



Natural Gas & LNG Outlook

National Energy Board



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Executive Summary

◆ The formulation of our base-case scenario

- Long-term price forecast is US\$7.15/mmbtu and US\$50/b WTI
- N.A. supply costs are price-maker; LNG is a price-taker

◆ Tristone's base-case scenario

- Forecast global LNG trade
- Regional trade expectations

◆ Beyond 2010

- Challenges in growing LNG trade

◆ N.A. supply / demand outlook

◆ NEB scenario analysis considerations



LNG & N.A. Gas Prices



Tristone Base-Case Outlook Assumes US\$7.15/mmbtu

- ◆ **Base-Case outlook assumes US\$7.15/mmbtu gas price forecast**
 - Equivalent to a L/T WTI price of US\$50/b

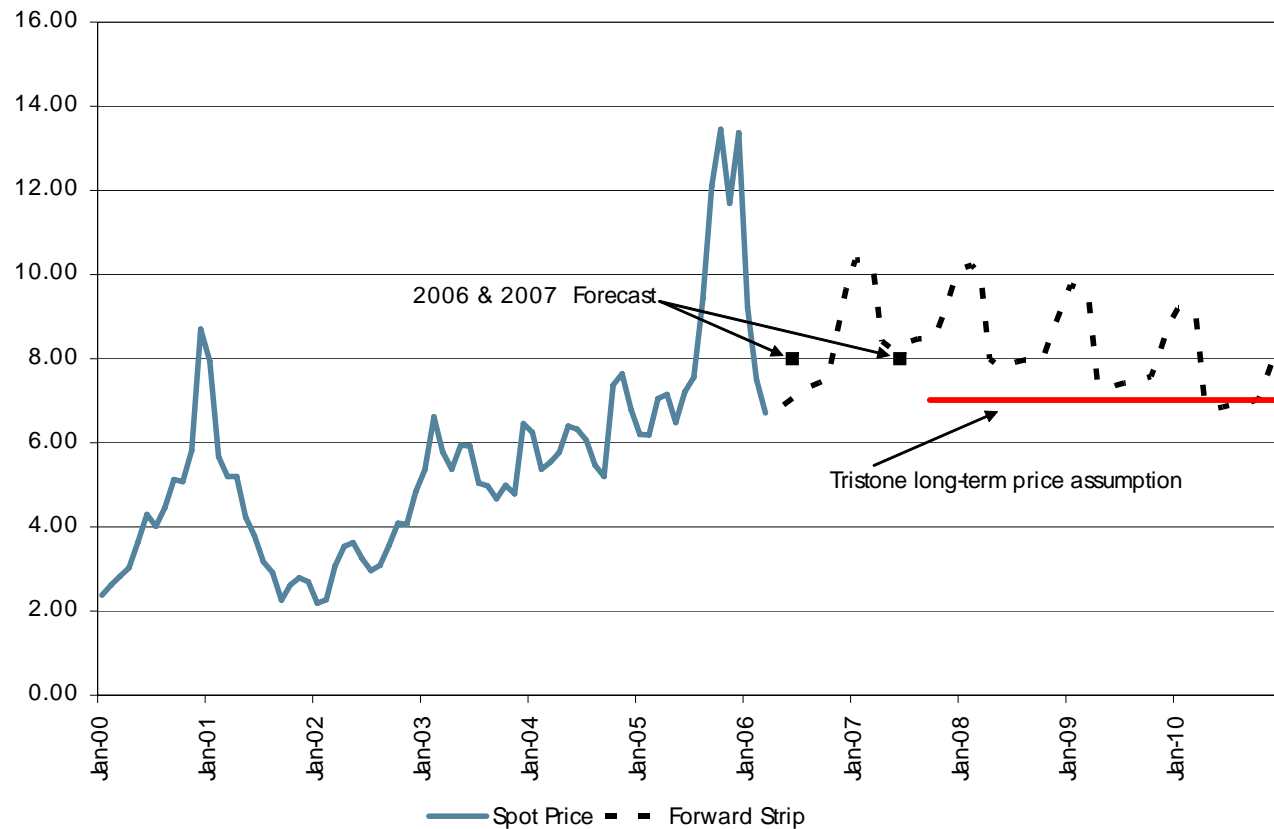
- ◆ **Key Price drivers**
 - Producer full-cycle cash costs set N.A. gas price
 - Comparative country netback prices
 - Substitution
 - Economic rent



Natural Gas Forward Prices

- ◆ Tristone assumes a US\$7.15/mmbtu gas price in our best-case scenario
- ◆ Current strip through 2010 is US\$8.28/mmbtu

Historical NYMEX Price and Forward Strip



Source: Bloomberg

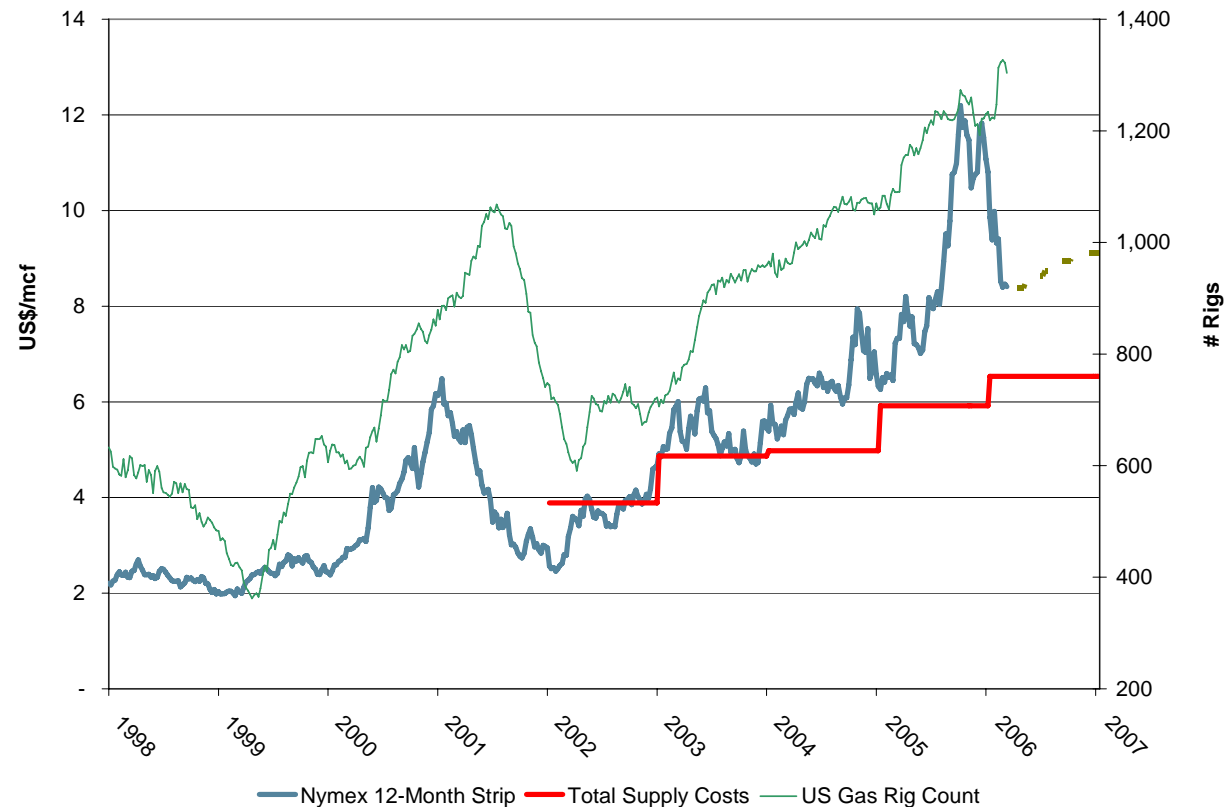


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North American Full Cycle Gas Supply Cost

- ◆ Full cycle gas supply costs are up 15%/yr over the past four years
- ◆ N.A. supply costs today are US\$6.50/mcf
- ◆ N.A. supply costs will set the long-term price for N.A. natural gas



Source: Bloomberg, Tristone



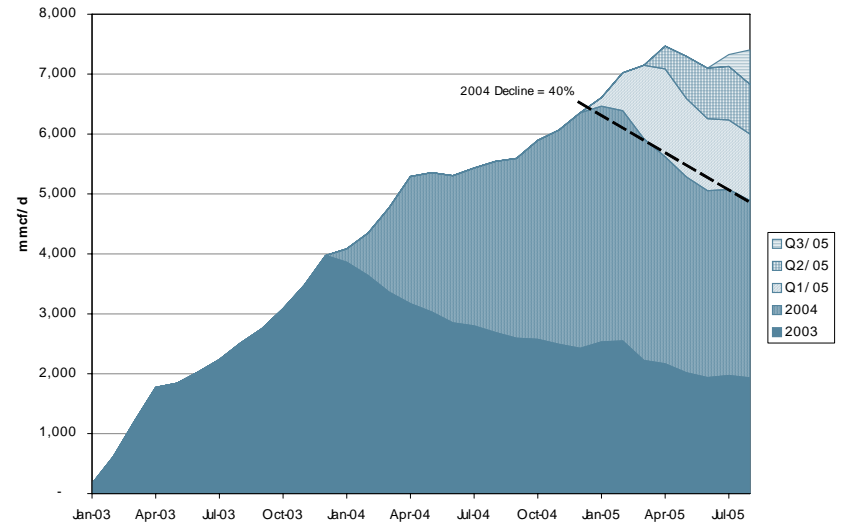
WCSB Gas Supply

- ◆ Industry fighting first year declines of 40%
 - The tight gas factor

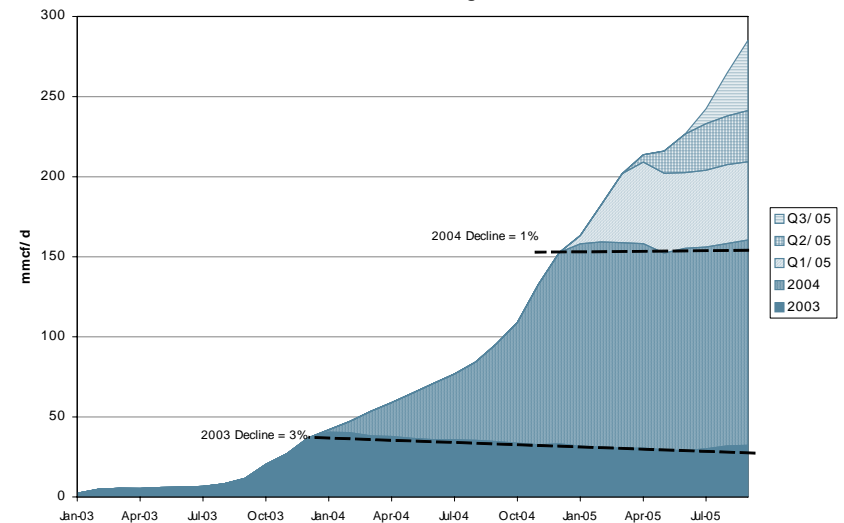
- ◆ “Just-in-time” supply market makes deliverability increasingly sensitive to price

- ◆ CBM flat profile, but only 290 mmcf/d or ~2% of Canadian total

All Other Gas Well Decline



CBM Well Vintage Plot

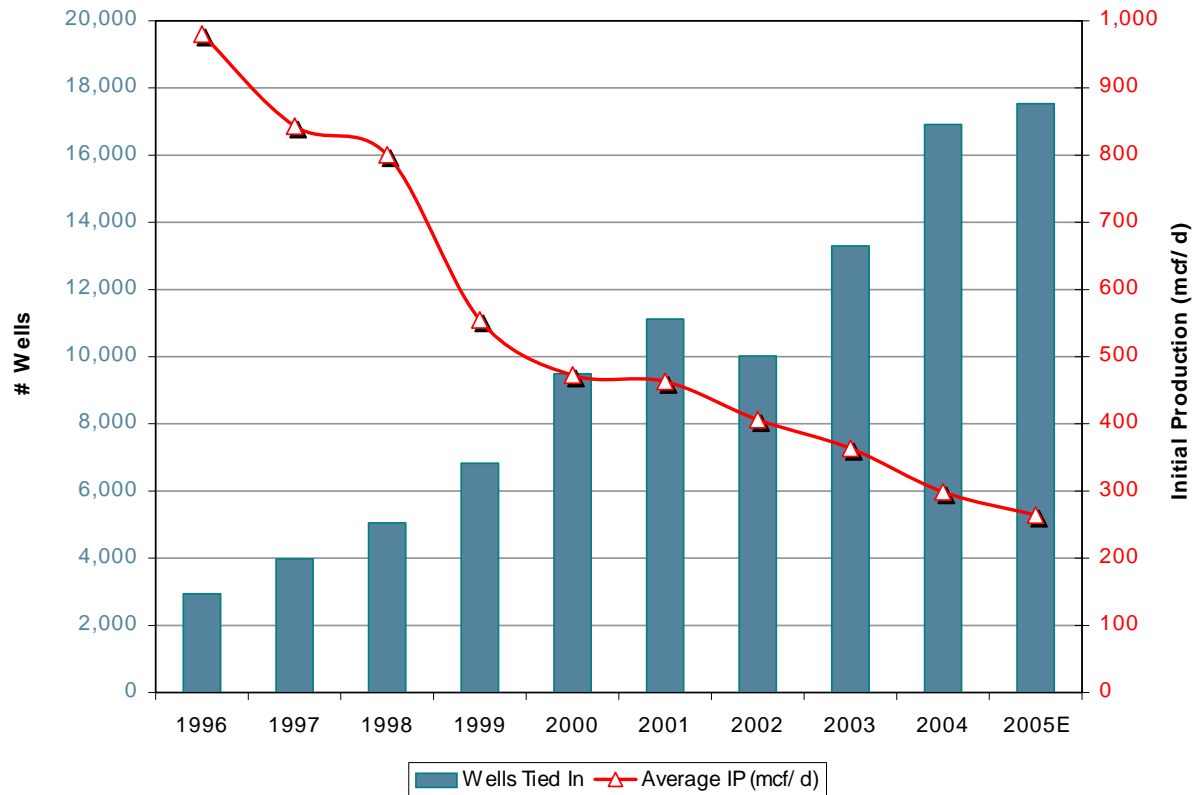


Source: GeoScout



WCSB IP Rates

- ◆ IP rates have fallen by 75% to 262 mcf/d over the past 10 years
- ◆ 3.5x as many wells drilled in 2005 vs. 1998, yet total production added from new wells was the same at 4.0 bcf/d



Source: GeoScout

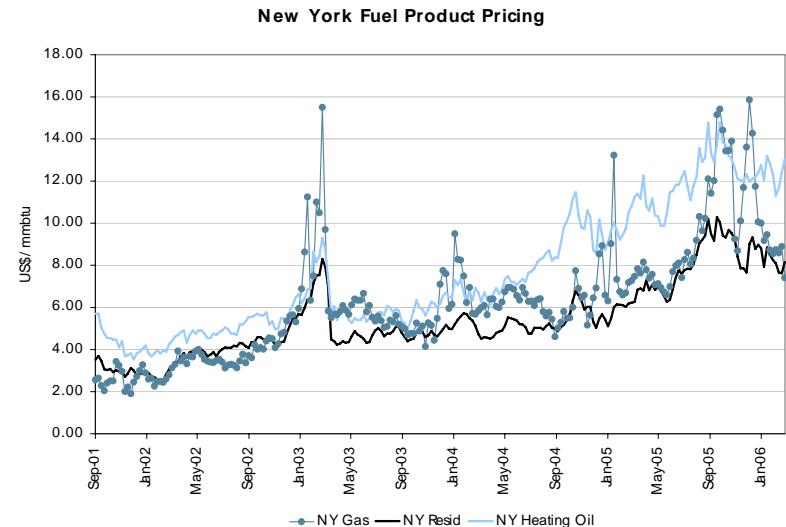
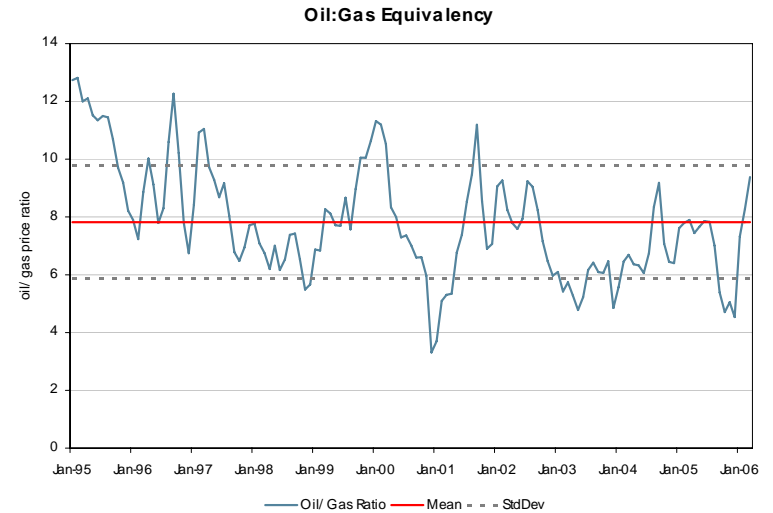


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The Influence of Oil Product Prices

- ◆ L/T oil:gas ratio is 8:1
- ◆ Dual fuel market is 1.5 bcf/d
 - Relative prices create incentive to switch
- ◆ Western Europe prices LNG at top end of the band
- ◆ As N.A. LNG import capacity increases, US prices will have to migrate to the top of the heating oil / resid band to keep USA netbacks competitive with western Europe netbacks



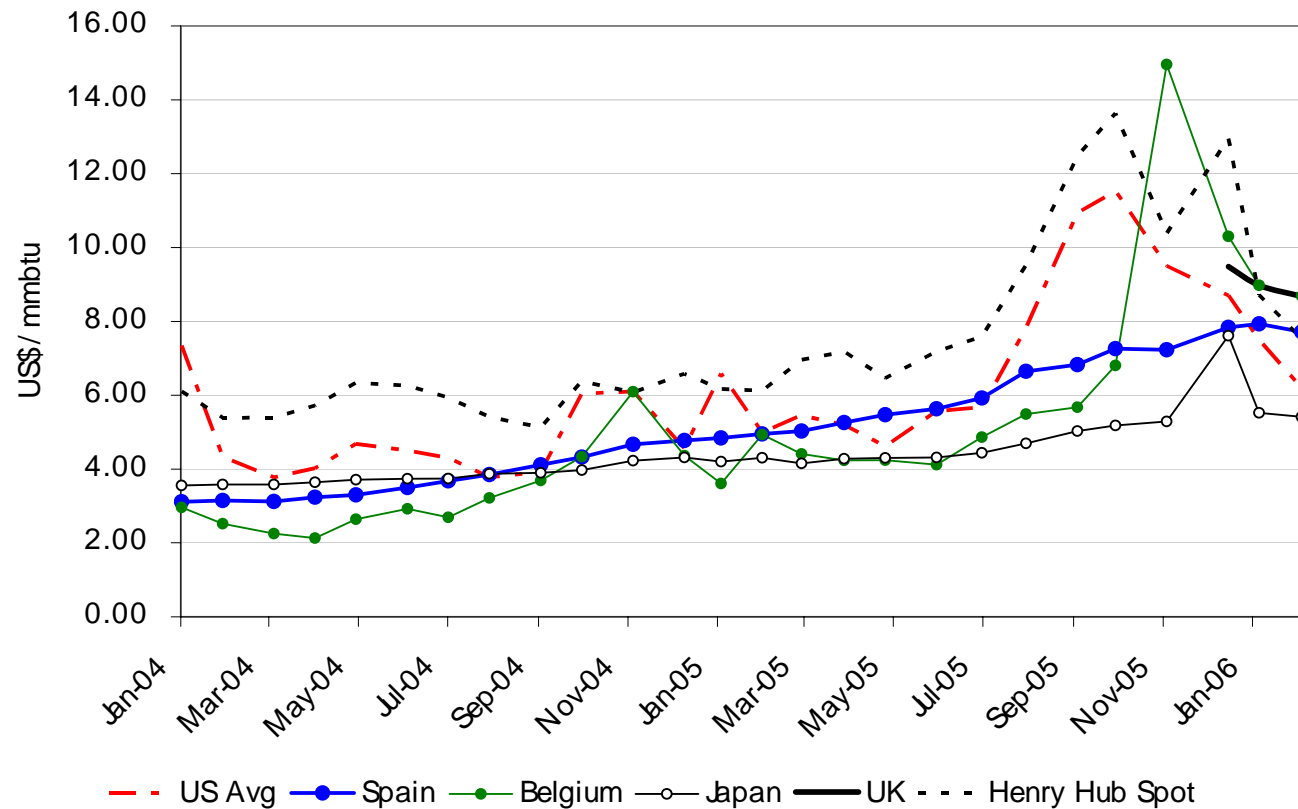
Source: Bloomberg



Comparative Country Netbacks

- ◆ Global LNG prices have doubled y/y
- ◆ Destination flexibility targets highest netback market

Comparative Country Netbacks



Source: Bloomberg, WGI

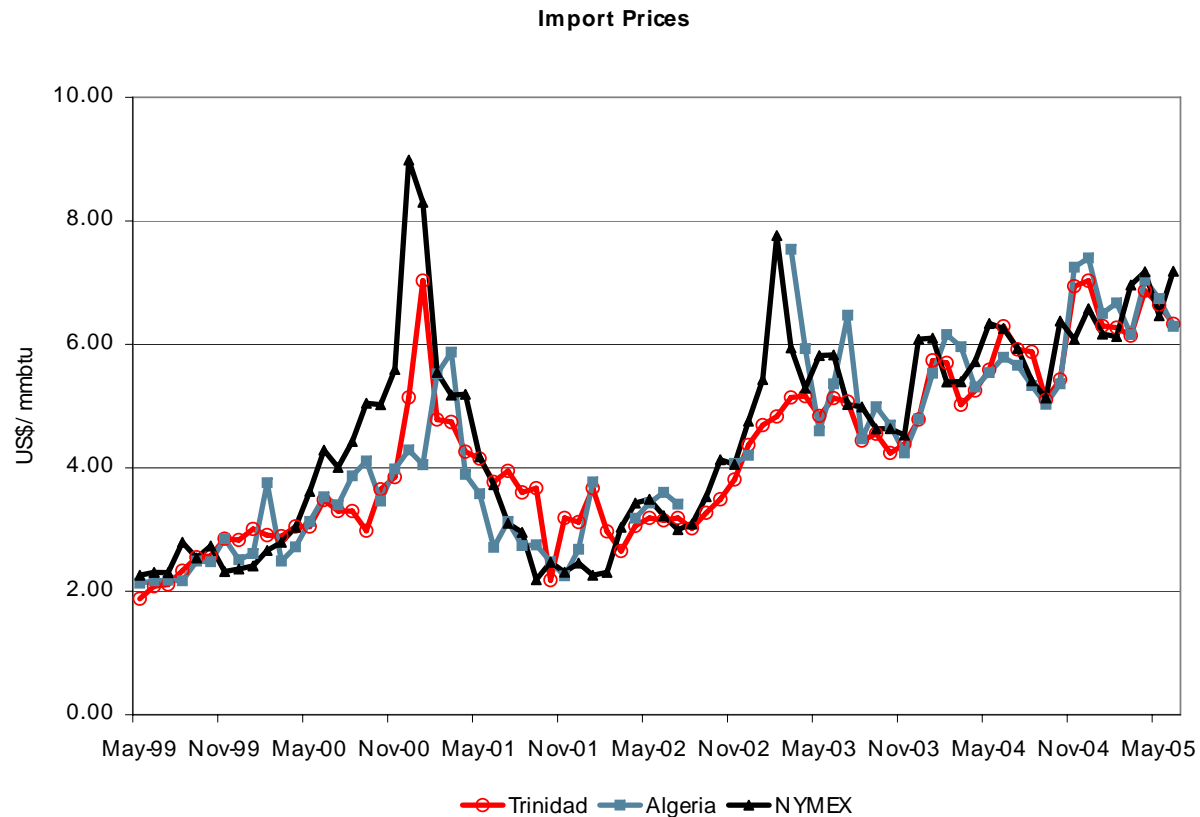


LNG Prices & Economic Rent

◆ Trinidad a great case study: “capture a fair economic rent”

- From stranded gas supplier to integrated LNG exporter
- Reviewing new tax regime targeting royalty and tax take
- Indexing to Henry Hub

“There is no cheap gas available in the world”



Source: Bloomberg, WGI

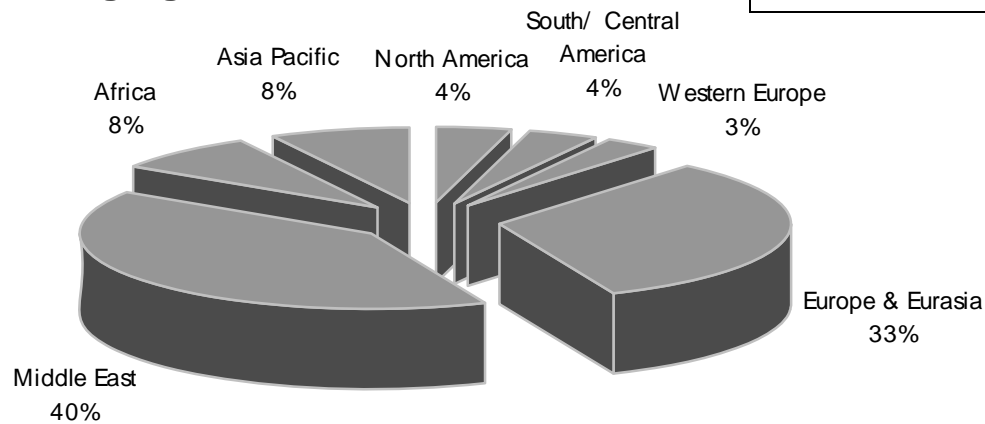
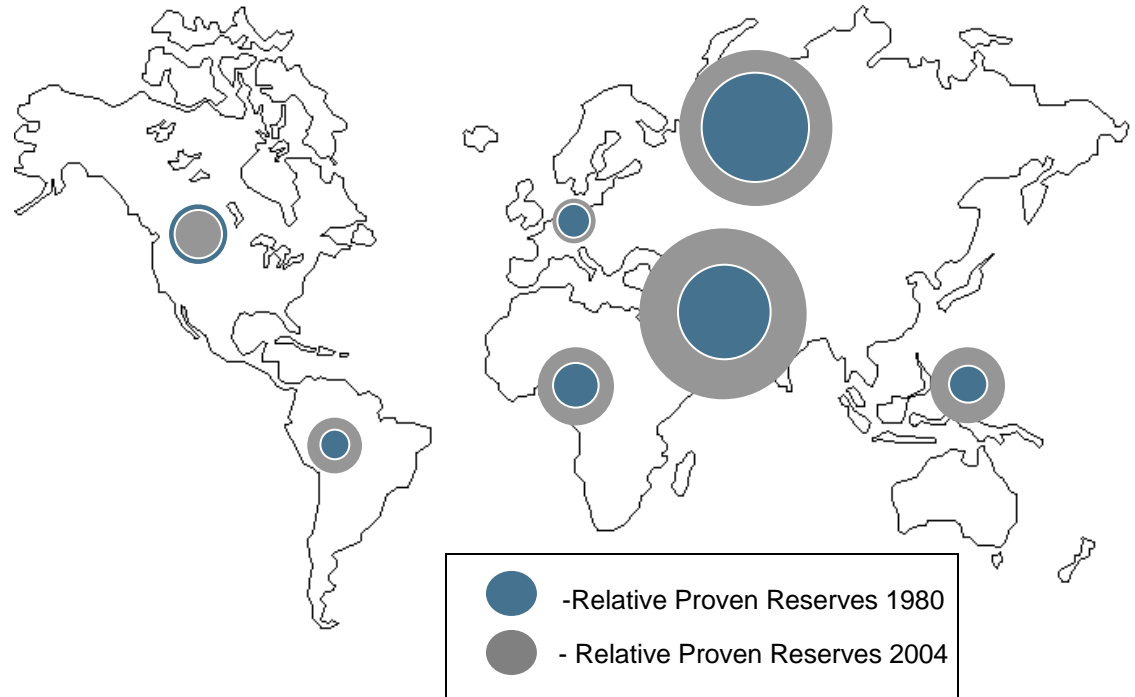


Global LNG: Base-Case Forecast



Global Natural Gas Reserves Distribution 2004

- ◆ Global proven natural gas reserves were 6,337 Tcf in 2004
 - 44% in 7 NOCs
 - 32% in Russia & the 'stan's
- ◆ Next decade of growth will be more challenging

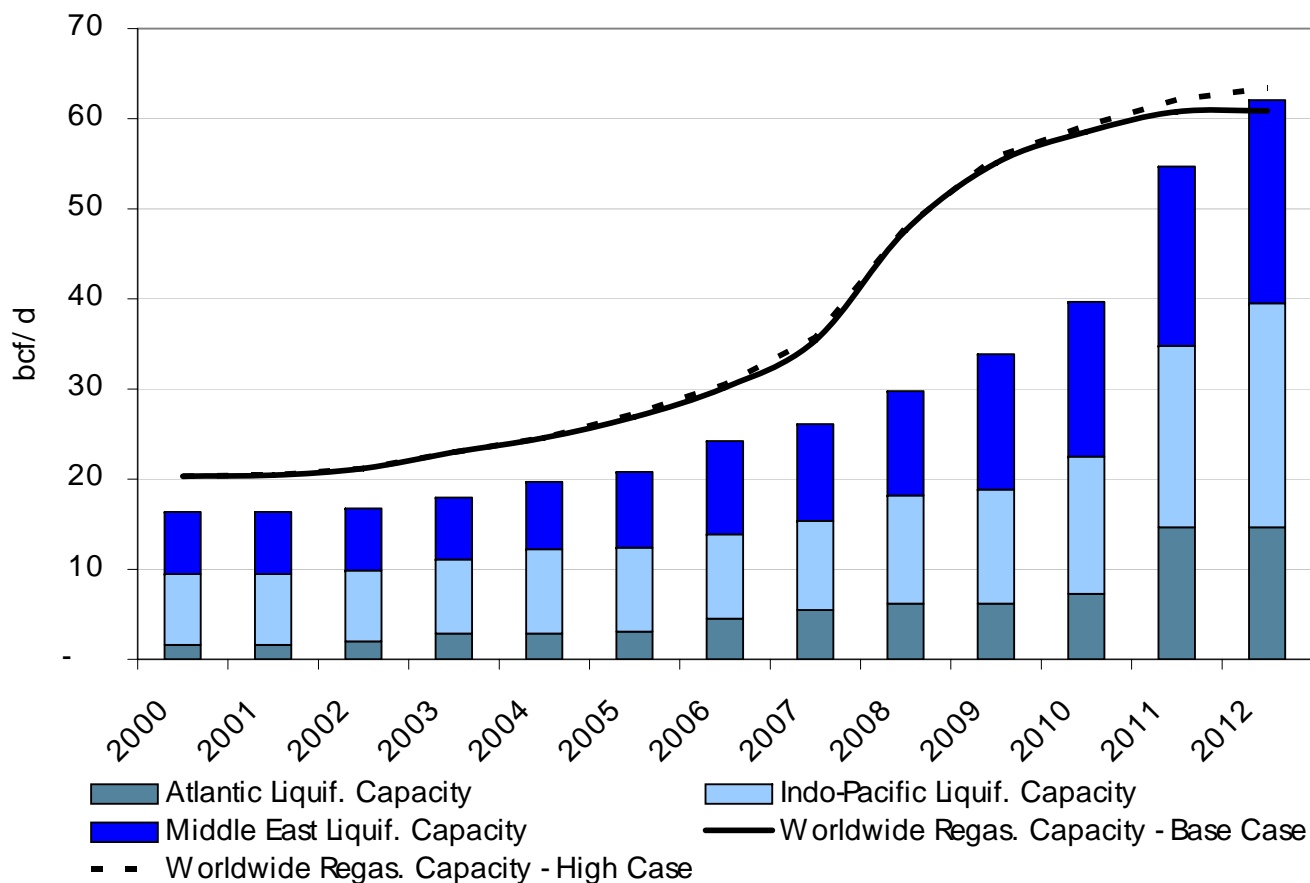


Note: Does not include Unconventional Reserves
 Source: BP Statistical Review 2004



Global Trade Profile – Market Balance?

- ◆ Expect a threefold increase in global LNG market to 60 bcf/d by 2012
- ◆ Three energy policies will dictate pace of growth: USA, China, India
- ◆ LNG liquefaction shortfall will get worse before it gets better

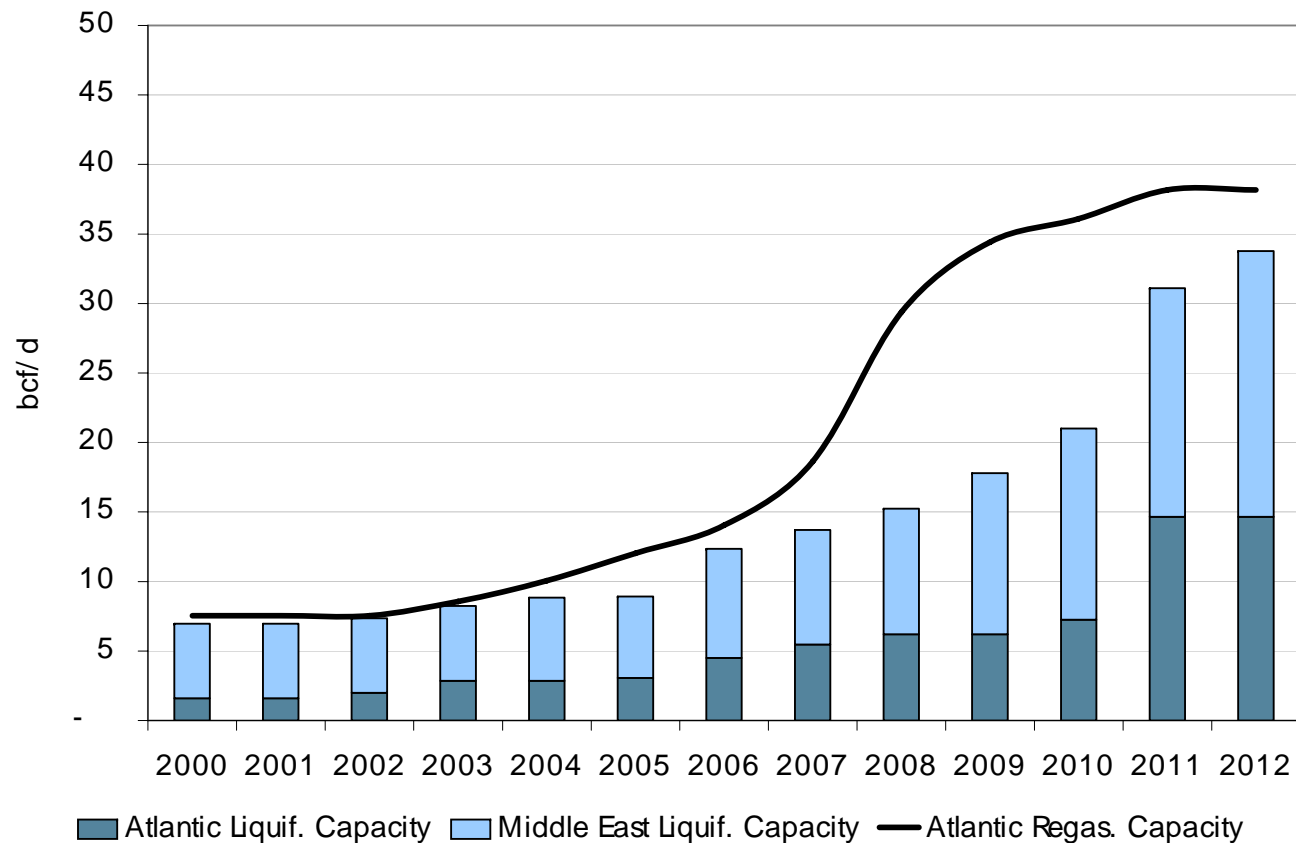


Source: DOE, Company reports, Tristone estimates



Basin Trade Profile - Atlantic

- ◆ Export capacity will drive pace of Atlantic basin trade
- ◆ Expect Atlantic trade to grow from 9 bcf/d to 34 bcf/d by 2012 (25% CAGR)
 - Risk is timing and cost

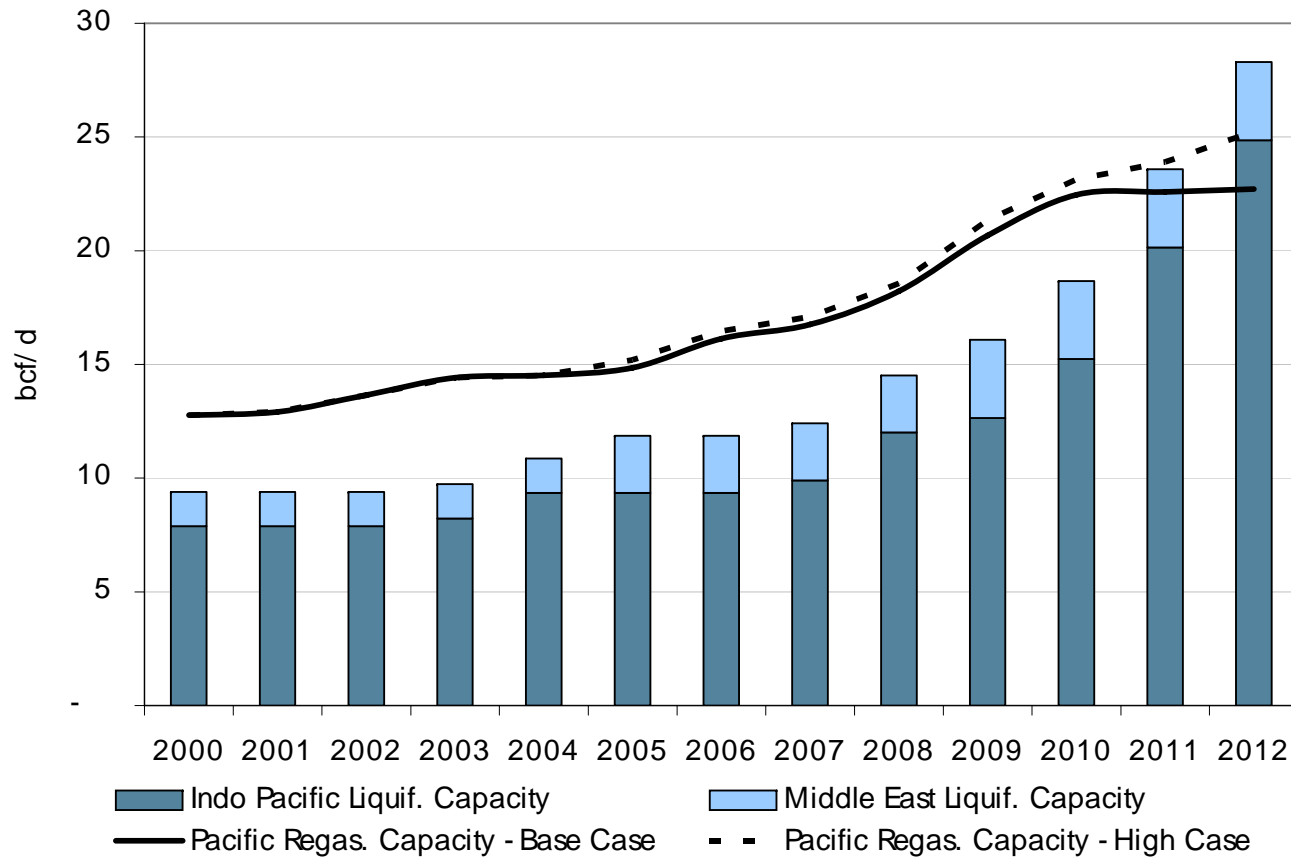


Source: DOE, Company reports, Tristone estimates



Basin Trade Profile – Indo-Pacific

- ◆ **China/India drive pace of growth in otherwise mature basin**
- ◆ **China/India low case vs. high case predicated on price of LNG**
 - Cash-plus or market-based pricing
 - China requires major downstream investments to integrate gas & power

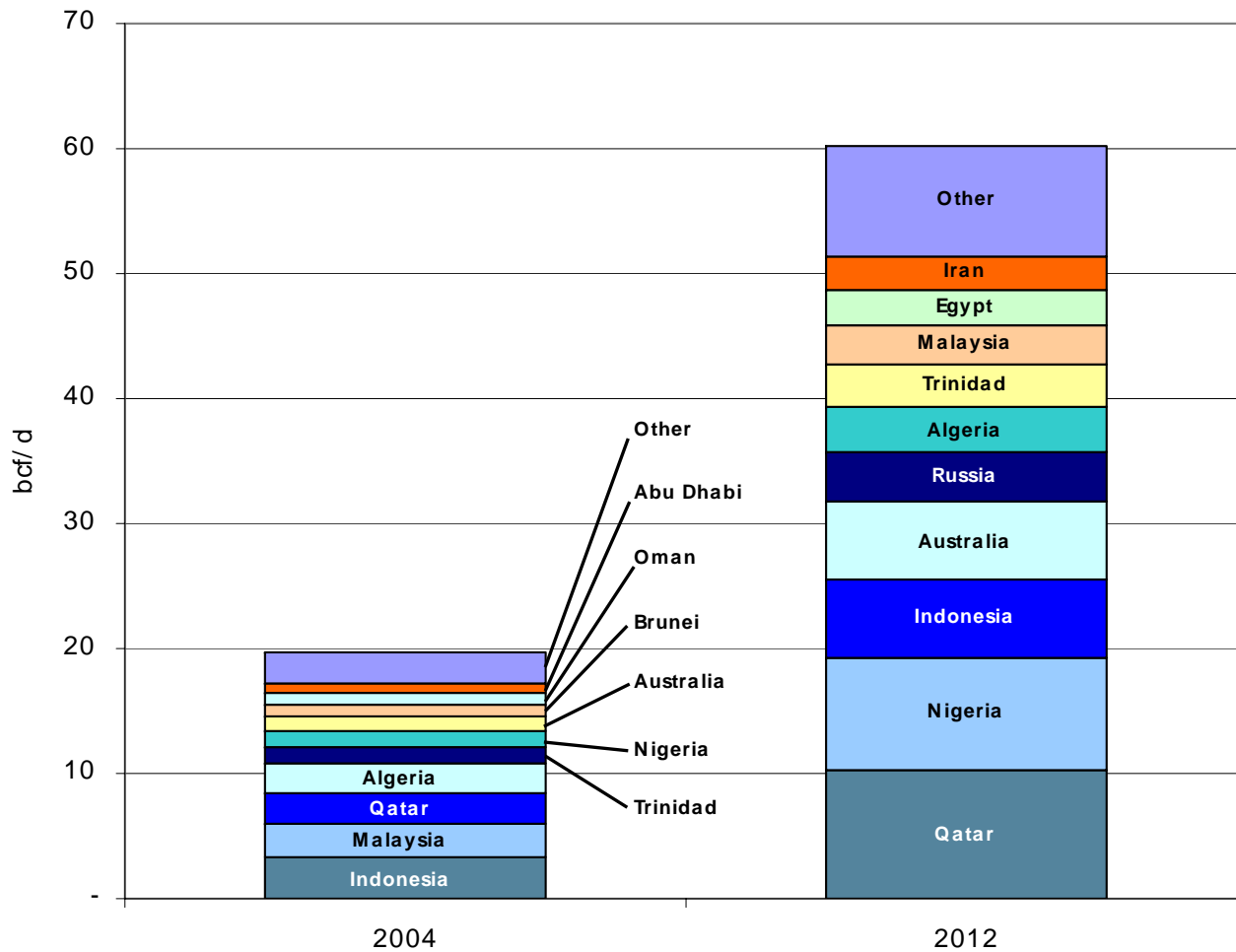


Source: DOE, Company reports, Tristone estimates



Top 10 Exporters Now & 2012

◆ NOCs dominate LNG exports by 2012



Source: DOE, Company reports

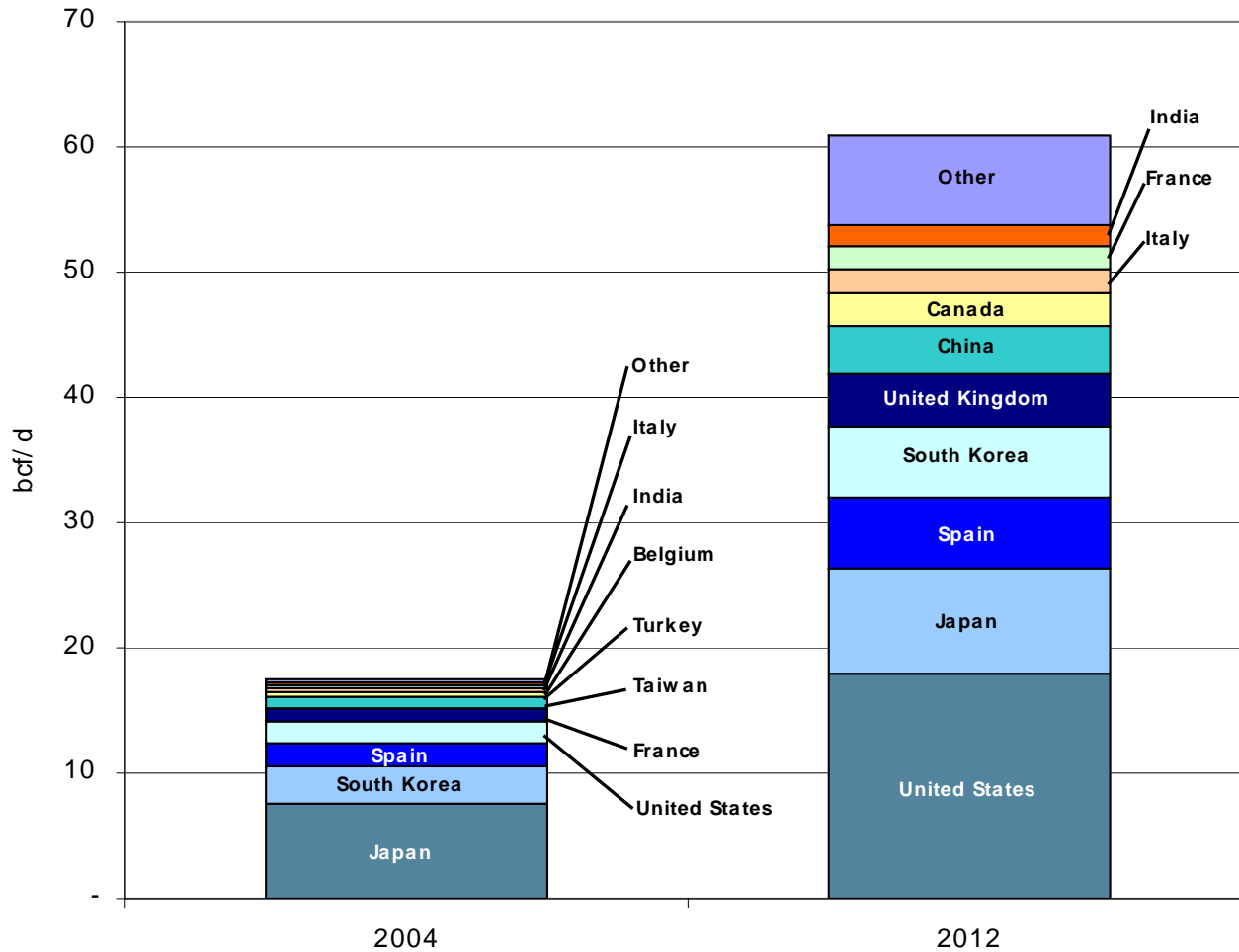


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Top 10 Importers Now & 2012

- ◆ US capacity will grow to ~18.5 bcf/d by 2012
- ◆ We expect to see regional consolidation of projects

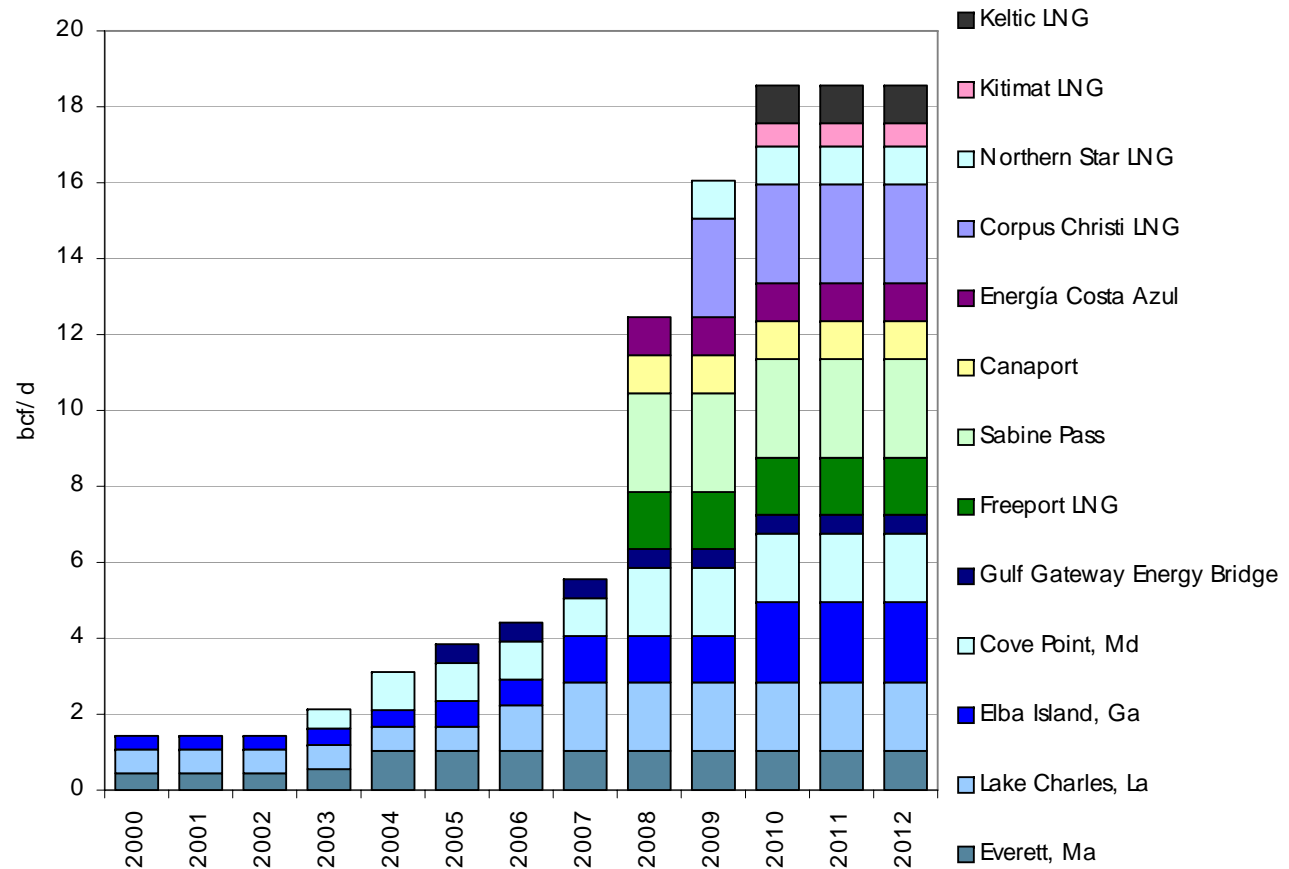


Source: DOE, Company reports



Expected LNG Imports in the USA / Canada

- ◆ Expect 18.5 bcf/d of N.A. import capacity by 2012
 - NIMBY is second to supply as key success variable

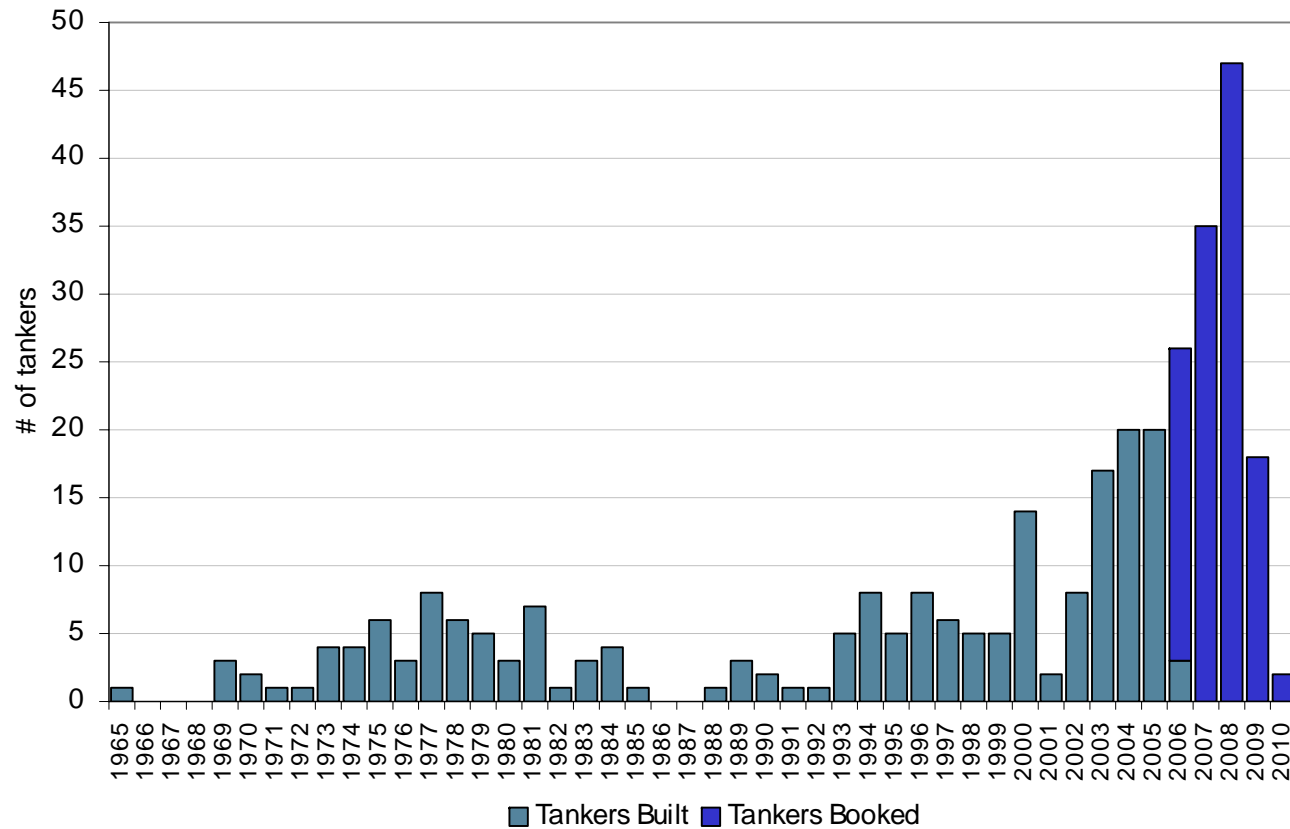


Source: DOE, FERC, NEB, Company reports



LNG Tanker Market Profile

- ◆ 199 tankers are now in service; another 135 are on order
- ◆ Migrating to larger scale Q-Flex, Q-Max tankers
- ◆ Manning the burgeoning fleet is the single biggest risk in the LNG chain today



Source: Maritime Business Strategies



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LNG – Major Challenges

- ◆ **Input costs**
 - Labour
 - Steel
 - Nickel
 - Cement

- ◆ **Security risk**
 - NIMBY obstacles; terrorism

- ◆ **Timing risk**
 - Tighness of services, harsh conditions

- ◆ **Fiscal risk**
 - Difficult fiscal terms with many NOCs

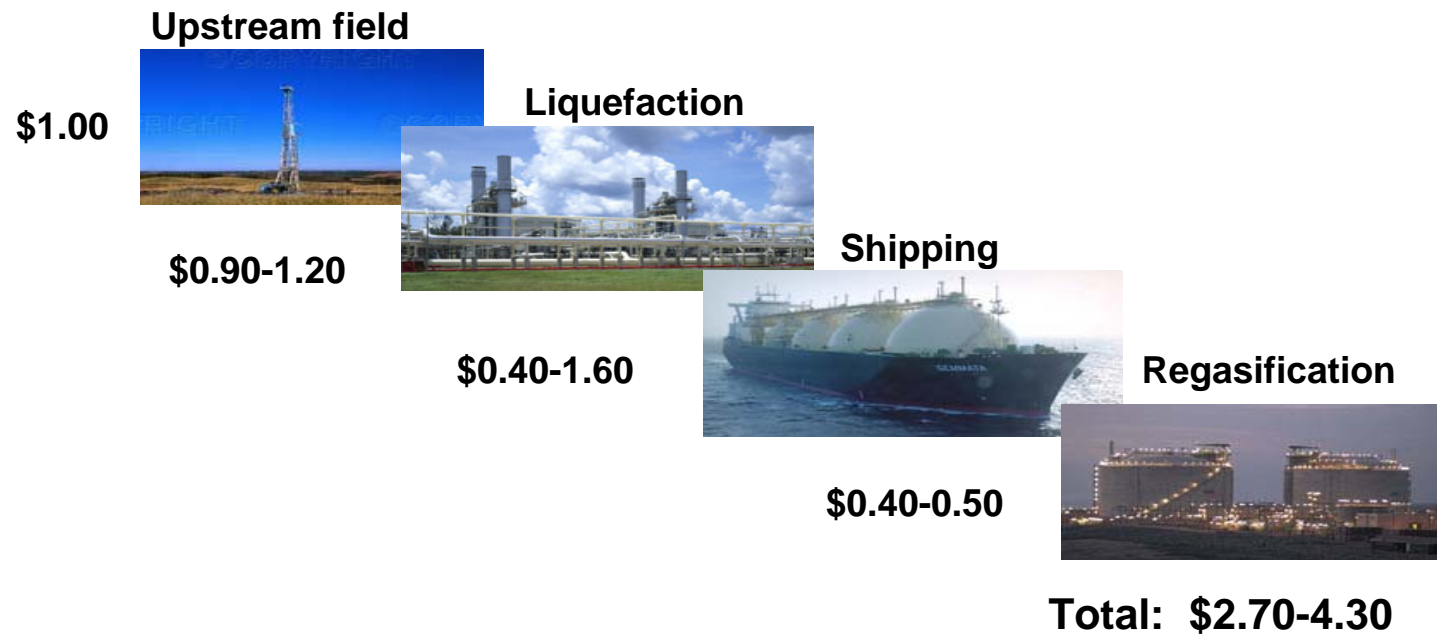
- ◆ **Financing risk**
 - Project integration is key to accessing capital
 - Counterparty risk

- ◆ **Qualified shipdrivers**
 - Training
 - “Criminalization” of seafarers



LNG Cost Structure

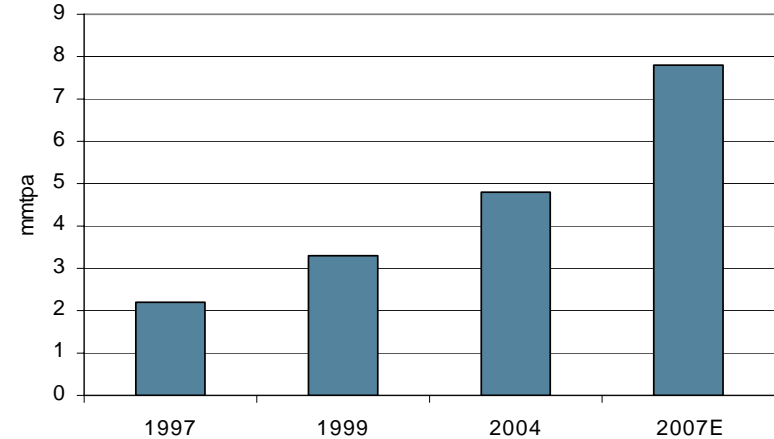
- ◆ Cost efficiencies in the LNG chain being lost to higher EPC costs
- ◆ Economic rent rising in source country



Period of LNG Cost Decreases Coming to Halt

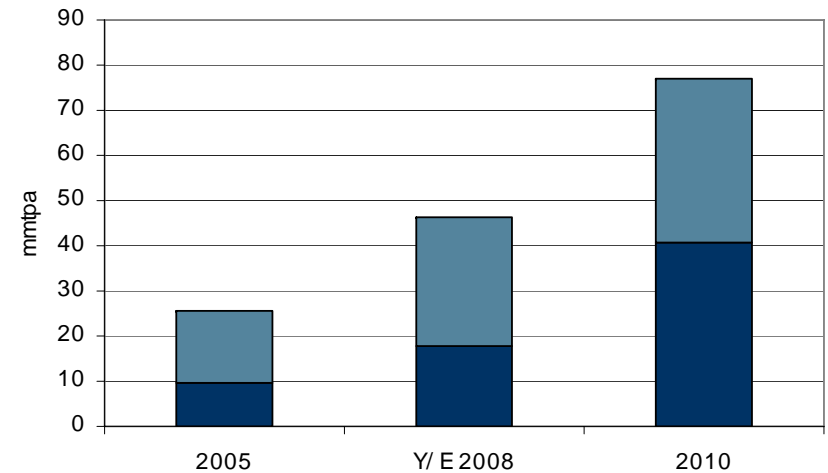


- ◆ **New trains in Qatar are 150% bigger than the original trains**
- ◆ **Combined with larger tankers, Middle East supply costs compete with West/North Africa**
- ◆ **Not surprisingly, Qatar emerging as a dominant supplier to the US**
- ◆ **Economies of scale offset by 30-35% increase in EPC costs i.e. Snohvit, Sakhalin**



7.5 mmtpa = 1 bcf/ d

■ Train Size



7.5 mmtpa = 1 bcf/ d

■ QatarGas ■ RasGas

Source: QatarGas



LNG & Northern Gas



Where Does Northern Gas Fit In?

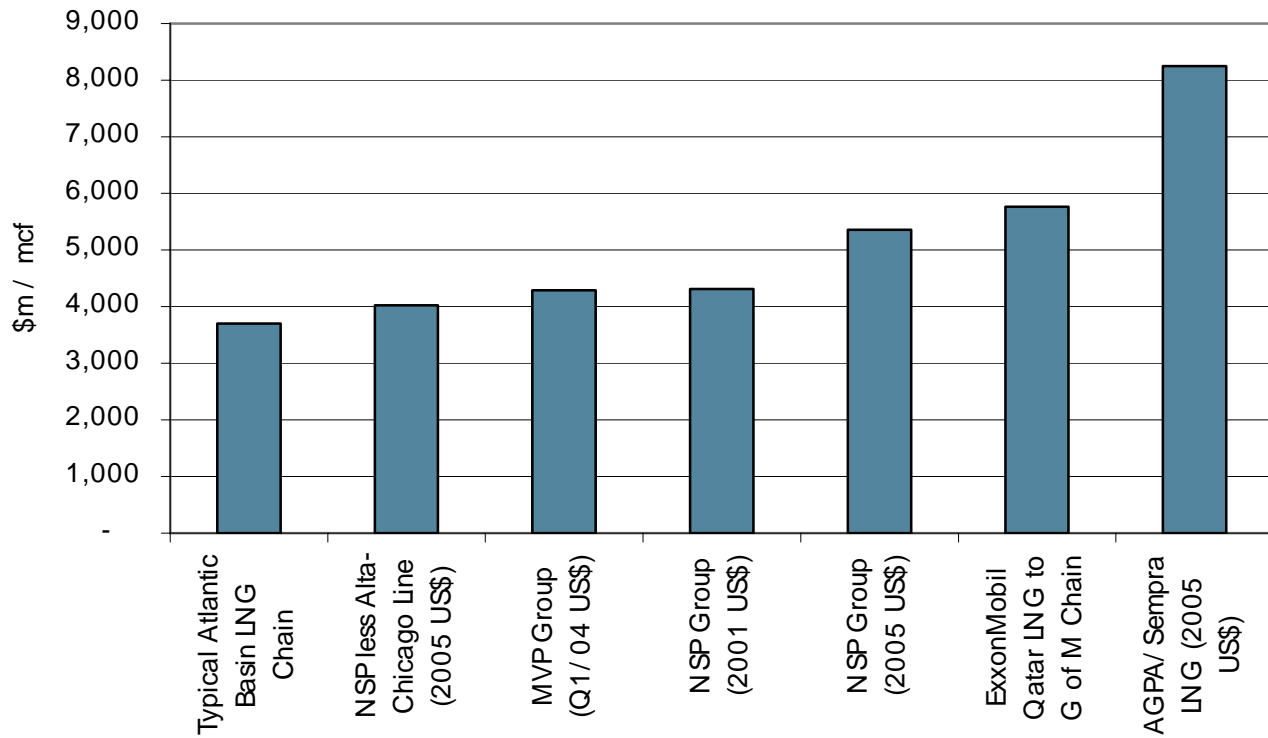
- ◆ Investment in Frontier gas has to compete with LNG options
- ◆ Execution risk still high in terms of costs, labour, regulatory process, First Nations





Frontier Gas Relative Capital Costs

- ◆ Northern pipelines can compete with fully integrated LNG supply chains
- ◆ We believe capital costs are understated on all projects given input cost pressures



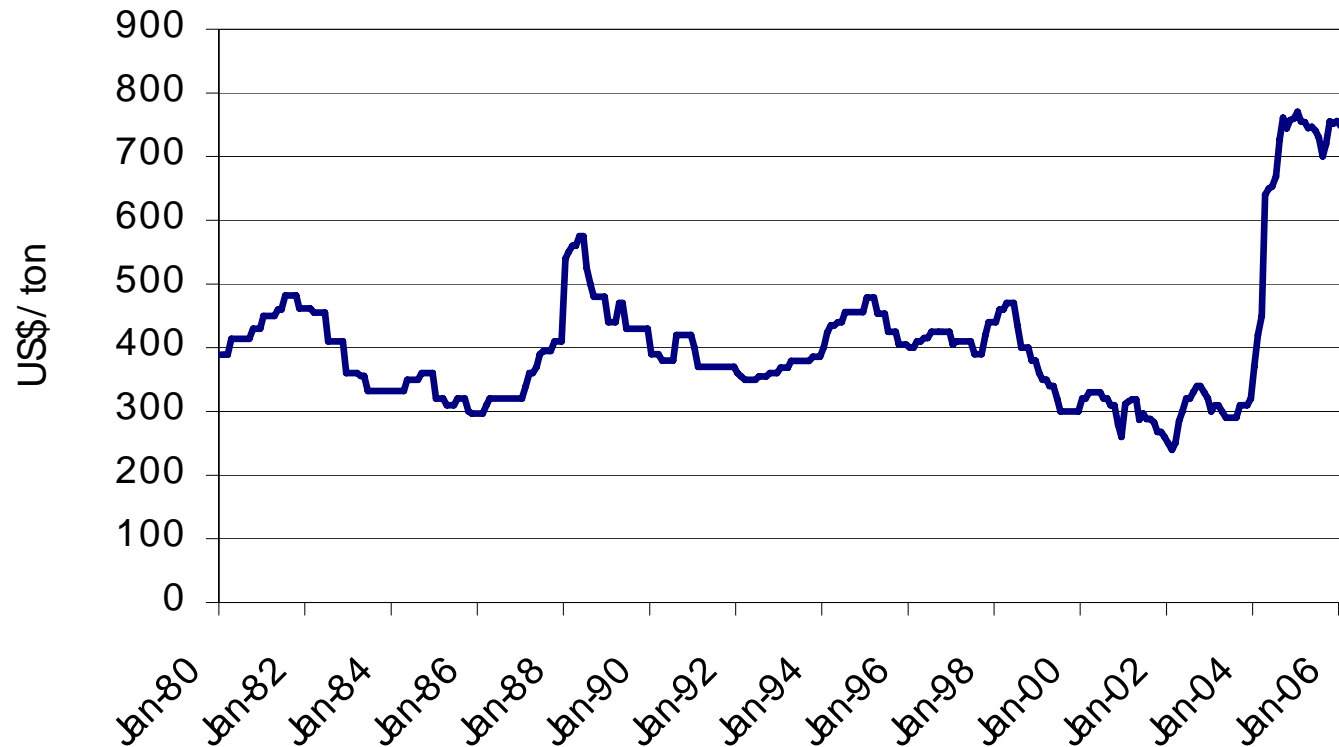
Source: Regulatory filings, Tristone



Input Cost Pressures

- ◆ Hot rolled steel prices have increased by 150% since the NSP Group announced the project was uneconomic in 2001
 - Steel is ~20% of the cost of the pipelines

Steel Prices



Source: Purchasing Magazine

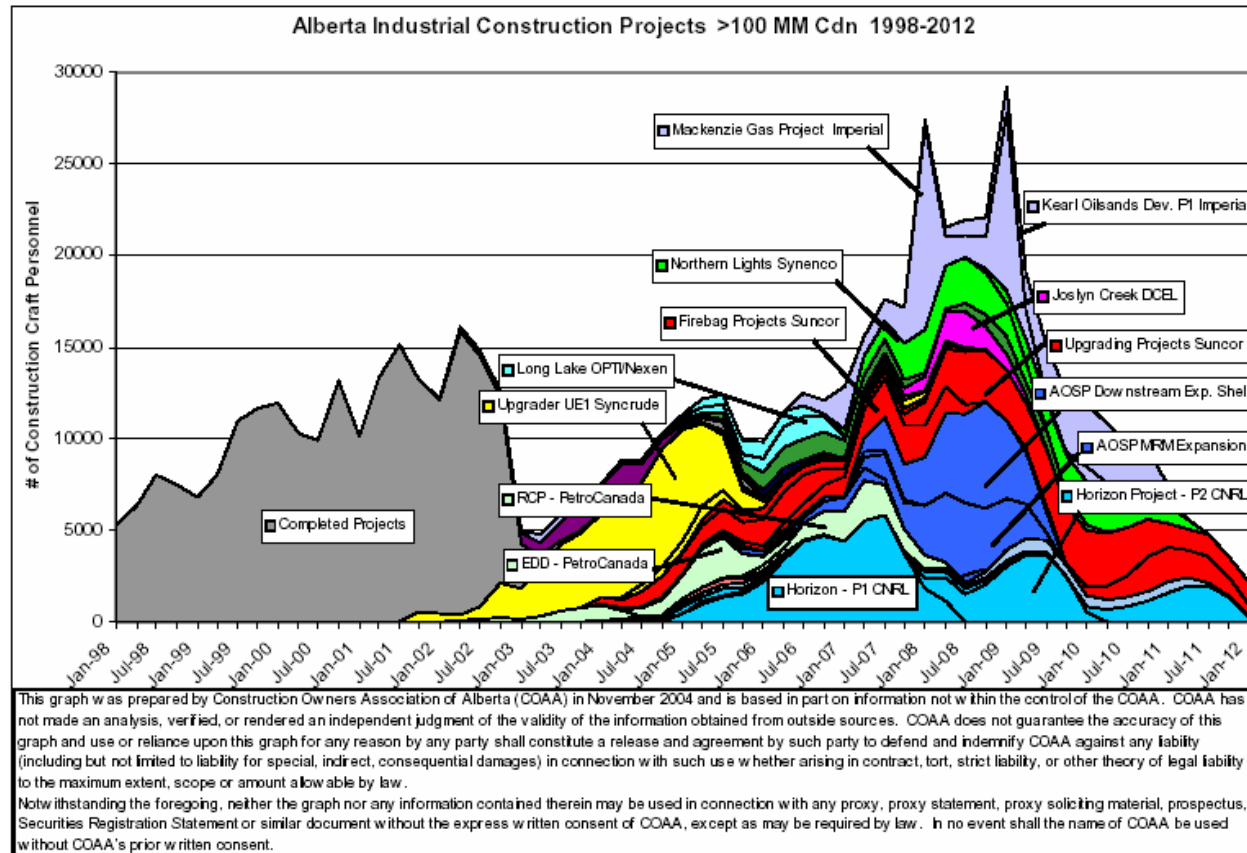


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Cost Pressures on Frontier Gas Projects

- ◆ The last cycle resulted in up to 50% cost overruns
- ◆ The next cycle will create even more challenges
- ◆ Excludes BA, Northwest Upgrading, Vancouver Olympics, Gateway



Source: COAA

Supply Costs for Frontier Alternatives

◆ LNG is a viable threat to northern gas development

- Northern projects can compete, but majors may look to allocate capital where execution risk is lower

Alaska Highway Pipeline

	US\$/ mcf
Royalty & Severance	0.23
Operating	0.25
Gas Processing	0.30
AH Pipeline Toll	1.18
Netback to NWT/ Alberta Border	<u>1.96</u>

Intra-Alberta Transportation	0.27
AECO Hub to Chicago	1.25
Combined Supply Cost to US Market	<u>3.48</u>
Assumed Return on Investment (10%)	0.35
Total Supply Cost	<u>3.83</u>

Alaska LNG

	US\$/ mcf
Gas Conditioning	0.30
Royalty & Severance	0.23
Pipeline Toll	0.80
AGPA Distribution (Taxes/ Royalty)	0.34
Liquefaction	1.20
Supply Cost to Tidewater	<u>2.87</u>

LNG Shipping	0.40
Regasification	0.40
Market Access	0.10
Combined Supply Cost to US Market	<u>3.77</u>
Assumed Return on Investment (10%)	0.38
Total Supply Cost	<u>4.14</u>

Mackenzie Valley Pipeline

	US\$/ mcf
Royalty	0.15
Operating	0.15
Gathering & Processing	0.15
MV Pipeline Toll	1.27
Netback to NWT/ Alberta Border	<u>1.72</u>

Intra-Alberta Transportation	0.27
AECO Hub to Chicago	1.25
Combined Supply Cost to US Market	<u>3.24</u>
Assumed Return on Investment (10%)	0.32
Total Supply Cost	<u>3.57</u>

LNG: Qatar - Gulf of Mexico

	US\$/ mcf
Cost of Upstream Gas	1.00
Liquefaction	0.90
Netback to Tidewater	<u>1.90</u>

LNG Shipping	0.90
Regasification	0.40
Market Access	0.10
Combined Supply Cost to US Market	<u>3.30</u>
Assumed Return on Investment (10%)	0.33
Total Supply Cost	<u>3.63</u>

Source: Regulatory filings, Tristone estimates



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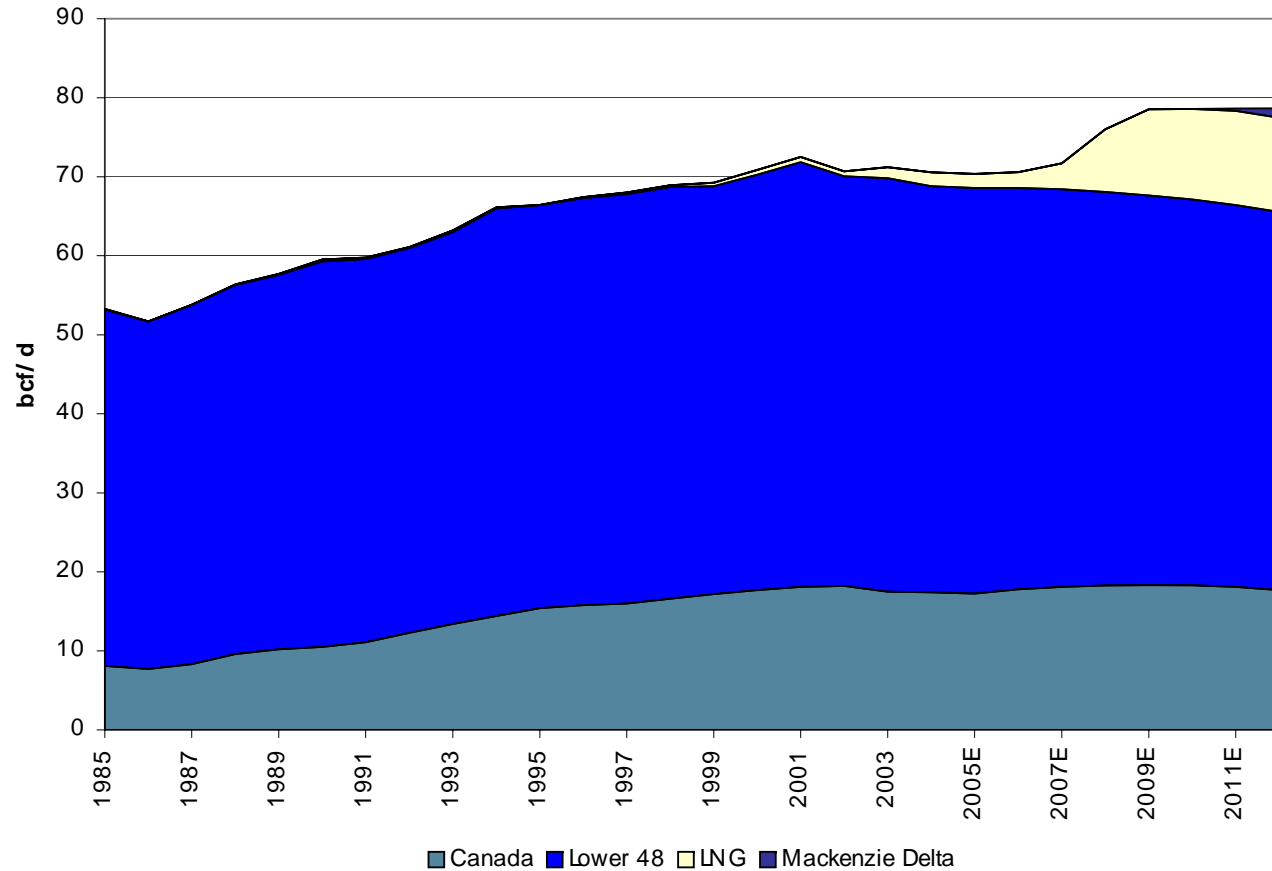


LNG & North American Supply



N.A. Gas Demand Growth – Supply Driven Market

- ◆ N.A demand will be driven by pace of supply growth
- ◆ We expect 1.6% CAGR to 79 bcf/d in 2012; growth is back-end weighted in profile



Source: DOE, StatsCan, Tristone estimates

Scenario Analysis Considerations



Commodity Prices	Low Case	Base Case	High Case
WTI	40.00	50.00	75.00
Henry Hub	5.75	7.00	11.00

North American Gas Supply

IRRs insufficient, low gas rig count = declining supply; low price is unsustainable.

N.A. gas industry generates cost of capital returns; little incentive to grow production.

Strong returns for unconventional drilling see's modest increase in N.A. supply.

LNG Supply

Prices not high enough to attract spot cargoes = LNG imports decline. Low N.A. terminal utilization.

Producers earn cost of capital returns on LNG chain investments. Spot cargo destinations depend on relative netbacks.

High prices likely see influx of LNG cargoes to capture high netbacks.

N.A. Gas Demand

Industrial consumption is stable. Modest overall demand growth. Non-inflationary impact on economy.

Industrial consumers near b/ e. Continue to see capacity move offshore. Demand grows at best case 1.6%. Non-inflationary environment.

Demand destruction. Feedstock consumers are a sunset industry. Inflationary impact on economy.

The China/ India factor

Robust China / India gas demand in this scenario as prices reflect supply cost plus RoR; Makes for tighter supply to US west coast.

NYMEX sets price signal for China/ India LNG prices. Having liquid market in I-P region forces China/ India to migrate from cost-plus pricing to grow gas consumption.

Focus on alternative fuels: coal, clean coal, nuclear, Siberian gas pipeline. LNG growth is negligible.

Price Impact

Not sustainable

Market Neutral

Not sustainable

