



Global Energy Security – A “North American” Perspective

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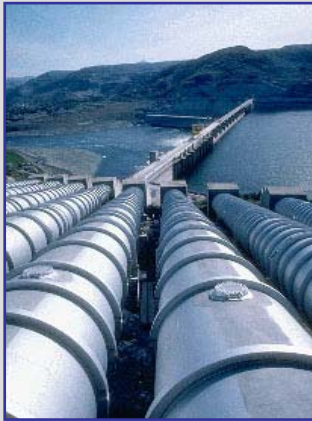


Introduction – Taylor-DeJongh

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Taylor-DeJongh – Industry Focus

Core Expertise



- Oil & Gas
- LNG
- GTL
- Petrochemicals and Refineries



- Pipelines
- Power Generation
- Metals & Mining

Other Sectors



- Telecommunications
- Water & Wastewater
- Industrial / Infrastructure
- Offset Programs

Competitive Position: League Tables for Financial Advisory

ij 2005 LEAGUE TABLES FINANCIAL ADVISERS

Global by Value (Mandates Won):

Rank	Bank	US\$MM
1	Ernst & Young	32,894
2	Taylor-DeJongh	30,415
3	Lazard	16,106
4	Calyon	11,650
5	Dexia Group	10,630

Global by Number (Mandates Won):

Rank	Bank	Number
1	KPMG	33
2	Taylor-DeJongh	31
3	Ernst & Young	26
3	Dexia Group	22
4	BNP Paribas	10

North America by Value

Rank	Bank	US\$MM
1	Taylor-DeJongh	3,840
2	Citigroup	820
3	BNP Paribas	500

Africa and Middle East by Value

Rank	Bank	US\$MM
1	Taylor-DeJongh	17,470
2	Ernst & Young	16,000
3	Citigroup	6,000
4	BNP Paribas	3,000

Latin America by Value

Rank	Bank	US\$MM
1	Taylor-DeJongh	4,305
2	BNP Paribas	2,455
3	Dexia Group	1,240

Source: *Infrastructure Journal* 2005 Full Year League Tables

Competitive Position: League Tables for Financial Advisory

ij 2005 LEAGUE TABLES
FINANCIAL ADVISERS

MANDATES WON BY INDUSTRY SECTOR:

Oil & Gas by Value (Mandates Won):		
Rank	Bank	US\$MM
1	Ernst & Young	16,250
2	Taylor-DeJongh	13,165
3	Citigroup	6,620
4	BNP Paribas	4,845

Oil & Gas by Number (Mandates Won):		
Rank	Bank	Number
1	Taylor-DeJongh	13
2	BNP Paribas	3
2	Ernst & Young	3
3	Citigroup	2

Power by Value (Mandates Won):		
Rank	Bank	US\$MM
1	Taylor-DeJongh	3,450
2	KPMG	2,780
3	BNL	1,200
4	Citigroup	1,000

Mining by Value (Mandates Won):		
Rank	Bank	US\$MM
1	Taylor-DeJongh	6,000

Petrochem by Value (Mandates Won):		
Rank	Bank	US\$MM
1	Taylor-DeJongh	3,500
2	BNP Paribas	260

Telecoms by Value (Mandates Won):		
Rank	Bank	US\$MM
1	Taylor-DeJongh	300

Source: Infrastructure Journal 2005 Full Year League Tables



Thesis

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Thesis

- Energy “independence” is not a realistic goal.
 - Energy markets are global and integrated.
- Global supply is sufficient to meet demand.
- The best way to manage supply risk and increase energy security is through **investment in technology and infrastructure**.
 - Ensure available resources are fully exploited.
 - Diversify sources and types of supply.
 - Create flexibility in transportation and delivery infrastructure.
- Governments can create the framework to enable the private sector to invest capital and technical expertise.



Risks and Risk Mitigation

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Energy Security Defined

Security of energy supply rests on the following 4 pillars:

- Availability;
- Reliability;
- Deliverability; and
- Affordability.



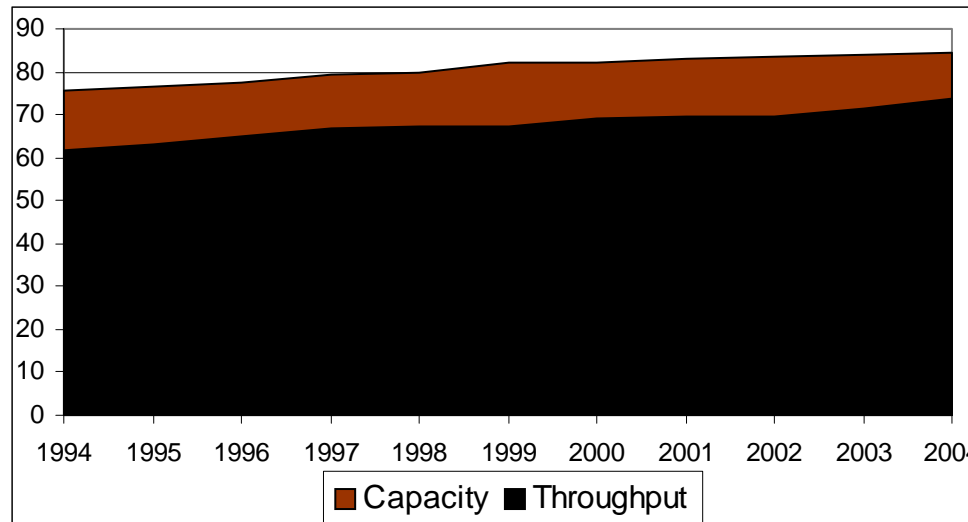
Availability

Availability – Oil

- BP Statistical Review 2005 puts global reserve-to-production ratio for oil at 40.5 years.
- Available reserves can be increased with appropriate investment in exploration & production projects.
 - Technically challenging (deepwater, arctic conditions).
 - Unconventional sources (Canada, Venezuela).
- Goal should be not only to increase supply but also to expand sources of supply.

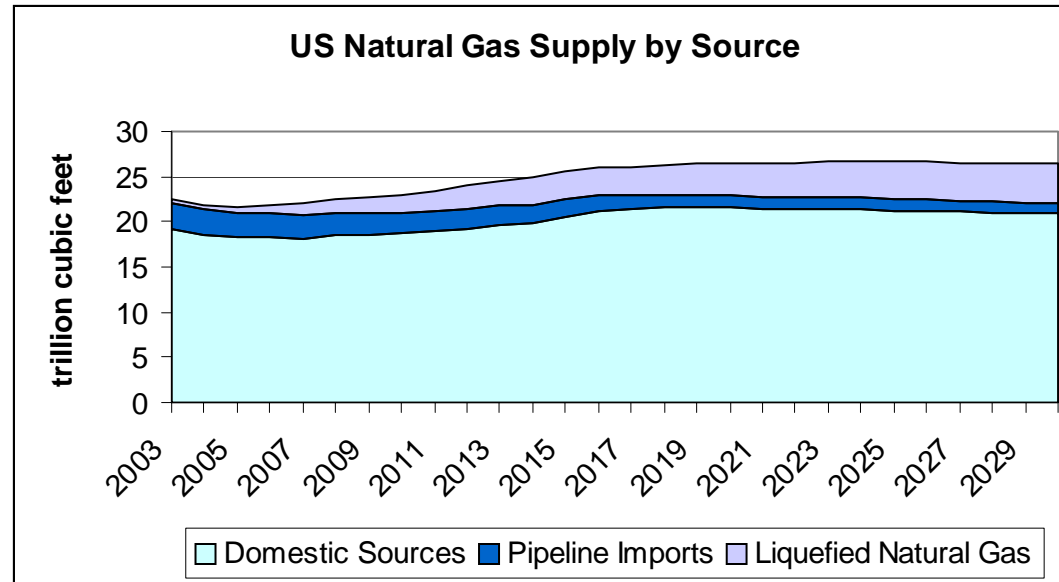
Availability – Refining Capacity

Global Refinery Capacity and Throughputs, 1994-2004. (Million bbl/d)



- IEA estimates global refinery rates will be over 86% by 2010.
- U.S. refining capacity usage reached 93% in 2004 and was approximately 90% in 2005.
- Increasingly stringent environmental standards for refined products and tougher permitting requirements for new refineries make it more difficult for refining capacity to meet demand.

Availability – Natural Gas

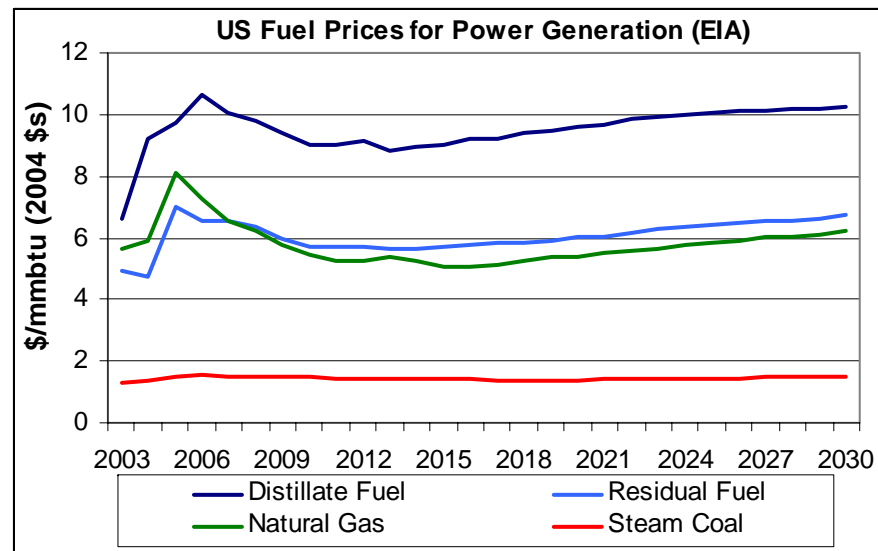


Source: EIA Annual Energy Outlook 2006

- BP Statistical Review 2005 puts global reserve-to-production ratio for natural gas at over 65 years.
- Traditional domestic sources of production are unable to keep up with demand. Need for investment in alternative sources of supply:
 - Liquefied Natural Gas, to tap stranded gas.
 - Unconventional Sources (Coalbed methane).

Availability – Coal

- BP Statistical Review 2005 places North America's reserve-to-production ratio for coal at over 235 years, global levels at 164 years.



- Availability and affordability make coal an attractive option; however, need to focus on clean coal technology.

Availability – Nuclear Energy

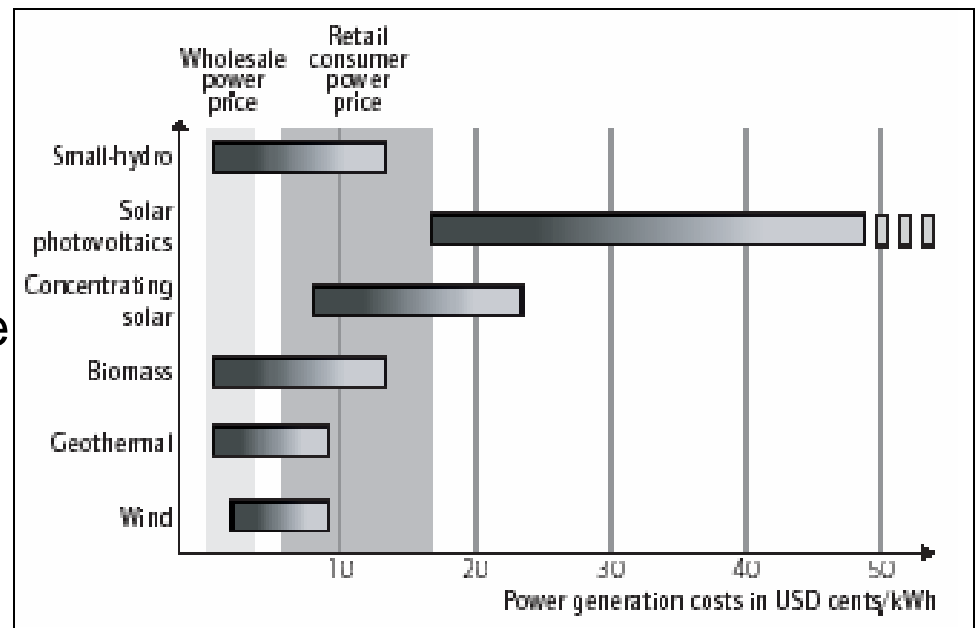
- IAEA estimates economically exploitable sources of uranium will last 50 years at today's current usage rate.

	'000 Tonnes	% of Global Supply
Australia	1,074	30%
Kazakhstan	622	17%
Canada	439	12%
South Africa	298	8%
Namibia	213	6%
Russian Federation	158	4%
Brazil	143	4%
US	102	3%
Uzbekistan	93	3%

- Nuclear energy has a number of other issues as well:
 - High capital costs.
 - Safety.
 - Disposal of nuclear waste.
 - Prevention of proliferation.

Availability – Renewable Energy

- Availability is dependent on environmental factors.
- Unique cost structure.
 - High upfront capital costs.
 - No fuel costs (except biomass).
- Renewable power needs to be covered by redundant conventional generation.
- Becoming more cost competitive, but still needs strong government support.



Source: IEA



Reliability

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Reliability

- Because energy projects are capital-intensive and long-term, investors require a stable and favorable political, social and fiscal environment.
- Political risks in some traditional supplier countries and transportation and infrastructure bottlenecks are hindering new capacity development in many places.
- Consuming and energy exporting countries are interdependent in the creation of a more reliable, flexible energy supply.

Reliability – Political Risks

Europe & North Africa

- Recent conflict between Russia and Ukraine over natural gas has motivated Europe to look harder at diversifying its sources of supply.
 - This can lead to increased competition with North American countries.
 - Spain, for example, is securing LNG cargos by paying a premium to the Henry Hub market price.
- Increasingly favorable U.S.-Libya relations may serve to reinforce competition between Europe and the United States.

Iran

- Iran, OPEC's 2nd largest producer, has roiled oil markets recently with threats to cut its oil supplies.

Iraq

- Continued civil unrest has resulted in production declines and little investment in needed infrastructure.

Reliability – Political Risks

Latin America

- Latin America is a traditional supplier to the U.S.
 - Mexico is the 2nd largest source of oil imports after Canada, and Venezuela is 4th.
 - Anti-American rhetoric, strengthening ties between Venezuela and Iran and growing Chinese interest in the region could contribute to competition to U.S. oil supply.
 - NOCs in Mexico and Venezuela also are plagued by underinvestment.

Sub-Saharan Africa

- Africa is an important supplier of oil, coal and LNG to Europe and the U.S.
 - Major African producers are plagued by political and economic instability and corruption.

Reliability – Concentration of Oil Supply

- Political risk is exacerbated by the increasing concentration of oil reserves in limited numbers of next exporters.
- Non-OPEC production, despite recent successes, will be overtaken in the next 2 decades by OPEC producers who will have increasing influence over the world oil market and the price of oil.
 - OPEC's market share will increase from less than 40% in 2004 to over 50% by 2030.
 - Non-OPEC production will peak between 2010-2020 and OPEC producers will capitalize on much larger reserves and lower-cost production.

Reliability – Concentration of Oil Supply

Top Non-OPEC Oil Producers, 2004 (million bbl/d)

Country	Total Oil Production
Russia	9.27
United States	8.69
Mexico	3.83
China	3.62
Norway	3.18
Canada	3.14
United Kingdom	2.08

Source: EIA

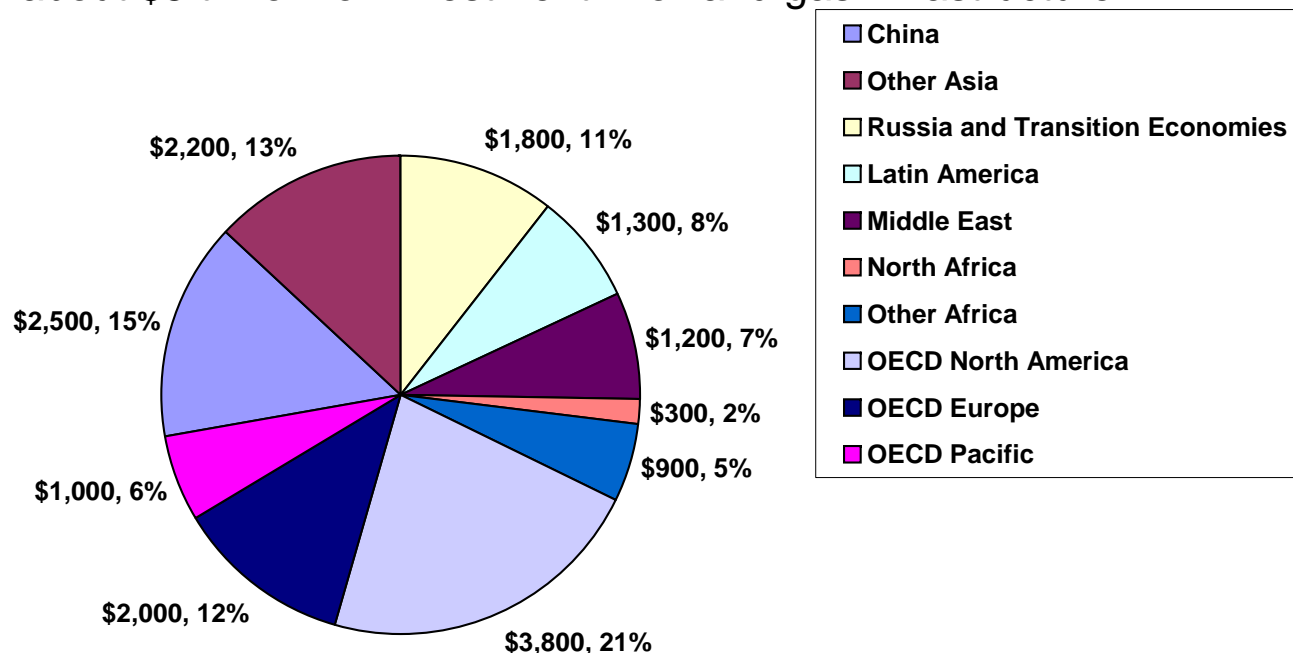
- The majority of these producing countries are net oil importers.
- Russia, Norway and Mexico are the world's largest non-OPEC net oil exporters.
 - Of these three, only Russia's production is increasing.

Reliability: Force Majeure

- Security of supply also can be impacted by force majeure, triggered by natural disasters, war or terrorism.
- Hurricanes Katrina and Rita are a recent demonstration of the devastating impact natural disasters can have on oil production and refining capacity.
 - Katrina demolished 46 platforms and damaged 20 others.
 - 100% of Gulf oil was shut-in during both storms; 94% of gas production was shut-in during Katrina.
 - In the aftermath of Katrina, gasoline prices in the U.S. jumped by 17%.
- Terrorist acts aimed at pipelines or production facilities have plagued countries such as Iraq, Nigeria and Colombia, disrupting supply.

Reliability – Infrastructure Bottlenecks

- Massive investment in energy infrastructure will be required over the next few decades to ensure sufficient global supply.
 - The IEA estimates that \$17 trillion (in year 2004 dollars) will be needed from 2004-2030.
 - Nearly half of this figure will be required in developing countries.
 - The majority of supply investments will be allocated to the power sector and about \$3 trillion for investment in oil and gas infrastructure.



Reliability – Infrastructure Bottlenecks

- Few non-OECD governments are capable of funding these projects independently.
- Private sector financing will prove crucial.
 - Raising the necessary capital will prove challenging.
- Governments must establish favorable investment frameworks to attract adequate private sector involvement.



Deliverability

Deliverability

- Significant investments are needed to link buyers to multiple sources of supply and to provide redundancy in transportation infrastructure.
- By increasing supply and deliverability options, options are spread across energy sources and infrastructure.
- New pipeline, LNG infrastructure and natural gas storage capacity construction is needed to diversify supply risks and increase the security of supply.

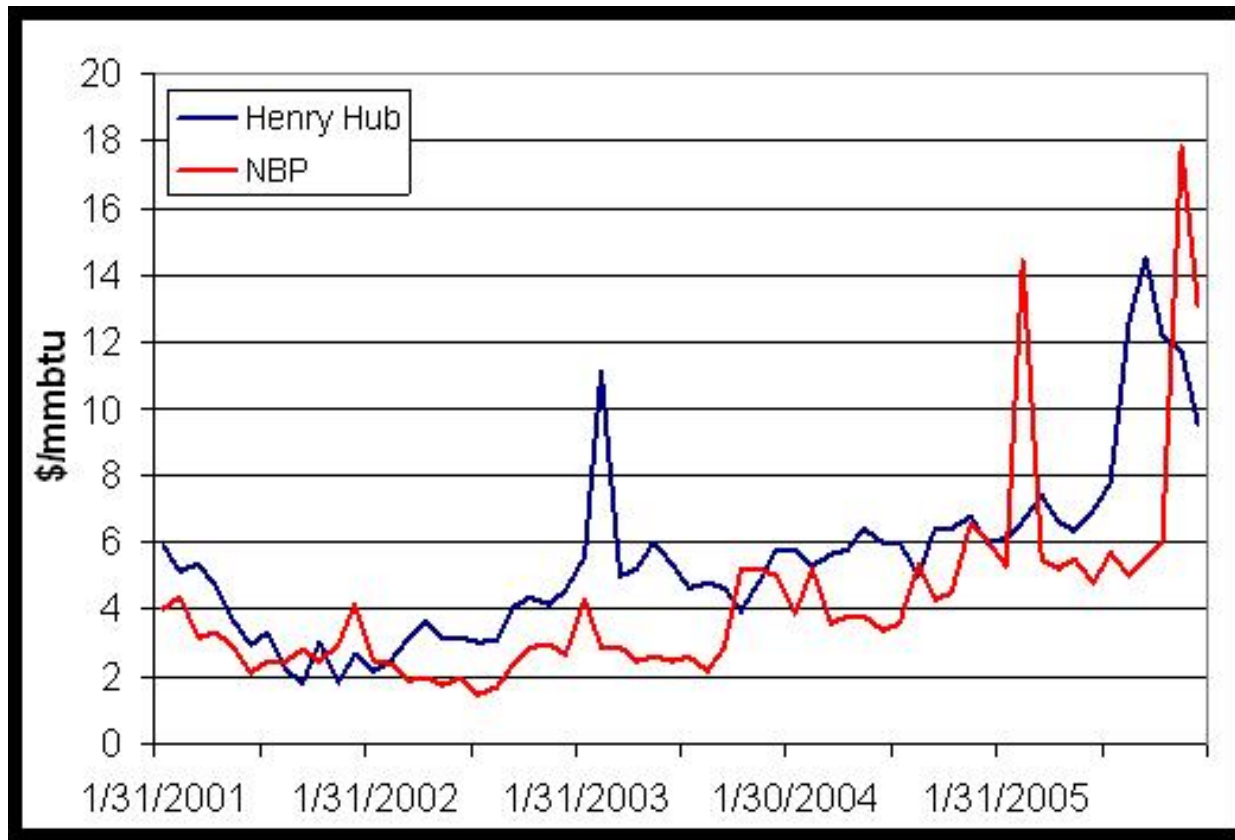
Deliverability – Pipelines

- The EU has actively promoted pipeline construction, while the U.S. has pursued a more laissez-faire approach.
 - Market forces determine which pipelines are built in the U.S.; nonetheless, there is strong redundancy in the system.
- Trans European Energy Networks established to diversify sources of supply and ease congestion by funding gas transportation projects between EU and key suppliers.
- A number of routes have been identified but there remains a need to improve the connection with external suppliers, i.e. North Africa and Russia, and better manage gas flows.

Deliverability – Liquefied Natural Gas

- One of the most exposed areas of energy supply is pipeline imports of natural gas.
 - Buyer is locked into a source of supply and is vulnerable to all risks that might disrupt flow.
- An alternative is liquefied natural gas (LNG).
 - If disruptions occur, cargos can be routed to alternate import locations.
- Despite anticipated growth in the LNG trade, liquefaction capacity remains the greatest constraint of the Atlantic Basin LNG trade.
 - Liquefaction requires billions of dollars of investment.
 - Investments are only committed if price and demand can be guaranteed with a high degree of certainty.
 - More liquefaction capacity will increase flexibility and diversity of energy supply.

Deliverability – Liquefied Natural Gas



Current Henry Hub prices of \$6-\$7/mmbtu, with the U.K.'s NBP prices even higher, provide incentive for investment in LNG production capacity.

Deliverability – Regasification

- The U.S. has 5 operating import terminals with combined capacity of 25 mtpa in the Atlantic Basin.
- U.S. policymakers have encouraged construction of new LNG import terminals by allowing terminals to operate on “closed access” basis and consolidating permitting authority within one regulatory body: FERC.
- Local opposition, however, has resulted in clustering of terminals in Gulf of Mexico.
 - As demonstrated by hurricanes Katrina and Rita, a country dependent on a particular region is more susceptible to supply stoppages.
 - The risk of disruption of pipeline takeaway capacity is also magnified.

Deliverability – Storage Capacity

- Natural gas storage can provide a buffer against unexpected short-term supply shocks.
 - Underground storage, in particular, is less vulnerable to natural disasters and intentional sabotage.
 - Storage can also provide regional price stability as LNG grows in importance.
- Governments can ensure necessary storage capacity by providing an appropriate regulatory framework.
 - Open access vs. closed access; same issues as for receiving terminals.

Deliverability – Storage Capacity

- Market-based versus cost-based pricing also will have a major impact on new storage development.
- U.S. regulators will allow market-based pricing if a storage facility can demonstrate that it does not have market power; yet areas that need new capacity often have no existing facilities.
- New investments are thus subject to cost-based tariffs, which may discourage investment.
- The U.S. Energy Policy Act of 2005 addresses this by allowing regulator to authorize market-based rates even if market power may be an issue.



Government Role

Government Role

- Security of supply can be enhanced by diversifying both the fuel mix and sources of supply.
- Both will require substantial investments.
- Producer governments do not need to provide capital themselves but can achieve objectives by ensuring social stability and creating a favorable investment framework.
- U.S. and other consumer governments should focus on transportation infrastructure.

Government Role – Energy Exporting Countries

- ***Ensuring domestic social stability by utilizing revenues for social, health and education investments.***
 - Setting up an oil fund is one method of balancing short-term income with longer term social investment.
- ***Ensuring adequate investments in E&P.***
 - NOCs and IOCs should retain adequate revenues to finance new investments in production capacity.
 - In Mexico, for example, the effective taxation rate on Pemex frequently equals or exceeds 100%.
- ***Improving the recovery of oil and gas reserves.***
 - Governments with international organizations can sponsor R&D initiatives to increase availability of resources previously considered unrecoverable.

Government Role – Energy Exporting Countries

- ***Providing favorable investment framework.*** Should include:
 - Laws that protect investors against nationalizations or expropriations and guarantee equal rights for foreign and domestic investors.
 - Reasonable tax regime.
 - Stable currency.
 - Development of local capital markets.
 - Transparent permitting procedures and energy regulation.
 - Transparent judiciary system.
- Qatar, for example, has attracted over \$40 billion of foreign investment in the energy sector over the past 5 years by eliminating restrictions on FDI and offering fiscal incentives.
 - Qatar is poised to become the world's largest LNG producer after 2010.

Government Role – Consumer Governments

- Energy importing countries must provide a favorable environment for private sector investment in vital infrastructure and technologies:
 - **Pipelines.** Be it U.S. laissez-faire approach or EU's more interventionist policies.
 - **LNG Import Terminals.** Need for redundancy. U.S. closed access model versus Spain's more highly regulated model: return based on 75% load factor and long-term contracted capacity limited to 75%.
 - **Refining Capacity.** Streamline permitting process to reduce development period of refinery investments.
 - **Developing Clean Coal Technology.** U.S. provides financial incentives to gasification projects.
 - **Promoting Nuclear and Renewable Sources.** Governments can provide direct subsidies, tax credits and/or fixed offtake prices.



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