



# CO<sub>2</sub> Freight Transport Workshop

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October 12, 2022



ASSOCIATION OF  
AMERICAN RAILROADS

# The North American Railroad Industry



**Interconnected, private  
180,000-mile network in  
Canada, Mexico and U.S.**



**Annual \$21B invested into  
equipment, infrastructure,  
training and technology.**



**7 Class I railroads operate  
over 2/3 of the nation's  
right-of-way and = 95% of  
railroad freight revenue.**



**Freight rail = ~40% of long-  
distance ton-miles,\* more  
than any other mode of  
transportation.**



**Freight railroads are the  
most fuel-efficient way  
to move freight over land.**

# Delivering a Sustainable Future

**On average, one train can move one ton of freight nearly 500 miles on one gallon of fuel.**



**Moving freight by train instead of truck reduces GHG emissions by up to 75%**



**One train can carry the freight of hundreds of trucks, which reduces highway congestion\*\***

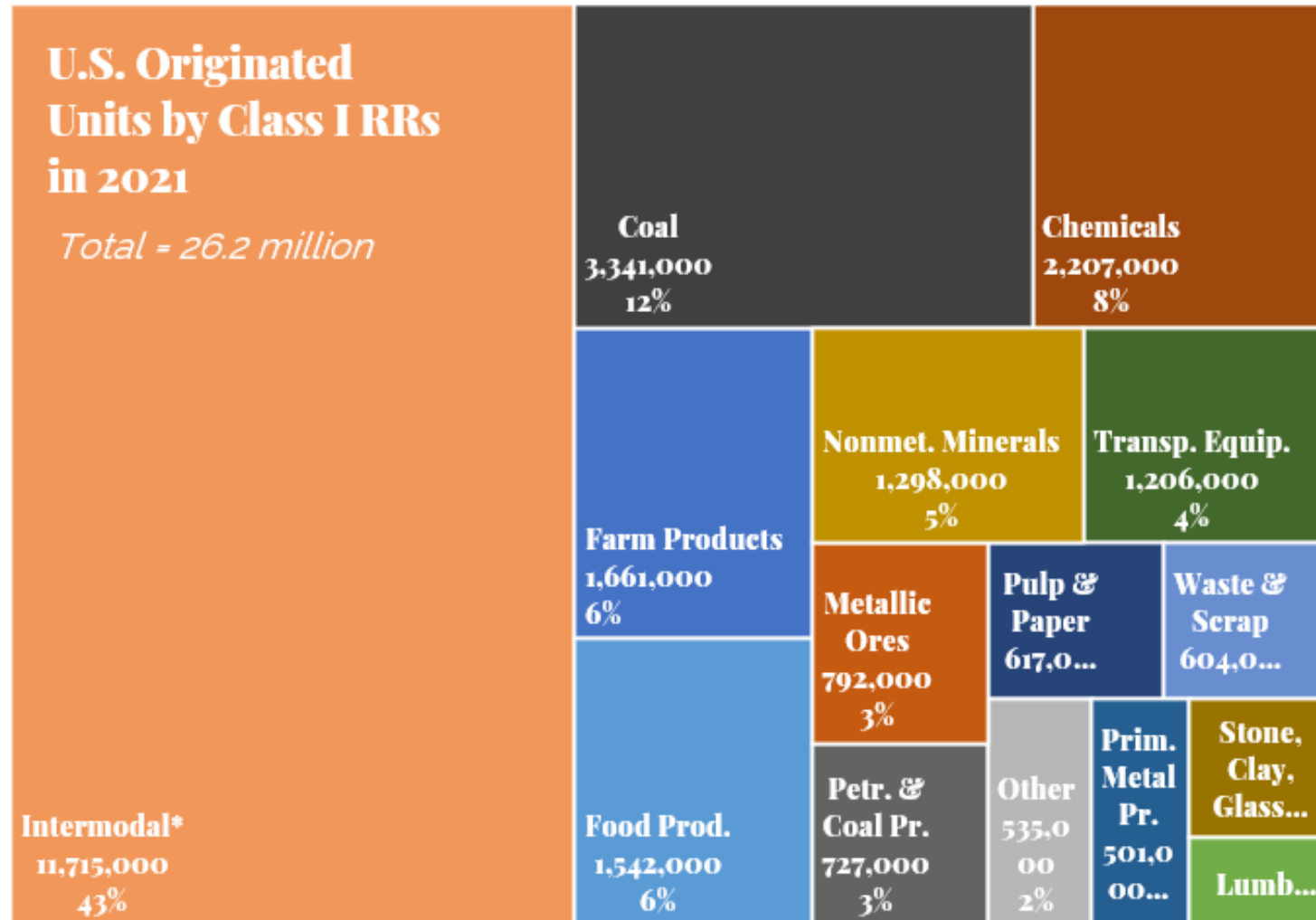


**Freight railroads are 3-4 times more fuel efficient than trucks, on average**

\*\*According to the Texas Transportation Institute's 2019 Urban Mobility Report, highway congestion cost Americans \$165 billion in wasted time (8.8 billion hours) and wasted fuel (3.3 billion gallons) in 2017.



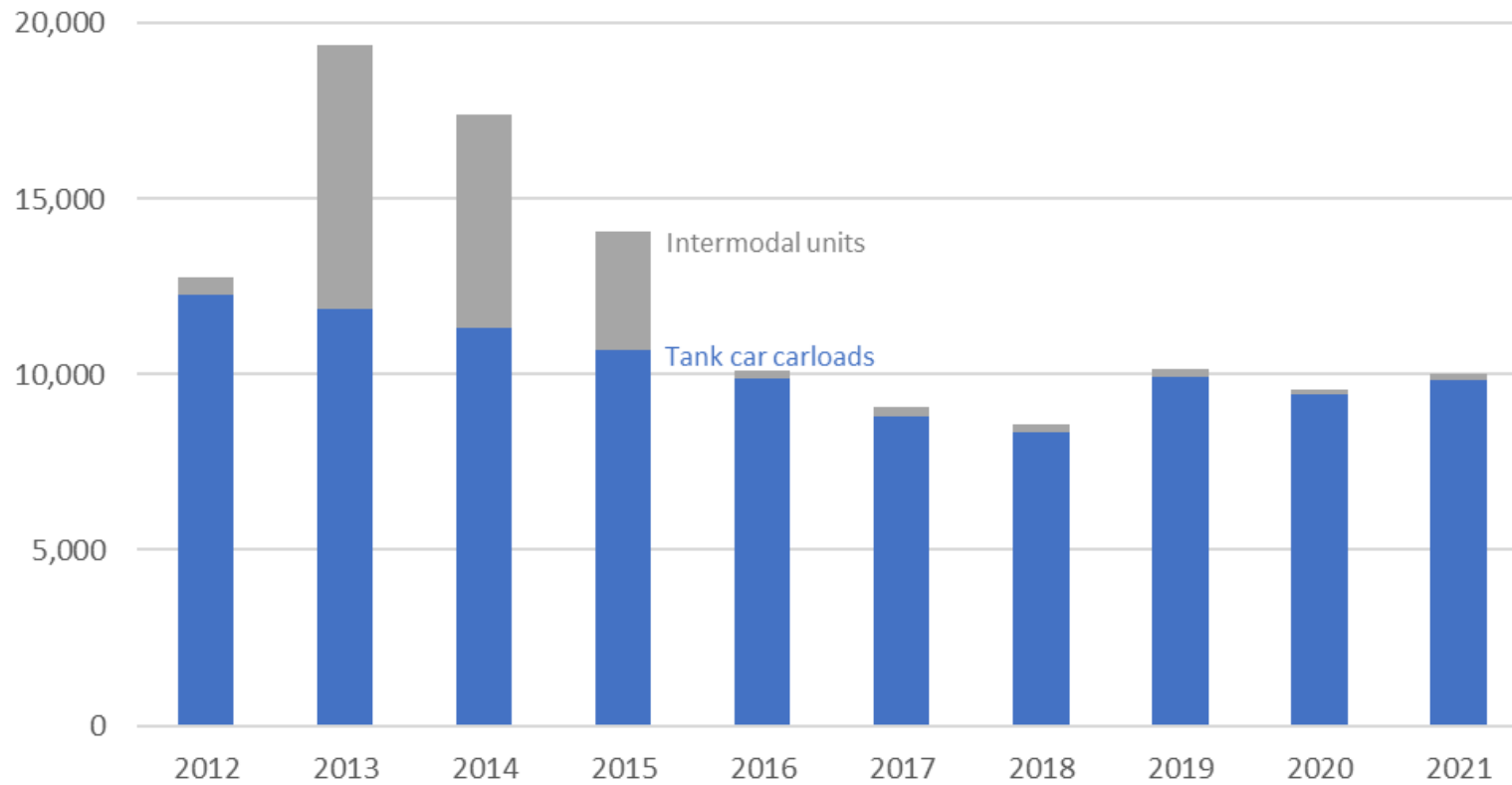
# Railroads Carry Just About Everything



\* Some intermodal is included in other commodities. Source: AAR Freight Commodity Statistics.

# Railroads currently transport CO<sub>2</sub>

U.S. rail originated about **12,000** annual shipments of Carbon Dioxide



Source: AAR Annual Hazmat Report

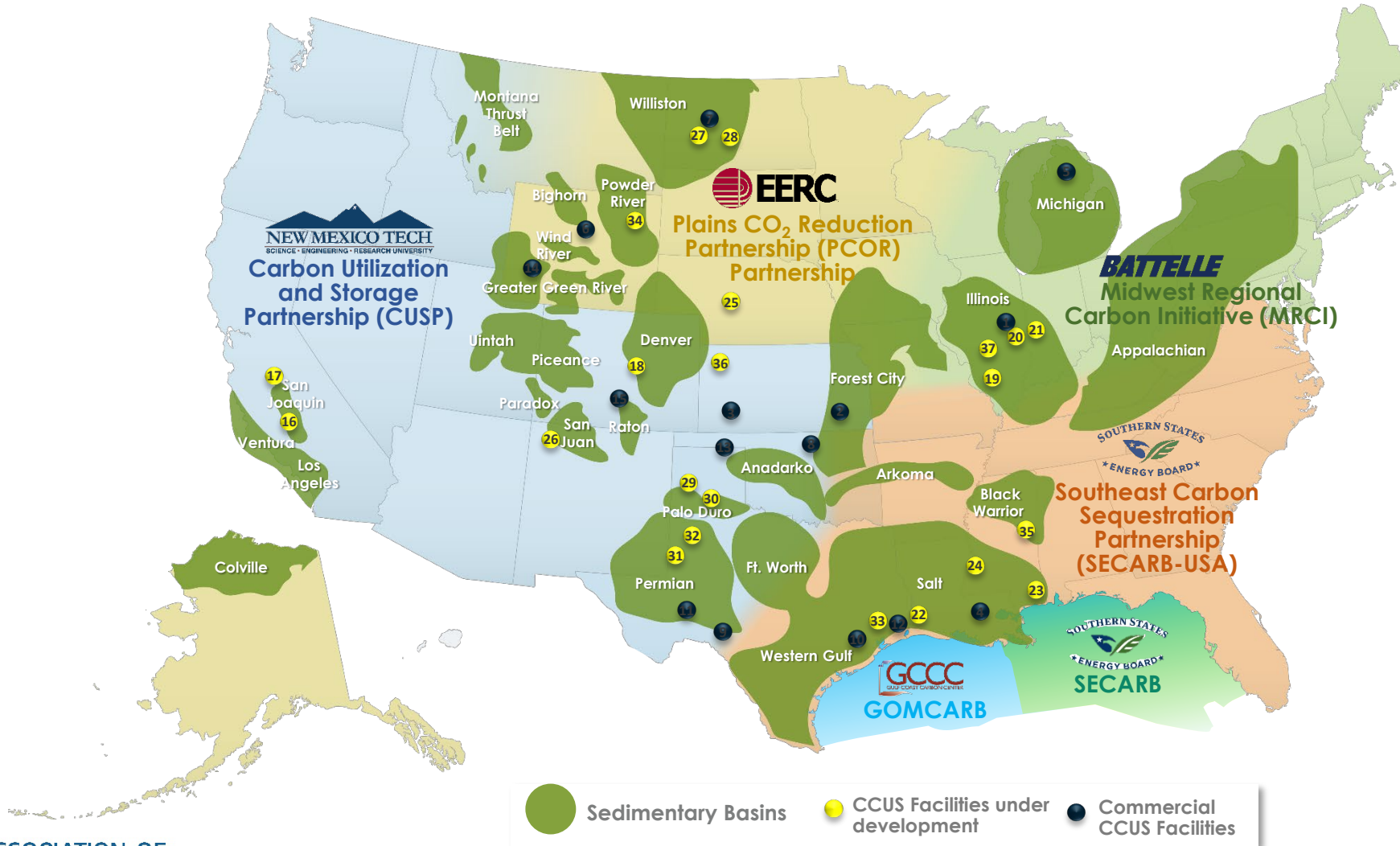
# CO<sub>2</sub> Transport Today

- Carbon dioxide is currently moved via DOT105-J500W Tank Cars
  - Thermal Protection
  - Head Protection
  - Safety Valve (375 psi)
  - Also used to transport liquified petroleum gas and liquified hydrocarbon gas
- These cars are owned privately by shippers (not the railroads)
  - Between 1,000 and 1,500 cars currently used to transport CO<sub>2</sub>

# Today's North American Rail Network

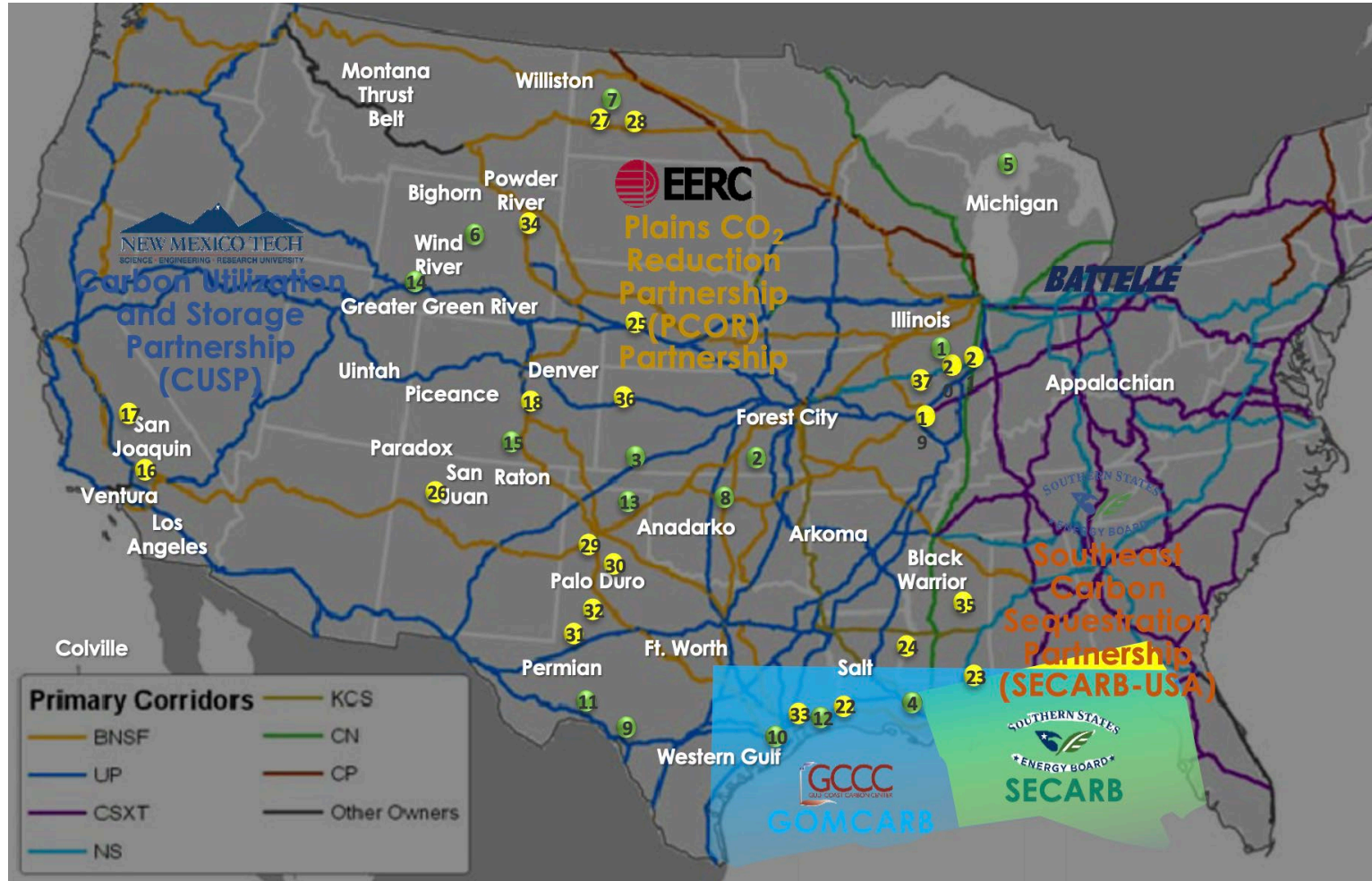


# Current U.S. CCUS Projects and Infrastructure





# Rail Network with CCUS Projects



# CO<sub>2</sub> Transport Tomorrow

- DOT105-J500W Tank Cars
  - Some commodity loss is normal (~5-10%)
  - Pressure release is normal
    - Ways to Minimize losses
      - Improved valves
      - Higher pressures
- DOT 113 Tank Cars
  - ~800 in service today
    - Argonne and Ethelene
    - Proposed for transport of LNG
  - Not currently authorized for CO<sub>2</sub> transport



# Next Steps



**Railroads are interested in working with the Department of Energy to explore opportunities to transport captured carbon dioxide.**



# Questions?

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