



Advisors and Investment Bankers to the Energy Industry

## LNG – Opportunities & Challenges for Caribbean & Central America

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Gal way Energy Advisors  
A Member of the Gal way Group LP  
[www.galwaygroup.com](http://www.galwaygroup.com)

# Galway's Perspective

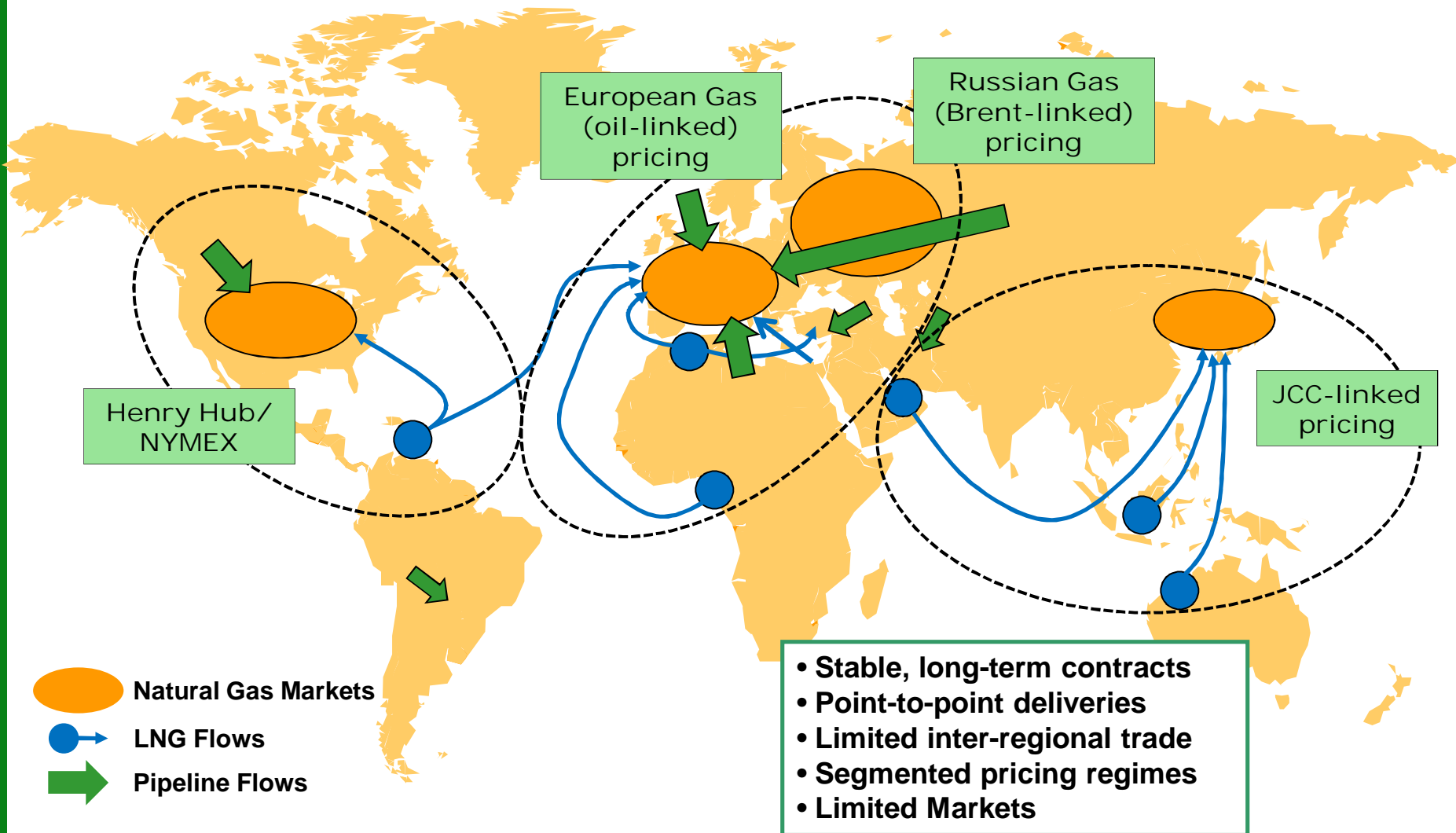
- ❖ Galway Group is an energy consulting firm that provides strategy, commercial, financial and technical advice to its clients
  - Upstream gas and LNG producing companies
  - Government and investor-owned utilities interested/working on LNG projects
  - Large energy trading companies
  - LNG terminal development companies
  - Private equity investors
  
- ❖ Galway has offices in Houston and Singapore
  
- ❖ Galway is advising several clients in the Caribbean, Central America, South America and Asia on LNG procurement and Floating LNG import terminal development

# Natural Gas Conversion Using LNG

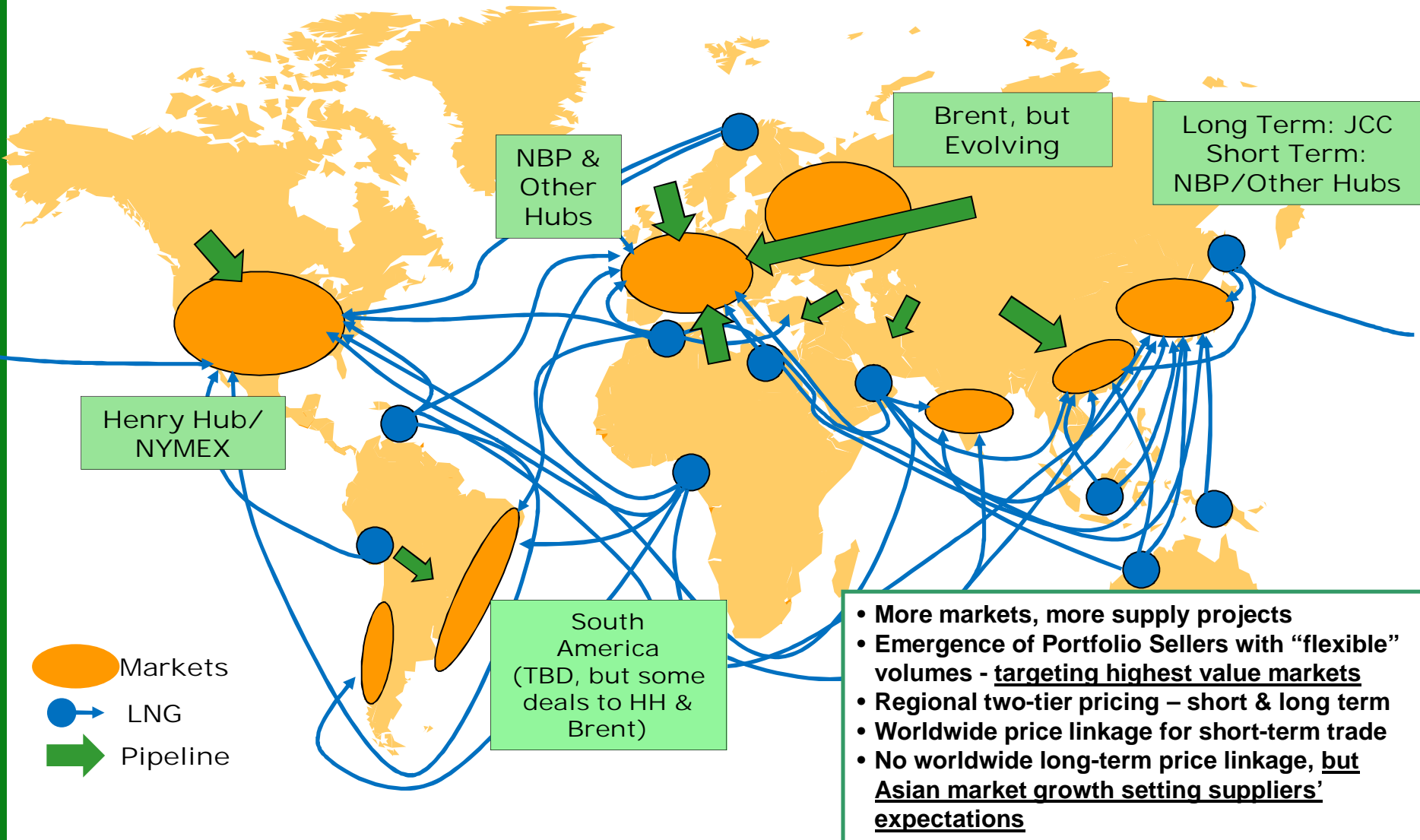
## *Opportunities & Challenges*

- ❖ Opportunities for natural gas
  - Abundant and clean fuel source
  - Ideal fuel source for more efficient power generation
  - Complement for renewable energy sources
  
- ❖ Potential challenges for the Caribbean and Central America
  - “Commercial” - pricing, size of individual markets, credit worthiness, seasonality, etc.
  - Infrastructure and logistics to deliver to remote markets (pipeline, LNG, CNG)
  - Development of critical mass of demand to justify delivery infrastructure and logistics

# LNG Markets 10 – 15 Years Ago: Regionally Compartmentalized



# LNG Market in 2012: More Globalized, More Liquid

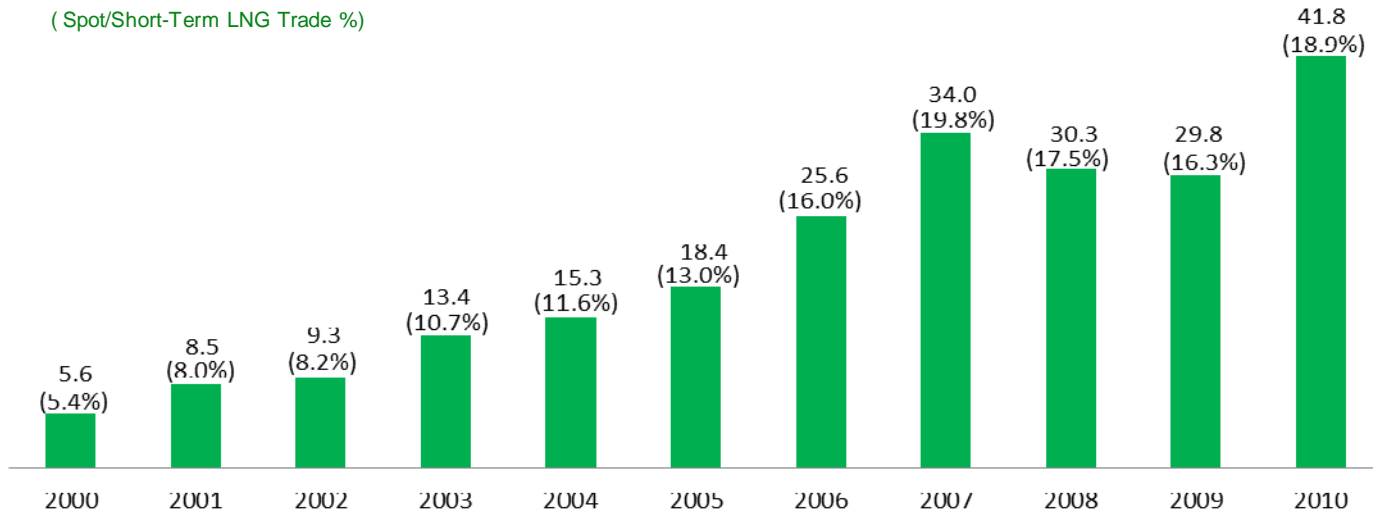


# Short Term LNG Market is Growing – Now over 20%

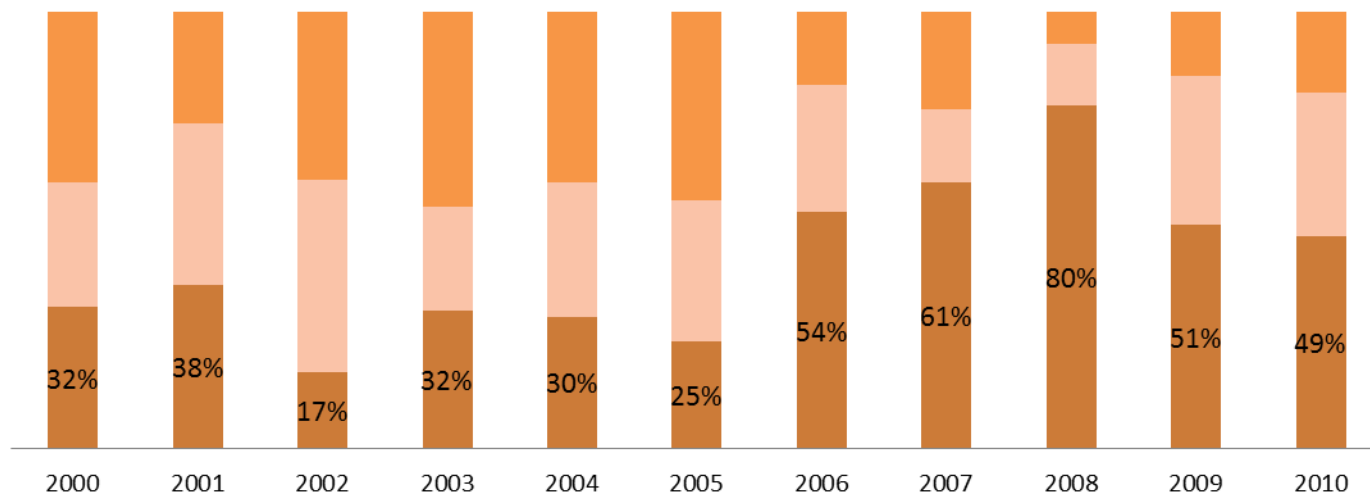
*Limited Volume Risk, But Price Risk*

Global Spot/Short-Term LNG Trade (MTPA)

(Spot/Short-Term LNG Trade %)



% of Spot/Short-Term LNG Trade by Importing Region



Source: GIIGNL, Galway Analysis

■ Asia ■ Europe ■ Americas

# What Will LNG Cost in Caribbean & Central America?

- ❖ Globalization of LNG market induces competition amongst LNG markets
  - Panama Canal expansion - enhance globalization
- ❖ Competitive intensity, and balance of negotiation leverage between buyers and sellers, based on expectations of future supply/demand balance
  - Market is cyclical and bargaining advantage transitions between buyers and sellers
- ❖ Generalized view of current market sentiment (each actor has own view)
  - Suppliers – large growth potential in Asia & sets price expectations, need oil indexation to develop new supplies (14-15% x Brent)
  - Established buyers – limited supply risk, index diversification & lower prices with US LNG Supplies
  - New buyers – US LNG will be “cheap”

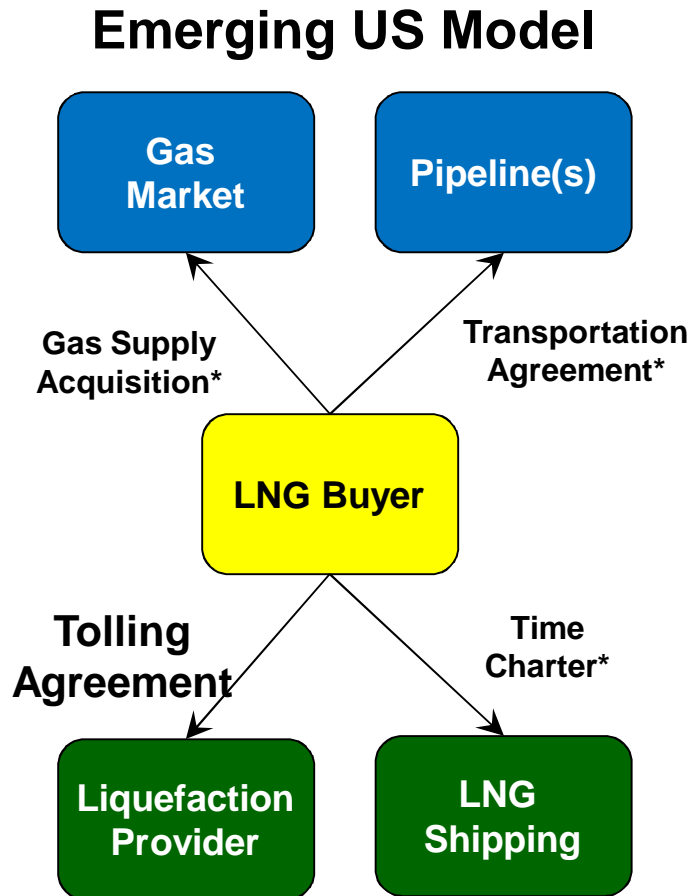
# Multiple Proposed LNG Export Projects in US, More Rumored to Be in Development





# Tolling Capacity Emerging as Model for US LNG Exports

## *Only Capacity Holder Can Access "Cheap" LNG*



- ❖ Expectations that US LNG is "Cheap" driven by current low gas prices & sustained oil/HH spread (shale gas impact)
- ❖ Liquefaction project developer/owner seeking return on physical assets
- ❖ Long-term (15-20 years) liquefaction tolling capacity commitments from credit-worthy holders needed to finance multi \$ Billion export projects
- ❖ Potential capacity holders are actively negotiating tolling agreements
  - Portfolio LNG sellers – resell at market prices
  - End-users – incorporate in supply portfolio for own use

\* May or may not be offered by liquefaction project developer

# LNG Regasification & Storage Alternatives

## Standard LNG Terminals

Onshore



Floating



## Small Scale LNG

Onshore or Floating



- Industry “Standard”
- Cost: \$0.5 - \$1.5+ Billion
- 3-4 years construction
- Most suitable for larger, base load service (economics)
- Unit costs depend on throughput – very high for small volumes
- Require deep water port
- Require sizeable land area

- Rapidly growing option
- Cost: \$100-\$250+ MM (FSRU) plus \$50 - \$200+ MM (infrastructure)
- Construction: 12-30 months
- Unit costs depend on throughput – can be manageable for medium volumes
- Require deep water port

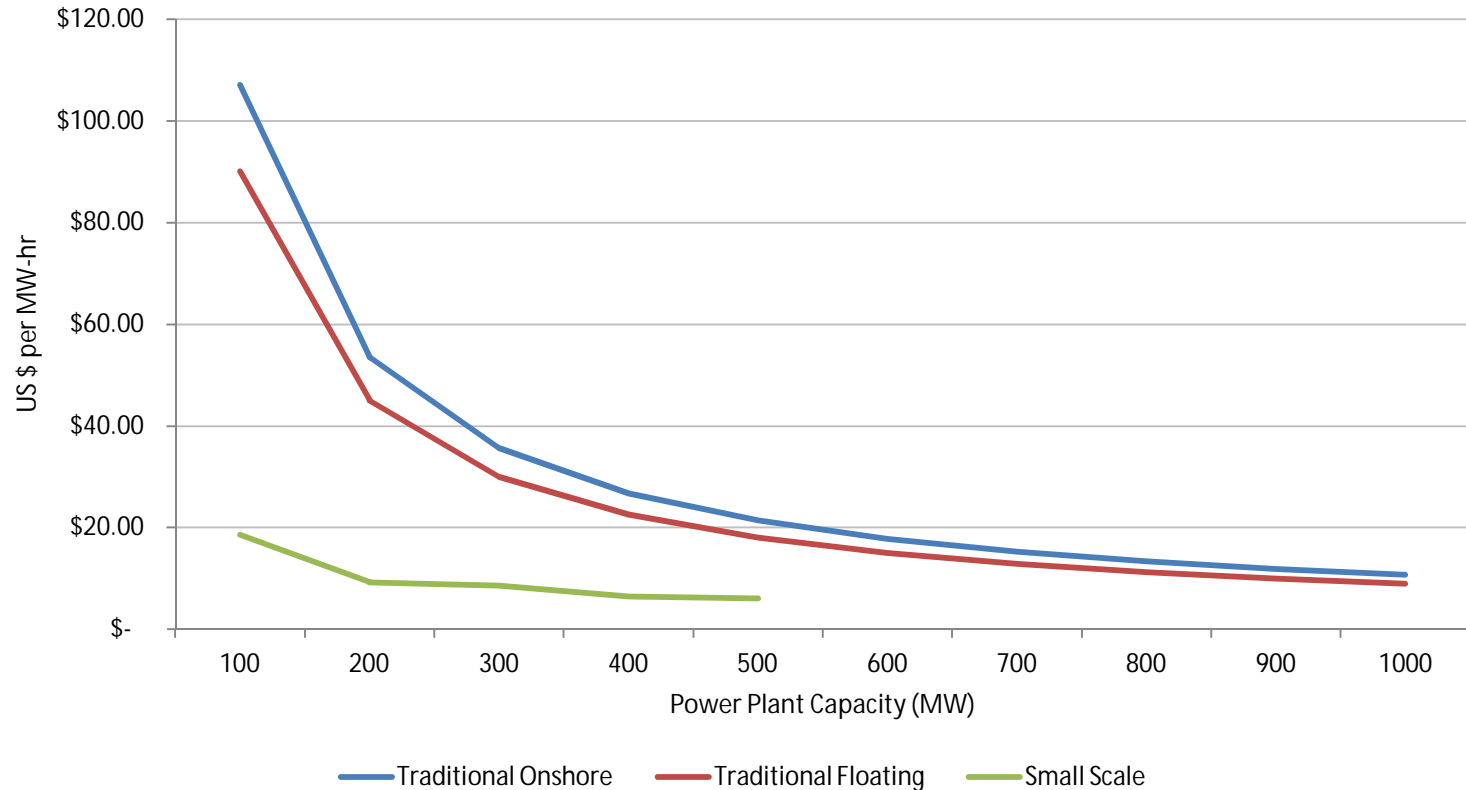
- Emerging option
- Cost: \$70+ million
- Construction: 2+ years
- Onshore or floating (barges)
- Unit costs highly dependent on throughput
- May not require deep water port if serviced by small scale ships/barges

\* Floating Regasification and Storage Unit

# Traditional vs. Small Scale Costs

## *Small Scale May Offer Compelling Alternatives*

### Regasification & Storage Costs vs. Power Plant Capacity



#### Key Assumptions:

Avg. Dispatch = 80%  
Heat Rate = 8,000 BTU/kw  
Project Life = 20 years  
ROE = 15% (pre-tax)  
Interest = 8%  
D/E = 80%

# LNG Shipping Alternatives

## Standard LNG Ship



- 90,000 – 260,000 m<sup>3</sup>
- Typical Size: 145,000 m<sup>3</sup> (~3.1 BCF)
- Require deep water access = 40-45 feet
- Require relatively large LNG tanks at receiving terminal
- Require large tug support
- Cost: \$200+ million

## Small Scale LNG Ship/ Barges



- New class of small scale ships: 7,500 – 12,000 m<sup>3</sup> (0.16 – 0.26 BCF)
- Can service shallower ports (~20 feet)
- More maneuverable and can be supported by smaller tugs
- Cost: \$45+ million
- More costly on a unit basis
- Liquefaction project must agree to service small ships

## Transshipment



- Combine benefits of standard shipping (low cost for long distances), and small scale (marine access, small loads)
- Transshipment from either onshore terminal or floating storage/ship



# LNG Shipping Costs

*2,000 Nautical Miles Distance (one-way)*

Standard LNG Ship



- Single 145,000 m<sup>3</sup> ship can serve ~1,300 MW
- Cost = US\$6.78 per MW-hr
- Requires large scale terminal

Small Scale LNG Ship



- Single 12,000 m<sup>3</sup> ship can serve ~ 100 MW
- Cost = US\$19.65 per MW-hr
- Can serve small scale terminals

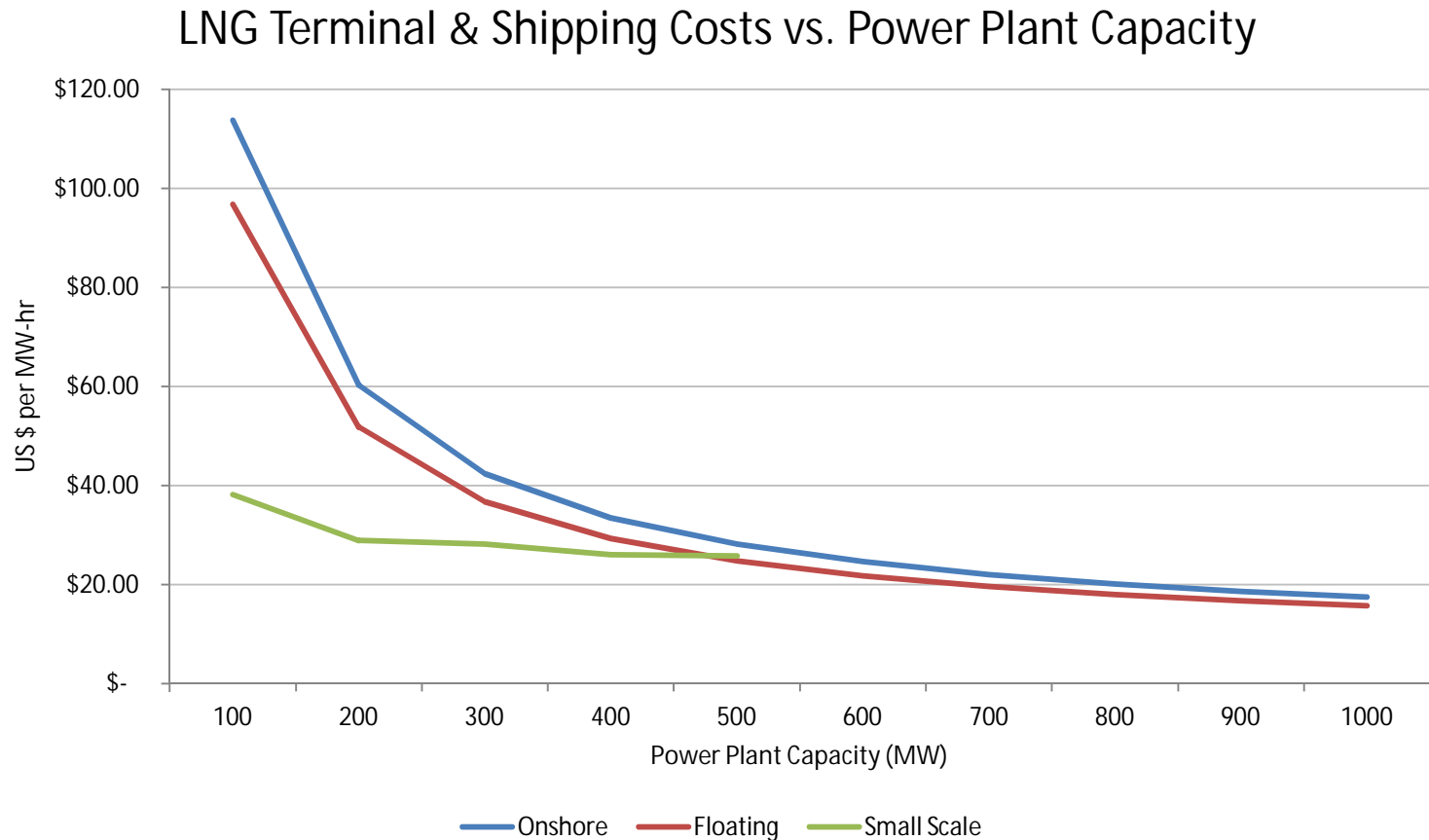
Transshipment



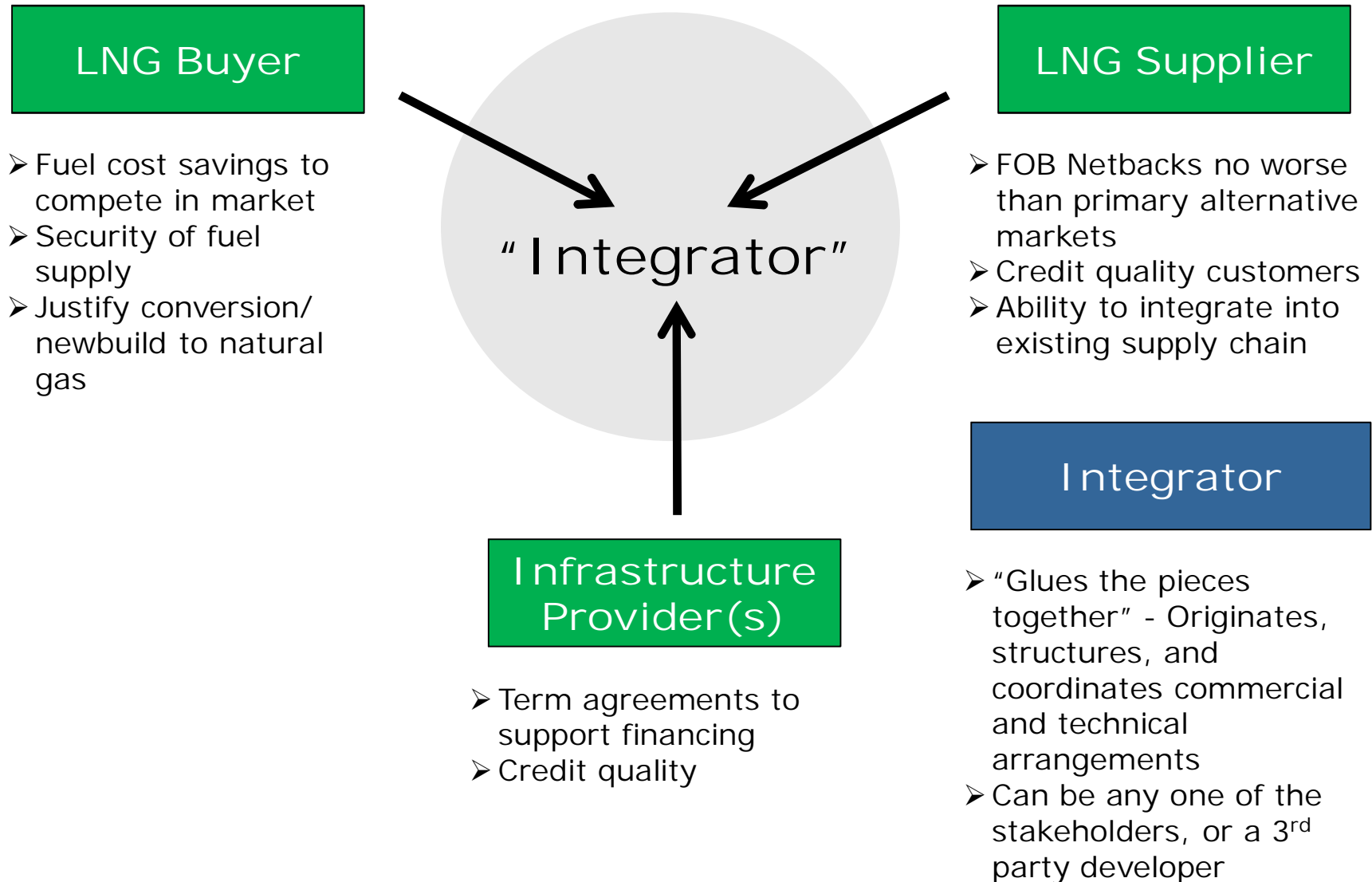
- 145,000 m<sup>3</sup> to transshipment terminal (1,500 nm), can serve 1,500 MW
- 12,000 m<sup>3</sup> serves small scale terminals (500 nm), can serve ~ 300 MW
- Cost = US\$11.90 per MW-hr (excl. transshipment fees)

# LNG Shipping & Terminal Costs

Small Scale LNG May be an Alternative for < 500 MW



# All Stakeholders' Requirements Must Be Addressed to Make a Project Viable



# Takeaways

- ❖ Globalization of LNG markets induces competition among buyers
  - Intensity of competition drives bargaining leverage between buyers & sellers
  - Expectations of Asian market growth driving suppliers' pricing expectations
- ❖ US LNG exports may become new viable source of LNG, but must hold tolling capacity to access "cheap" LNG
  - Perception that US LNG is "Cheap" driven by expectation of sustained oil/HH spread
- ❖ Significant load is still generally required to support traditional LNG infrastructure
  - Small scale LNG may offer potentially viable options to support smaller loads (<500 MW)
- ❖ Substitution incentives must be allocated amongst all stakeholders



Thank you!

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