



The Growth of the Freight Railroad Industry

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SCM 496 SCMT Project

Sponsored by Lansdale Warehouse

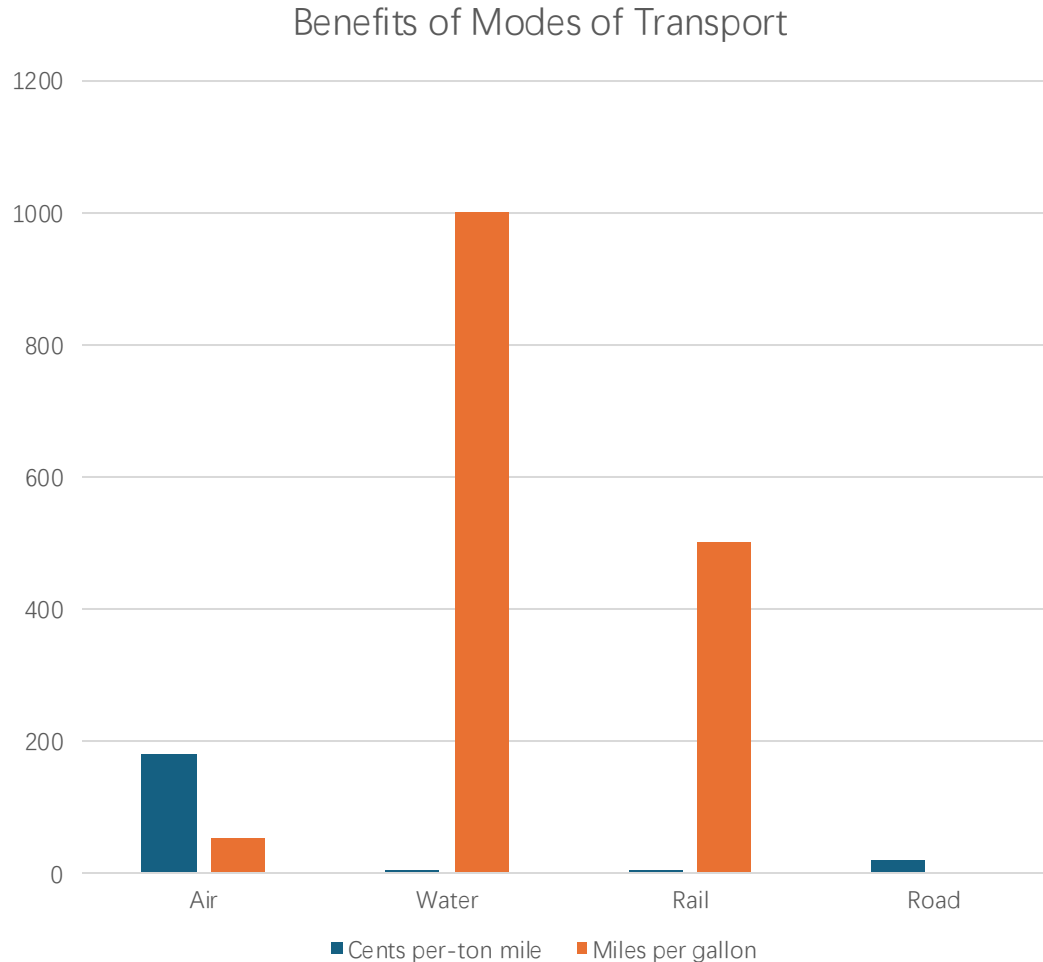
Project Overview

PROJECT CHARTER : Lansdale Warehouse FA2024LAN01		Last Update: 10/04/2024	Status: APPROVED
<p>Problem: The declining rail freight volume over the past decade reflects diminishing incentives for shippers to choose rail due to poor shipment visibility, timeliness, railcar utilization, and heavy focus on Precision Scheduled Railroading.</p> <p>Opportunity Statement: Seeking new business opportunities through new technology, the ability to increase interest in rail has a promising future by optimizing logistics and improving service reliability.</p>		<p>“SMART” GOALS & DELIVERABLES:</p> <p>Specific: Finding the core reasons behind current railroad industry conditions. Understanding the market/government power and provide solutions.</p> <p>Measurable: Develop comprehensive data visualizations as we discover more about increasing carloadings, improving on-time delivery performance, and a structural report for the case.</p> <p>Achievable: Implement technology-powered solutions for better tracking, partner with local governments to incentivize rail-centric development, and improve operations without sacrificing service quality.</p> <p>Relevant: As the industry moves away from PSR, technology innovation through methods like AI are becoming more utilized.</p> <p>Time-Bound: Have final deliverable ready to present on December 13th.</p>	
<p>Key Stakeholders and Project Team Members:</p> <ul style="list-style-type: none"> - Researchers and Mentors: <u>Zijia Huang</u>, <u>Colin Wellock</u>, <u>Khadidiatou Dia</u> - Advisor: <u>Tom Mulherin</u> - Corporate Stakeholder: <u>Paul Delp</u> 		<p>PROJECT PHASES, TIMELINESS and MAJOR MILESTONES:</p> <p>Planning Phases: (week 2-week-3)</p> <ul style="list-style-type: none"> - Project Kickoff Meeting - Research the industry condition and understand client's requirement in depth. <p>Execution Phases (week 2-week-12):</p> <ul style="list-style-type: none"> - Analyze data and collect industry reports. - Have active group meetings, - Consult with advisor - Meet with company sponsors <p>Presentation Phases (week 12 –15):</p> <ul style="list-style-type: none"> - Final deliverable completed and reviewed. 	
<p>SCOPE: (Please consider 10-weeks project execution timeline for the semester)</p>			
<p>IN-SCOPE:</p> <ul style="list-style-type: none"> - Establish High-Level Measurements of Improving rail service reliability, shipment visibility, and operational efficiency through technology, government incentives, and management systems. - Comprehensive assessment on the factor causing current poor visibility and services reliability - Provide financial analysis on industry growth. 	<p>OUT-OF-SCOPE:</p> <ul style="list-style-type: none"> -Detailed implementation plan and operational adjustment for the company. -Redesigning the railroad infrastructure for Lansdale and the industry. 	<p>COMMUNICATION PLAN:</p> <p>Files & Materials: Microsoft Teams</p> <p>Weekly Meeting Date: Typically, 11 am EST Friday.</p> <p>Main point of communication: Text/iMessage/Teams</p>	

Lansdale Warehouse Background



Inherent Benefits of Rail



Advantages	Disadvantages
Air: High speed, wide reach	Limited capacity, high cost
Water: Large capacity, low cost per unit	Slow speed
Rail: High capacity, cost-effective for long distance	Infrastructure limits
Road: High flexibility	Variable speed, high cost for long distance, not fastest or cheapest option

Class 1 Railroads



Drawings by Andy Fletcher

Andy Fletcher

The Condition of the Freight Railroad Industry



Precision Scheduled Railroading (PSR)



Focus on cost reduction, reducing workforce, consolidating trains, and maximizing asset utilization



Has succeeded in lowering operating costs



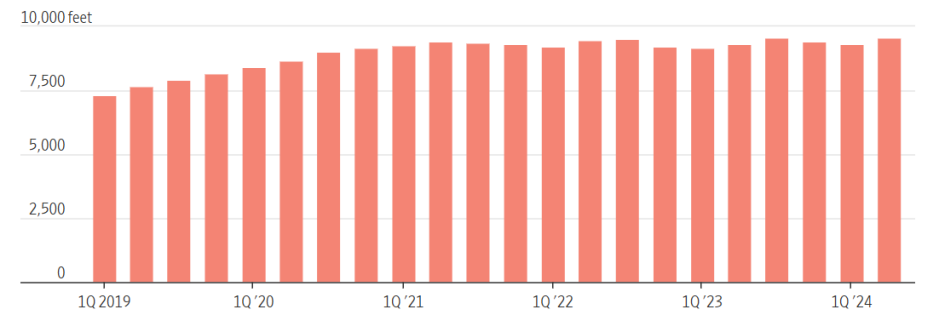
Moving forward, the freight rail industry must adopt a more balanced approach



Stance on PSR



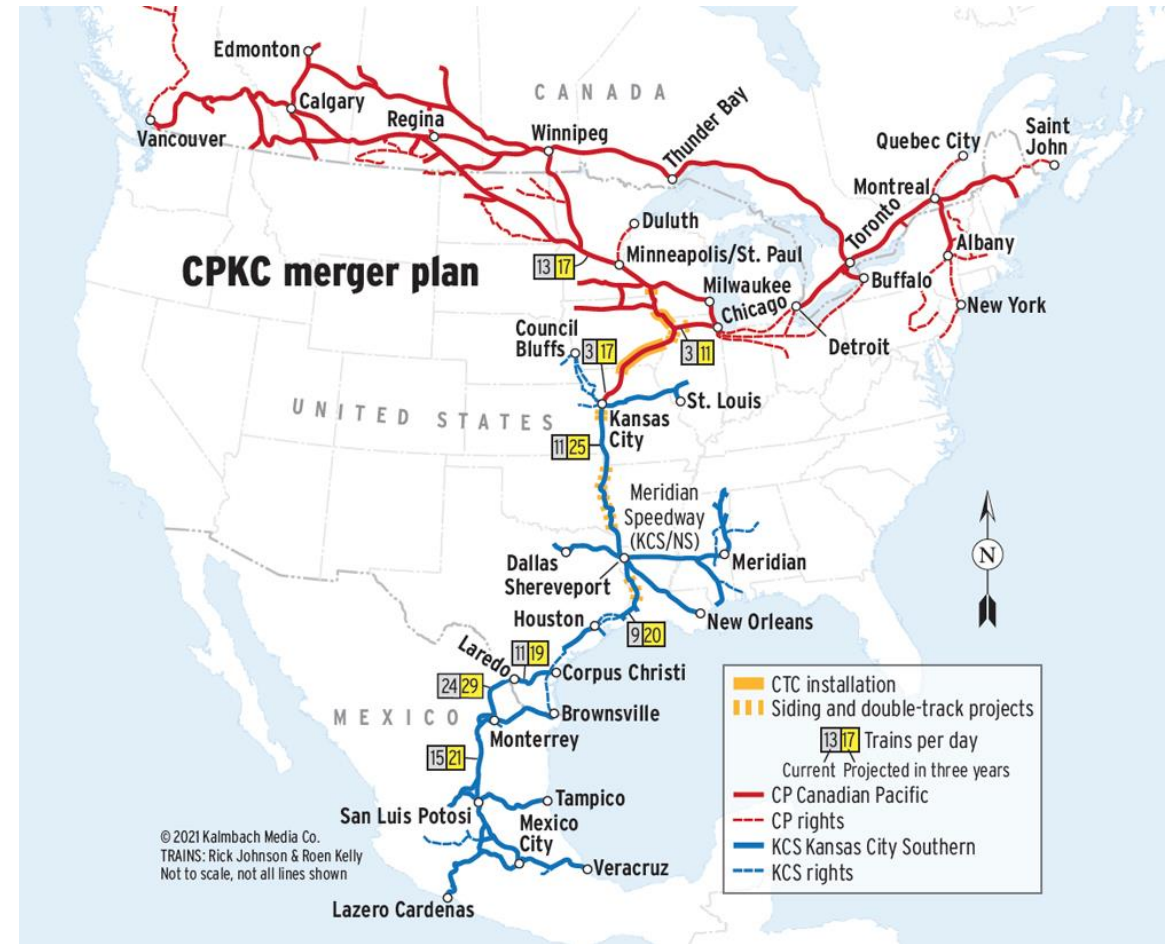
Average train length, by quarter, at Union Pacific



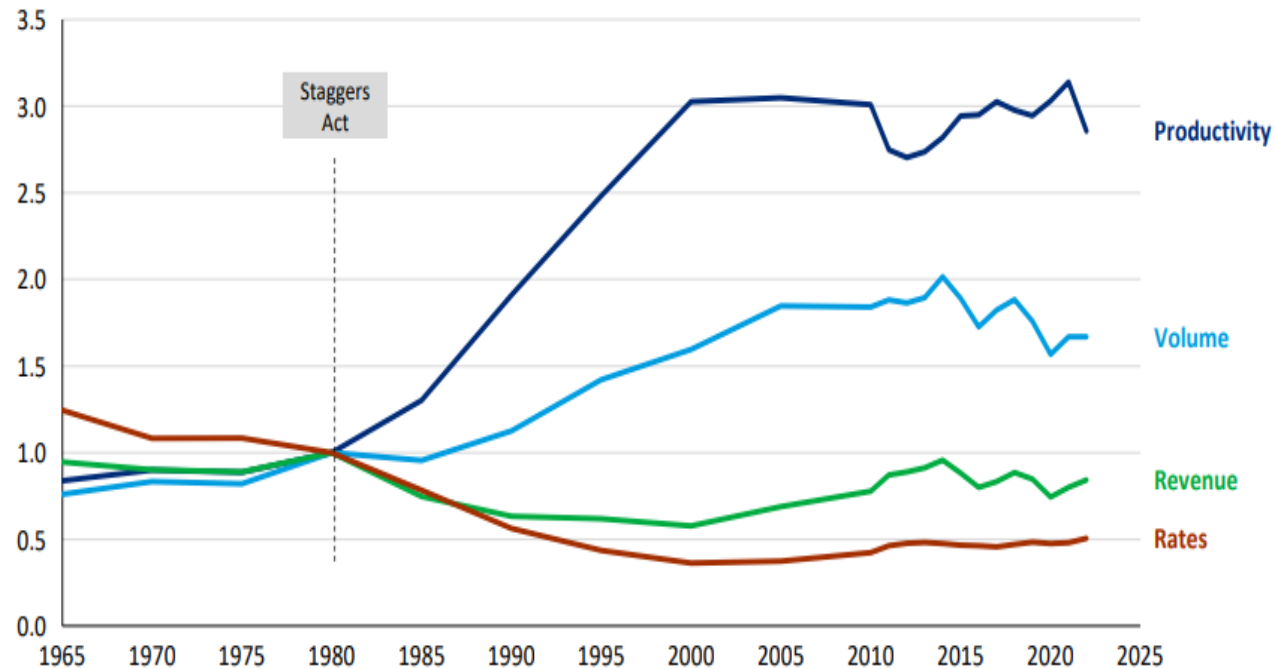
Source: Company filings

Industry Consolidation

- Initially allowed because it was in the public's best interest, government permitted mergers
- Railroads have historically received government support and protection
- Canadian Pacific Railway and Kansas City Southern merged into CPKC in 2023



Class I Rail Metrics

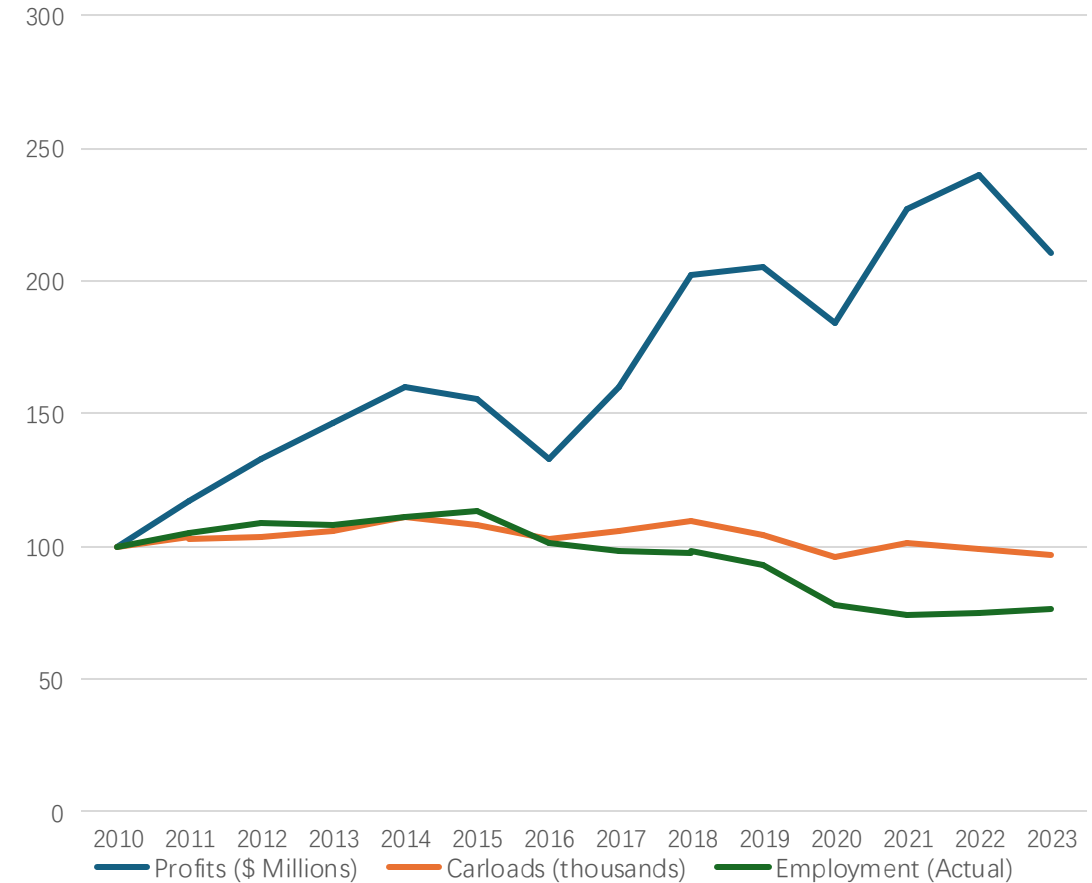


Note: Rates = inflation-adjusted revenue per ton-mile, volume = ton-miles, productivity = revenue ton-miles per constant dollar operating expense, revenue = operating revenue in 2022 dollars
Source: Association of American Railroads

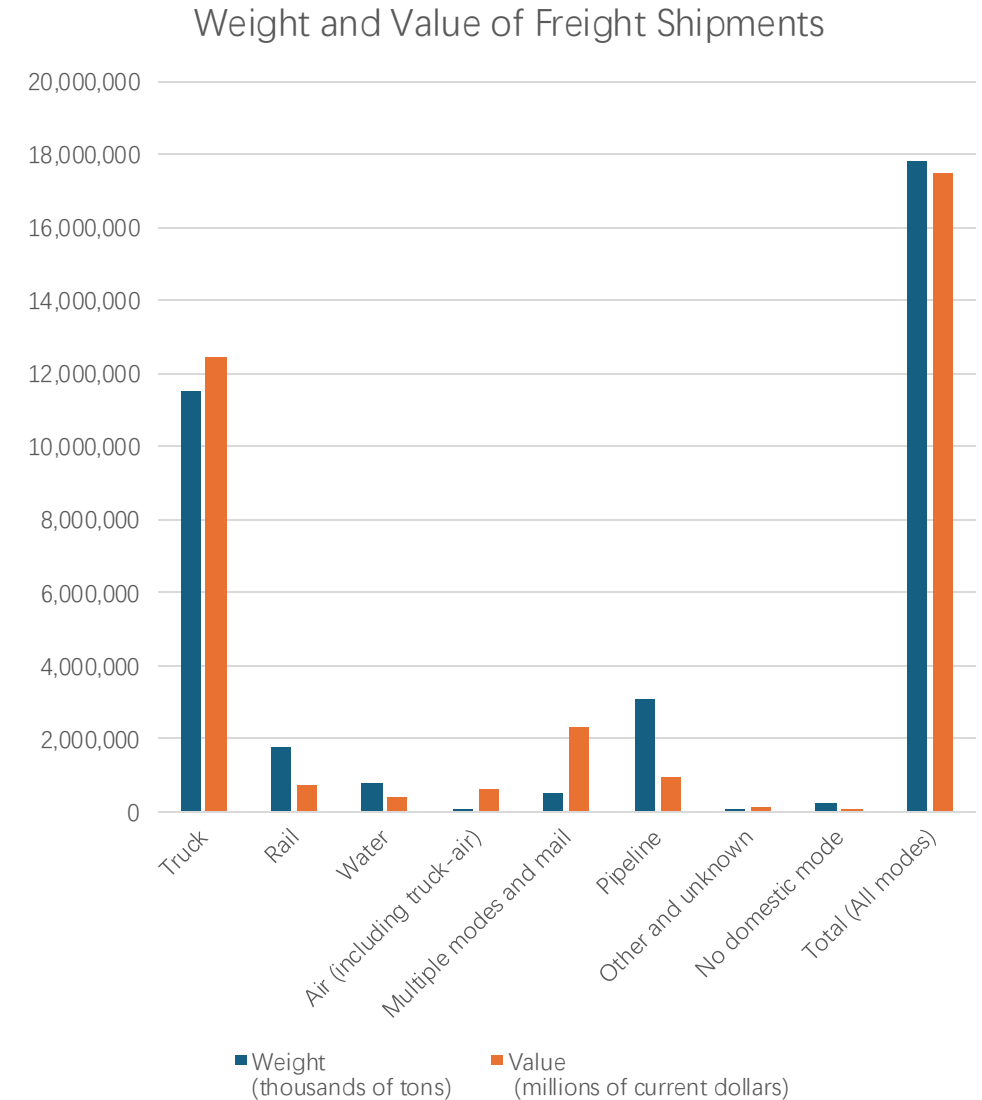
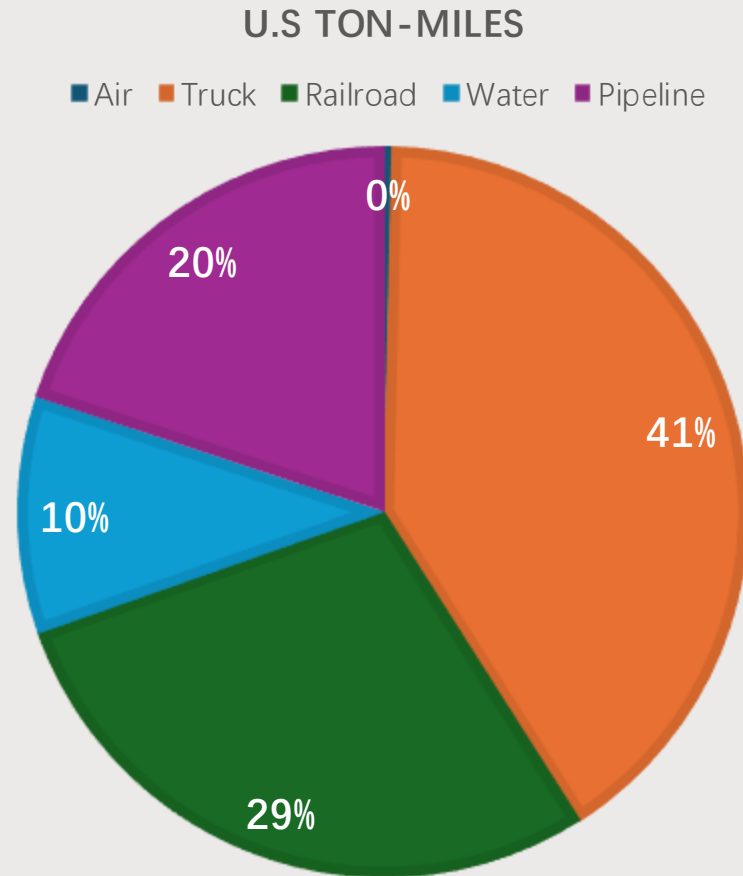
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Big Four Freight Railroad's

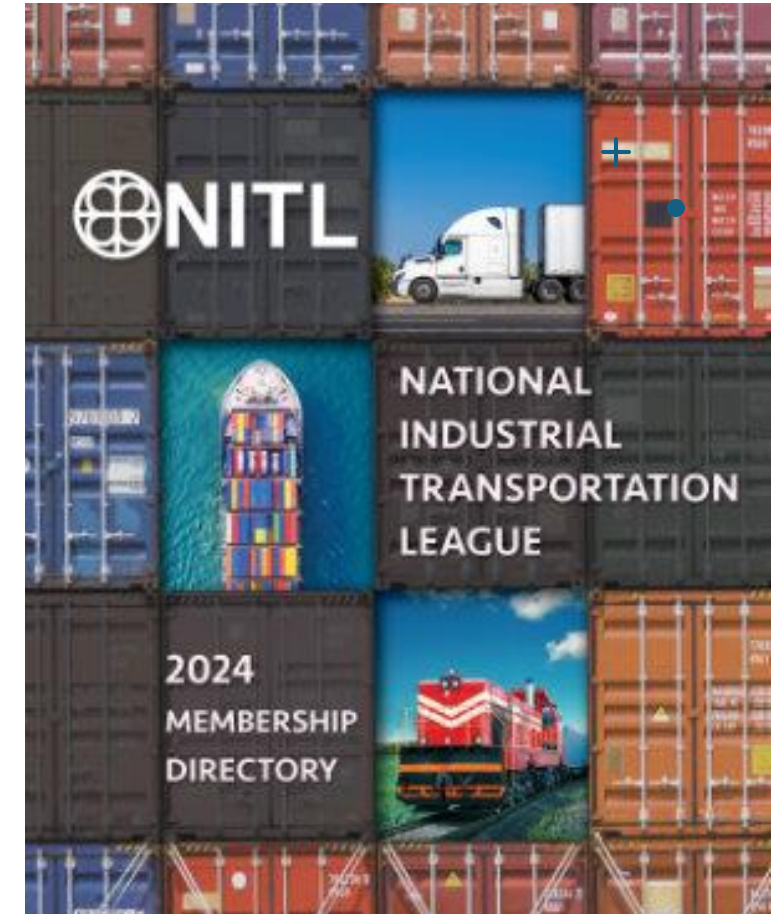


Perspectives of Market Share

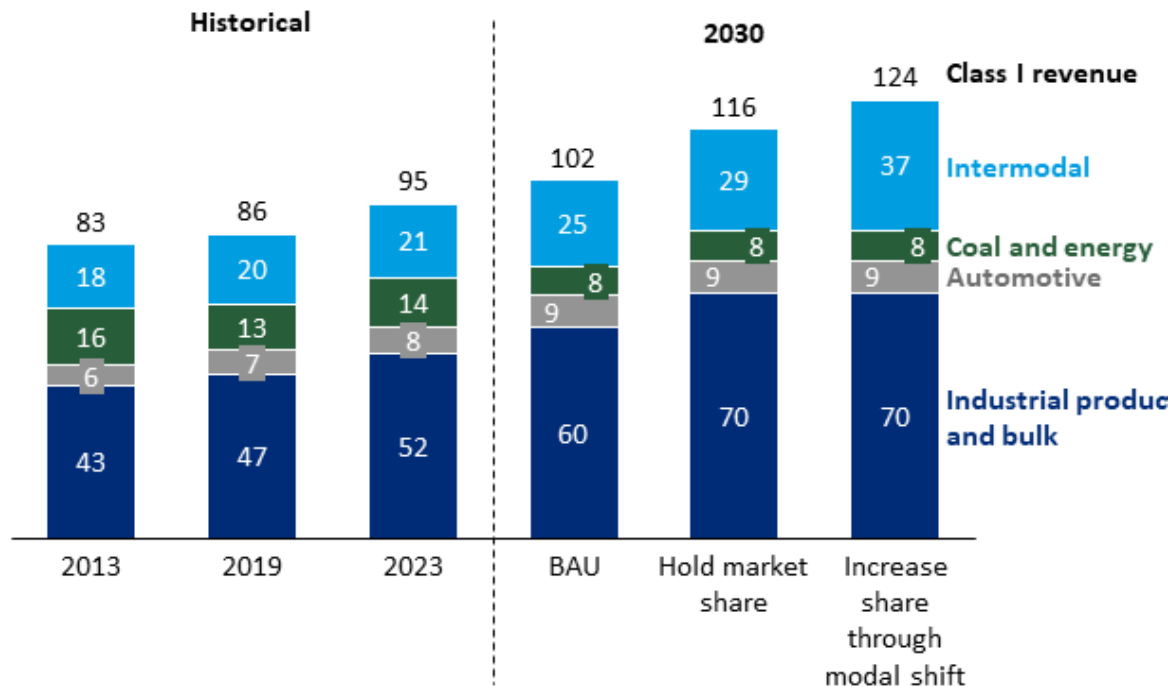


Perspectives from stakeholders

- NCTA report 43% longer transit times and 78% experienced delays in train pick up
- NITL members want greater utilization of the short lines
- Aggressively cutting employment level to chase lower operating ratio causing safety issues

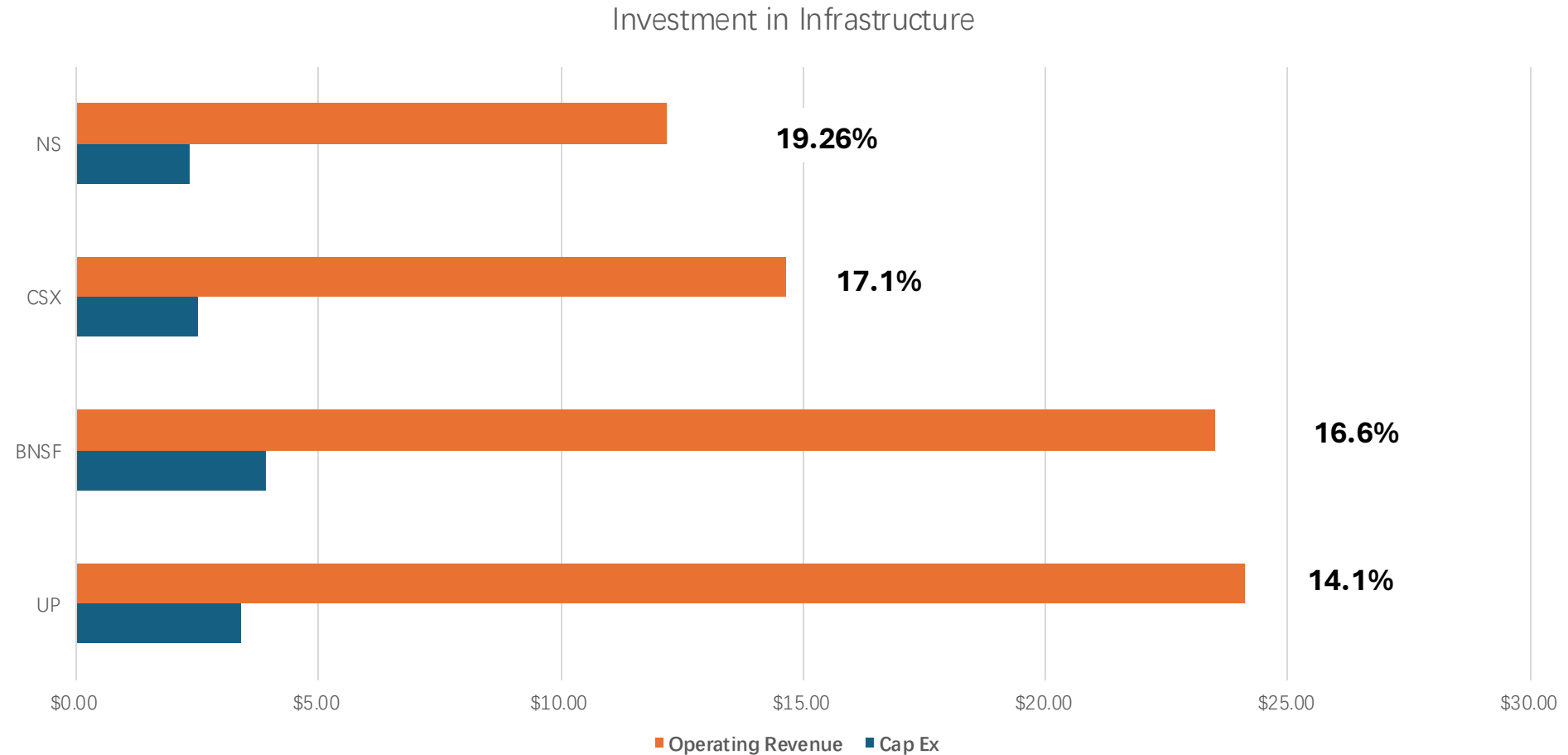


Financial Analysis of Class I Railroads



Metric	Union Pacific (UP)	CSX Corporation	BNSF Railway	Norfolk Southern Corporation
Operating Ratio (OR)	60.3% (Q3)	62.6% (Q3)	65.1% (Q3), 68.2% (Q2)	63.4% (Q3)
Earnings Per Share (EPS)	\$2.75	\$0.46	N/A	\$4.85
Stock Price	\$240.41 (as of 11/13/24)	\$36.48	N/A	\$259.71
Free Cash Flow (FCF)	\$5.53 billion	\$2.44 billion	N/A	\$1.21 billion

Capital Expenditure Comparison



Lack of Technology Implementation

- Outdated locomotives & absence of real-time tracking and predictive analytics
- Trucking far ahead in tracking technology
- Traditionally use AEI to read tags and gather data at check points



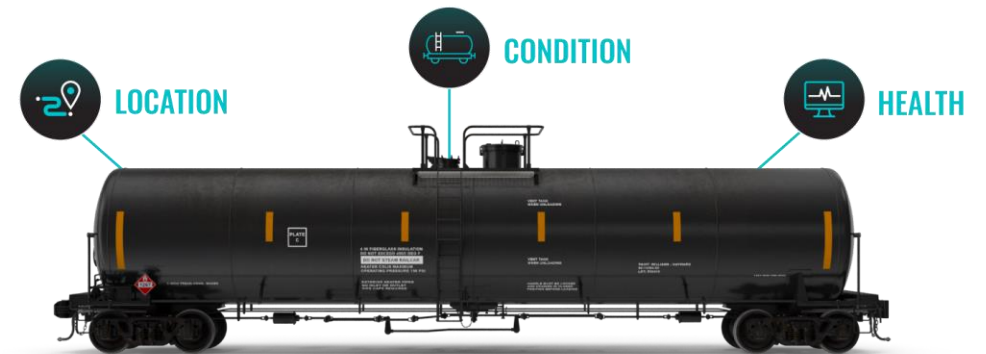


Improvement Solutions



Technology Implementation in U.S. Freight Railroads

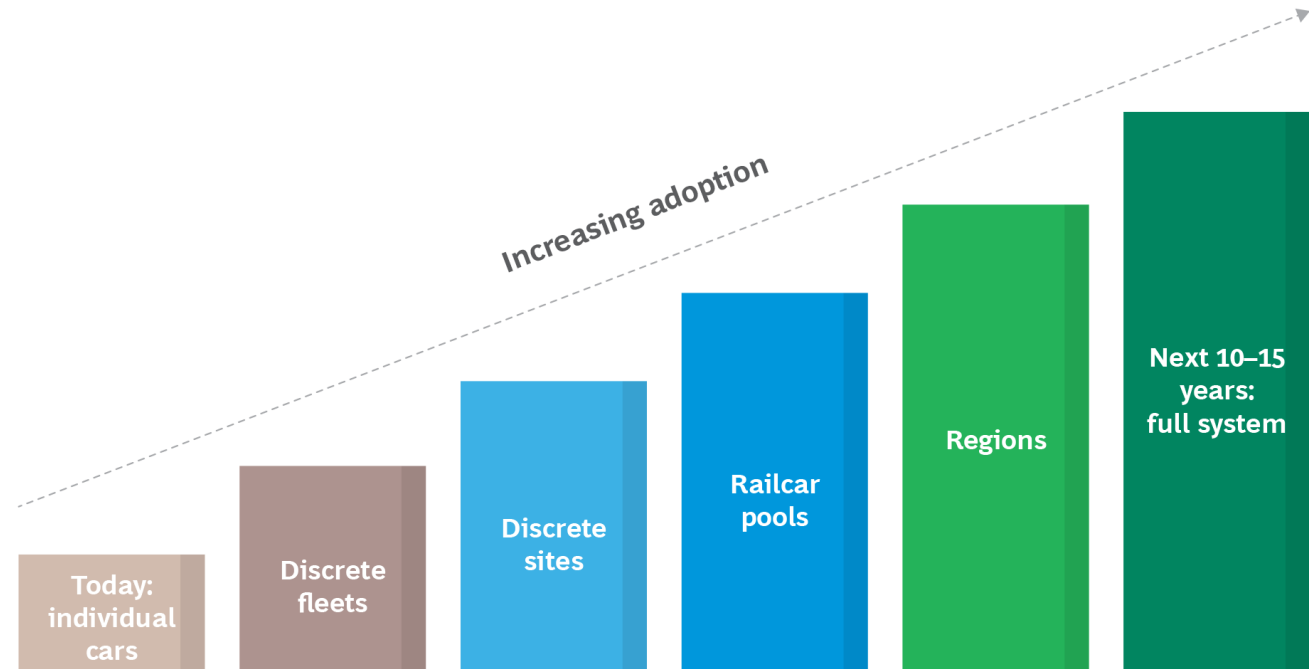
- RailPulse: sensor-based tracking provides real-time data on railcar location and health
 - Increases GPS and location traceability
 - Possible AI implementation in the future:
 - Application of AI could improve traceability
 - More optimized train scheduling



More on RailPulse

- 20-year data journey
- Represents collaborative effort for unified approach
- Can't solve every problem
- Builds ecosystem around railcar data

The Stages of Telematics Adoption



Management Analysis

- Joseph Hinrichs & CSX: customer-centric focus
- Improve relations between management & employees
- 76% of CEO's see sustainability performance as key to long-term growth
- Railroads will be key in achieving companies net zero emissions by 2050



Management Analysis



Building trust with customers is key



Economic uptick scenario



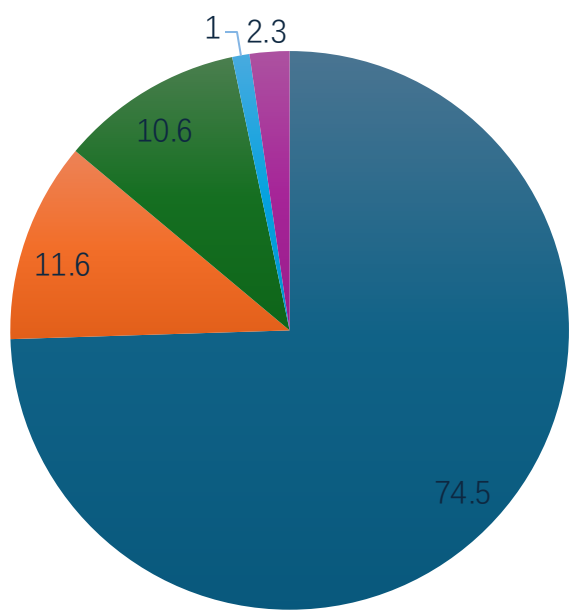
Embracement of technology must happen quicker

CSX member of EPA's Climate Leaders Program

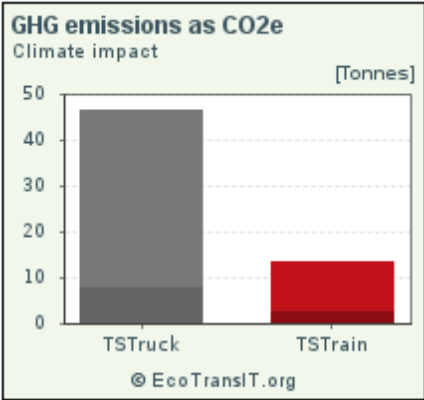
Air	<ul style="list-style-type: none">-Cleaner air through increased fuel efficiency and reduction in GHG's.-Each day that CSX locomotives are hauling freight means cleaner air
Water	<ul style="list-style-type: none">-Dedicated to their communities that depend on water and protecting natural resources-Serve more than 70 ocean, river, and lake ports.
Earth	<ul style="list-style-type: none">-Uses a variety of materials in business that can be recycled-Reduces the amount sent to landfills and improves bottom line
People	<ul style="list-style-type: none">-Detailed safety initiatives and training-Environmental stewardship; employees care deeply about family & neighbors-“People make the difference”

Benefits of Freight in the Long Haul

Share of Transport CO₂ Emissions (%)



■ Road Transport ■ Aviation ■ Shipping/Water ■ Rail ■ Other



GHG emissions as CO₂e (WTW)
Climate impact

	[Tonnes]	
	TSTruck	TSTrain
Truck	46	0
Train	0	13
Sum:	46	13

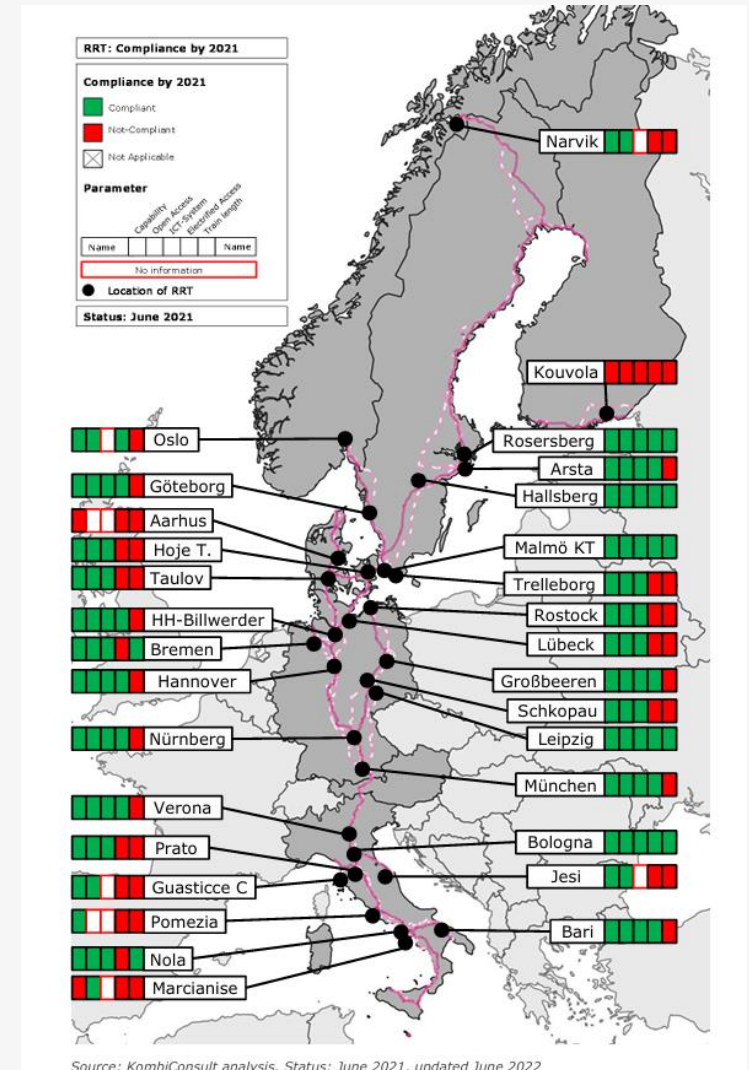
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Lessons from Europe

European Union has implemented several valuable initiatives to boost freight rail

- EU has adopted 11 Pan-European corridors as part of a broader infrastructure investment plan
- EU integrates its Green Deal objectives into rail strategy, promoting sustainability through legislative measures
- Countries like Germany offer both economic and environmental incentives to encourage greater use of rail for freight



Source: KombiConsult analysis, Status: June 2021, updated June 2022

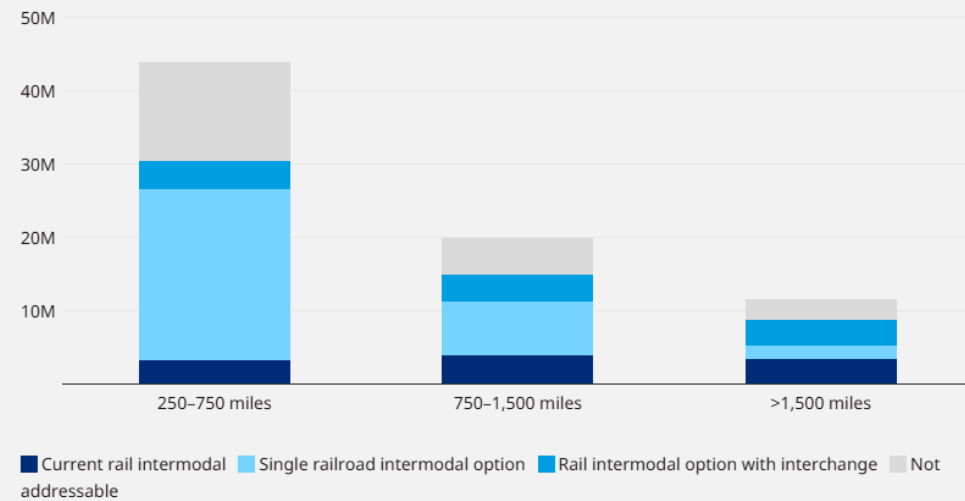
Category	Government Actions
Regulatory Reforms	<ul style="list-style-type: none"> - Clarify and enforce Common Carrier Obligations (CCO) - Expand reciprocal switching to promote competition. - Accountability through penalties like reverse demurrage
Economic Incentives	<ul style="list-style-type: none"> - Continue CRISI grants to support short-line railroads. - Provide subsidies for low-emission or environmentally friendly rail technologies. - Introduce matching grants for Class I's - Implement performance-based funding tied to service improvements like reduced delays and higher freight volumes.
Technology Integration	<ul style="list-style-type: none"> - Support adoption of Rail Pulse and automated track inspections. - Streamline regulatory barriers for new technologies.
Infrastructure Development	<ul style="list-style-type: none"> - Public-private partnerships (PPPs) to share financial burdens and risks. - Prioritize investments in rail infrastructure and intermodal connections

The Short Lines

- Offer first and last mile service
- Holding share in industrial products
→ \$10 billion in revenue to industry by 2030
- To achieve revenue growth, expansion beyond long haul needed
- Long haul 65% of intermodal, 13% for short haul

Exhibit 1: Estimated addressable US domestic rail intermodal market for hauls longer than 250 miles

Million equivalent loads



Note: Intermodal compatible, mode-flexible freight commodities only, excludes revenue empties

Source: US Department of Transportation Freight Analysis Framework FAF 5.5.1, Oliver Wyman analysis

The Short Lines

- Many want to use rail, but cannot since they are not rail-served
- NS Short Line performance project
→ 9% growth in volume
- Short lines supported through state and federal funding
- Local partnerships to access logistics parks & business hubs

Sierra Northern Oakdale Division

Use grants for safety upgrades and are trying to transition fleet to hydrogen fuel cell technology. **Have invested in an inland port transload facility on 116-acre site**

RJ Corman Railroad

Operate 19 short lines across multiple states, 132,000 carloads annually, and partner with Class I's to offer customer-centric service

Iowa Interstate Railroad

Emphasize competition and cooperation, and promote intermodal growth with strategic terminals

New York and Atlantic Railway

Connect with major railroads to provide consistent service to 80 customers across 270 route miles

Puget Sound & Pacific Railroad

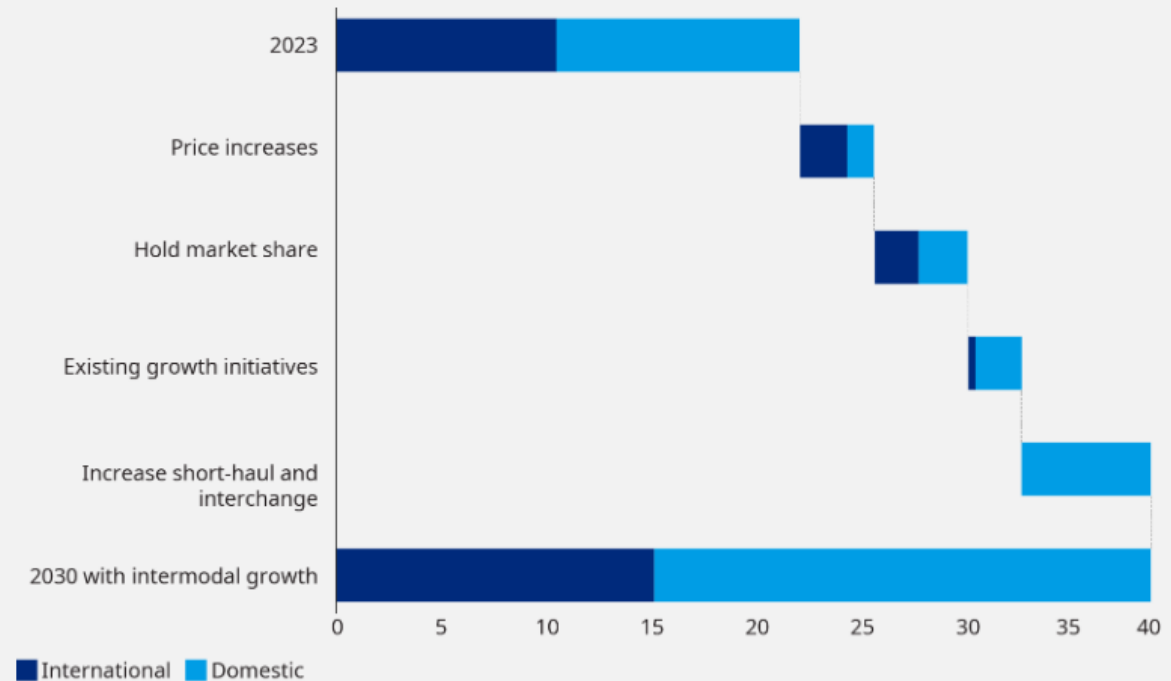
Plan for considerable growth in auto and grain sectors, with a 50% projected increase in carloads by 2029

The Short Lines

- Involved in and encourage RailPulse
- Strict emissions standards that place financial burden on short lines to comply
- Interchange reliability burden falls on short lines
- UP, BNSF, and NS emphasis in working with short lines, intermodal, and transload is hopeful

Exhibit 3: Pathway to \$37 billion in Class I intermodal revenue

\$ billions



Source: Class I railroad annual reports; "Intermodal in Depth," Gross Transportation Consulting, Oliver Wyman analysis

CRISI Grant

- \$6.87 million for Rail Center for Research Enhancing Short-line Transportation
- Affordable technology
- Improves safety, efficiency, reliability, and sustainability



Recommendations



U.S freight rail
industry stands at
pivotal moment



RailPulse and green
principles of rail



Government
regulation



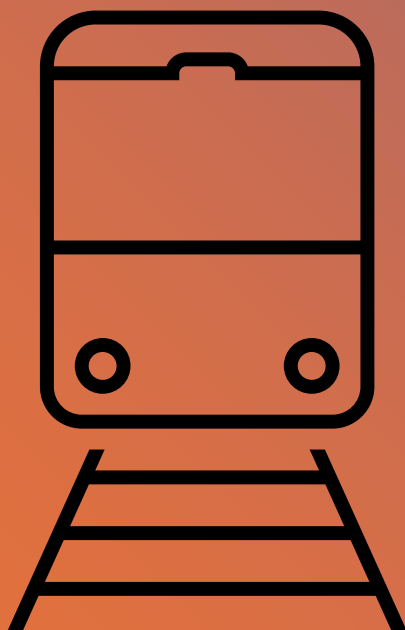
Balanced approach



Short lines,
intermodal, to assist
in increasing
revenue trips



Collaboration
among all will be
necessary



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Thank You

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