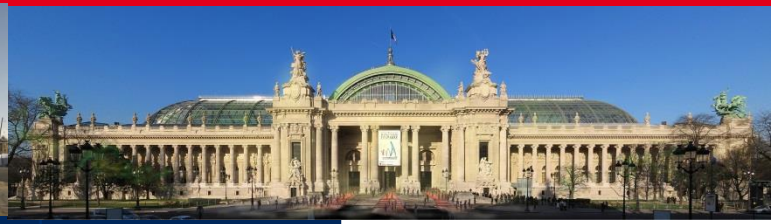
26th World Gas Conference

1 – 5 June 2015, Paris, France



SMALL SCALE WHOLE SALE LNG
PGC D3

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TOTAL Gas & Power

IGU
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Small Scale LNG: Introduction

- The Small Scale LNG Study Group (PGC-D3) was launched in the fall 2012
- Strong interest in, and participation of, major LNG industry players
- Two meetings per year involving participation of companies all over the world including France, Germany, India, Iran, Italy, Japan, Korea, Malaysia, Netherlands, Qatar, Russia, Spain, Thailand,…
- PGCD-3 Triennium Report focused on Wholesale Small Scale LNG:
  - Parties Involved
  - Drivers
  - Business Models
  - Technology
  - Safety

Small Scale LNG: Where we come from…

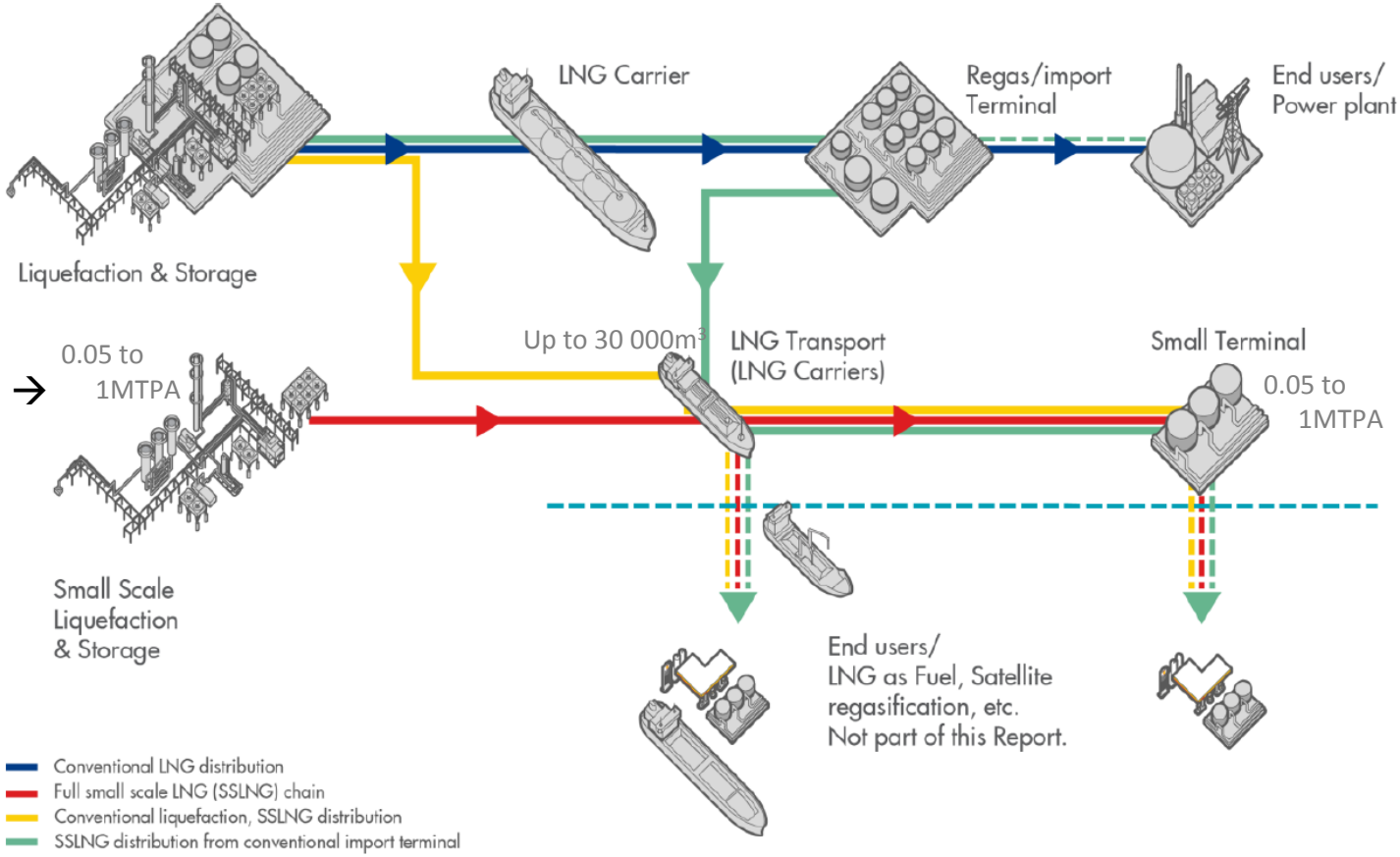
- Historically, LNG started small scale : first commercial liquefaction plants in 40’s (peak-shaving around 0.002 MTPA in the US)
- In1964, LNG plant started up in Arzew, Algeria (trains – with capacity below 1 MTPA)
- Economy of scale from then on has been the driver in LNG (mega train : 7.8 MTPA)
- The last couple of years SSLNG gained attractiveness with some drivers compensating diseconomy of scale (environment, price arbitrage…)
- SSLNG is a reality and the aggregated worldwide production is currently reaching a total capacity around 15 MTPA, with many new players with diversified profiles

Small Scale LNG: From value chain to value network

Conventional →

Small Scale Whole Sale →

Small Scale Retail →

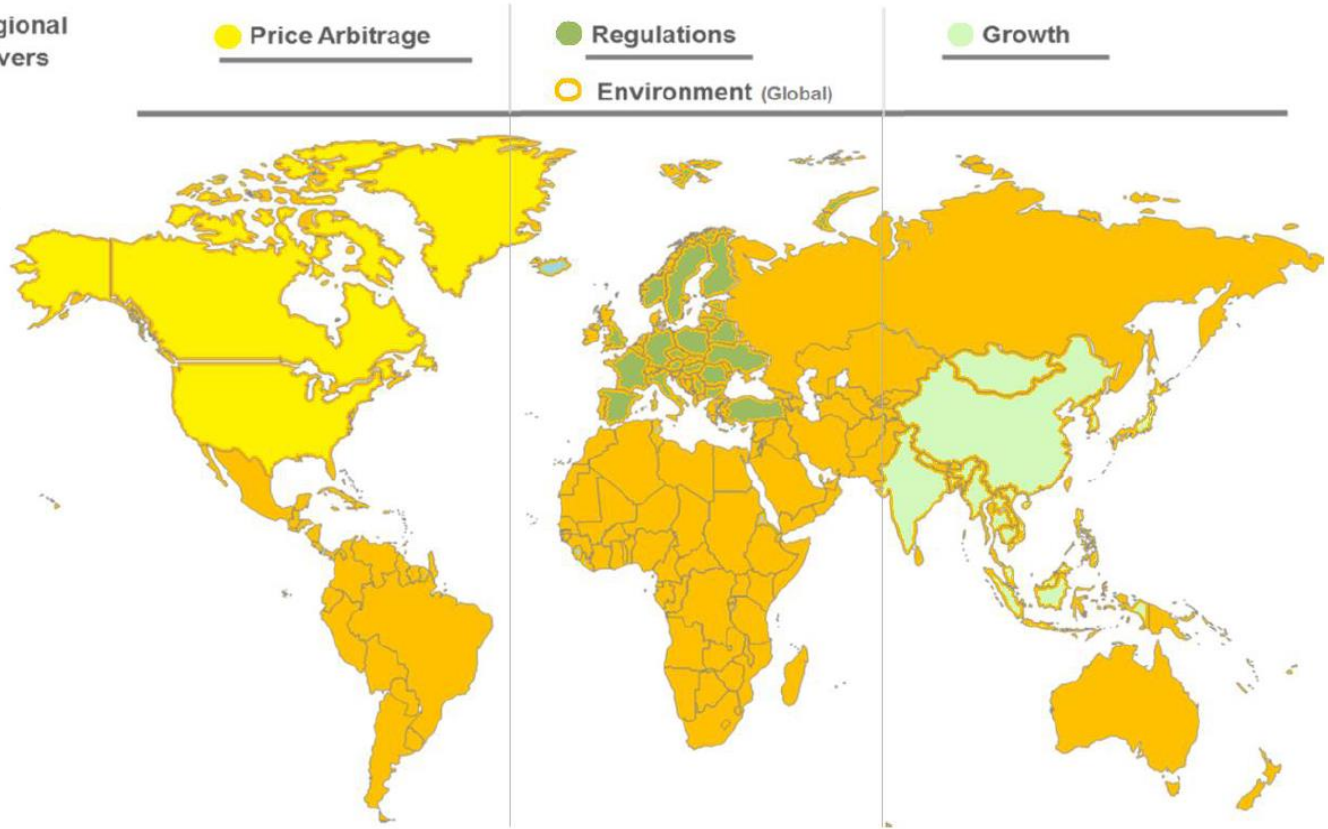


Small Scale LNG: Distinct Regional Drivers

America
- → Abundance of shale gas
- → Stranded gas monetization
- → Absence of pipeline grid

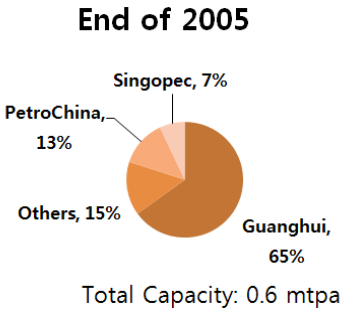
Europe
- → Regulations in maritime sector

China
- → Clean fuels incentives

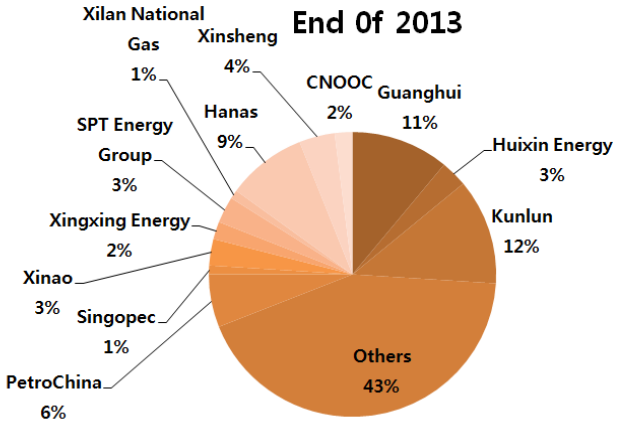


Small Scale LNG: Examples

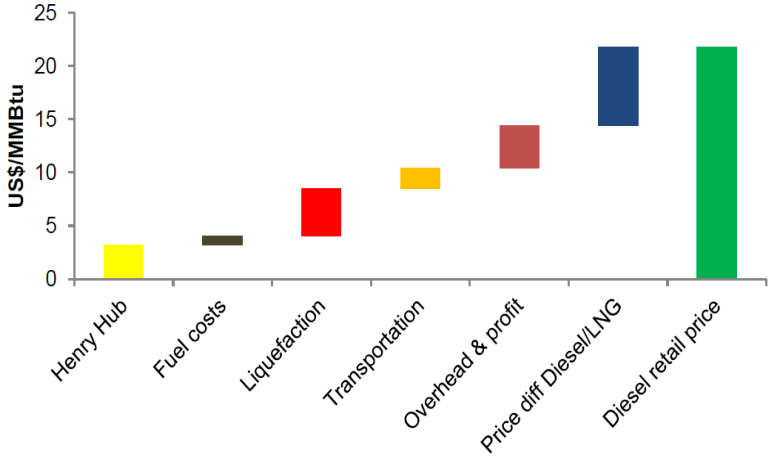
Most of the growth is in China where efforts are in place to get clean fuels to fight air pollution in the cities



Total Capacity: 0.6 mtpa



Total Capacity: 8.9 mtpa



In USA, price arbitrage stimulated by abundance of shale gas is driving SSLNG development

Small Scale LNG: Characteristics & enablers

Characteristics

- Modularization
- Simple systems
- Lean plant operation (unmanned…)
- Limited investment

…and enablers:

- Standardization (enable compatibility, market markers…)
- Availability of LNG supply and demand (secure vs commitment)
- Stimulating policies and regulation (taxes…)

Small Scale LNG: Challenges & recommendations

- Maintain the high safety level
- Put effort on cost effectiveness vs diseconomy of scale, to increase resilience against oil price fluctuations
- Develop Consistent technical guidelines and standards
- Common ground of awareness with all stakeholders for better acceptance
- Develop specific standards for training and foster certification system for personnel working in SSLNG
- Sharing of LNG safety learnings in the industry

Thank you

Small Scale LNG: Liquefaction plant

LNG Plant, Kwinana, Australia, 61 KTPA . *Source:* Linde/Wesfarmers

Small Scale LNG: Wholesale & Retail

- The SSLNG Wholesale is depicted in the blue dotted boundaries
- The SSLNG Retail is depicted in the green dotted boundaries