



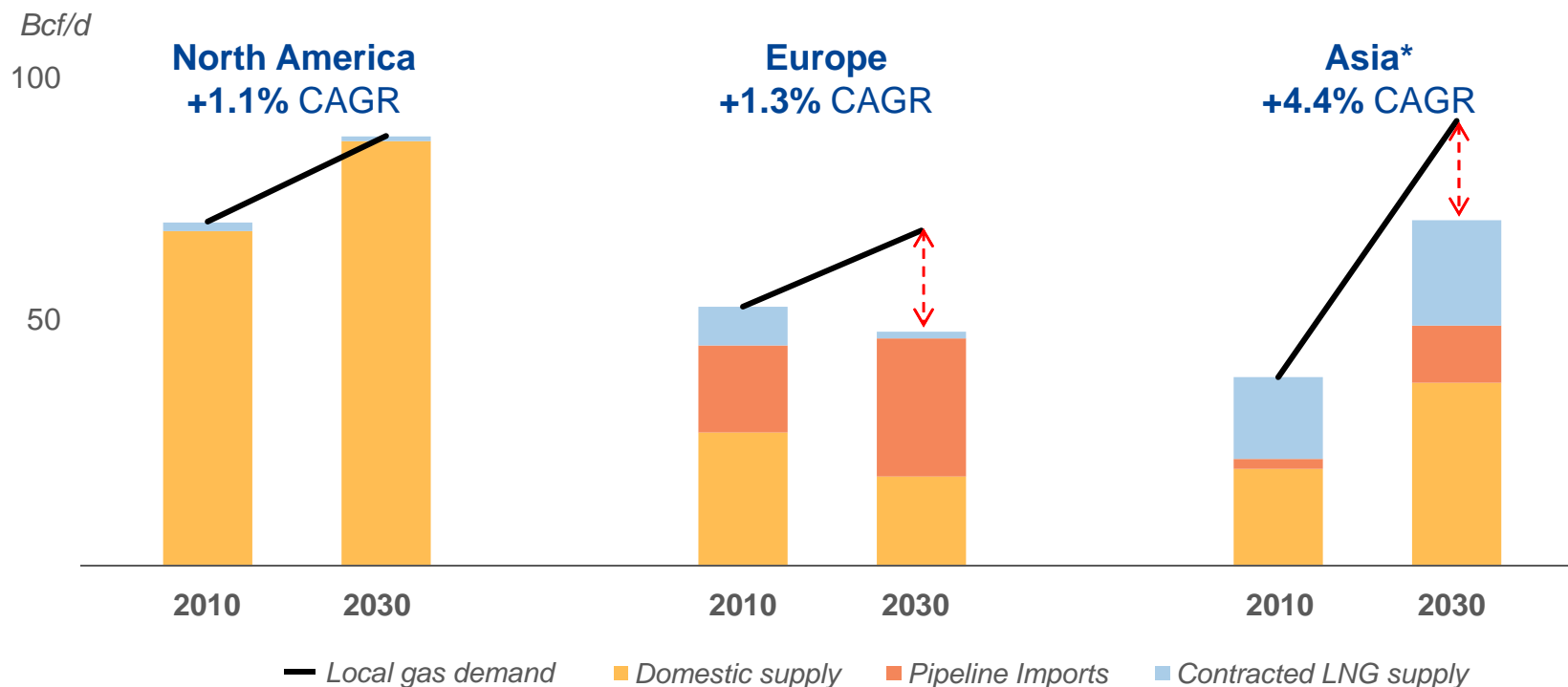
NEW FRONTIERS FOR GAS SUPPLY CHAIN

Philippe Sauquet



ESSENTIAL NEED FOR NEW LNG PROJECTS

Satisfaction of gas demand by region

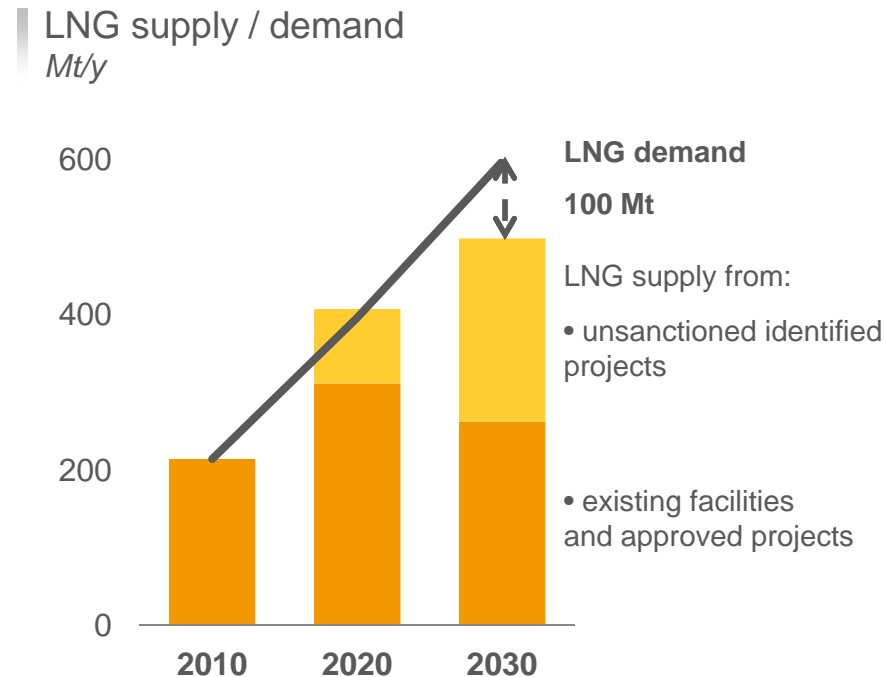


Global gas demand (+2% CAGR)
increasing faster than oil driven by Asia and Middle East

European and Asian markets **balanced by new LNG projects**, even with potential additional supply from shale gas and softer CO₂ regulations in Europe

*Japan, China, South Korea, Taiwan, Singapour, Thailand, Vietnam, Pakistan, India, Bangladesh, Myanmar.

SURGING LNG DEMAND, TIGHTENING MARKETS



Strong LNG demand in both traditional and emerging markets

Essential need for new LNG projects in 2030 (~340 Mt)

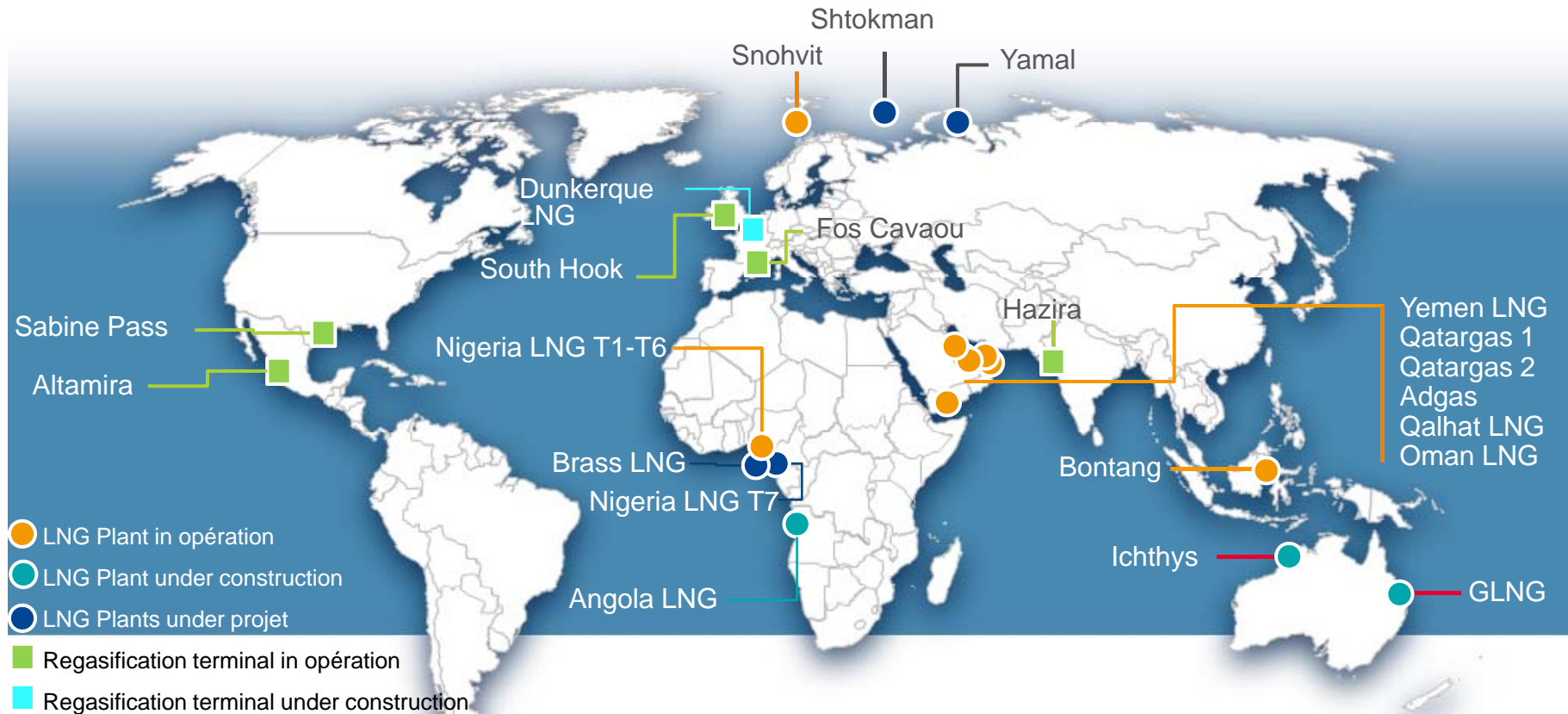
Potentially reduced by 30 Mt considering lower CO₂ emission constraints in Europe

Challenges of LNG projects increasing tensions on supply

Tightening markets on the long term supportive of gas prices in Europe and Asia

* LNG supply based on existing facilities, approved and other identified projects for the 2020-30 period

A DIVERSIFIED LNG PORTFOLIO



Angola LNG



GLNG



Ichthys



Shtokman

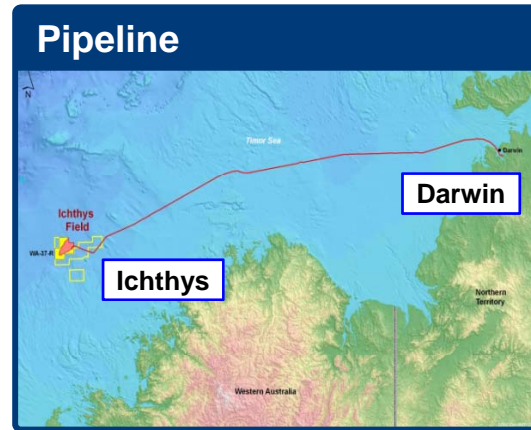
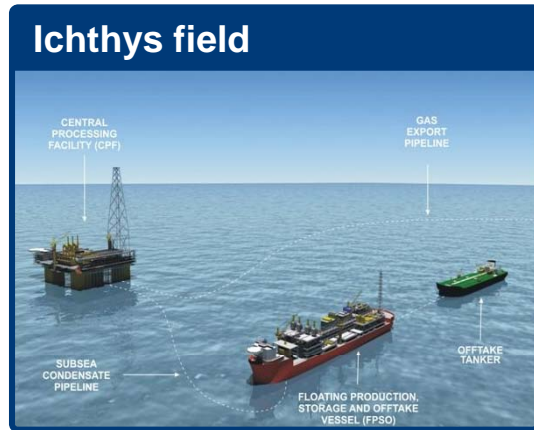


Brass LNG



Yamal LNG

ICHTHYS : THREE MAJOR DEVELOPMENTS IN ONE PROJECT



Key Data

- Total 30%, Inpex 66% (Operator)
- 2P reserves 12.8 Tcf gas & 530 Mb cond.
- Plant Capacity 8.4 Mt/y LNG + 1.6 Mt/y LPG
- 100 kb/d condensate at peak
- FID Jan-12, start-up end 2016

Total's contribution

- Major project management expertise
- Over 20 secondees including project director
- Offshore and LNG technology leadership
- LNG marketing and shipping

Technical Challenges

- 1st major development in Browse Basin
- Among the largest offshore facilities ever
- Designed to withstand cyclones
- CO₂ management (re-injection)

YAMAL LNG – TARGETING FIRST PRODUCTION END 2016

80%  **NOVATEK** - 20%  **TOTAL**

31 TCF Gas Field

- Shallow onshore
- Proven & Probable certified gas reserves

16.5 Mtpa LNG plant

- 3 trains, onshore, piled facilities
- Modularized construction
- Proven process (APCI)

Full Year Access Port

- Air bubbling & hot water circulation
- Ice breaker for ice management

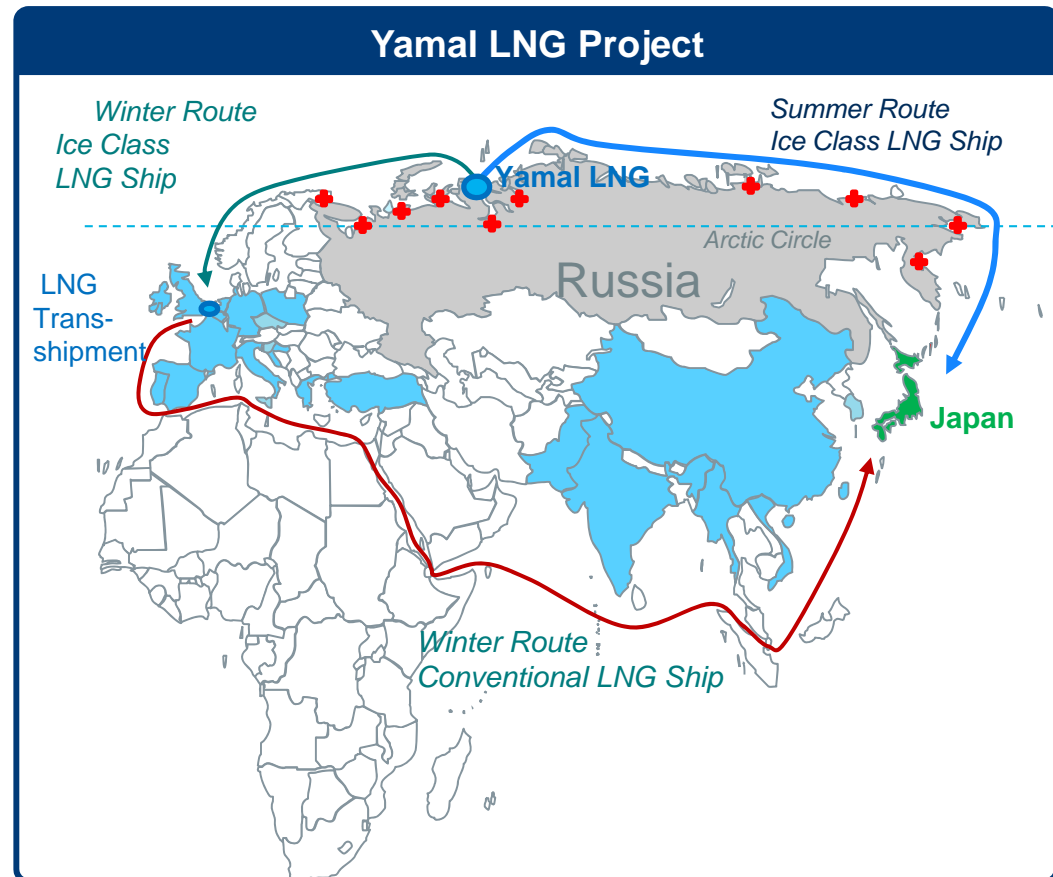
Ice Class LNG ships

- 170,000 m³, no ice breaker support
- Sailing to Asia during Summer
- Sailing to Europe at all times

Marketing

- Targeting Europe & Asian Markets
- LNG delivered ex-ship

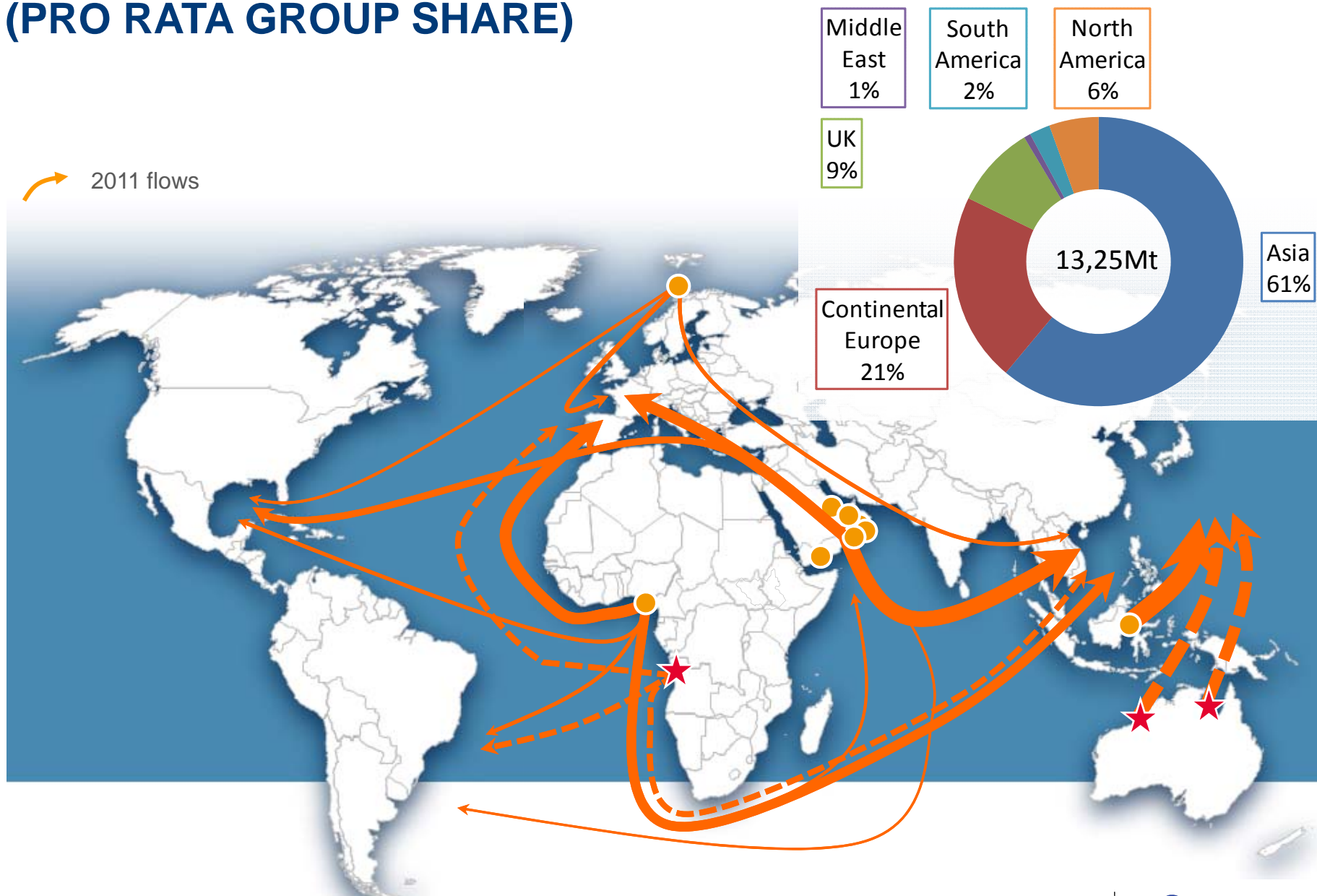
Russian government support



**Yamal Peninsula - 500 TCF gas
Operations since 1974**



E&P : LNG SALES DESTINATION 2011 (PRO RATA GROUP SHARE)



2011 : AN OPTIMISED LNG TRADING PORTFOLIO

