



Global Gas Markets and Macro Fundamentals

Anchorage, AK
August 5-9, 2013

North Slope Gas & LNG Symposium

Table of Contents

Drivers of Energy and Gas Demand

How Gas Differs from Oil

Outlook for Natural Gas Demand

Outlook for LNG Supply and Demand

What Drives Energy Growth?

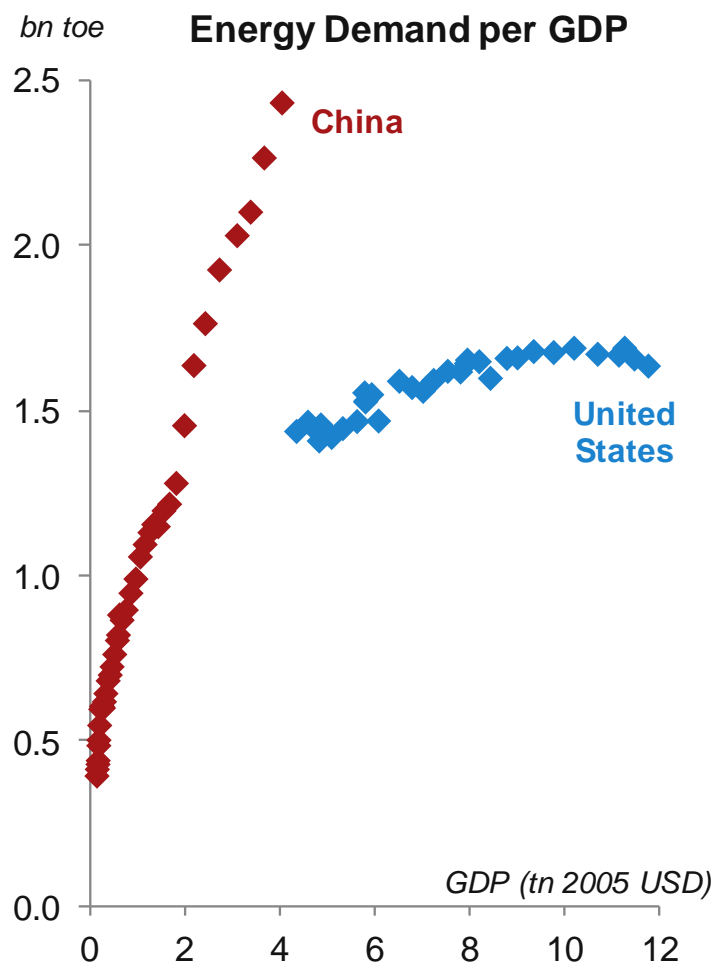
Drivers of Energy Demand

- Economic Growth
 - Structure of the economy:
 - Share of GDP from services v. industry
 - Heavy industrial v. light industrial
- Population and Demographics
 - Population growth
 - Age of the population
 - Urbanization
- Energy Efficiency
 - Vehicle usage
 - Appliances
 - Power plants
- Energy Targets
 - Carbon emissions

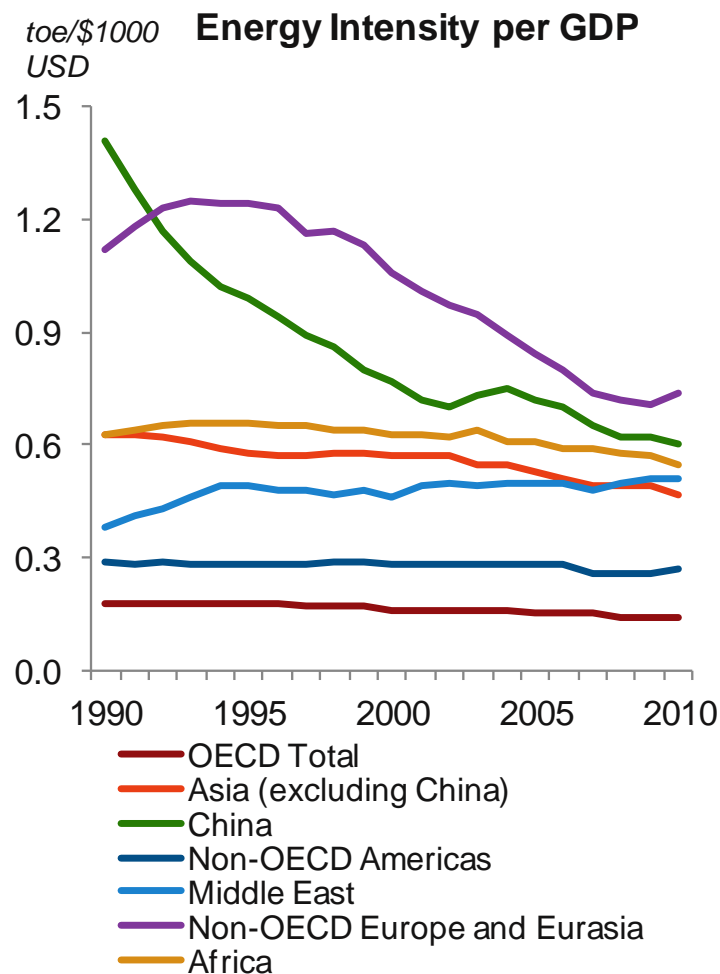
Drivers of Energy Supply

- Domestic Resource Availability
 - Hydro
 - Coal
 - Oil
 - Gas
- Import/ Export Infrastructure
 - Pipelines
 - Port Infrastructure
 - Ability to pay constraints
- Government Policy
 - Energy subsidies
 - Energy security
 - Promotion of renewables
- Geopolitics/ Strategic Considerations

Economic Growth

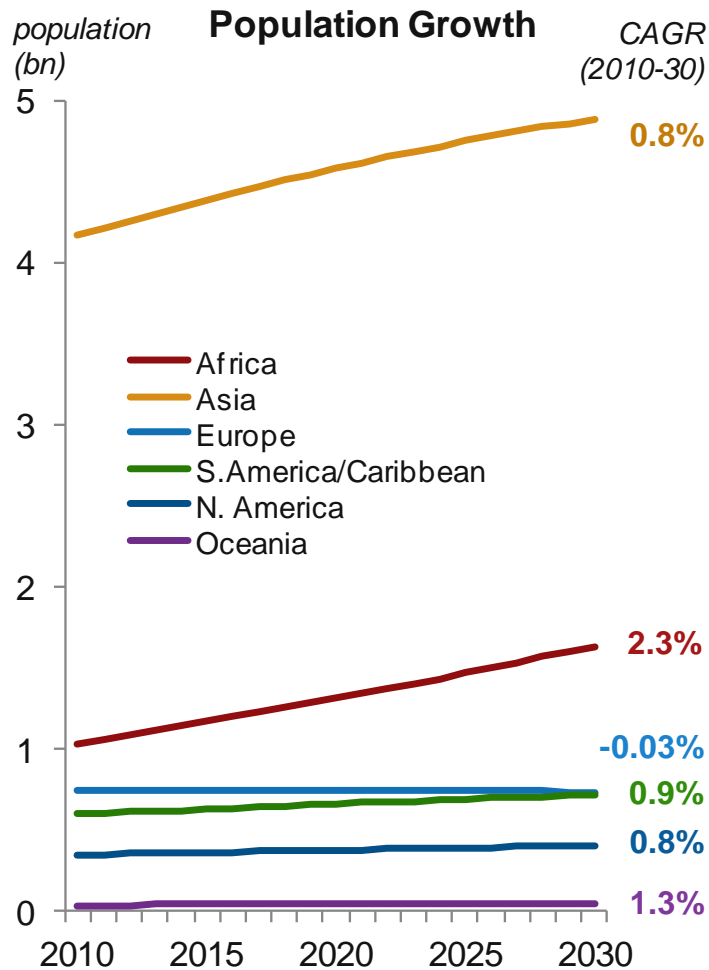


Relationship between energy demand and GDP

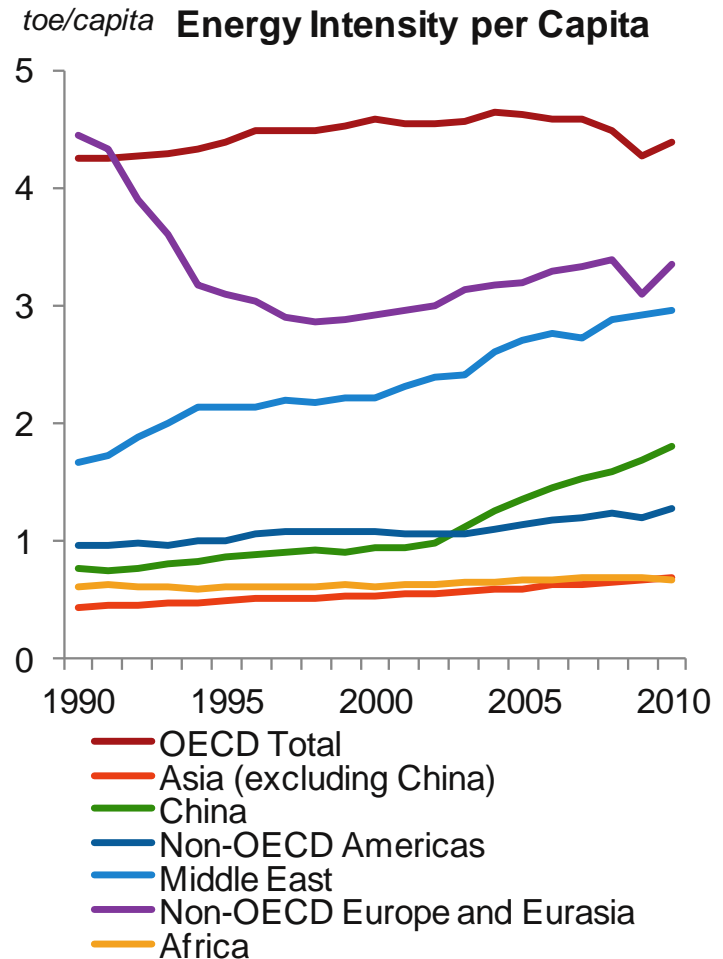


Energy intensity: one measure of efficiency

Demographics

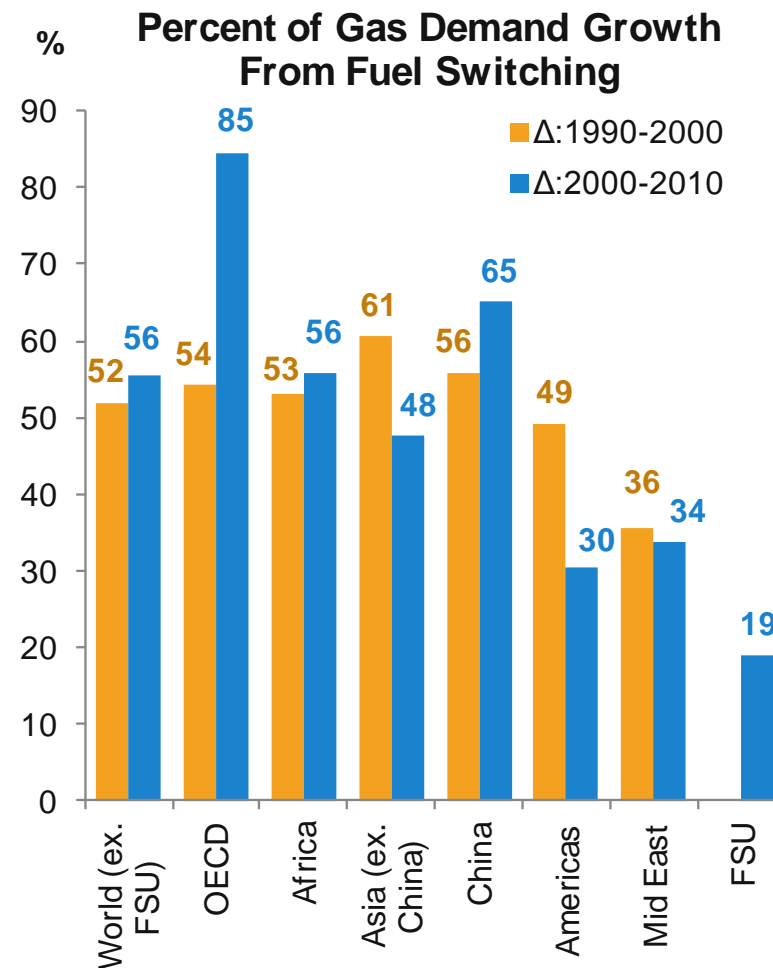
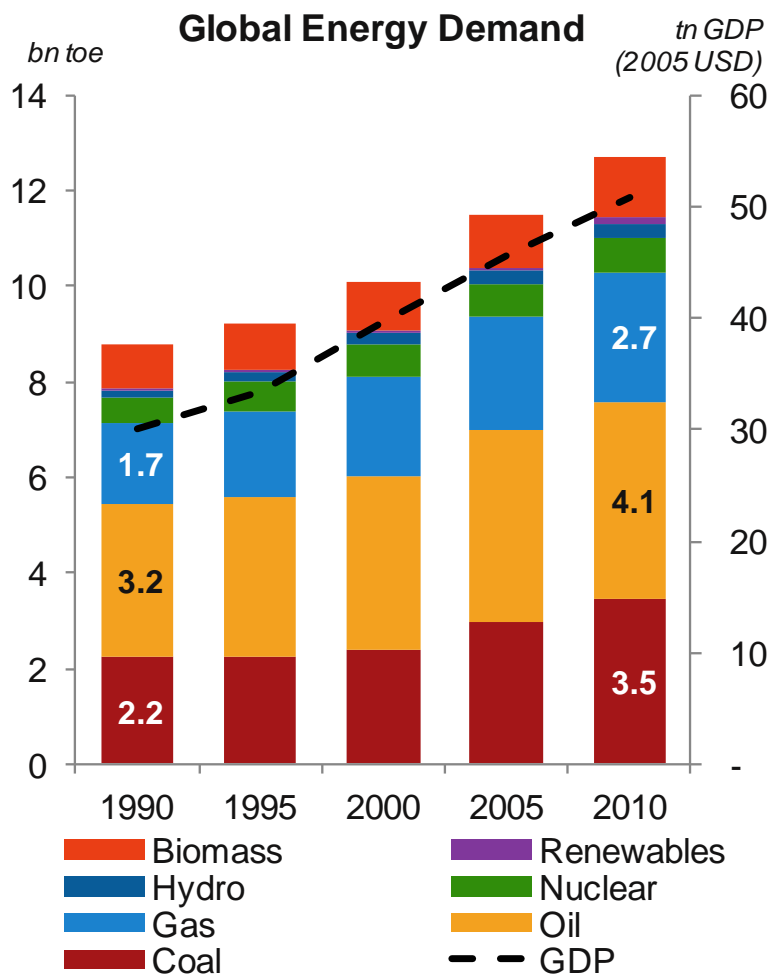


Population growth: declining?
Demographics: aging populations



Energy intensity per capita: Increasing, flat, or decreasing?

What Drives Gas Demand?



Overall Energy Demand Growth

Fuel Switching: Substitution of oil with gas

Table of Contents

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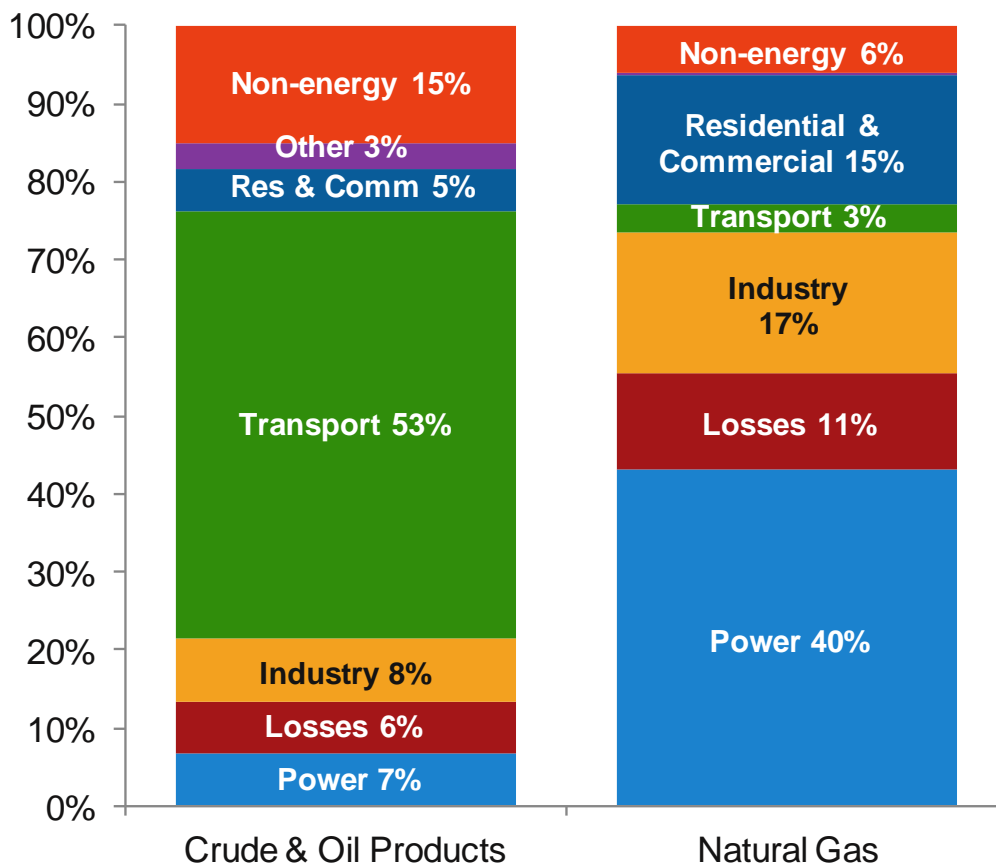
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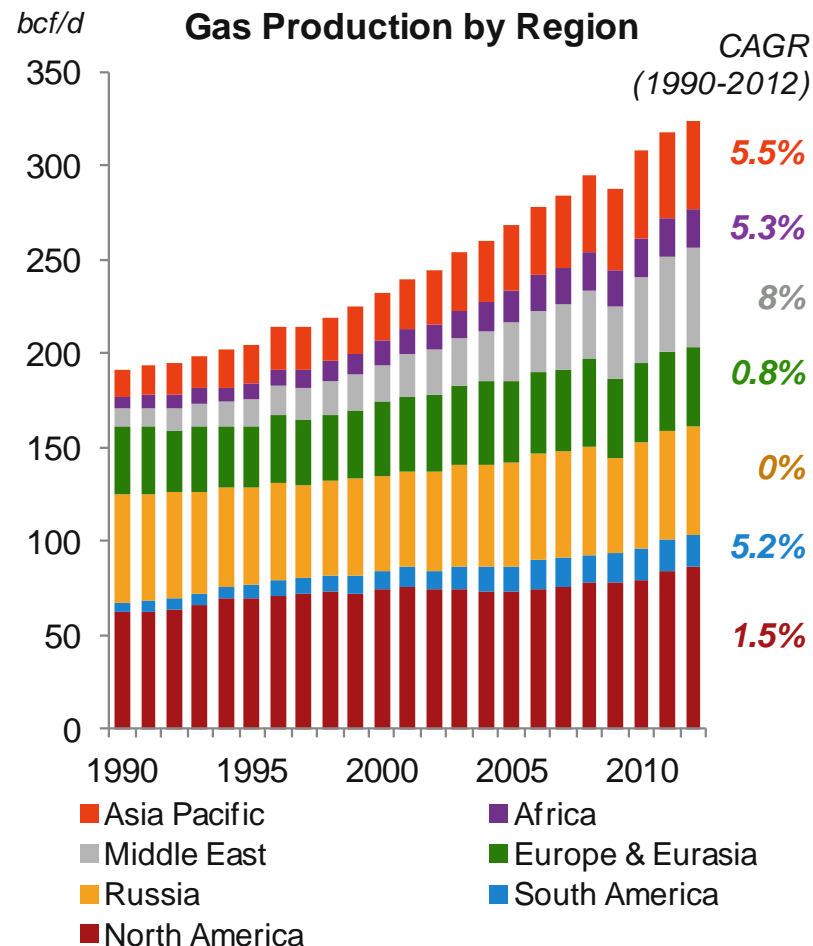
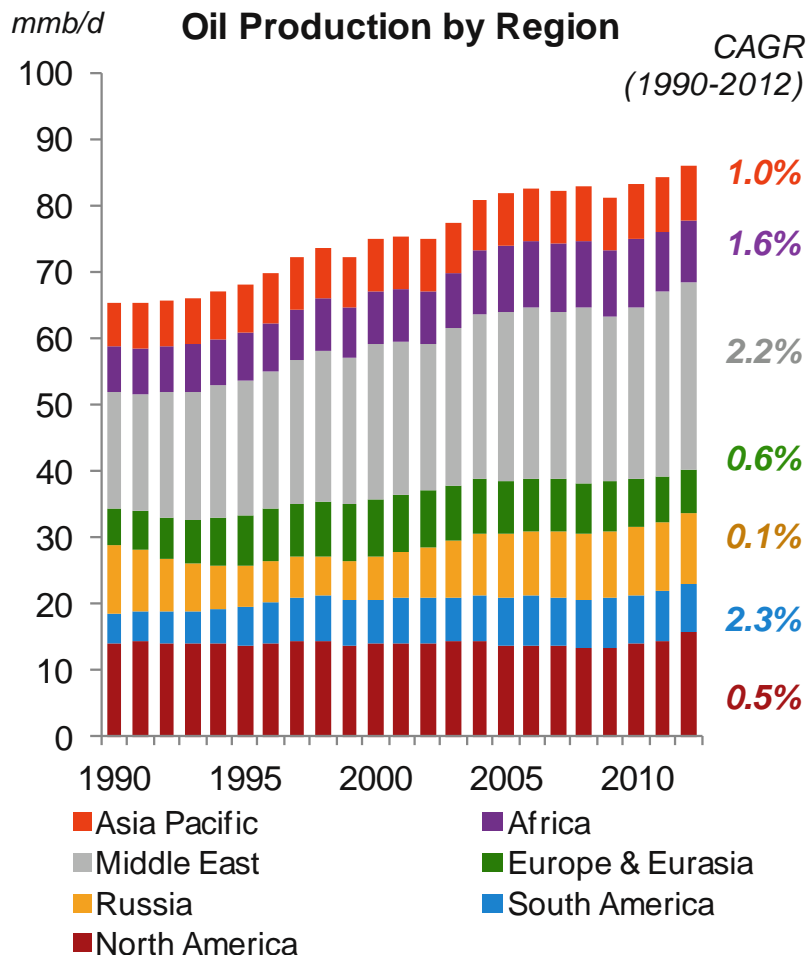
Different Demand Drivers

Oil v. Gas Consumption by Sector (2010)



Transport is the largest source of oil consumption (53%). Gas use is more diversified; power is the largest gas consumed (40%).

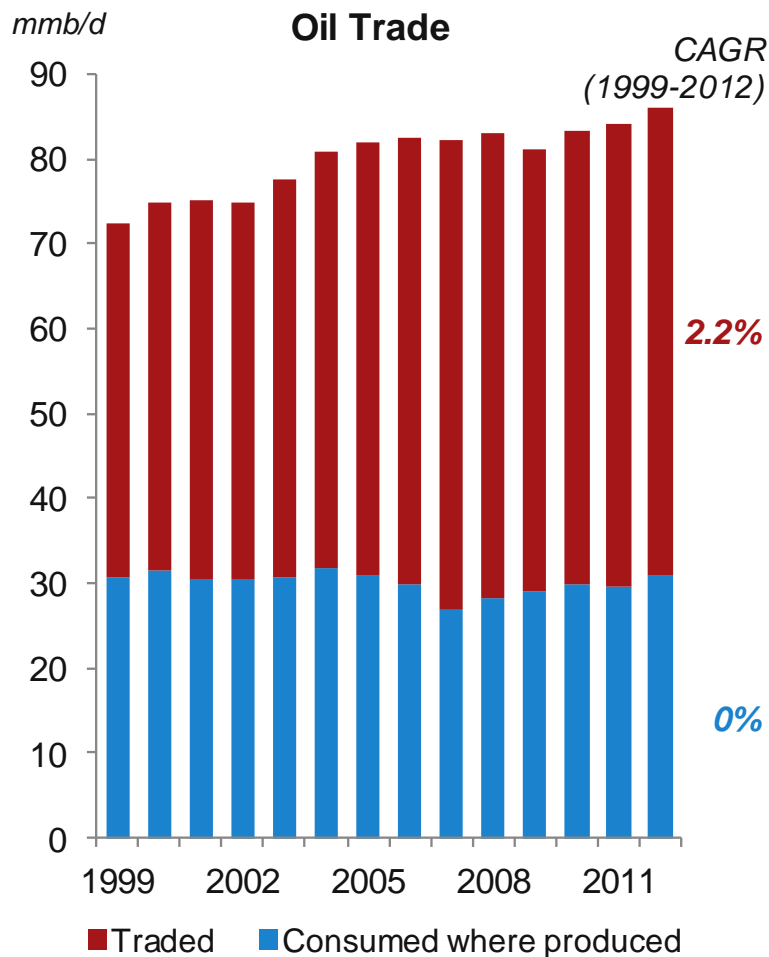
And Different Supply Sources



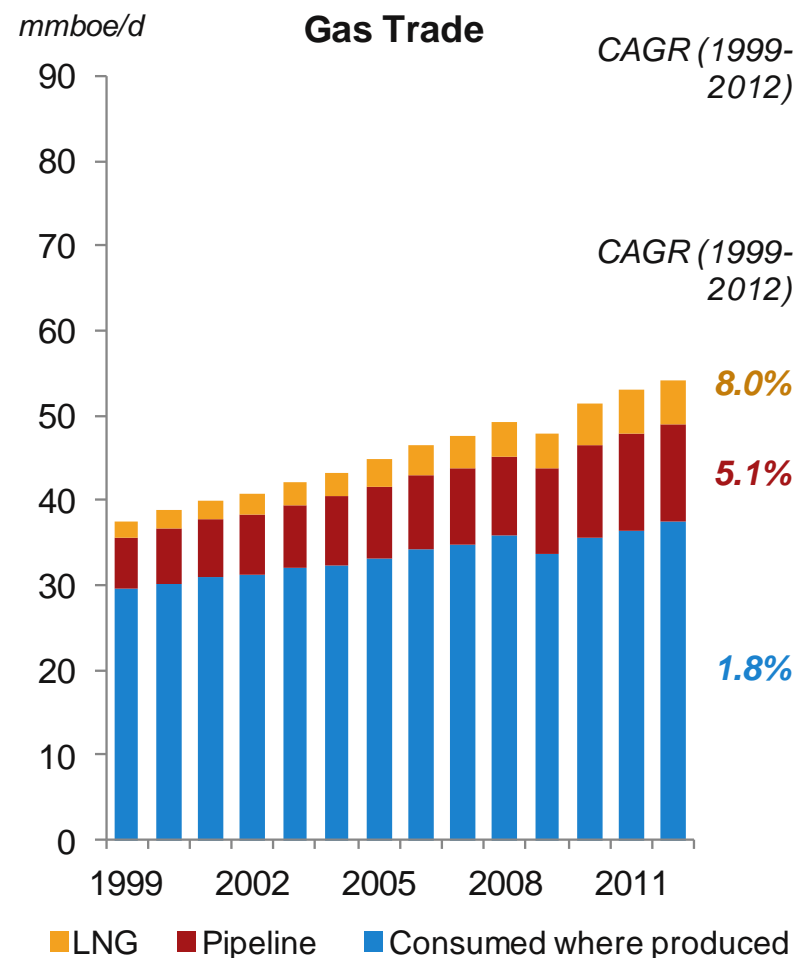
Middle East supplies one-third of oil and second-fastest growing region

N. America supplies 27% of gas and Russia 18%; Asia-Pacific fastest growth

Gas Trade Small (31%) But Growing

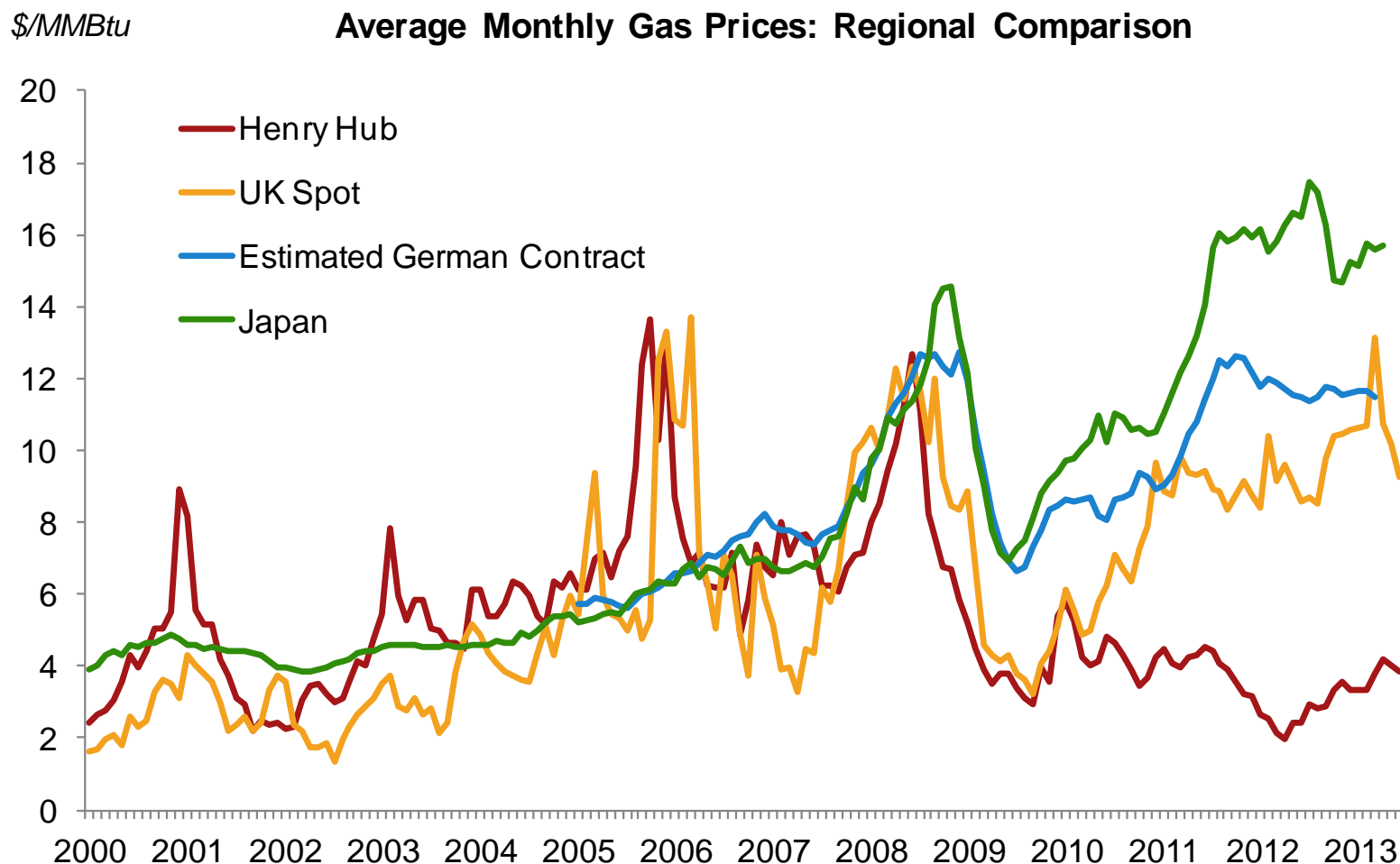


Oil trade 3.3X larger than gas trade



Transportation constraints and infrastructure investment limit trade

Limited Trade Creates Regional Markets



Divergence of regional prices post-2008 driven by rising production in North America (Henry Hub) and rising oil prices (Japan)

Table of Contents

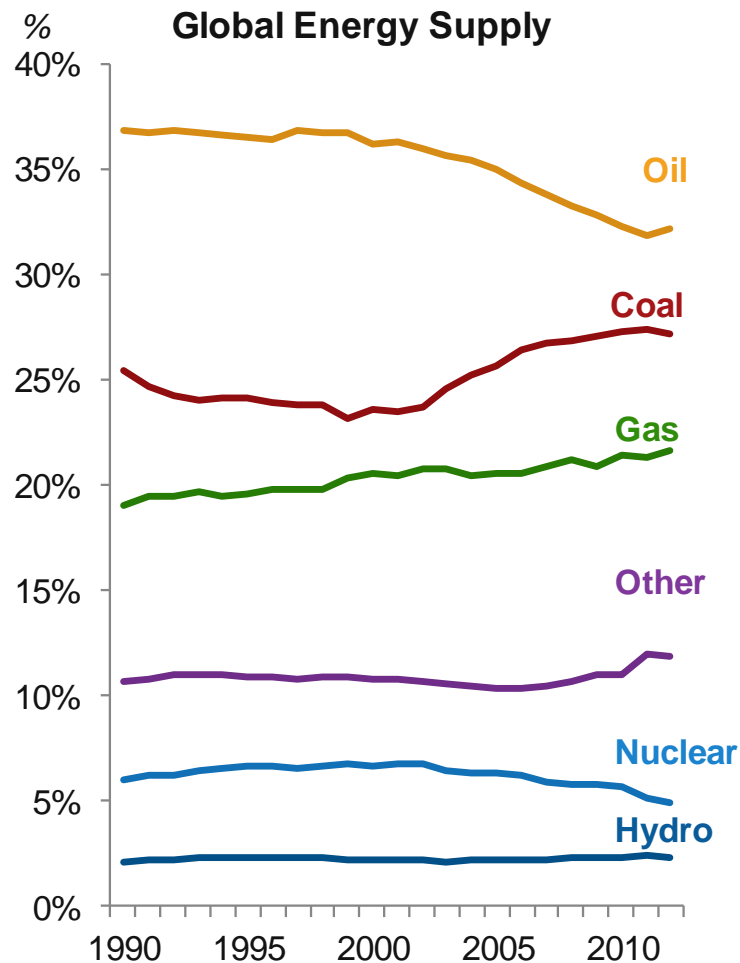
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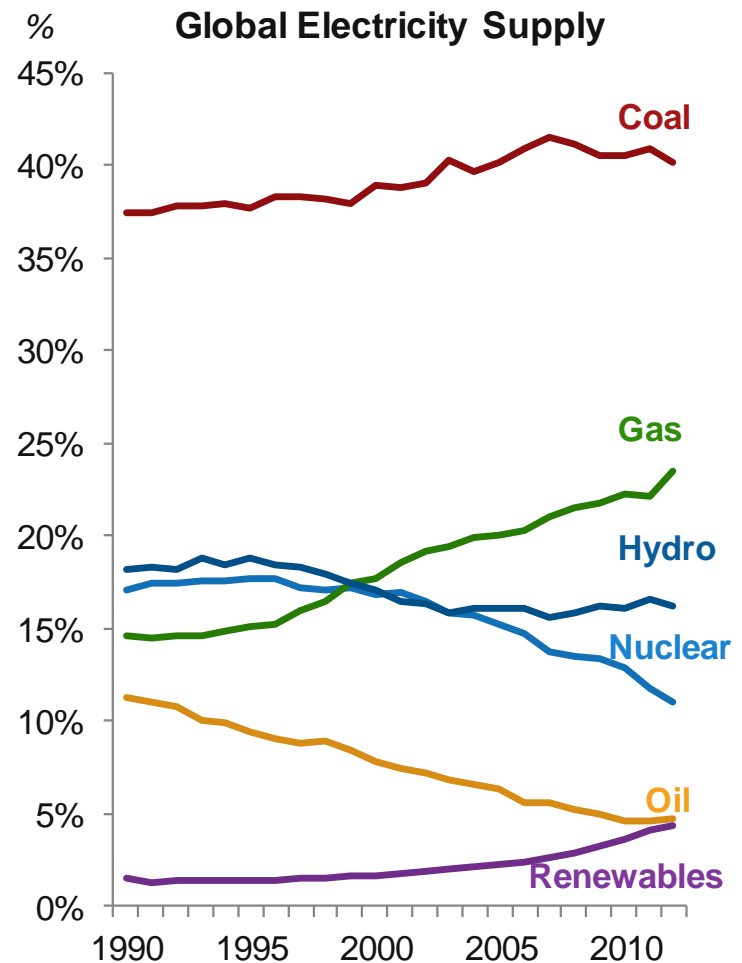
Outlook for Natural Gas Demand

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Gas Importance Increasing



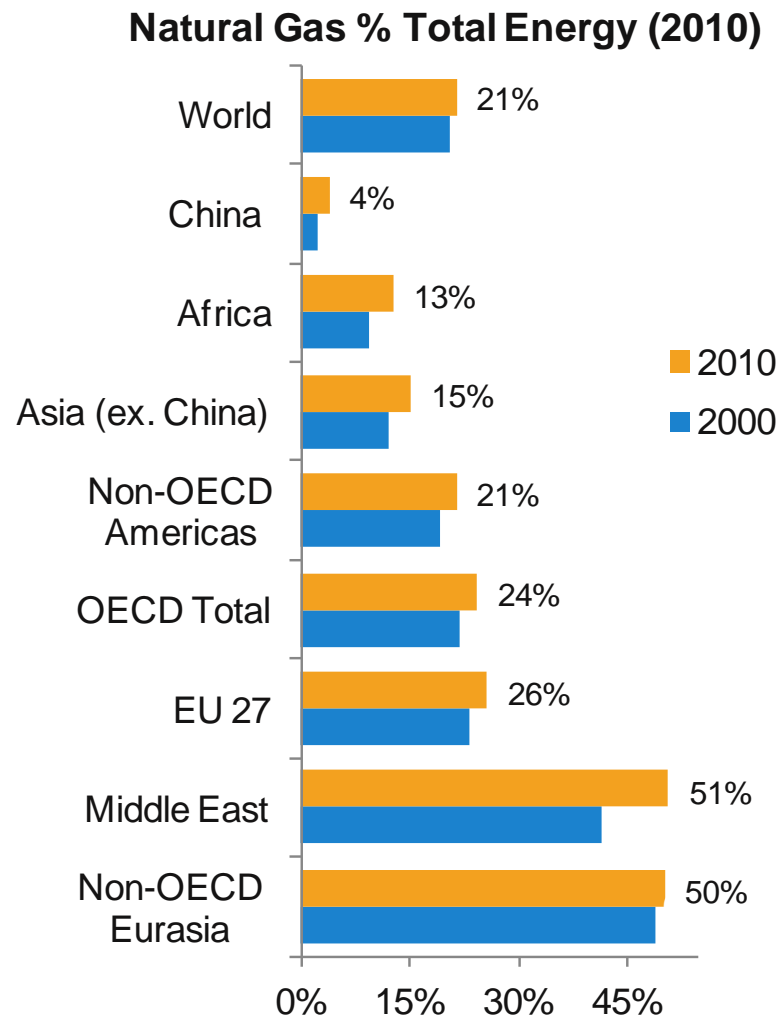
Gas share has risen from 19 to 22%



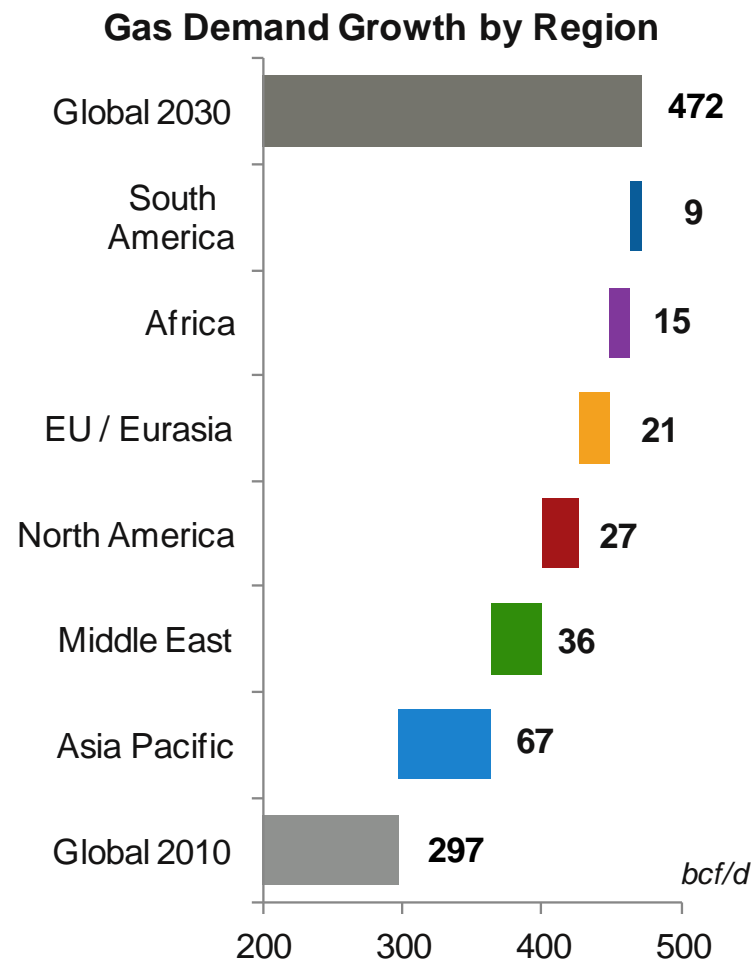
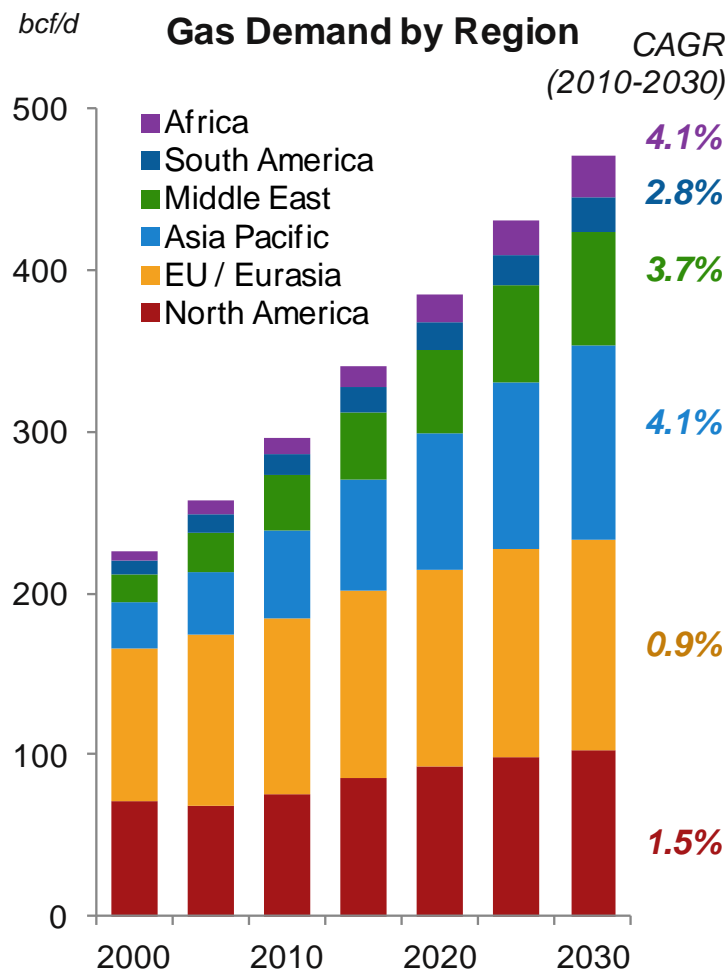
Gas share has risen from 15 to 24%

But Large Variation in Regional Gas Use

- Eurasia (Russia) and Middle East most dependent on gas
- OECD average is 24% versus 21% for world
- Asia and, particularly, China very under-exposed to gas
- If China used gas at the OECD rate – 23.8% – global demand in 2010 would be 17% higher



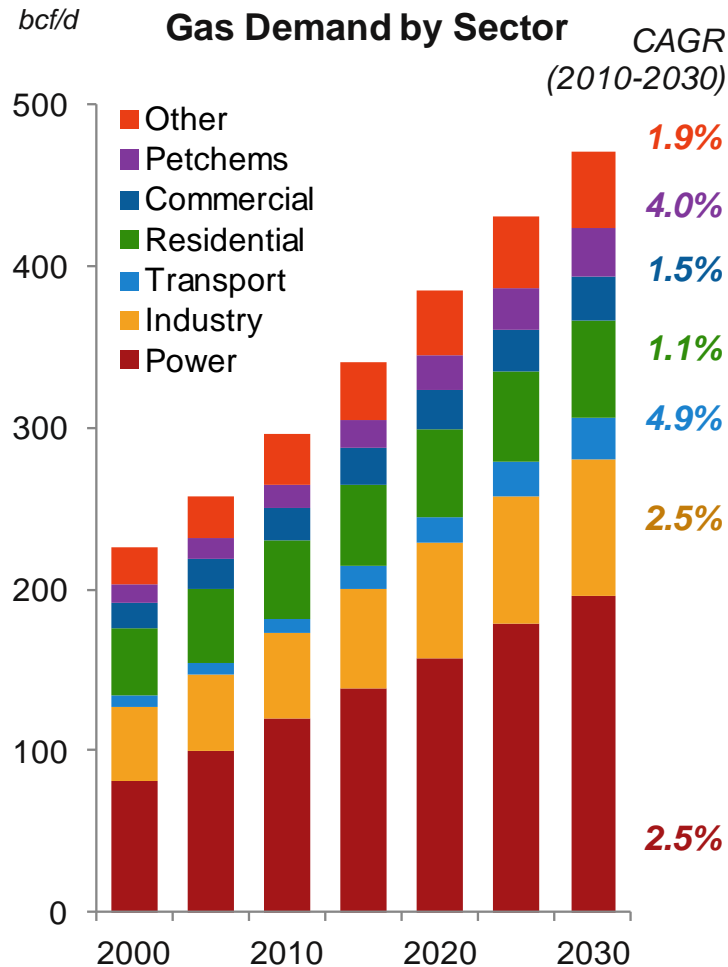
Growth at 2.3% per Year Driven by Asia...



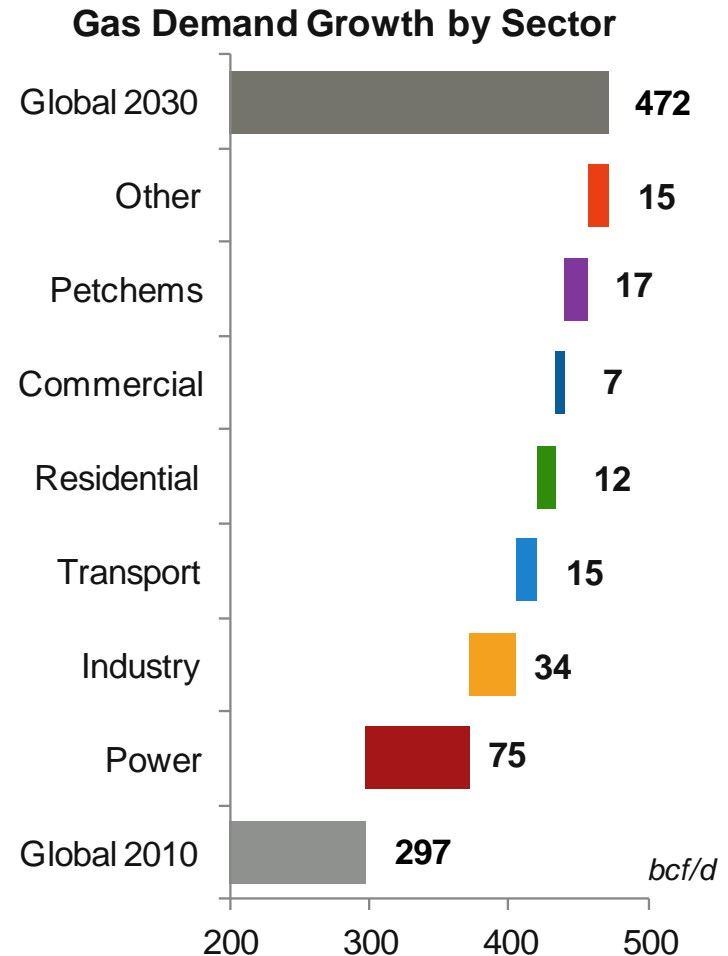
Global demand growth of 2.3% p.a.

+175 bcf/d = ~3X US 2010 demand

... And by Power



Power accounts for 41% of demand



Power makes up 43% of growth

Table of Contents

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Large Infrastructure Investments Shape Business



Upstream



Liquefaction



Shipping

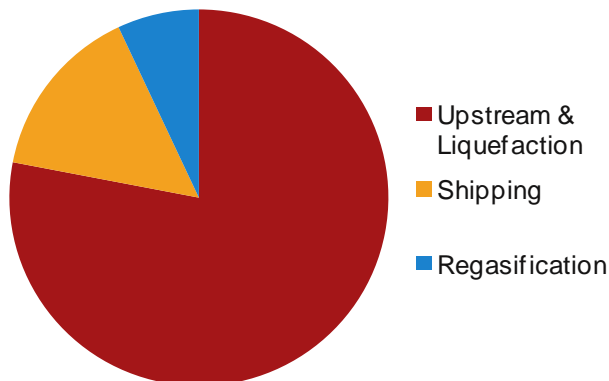


Regasification



Residential
Commercial
Industry
Power

LNG Value Chain: \$10-25 bn



Traditional model

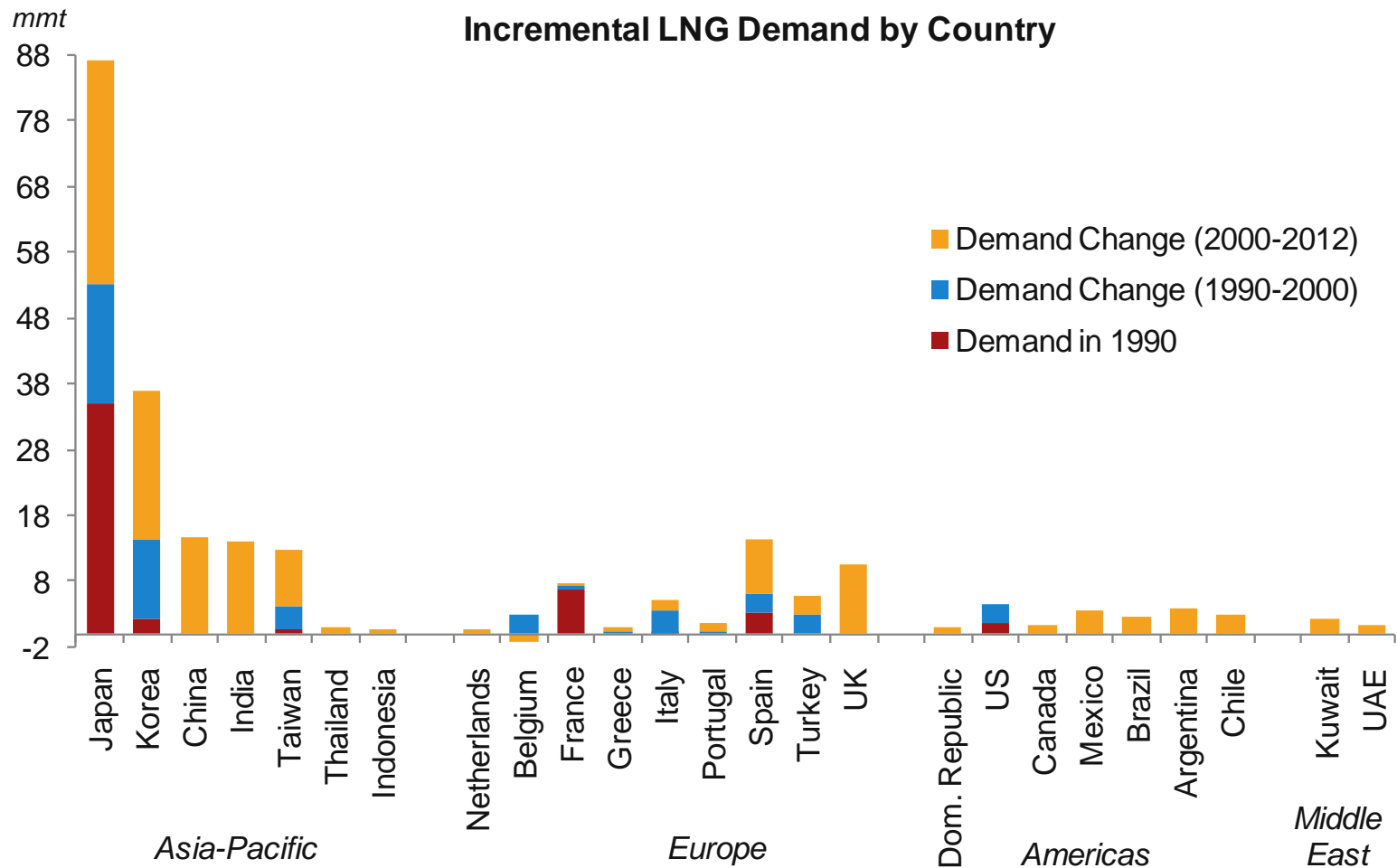
JVs between buyers, sellers, IOCs
Long-term contracts indexed to oil / products
Buyer bears volume risk, seller price risk



New model

Upstream-downstream connections
Flexibility in contracts to
manage risk and capture upside

Growing Number of Markets

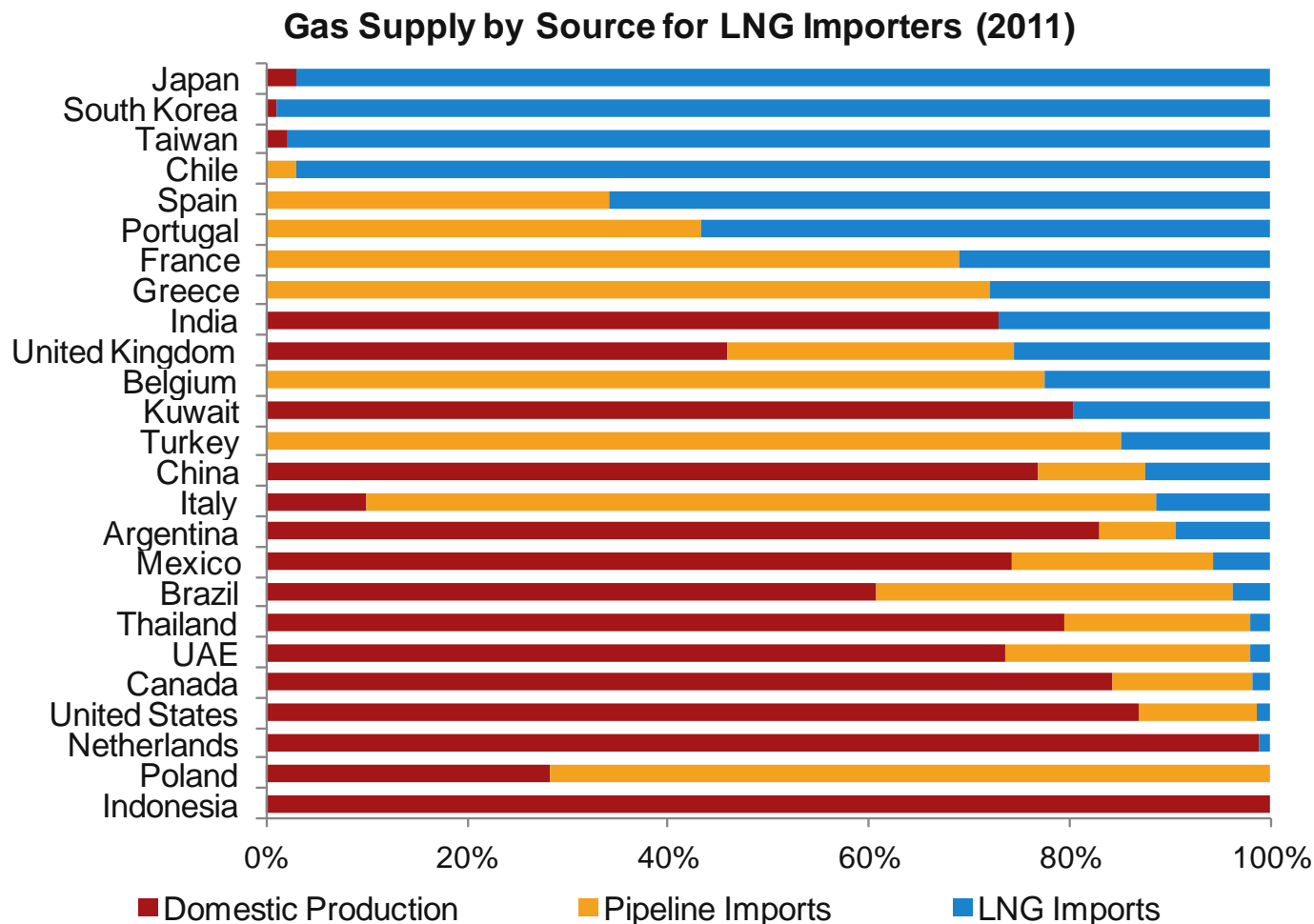


Post-2000 importers account for 25% of demand

Why Import LNG?

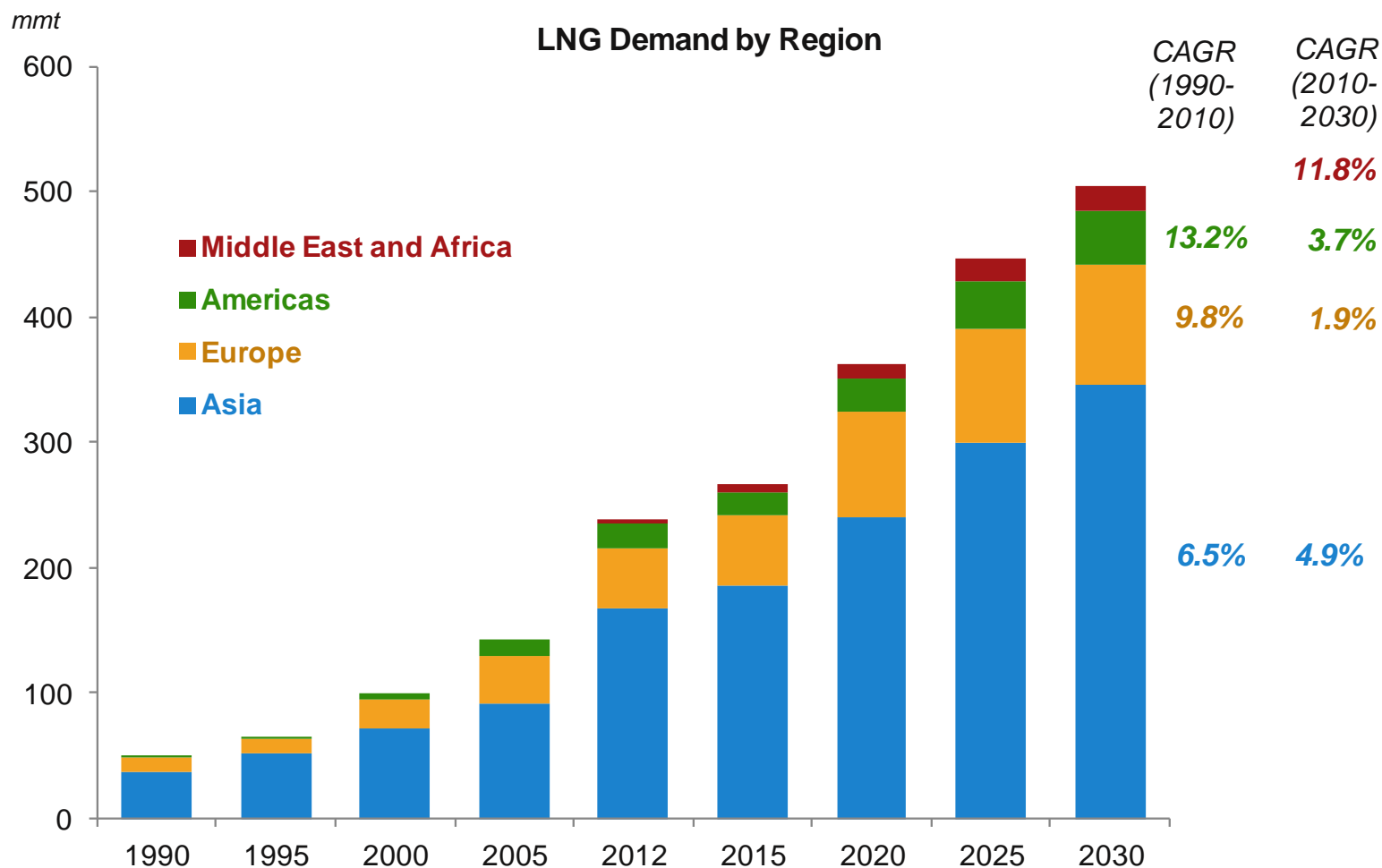
	Japan Korea Taiwan	India	China	Thailand, Vietnam, Bangladesh, & Pakistan	Indonesia & Malaysia	Europe	Brazil & Argentina	Middle East: UAE Kuwait	US & Canada
Power generation	X	X	X	X	X	X	X	X	
Oil substitution	X							X	
Diversify energy mix			X	X	X	X		X	
Production issues		X	X	X		X			
Flexibility/ seasonality	X						X	X	X
Diversify gas supply		X	X						
Lack of reserves	X								
Remoteness	X				X				X
Energy security	X			X	X	X	X	X	
Carbon Targets	X					X			

LNG Dependence Varies Significantly



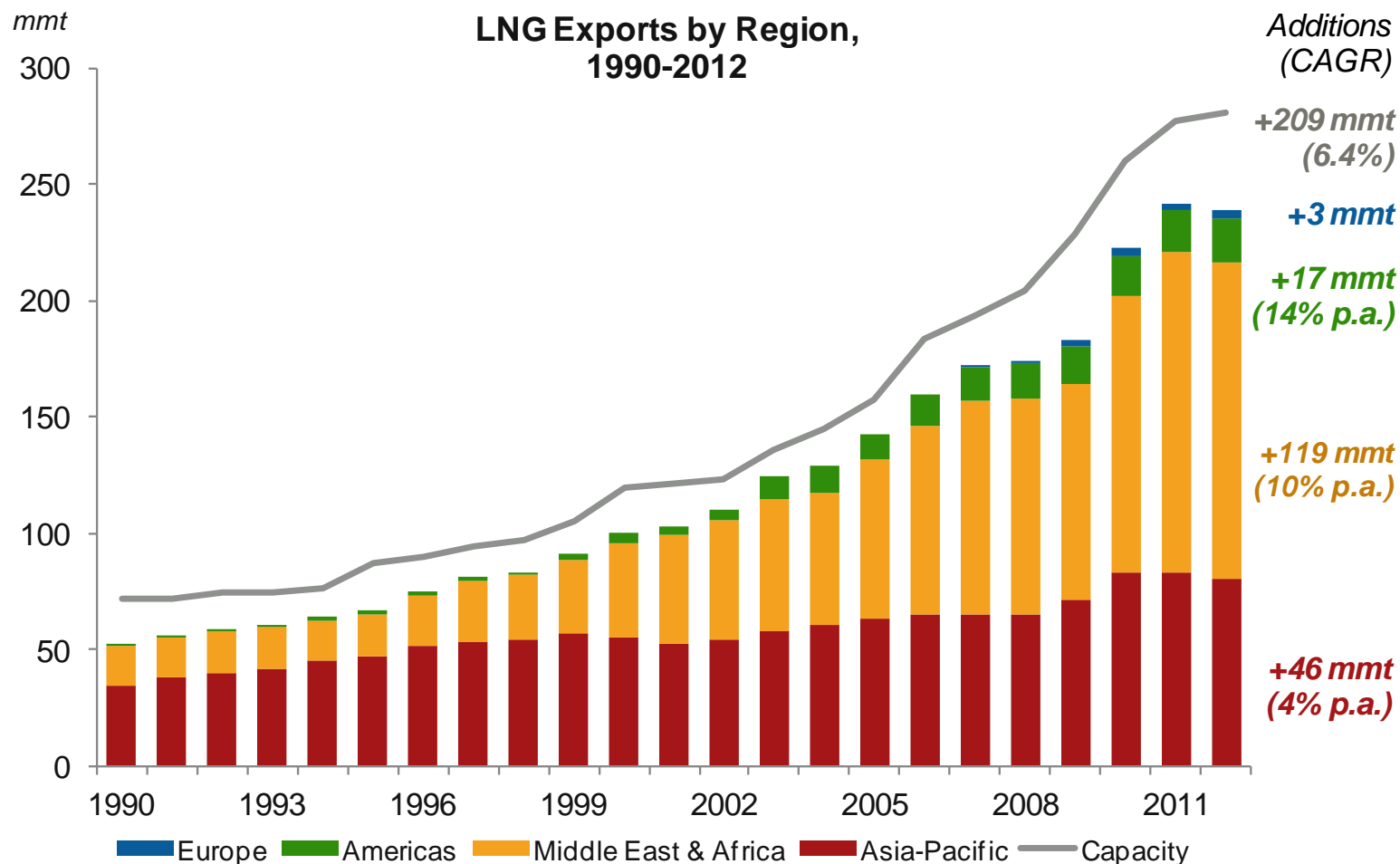
Reliance on LNG imports ranges from 99% (South Korea) to 1% (Netherlands)

Asia Drives Demand



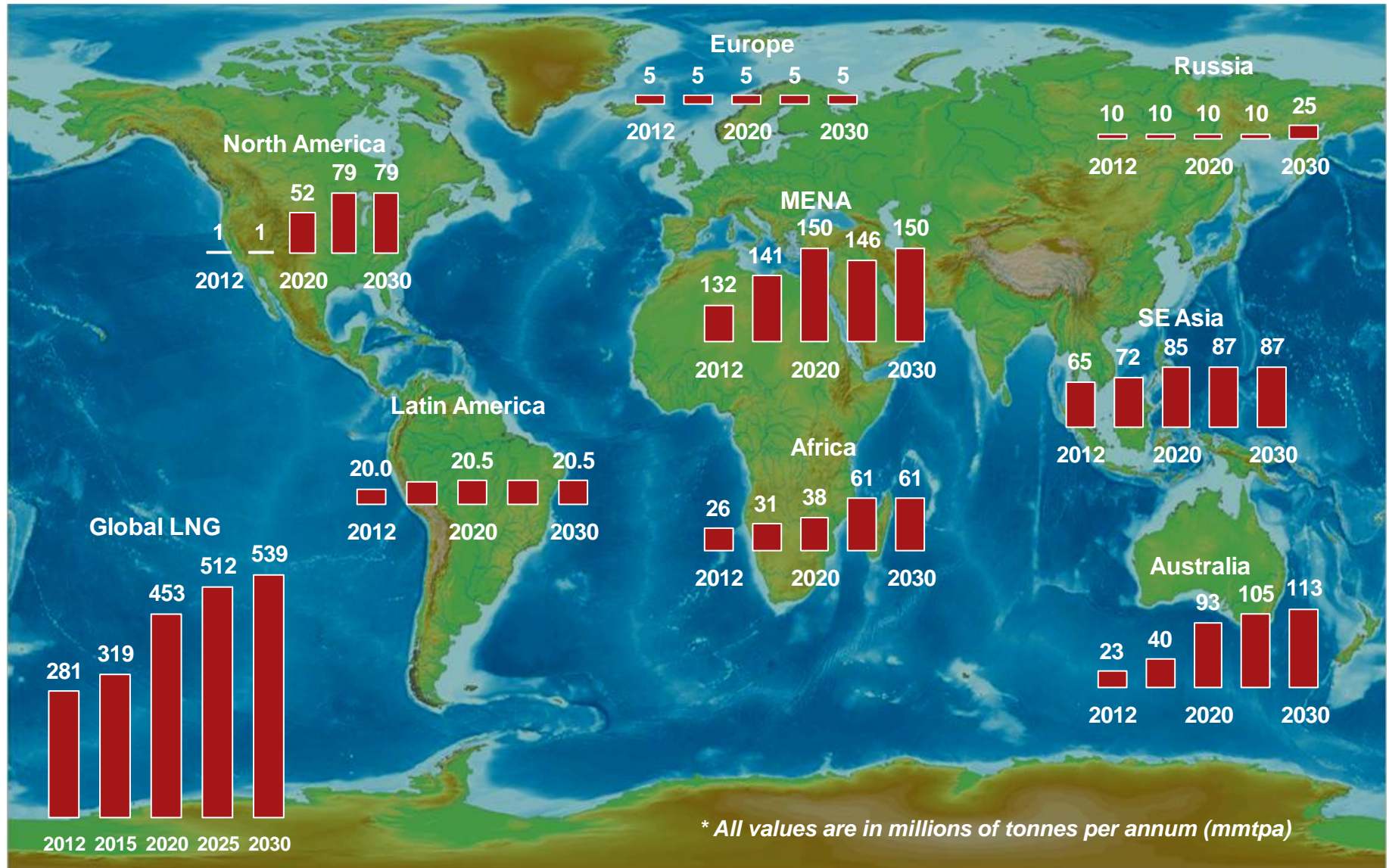
Asia accounted for 2/3 of growth since 1990 and will make up 2/3 of new demand

Middle East Most Important Supplier

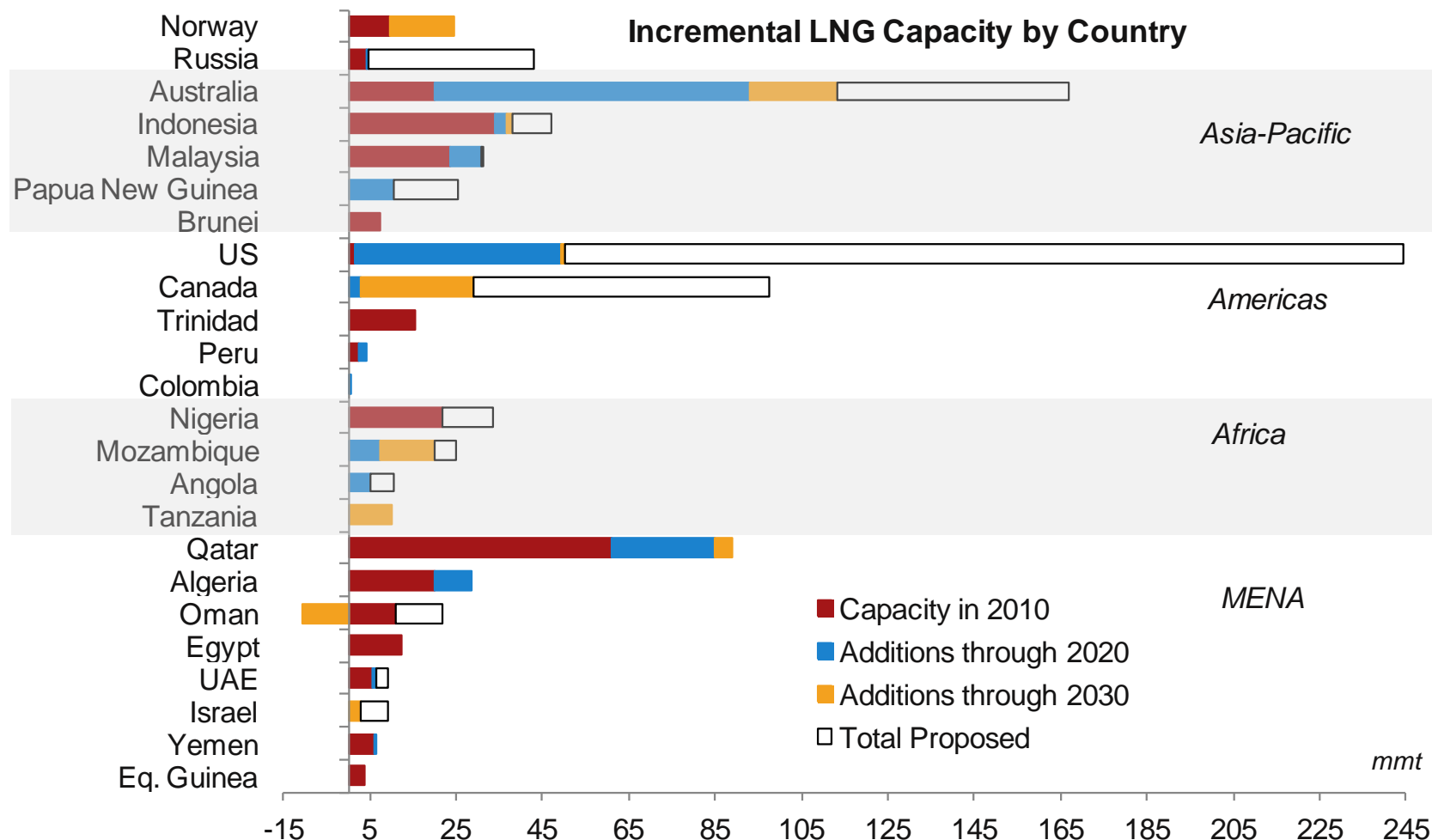


Over half of new supply since 1990 has come from the Middle East

Lots of Supply Competition

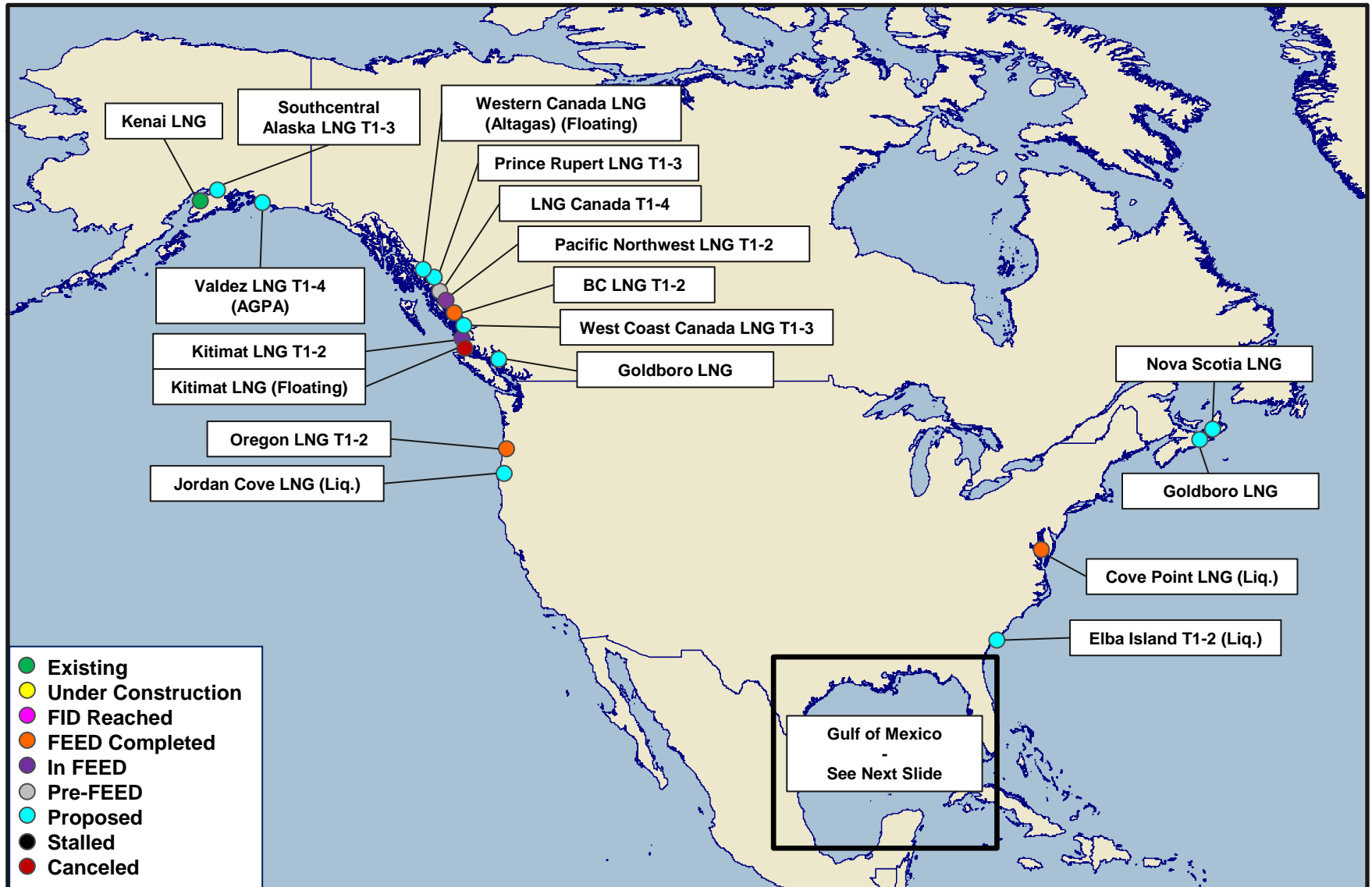


Not All Proposals Move Forward

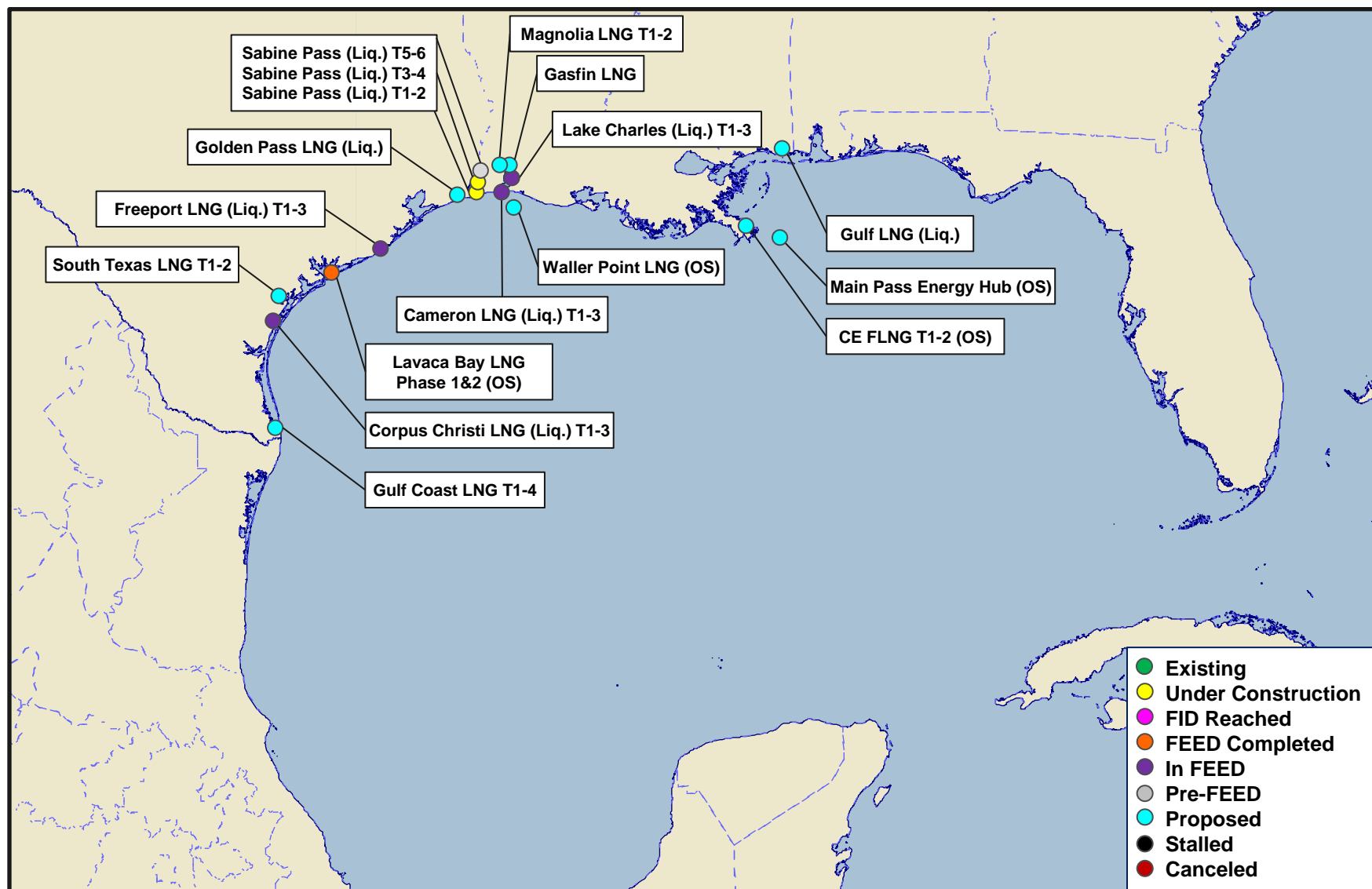


Of total proposed capacity (~950 mmt), ~56% expected online by 2030

North America LNG Projects



Gulf of Mexico LNG Projects



Companies Rushing to Sign Up for US L48-Based LNG

Contracts for Volumes or Capacity from US Lower 48 Projects

Project	Buyer	Contract Status	Volume (mmtpa)	Original Signing
Sabine Pass LNG	BG Group	SPA	5.5	Oct. 2011
	Gas Natural Fenosa	SPA	3.5	Nov. 2011
	GAIL	SPA	3.5	Dec. 2011
	KOGAS	SPA	3.5	Jan. 2012
	TOTAL	SPA	2	Dec. 2012
	Centrica	SPA	1.75	Mar. 2013
Cameron LNG	Mitsui	Binding tolling agreement (HOA)	4	Apr. 2012
	Mitsubishi	Binding tolling agreement (HOA)	4	Apr. 2012
	GDF SUEZ	Binding tolling agreement (HOA)	4	May 2012
Freeport LNG	Chubu Electric	Binding tolling agreement (HOA)	2.2	Jul. 2012
	Osaka Gas	Binding tolling agreement (HOA)	2.2	Jul. 2012
	BP	Binding tolling agreement (HOA)	4.4	Feb. 2013
Cove Point LNG	Sumitomo	Terminal service agreement (HOA)	2.3	Apr. 2013
	GAIL	Terminal service agreement (HOA)	2.6	Apr. 2013
Elba Island LNG	Shell	HOA	2.5	Jan. 2013
Main Pass Energy Hub	Petronet LNG	HOA	4	Apr. 2013
Magnolia LNG	Gunvor	Term Sheet for Tolling Agreement	2	Jul. 2013

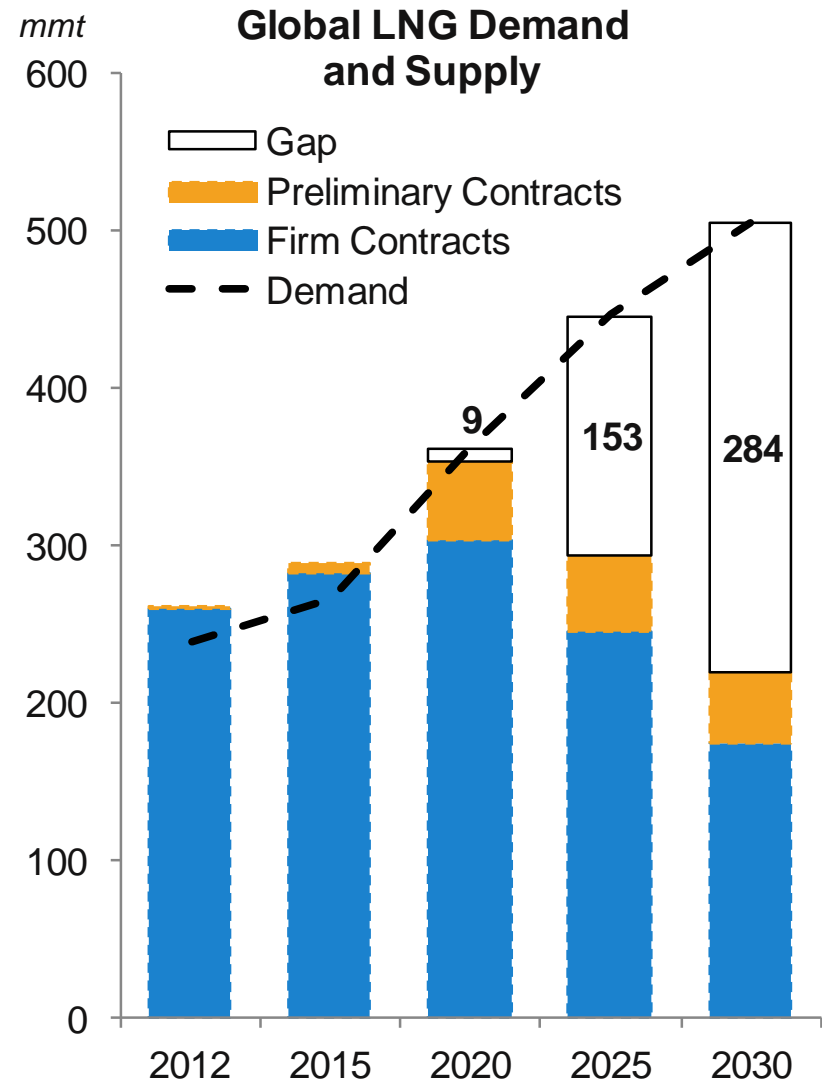
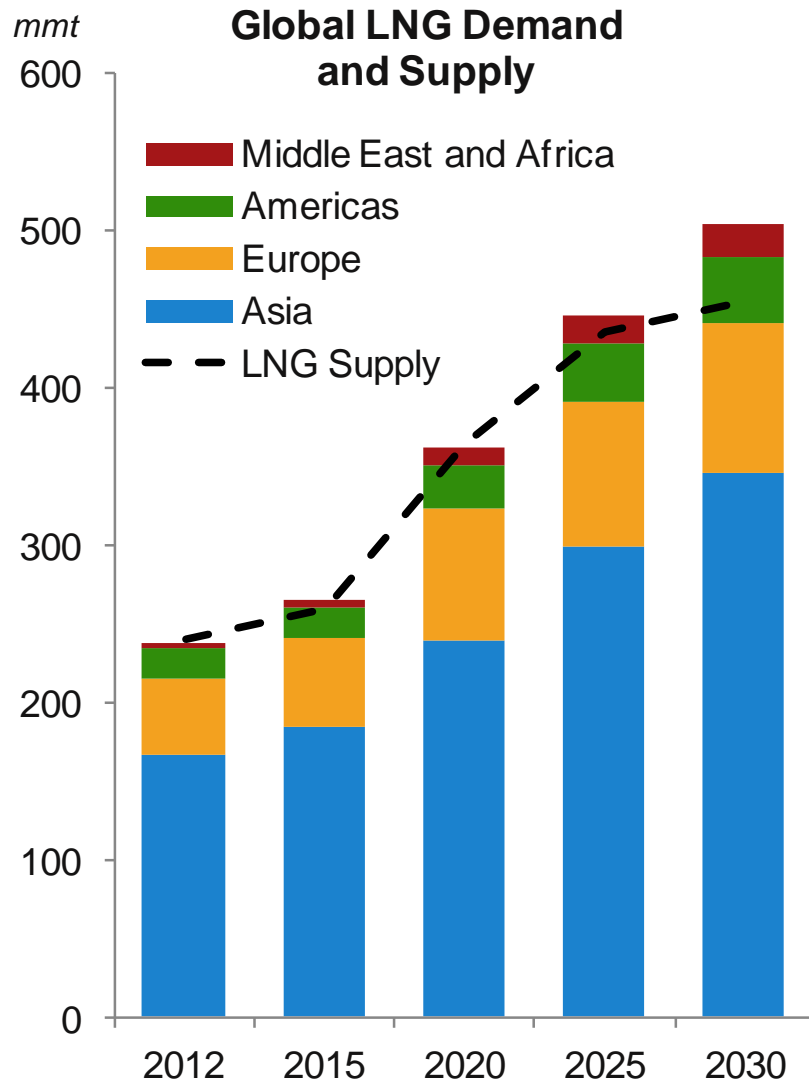
Recontracted Volumes from US Lower 48 Projects

Project	Seller	Buyer	Contract Status	Volume (mmtpa)	Original Signing
Cameron LNG	Mitsubishi	TEPCO	HOA	0.4	Feb. 2013
	Mitsui	TEPCO	HOA	0.4	Feb. 2013
Sabine Pass LNG	KOGAS	TOTAL	SPA	0.7	Sep. 2012
Cove Point LNG	Sumitomo	Tokyo Gas	HOA	1.4	Apr. 2013
		Kansai Electric	HOA	0.8	Apr. 2013

Each Region Faces Unique Risks

Country	Major Risks
United States	FERC & DOE Approvals First-mover advantages Gas pricing
Canada	Gas reserves Infrastructure challenges Project costs and gas pricing
Australia	Rising EPC costs LNG buyers' desire for supply diversification Coal bed methane production
E. Africa	Unitization of gas resources & ownership structure Government Capacity
Russia	License to export / export monopoly Cost / Project economics / Finance
Nigeria	Petroleum Industry Bill (PIB) Security risk
Papua New Guinea	Infrastructure challenges Government capacity
Alaska	?

Balanced Market—But Contracts Needed to Close Gap



Implications for Alaska LNG Prospects

- Large opportunity to meet rising gas demand
 - Growth from economics, population
 - Growth from fuel switching
 - LNG trade increasing
- Alaska well-positioned geographically
- Alaska faces different set of risks than other regions
- How can Alaska move to the head of the queue?