CURRENT STATE AND PROPECTS OF LNG IN THE UNECE REGION

Francisco P. de la Flor

Benjamin Schlesinger

Luis Gorospe

María Á. de Vicente

Economic Commission for Europe
Committee on Sustainable Energy

Structure of the Study

I. Executive summary, conclusions and recommendations

II. Chapter 1: LNG market

III. Chapter 2: LNG value chain and technology

IV. Chapter 3: Regulation

V. Chapter 4: Interoperability

VI. Annexes.

The Team of Participants

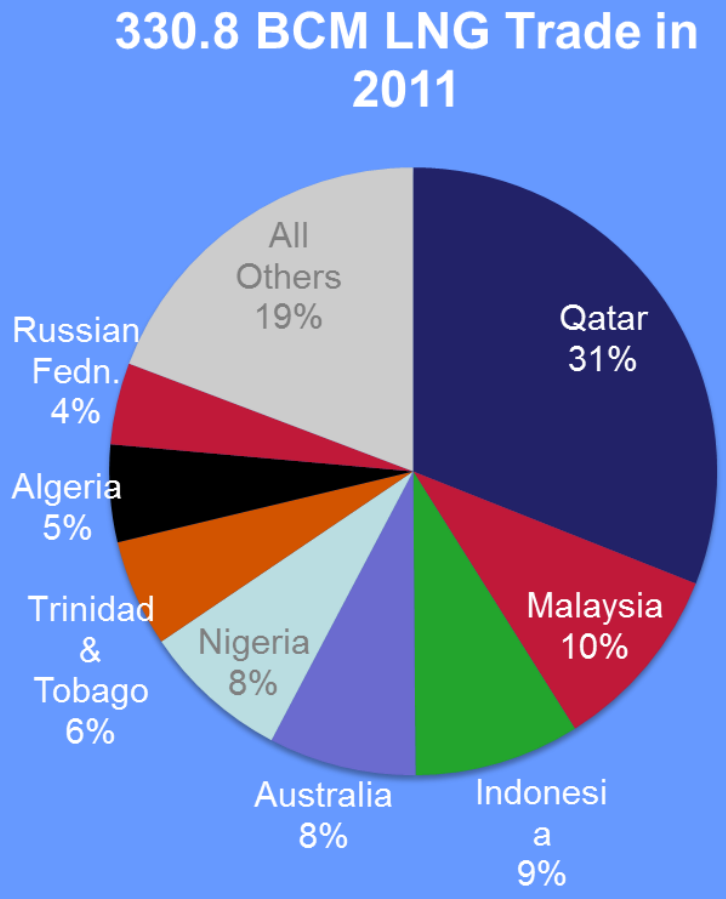
- Francisco P. de la Flor
- Benjamin Schlesinger
- Diego Portoghese
- Ramon Diaz Casado
- Victor Tuñón
- Alfredo Puente
- Luis Parada
- María Ángeles de Vicente
- Luis Gorospe
- Nathalie Sabbatucci

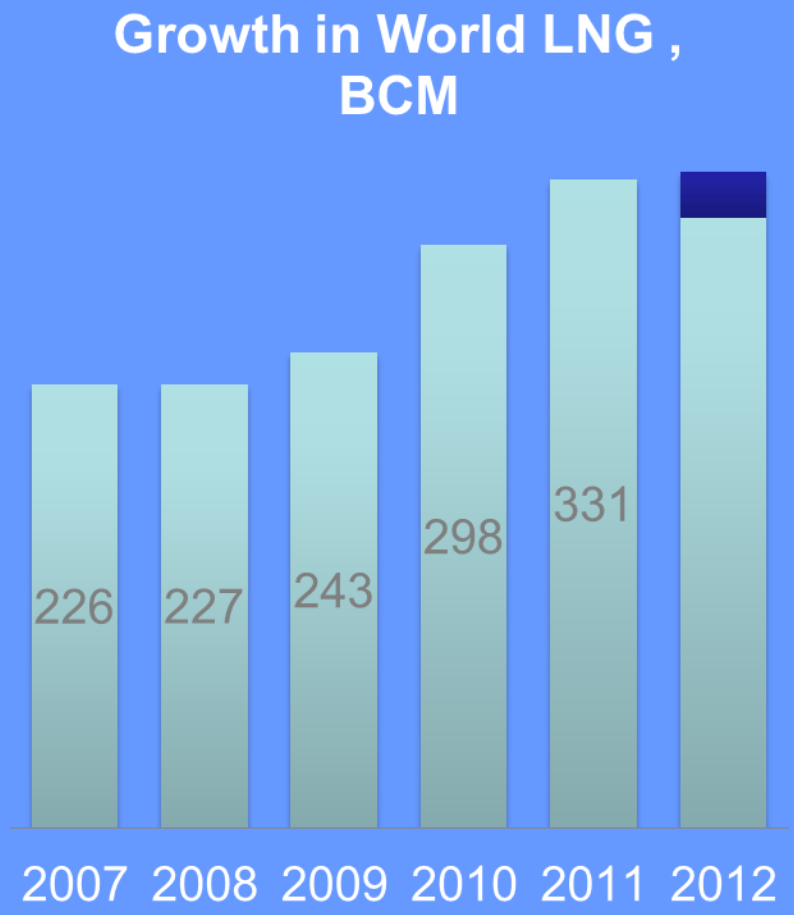
Chapter 1 Outline – LNG Market

Main results and conclusions of Chapter 1:

- Fukushima and declining gas production in UK and Western Europe caused a surge in LNG demand.
- In the next decade, improving economic conditions will add to LNG demand in the ECE region.
- New LNG supplies from Australia and US will contribute to reduced gas price differentials among continents.
- Pipeline gas and LNG competition will remain largely regional, e.g., in Northwestern Europe, since most other major markets depend on either one or the other.

Qatar's 8 trains in service balance global LNG supplies.





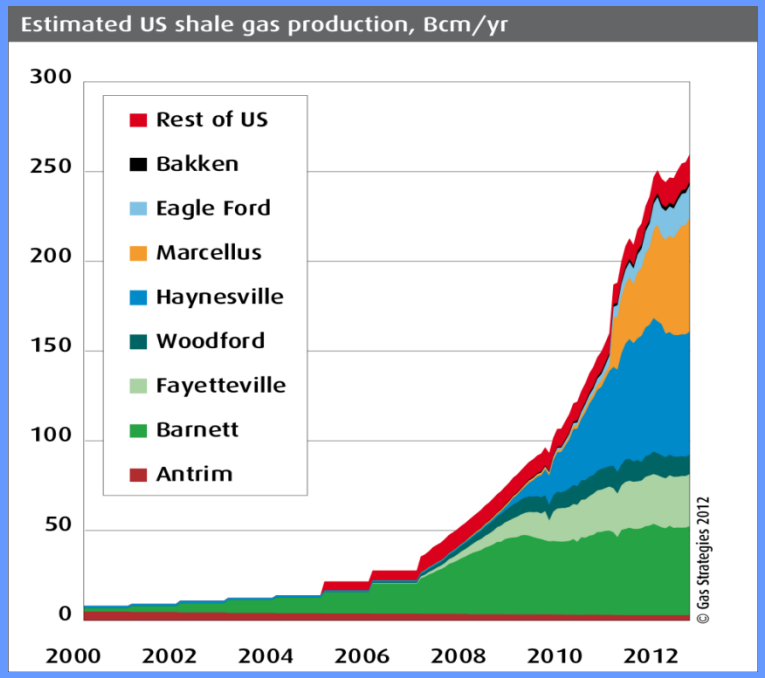
Source: UNECE WPG LNG report, Chapter 1, from BP Statistical Reviews, 2008-2012.

Asian LNG demand and US shale gas have widened world price gaps.

Source: UNECE WPG LNG report, Chapter 1, update courtesy Prof. Ken Medlock, James K. Baker III Institute, Rice University, Houston, TX .

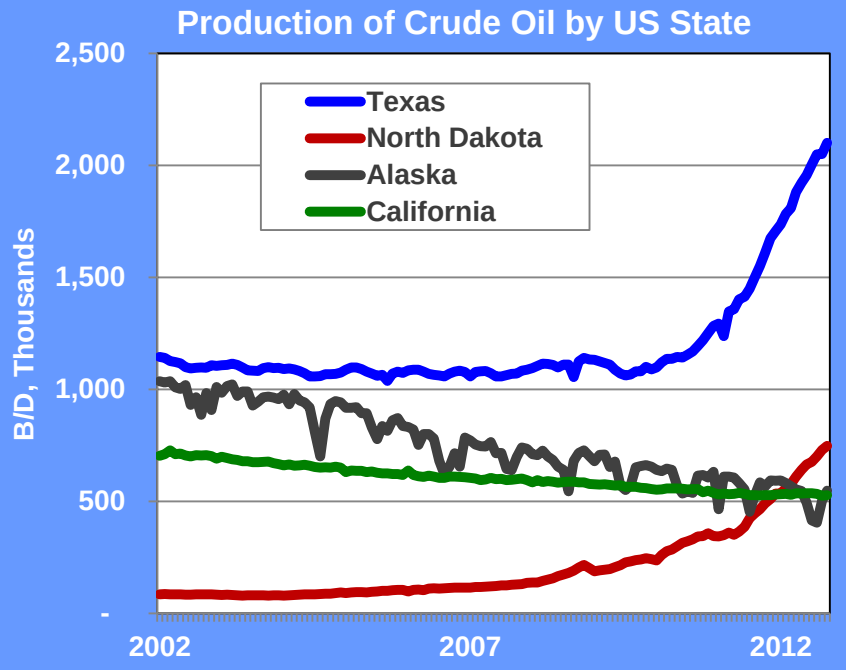
North American LNG export approvals are likely in 1Q2013.

North American LNG potential



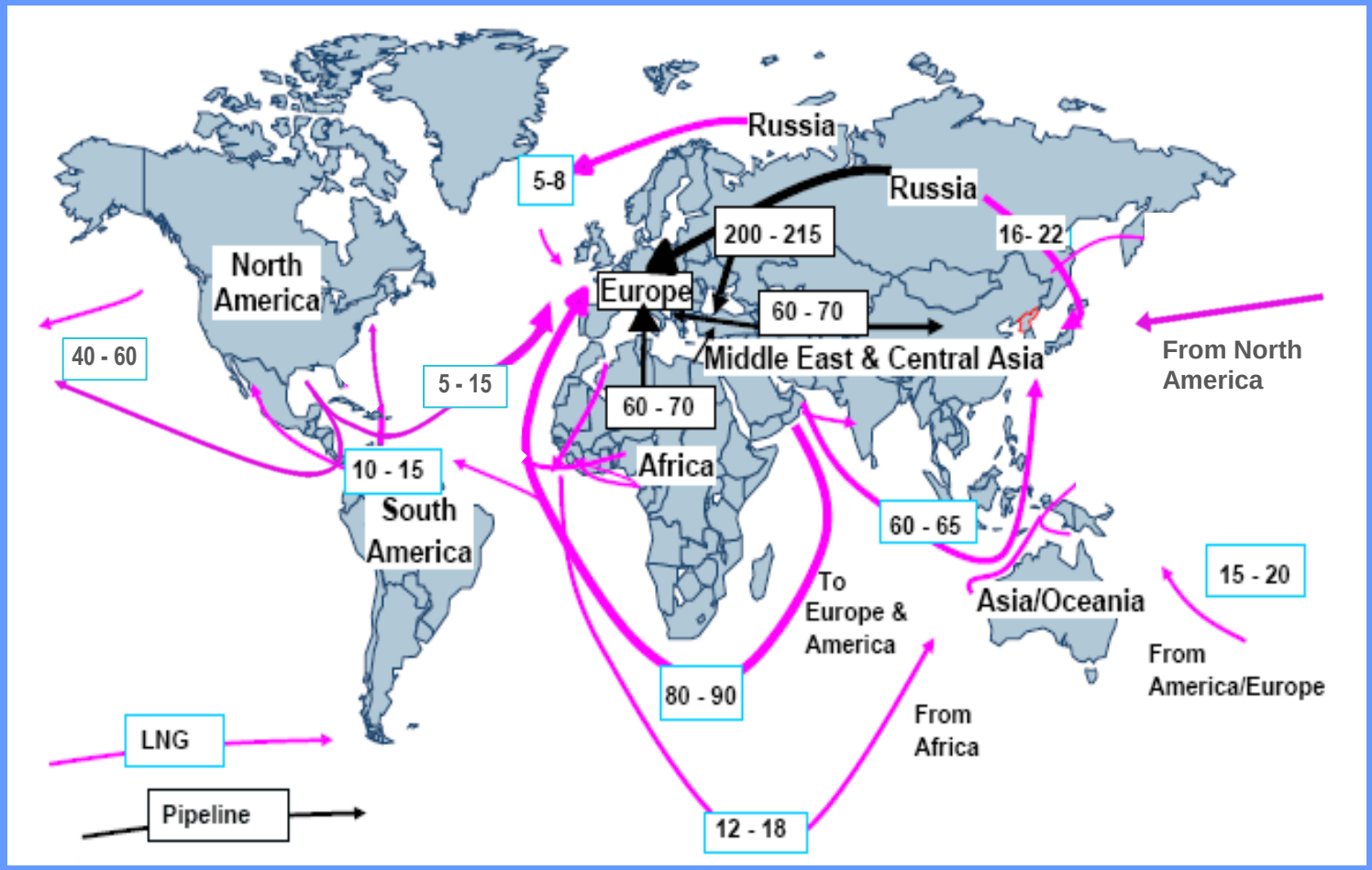
- 260 Bcm of shale gas in 2012.
- LNG exports required to balance markets – domestic demand is saturated.

Liquids growth now matching gas



- Drilling has shifted to oil, from gas.
- NGL is spawning new industries.

By 2020, global LNG flows could reach 566 BCM per year.



Source: UNECE WPG LNG report, Chapter 1, from Cedigaz, 2011 .

Chapter 2: LNG value chain

US brownfield bidirectional projects
Vs
Australia&E. Africa greenfield projects

Floating popularity
Regas/Liquefaction
Mature technology

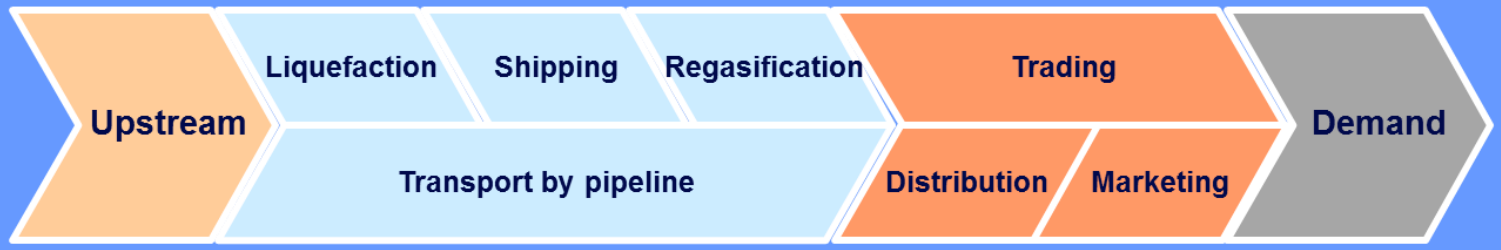
Europe:↓ Short term,↑ mid term due to domestic production decline

Asia: ↑ (but nuclear uncertainty Japan)

Coal vs Gas competition
↑ gas in US, ↑ Coal in Europe

Innovative uses: GTL, NGV

↑ weight of LNG in global gas consumption



Shale gas boom in the US

Huge gas discoveries E. Africa

Increasing number of players
NOC,IOC,Utilities,Banks,
Final Customers,Shipping Cos

Price indexation
Crude oil Vs Liquid Hubs

Value of flexibility
for arbitrage opportunities

Chapter 3: Regulation

- Regulatory models range from those where terminals heavy regulation to those based light-handed approaches.

- Difficult to draw definitive conclusions:
  - Regulated and non-regulated regimes are not good or bad per se.
  - Regulatory regimes are in general well adapted to the different market models where they are inserted.
  - These models are in constant evolution, as a result of the recurrent interaction between the industry and regulators.
  - Regulated access have advantages where market structure makes competition more difficult to develop since it facilitates monitoring and transparency. However, it is less adaptable to the evolving market needs

Chapter 3: Regulation

- **Europe**: rTPA is the default regime, but exemptions allowed since 2003; nowadays 60% of capacity under rTPA and the rest, exempted. The coexistence of regimes poses some questions. Regulatory developments are focused on implementation of the 3rd Package, CMPs and transparency. Tendency to make use of Open Seasons for new capacity, and sometimes to reallocate existing capacity.

- **US**: decision to remove access regulation from new terminals adopted in 2002 (Hackberry) and 2005 (EPAct). The access model is not driving the regulatory debate nowadays after the shale gas revolution. DOE determination on export authorisation permits for non-free trade is expected soon (only Sabine Pass approved).

Chapter 3: Regulation

- **Asia**: TPA not implemented, but debated in some countries. Operators in Japan are obliged to create manuals for negotiations about the use of LNG terminals. Not used in practice.
- Sound and stable **investment climate** is crucial for LNG facilities, in particular for regulated infrastructures.
- Regulations are affected by **strategic considerations** like SoS, competition,… E.g. SoS Regulation in Europe or the EIP under development.
- **OU** happening in Europe through integrations of TSOs and LSOs, though it is not required.
- **Permitting processes** complex and time-consuming but from an aggregated point of vie have not been an obstacle f the successful development sufficient supply capacity

Chapter 4: Interoperability

- Great expansion of LNG business
- Sampling, analysis and measurement are very important for quality control
- Quality adjustment at LNG liquefaction plants and at regasification terminals
- LNG tanks management procedure
- Operational safety at LNG facilities and carriers

Chapter 4: Interoperability

- Critical aspect: ship to terminal interface compatibility
- Enormous range of coastal and port environments
- Differences in local operational procedures from port to port
- Increasing ship-shore compatibility

Chapter 4: Interoperability

- Gas quality harmonization is an important effort
- Global harmonization or at least regional harmonization
- Ever-changing regulations and technology
- Accurate analysis and measurement of LNG quality is very important
- Lean composition of unconventional gas: Shale Gas, Tight Gas and CBM

Chapter 4: Interoperability

- LNG industry: excellent safety record
- Increasing spot-trading cargoes and off-loading projects (FSRU, FSU, etc…)
- Encourage dialogue between: LNG producers and receivers, LNG shippers, etc…
- New bi-directional capability, regasification+liquefaction in the same plant

Chapter 4: Interoperability

- Summing up, the chapter Interoperability and safety identifies the current issues, trends, requirements and challenges to allow the LNG industry to grow in safety and interoperability worldwide

Summary, conclusions and recommendations (I)

1. Global and dynamic business with several regional/local perspectives: new markets, new players along all the value chain, exporters and importers, Bright future
2. Huge investments involved: Long term perspective with increasing trading and arbitrage opportunities
3. Different business models and integration in the value chain and risk management hedging
4. High and increasing impact of the technological changes and improvements; FLNG, Small Scale
5. Complementarity between Pipe and LNG
6. Coexistence of several access rules to LNG terminals vs. *essential infrastructure* or *option value.* TPA access fosters competition
7. The interoperability and quality are not an *issue* per se, but harmonisation improves trading

Summary, conclusions and recommendations (II)

1. Do leave the market (fairly) work; investments and investors are available; looking for the right balance between the long terms perspective and the arbitrage opportunities,
2. Do not establish barriers to trade, neither administrative nor technical, removing those already in place
3. Do let coexist the different business models and terminal access conditions; fitting with local conditions, preventing from unfair distortions (rTPA vs. exemptions)
4. Do allow every country benefiting from LNG, either with own LNG import facilities and/or by interconnections. Take advantage of the facilities is already in place in the region

…The Pending Topics

- Permits for some pictures and charts
- Editorial issues
- Meeting with producers
- Dissemination of the job

THANK YOU FOR YOUR ATTENTION