



“Impact of the North American Energy Boom on the Global Engineering and Construction Industry”



**2014 Rice Global E&C
XV II Annual Forum**



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Executive Chairman
Chiyoda Corporation

Chiyoda

"Energy and Environment in Harmony"



Founded in 1948
Integrated EPC



Energy &
Environment

US\$ **4.4** Bil

Revenue

US\$ **10.7** Bil

Backlog



Yokohama GHQ
20+ Countries



8,300 Global
Employees



40% Global
LNG Capacity



Offshore
Upstream

* Courtesy of Qatargas Operating
Company Limited

Safety is No. 1 Priority

PNG LNG - 73 Million Continuous Work-hours LTI Free Record in Aug. 2014

**Taking Ownership of Safety, based on
“C-Safe” Concept:**

**Work as One Team
Behavior Based Safety Program
Promote “Happy Worker” Environment
Maximized Leadership Interaction**

Courtesy of Esso Australia

Shale Revolution Challenges & Strategy

Shale Revolution in the North America

**What are the challenges on E&C
companies?**

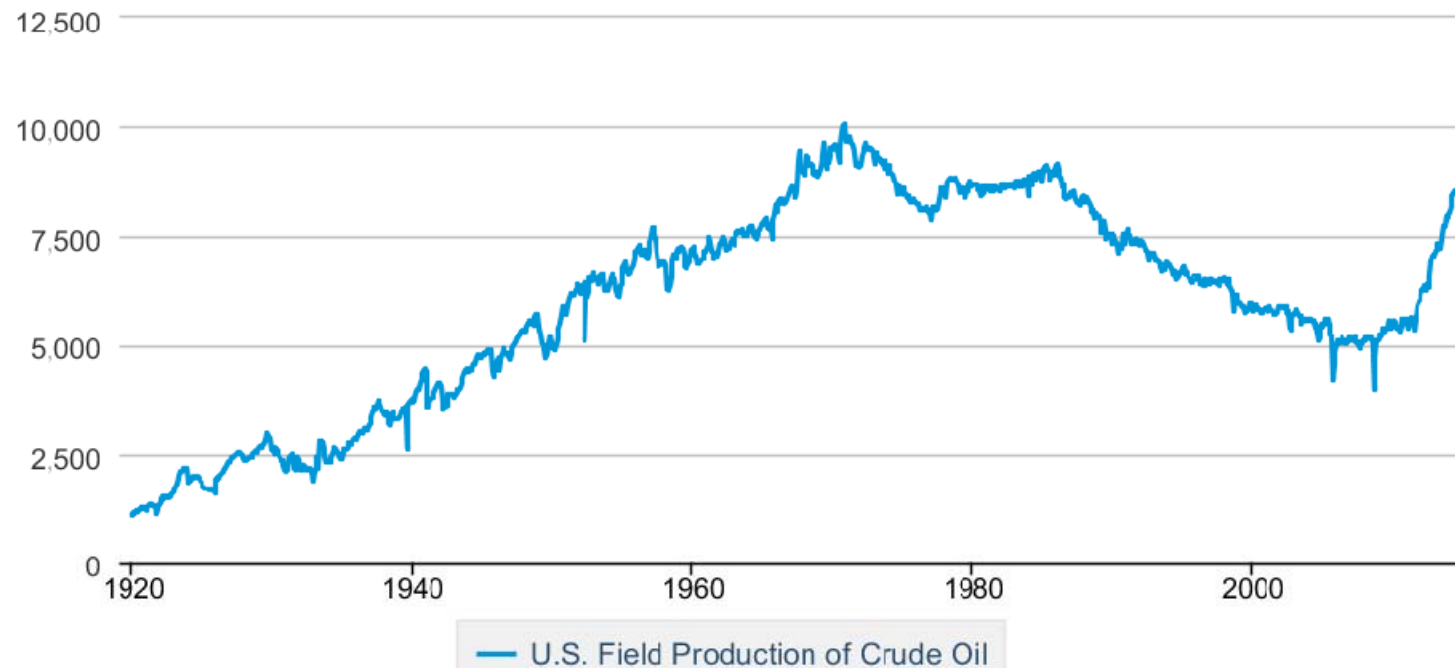
Key Strategy for Managing Risks

Shale Revolution

US Crude Production Rise to 8.5Mil Bpd

U.S. Field Production of Crude Oil

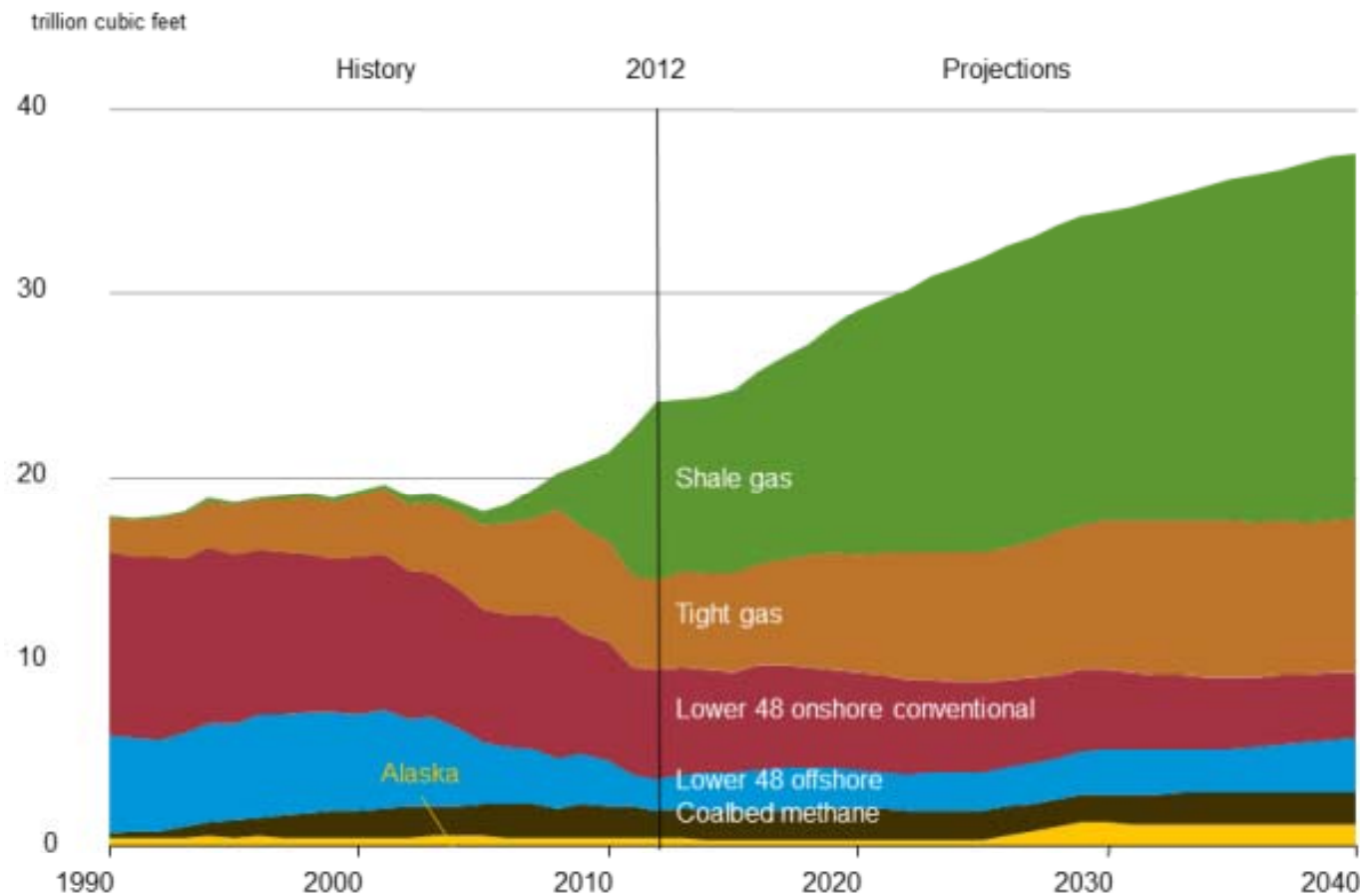
Thousand Barrels per Day



Source: U.S. Energy Information Administration

Shale Gas leads Growth in Total Gas Production through 2040

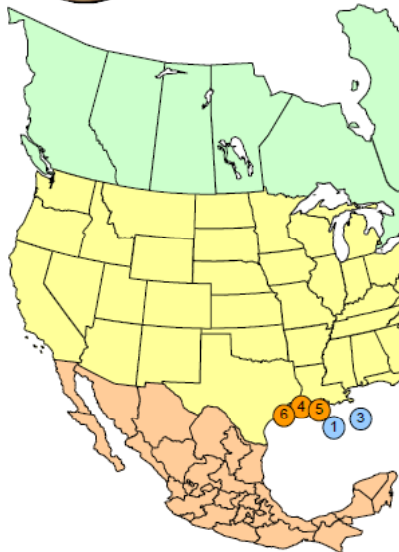
US Natural Gas Production by Source (EIA)



North America LNG Export Projects



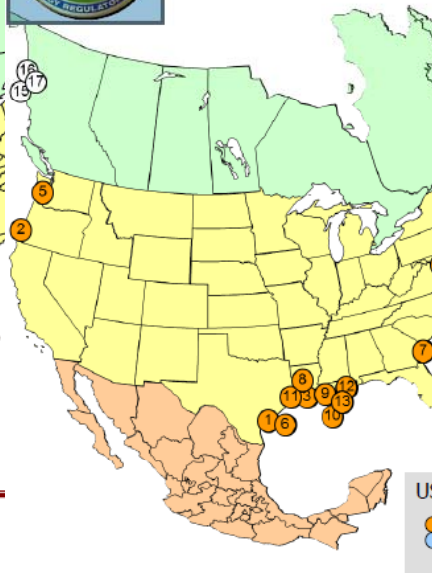
North American LNG Import /Export Terminals *Approved*



As of August 15, 2014
* Expansion of an existing facility



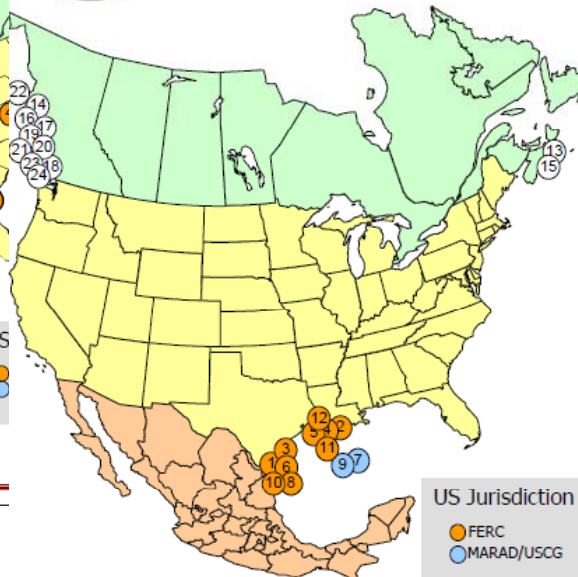
North American LNG Export Terminals *Proposed*



As of August 15, 2014



North American LNG Export Terminals *Potential*



US Jurisdiction

- FERC
- MARAD/USCG

24 POTENTIAL

7 PROPOSED

1 APPROVED

Export Terminal

POTENTIAL U.S. SITES IDENTIFIED BY PROJECT SPONSORS

1. Brownsville, TX: 2.8 Bcfd (Gulf Coast LNG Export)
2. Cameron Parish, LA: 0.16 Bcfd (Waller LNG Services)
3. Ingleside, TX: 1.09 Bcfd (Pangea LNG (North America))
4. Cameron Parish, LA: 0.20 Bcfd (Gasfin Development)
5. Cameron Parish, LA: 1.34 Bcfd (Venture Global)
6. Brownsville, TX: 3.2 Bcfd (Eos LNG & Barca LNG)
7. Gulf of Mexico: 3.22 Bcfd (Main Pass - Freeport-McMoran)
8. Brownsville, TX: 0.94 Bcfd (Annova LNG)
9. Gulf of Mexico: 1.8 Bcfd (Delfin LNG)
10. Brownsville, TX: 0.27 Bcfd (Texas LNG)
11. Cameron Parish, LA: 1.60 Bcfd (SCT&E LNG)
12. Port Arthur, TX: 0.2 Bcfd (WesPac/Gulfgate Terminal)

POTENTIAL CANADIAN SITES IDENTIFIED BY PROJECT SPONSORS

13. Goldboro, NS: 1.4 Bcfd (Pieridae Energy Canada)
14. Prince Rupert Island, BC: 2.91 Bcfd (BG Group)
15. Melford, NS: 1.8 Bcfd (H-Energy)
16. Prince Rupert Island, BC: 2.74 Bcfd (Pacific Northwest LNG)
17. Prince Rupert Island, BC: 4.0 Bcfd (ExxonMobil - Imperial)
18. Squamish, BC: 0.29 Bcfd (Woodfibre LNG Export)
19. Kitimat/Prince Rupert, BC: 0.32 Bcfd (Triton LNG)
20. Prince Rupert, BC: 3.12 Bcfd (Aurora LNG)
21. Kitsault, BC: 2.7 Bcfd (Kitsault Energy)
22. Stewart, BC: 4.1 Bcfd (Canada Stewart Energy Group)
23. Delta, BC: 0.4 Bcfd (WesPac Midstream Vancouver)
24. Vancouver Island, BC: 0.11 Bcfd (Steelhead LNG)

As of August 15, 2014

Office of Energy Projects

Impact on E&C Industry

Key Challenges

Uncertainty of Shale Development

- Use of Water
- NIMBY
- Sharp Drop of Production
- Financial Health of Shale Developer
- Volatility of Henry Hub Price
- Political Instability



Key Challenges for Managing Large EPC

- ✓ Shortage of Experienced Project Managers, Engineers and Construction SVs
- ✓ Escalation of Cost
- ✓ Cost Reimburse vs. Lump Sum Contract
- ✓ Need the size, but “Bigger, the Better”?

Global E&C Contractors Role & Strategy

Global E&C Contractors can bring...

- ✓ Experienced PMs, Engineers and Construction SVs to manage large EPC

Local E&C Contractors can bring...

- ✓ Local Execution Center
- ✓ Local Knowledge of Regulatory Requirements & Codes

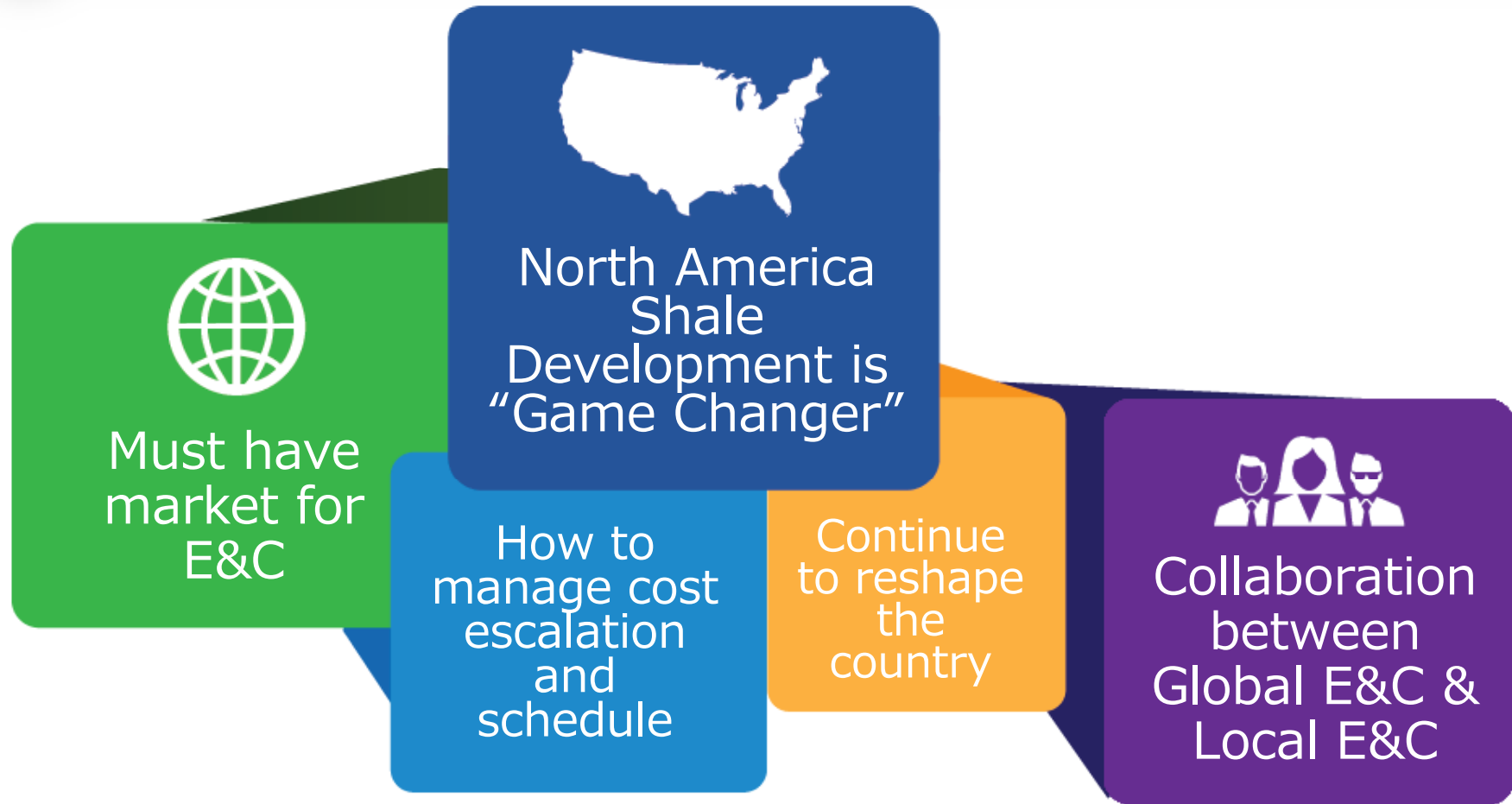
Collaboration
vs. M&A

Chiyoda's
Case

Portfolio
Management



In Conclusion.....



Thank you

Comments?

