BARRY ROGLIANO SALLES

SHIPBROKERS SINCE 1856

History, trends and prospects for LNG shipping
ABSTRACT

Paul-Albert Leroy
LNG Shipping
Barry Rogliano Salles

INSTITUTE OF ENERGY
FOR SOUTH-EAST EUROPE

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WORLD GAS
GENERAL FACTS

NATURAL GAS : SOME FIGURES

- **WORLD GAS RESERVES 2010 : 187 Trillion m3**
- **WORLD GAS RESERVES 2000 : 154 Trillion m3**

  (~20% increase of global reserves in 10 years)
- **MIDDLE EAST RESERVES 2010 : 76 Trillion m3**

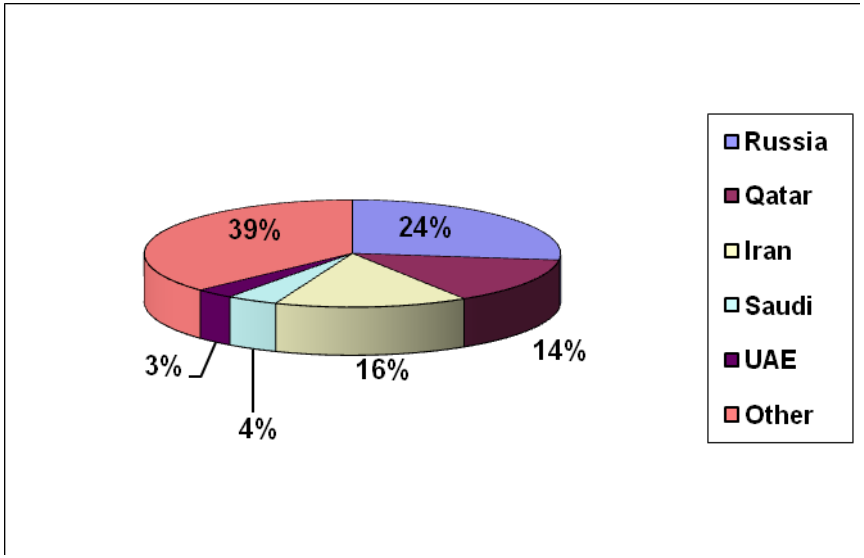
- **WORLD GAS PRODUCTION 2010 : 3.19 Trillion m3**
- **WORLD GAS PRODUCTION 2000 : 2.41 Trillion m3**

  (~30% increase of global production in 10 years)
- **MIDDLE EAST PRODUCTION : 0.46Trillion m3**

(Source :BP Statistics 2011)

WORLD GAS RESERVES

- World gas reserves: 187 Tm3 (6621 TCF)
- 40% of the reserves in Middle-East
- 53% of the reserves in Iran, Russia, Qatar
- Between 1990 and 2010, Middle-East reserves have increased by a factor 2



WORLD GAS PRODUCTION

- **2010 WORLD GAS PRODUCTION : 3193 billion m3**
- **2010 WORLD INTERNATIONAL TRADE: 975 billion m3 (~30%)**

  - » **678 billion m3 by pipe 70% pipeline**
  - » **298 billion m3 by ship 30% LNG carriers**

In 2010, around 9% of the gas produced in the world have been transported by ship corresponding to 483 million m3 of gas under liquid form (~600 times less)

LNG Shipping
Brief History

HISTORY OF LNG SHIPPING (1/2)

1958: 1st tanker shipment of LNG (Lake Charles, USA - Canvey Island, UK)

1964: 1st commercial trade to deliver Algerian gas to the UK and France.

By 1969: three more trades (Algeria - France, Libya - Italy & Spain, Alaska – Japan, *the 1st Pacific project*)

Development of the **Atlantic LNG market (mainly Europe and US)** coincided with:

- Oil price shock in 1973
- Nationalisation of IOCs' concession areas
- Restructuring of the N. American gas industry

⇨ LNG imports into Europe continued to increase, but the North American trade nearly collapsed

HISTORY OF LNG SHIPPING (2/2)

In the 1980s LNG trade shifted to the Pacific as **Korea** & **Taiwan** joined **Japan** as importers

From 1996: Atlantic Basin market began to increase in relative size (Spain France, UK, USA)

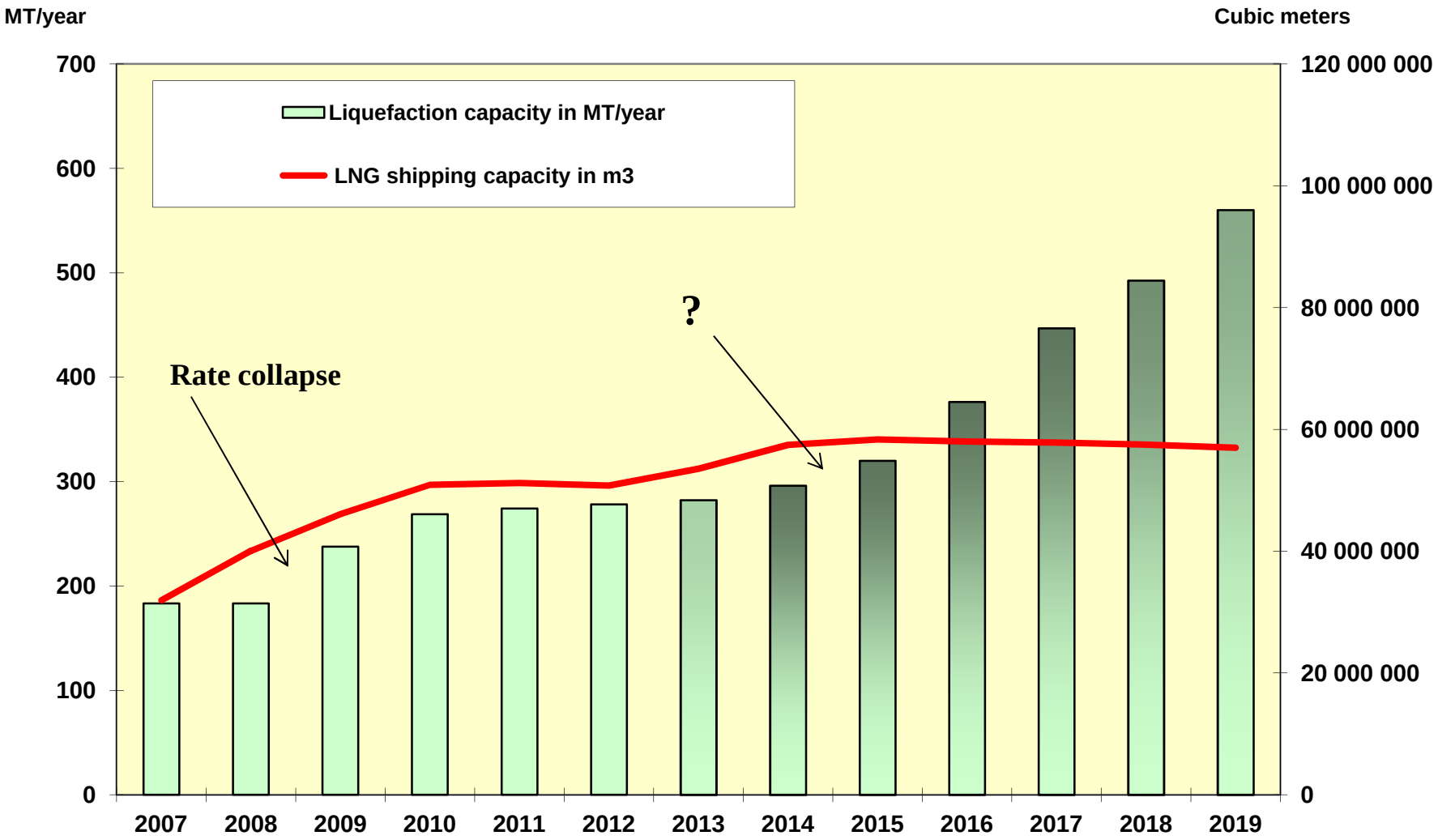
From 2000: growth 7-10% p.a., boosted by exports from **Qatar**, Indonesia, Malaysia, Australia, Nigeria, Trinidad & Tob., Algeria etc.

2011: LNG trade movements: 298 bcm / year with Qatar leadership with more than 120 bcm /year

LNG MARKETS

-PRESENT STATUS & EVOLUTION-

LIQUEFACTION CAPACITY VS SHIPPING TRANSPORTATION CAPACITY
Age of LNGcs below 35 years



LNG TRADE
- PRICING & ARBITRAGE

HOW TO TRANSPORT GAS ?

Long-term: gas prices driven by gas supply options, economic growth and political issues

Short term: depend on storage and flexibility

Prices can be calculated on a free-on-board (**FOB**) or delivered ex-ship (**DES**)

LNG PRICES

LNG prices usually expressed in US dollars per million Btu (**USD/Mbtu**).

No international price for LNG. Gas “hubs” of both LNG and pipeline gas:

- United States (**Henry Hub**)
- The United Kingdom (**NBP**)
- Europe (**Zeebrugge** in Belgium)

→Opportunities for **price arbitrage** and eventual **convergence of price between various markets**

LNG CONTRACTS (1/3)

Central to a traditional LNG project has been the long-term contract between buyer and seller known as the **Sale and Purchase Agreement (SPA).**

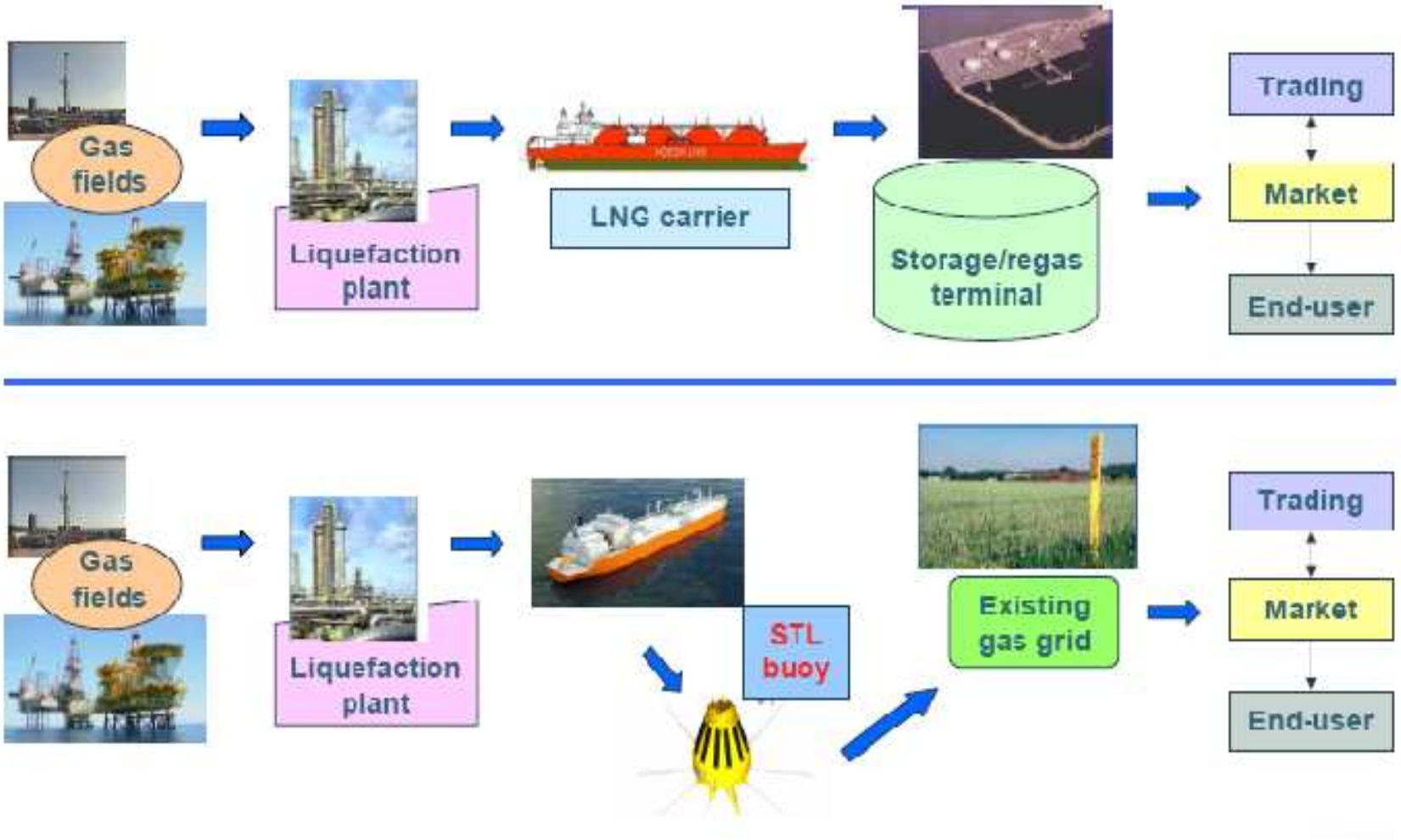
Early contracts: a typical duration of 20 years / oil, as the competitive target → **indexation clauses in oil terms**, a pattern that persists in markets to this day.

Contract prices are progressively indexed to gas prices (**gas-to-gas competition**)

A **growing short-term / spot market** currently represents up to **15%** of the total market → contracts increasingly become **more flexible** in volumes and price mechanisms

LNG CHAIN
- SHIPPING COSTS-

LNG TRANSPORTATION SCHEMES



LNG cost elements

LNG projects are among the most expensive energy projects.

4 main cost components (from the gas field to the receiving terminal):

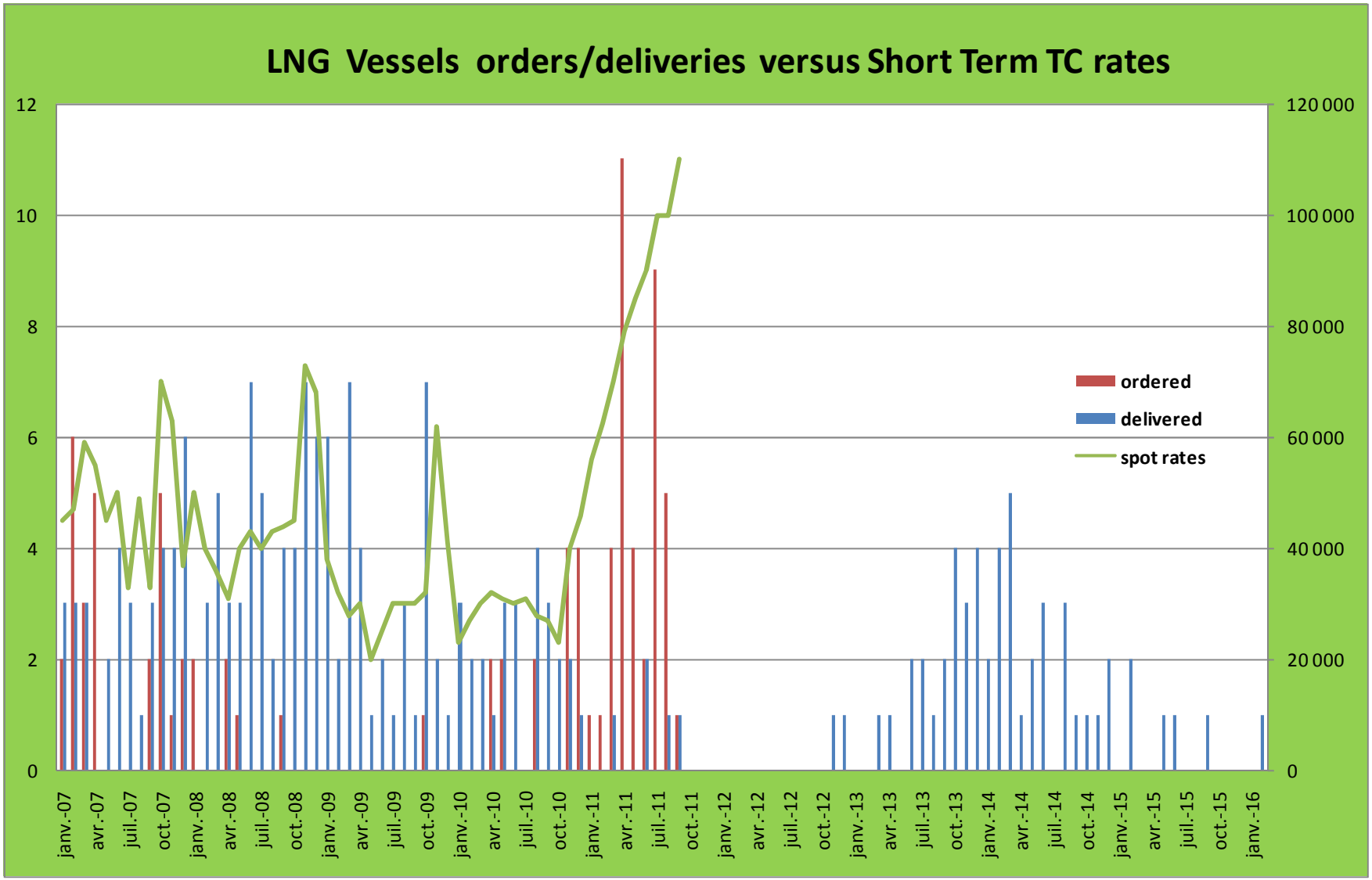
1. **Gas production: 15 - 20 %** of costs (from the reservoir to the LNG plant, including gas processing and associated pipelines)
2. **LNG plant: 30-45%** of costs (gas treating, liquefaction, LNG loading and storage)
3. **LNG shipping: 10 - 30% of costs**
4. **Receiving terminal: 15 - 25 %** of costs (unloading, storage, regasification and distribution).

SNAPSHOT OF THE LNG FLEET

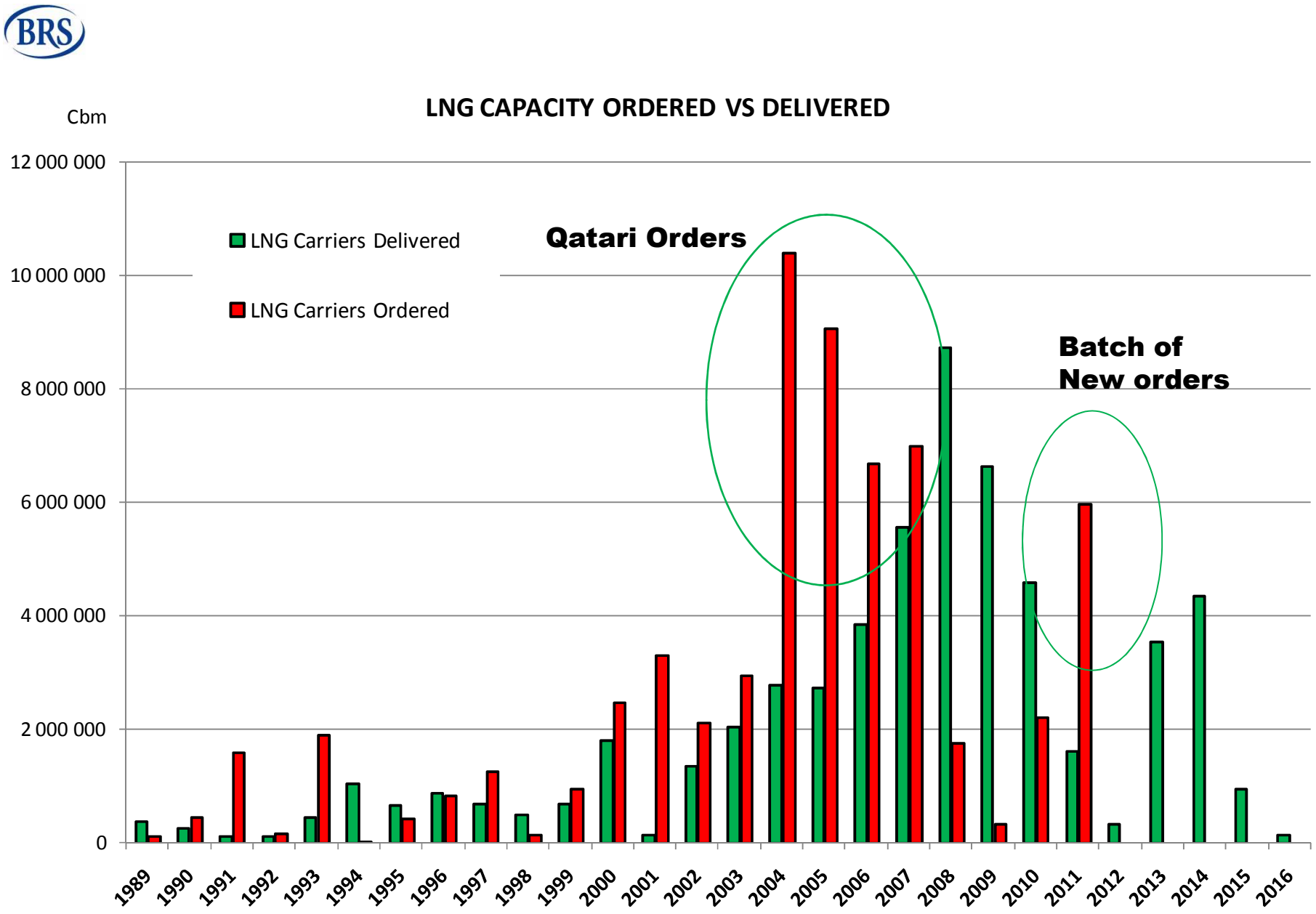
- Around 350 sea going LNG carriers
- 51 vessels built after 2001 with short term TC (less than 5 years) including 9 regas vessels
  - Less than 5 of those available on the market
- 27 vessels built in the 80s with short term TC
  - Less than 10 of those available on the market

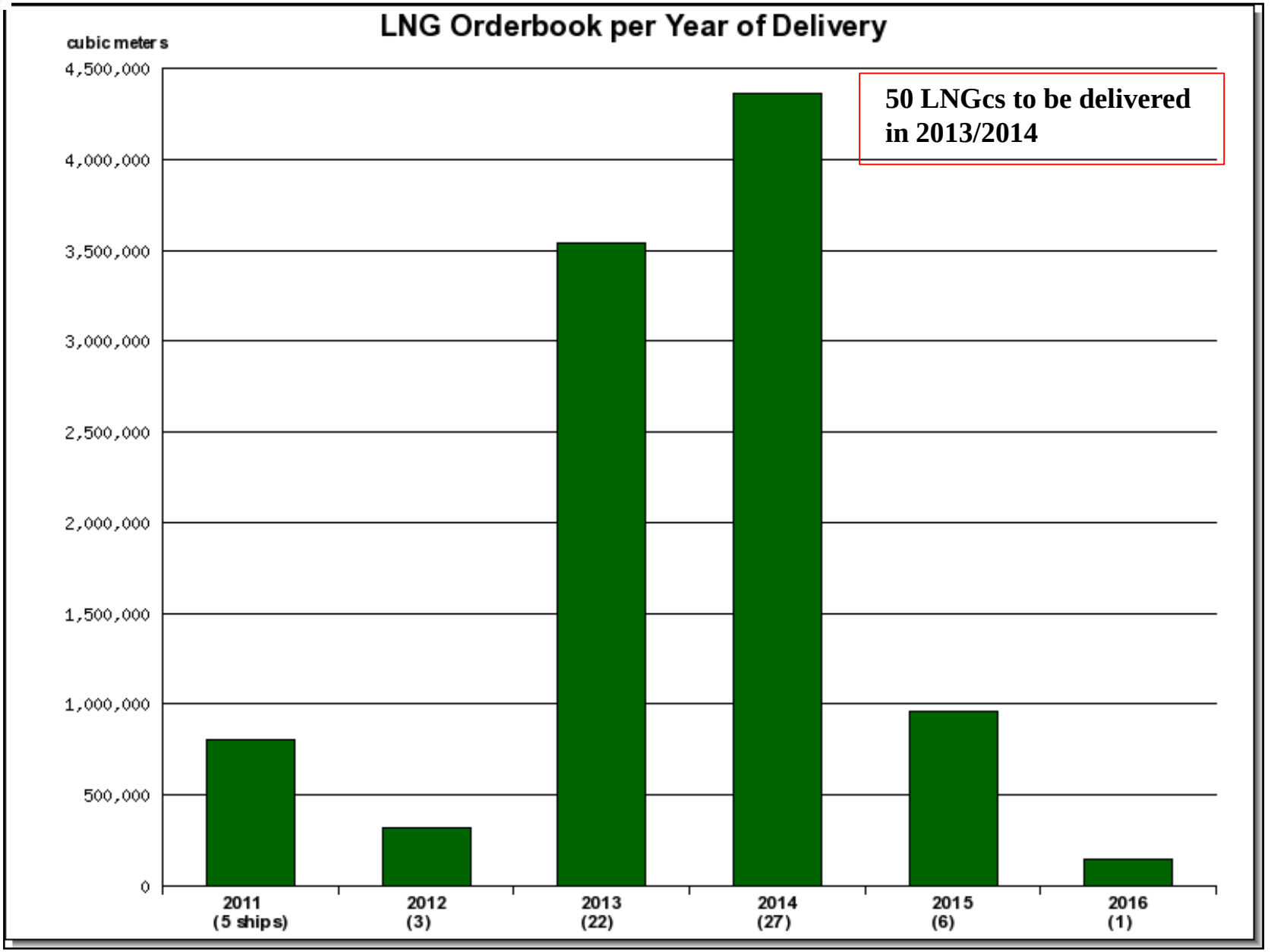
TC rate for LNGC 25 years + : circa 70 000 $/d

TC rate for LNG C less than 10 years: circa 120 000$/d

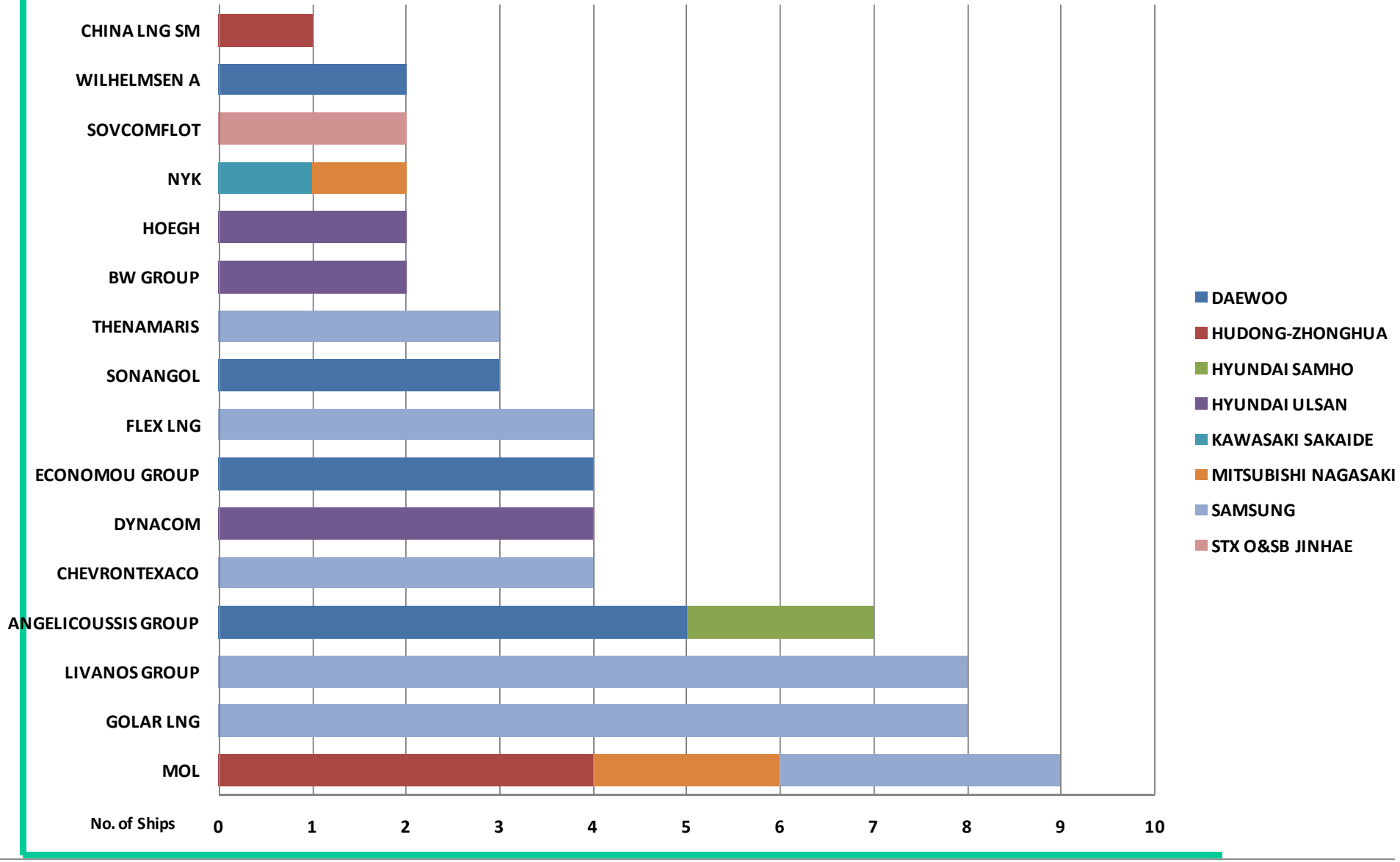

LNG Vessels orders/deliveries versus Short Term TC rates
12
10
8
6
4
2
0
120 000
100 000
80 000
60 000
40 000
20 000
0
ordered
delivered
spot rates
janv.-07
avr.-07
juil.-07
oct.-07
janv.-08
avr.-08
juil.-08
oct.-08
janv.-09
avr.-09
juil.-09
oct.-09
janv.-10
avr.-10
juil.-10
oct.-10
janv.-11
avr.-11
juil.-11
oct.-11
janv.-12
avr.-12
juil.-12
oct.-12
janv.-13
avr.-13
juil.-13
oct.-13
janv.-14
avr.-14
juil.-14
oct.-14
janv.-15
avr.-15
juil.-15
oct.-15
janv.-16

LNG CARRIERS
- FLEET STATUS & EVOLUTION-


LNG CAPACITY ORDERED VS DELIVERED
Cbm
12 000 000
10 000 000
8 000 000
6 000 000
4 000 000
2 000 000
0
LNG Carriers Delivered
LNG Carriers Ordered
Qatari Orders
Batch of
New orders
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016


LNG Orderbook per Year of Delivery
cubic meters
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2011
(5 ships)
2012
(3)
2013
(22)
2014
(27)
2015
(6)
2016
(1)
50 LNGcs to be delivered
in 2013/2014

Orderbook per Parent Group and Shipyard - 2011/09



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