



Regional Freight Delay and Commodities Movement Study

E-commerce, mobility and reliability, and regional findings

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Main Study Objectives

- Identify highest volumes and values of commodities
- Explore increases in e-commerce and delivery
- Examine congestion and unreliability on the transportation system
- Make recommendations for future freight policy

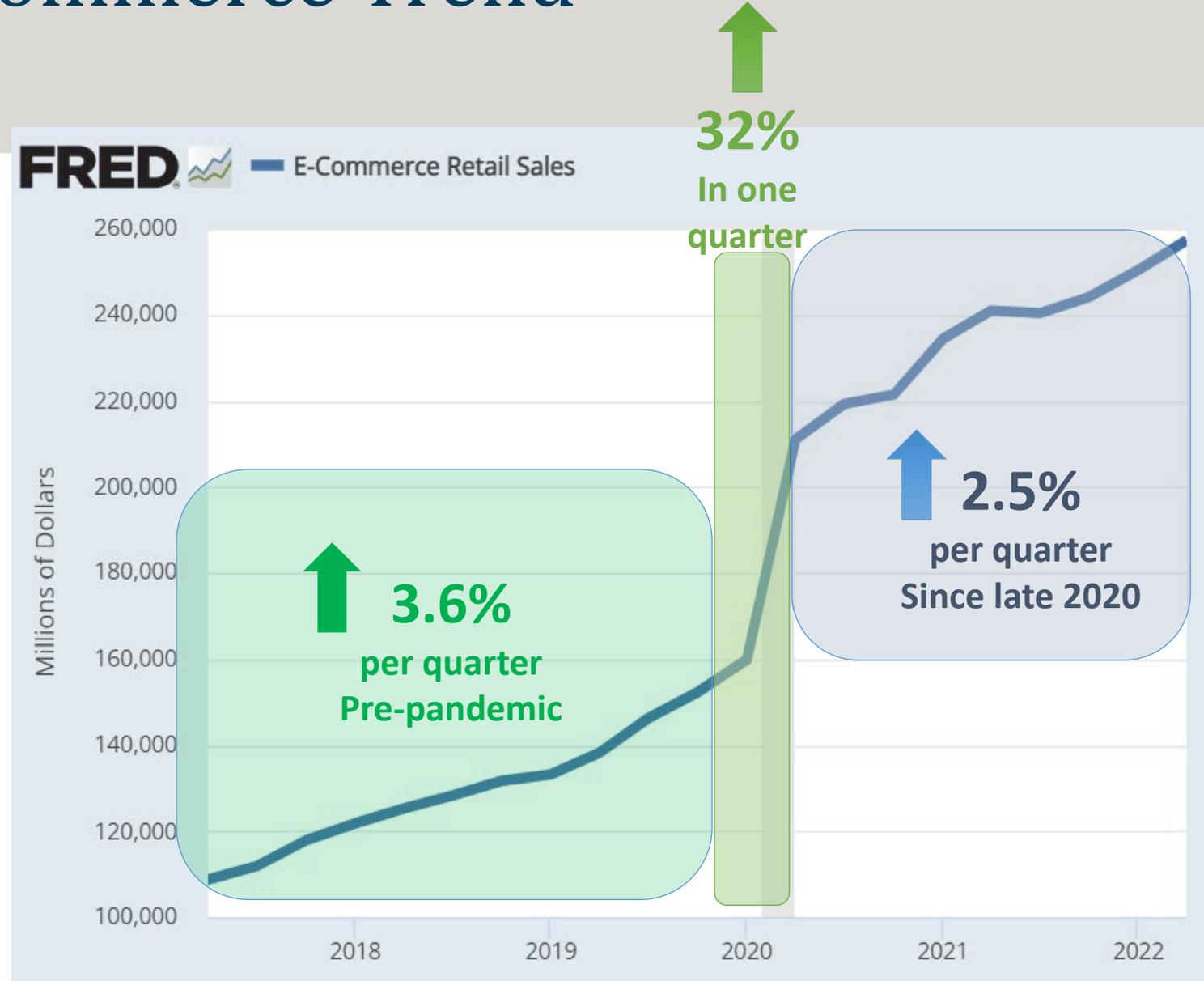


Presentation Outline

1. E-commerce trends and impacts
2. Regional key findings on commodities movement
3. Mobility and Reliability Issues
4. Regional Freight Policy Questions and Lessons Learned
5. Next Steps – Final Report

1. National E-Commerce Trend

- Tremendous spike in e-commerce demand in 2020
- Growth rate has **slowed** since, but sales and deliveries continue to increase
- What effects has the pandemic had on e-commerce in this state and region?



Summary of Impacts in the Region

- Rise of E-Commerce means more:
 - Industrial real estate development
 - Deliveries
 - Jobs and wages in key sectors
- Uncertainty on:
 - Net traffic and environmental impacts



2. Key Regional Commodity Flow Findings for 2020

1. Locations with largest daily dollar values for 'All Goods':
 - I-5 south of downtown Portland to Wilsonville
 - I-84 east of I-205 to Troutdale
 - I-5 north of downtown Portland to Vancouver
2. Electronics, Food, Misc. Manufacturing, and Motor Vehicles are the most common commodity types, by percentage of daily dollar value, on all the interstate and state highways.

Regional Commodity Flow example: I-5 and I-205 - North end of the region

1. Daily \$ values for 'All Goods' exiting at north end of the region:

- I-5 NB at Columbia River is \$67.1 M
- I-205 NB at the Columbia River is \$24.7 M

2. Daily \$ values for 'All Goods' entering at north end of the region:

- I-5 SB at Columbia River is \$65.5 M
- I-205 SB at the Columbia River is 49.2 M

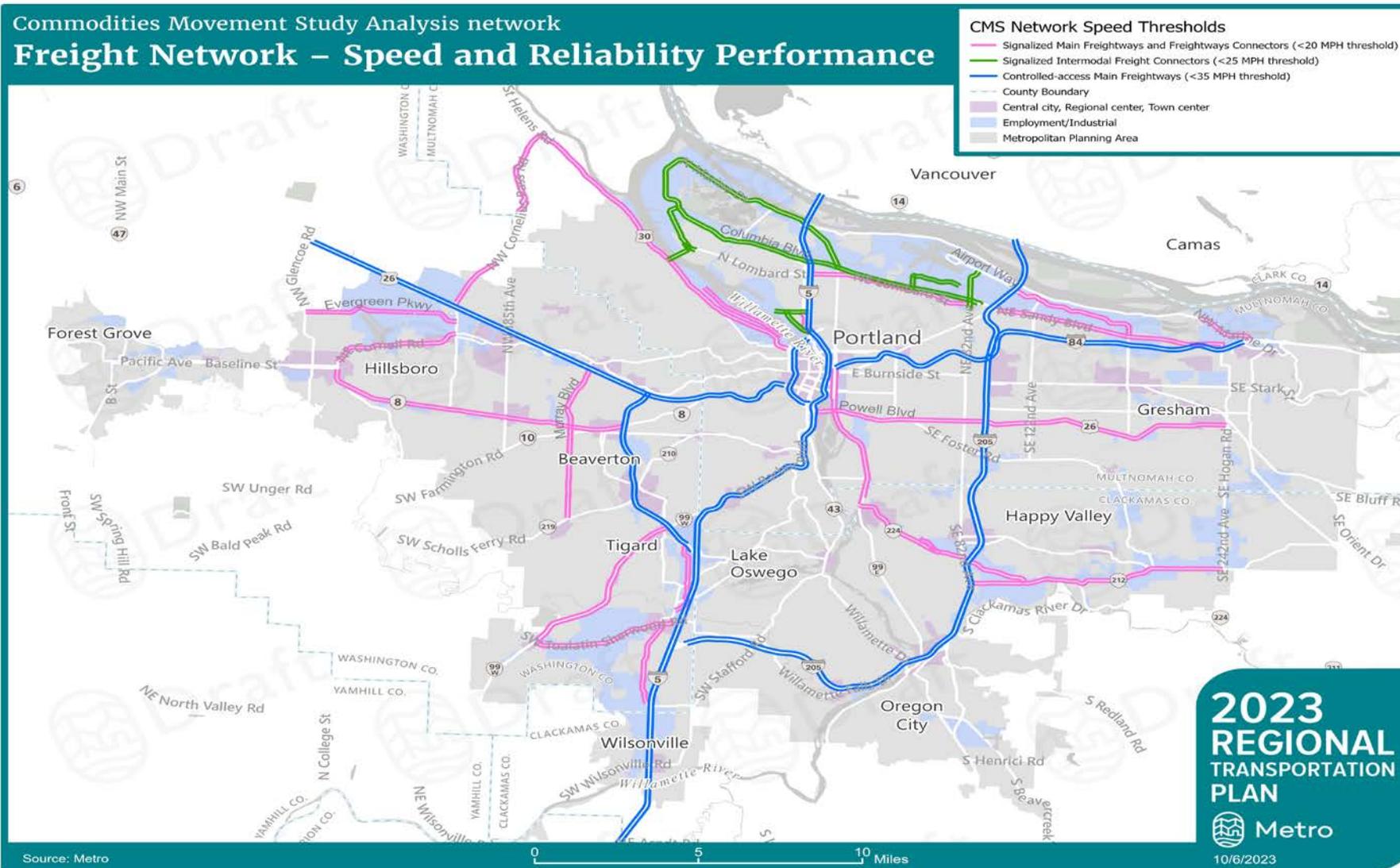
3. Regional Mobility Policy update based on average speeds

- Regional Mobility Policy update – Measures hours of reduced average speeds throughout the day on regional throughways that exceed these thresholds:
 1. **Less than 35 mph** for up to 4 hours, on regional throughways with limited access
 2. **Less than 20 mph** for up to 4 hours, on regional throughways with signals and other access

Commodities Movement Study (CMS) expands the network for freight mobility

- Commodities Movement Study – Measured freight mobility throughout the day on the regional freight network that don't meet these thresholds:
 1. **Less than 35 mph** for up to 4 hours, on freeways
 2. **Less than 25 mph** for up to 4 hours, on regional intermodal connectors
 3. **Less than 20 mph** for up to 4 hours, on highways with signals and other signalized freight network routes

Freight network used for average speed and travel time reliability analysis



What is the Travel Time Reliability Index (TTRI)?

- Measures travel times at different times of the day for each of the segments on the regional transportation system
- This study looks at the TTRI for the AM travel times from 6 to 10am, and the Mid-day travel times from 10 am to 4 pm
- The TTRI does not measure congestion; locations can be reliably congested during a period of the day.

Existing Mobility and Reliability Issues

- Identified top locations with speed or reliability issues
 - HOC – Hours of Congestion (Speed below threshold)
 - TTR – Travel Time Reliability (How long can it take relative to normal)
- The following slide summarizes the performance of freight network facilities and how they compare to each other

TABLE KEY	HOC	TTR (AM or MIDDAY)
<u>Top Tier Issue</u> (Relative to other freight facilities)	<u>7+ Hours</u>	<u>3+ Times as long</u>
<u>Second Tier Issue</u> (Relative to Other Facilities)	<u>4 to 7 Hours</u>	<u>2 to 3 Times as long</u>
Third Tier Issue (Relative to Other Facilities)	3 to 4 Hours	Under 2 Times as long

Examples of Existing Mobility and Reliability Issues

CORRIDOR	LOCATION	SPEED (HOC)	TTR (AM)	TTR (MIDDAY)
I-405	NB (US 26 to I-5)	<u>3.6 to 4.5</u>		<u>3.9 to 4.7</u>
	SB (US 26 to I-5)	<u>4.4 to 6.4</u>	<u>2.7 to 3.7</u>	<u>3.1 to 4.2</u>
I-5 (North)	SB (Marine to I-84)	<u>5.3 to 9.1</u>	<u>2.0 to 2.4</u>	<u>2.3 to 3.3</u>
	NB (I-84 to Vancouver WA)	<u>5.0 to 6.8</u>		<u>4.5 to 6.7</u>
I-84	WB (I-205 to OR99E)	<u>3.9 to 7.7</u>		<u>2.0 to 2.1</u>
	EB (OR99E to Sandy)	<u>3.5 to 5.6</u>		<u>1.8 to 2.2</u>
I-5 (South)	SB (I-205 to Boones Ferry)	3.1		<u>4.7</u>
	NB (Capitol Road to Multnomah Blvd.)	3.1	<u>2.3</u>	
	NB (Dartmouth to Capitol Road)	Not applicable	<u>3.2</u>	

- **I-405** has Tier 2 duration of low speeds, but higher degree of unreliability
- **I-5 North** has generally longer duration of low speed (Tier 1 and Tier 2) and high midday unreliability
- **I-84** also longer duration of lower speed, though reliability better than I-5 North
- **I-5 South** generally fewer hours of low speed, but unreliability higher in some segments

4. Regional Freight Policy Questions: Lessons Learned

Q1

What are **emerging trends** in the freight sector that have certain types of impacts on the transportation system?

Q2

When and how should the public sector **play a role** in addressing the growth **impacts that e-commerce** and goods delivery is having?

Q3

Are there **new ways to address goods movement performance** and what is relevant to know about freight and goods movement?

Q4

What are ways in which the freight sector can **reduce greenhouse gas emissions?**

Q1: Emerging Trends

What are **emerging trends** in the freight sector that have certain types of impacts on the transportation system?

Trend	Global “Big Picture” Impacts	Portland Regional Impacts: \$ <i>Economic Impacts</i> + <i>Transportation Impacts</i>
Mitigating risks/uncertainty	<ul style="list-style-type: none"> - Diversifying production locations - “Reshoring” production and materials sourcing 	<ul style="list-style-type: none"> \$ New manufacturing job opportunities + Origins and destinations, modes, routes, etc., may change
Technological advancement <i>(A.I., terminal and vehicle automation, 3D printing, etc.)</i>	<ul style="list-style-type: none"> - Could reduce transportation costs and facilitate more diverse and resilient supply chains 	<ul style="list-style-type: none"> \$ Potential to gain a regional economic competitiveness advantage + Improved efficiency, reduced truck delay
Growth in e-commerce demand	<ul style="list-style-type: none"> - Emphasis on “time-definite” delivery - Increase in foreign imports to the U.S. - Networks of fulfillment and delivery centers in/near population centers 	<ul style="list-style-type: none"> \$ Increased jobs in some sectors; \$ Increased pressure on industrial real estate + Net effects of e-commerce are not well understood + Last-mile challenges in many Portland neighborhoods and other urban/mixed-use centers

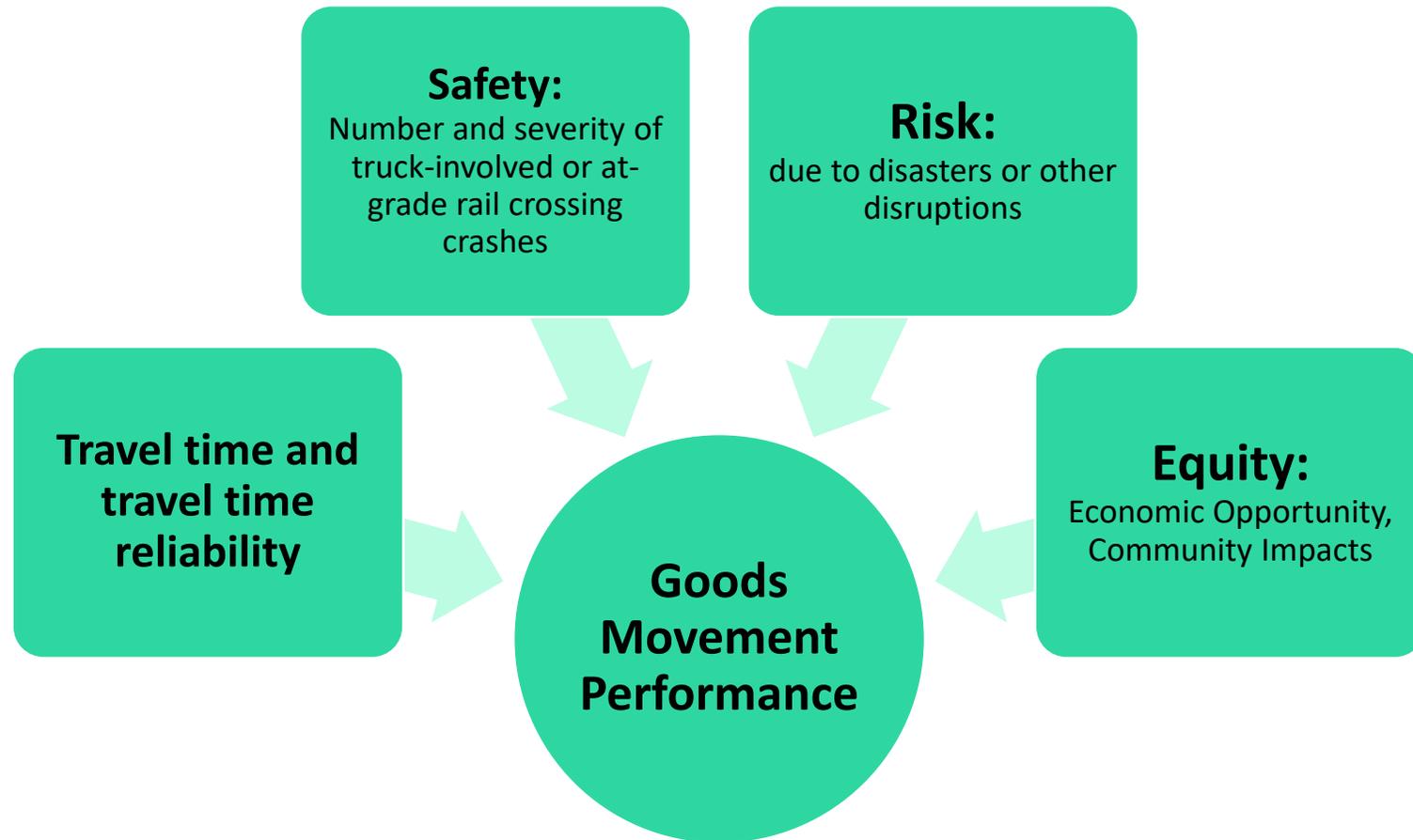
When and how should the public sector **play a role** in addressing the growth **impacts that e-commerce** and goods delivery is having?

Q2: Public Sector Role in E-Commerce Impacts

Issue/Impact	How to Address the Issue
Curb access, double-parking, etc.	Context-sensitive curb management and parking strategies , including right-sizing loading zones, flexible curb zones, and reservation systems
Land use: Warehouse and fulfillment center development	Conduct an inventory of land use appropriate for warehouse and fulfillment center development and assess capacity versus need. Monitor development and redevelopment trends in industrial districts. Might need changes to land use policies
Land use: “Dark store” conversions	Review land use regulations to determine if dark store conversions are feasible. Conduct outreach to determine if and where such conversions may be desirable or undesirable. Adjust land use regulations as necessary.
Augment the public’s understanding of e-commerce trends and impacts	Purchase available data, perform analysis and integrate with existing modeling tools to estimate the transportation system effects of e-commerce and last-mile deliveries. Incorporate findings into planning documents and public/stakeholder engagement activities

Q3: Goods Movement Performance

Are there new ways to address goods movement performance and what is relevant to know about freight and goods movement?



What are ways in which the freight sector can reduce greenhouse gas emissions?

Q4: Reducing Freight Emissions

Methods for reducing freight emissions:

- Transition fleets to alternative fuels
- Mode shift (truck to rail for long-haul)
- Alternative last-mile delivery solutions (cargo bikes, delivery robots, etc.)
- Continue to improve routing efficiency (using A.I. and other tools).



Image sources: Top: Daimler Trucks North America; Bottom: Portland Bureau of Transportation, image captured from a video titled "2040 Freight Featured Perspective: B-Line Sustainable Urban Delivery, 2022."

Next Steps: Final Report Outline

- Executive Summary
 1. Introduction
 2. Project Team and Stakeholder Participation
 3. Regional Freight Policy Framework and Policy Questions
 4. Commodities Movement by Trucks
 5. Network Performance
 6. Trends Impacting Current and Future Commodity Movements
 7. Addressing Goods Movement Performance
 8. Study Recommendations and Freight Policy
 9. Next Steps and Further Research

Comments and feedback

Questions?

