

Frac Sand Supply and Demand

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An “Arms Race”: Vast Opportunity
for Strategic-Minded Companies

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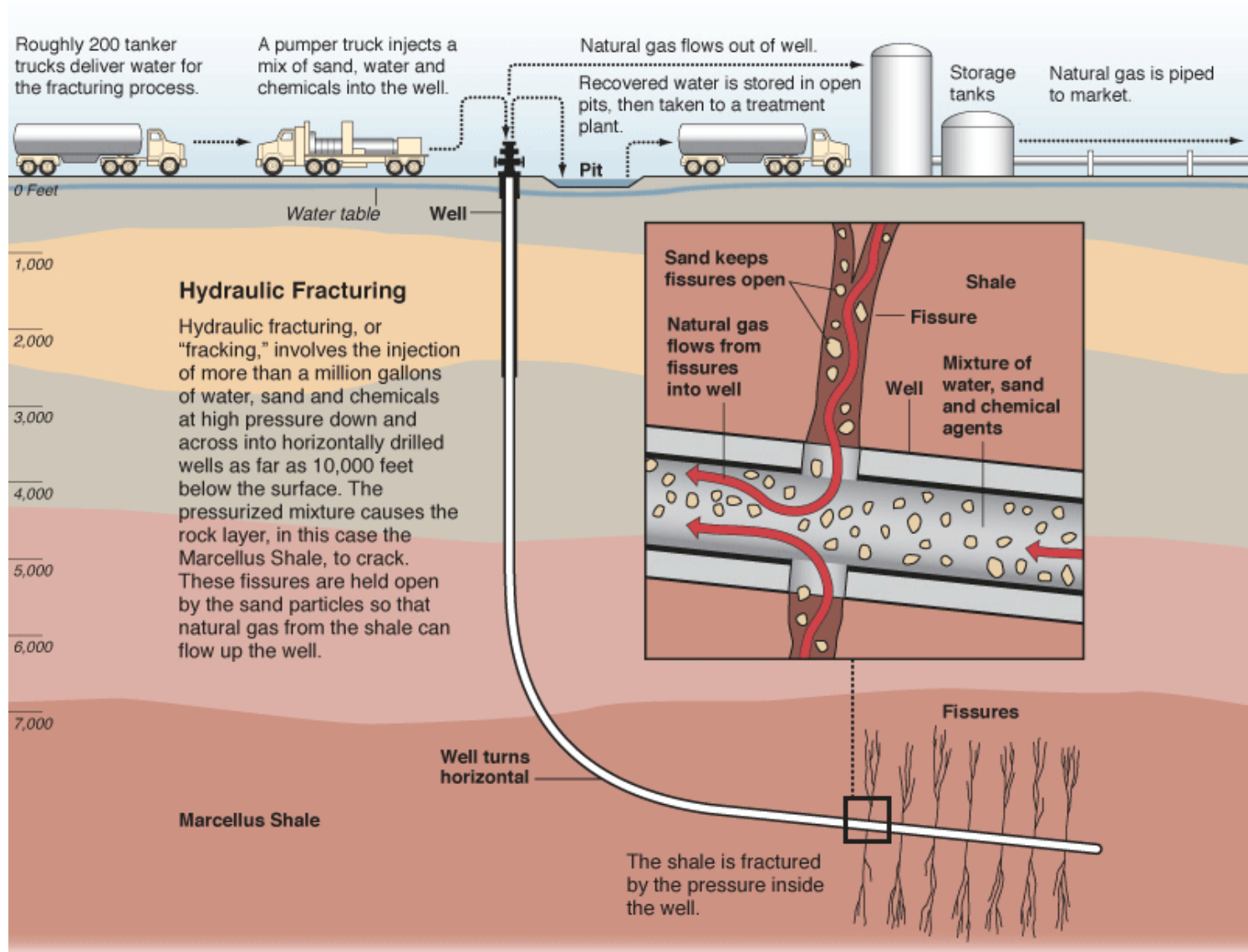
Cattle coexist with frac sand mining!



Sand on the tracks does not create chaos!



A Graphic of the Frac Process:

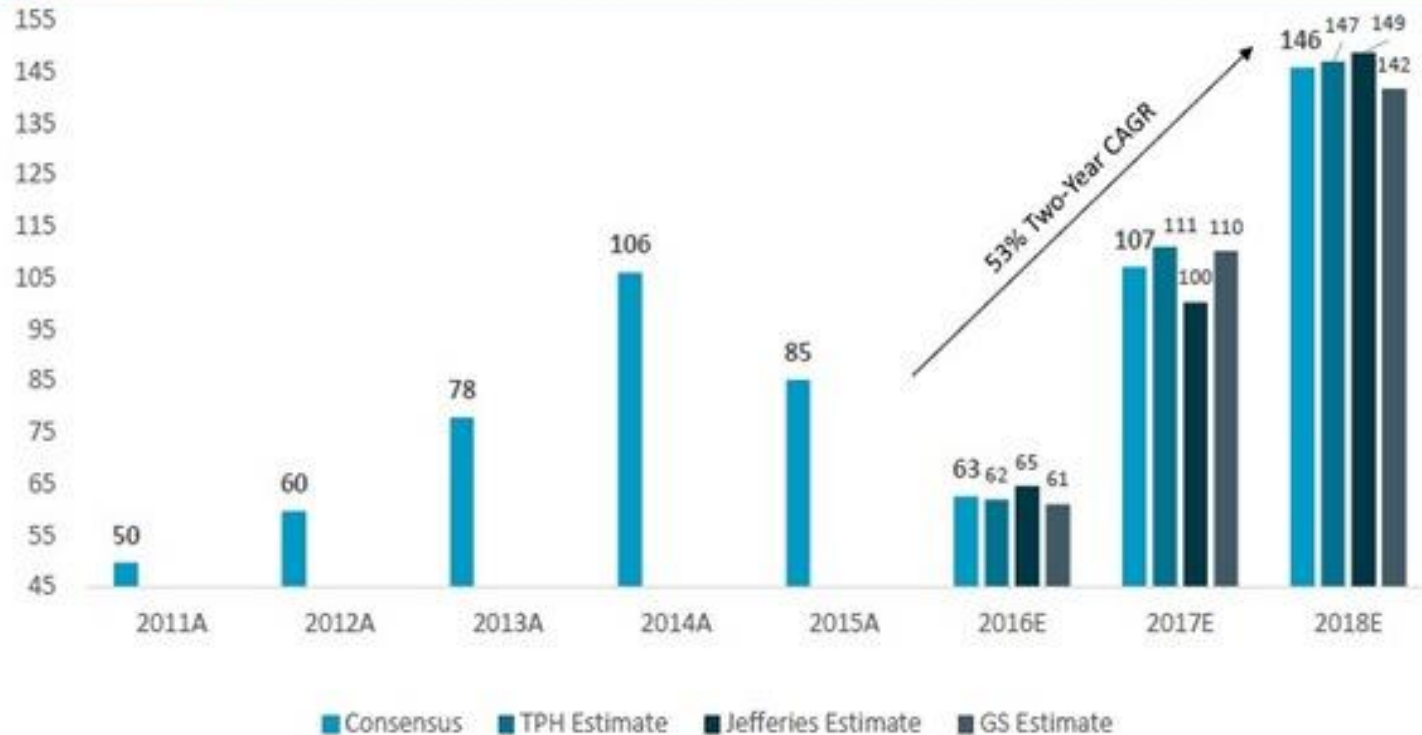


Trucks, Equipment and Crews on a Frac Site



Sand Industry Demand – Robust Projections

**Frac Demand Forecast
(bn pounds)**



Source: Equity Research

Some States with Frac Sand Mining Operations:

- Wisconsin
- Minnesota
- Iowa
- Michigan
- Illinois
- Ohio
- Missouri
- Arkansas
- Mississippi
- Oklahoma
- Texas

Key Shale Plays in North America:

- Canada (includes several Shale Plays)
- Bakken
- DJ - Niobrara
- Marcellus - Utica
- Midcon (Stack/Scoop/Merge/Wash/Arkoma)
- Permian
- Eagle Ford
- Haynesville

Class 1 Railroads:

- CN
- CP
- NS
- UP
- BNSF
- CSX
- KCS

Short Line Railroads:

- There are numerous Short Line Railroads throughout the several Shale Plays.
- Short Lines can be the key, particularly with the varied geography in the Northeast (you cannot drive 100 miles on a fairly flat terrain at a high speed as in west Texas). There can be multiple rail transload sites in relative close proximity in the Northeast.

How Important Are the Railroads?

No Railroads, No Frac Sand Industry!!!!

Key Sand Industry Items:

- “King” 20 – 40
- “2 – 2 – 1”
- Traditional fracs (20-40, gels, guar, high viscosity fluids, etc...)
- Slickwater fracs (high volumes of water, minimal chemical additives, 40-70 & 100 mesh)
- Geography (varied terrain in the Northeast)
- History (has a way of repeating itself)
- Conductivity (20-40 has it, 100 mesh does not)

Keys to Success:

- Railcars!! (can you get them??)
- Locate a Viable and Long-Term Sand Source
- Quick Off-load at a Transload
- Sand Storage Capabilities at the Transload
- Egress and Points of Entry
- Preparing for the Future
- Shell Cracker in Beaver County, PA
- LNG Plants

Shale Plays Currently Underserved in Sand:

- Marcellus / Utica

How To Change This:

- Form a Group to Secure a Sand Supply AND Utilize Rail Transloads in the Northeast!
- Consider supplying sand to outside markets, such as Argentina, Columbia, Mexico, etc...
- Distribute to other industries, such as foundries, glass, etc...