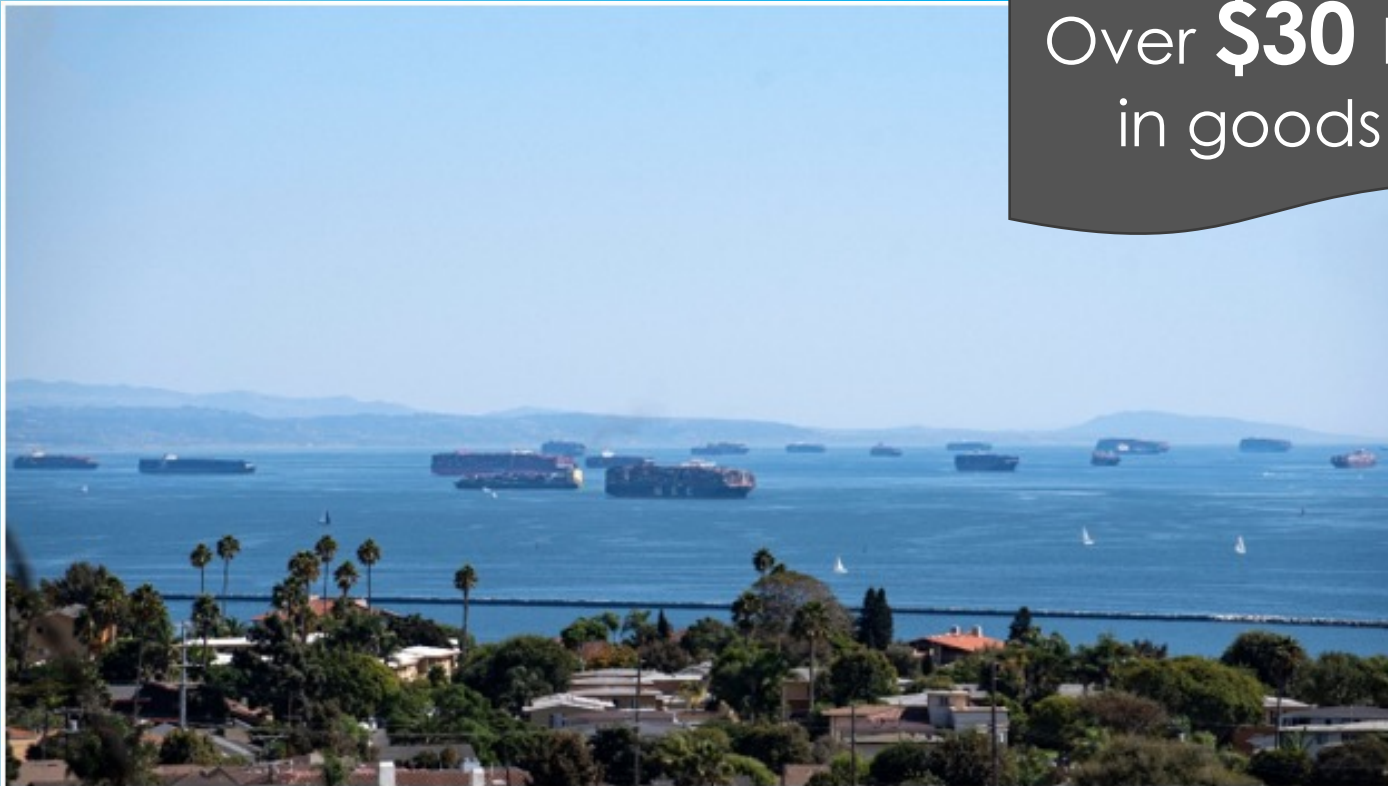


WHERE IS MY SHIPMENT AND WHY CAN'T I GET IT?

Over **\$30** Bn
in goods



Shutterstock/MSPhotographic)

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WHY IS FREIGHT TRANSPORT IMPORTANT?



MAYHEM AT THE PORT GATE



Source: Bloomberg

Impacts

- Environmental
- Financial
- Operational

SOURCE OF THE PROBLEM



Anticipatory
Orders

IT'S NOT JUST ONE ISSUE AND ITS NOT NEW!

2018-2019 U.S.-China Trade Tensions Tariffs & Retaliatory Tariffs

Manufacturer Migration to Southeast Asia
= Cargo Routing to U.S. East Coast

Cargo Owners Pull Inventories Forward in
Advance of Scheduled Tariff Increases

Tariff Wars Exacerbate
Trade Deficit Imbalances

Record-Setting 2018 Volume

2020-2021 COVID-19 Disruptions Distressed Supply Chain

Economies Shutter
China Manufacturing Halts
Global and Regional Workforce Shortages

Consumer-Driven Cargo Surge
E-Commerce Boom

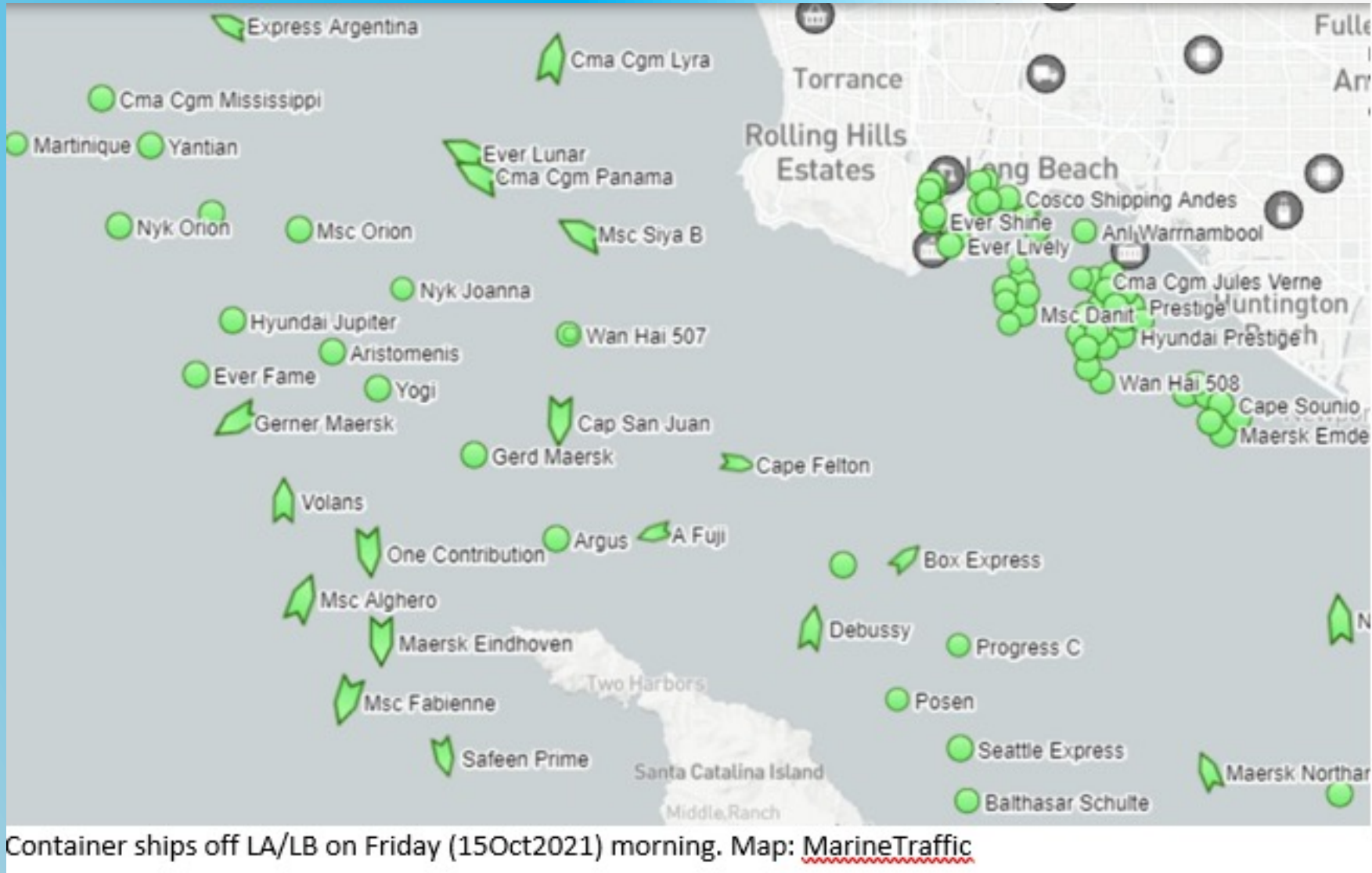
Global Supply Chain Disruptions

Container Shortages
Shipping Price Hikes

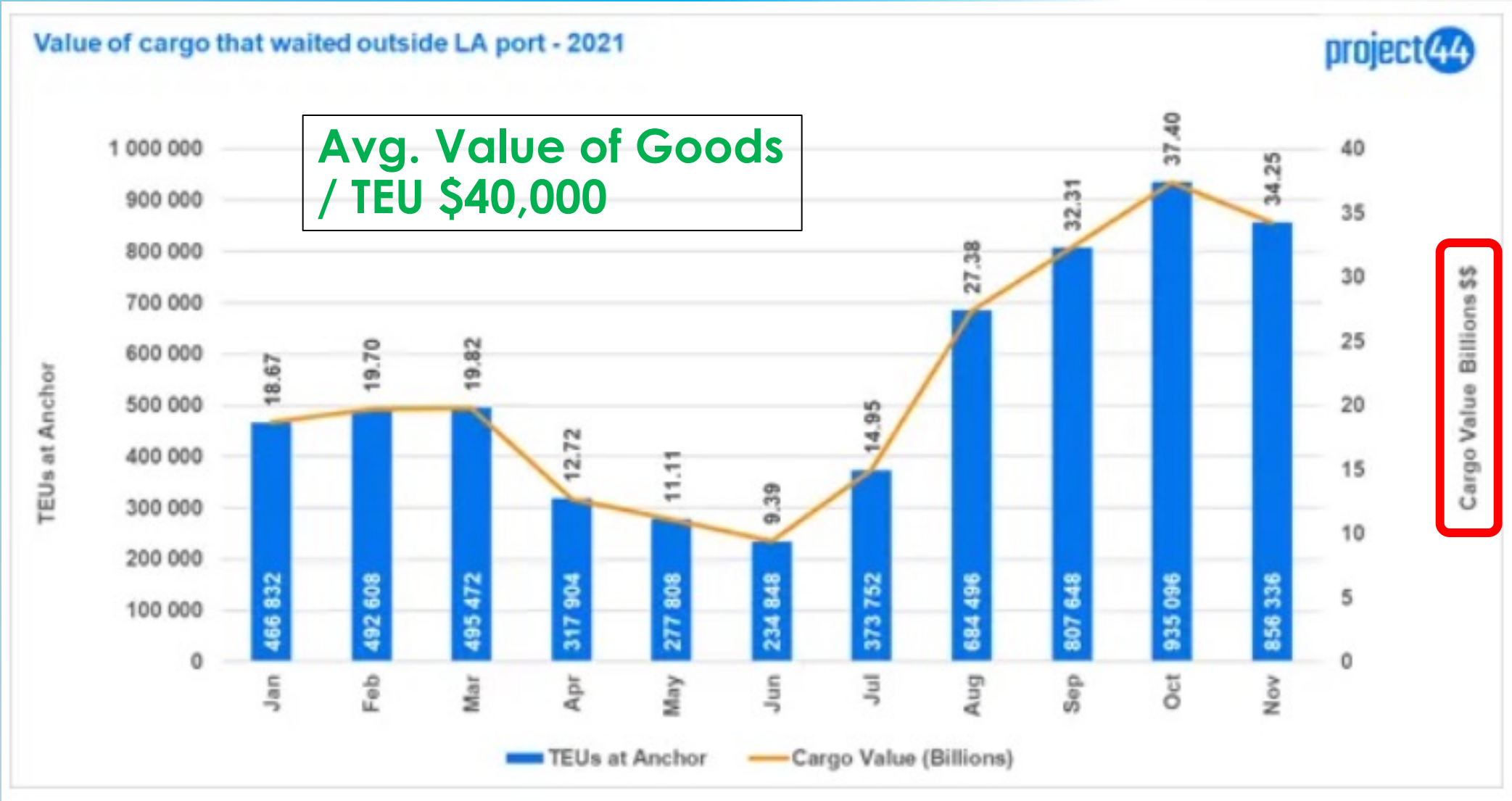
POLA Exports Down 31 out of 35 months
thru Sept. (biggest declines since 2002)

Record-Setting 2021 Volume

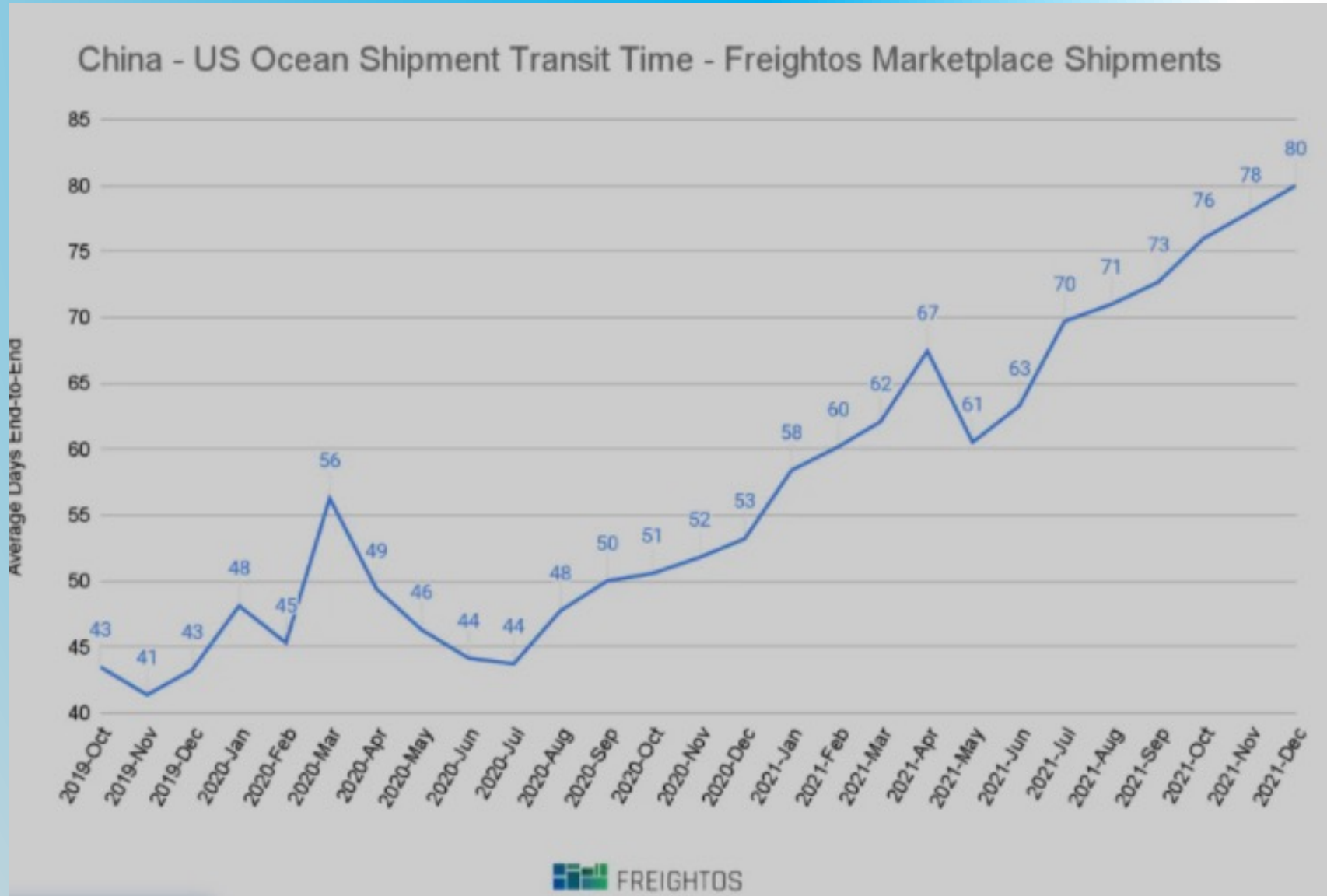
SHIPS AT ANCHOR – NOT IN PORT



SUPPLY CHAIN METRICS



SUPPLY CHAIN METRICS



SUPPLY CHAIN METRICS

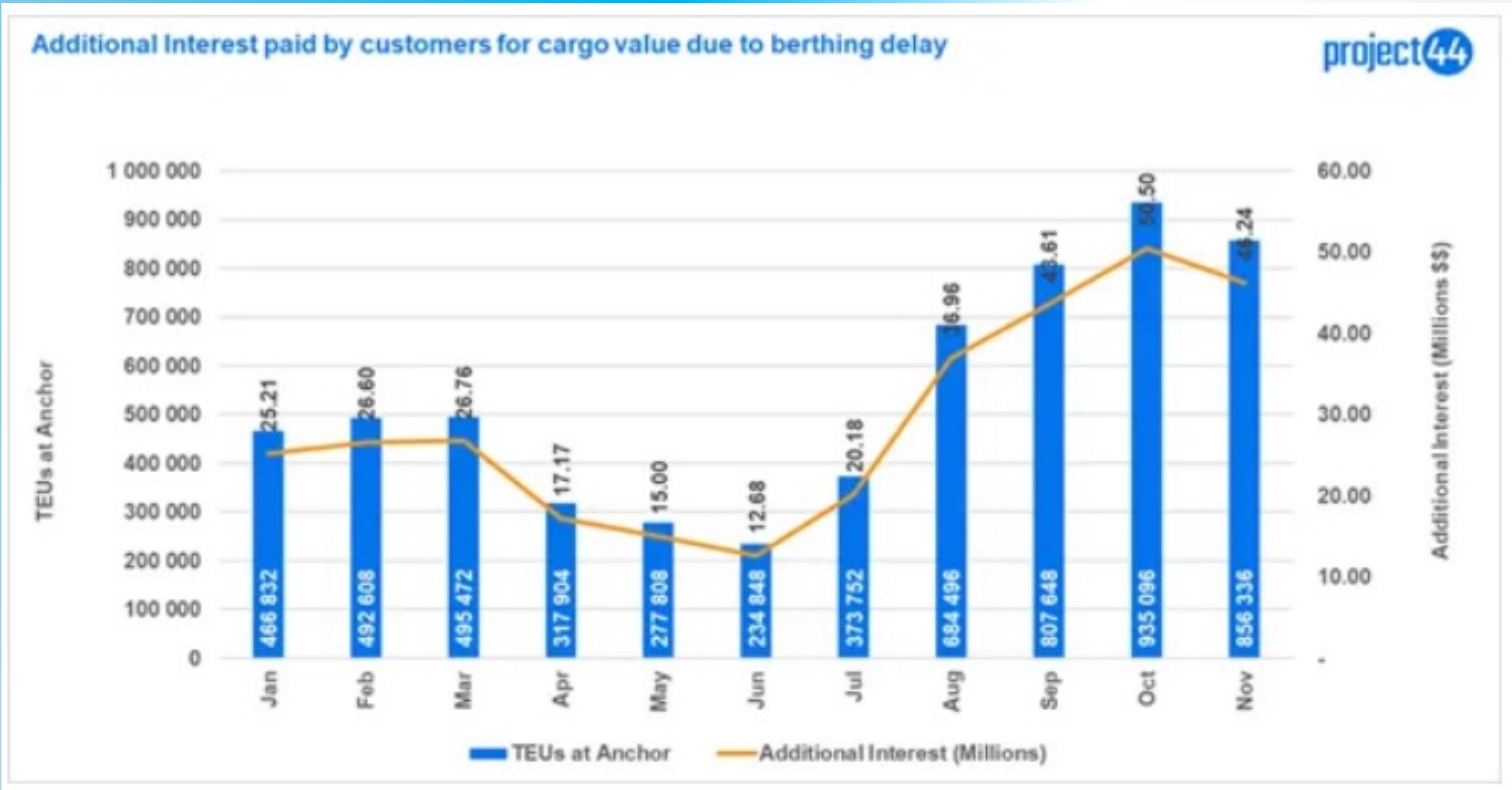
Container	Terminal Dwell	Street Dwell	Total Dwell
TEU	8.4	10.5	18.9
FEU	4.0	9.7	13.7

Examples of real-world on-port dwell times:

- LA/LB – 45 days
- Balt. – 14 days

- Chassis used to store containers NOT moving containers
- Distribution centers / warehouses at or above capacity
- Not enough truck drivers (est. at 80,000 -100,000 deficit)
- Drivers being poached by other trucking lines

SUPPLY CHAIN METRICS - FINANCIAL



SUPPLY CHAIN METRICS

How individual railroads charge for demurrage varies

Railroad	Range of daily demurrage fees
<u>BNSF</u>	\$150 to \$500, depending on container dwell time and facility
<u>CN</u>	\$100 to \$450, depending on container dwell time and facility
<u>CP</u>	\$75 to \$350, depending on container dwell time, facility and who owns the equipment
<u>CSX</u>	\$100 to \$500, depending on container dwell time, facility and whether the equipment is for domestic or international use
<u>KCS</u>	\$100 per day after free time expires, in all cases
<u>NS</u>	\$100 to \$300, depending on container dwell time and facility
<u>UP</u>	\$100 to \$225, depending on container dwell time, facility and whether the equipment is for domestic or international use

SOURCE: Letters in response to the STB, as linked. Union Pacific did not disclose its specific fees in the letter, but its rates are available online.

- Velocity is the key to profitability
- Using a stick (demurrage) can have negative effects

OCEAN TRANSPORT COST RISES DRIVING INFLATION AND DEMAND

Ocean Freight Costs vs. Value of Products								
Product Type	Typical Nbr. Of Items per 40 foot container		Estimated Retail Value (USD)		China - US West Coast Freight Rate per Retail Value			
	Low	High	Low	High	Usual		Oct-21	
					Low	High	Low	High
Clothing (low-value)	90,000	130,000	\$ 225,000	\$ 520,000	1.23%	0.53%	7.50%	3.25%
Clothing (mid-range)	25,000	60,000	\$ 500,000	\$ 3,600,000	0.55%	0.08%	3.38%	0.47%
Sports shoes	18,000	28,000	\$ 350,000	\$ 2,520,000	0.79%	0.11%	4.82%	0.67%
Bicycles	1,200	1,600	\$ 240,000	\$ 480,000	1.15%	0.58%	7.03%	3.52%
Toys (low-quality)	20,000	60,000	\$ 60,000	\$ 720,000	4.61%	0.38%	28.14%	2.34%
Consumer electronics (small)	2,800	3,800	\$ 170,000	\$ 430,000	1.63%	0.64%	9.93%	3.93%
Consumer electronics (large)	240	480	\$ 70,000	\$ 140,000	3.95%	1.98%	24.12%	12.06%
Appliances (small)	600	1,200	\$ 45,000	\$ 100,000	6.15%	2.77%	37.52%	16.88%
Appliances (large)	100	120	\$ 20,000	\$ 65,000	0.22%	1.28%	56.28%	25.07%
Furniture (assembled)	250	600	\$ 20,000	\$ 150,000	13.83%	1.84%	84.42%	11.26%
Furniture (flat-packed)	1,000	3,000	\$ 70,000	\$ 340,000	3.95%	0.77%	24.12%	4.97%
Automobile parts	600	15,000	\$ 50,000	\$ 375,000	5.53%	0.74%	33.77%	4.50%

FEU rate China - North America west coast \$ 16,883

Sources:
 Jean-Paul Rodrigue, The Geography of Transport Systems, 5th Ed., 26May2020, New York - all data except 2021.
 Freightos Index, October 25, 2021 - FEU rate.

- Ocean transport costs are unsustainable
- Prices of products will have to rise significantly
- Price-elasticity of demand will affect flow of imports

OTHER ISSUES - IMPACTS

- **Anticipatory Orders**

- E-commerce clicks generate trends → **Supplier** ordering

- **Truck Repair Parts**

- Delayed from 2 weeks to 3 months → **Drivers** leaving who can't earn

- **Precision Scheduling Railroading**

- Focused on Wall Street **NOT** consumers → Insufficient **capacity**

- **Environmental Impacts**

- Container ships + trucks + trains idling → Increased concentrated **emissions**

E-COMMERCE IMPACT ON LOCAL COMMUNITIES?

- More trucks on the road

Estimated Truck Operations Per Year in U.S.				
	UPS	FedEx	USPS	Amazon
No. of packages per truck/day	125	125	100	300
No. of trucks per day / 2020	106,168	70,779	210,125	38,707
No. of trucks per day / 2026	186,740	124,493	369,589	68,082

- Higher costs

Ocean costs have increased from 1.5% to 15% of value of goods

- More congestion



WHAT TO DO?

- Manage expectations
- Purchase what is needed – **reduce** returns
- Re- and near-shore – **make** local **buy** local
- Focus on consumer needs **NOT** just investor expectations
- Improved / coordinated infrastructure planning and investment
- Expanded TDL/SCM training
- Digital investment

NEEDED RESEARCH

- Analyze existing 'freight' data bases and select 'best' ones
- Digitalization / cargo community systems – US applications in marine industry
- Benefit-cost analysis of significant expansion of Critical Urban and Critical Rural Freight Corridors program
- Benefits of EV on noise, particulate, and other emissions in communities surrounding ports
- Integrate / coordinate state TMS and port / company TMS systems
- Use of AI to improve ocean-domestic container processing and handling

QUESTIONS AND GENERAL DISCUSSION