Pipeline Transportation of Ammonia

Helping to Bridge the Gap to a Carbon Free Future

November 9, 2021

Background on NuStar

Pipelines:
10,000
pipeline miles

645 MM
barrels transported
in 2020

1.8 MMbpd
average daily
volume in 2020
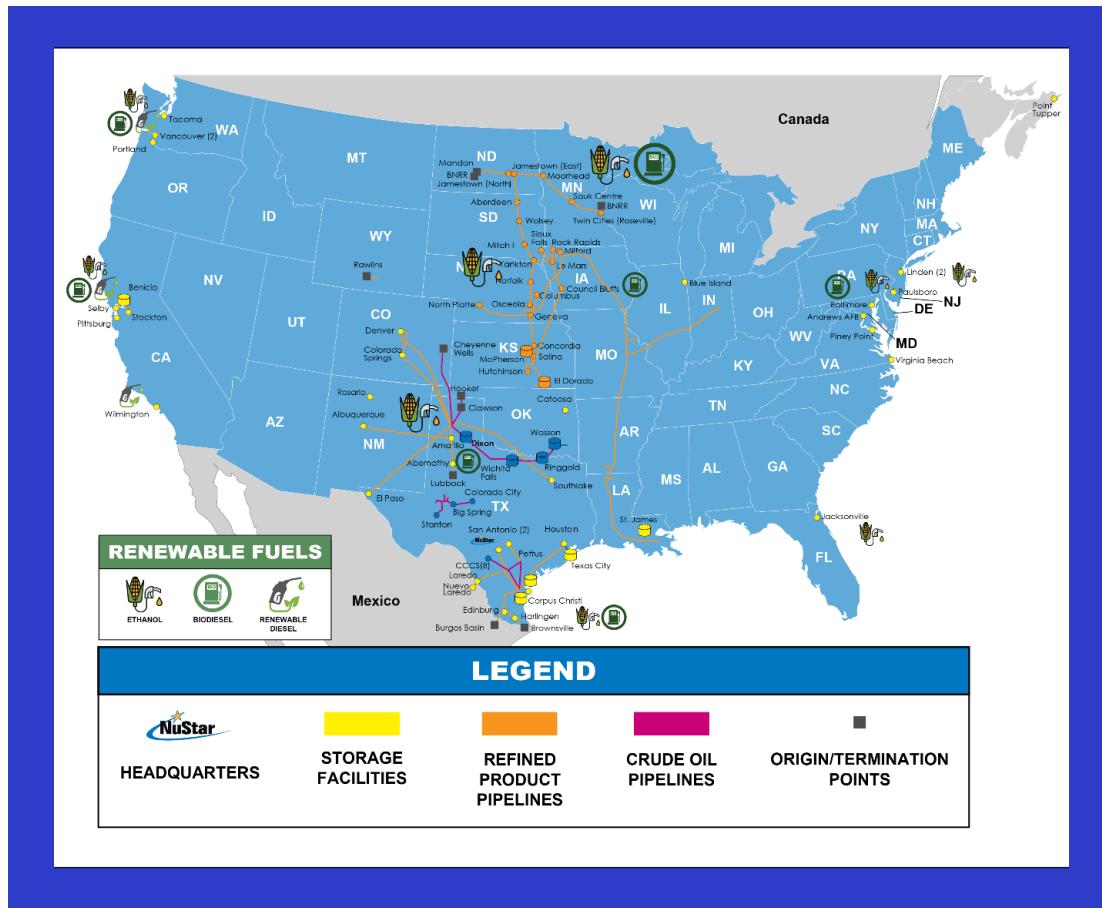
Terminals
73
terminal facilities

72 MM
barrels of storage
capacity

172 MM
barrels
throughput in
2020

RENEWABLE FUELS

ETHANOL   BIODIESEL   RENEWABLE DIESEL

LEGEND

NuStar HEADQUARTERS	STORAGE FACILITIES	REFINED PRODUCT PIPELINES	CRUDE OIL PIPELINES	ORIGIN/TERMINATION POINTS

Our #1 Priority: Health and Safety of our Workforce and Our Communities

- Excellent health and safety record
  - ✓ Over **7.5 times better** than the Bureau of Labor Statistics (BLS) comparison data for the **Bulk Terminals** Industry
  - ✓ And **2 times better** than the BLS data for the **Pipeline Transportation** Industry
- NuStar has received the International Liquids Terminals Association's (ILTA) Safety Excellence Award **10 times**, which is awarded based in part on OSHA safety reports
- We participate in the OSHA Voluntary Protection Program (VPP), which promotes effective worksite safety and health
  - ✓ **85%** of our eligible U.S. terminals are VPP-certified
- We work every day of every year to prevent any product releases

3- Year Total Recordable Incident Rate - Industry Comparison [1]

	2018	2019	2020
Bulk Terminals	2.80	2.80	2.80
Pipeline Transportation	0.60	0.80	0.80
NuStar TRIR	0.27	0.18	0.37

7.5 X better

2X better
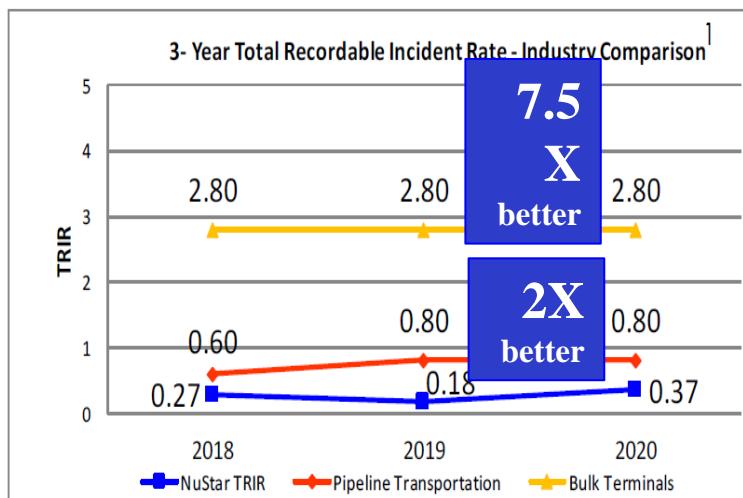
1 – Industry averages derived from 2018-2019 Bureau of Labor Statistics (BLS) Data. 2019 averages carried forward to 2020 for illustration purposes.

ILTA 10-time recipient

NuStar VPP STAR SITES

85% of eligible facilities

811

VPP — Voluntary Protection Programs, An OSHA Cooperative Program

NuStar

NuStar's Support of Each Other and Our Communities

We Invest in Our Communities: Partnering With Local Organizations and Helping to Build Safe, Vibrant Communities

- Our employees take great pride in **giving back and building a brighter future** for our neighbors by contributing time, talent, money and other resources to hundreds of community initiatives each year

- NuStar maintains **local volunteer councils** in each community in which we operate to contribute to the charitable and civic causes unique to that local community

- When disasters strike **our community**, NuStar is there to help employees and their families recover

Over **80** board positions held by NuStar employees on non-profit boards

99.9% United Way participation in 2020

NuStar's Ammonia Pipeline System

- The Ammonia Pipeline System is a common carrier pipeline system

- Approximately 2,000 miles long, completed in 1971, consisting of 4", 6", 8" and 10" pipe

- Transports Anhydrous Ammonia for third parties, in liquid form, from Louisiana and other various points to the Corn Belt region

- Serves both agricultural and industrial customers

- Transports approximately 1.5 million tons of anhydrous ammonia per year

- The construction and operation is regulated by DOT - PHMSA (Pipeline Hazardous Materials Safety Administration)

Pipeline Transportation Advantages

Pipeline Transportation
- Safe
- Cost Effective
- Efficient
- Low Carbon Footprint

Fungible
- Source Independent
  - Green
  - Blue
  - Grey

Ammonia Acceptance Specifications	
Temperature:	Not less than 35 degrees Fahrenheit, nor more than 85 degrees Fahrenheit
Ammonia (NH3) Content:	99.5 % minimum by weight
Water Content:	0.2 % minimum by weight
Oil Content by Weight:	5 parts per million maximum
Inerts:	0.5cc per gram maximum

Liquid vs. Gas Pipeline Infrastructure
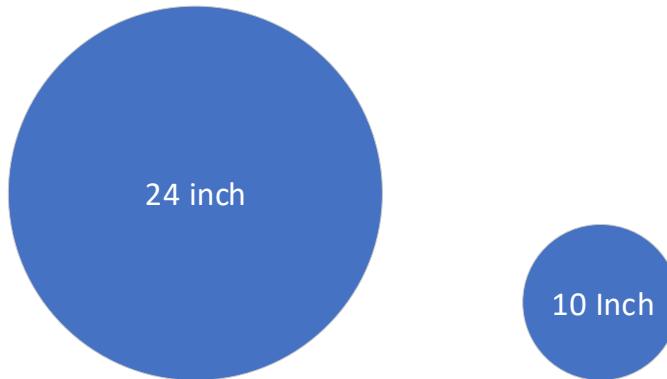
- Natural Gas Transmission Pipeline sizes range from 16 to 40 inches in diameter and are equipped with compressors rather than pumps

- Liquids pipelines more typically range from 6 to 16 inches in diameter and are usually equipped with centrifugal pumps

Pipe Size	Capacity (Barrels/Day)	Capacity (Tons/Day)	Linefill/mile (BBLs)	Linefill/mile (Tons)
6 inch	24,000	2,600	184	20
10 inch	60,000	6,600	512	56
16 inch	240,000	26,300	1,313	144

24 inch

10 Inch

- NuStar owns approximately 75,000 tons of linefill

Repurpose vs. New Build

- **Idle or Abandoned Liquid Pipelines**
    - ROW (might be specific)
    - Integrity (Inline Inspection/Hydrotest)
    - Replacement of Soft Goods
    - Cleaning/Drying
    - Lateral extensions to Origins and Delivery points
    - Cost range can be wide

- **New Build**
    - ROW Acquisition
    - Construction
    - Commissioning
    - $1-3 million/mile

Thank You!

Questions???