

World LNG Market – The Influence of the US Gulf Coast

Presentation to Louisiana Energy Conference

May 31, 2017

US LNG....by numbers

1 Million tonnes of LNG

50 bcf of gas

60 Million tonnes of LNG

3 Tcf of gas

9 bcf/d of gas including fuel

2 GW of power for liquefaction

100 GW of CCGT fuel (at 45% load)

\$10bn of gas sold per annum

\$25bn of LNG sold per annum

US LNG : A freight train rushing towards an unsuspecting world

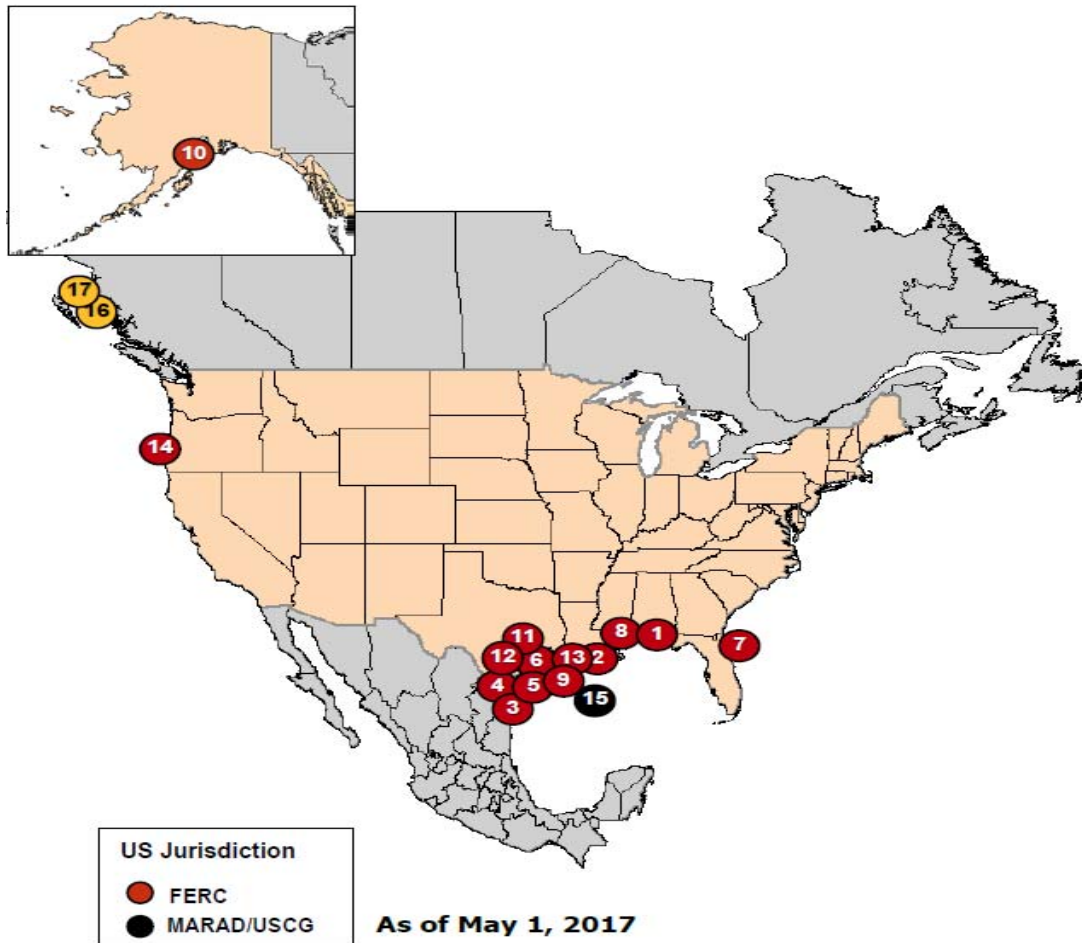
Five trends we expect to drive gas and LNG over the next 15-20 years

- 1. “Tidal wave” of US LNG exports arriving like a steam train**
 - Will radically alter the global gas scene and likely to set global prices
- 2. Electrification of emerging economies (Africa, Asia, Latin America)**
 - Represents the largest near to medium-term opportunity for gas demand growth
- 3. Lower LNG prices fuelling gas demand**
 - Strong correlation between sub \$10/MMBtu prices and new LNG buyers
- 4. Shift from large scale to “fit for purpose scale” projects**
 - Mop up fragmented demand pockets at competitive prices, quicker and more flexibly
- 5. Buyer power pressuring traditional LNG contractual terms and pricing**
 - More flexible global pricing mechanisms will emerge, based on gas-on-gas competition

Gas is becoming the cheapest and most flexible form of energy supply

USGC will be the focal point of American LNG exports

Proposed terminals



PROPOSED TO FERC

Pending Applications:

1. Pascagoula, MS: 1.5 Bcf/d (Gulf LNG Liquefaction) (CP15-521)
2. Cameron Parish, LA: 1.41 Bcf/d (Venture Global Calcasieu Pass) (CP15-550)
3. Brownsville, TX: 0.55 Bcf/d (Texas LNG Brownsville) (CP16-116)
4. Brownsville, TX: 3.6 Bcf/d (Rio Grande LNG – NextDecade) (CP16-454)
5. Brownsville, TX: 0.9 Bcf/d (Annova LNG Brownsville) (CP16-480)
6. Port Arthur, TX: 1.86 Bcf/d (Port Arthur LNG) (CP17-20)
7. Jacksonville, FL: 0.132 Bcf/d (Eagle LNG Partners) (CP17-41)
8. Plaquemines Parish, LA: 3.40 Bcf/d (Venture Global LNG) (CP17-66)
9. Calcasieu Parish, LA: 4.0 Bcf/d (Driftwood LNG) (CP17-117)
10. Nikiski, AK: 2.63 Bcf/d (Alaska Gasline) (CP17-178)

Projects in Pre-filing:

11. Freeport, TX: 0.72 Bcf/d (Freeport LNG Dev) (PF15-25)
12. Corpus Christi, TX: 1.4 Bcf/d (Cheniere – Corpus Christi LNG) (PF15-26)
13. Cameron Parish, LA: 1.84 Bcf/d (G2 LNG) (PF16-2)
14. Coos Bay, OR: 1.08 Bcf/d (Jordan Cove) (PF17-4)

PROPOSED TO U.S.-MARAD/COAST GUARD

15. Gulf of Mexico: 1.8 Bcf/d (Delfin LNG)

PROPOSED CANADIAN SITES

16. Kitimat, BC: 1.28 Bcf/d (Apache Canada Ltd.)
17. Douglas Island, BC: 0.23 Bcf/d (BC LNG Export Cooperative)

Buyers are getting what buyers want...

- ❑ Lower prices (reduction in oil indexation %)
- ❑ Destination free clauses (being challenged)
- ❑ Take or pay flexibility
- ❑ Shorter contract durations
- ❑ Benefiting from upside and trading opportunities
 - Kogas winter buyer
 - CNOOC summer buyer
 - JERA buys across both seasons
- ❑ Smaller parcel sizes
- ❑ Portfolio diversification
- ❑ Novel pricing formulas



... but could create opportunity for sellers with increased market liquidity

USGC LNG is becoming a global price setter

US LNG (FOB) = HH + fuel + liqn

☐ 115% HH + tolling fee

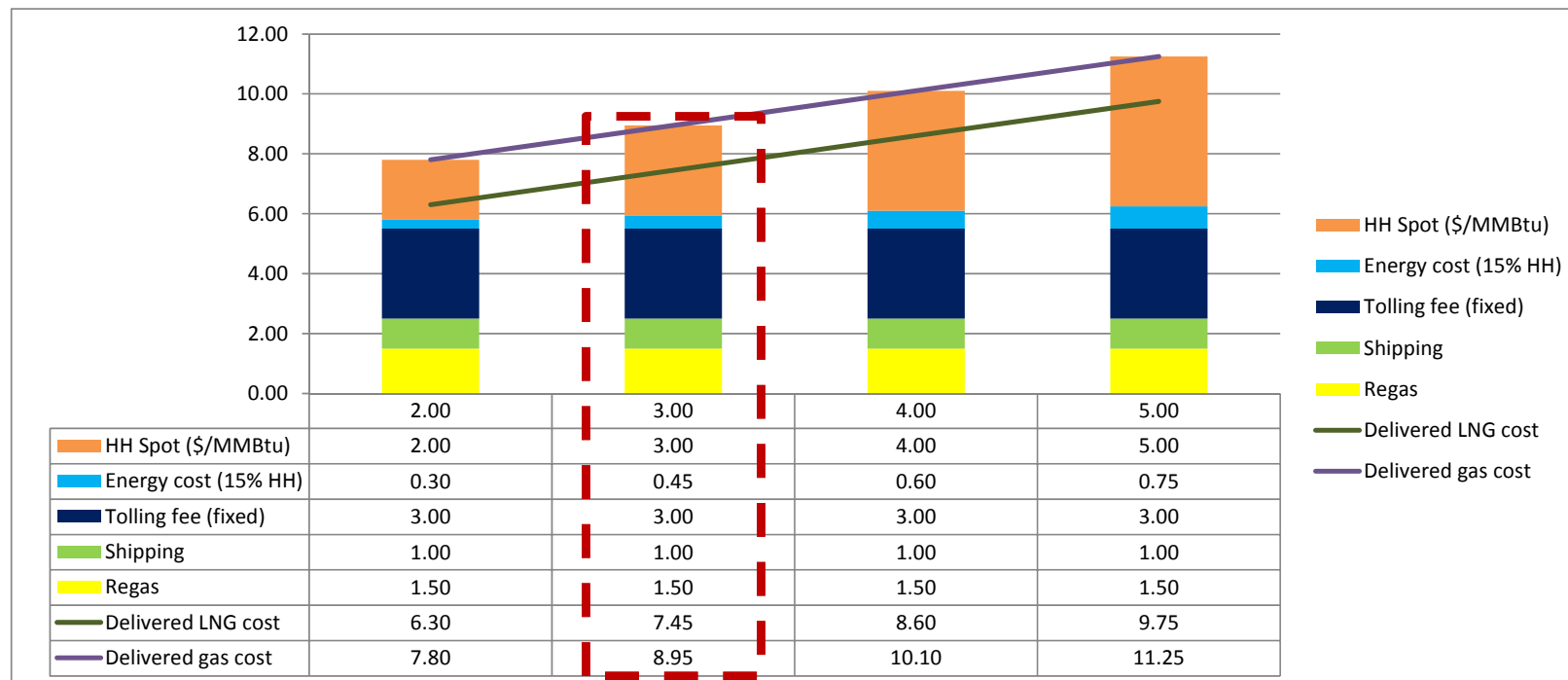
US LNG (DES) = HH + fuel + liqn + shipping

US LNG (delivered to W.Africa) = \$3.00 + \$0.45 + \$3.00 + \$1.00 = \$7.45

☐ \$1/MMBtu shipping (current freight rates)

US LNG (Delivered as gas) = HH + fuel + liqn + shipping + regas

☐ \$1.50/MMBtu regas (but could be lower)



At current prices can deliver LNG to West Africa at c. \$7.5/MMBtu (plus regas)

A new destination for US gas...Africa and Asia

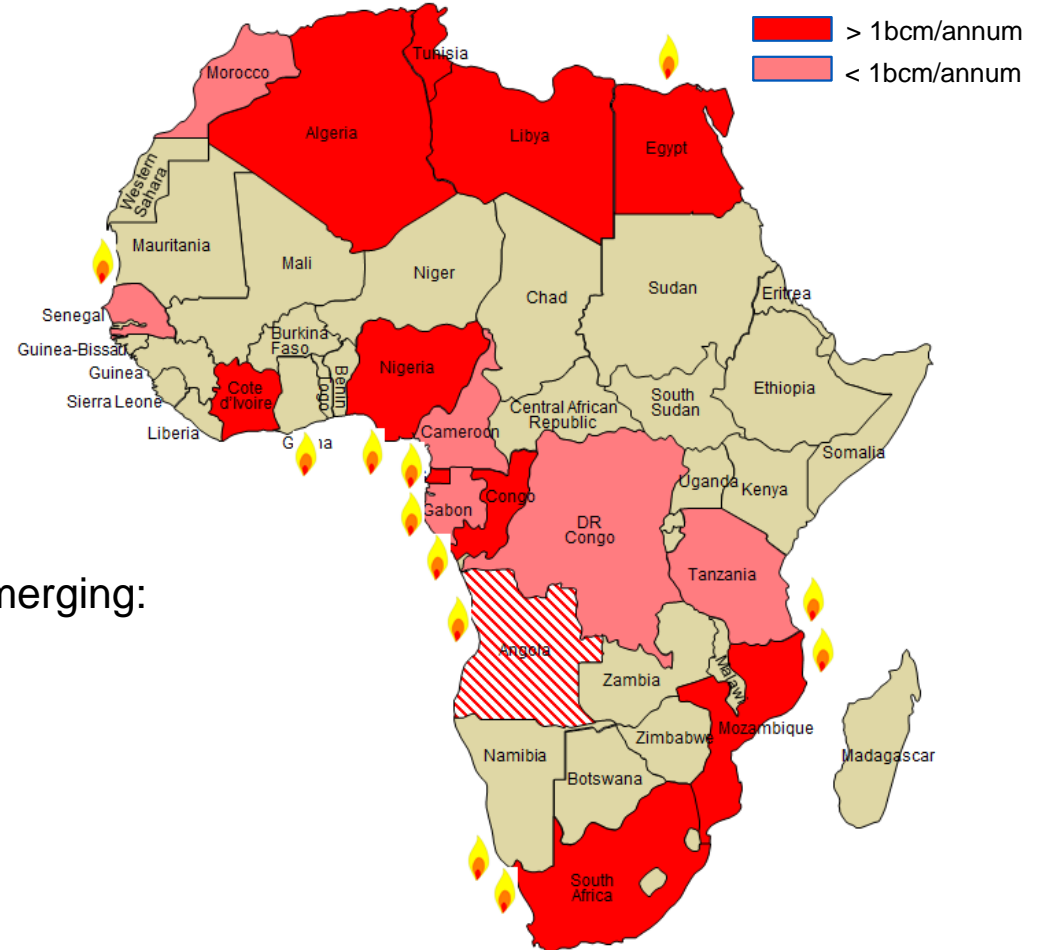
Current and future potential importers

- Egypt
- Ghana
- Ivory Coast
- Lagos state, Nigeria
- Benin
- Senegal
- Morocco
- Kenya
- South Africa
- Namibia

Significant other LNG importers also emerging:

- Thailand, Pakistan
- Vietnam, Bangladesh
- Sri Lanka, Myanmar
- Indonesia
- Caribbean islands
- Australia??!

Africa gas production (non exhaustive)



Many of the worlds developing economies could be burning American gas...

Small scale “fit for purpose” opportunities – ship bunkering, transportation, FLNG, FSRU, FSRP



- Small scale**
Design of choice
- *Fast track*
 - *Lower risk*
 - *Cost control*
 - *Redeployment*

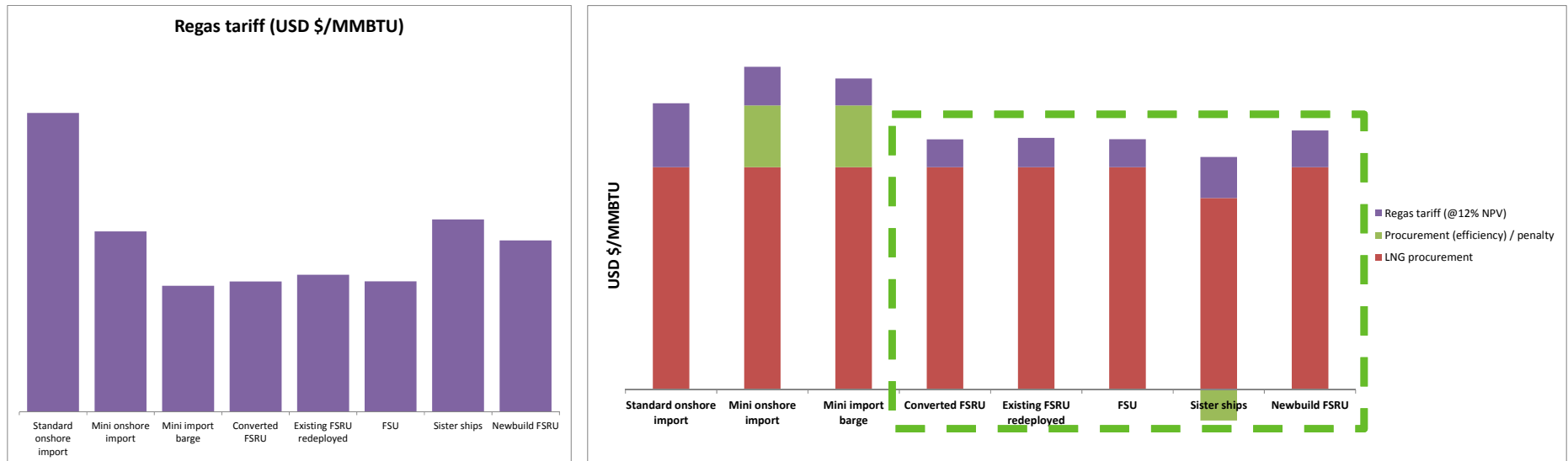
- Floating**
Aligned with markets
- *Transportation*
 - *Environmental*
 - *Tax advantages*
 - *Demand generation*

- Credit**
Risk mitigation
- *Financial settlement*
 - *Distributed markets*
 - *Multiple offtakers*



Flexible midstream solutions are increasingly popular in emerging new markets requiring smaller scale LNG (trading and “break bulk”) and “molecules to MW”

Economics – an indicative example highlighting the strong emergence of “floating” solutions for new niche markets



- Offshore floating LNG import solutions becoming increasingly viable:
 - Scalable over time
 - Costs reducing / lower capex
 - Shorter lead times
 - Conversions / redeployments
 - Flexibility

**Newer markets are requiring more creative and flexible solutions...
Resulting in a reduction in regas tariffs**

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Gaffney, Cline & Associates - Gas & LNG Services

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Nick.fulford@gaffney-cline.com

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