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Better Data – Better Decisions

Gas to Liquid (GTL) / Coal to Liquid Technologies and Markets Explained

Yuichiro Torikata
Energy Analyst, IEF, Riyadh

Key motivations to deploy liquefaction technologies

- **Abundant coal and/or gas resource bases**
- **Maximisation of resource value / Diversification of asset portofolio**
- **Stranded energy resources**
- **Need for energy resources diversification**
- **Energy supply/demand security**

Rationales for these liquefaction technology deployment are different

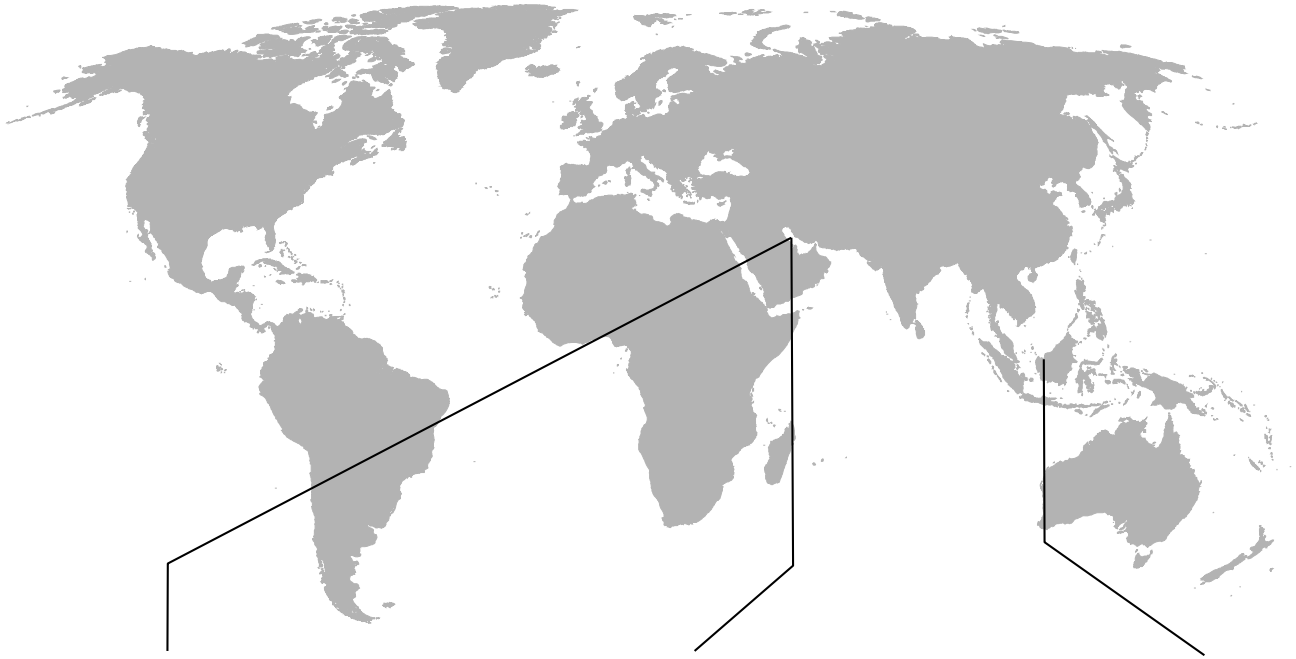
Existing and planned capacity (FT-GTL)

Project Parameters			Plant Location		Announced Technology Parameters		
Operator	Status	Operational Year	Name / Locality	Country	Nameplate Capacity	Million US$	$/bd
Shell	Operating	1993	Bintulu	Malaysia	12,000	$1,500	$125,000
Sasol	Operating	1994	Sasolburg	South Africa	5,600	ND	ND
Shell	Operating	2006	Bintulu	Malaysia	2,700	ND	ND
Sasol / Chevron[1]	Operating	2006	Oryx	Qatar	34,000	$1,500	$44,118
Shell[2]	Operating	2011	Pearl	Qatar	140,000	$20,000	$142,857
Chevron[3]	Construction	-	Escravos	Nigeria	34,000	$10,000	$294,118
Sasol	Proposed	2018	St Charles	USA	96,000	$14,000	$145.833
Calumet	Proposed	2014	Karns City	USA	1,000	ND	ND

First large Scale GTL facility

Source: IEA

Rationales for these liquefaction technology deployment are different



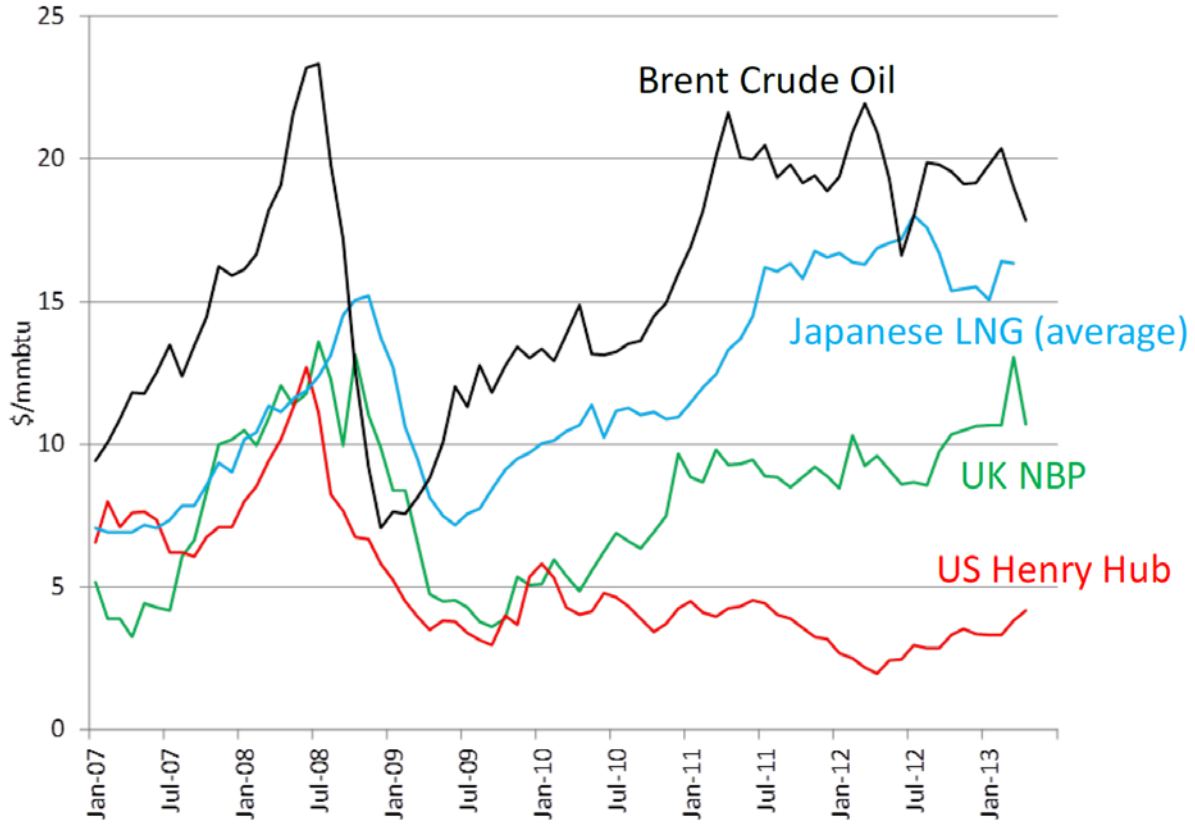
Pearl, Qatar
Operator: Sasol, Chevron
Capacity: 140,000 KBD
Investment: US $24 b

Oryx, Qatar
Operator: Sasol, Chevron
Capacity: 34,000 KBD
Investment: > US $900m

Bintulu, Malaysia
Operator: Shell
Capacity: 14,700 KBD
Investment: > US $ 1b

Source: Compiled by the author with various sources

Differentials between oil and gas price is key indicator of GTL profitability



Sources: Platts, Argus, EIA

Differentials between oil and gas price is key indicator of GTL profitability

Technical and economic characteristics of FTGTL and LNG production (capacity of 10 billion m3/year)

Characteristics	FTGTL	LNG
CAPEX, $ billion	3.8 (depends on the location of the plant)	4.2 (coastal location of the plant)
Production of liquid hydrocarbon, bbl/d	100,000 (GTL products)	280,000 (LNG)
Consumption of natural gas for the production of liquid product, ft3/bbl.	10,000	3,570
Requirements for the disposal of CO2	Disposal of apart	Disposal of the total volume
Factory area without common facilities	About 1 km2	About 0.1 km2

Source: Olga Glebova, The Oxford Institute for Energy Studies

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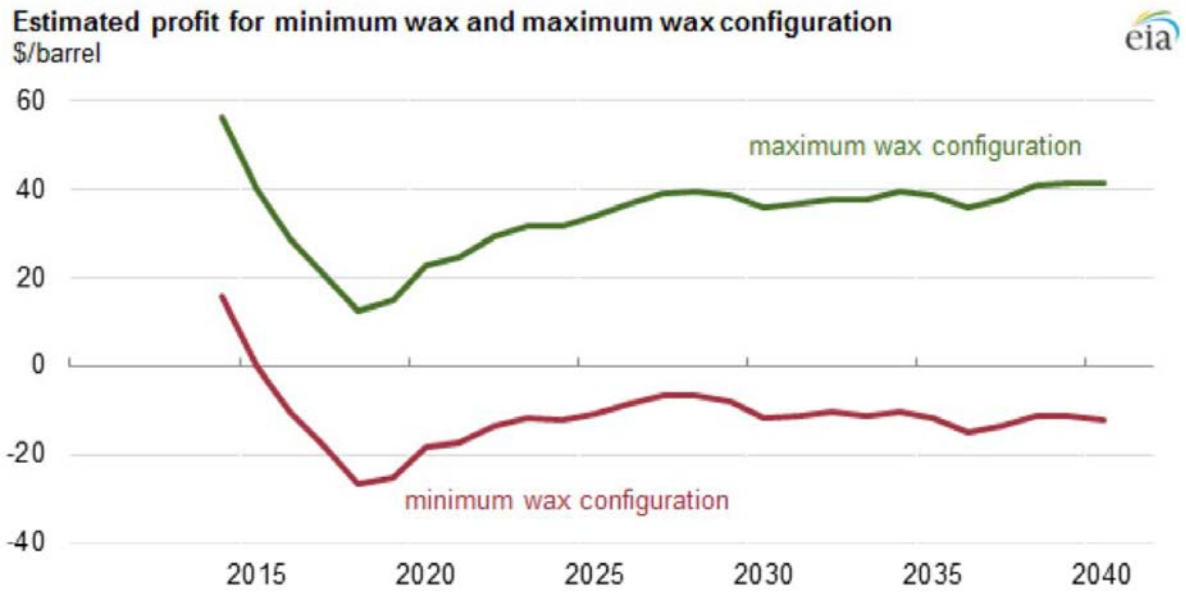

Source: US Energy Information Agency

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