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A University of Wisconsin - Superior and University of Minnesota Duluth Consortium

Positioning for Progress:

Establishing a Natural Gas Liquefaction Plant in the Twin Ports

UNIVERSITY of WISCONSIN Superior

UNIVERSITY OF MINNESOTA DULUTH

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Marine

- "EPA and USCG facilitate TOTE's groundbreaking move to convert its vessels to alternative fuel - LNG"
- "Interlake Steamship Moves Toward Upgrading US Flag Fleet to Energy Efficient LNG"
- "LNG to power a Staten Island Ferry, saving a boatload on fuel costs"

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Rail

- "Three of the biggest U.S. rail carriers Burlington Northern Santa Fe, Union Pacific, and Norfolk Southern are working with manufacturers on using gas as an alternative power source for freight trains."
- "CN – Canadian National Railway – has confirmed trials of an LNG-fueled train in Alberta"
- "Canadian Pacific said it is looking into testing liquefied natural-gas-powered locomotives and is considering different suppliers, but the company isn't testing new engines at the moment."

Truck Conversions to CNG or LNG

PTI PAPER TRANSPORT, INC.

SCHNEIDER NATIONAL

U.S. Venture

Pilot FLYING J

La Crosse, WI

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Mining

- **"Shell sees market in LNG mining trucks"**
  - by: *MATT CHAMBERS* ,From: *The Australian* , April 03, 2013 12:00AM
- **"Caterpillar Previews Natural-Gas Powered Product Initiative at MINExpo"**
  - **For Release Worldwide: September 2012** Release Number: 301PR12
- **"Prometheus Energy helps mining facilities with their LNG fuel needs by converting mining trucks, power shovels, and other processing equipment."**
- **http://www.prometheusenergy.com/solutions/mining-sector.htmlc 2013**

National Energy Policy Institute

"**1. LNG infrastructure** is currently extremely limited and in most cases, the conversion of a marine vessel to LNG must also include development of an LNG fuel source at the marine port. Without a motivated partner to supply fuel, the development of fueling infrastructure adds to the overall cost of the marine LNG project."

Liquefied Natural Gas as a Marine Fuel A Closer Look at TOTE's Containership Projects, Anna Lee Deal **May 7, 2013**

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Essential Requirements for a Twin Ports Liquefaction Plant Serving Current and Future Markets

- **A potentially large and expanding regional market for LNG**
- **A lack of competition**
- **An abundant cost-effective source of natural gas**
- **A location that is LNG plant friendly**
- **Multi-modal distribution options**

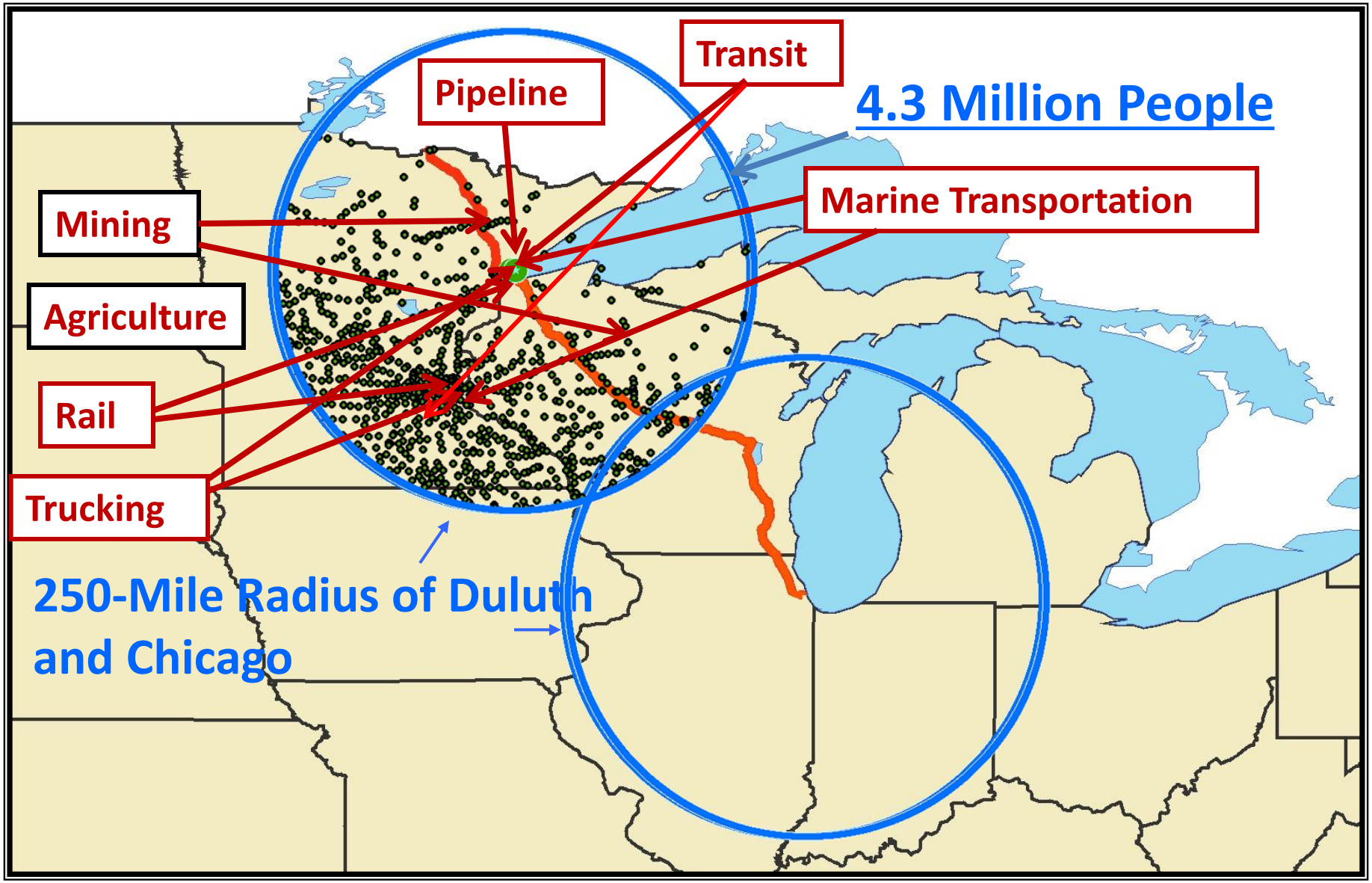
Positioning a Liquefaction Plant in the Twin Ports for current and future markets

- **Potential market within 250 miles of Duluth/Superior**

1. **Marine fueling - Great Lakes and Mississippi River**
2. **Rail – Twin Ports and Twin Cities**
3. **Transit Twin Ports and Twin Cities**
4. **Mining industry – Minnesota and Wisconsin**
5. **Trucking industry – long haul – regional**
6. **Agriculture – Minnesota – Wisconsin - ND**
7. **Distribution to users by truck, rail or water**

Community acceptance of plant is critical!

Twin Ports LNG Liquefaction Plant Marketing Region
250 mile drayage



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Shell

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for their support

Agenda

Photo by Chris J. Benson