IGU 2006

Natural Gas: Energy Driver of the World?

George H.B. Verberg

President International Gas Union

EDReC *27 October 2005*

Congratulations with this first...

‘Energy Convention Groningen’
In the Heart of Energy Valley!

Long Ago..... Natural Gas Was Used To .....

predict the future of gods and mankind....

Apollo temple

Delphi, Greece

INTERNATIONAL GAS UNION
Covers >95 % of World Gas Sales
'Spokesman' of the Gas Industry

www.IGU.org

Non Members

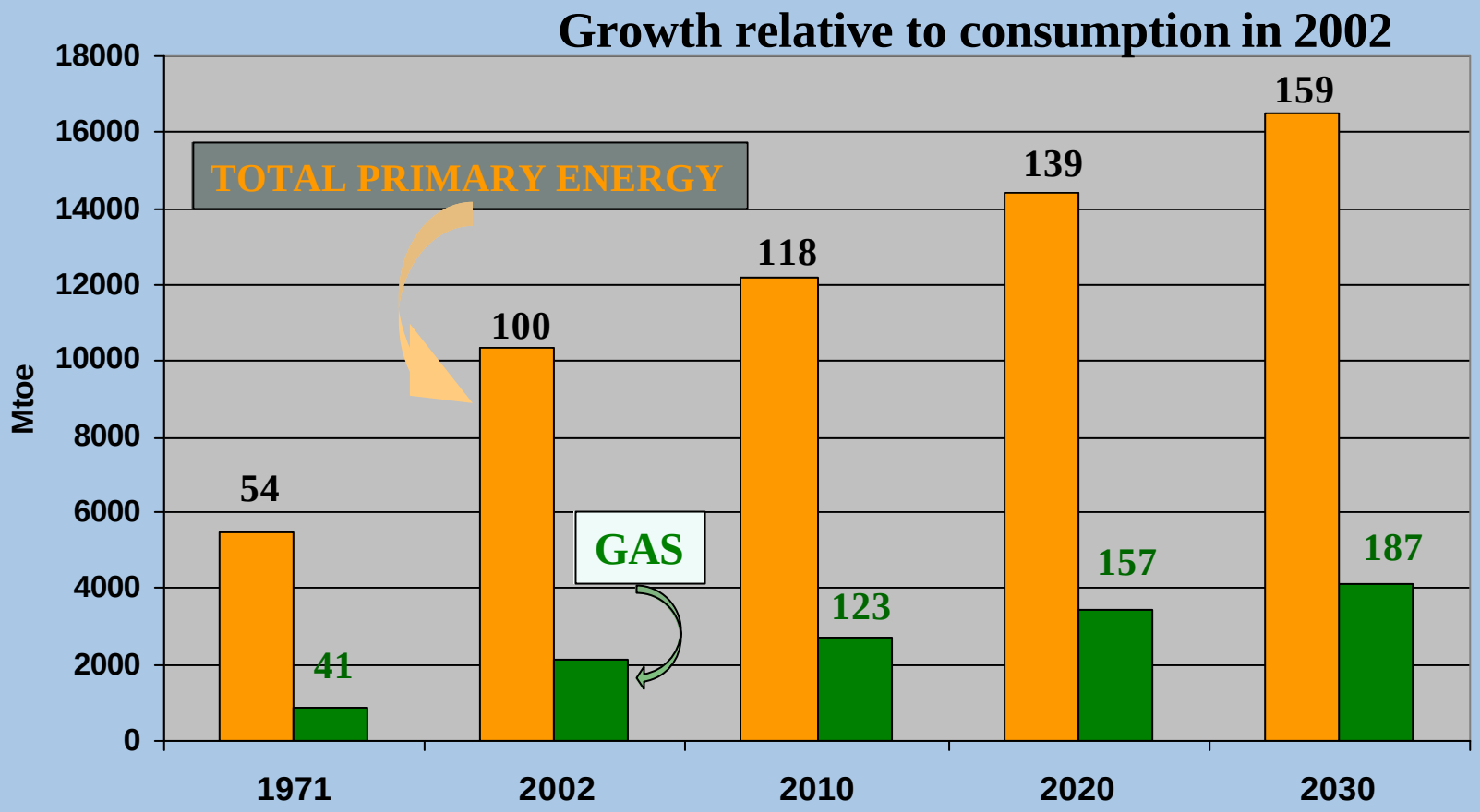
Membership from 67 countries and 20 Associated Members

natural gas: energy driver of the world?

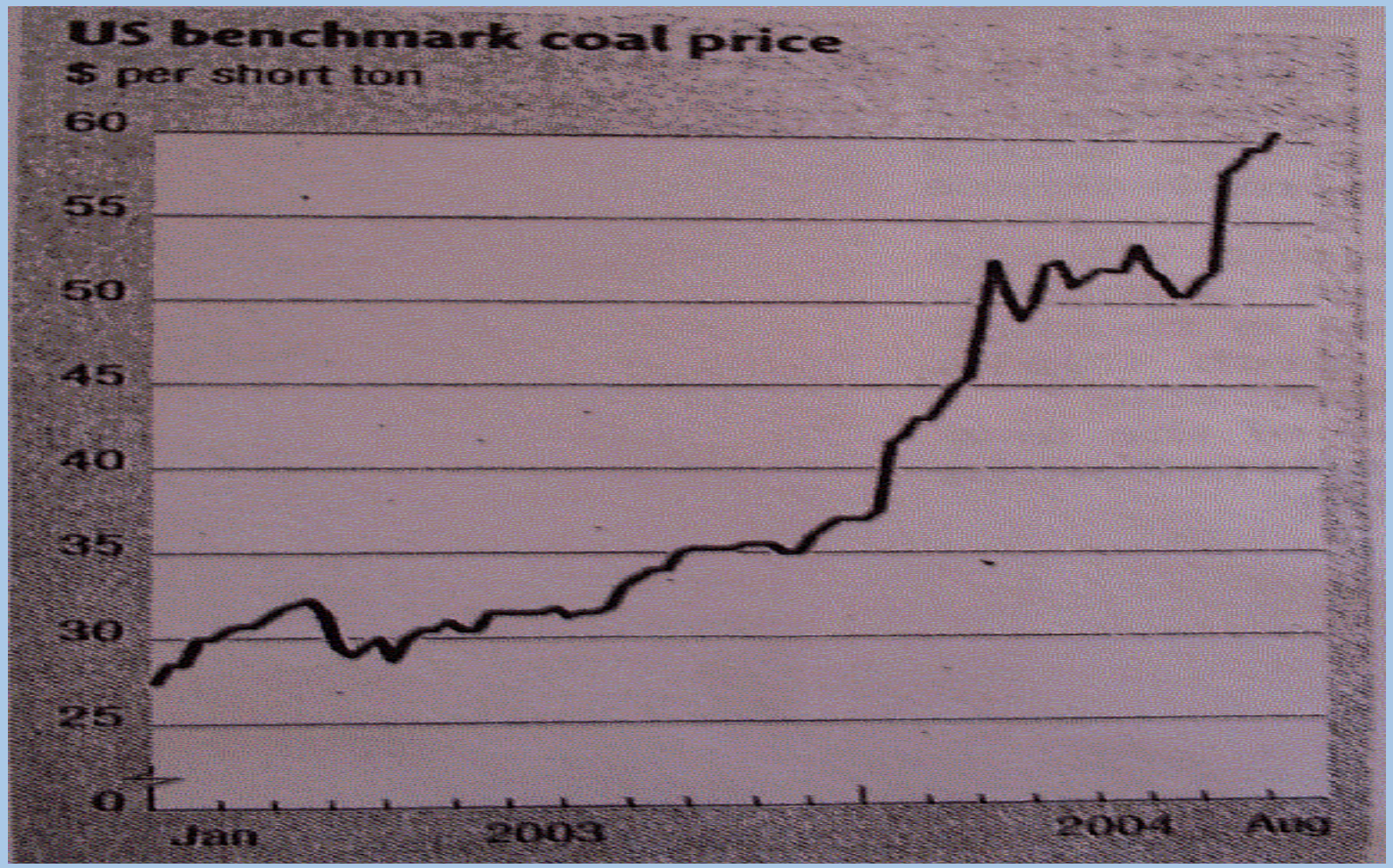
Three Themes for Today

- **The World needs Energy;**
- **LNG changes the Global Gas Scene;**
- **Gas Industry's Challenges and Fundamentals.**

Global Energy Demand
Forecast IEA WEO 2004



Not Oil Alone: since Jan. 2003 more than doubling of US coal prices!

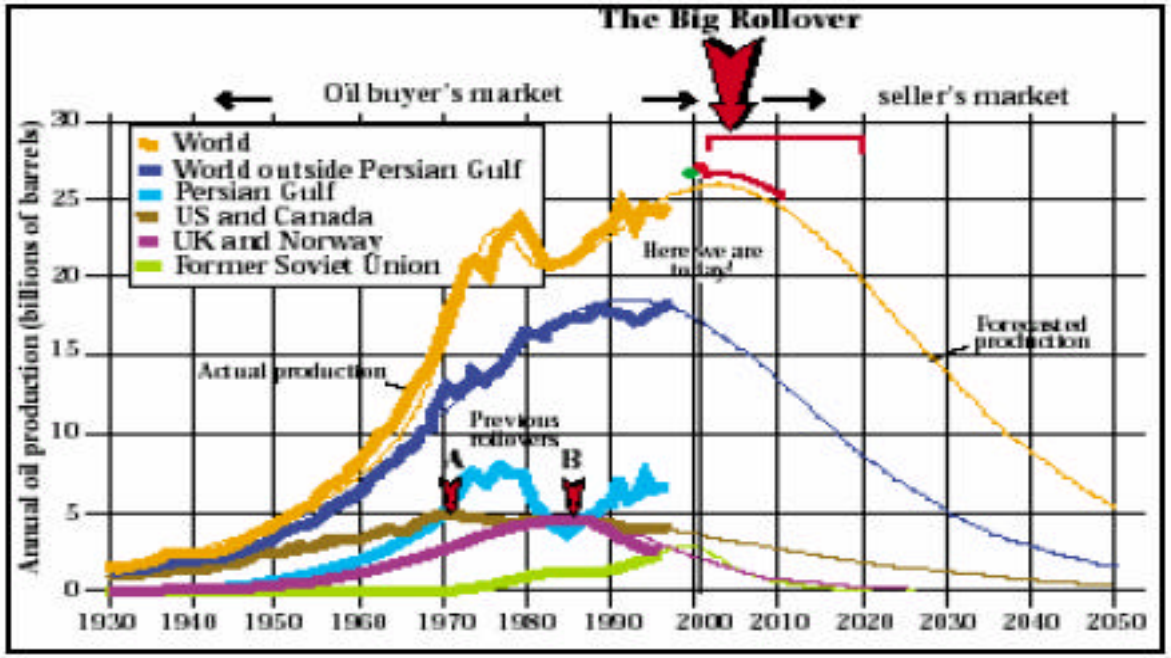


Oil Prices: How High is High?

Oil prices in US$ of 2004:

- **1864: 92 $/b, but at that time no oil dependent economy**
- **1980: 81 $/b, economic difficulties**
- **2004: 55 $/b**
- **2005: 60+ $/b**
- **Expected: restraints in refinery capacity lifted by 2008**

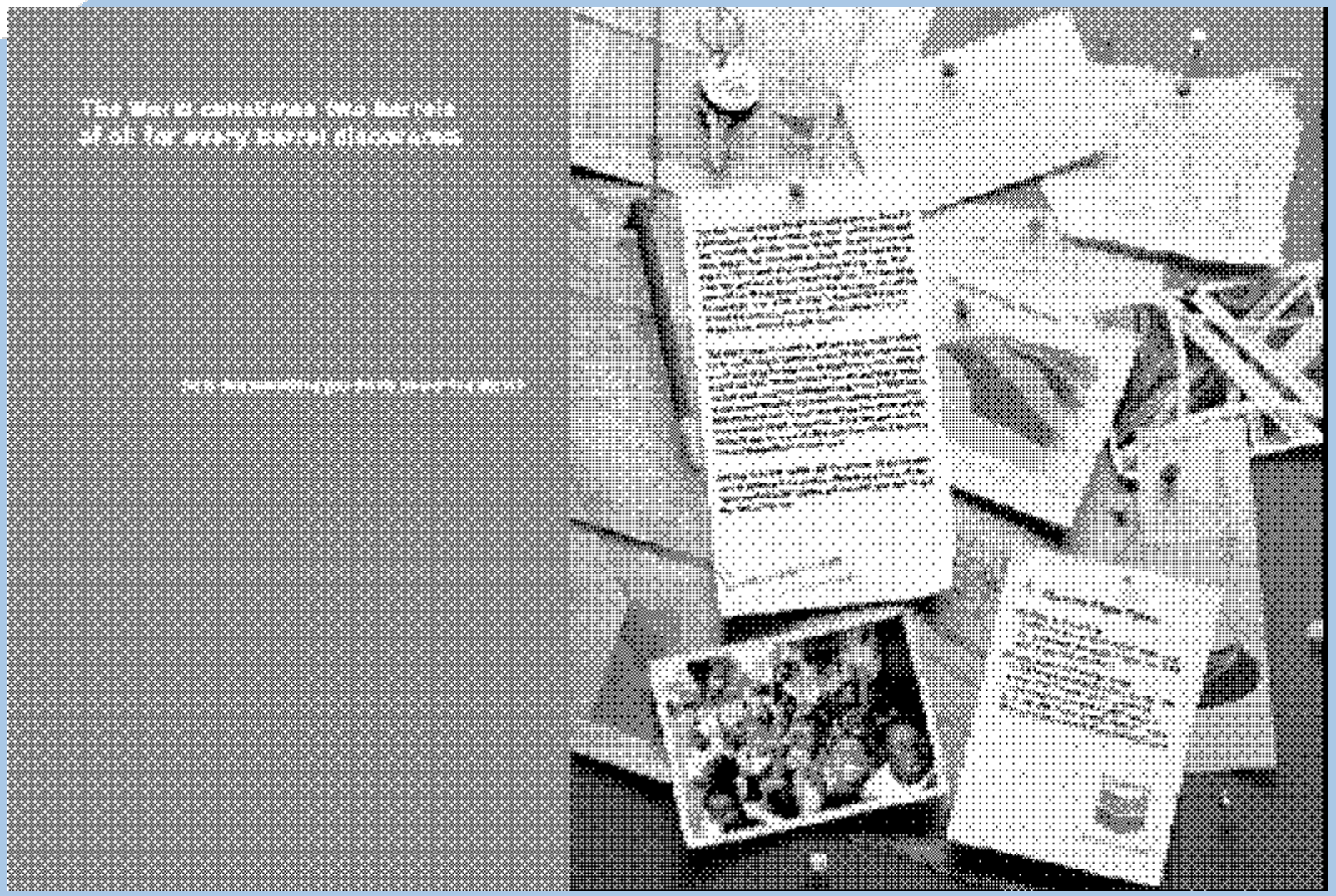
How Much Oil is Left ?



Year of The Big Rollover	Forecaster
2003	Campbell, 1998
2004	Bartlett, 2000
2007	Duncan and Youngquist, 1999
2019	Bartlett, 2000
2020	Edwards, 1997
2010-2020	International Energy Agency, 1998

at EIA Midterm enrgy Outlook Conference, april 12 2005

Chevron: willyoujoinus

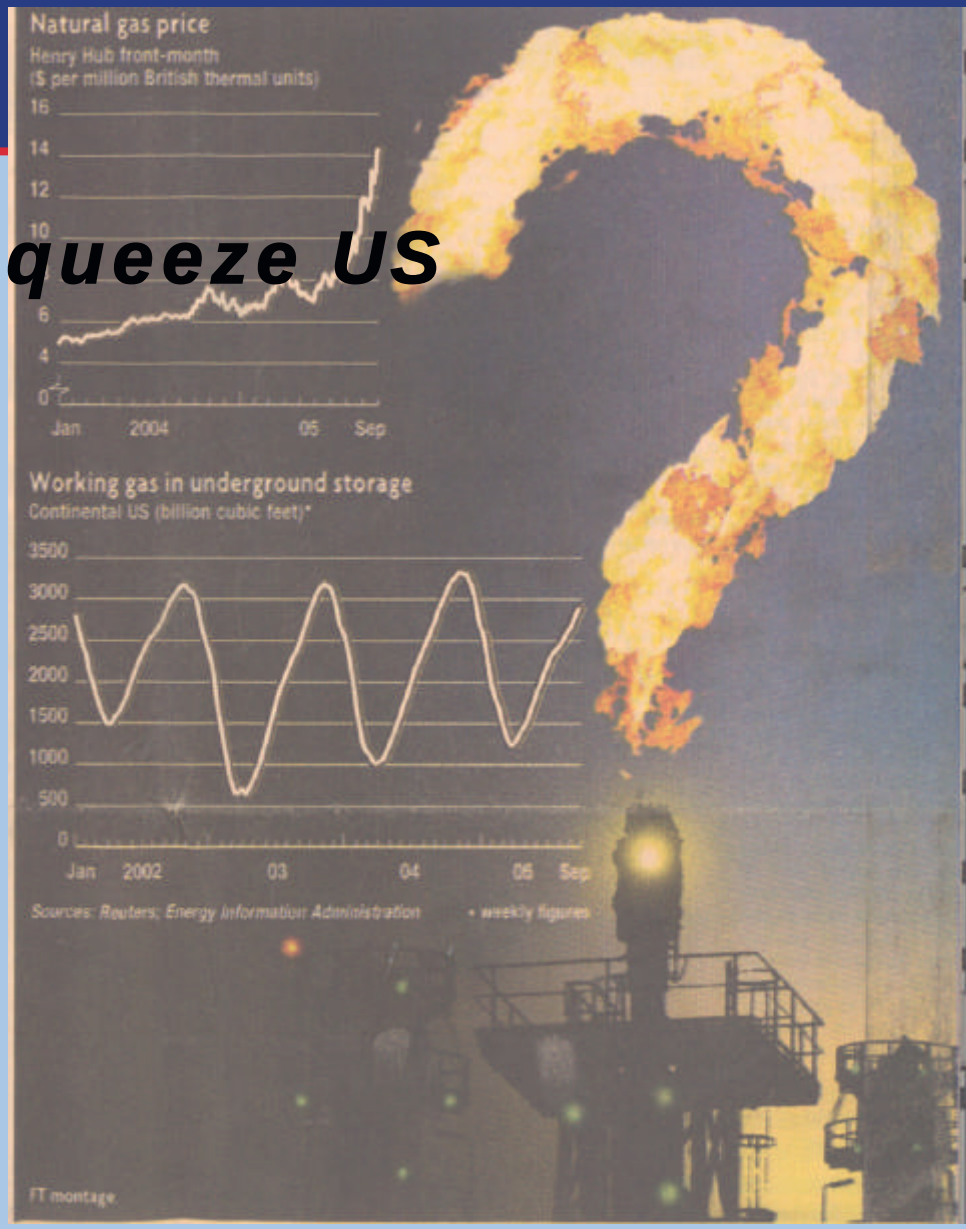


natural gas: energy driver of the world?

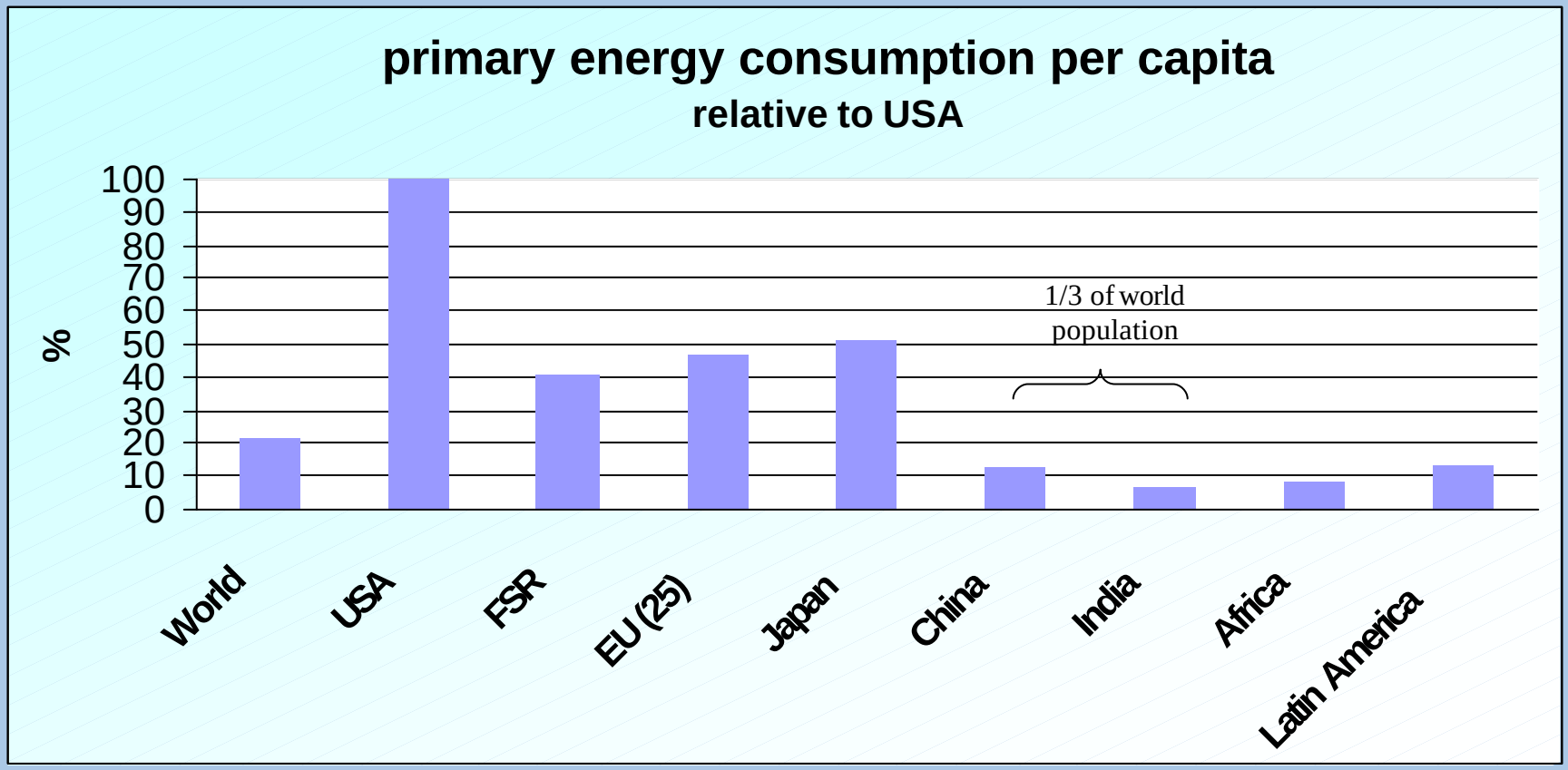
Nymex futures untill dec 2010: >6$/mbtu

High gas prices squeeze US manufacturers

(Financial Times 3 Oct '05)

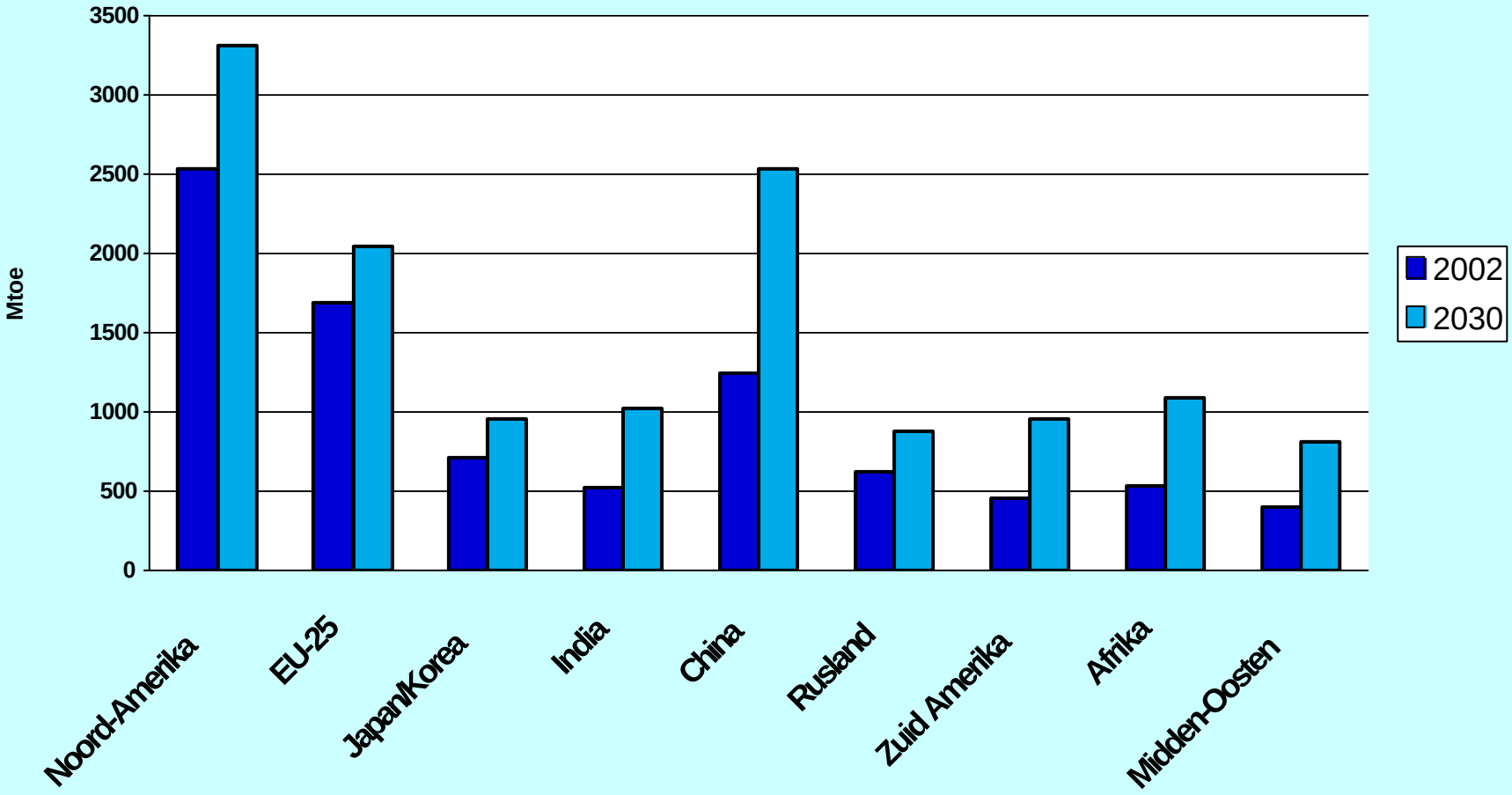


Energy Consumption in Perspective

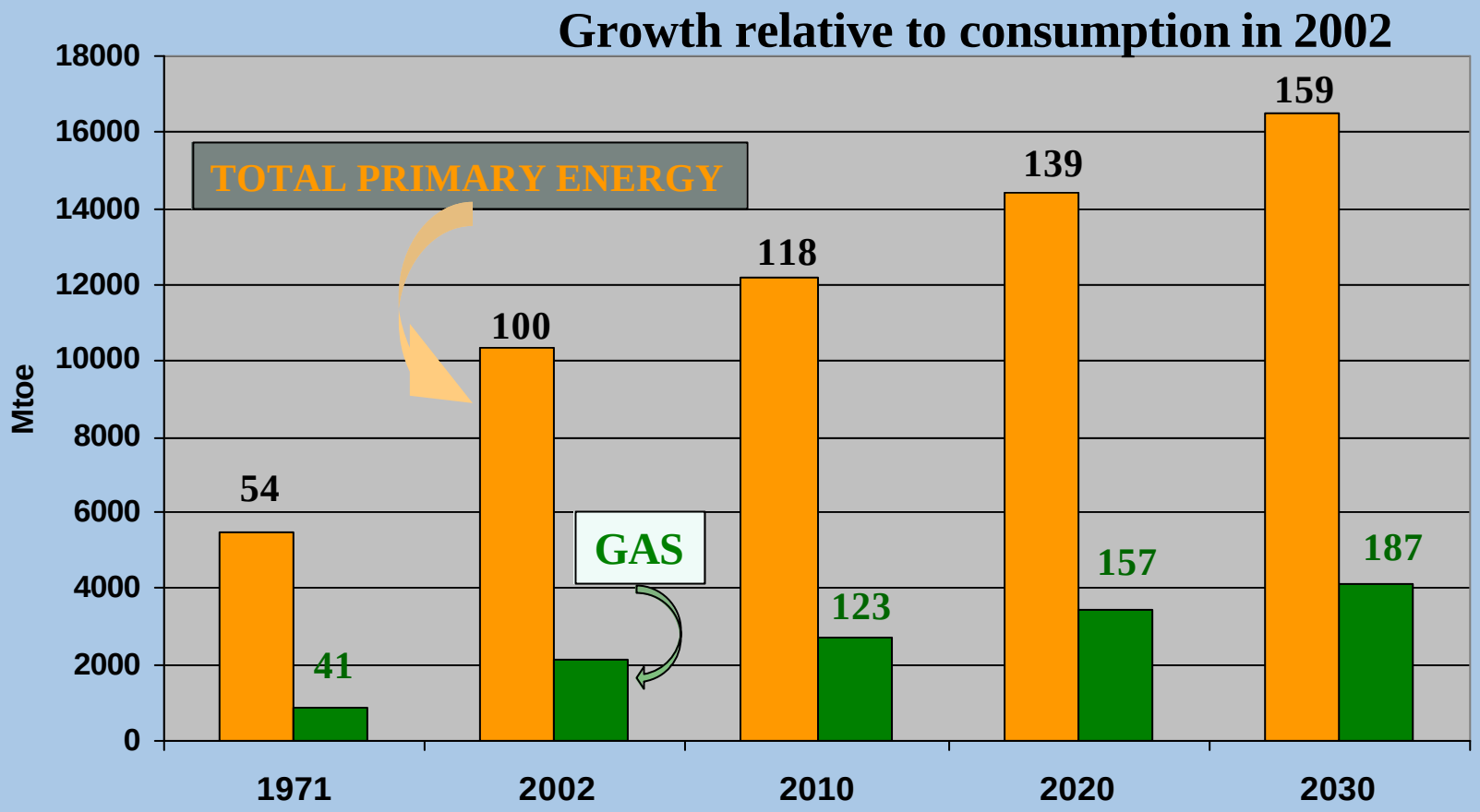


IEA data year 2002

Total Energy Demand by Region 2002 and 2030



Global Energy Demand
Forecast IEA WEO 2004

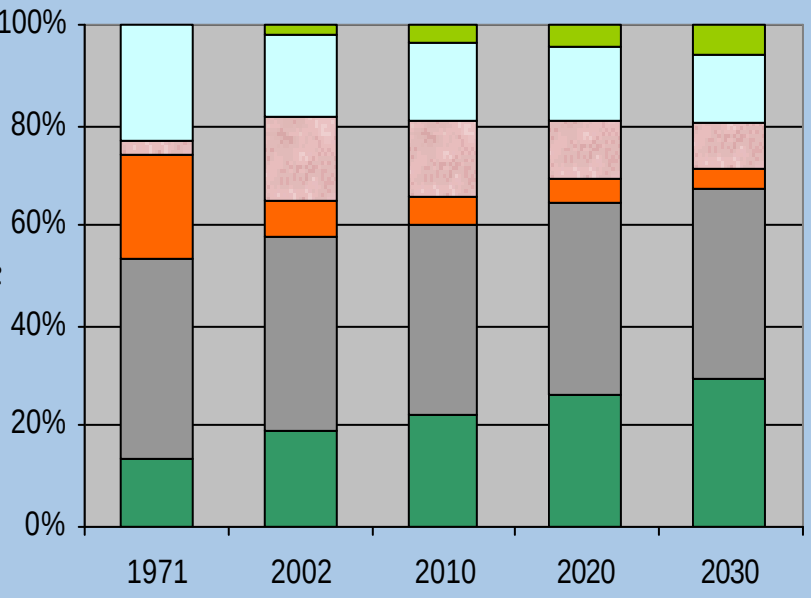


Gas the Fuel of Choice

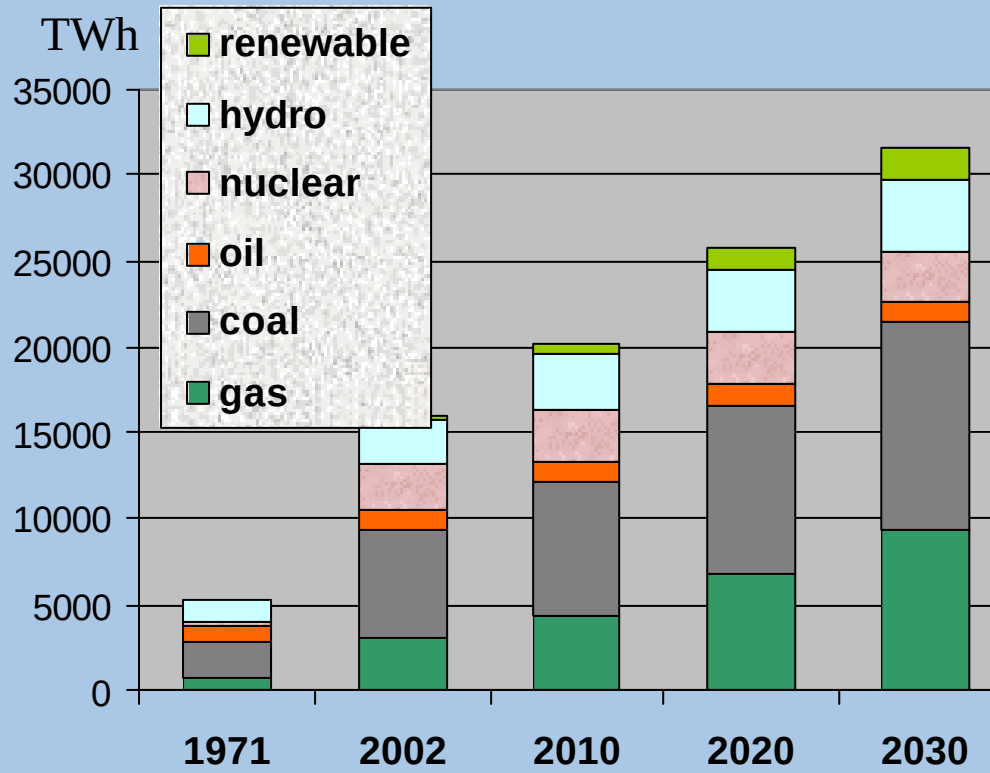
- **For financial-economic reasons,**
- **For environmental reasons,**
- **For space planning reasons (gas fired power station needs a lot less space than a coal fired one)**
- **For cooling water requirements (gas fired power stations need a lot less cooling water than coal fired ones or nuclear)**

Natural Gas will be the fuel of choice!

Power Generation (Global): More and More Natural Gas



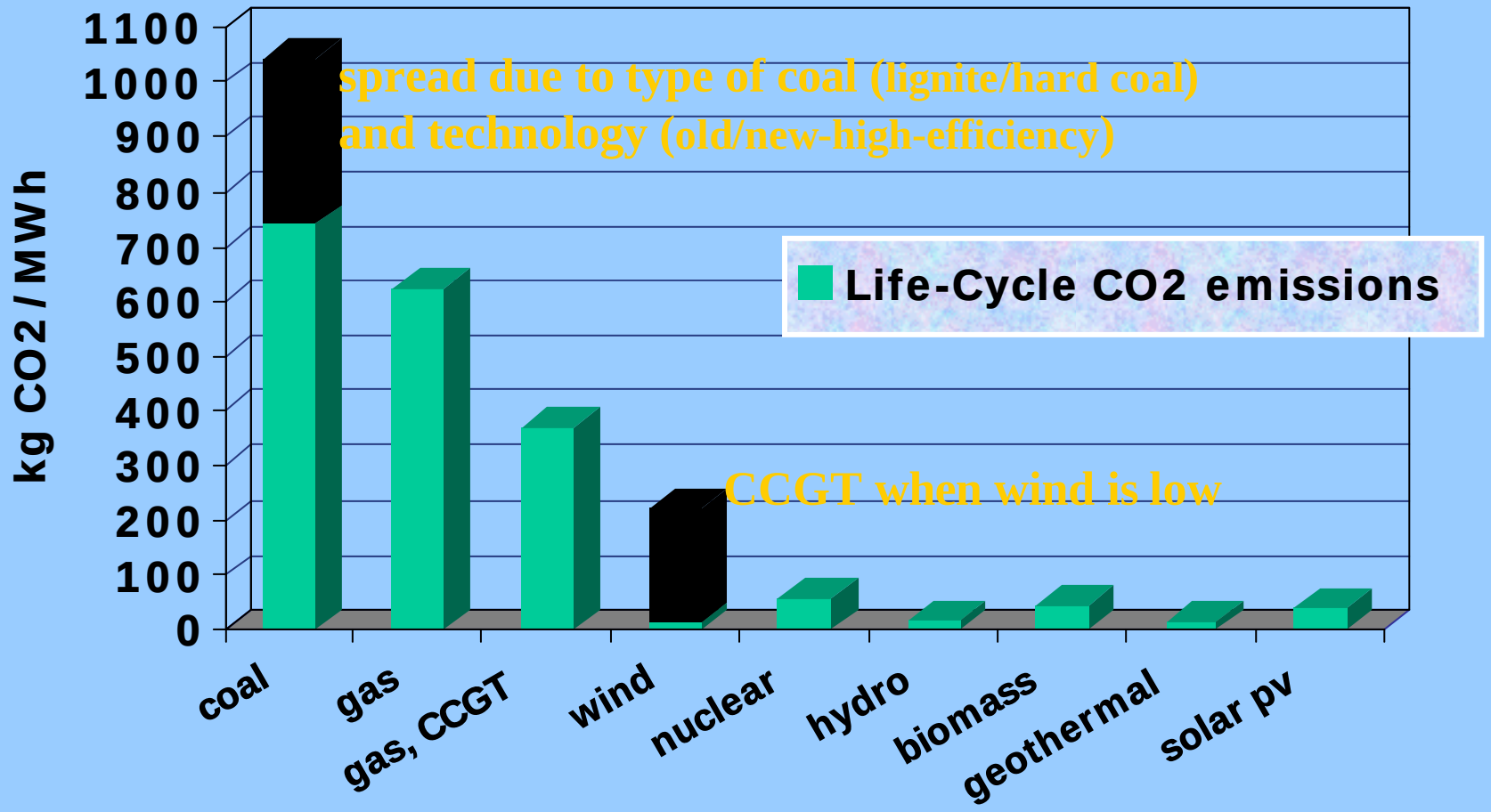
Fuel market-shares



TWh generated

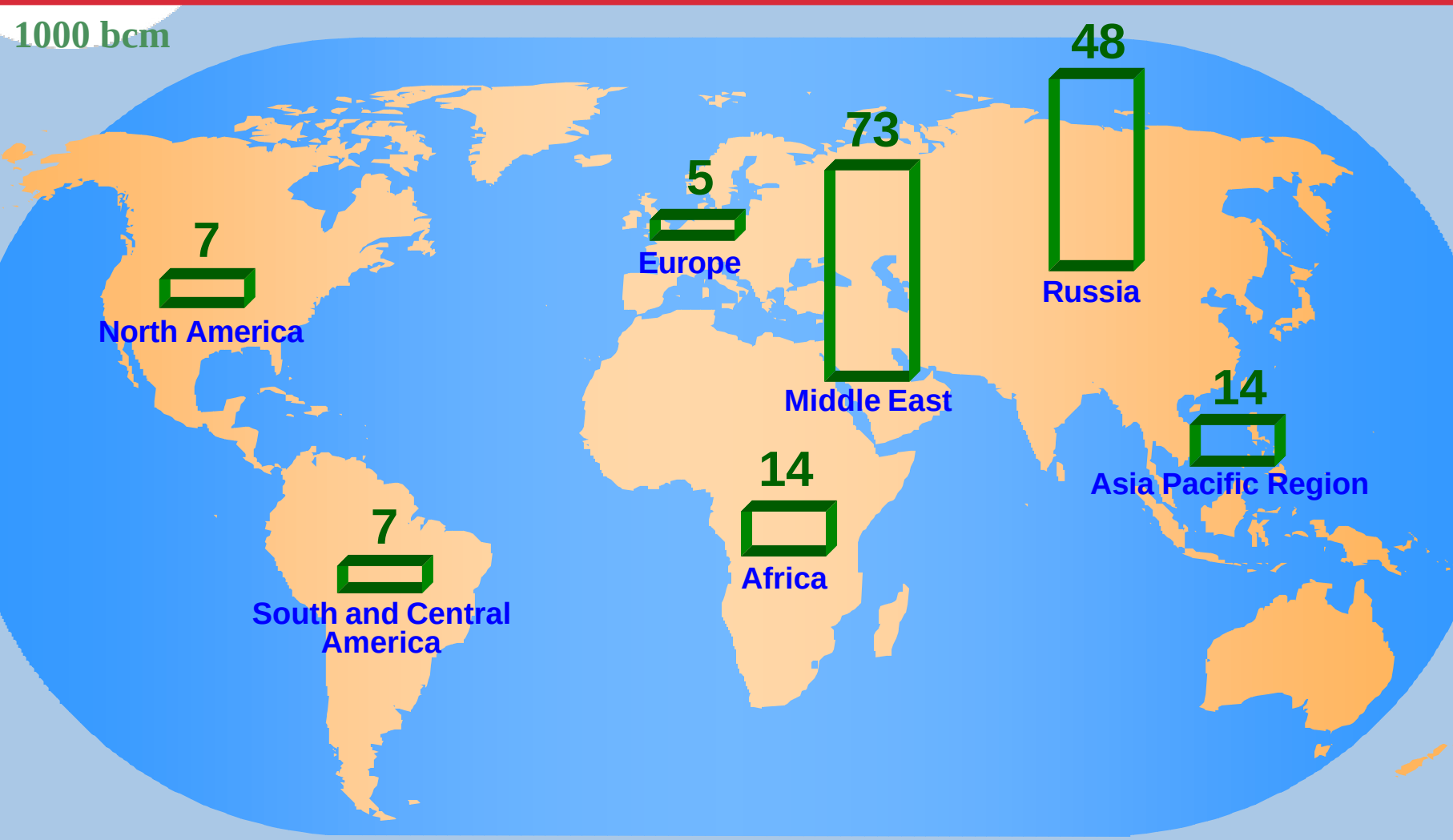
data: IEA weo 2004

CO_2 Emission from Power Plants



ources: life-cycle assessment of electricity generation systems and applications for climate change policy analysis, Meier, 2002, published on website Nuclear Energy Institute; own data; IEA

World Gas Reserves
Proven 180 Trillion m3
R/P ratio ~66 years

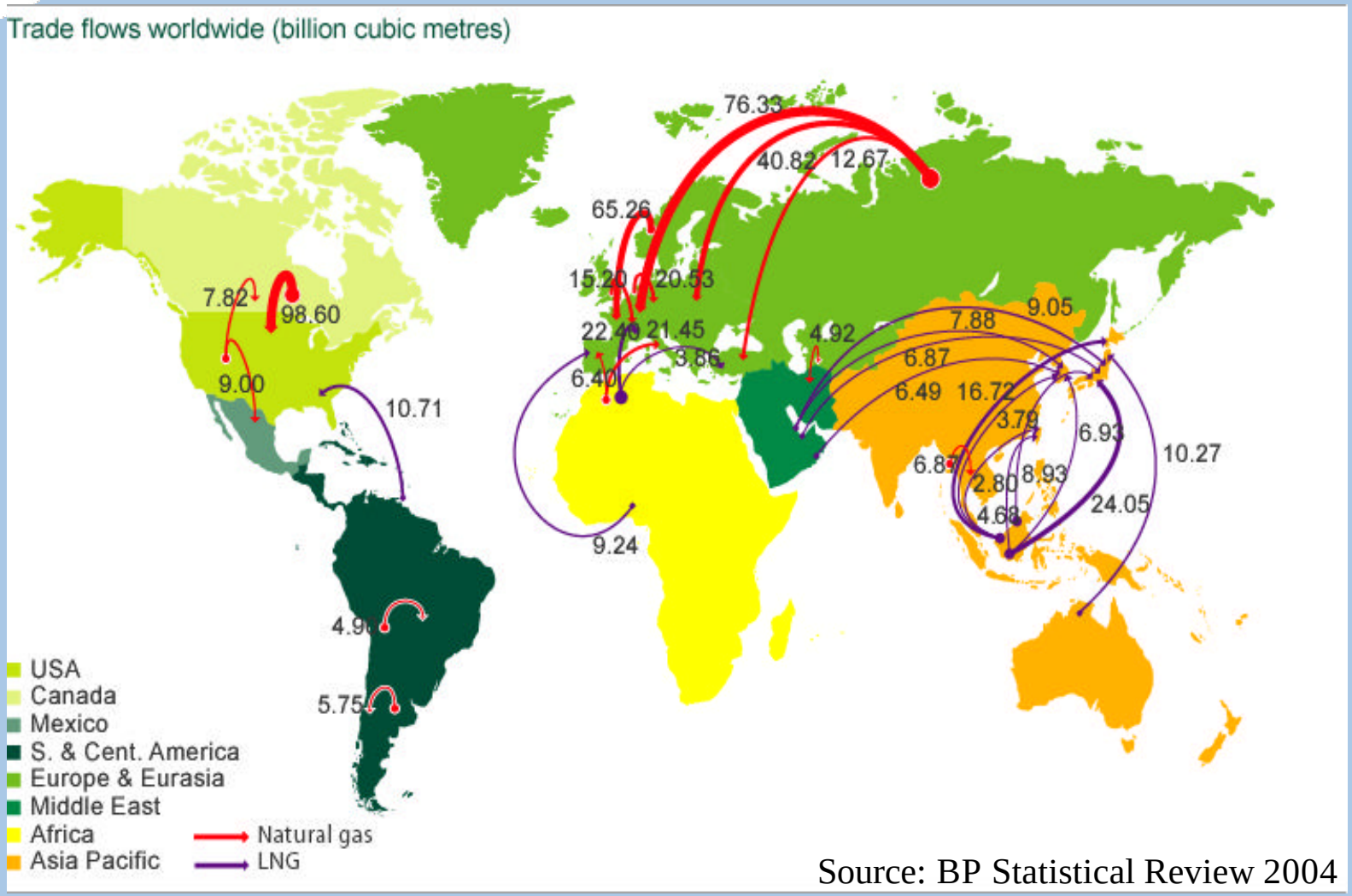


ata: BP Statistical Review 2005

Three Themes for Today

- The World needs Energy;
- LNG changes the Global Gas Scene;
- Gas Industry's Challenges and Fundamentals.

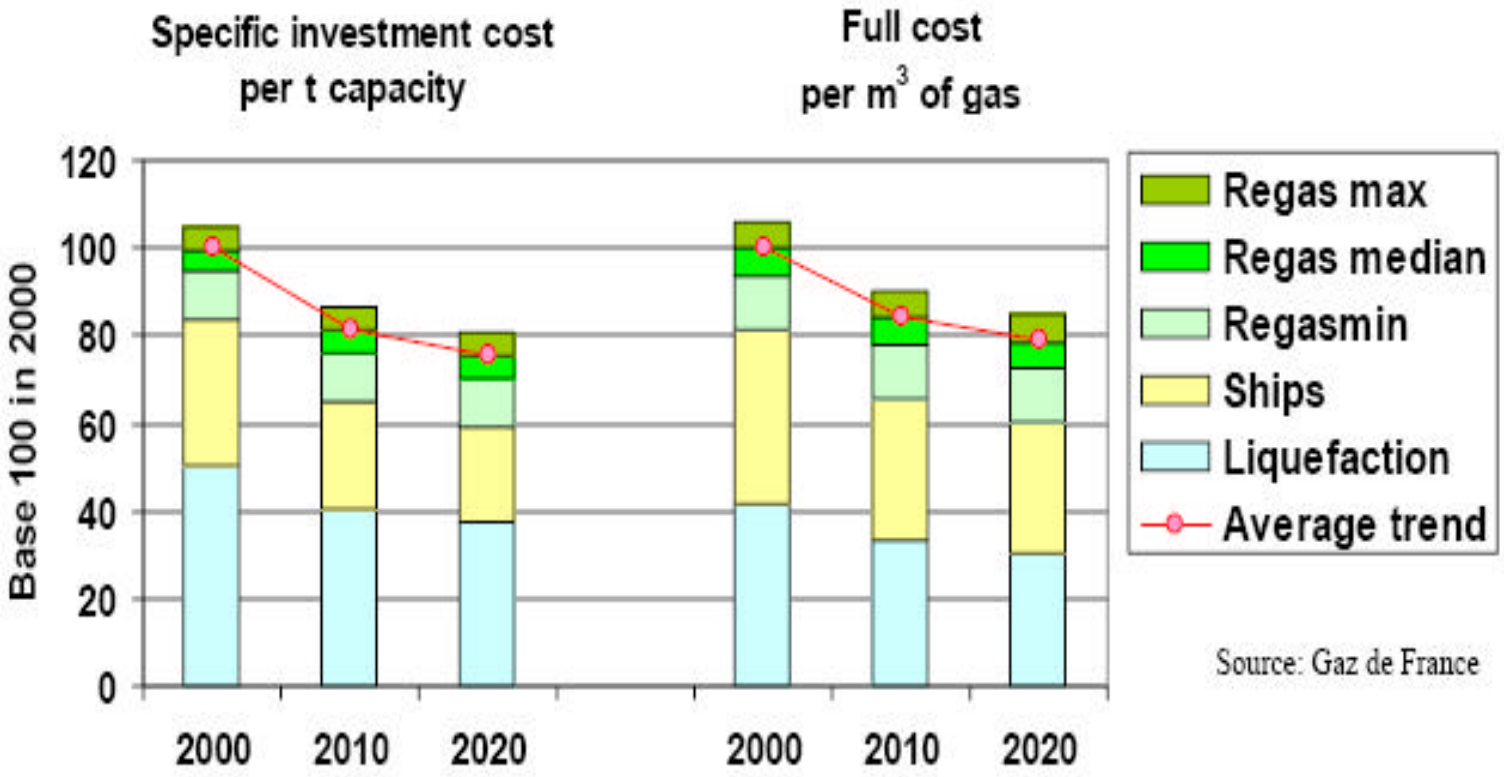
Major Natural Gas Trade Movements at the Start of the 21st Century



Source: BP Statistical Review 2004

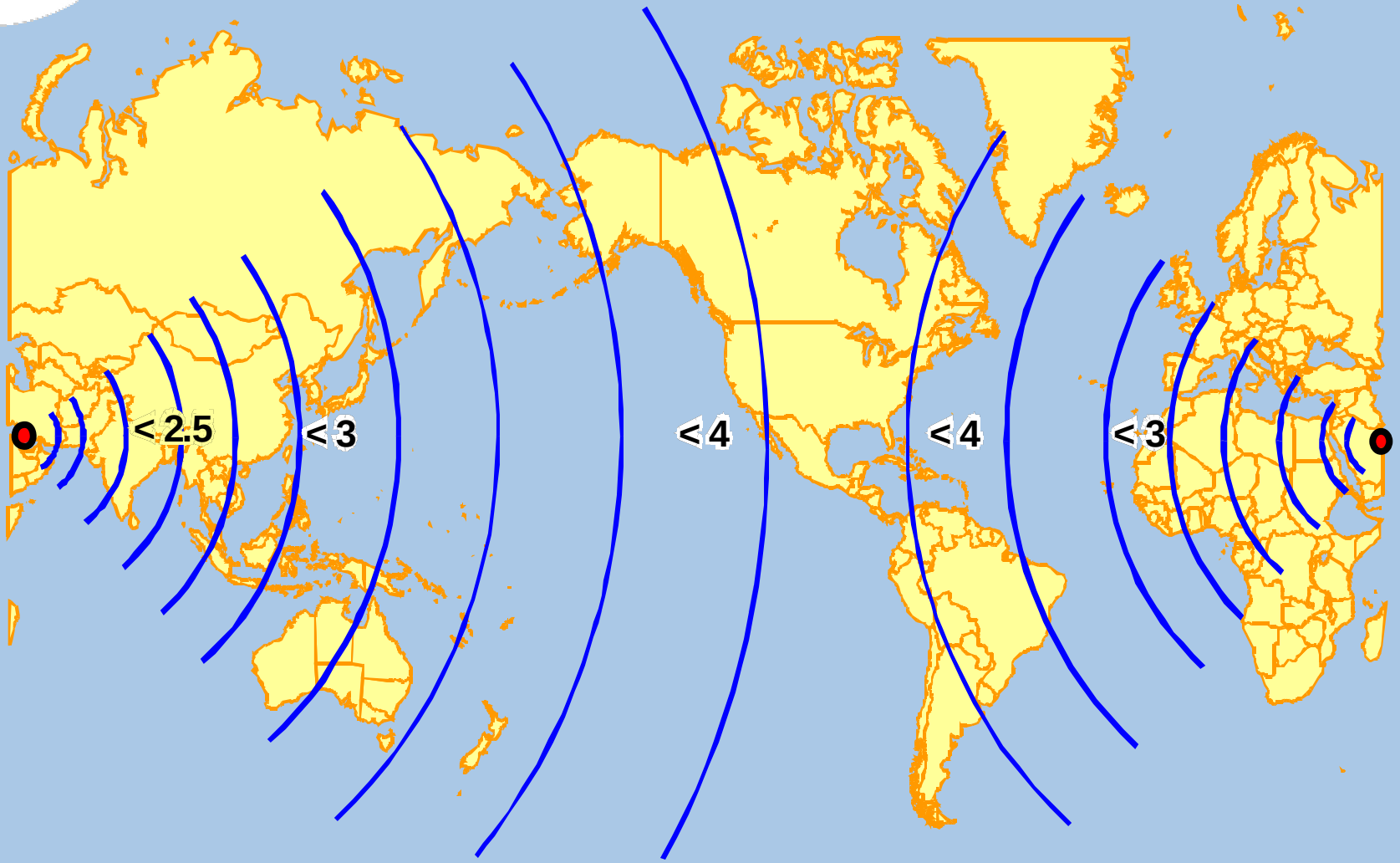
LNG trumps: decreasing costs

- For a 7 400 km LNG chain



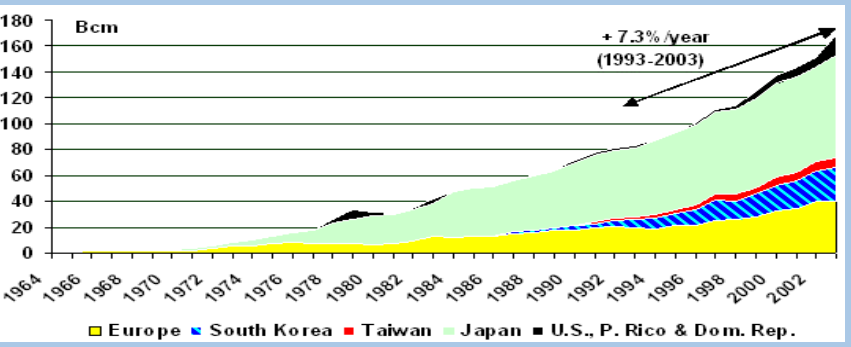
Source: presentation by GdF at 19th WEC, sept. 2004

Middle East LNG—Setting a New Global Cost Benchmark ($ per MMBtu)

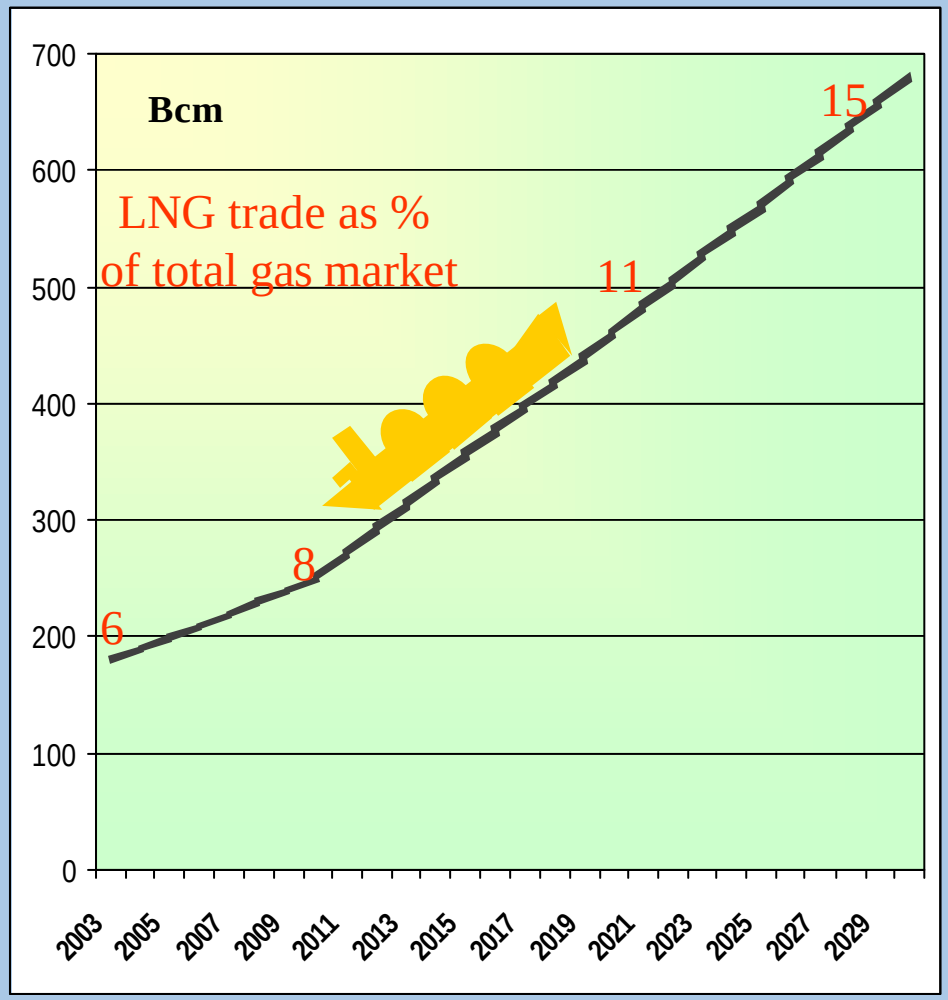


Source: Cambridge Energy Research Associates.
31001-10

LNG Trade History and Perspectives



History (CEDIGAZ)



Forecast (IEA weo 2004)

LNG Spot Trade Grows, but remains < 20%

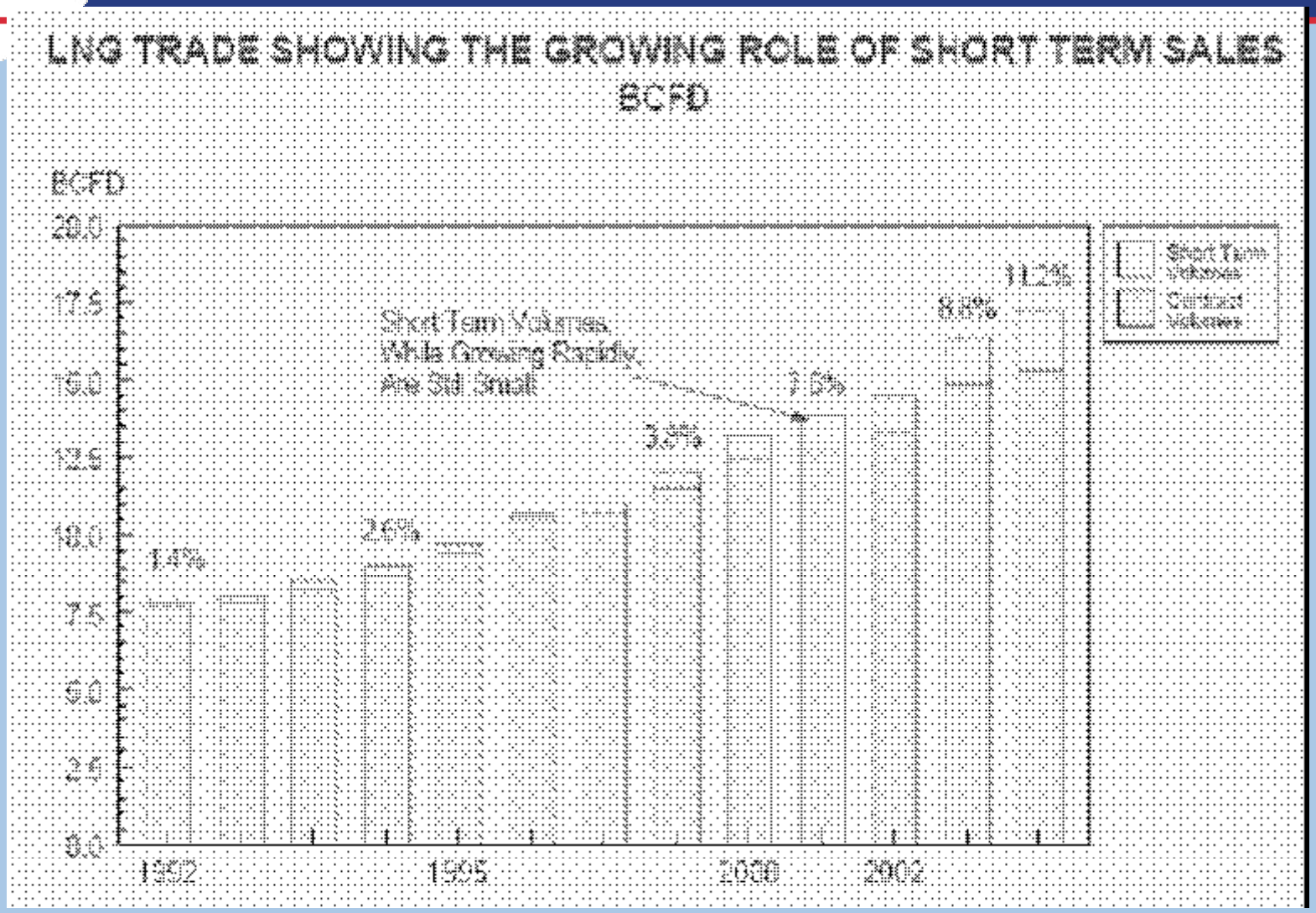


Chart: Presentation by Jensen Associates to California Energy Commission June 2005

From Regional Gas Markets to Global Competition

- **Price levels of natural gas in the different gasregions are so high that LNG is competitive wherever it originates from.**

- **Traditional gas supply patterns (Russian gas to Europe, Mid Eastern gas to Pacific Rim, North America autarctic) will give way.**

- **The big gas import regions (Europe, US, Pacific Rim, China, India) will compete with each other for supplies.**

International LNG Trade: Connecting Markets

Three Themes for Today

- The World needs Energy;
- LNG changes the Global Gas Scene;
- Gas Industry's Challenges and Fundamentals.

Challenges and Fundamentals: or How to Serve the Customer

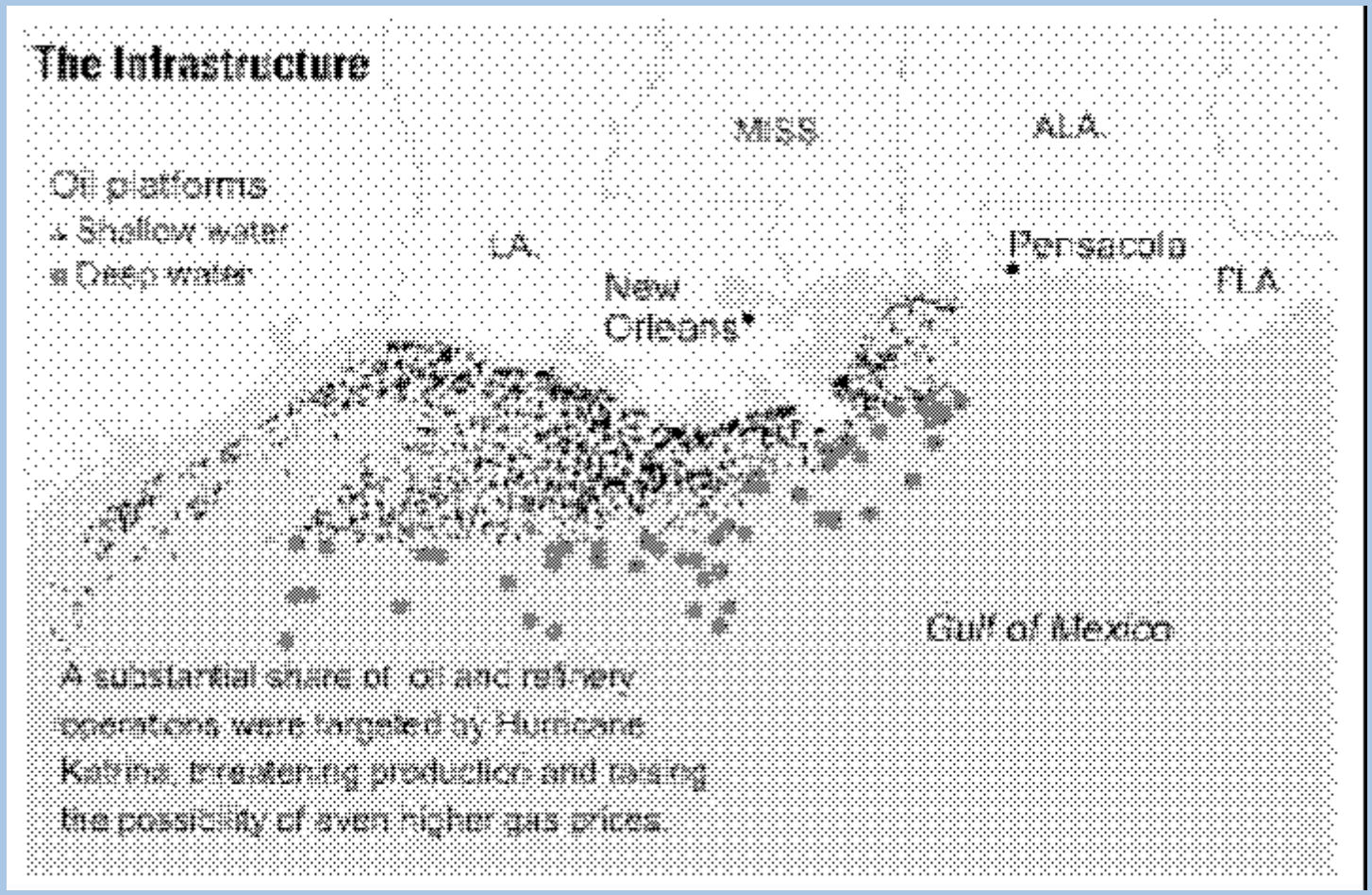
Five Fundamentals for the Sound Development of the Gas Industry

- **SAFETY**, Integrity and Reliability of Infrastructure and Appliances
- Security of Supply
- **Transparency**: Clear Regulatory Framework, Indiscriminately by Nature and in Execution
- Competitiveness
- Sustainability

SAFETY a MUST:

- For the employees
- For the customers
- For the company
- For the environment

SoS: Key Energy Region (1): Risk : Tornado's

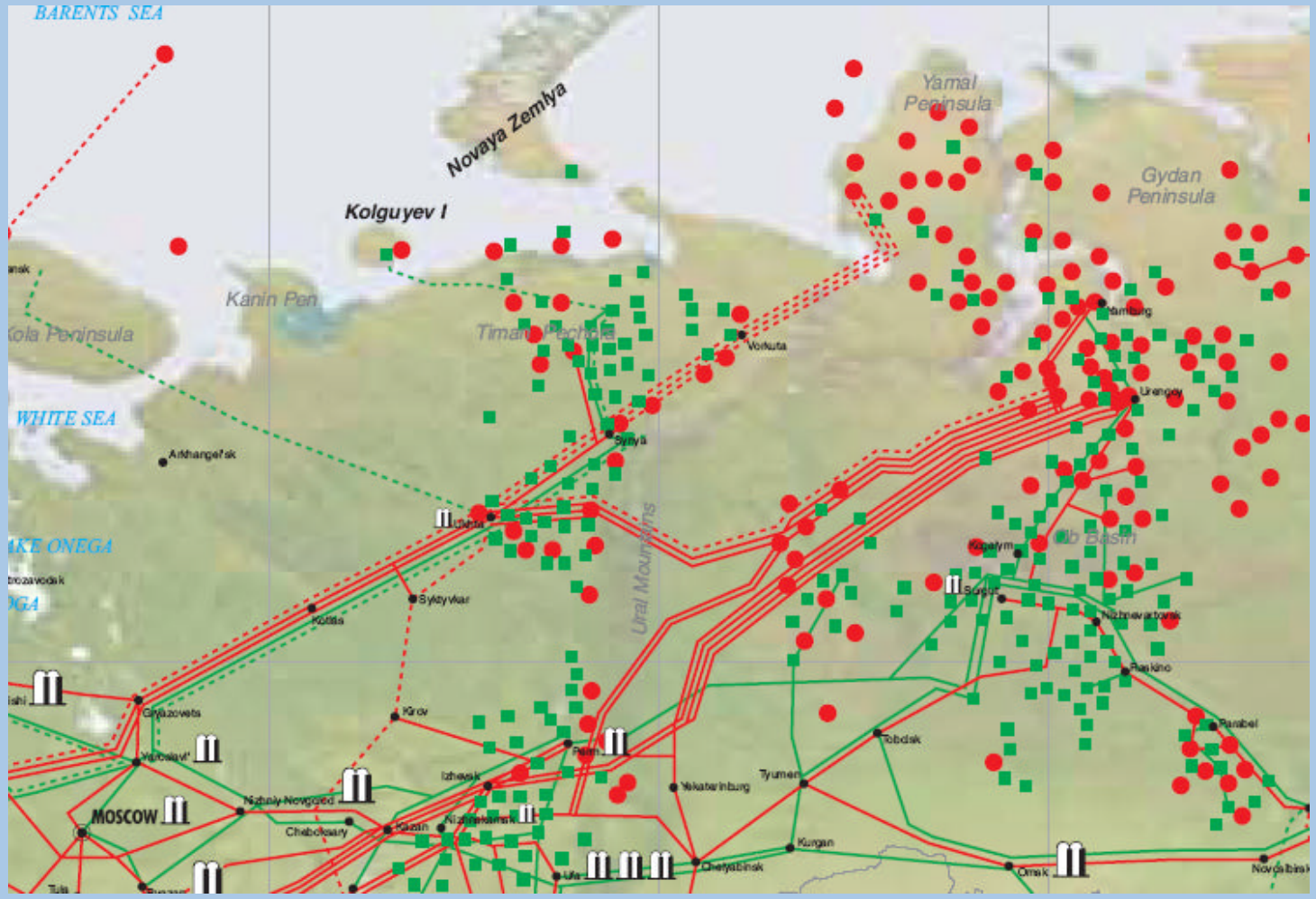


SoS:Katrina and Rita will they do away with ……

- **NIMBY,not in my backyard**
- **BANANA,build anything not anywhere near anything**
- **CAVE, citizens against virtual everything**

in the US, so LNG-Regassification Terminals can be build ??

SoS: Key Energy Region (2): Risk : Melting Permafrost

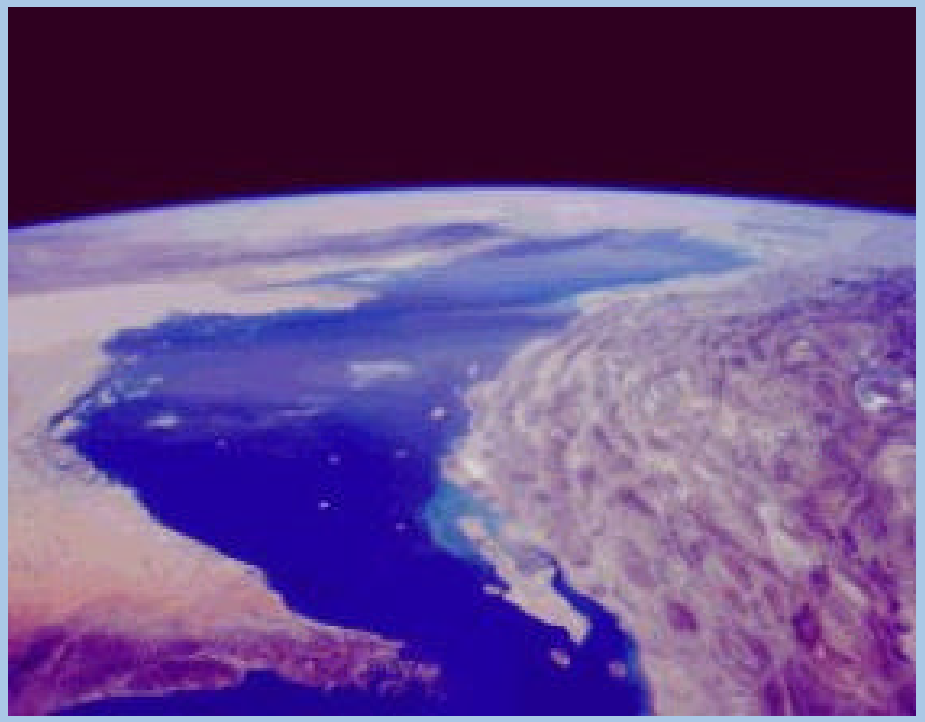


natural gas: energy driver of the world?

SoS: Key Energy Region (3): Risk : Political Situation?

Security of Supply: enhanced by International LNG Trade

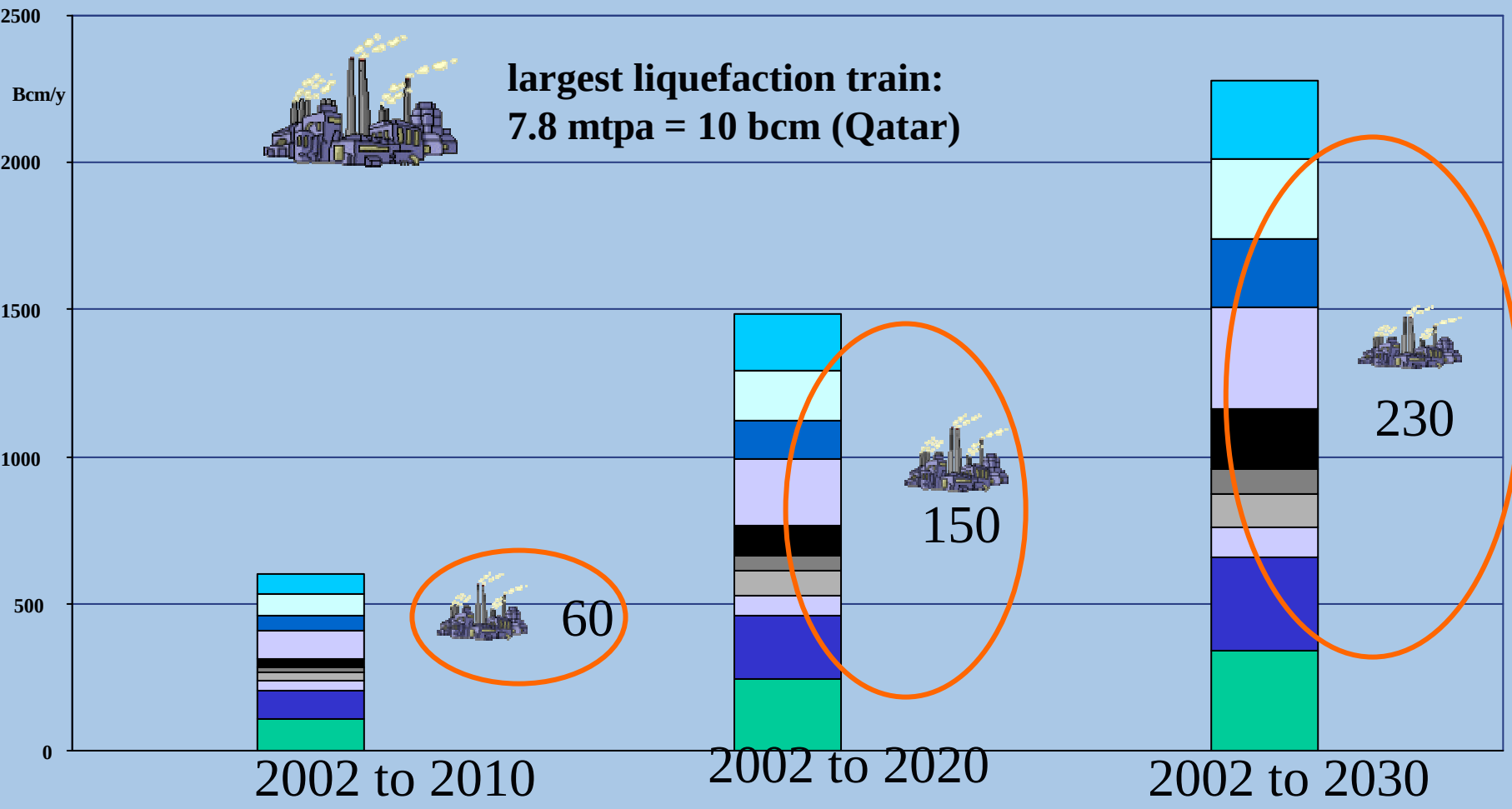
SoS: Several Key Straits : Risks : Overloading and Terrorism



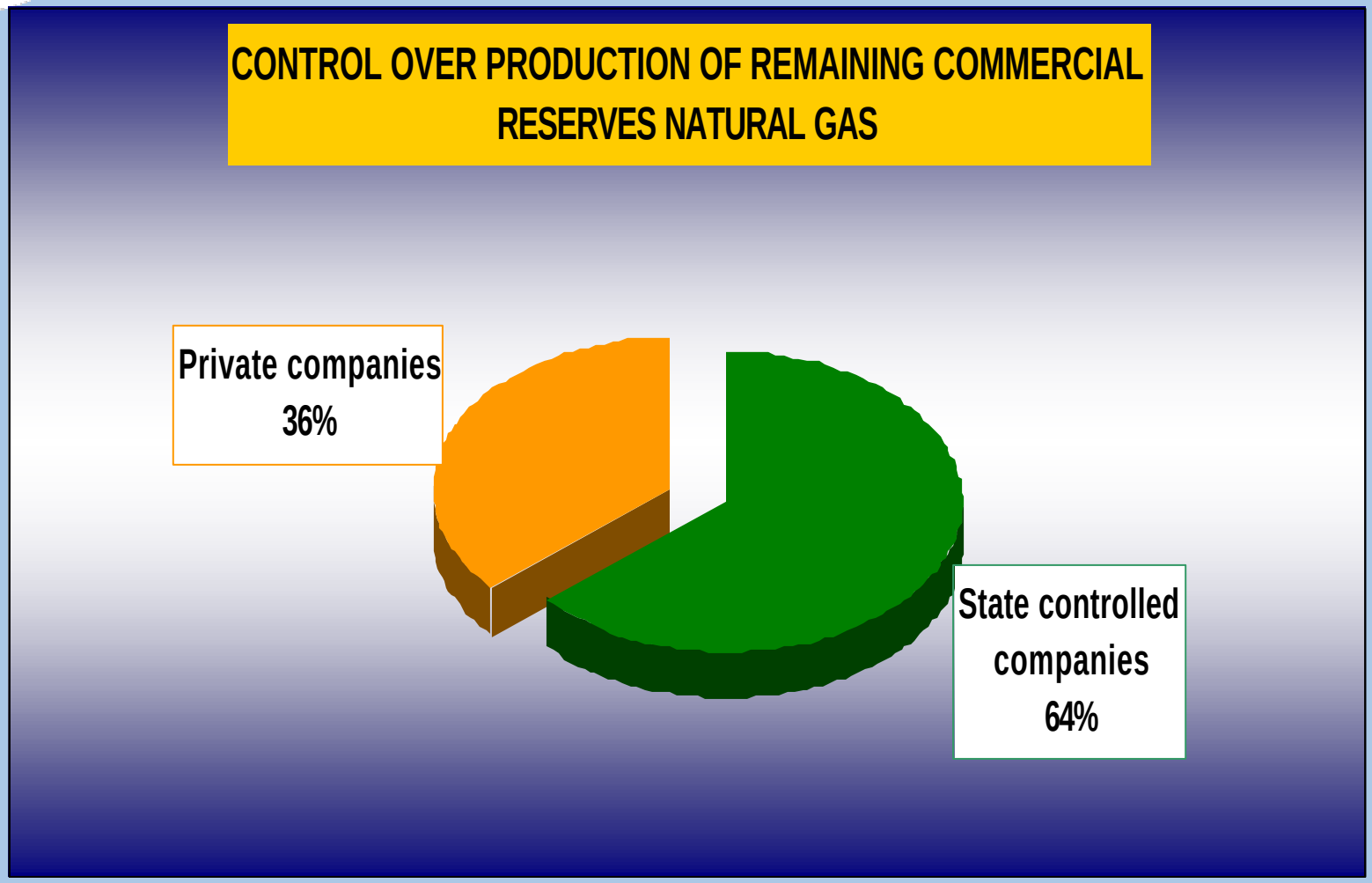
SoS: Giant Investments Necessary from now until 2030 (IEA)

- **Electricity:**
  - 4800 GW capacity
  - $4600 bln in generation
  - $5200 bln in transmission & distribution
  - 45/55 developed/developing economies
- **Gas:**
  - $2700 bln
  - 50/50 upstream (exloration & production) and downstream (transmission, distribution, storage, LNG-chains)
- **Coal:**
  - 'Only' $400 bln (mines, shipping, ports)

SoS: Incremental Global Gas Demand: Needed More Production Capacity



SoS: Who Owns the Gas (and Oil) Reserves?



SoS: May 3 2005: IEA Warns for Shortfall of Investments in Energy

- Global investment remained below the IEA's 2003 estimate of the $16.000bn needed by 2030 to meet demand

- Lehman Brothers / Citybank predict investments in exploration will rise by less than 6% in 2005 against 12% in 2004

- Mandil's (IEA, Oct.2004): "wouldn't it be better if Oil Cie's would invest more instead of executing shares buy back schemes" could well be a symptom of difficulties.

Share Buy Back Schemes
(source: annual reports)

- **ExxonMobil**: $24 bln since 1999 merger, reducing shares outstanding by over 8%
- **Shell**: since start 2001 62.5 mln shares cancelled; €4 bln + BP 1,5 bln
- **BP**: $7.5 bln in 2004, since 2000 $13.5 bln
- **Chevron**: common stock buy back program of up to $5 bln by 2007; at the end of 2004 more than $ 2 bln repurchased
- **Total**: 2000-2004 more than 17% of capital bought back (~€ 17 bln)

Total for these 5 oil-majors: ~70 bln US$

SoS: If Enough Viable Projects would have been Available...??

The 70 bln US$ Buy Back Cash Pile, and using a Debt/Equity Ratio of 25/75, could have financed a Production Capacity of:

- **4.7 mln bbl/d**
- **or 160 bln m3/y**

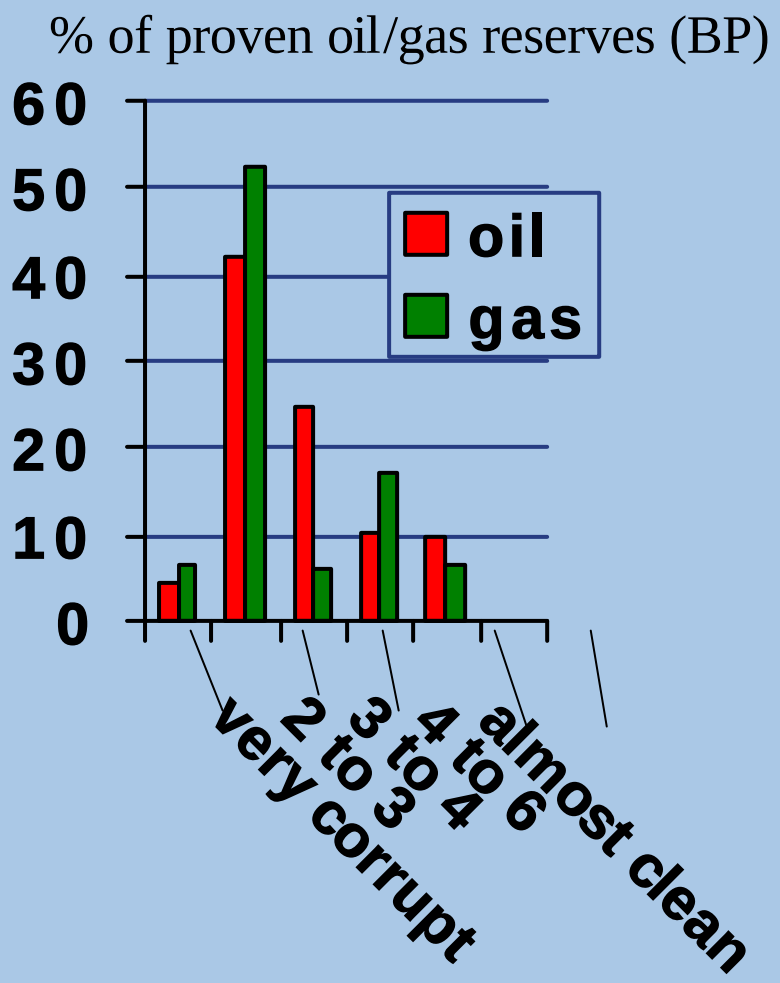
SoS: So There seems to be a Shortfall of Investments, why??

- Difficulties to get access to Reserves?
- No Adequate Legal and Regulatory Transparency?
- Bribery and Corruption?
- No Promising Acreage?
- Financial Markets and their Analysts?

Transparency: Corruption and Bribery versus Oil and Gas Reserves

- **Corruption index (by Transparency International) ranks countries' degree of corruption among public officials and politicians.**
- **0 = highly corrupt**
- **10 = clean**

BUT PROGRESS IS IN THE AIR



Transparency and Regulation: Three Commandments

for Effective Regulation

Predictability

stable, long-term regulatory frameworks

Consistency

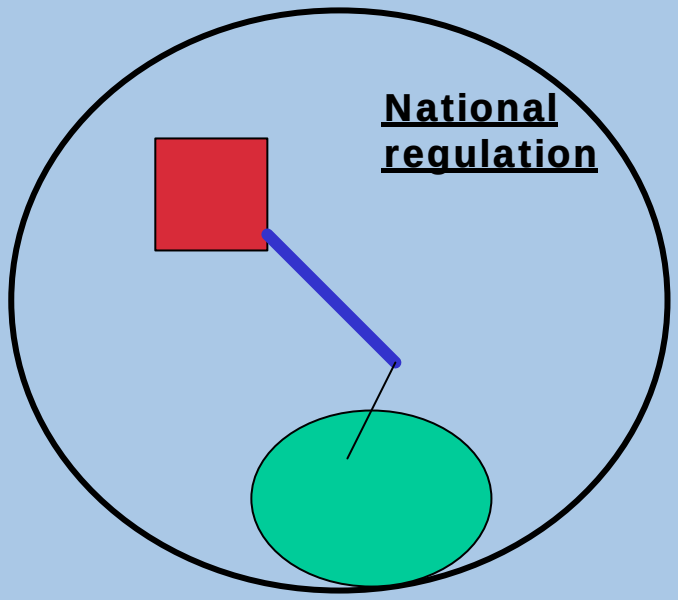
taking characteristics of natural gas into account

Reliable framework for enforceability of commercial contracts

Transparency

market rules and opportunities must be clear to all players

Transparency and Regulation: Electricity



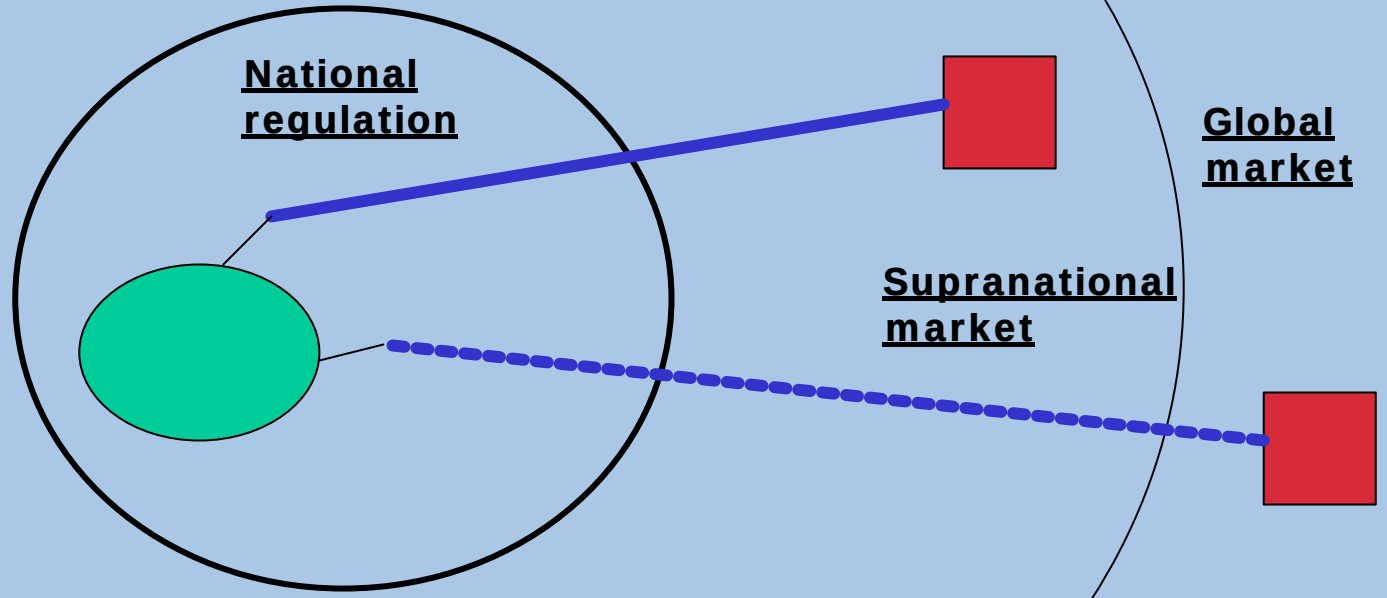
Business levels

- production
- transmission
- distribution / consumption

Electricity chain:

- Production close to consumption (local, regional, national scale)
- Regulation on a national level (foreseeable effects; consistency)

Transparency and Regulation: Gas



Business levels

- production
- transmission
- distribution / consumption

Gas chain:

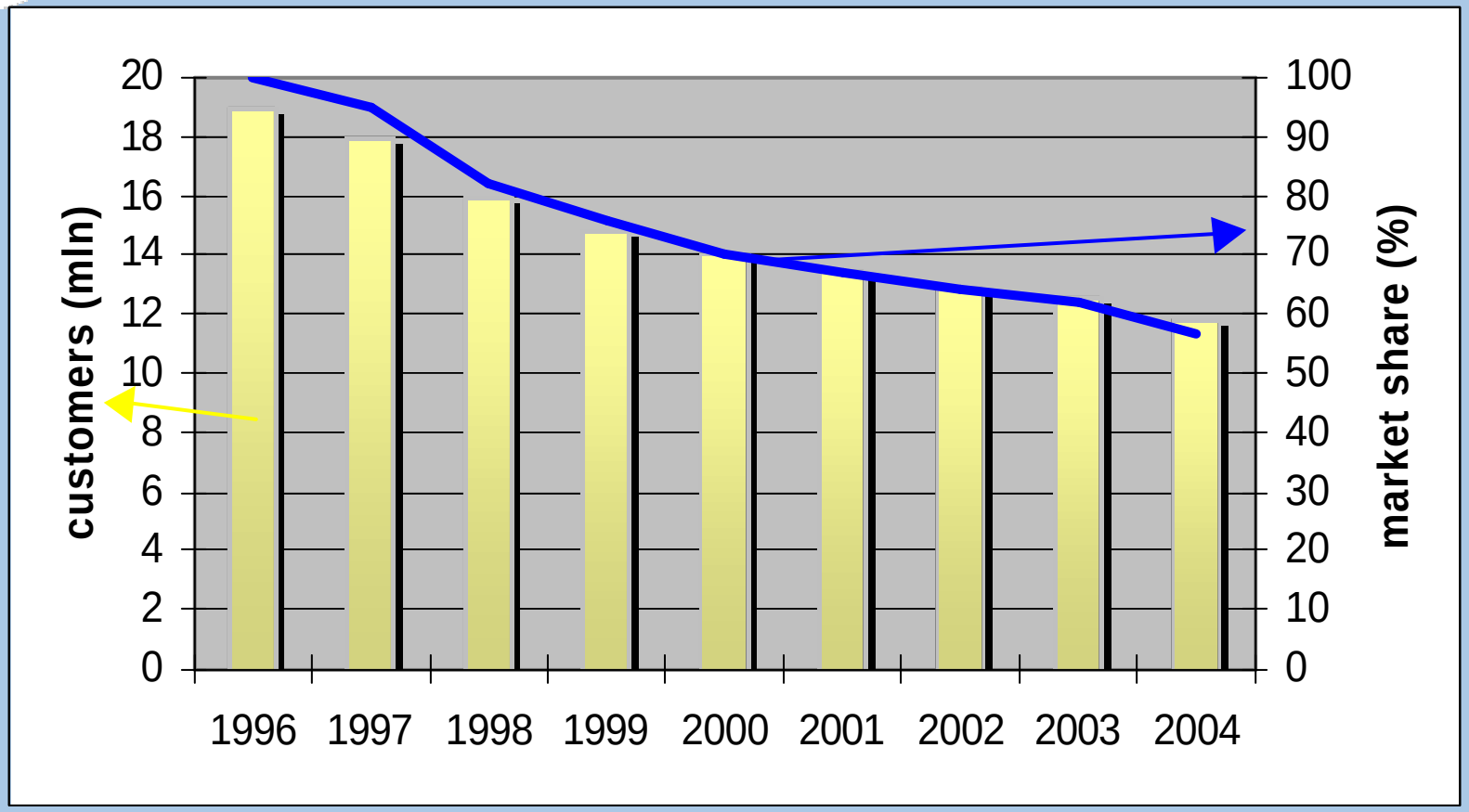
- Production and supply: supranational / global
- Consumption and marketing: national / local

National regulation versus **international market dynamics**

Transparency and Regulation: Europe / Neth.

- The Regulatory Concept is based upon the idea that supply of gas to Europe will be abundant, which remain to be seen;
- Competition needs also some overcapacity in the infrastructure
- More than once it looks like creating a market by “Intelligent Design” which is not necessarily in touch with reality.

Competitiveness:
How British Gas Residential developed under Liberalisation



Source: annual reports Centrica

Sustainability: Gas Flaring and Venting

- estimated 100+ bcm is flared/vented annually
  - flaring: associated gas
  - venting: for safety reasons

- World Bank launched GGFR in Dec. 2002:
  - Global Gas Flaring Reduction Partnership
  - Members: oil/gas majors and governments of producing countries
  - GGFR advices regulation and legislation
  - will share best practises and monitor volumes

- Nigeria to end flaring 2008

Sustainability: As a Responsible Industry We Acknowledge:

- The best supply is the saved m3

- The second best supply comes from the gas industry where people work together to serve people

  - » Gas: powers the people,
  - » preserves the world,
  - » promoted by IGU

Thank you for your attention

See you in Amsterdam!

23rd World Gas Conference and Exhibition

June 5 – 9 2006