



Shale: Short Line Opportunities in Pennsylvania

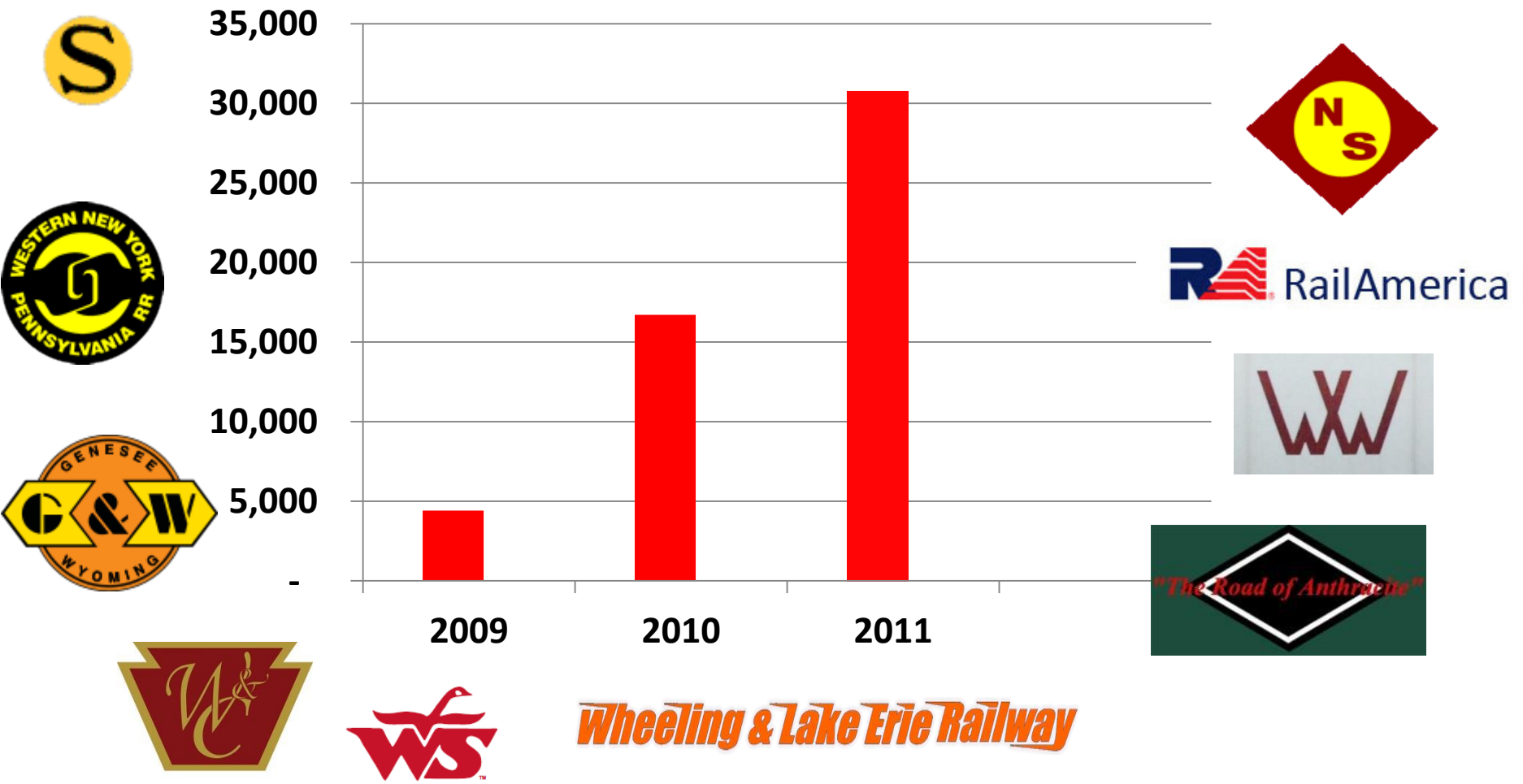
Pennsylvania Rail Freight Seminar

Harrisburg, PA

May 17, 2012

Chris Spiceland, System Manager Short Line Marketing

NS Short Line Carloads for Marcellus Shale



World's Largest Natural Gas Fields

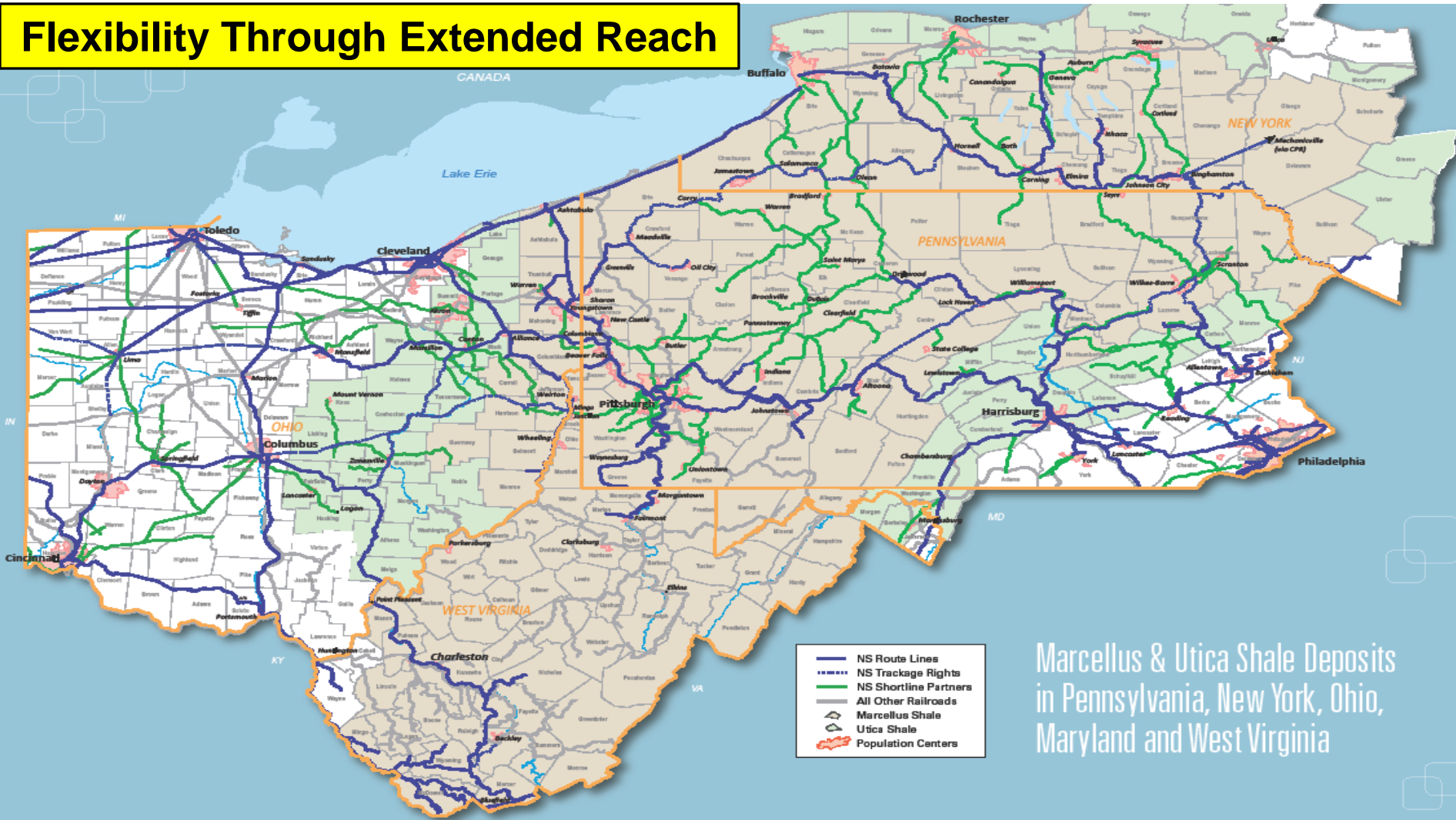
	Field	Country	Reserves (Tcf)
1	South Pars / North Field	Iran & Qatar	1,235
2	Marcellus	USA	489*
3	Urengoy	Russia	222
4	Yamburg	Russia	138
5	Hassi R'Mel	Algeria	123
6	Shtokman	Russia	110
7	South lolotan-Osman	Turkmenistan	98
8	Zapolyarnoye	Russia	95
9	Hugoton	USA	81
10	Groningen	Netherlands	73

*Dr. Terry Engelder, PSU – August 2009 issue of Fort Worth Basin Oil & Gas Magazine

Sources: Ralph Sandres, Global Natural Gas Reserves – A Heuristic Viewpoint

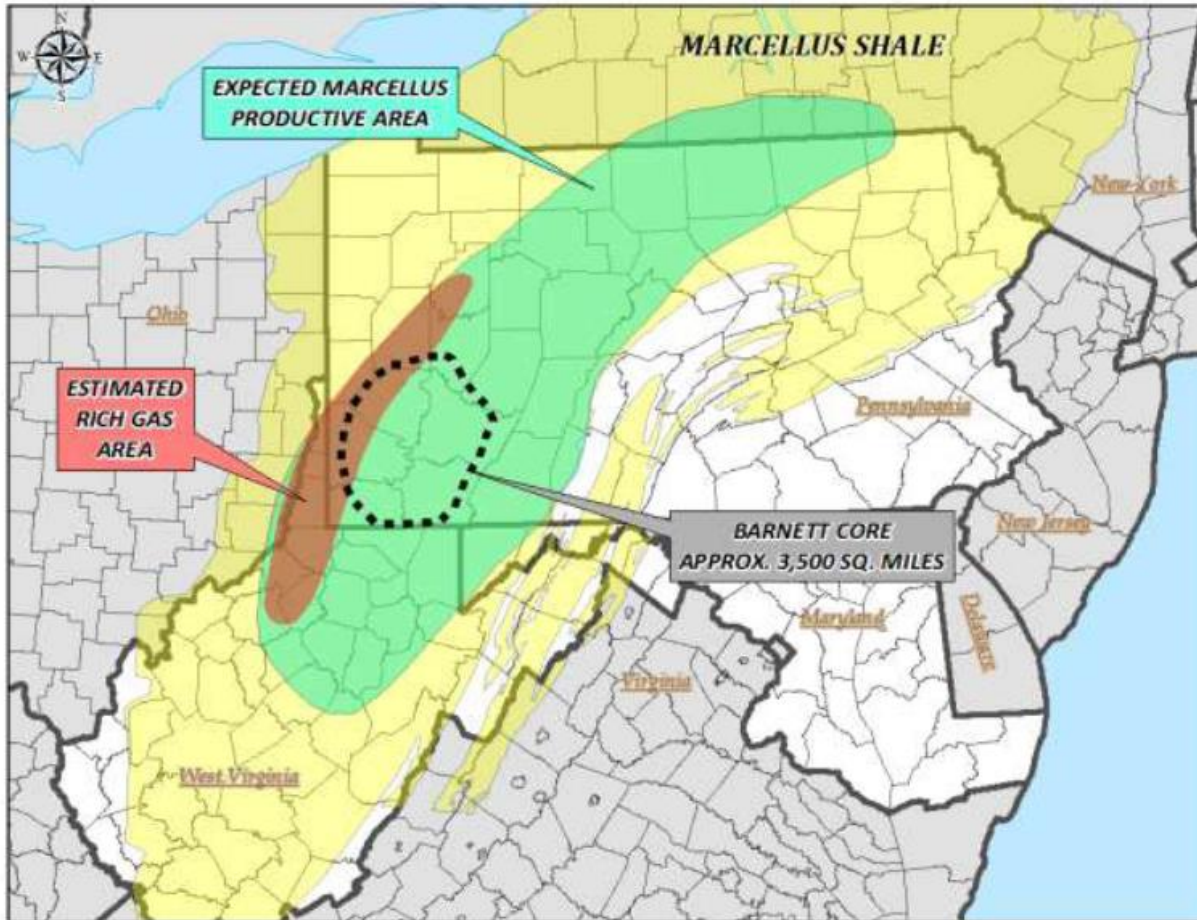
Shale Play – it's in our own Backyard

Flexibility Through Extended Reach



Marcellus & Utica Shale Deposits
in Pennsylvania, New York, Ohio,
Maryland and West Virginia

Marcellus Overview: Rich Acreage



Producers & capital shifting focus to liquids-rich areas:

- Eagle Ford, Woodford-Cana, & Marcellus

Rich acreage in Marcellus is 3,000 - 5,000 sq. miles:

- Approx size of Barnett core

Lack of adequate infrastructure:

- Billions in investment required to maximize producer netbacks from NGLs

Rich production issues:

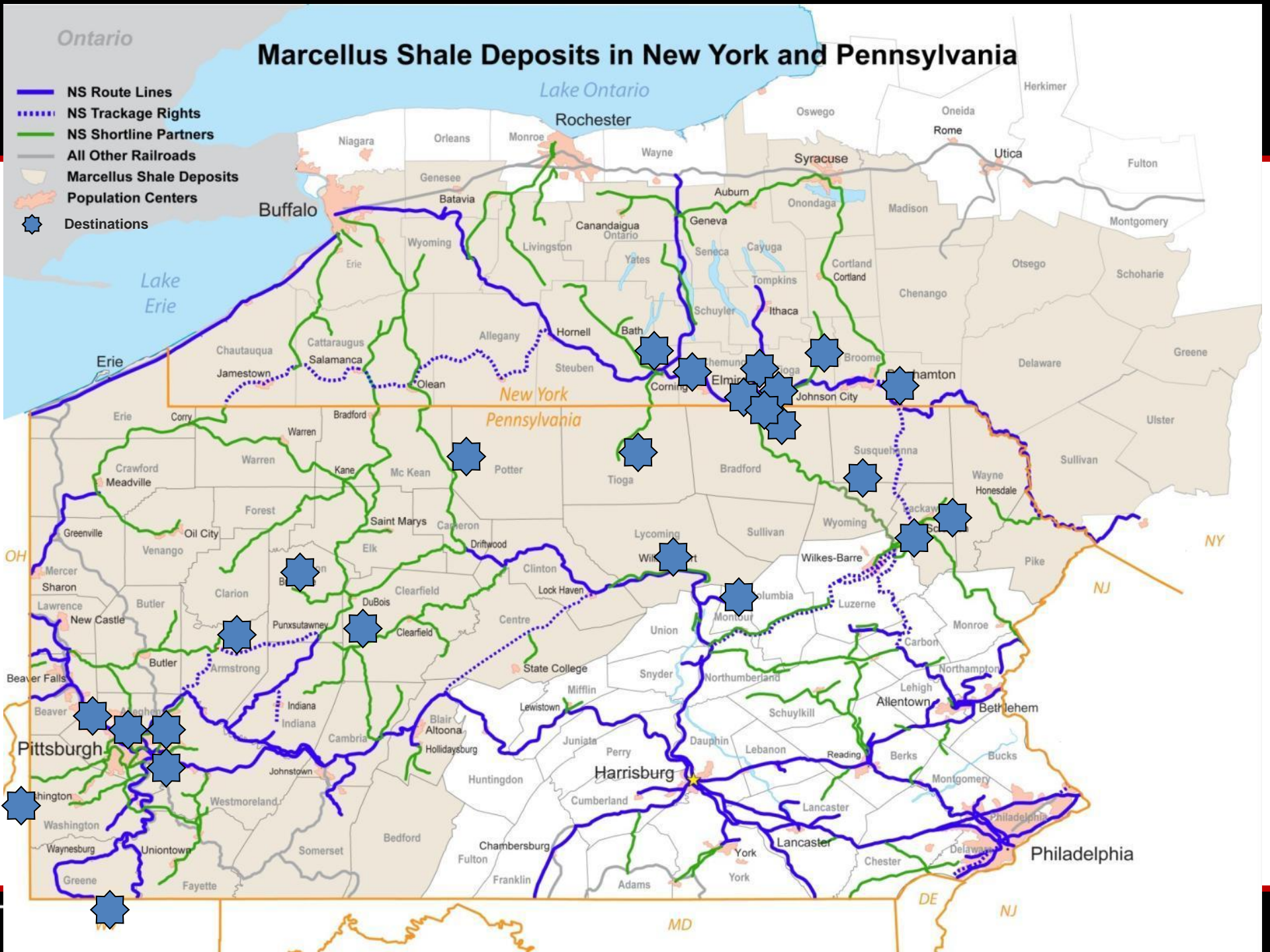
- Lack of processing facilities
- Lack of fractionation facilities
- Lack of NGL pipeline
- Lack of local industrial market

Ontario

Marcellus Shale Deposits in New York and Pennsylvania

Lake Ontario

- NS Route Lines
- NS Trackage Rights
- NS Shortline Partners
- All Other Railroads
- Marcellus Shale Deposits
- Population Centers
- Destinations



“The Holy Grail”

Facilitating a Consistent Inbound / Outbound Supply Chain



Inputs

- Sand
- Pipe
- Aggregates/Cement
- Crane Mats
- Chemicals

Outputs

- Drill Cuttings
- Waste Water
- Natural Gas
- Natural Gas Liquids
- Crude Oil

“The Paydirt”

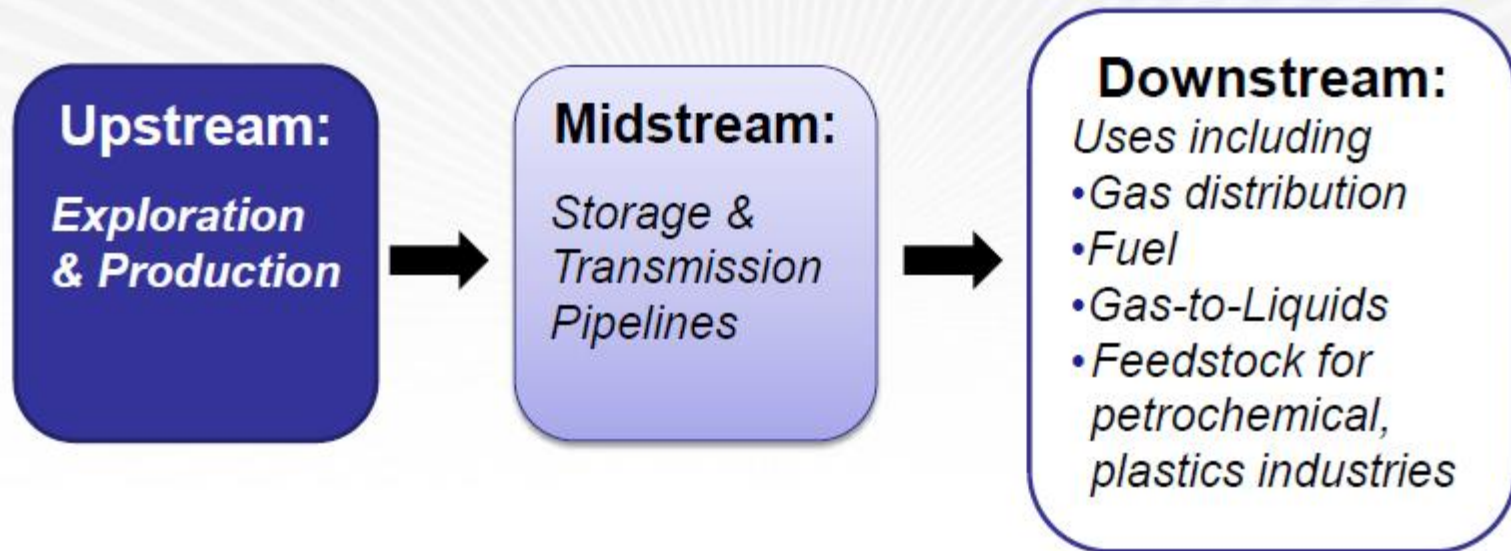
Potential Carloads/Avg. Wellpad

- Inputs:
 - Barites – 5 carloads
 - Freshwater – 300 carloads/railcar equivalent
 - Sand – 25 carloads/well number of wells/pad
 - Miscellaneous Chemicals – < 1 carload
 - Downhole Pipe – 25 carloads/wellpad
- Outputs:
 - Drill Cuttings – 25 carloads
 - Brine Water – 40 carloads

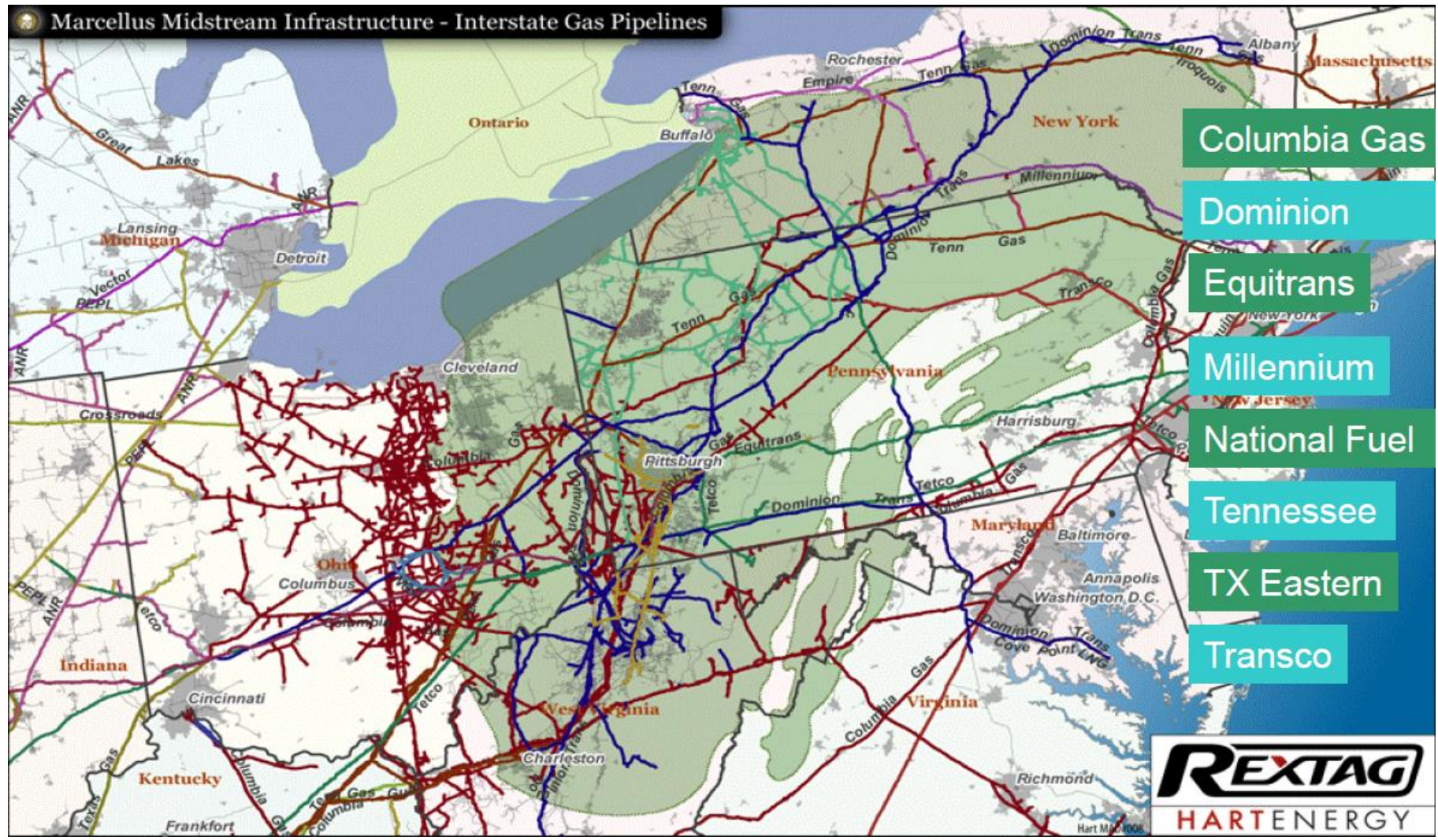
“Let’s Go Fishing”

Shale Play Supply Chain

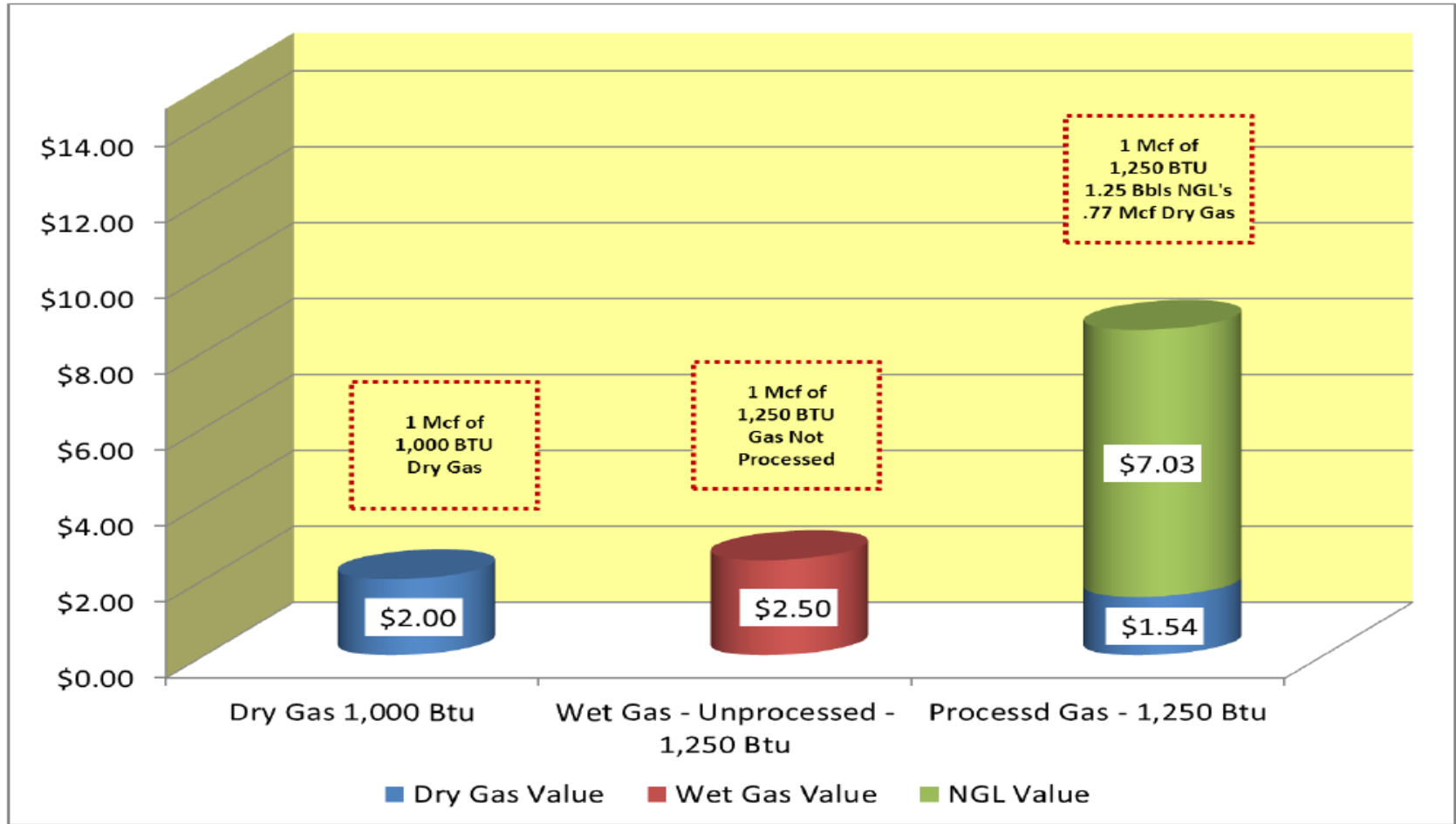
Natural gas production & supply chain



Lots of Marcellus Pipelines But Still Not Enough Natural Gas Takeaway

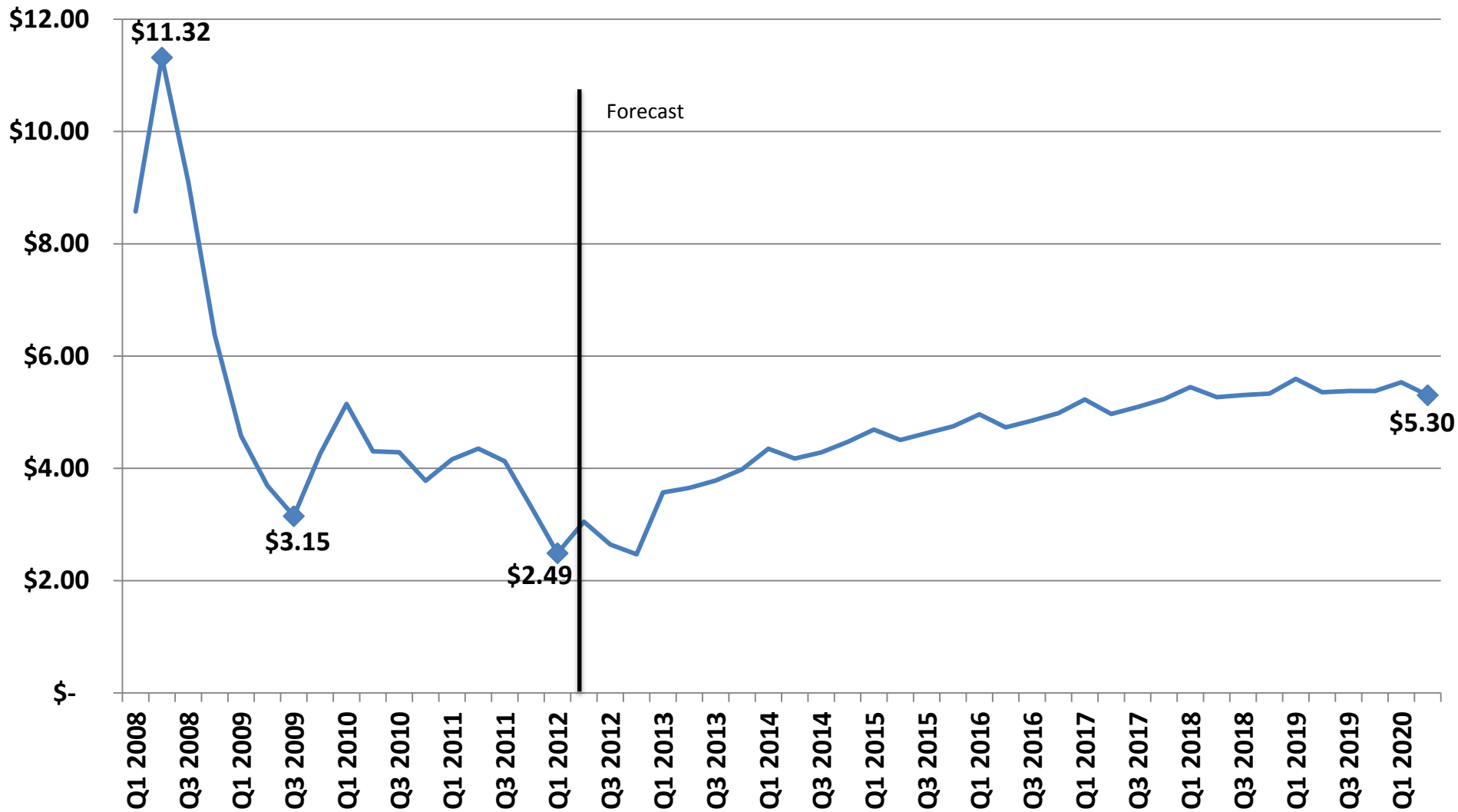


Liquid Values



Nat Gas Price \$2.00/mmbtu NGL Price \$56.23/bbl

U.S. Natural Gas Henry Hub Price: "Take a Guess, Any Guess"

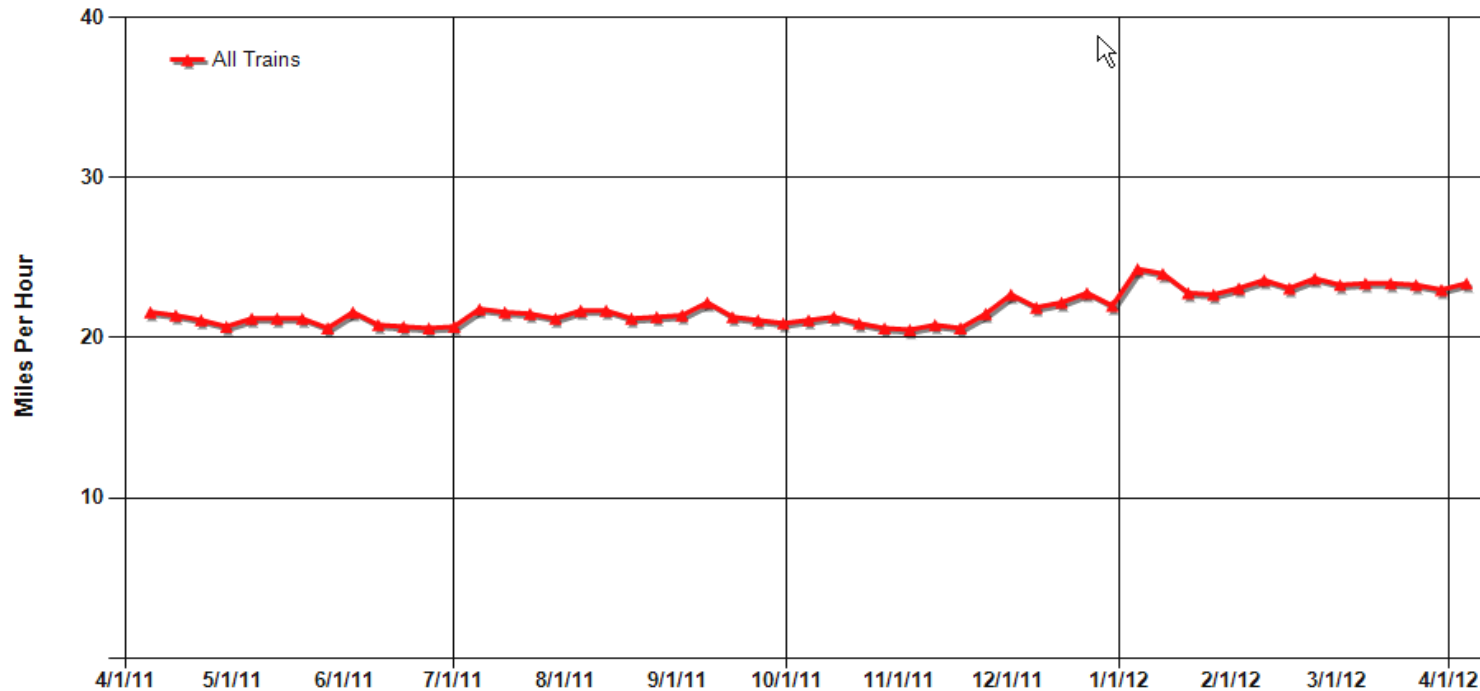


How Can We Improve?

- Service—It Has Improved
- Communication:
 - More and Better Partnerships
 - Shale Supply Chain Inclusion
- Reinvention
 - New Markets, New Opportunities

Solid Service Product

Norfolk Southern
Train Speed



Reinvention

- Today's business model may not work tomorrow
- Look for new revenue streams that Grow the Business!
 - *Mid Stream & Down Stream Shale*



Thank You.