KUALA LUMPUR 2012 WORLD GAS CONFERENCE

25th world gas conference
"Gas: Sustaining Future Global Growth"

Corporate Gas Business Strategy

Summary of Case Studies

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Saudi Aramco

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25th World Gas Conference

Kuala Lumpur

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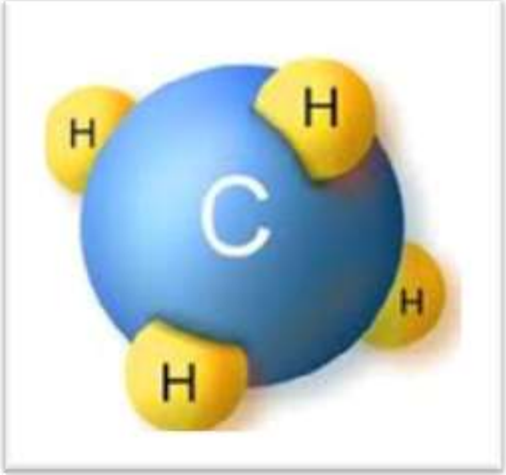
IGU International Gas Union / Union Internationale du Gaz	Malaysian Gas Association	PETRONAS

Study Group received and analyzed 14 Case Studies



Europe	7
Australasia	4
North America	1
South America	2

Company	Country
Alliander NV	The Netherlands
Argentina (National Case)	Argentina
Australia (National Case)	Australia
CNPC	China
Comgas	Brazil
Enagas	Spain
ENI	Italy
GAIL	India
GDF Suez	France
Gasunie	The Netherlands
Gazprom	Russia
Petronas	Malaysia
Statoil	Norway
USA (National case)	USA

Key Findings:

Regulation impacts corporate strategy as much as market

- Corporate strategy focused on
  - Developing and capturing new market opportunities to deliver value to customers and stakeholders
  - Mitigating regulatory risks
  - Anticipating, adapting to regulation
  - Finding new opportunities

- There is a need for
  - A global index / benchmark of energy regulation’s effectiveness
  - Sharing of lessons learned and best practices across regulatory agencies

Key Findings:

Best regulation harnesses the power of market dynamics to deliver value

- Effective regulation liberalizes and leads to free markets aimed at greater end-user benefits
- Drives best operators to rise above the rest and deliver maximum value to end-users, stakeholders

- Global trends generally positive but pace & quality vary across regions. Some struggling to reconcile subsidies with growing but unfulfilled demand
- U.S. and Canada have most liberalized markets and regulation that supports investments: **Unconventional gas (and oil) success story driven by technology innovations and effective market signals a shining example**

Key Findings:

European gas market regulation - Work in Progress

- Transformation to integrate the various national markets into a single liberalized EU gas industry structure:
  - Unbundling
  - Increased gas-to-gas competition
- Multiple goals & issues (some times working in cross-purposes): Environment, CO2 reduction, energy efficiency, renewables, growing import dependency, security of supply, supply diversity
- EU's continuing economic & political turmoil dampen outlook?

Recommendations:

Regulation must encourage necessary and timely supply & infrastructure investments

- Gas business capital-intensive: Security of demand essential for investments in production and infrastructure: Regulation can help or harm: **Do no harm**
- "Smart", stable regulatory framework grounded in sound economics critical for progress
- Promote energy efficiency and innovation
- Independency of regulatory agencies from undue political influence

Recommendations:

Gas deserves greater regulatory support

- **Gas**: Economics, environmental characteristics, CO_2 reduction potential, an ideal complement to renewables - **all overwhelmingly favor gas**

- Europe needs a decarbonization policy that favors gas – Higher, more predictable price of carbon
- Promote and engage in regular dialog between regulators, their associations (ACER, ICER, CEER, FERC, NARUC*) and all affected industry stakeholders for maximum shared value creation.

* Agency for Cooperation of Energy Regulators, International Confederation of Energy Regulators, Council of European Energy Regulators, Federal Energy Regulatory Commission, National Association of Regulatory Utility Commissioners

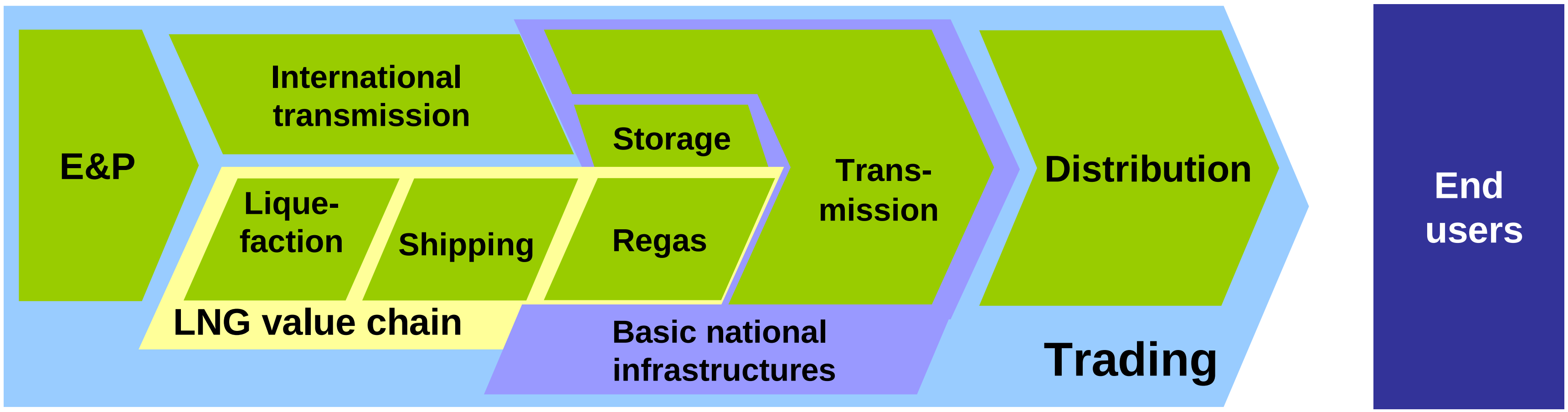
Are the industry and regulatory agencies ready for the Golden Age of Gas?

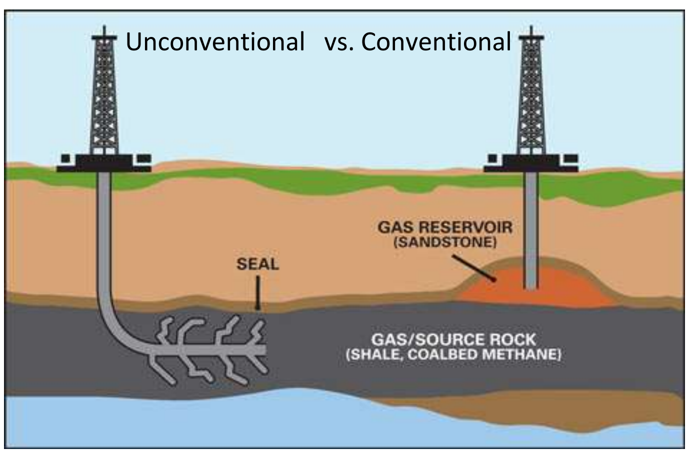
- Global gas demand projected to grow strongly - from about 3 TCM now to over 4.5 TCM in 2030
  - Is the industry ready?
  - Are the regulators ready?

- Future is filled with challenges, promises, opportunities

- The industry, working in a spirit of partnership with the regulators, can indeed shape a better future, deliver the gas, deliver the promise

Scope of Corporate Case Studies:
GAS VALUE CHAIN – Excluding Upstream





Upstream Fiscal Regime Outside the Scope
of this Study Group's work

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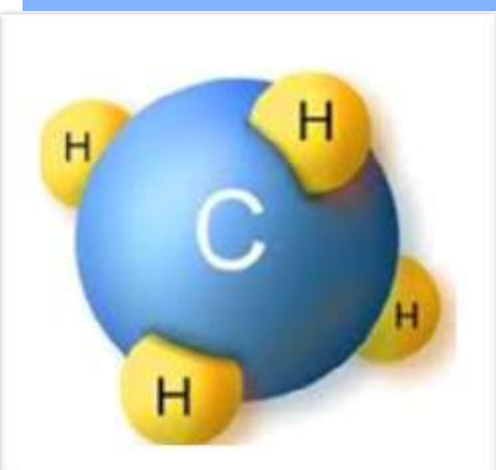

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Alliander - The Netherlands
Created by ownership unbundling.
Growing new regulated, commercial markets

- Founded in 2009 as a result of unbundling of the utility Nuon
- Owned by provinces and communities
- Largest gas and electricity grid operator of the Netherlands - 38% market-share
- Over 3 million gas, elec connections
- Annual turnover: € 1.6 Billion in 2011: 56% Elec, 22% Gas
- Growth by developing new regulated and commercial markets:
  - Biogas, Electric Vehicle infrastructure
    Smart grids and meters
    E-Atlas: Energy consumption mapping
  - M&A: Endinet

Argentina

Pricing constraints supply; Seeking to expand supply through E&P and infrastructure investments

- Natural Gas Act 1992 transitioned the gas industry from government control to privatization
- Argentine Gas Regulatory Agency, transport companies and distribution companies were created
- Value chain pricing: wellhead gas price + transportation fee + distribution margin and local taxes
- "Price Cap", rate reviews and corrections, de-dollarization, unbundling
- Freezing of tariffs, growth in CNG and industrial consumption and exports led to supply problems in 2004
- Exports suspended, imports from Bolivia and LNG began
- Electronic gas market created
- Government incentives for production and conservation
- Gas industry prospects:
  - Rate revision for the three segments
  - Investments in E&P and transport capacity to solve supply problems
  - Unconventional gas development
  - Recent nationalization moves by the government a serious concern

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Australia

Mostly free and competitive market, growing LNG exports high on the agenda, high carbon tax will support gas

- Upstream oil and gas development by the private sector
- Free and open market for foreign investment; substantial overseas investment
- Government-owned gas utilities and transmission pipelines were largely privatised in the 1990s
- Policy thrust to create an integrated and competitive gas market
- Tariffs and access arrangements for monopoly services are regulated
- Increased market transparency via short-term gas trading markets
- Publicly accessible "bulletin boards" of daily gas plant and pipeline flows
- Industry unbundled: Upstream, transmission pipelines, distribution networks, retail suppliers
- Growing LNG developments: conventional gas on the west, coal seam gas on the east; rising costs a major concern
- No export controls but stringent environmental conditions
- Most utilities have a portfolio: Gas, electricity from coal, gas, renewables
- Australia will have the highest carbon tax of AUD$23/tonne in the world
- Targeting 20% renewable energy by 2020

CNPC - China
State-owned integrated international major.
Large, growing gas business including unconventional

- World's 5th largest oil & gas company with operations in 30 countries
- Strategy: "Resources, Market, Internationalization"
  - Increase resources, expand market internationally through mutually beneficial development
- Founded as a National Oil Company in 1955 from Ministry of Petroleum Industry
- 2010 Sales of RMB 1.72 Trillion (US $ 273 Billion). Traded in NYSE
- Gas production 8 BCFD or 75% of China's plus over 1 BCFD overseas
- 2.87 TCM domestic reserves
- 32,800 km of gas pipeline in China
- Pursuing unconventional gas: Shale gas, tight gas, CBM
- Maintaining rapid growth in gas business
- "Safety first – Environment prioritized – Quality-focused – People-oriented"

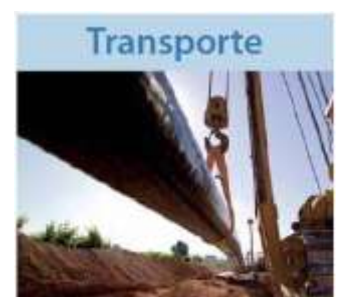
Comgas - Brazil
Gas distributor dependent on a monopoly supplier, yet growing in a regulated market

- Brazil's largest gas distributor serving Sao Paulo state
- 2010: Distributed 500 MMSCFD gas - 27% market share in Brazil
- Nearly a million customers, aim to add 100,000 each year
- Started as a British company in 1872, Canadian company take-over in 1912, Nationalized in 1959, Public company in 1996, trades in Bovespa
- 2010 revenue: U.S. $ 2.65 billion
- Brazil's production and transportation dominated by Petrobras
- Gas regulation: Open access allowed & negotiated but has difficulties; lack of transparency in Petrobras pricing policy
- 2010 Gas Law aims to stimulate competition
- 2000-2007 growth 17% p.a high-pressure network expansion; current growth in low pressure network to expand retail markets
- High dependence on Petrobras for gas supply

Enagas – Spain

Spain's primary gas system operator
Implementing all EU regulatory directives

- Founded in 1972, Enagas is Spain's main gas infrastructure operator:
  - Transmission System Operator - 10,000 km network
  - Underground storage
  - 3 + 1 LNG regas plants (5.5 million cu m/hr plus 2.34 m cu m LNG storage)
  - Technical Manager of Spanish Gas System
- Enagas in full compliance with European 3rd Package: Ownership Unbundling, TPA, Security of Supply
- Mission: Guarantee reliable functioning of Spanish gas system, competitiveness, transparency, secure supplies
- Spanish gas market highly transparent, publishes more information than EU regulation requires
- Enagas working with ENTSOG (European Network of TSOs for Gas) to implement required tasks (Annual report, Network Codes, seasonal outlooks)



Eni - Italy

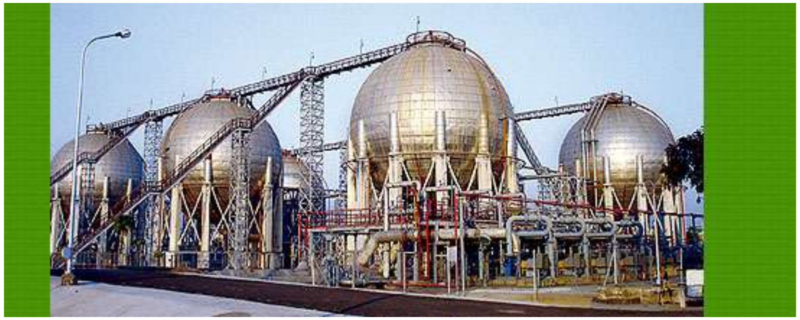
Challenges of adopting to new pricing mechanism & divestiture mandates

- Mandated reduction of raw material component in pricing gas supplies to residential customers
- 2012 Liberalization Decree to enhance competition in the Italian gas market.

- A more competitive pricing mechanism for residential supplies to gradually introduce continental hub benchmarks and indexation while oil-linked supplies continue: The rule will damage profitability
- Mandatory divestiture of Eni's interest in Snam:
  Criteria, terms and conditions by May 2012.
- Eni believes it is critical to debate the degree of competition and the regulatory activity and not ignore the impact on Eni's operations and cash flows

GAIL – India
Full gas value chain player, dominant and growing position in gas transmission, distribution

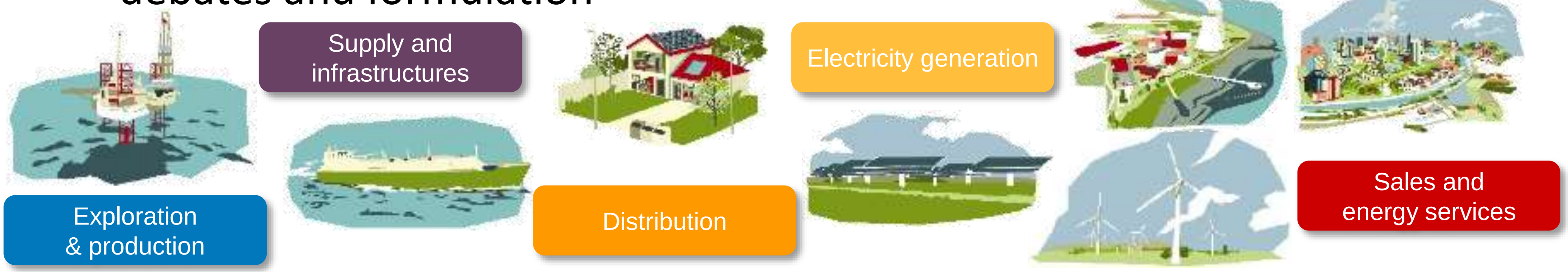
- Incorporated in 1956 as a government company, stock listed in 1996, still majority government-owned
- Core businesses: gas transmission (8000+ km, 170+ MMSCMD, 75% share), trading, LPG (25% share in transmission), liquid hydrocarbons, petrochemicals
- 2011 revenue near US $ 7 B with CAGR of 14+%
- 3800+ employees with presence in 4 countries
- Strong financials, robust CapEx plan in several gas pipeline projects
- Growing demand for gas, sensitive to price, supplies short



GDF Suez – France

Large European and global gas and electricity player actively involved in & impacted by regulation

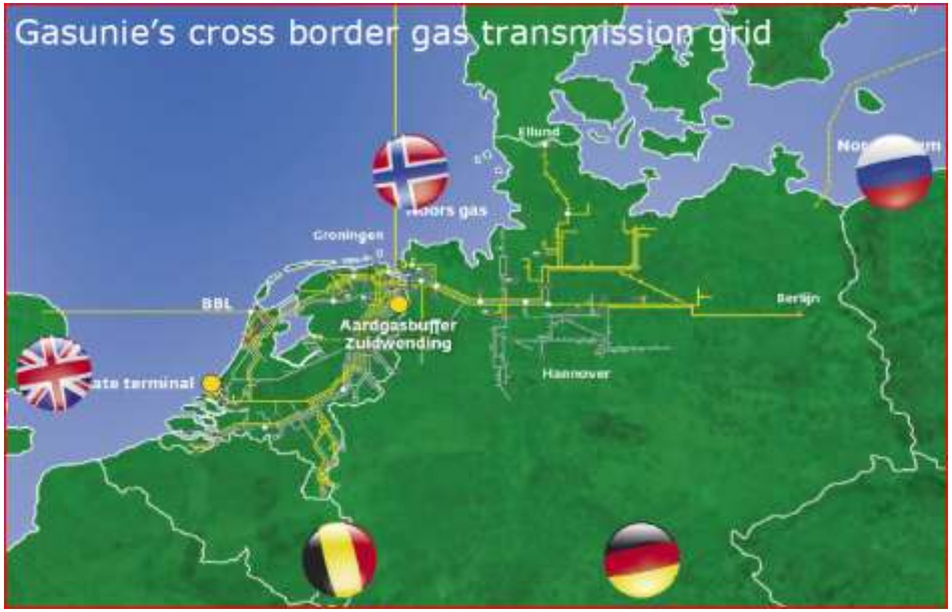
- Formed by 2008 merger of Gaz de France, a public utility, and Suez to capitalize on complementarity and synergies
- First global utilities company, Euro 84.5 B revenue (2010), over 218,000 employees in 70 countries, 36% French state owned
- Presence in the entire energy value chain:
  - Natural gas: Europe's top buyer, top transmission & distribution network, >1200 TWH portfolio, LNG terminals, tankers, regas vessels
  - Electricity: World's top IPP, 78.2 GW installed capacity
  - Energy, environmental, water services
- Multi-energy, multi-services offer, committed to security of supply and sustainable development
- Focused on implementing 3rd Package and active in Gas Target Model debates and formulation



Gasunie – The Netherlands

State-owned, unbundled gas infrastructure operator

- Founded in 1963 and unbundled in 2005 to Gasunie for infrastructure (and GasTerra for trade)



- Gas pipeline network, LNG regas, gas storage
- Over 15,000 km pipeline in the Netherlands, northern Germany
- Annual throughput 135 BCM in 2010, sales Euro 1.5 B+
- Dutch and German tariff regulation led to some significant impairments

Gazprom – Russia

Strategic goal to become a leading global energy company

- Domestic gas market priorities:
  - Shift from regulated wholesale price to regulated transport tariff
  - Form gas trading sector: Market mainly via negotiated, formula-based prices
  - Ensure an equilibrium of returns on domestic and foreign gas sales
  - Expand gas marketing: Electronic trading and stock exchange

- "Global Presence" Strategy
  - Reliably meet long-term gas export contracts
  - Conquer new markets (bidding, asset swaps)
  - Diversify Business
  - Expand, diversify gas transmission routes and capacity
  - Replenish reserves
- Electric power
  - Mitigate tariff risk
  - Pursue gas-electricity synergy

Source: www.gazprom.ru

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PETRONAS – Malaysia

Subsidies impose cost burden, cause supply shortage. Market reforms gradually taking shape

- Regulated gas pricing with substantial subsidy elements
  - Market distortions, inefficiencies, artificial demand
  - Heavy cost burden to PETRONAS
  - Hindered imports, accelerated supply shortage
  - Situation untenable
- PETRONAS and the Malaysian Government are undertaking reform measures
- Holistic approach: supply / demand management, infrastructure development, pricing mechanism, policies and regulation
- Pursuing energy efficiency, conservation and sustainable gas supply
- 10th Malaysia Plan, New Energy Policy 2010 and Competition Act 2010 : Productivity & innovation, market competition, rationalized energy pricing
- Government aim: Oil & gas service hub – LNG trade, oil storage, logistics, new gas-based industries

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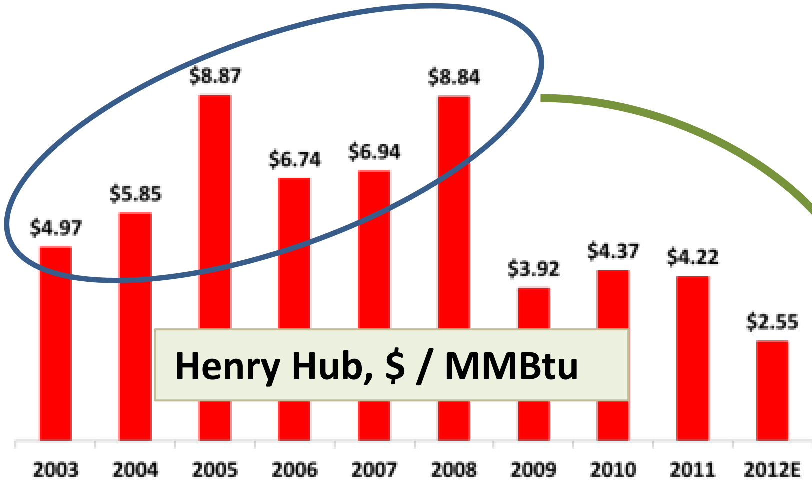
Statoil – Norway

Technology- and values-driven with growing global presence; leveraging arctic/offshore expertise

- International energy company, 2/3 state-owned, with operations in 40 countries and 18,000 employees
- Produces 1.95 boe/d oil and gas including 43 bcm gas
- Second largest exporter of gas to Europe, world leader in carbon capture and storage
- Strategic focus:
  - Strengthen and grow Norwegian Continental Shelf production
  - Leverage leadership in technology, EU gas position and complex offshore projects to grow internationally including unconventionals
  - A values based performance culture, firm commitment to health, safety and environment (HSE)
- Statoil welcomes and has capitalized on the opportunities from EU gas market liberalization; 2050 Climate goals cause uncertainty in gas demand

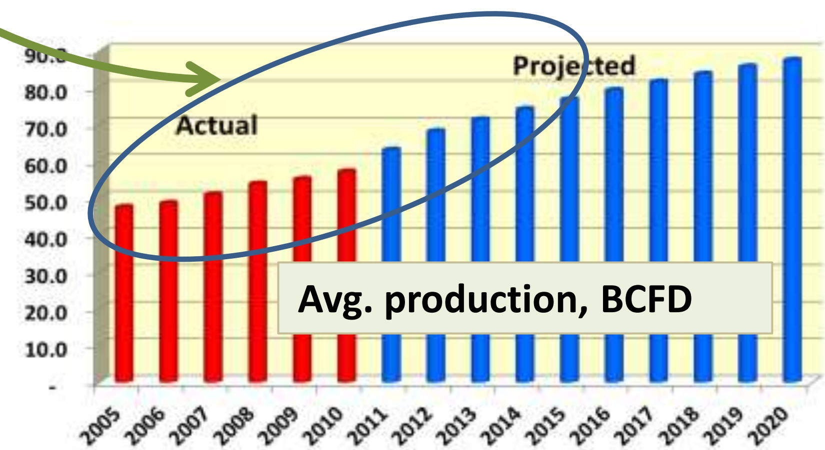
U.S.A – National Case

Technology innovations and effective market signals dramatically swing shortage to surplus



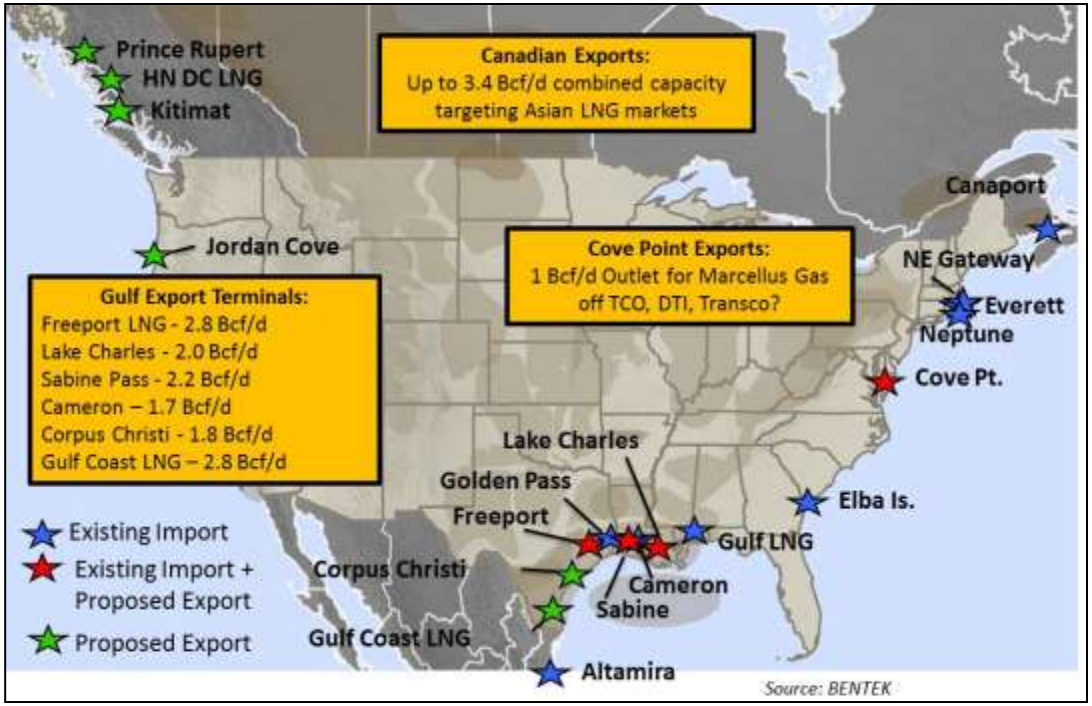
- US gas market transformed by unconventional gas (and oil) "revolution"
- Horizontal drilling, multi-stage hydraulic fracturing along with other exploration, drilling, completion technologies driving remarkable growth in oil and gas production in North America

- Price signals from 2004 to 2008 a key driver for experimentation and continuous learning to improve production and reduce drilling and completion costs
- Excellent gas and service infrastructure and efficient gas transport network, well-treaded geology also helped in the shale gas revolution



U.S.A – National Case

Can the U.S unconventional gas/oil experience be replicated elsewhere?



- Environmental concerns of shale gas production being debated and corrective measures being adopted by U.S. industry
- 2006: Over 3 doz. **IMPORT** terminals proposed in North Americas, 6 built; Today over a doz. **EXPORT** terminals proposed, several approved. Gas supplies will be sufficient to export small volumes of LNG.

- Other nations eagerly applying the technologies to exploit UG. Success depends on many factors: geology, infrastructure, not least, regulatory regime
- With supporting technologies and industry innovations, market will win in the end…..if regulation will allow, properly focusing on cost vs. end-user benefits

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