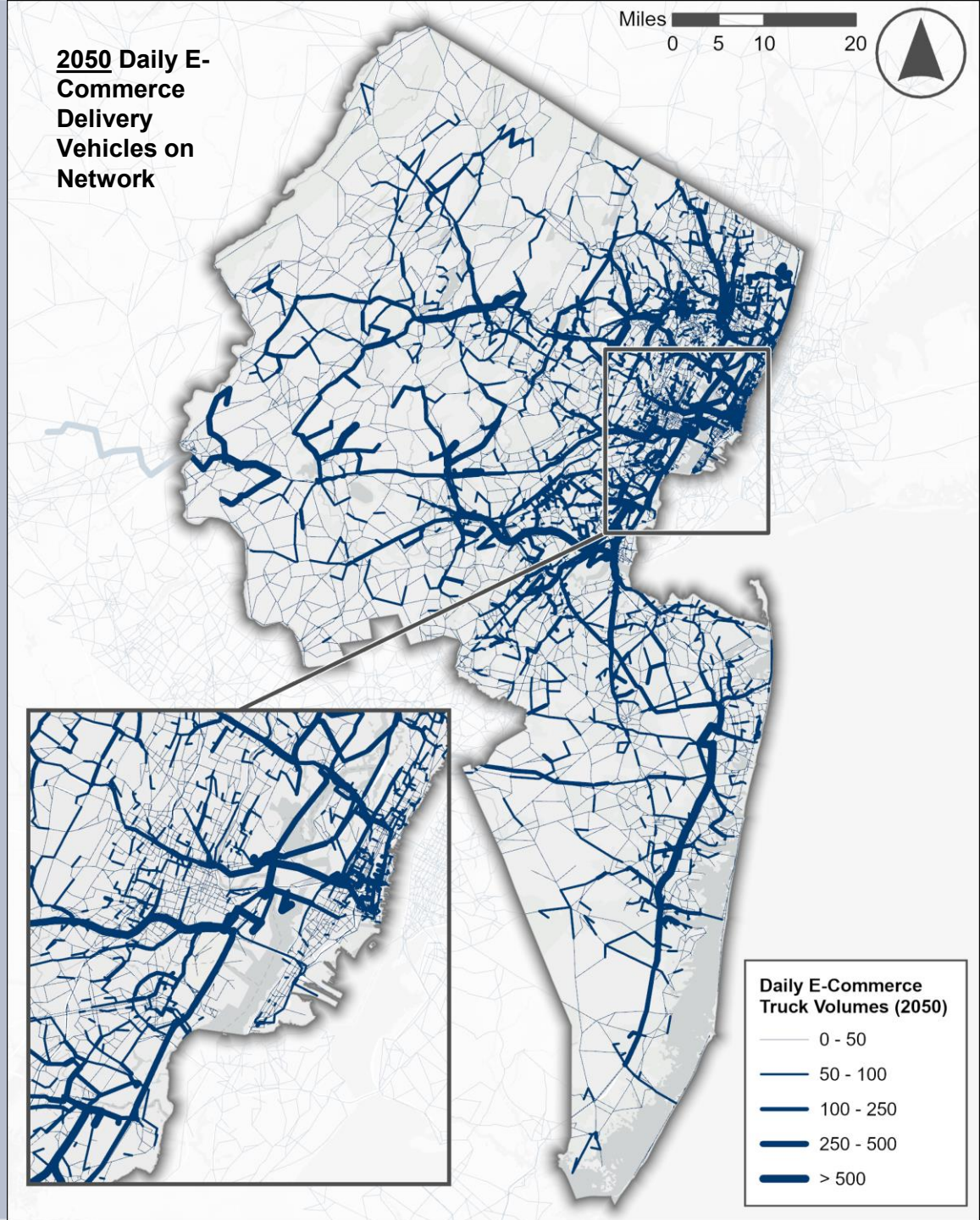

Business Establishments

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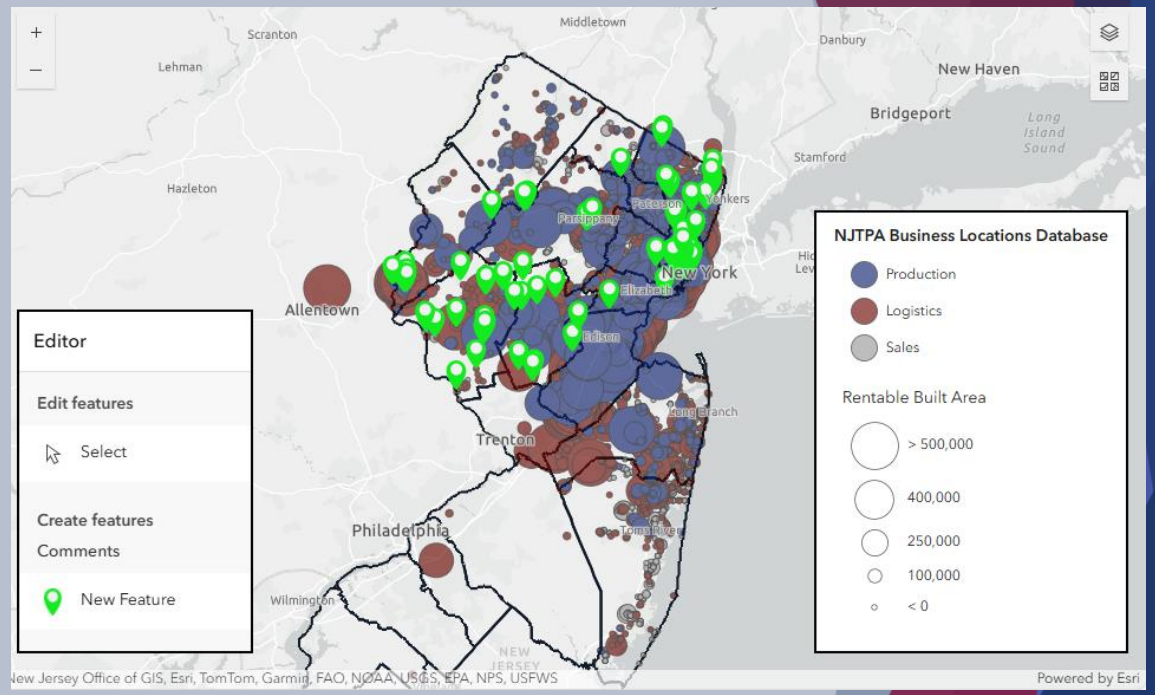
Business Establishments Data Sources

- Industrial real estate data from CoStar
- Sales-related business data from Infogroup
- Labor market analytics from Lightcast
- Business and industry company information from Mergent Intellect
- Review and input from participating subregions



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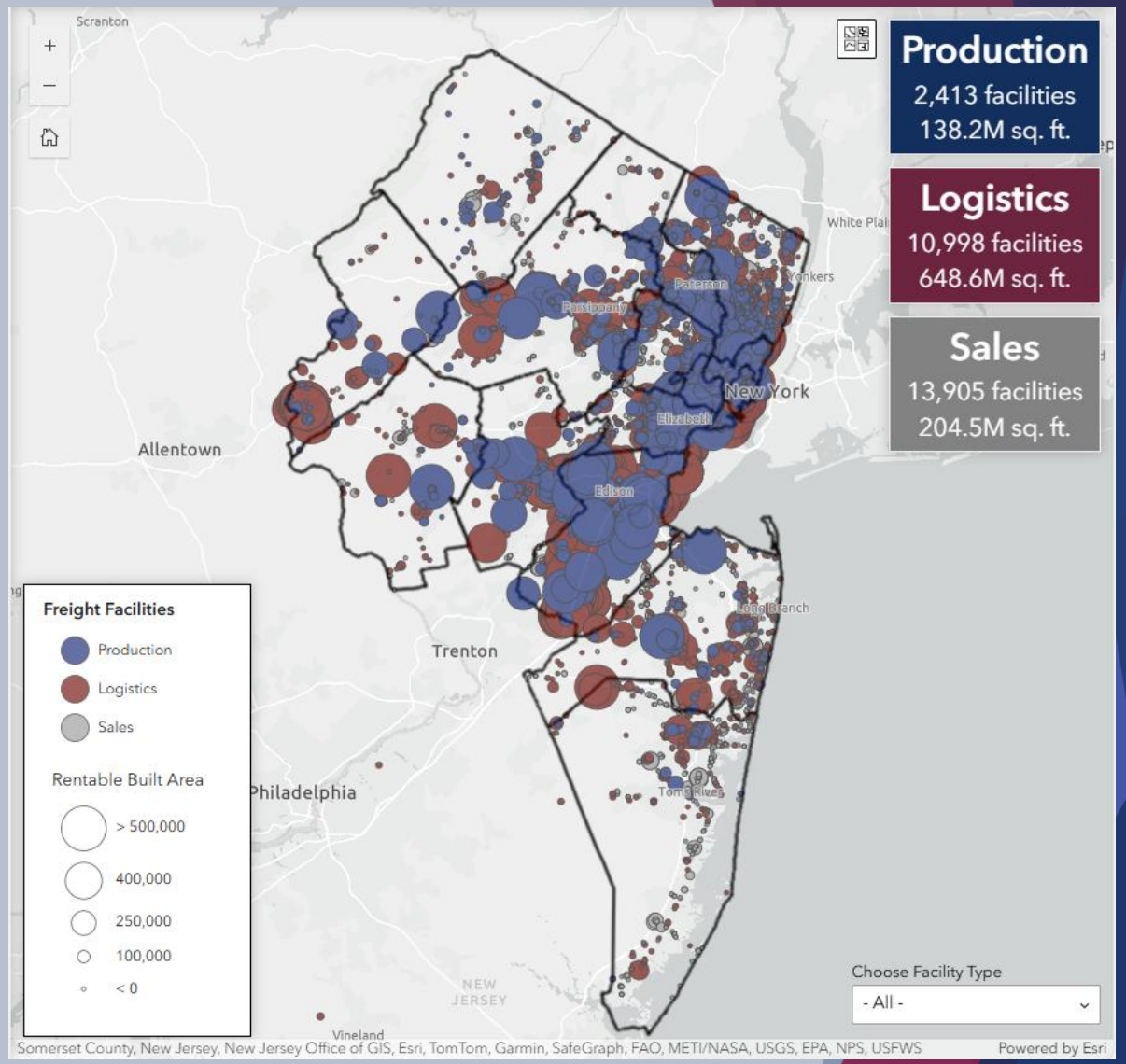
Business Establishment Mapping

- Establishments coded by:
  - Commodity bundle
  - Size (square feet)
  - Function:
    - Production (e.g., manufacturing, mining, agriculture)
    - Logistics (e.g., warehousing, distribution)
    - Sales (e.g., retail, or other end user locations)



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FFT Updates and Enhancements

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FFT Updates and Enhancements

- Incorporating latest economic forecast data, disaggregated FAF, and e-commerce data and forecast;
- Updating and enhancing the FFT, improving user selection, processing, and outputs generated;
- Developing updated and new “what-if” scenarios;
- Adding a FAF disaggregation module into the FFT

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Economic and What-If Scenarios

- **Updated (from previous):**
  - Changes to in-migration/urbanization
  - Increase out-migration
  - Increased NJ self sufficiency
  - Limits to pace of globalization
  - Shifting international trade patterns
  - Trans-Atlantic Free Trade Area
  - Manufacturing near-shoring to Mexico
  - Manufacturing technology
  - Mode share balance: Truck/Rail
  - Mode share balance: Truck/Water
- **New What-If Scenarios:**
  - Fluctuation in fossil fuel commodities
  - Increase in advanced domestic manufacturing
  - Change in natural gas production
  - Northeast New Jersey growth
  - Investment in marine highways
  - Port growth
  - Increased agricultural production

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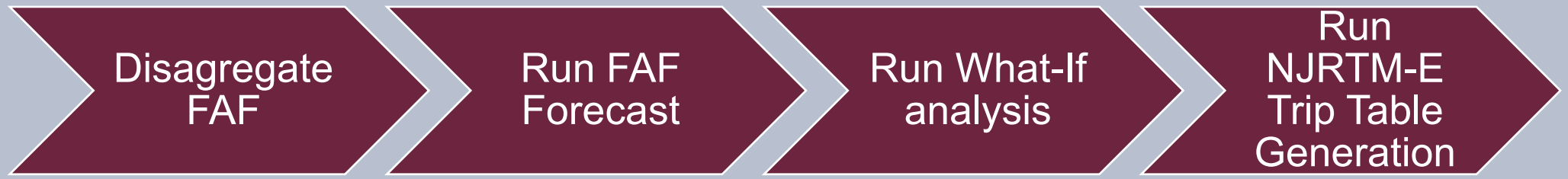
FFT Workflow



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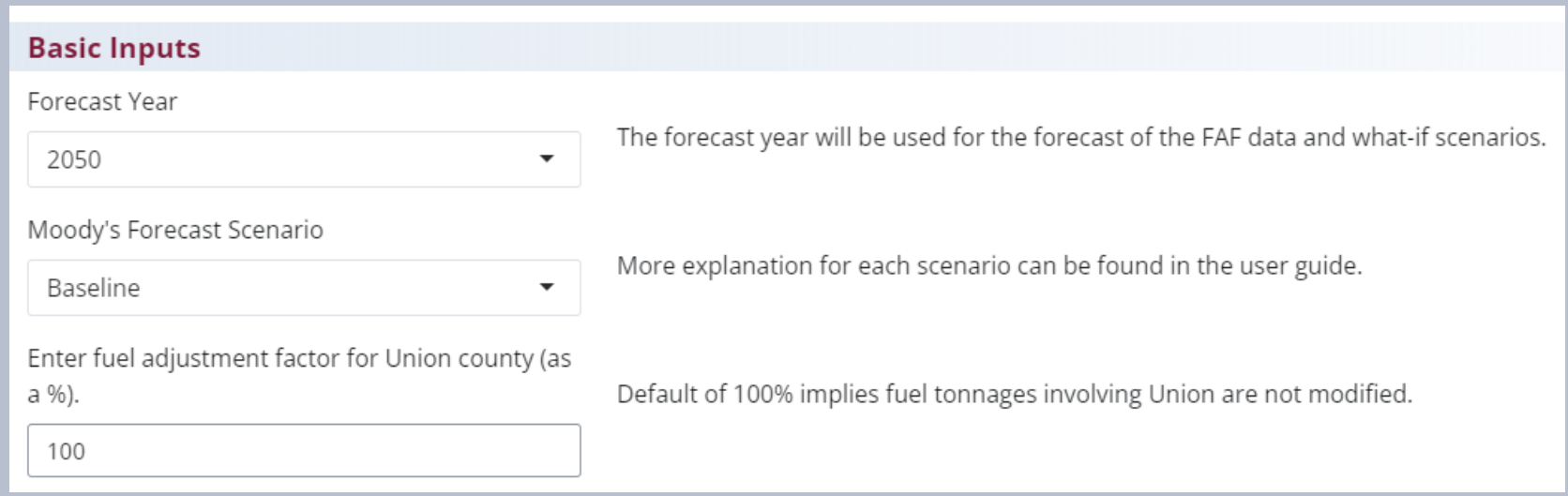
Forecast Module



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Forecast Module

E-Commerce Factors

Enter the average weight of an Ecommerce Package in pounds.

2

This value is an average per package value used to estimate the overall tonnage of e-commerce packages deliver in the region. The reccomended value is 2 pounds.

Enter the average value of an Ecommerce Package in $USD

159

This value is an average per package value used to estimate the overall value of e-commerce pacakges in the region. The reccomended value is $159.

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What-If Scenarios Module

What-ifs File Controls

Select the file location of the Freight forecast to apply what-if scenarios to. By default the app will load the outputs of a model run.

Load FAF Forecast to apply what-if scenarios to

no file selected ⊗

Select a name for the What-If output. The output will be saved in the directory selected for the Freight Forecast Module.

FAF_Forecast_WhatIf_2025-05-30

☐ Save What-if Results

☑ Load What-if results for NJTRTM-E Trip Table module

What-if Scenarios

Choose scenarios to include in analysis and provide required values as suggested in the text

Changes to In-Migration/Urbanization

○ On
◉ Off

Percent change from forecast, annualized

0.5

Adds or subtracts X% per year of additional growth to all flows originating and terminating in NJTPA (relative to scenario forecast). Recommended Value: 0.5%

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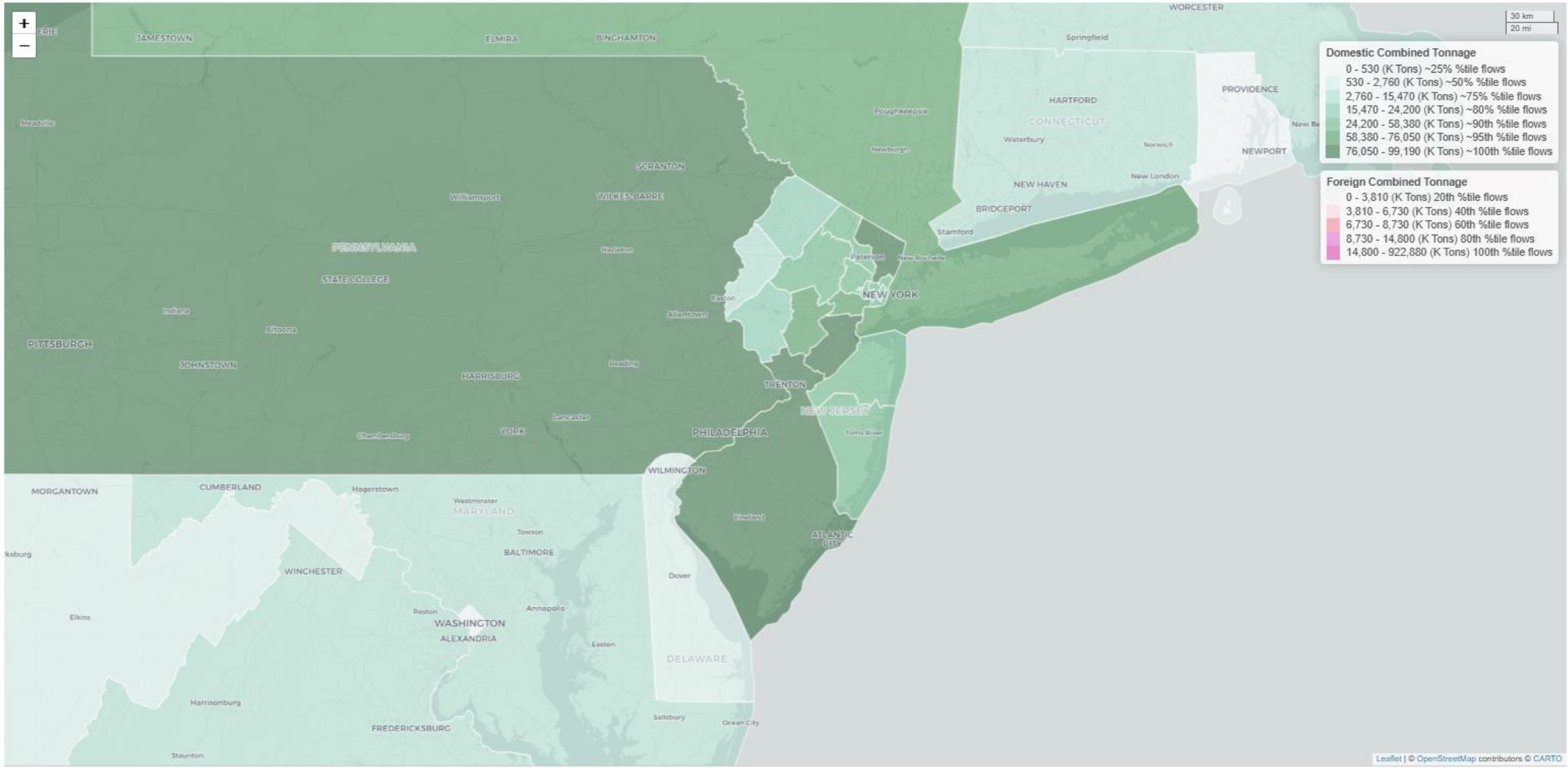
SAMPLE FFT OUTPUT

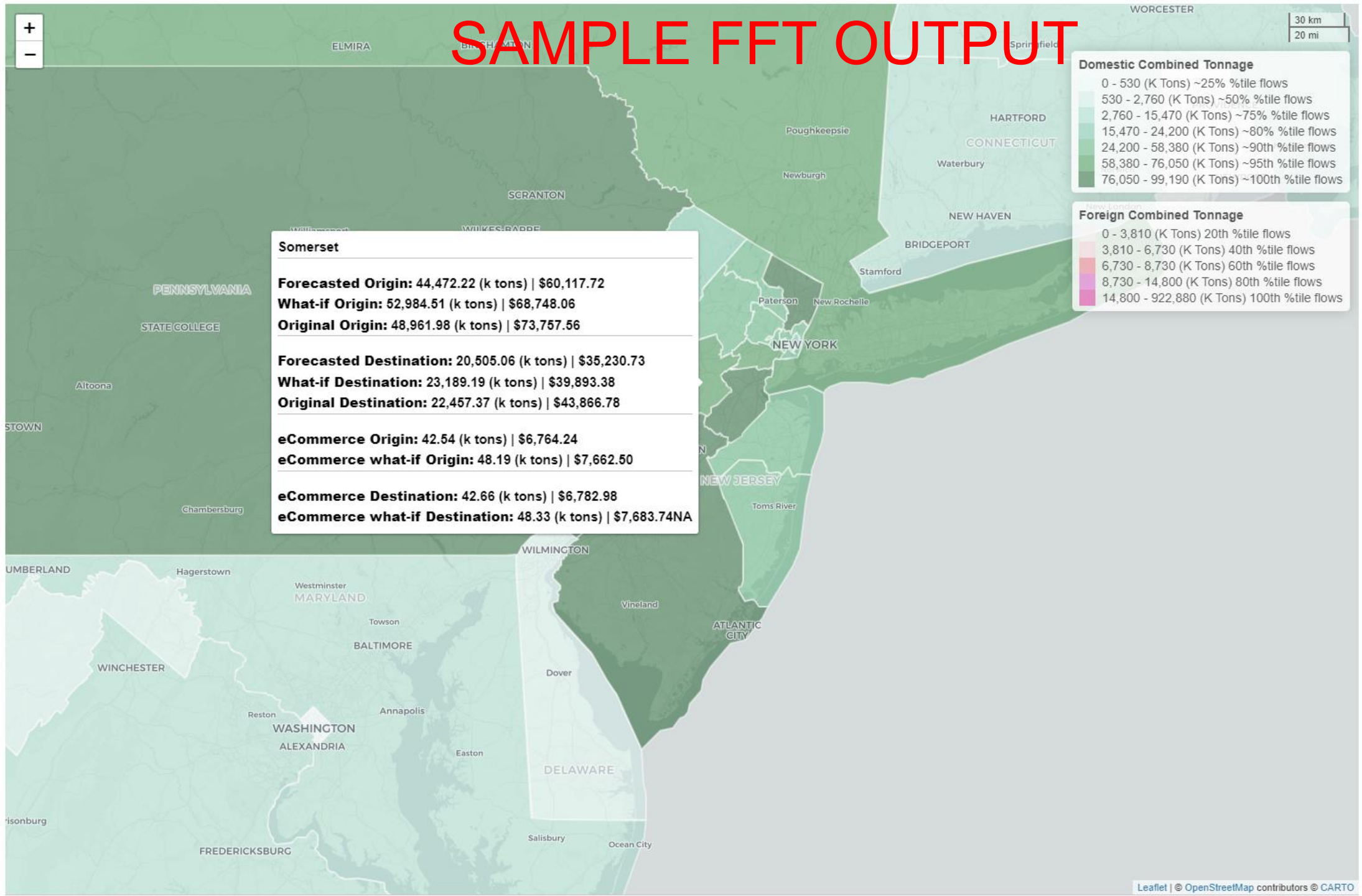
NJTPA FFT | Freight Forecast | What-if Scenarios | Outputs | NJTRTMF Trip Tabl | Disaggregate FAF Dataset

Map | NJ Origins | NJ Destinations

Output Sub-Tabs

Map




SAMPLE FFT OUTPUT
Somerset
Forecasted Origin: 44,472.22 (k tons) | $60,117.72
What-if Origin: 52,984.51 (k tons) | $68,748.06
Original Origin: 48,961.98 (k tons) | $73,757.56
Forecasted Destination: 20,505.06 (k tons) | $35,230.73
What-if Destination: 23,189.19 (k tons) | $39,893.38
Original Destination: 22,457.37 (k tons) | $43,866.78
eCommerce Origin: 42.54 (k tons) | $6,764.24
eCommerce what-if Origin: 48.19 (k tons) | $7,662.50
eCommerce Destination: 42.66 (k tons) | $6,782.98
eCommerce what-if Destination: 48.33 (k tons) | $7,683.74NA
Domestic Combined Tonnage
0 - 530 (K Tons) ~25% %tile flows
530 - 2,760 (K Tons) ~50% %tile flows
2,760 - 15,470 (K Tons) ~75% %tile flows
15,470 - 24,200 (K Tons) ~80% %tile flows
24,200 - 58,380 (K Tons) ~90th %tile flows
58,380 - 76,050 (K Tons) ~95th %tile flows
76,050 - 99,190 (K Tons) ~100th %tile flows
Foreign Combined Tonnage
0 - 3,810 (K Tons) 20th %tile flows
3,810 - 6,730 (K Tons) 40th %tile flows
6,730 - 8,730 (K Tons) 60th %tile flows
8,730 - 14,800 (K Tons) 80th %tile flows
14,800 - 922,880 (K Tons) 100th %tile flows
30 km
20 mi
WORCESTER
ELMIRA
HARTFORD
CONNECTICUT
Poughkeepsie
Waterbury
Newburgh
SCRANTON
NEW HAVEN
BRIDGEPORT
Stamford
PENNSYLVANIA
Paterson
New Rochelle
STATE COLLEGE
NEW YORK
Altoona
NEW JERSEY
Toms River
Chambersburg
WILMINGTON
Hagerstown
Westminster
MARYLAND
Vineland
ATLANTIC CITY
Towson
BALTIMORE
WINCHESTER
Dover
Reston
Annapolis
WASHINGTON
ALEXANDRIA
Easton
DELAWARE
Salisbury
Ocean City
FREDERICKSBURG
Leaflet | © OpenStreetMap contributors © CARTO

Totals and Overview

SAMPLE FFT OUTPUT

Original compared to Forecast

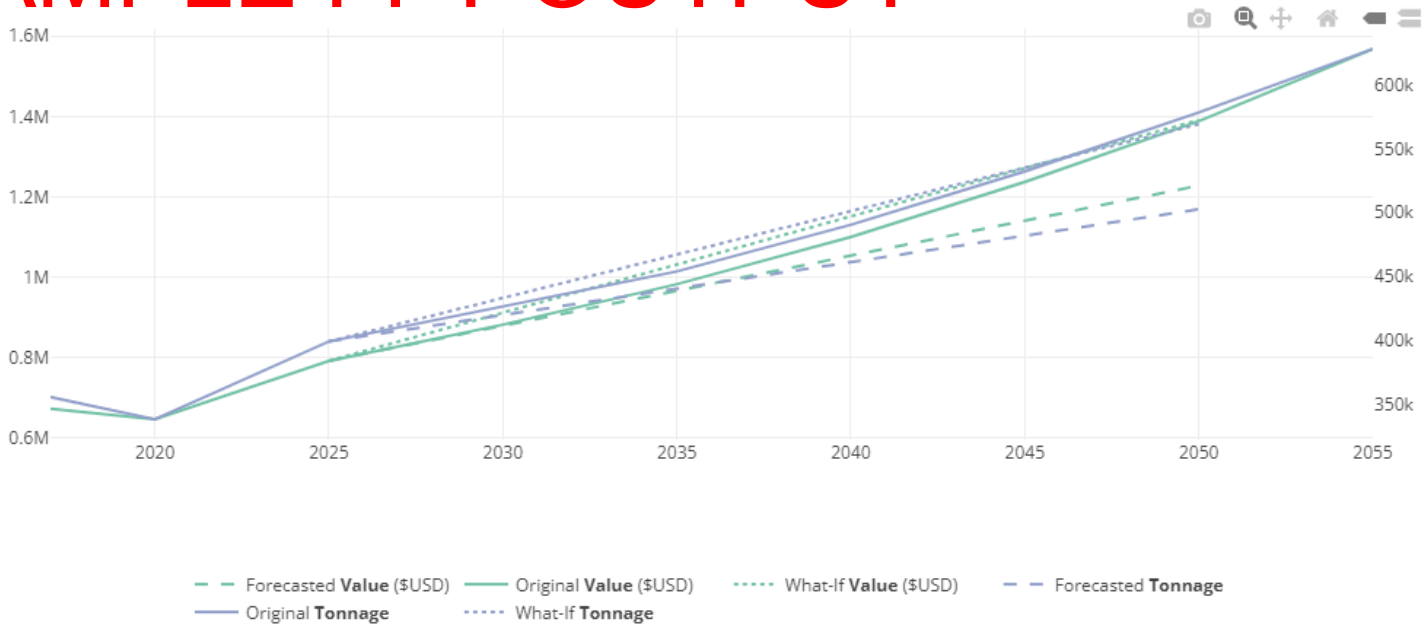
- **Tonnage - Percent Difference: -23.88%**
- **Value - Percent Difference: -4.19%**
- **Tonnage - Original CAGR: 1.49% Forecast CAGR: 0.39%**
- **Value - Original CAGR: 2.26% Forecast CAGR: 2.08%**

Original compared to What-if

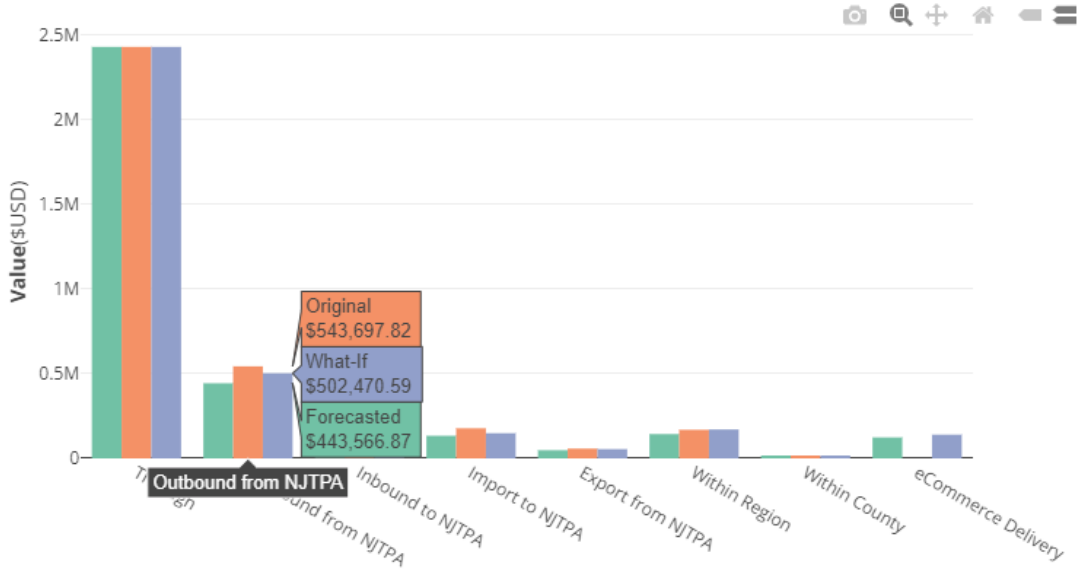
- **Tonnage - Percent Difference: -19.34%**
- **Value - Percent Difference: 0.08%**
- **Tonnage - Original CAGR: 1.49% What-if CAGR: 0.62%**
- **Value - Original CAGR: 2.26% What-if CAGR: 2.26%**

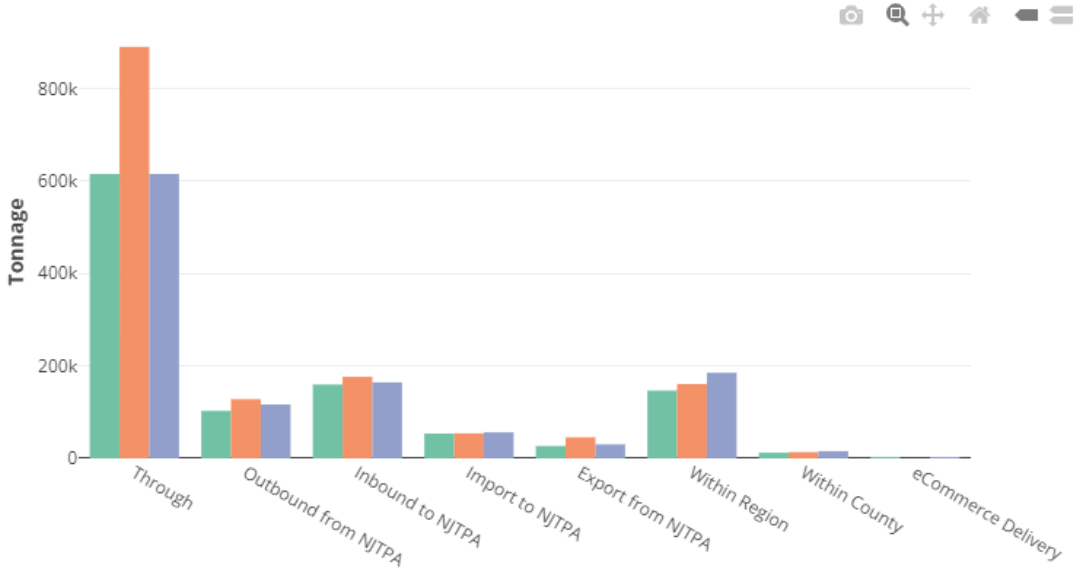
What-if compared to Forecast

- **Tonnage - Percent Difference: 5.96%**
- **Value - Percent Difference: 4.46%**



Flow Direction and Type





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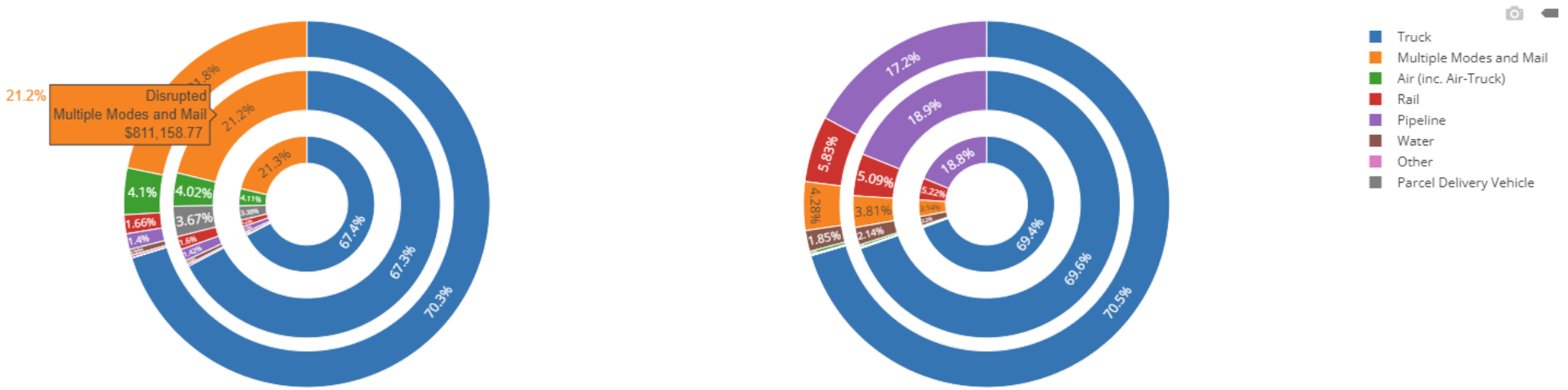
SAMPLE FFT OUTPUT

Commodities

Mode



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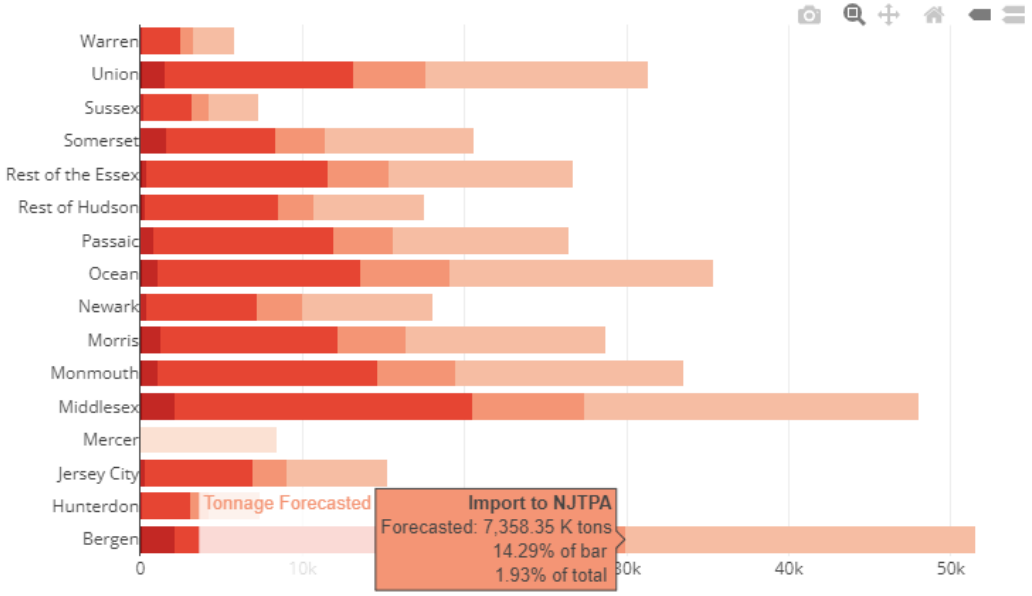
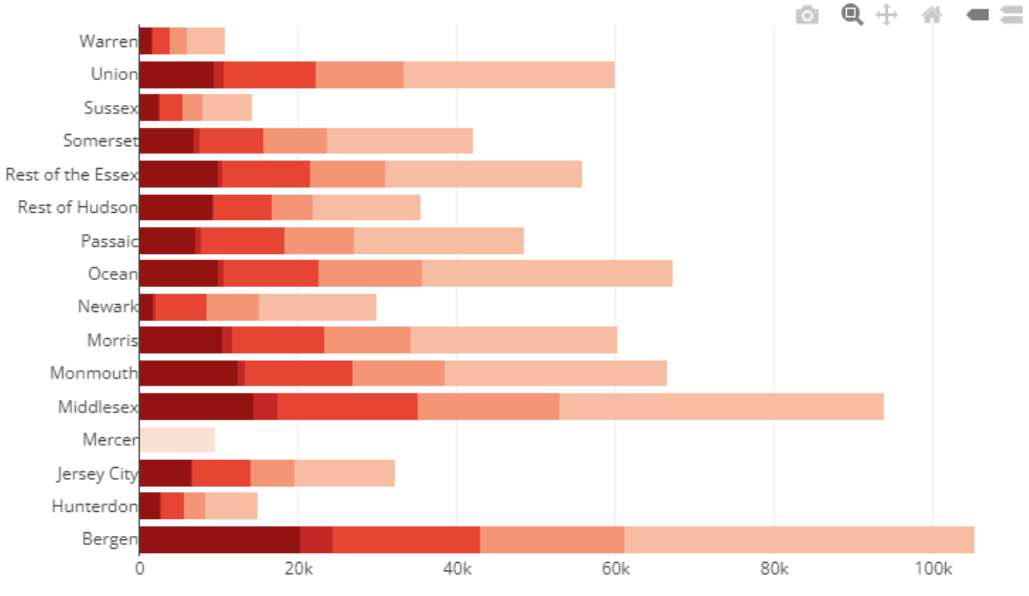
. . . by Flow Direction and Type

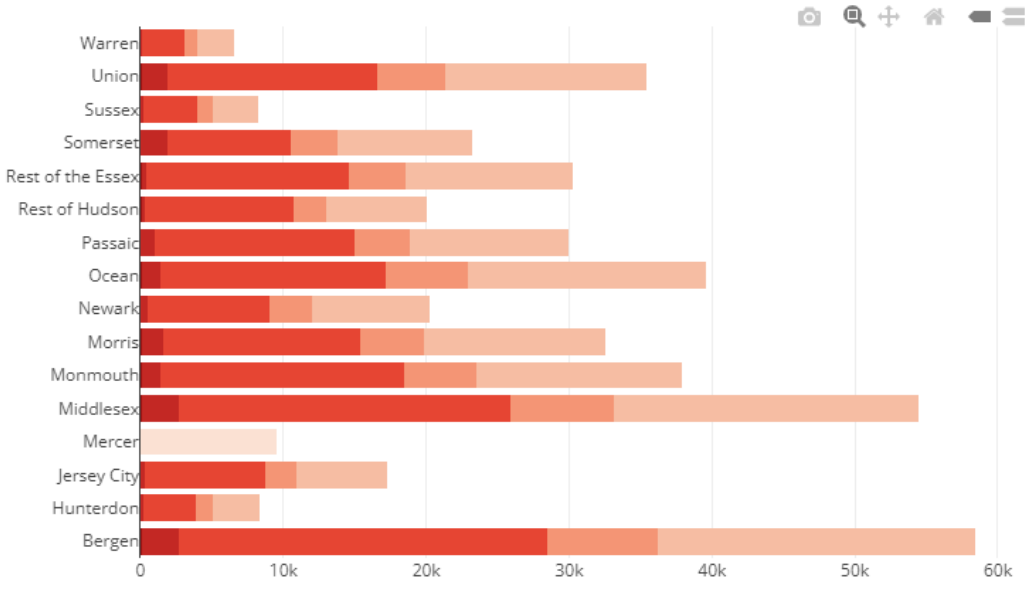
SAMPLE FFT OUTPUT

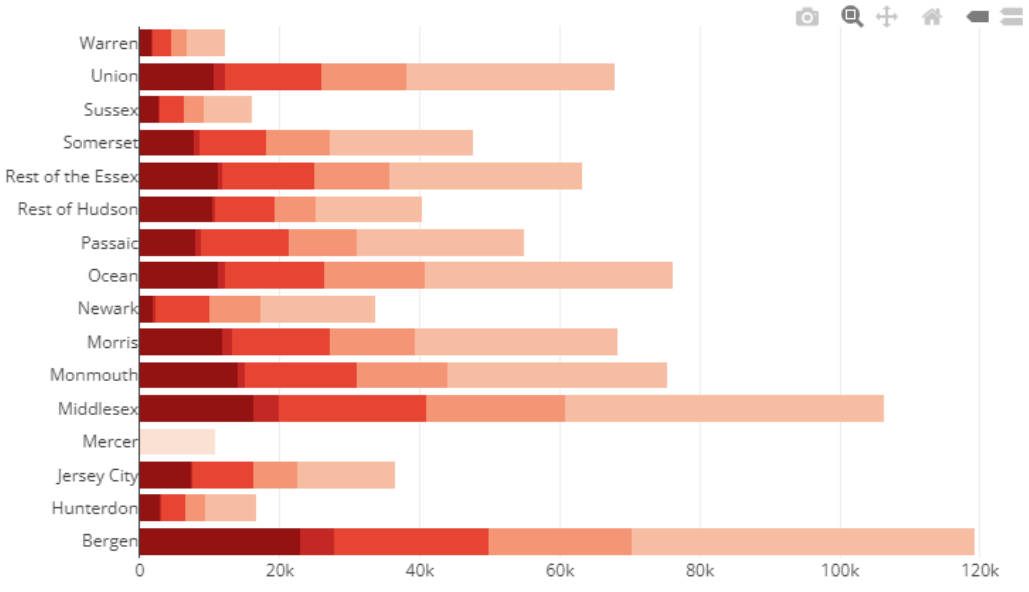
Forecast results





What - If results





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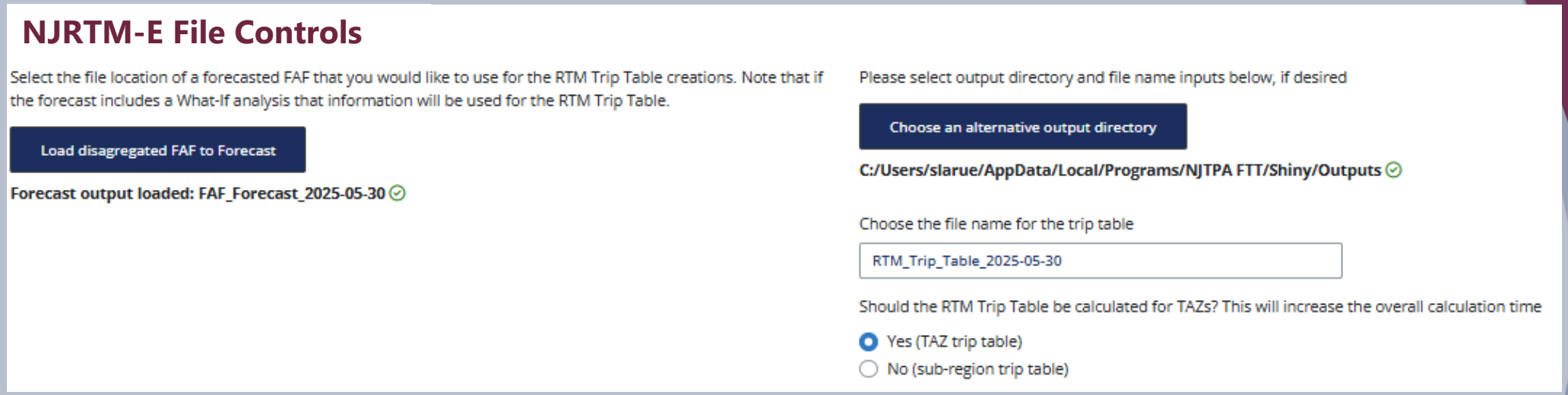
NJRTM-E Trip Table Module



- Options to adjust commodity bundle-specific payload factors, and/or adjust potential technology/efficiency that eliminate double moves

NJTPA

Data Dashboards

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Data Dashboards

- Present key outputs of the Freight Industry Level Forecasts Update Study
- Replaces the regional, subregional, and commodity profile brochures from previous studies
- Includes “high,” “medium,” and “low” economic growth scenario outputs
- Selections and queries allow users to find data points most relevant to their needs/interests

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Demo

Regional Profiles | Commodity Profiles

Demonstration of the Regional Profiles and Commodity Profiles Dashboards

NJTPA

Thank you!

Jakub Rowinski, NJTPA

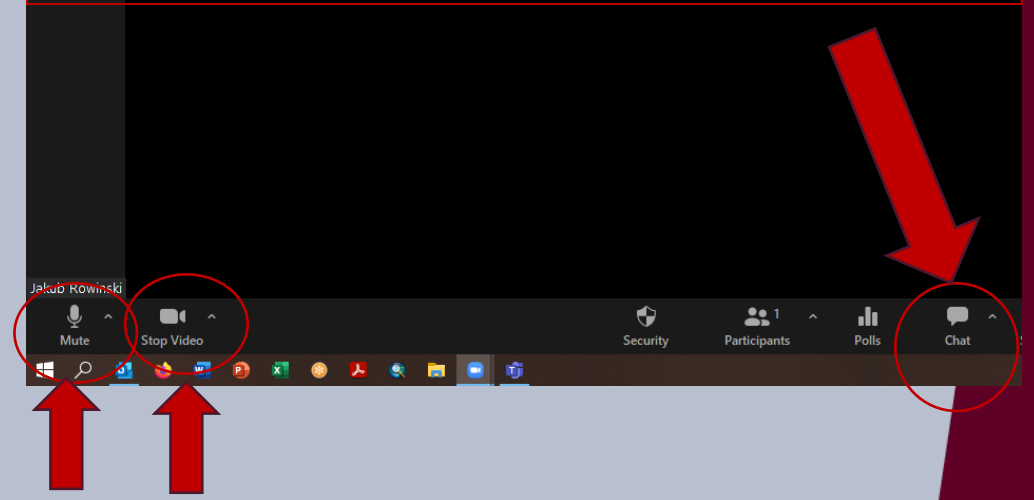
jrowinski@njtpa.org

NJTPA NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY

Defining the Vision. Shaping the Future.

June Freight Initiatives Committee

Please use the Chat box to ask questions during the presentations and if requesting credits, please post your name and email, followed by either AICP or PE with your NJ PE license number



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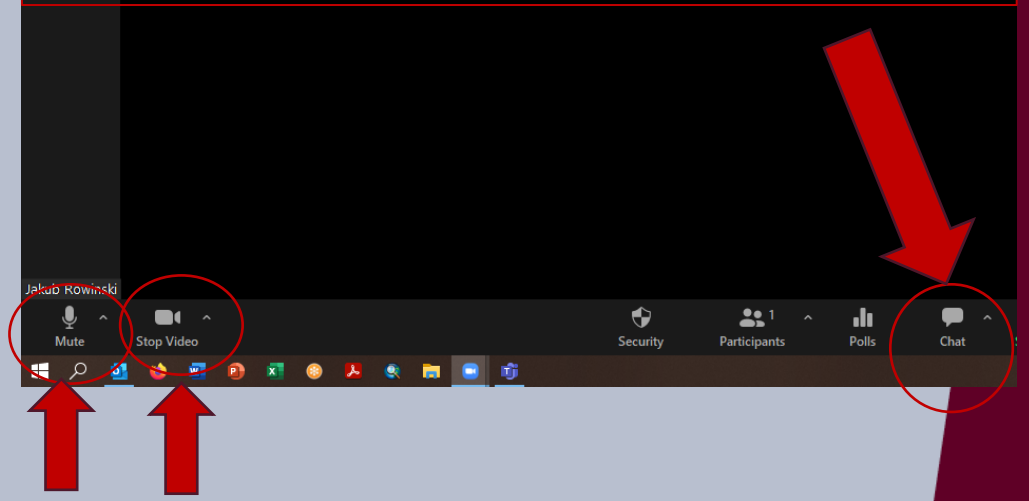
June 16 Freight Initiatives Committee Agenda

- Roll Call
- Approval of Minutes
- Update on NJTPA Freight Division Activities
- NJTPA's 2050 Freight Industry Level Forecasts Update
- Two-Minute Reports on Freight Activities from Committee Members
- Next Meeting: Monday, August 18, 2025
- Adjournment

Please use the Chat box to ask questions during the presentations and if requesting credits, please post your name and email, followed by either AICP or PE with your NJ PE license number



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