



Is Ghana's Gas-to-Power Value Chain Sustainable?

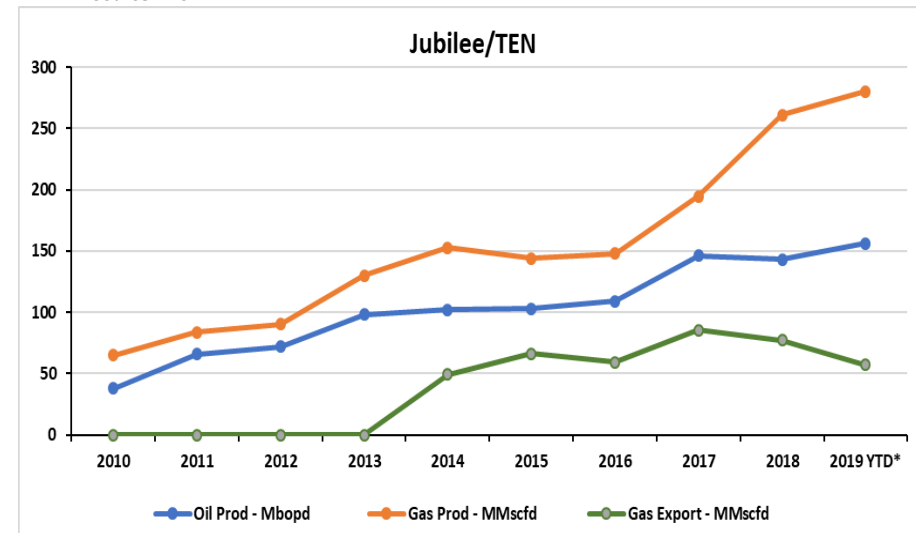
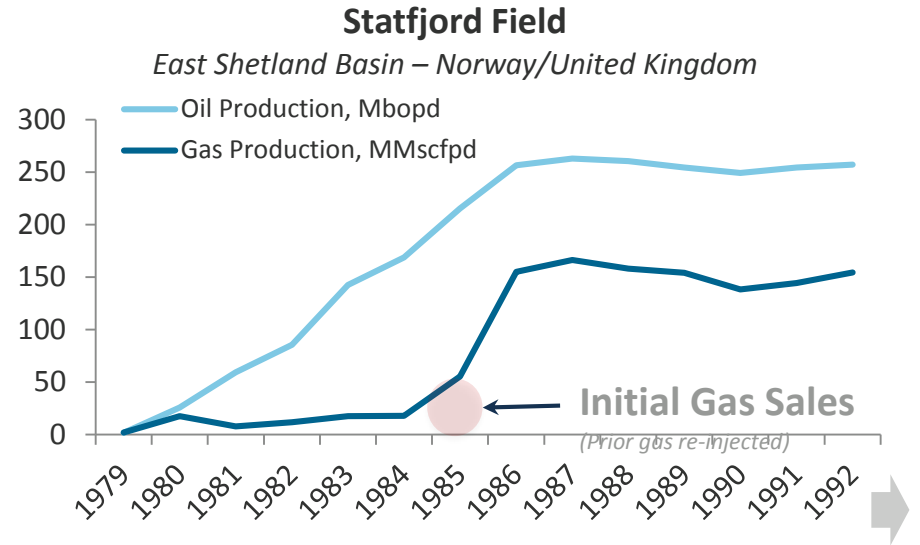
NYSE/LSE: KOS

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The Gas Journey

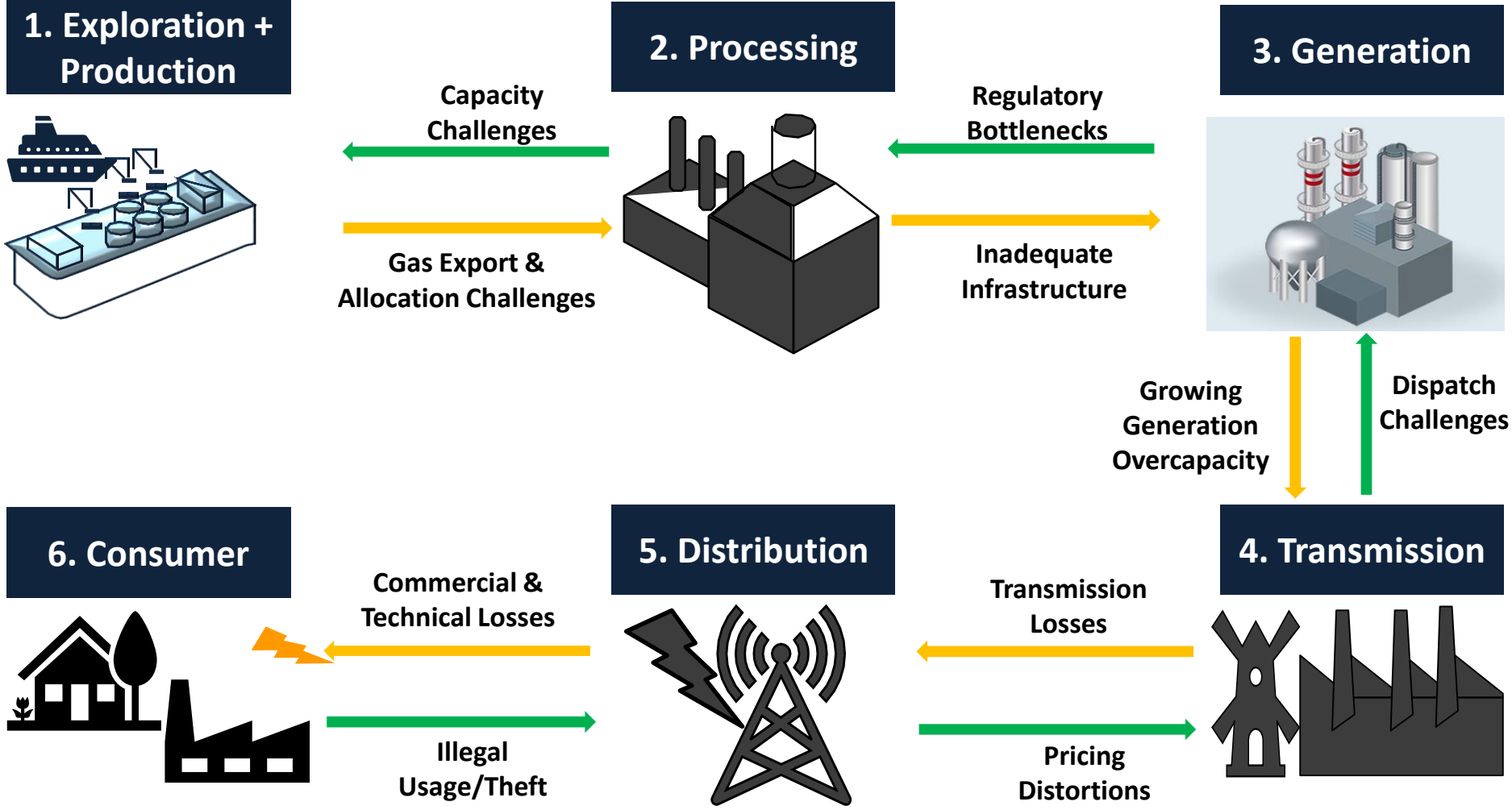
History shows that oil comes first, followed by the commercialization of domestic gas...

- Looking back, the UK's "Dash for Gas" in the 1970's – 80's was created by major oil discoveries in previous years
- Similar to Ghana, oil discoveries in the North Sea focused on oil capture first
 - Due to lack of a domestic infrastructure, gas reinjection was the go-to option
 - But as gas infrastructure and power markets matured, gas export provided an alternative...power solution
 - Existence of a robust domestic market stimulates exploration and production

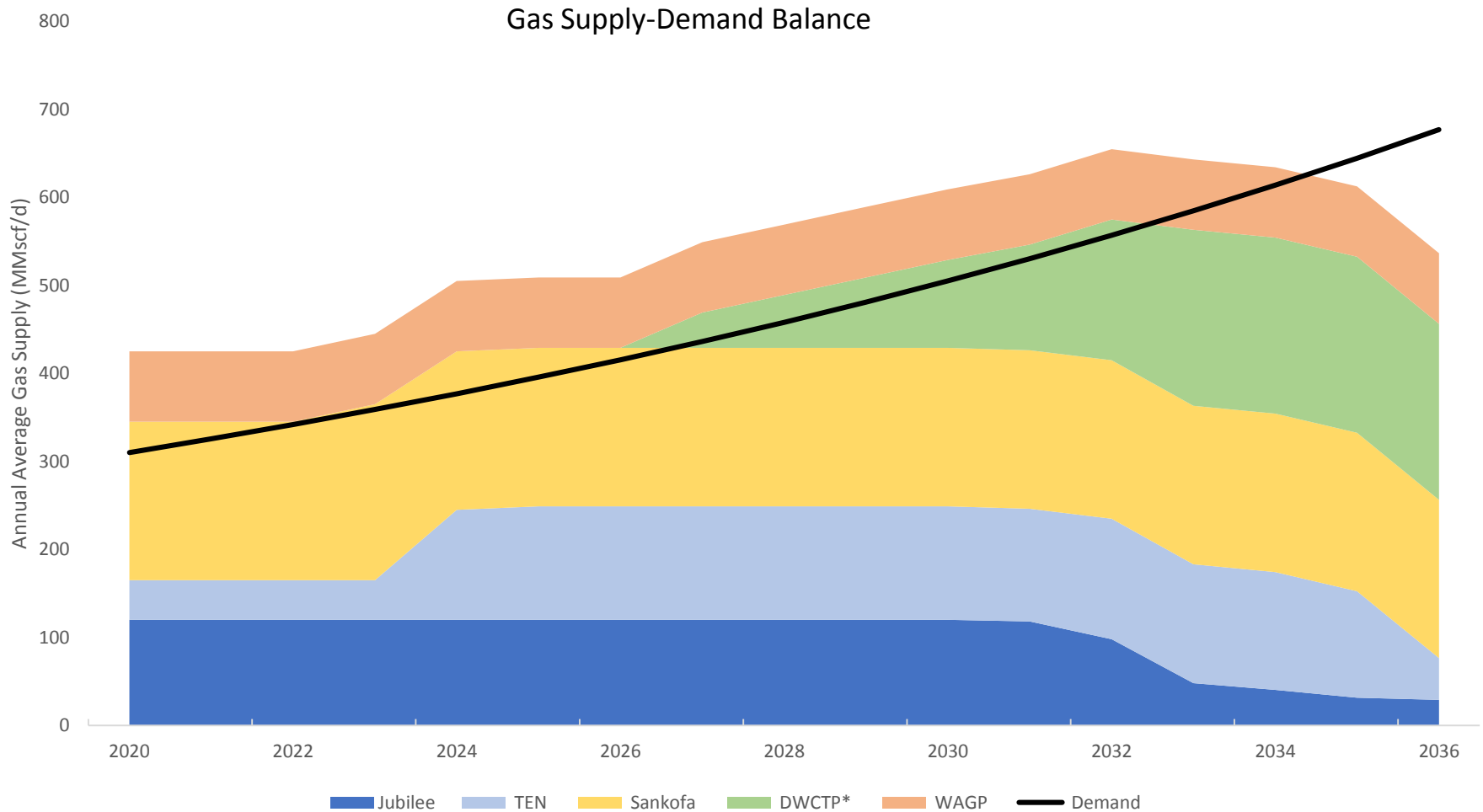


Ghana - Gas-to-Power Value Chain

Unstable Fiscal Regime - GoG estimates value chain debt of ~\$2 billion



Ghana has sufficient local gas supply to meet demand



Assumes 5% YOY power demand growth

**Source: Wood Mackenzie*

Opportunities & Challenges



- **Near-term LNG threatens oil revenue and displaces cheap domestic gas with high priced imported gas**
 - Availability of 150 to 250 MMSCF/d average annual supply from Jubilee/TEN for the next 15 years
 - Value destruction to Government of Ghana exceeds \$3 Billion (PV10 at \$ 60/Bbl.) over life of Jubilee & TEN
 - Until 2024, Jubilee gas is delivered to Atuabo GPP at no cost and TEN gas is delivered at \$ 0.50 / MMBTU
 - Liquids from Jubilee & TEN which currently represent 32% of Ghana's LPG demand, equates to an additional cost of \$50 MM per annum
 - Post 2024, Jubilee & TEN average gas price is \$ 1.59 / MMBTU
- Jubilee Partners need to reverse declining oil production at Jubilee due to gas export limitations and rising producing gas-oil-ratio and limited export to GPP
- The TEN field gas-oil-ratio is on the rise and could threaten crude production in the near term

Existence of a robust domestic market stimulates exploration and industrial development

- **Prioritize Local Gas Production**
 - Maximize local gas production
 - Provision of adequate onshore gas infrastructure
 - Leave no resource behind – Additional gas resource development dependent on demand
- **Competition between gas producers**
 - Compete on price, capacity, crude oil/processed products upside - (LPG/Condensate)
 - Benefits flowing to consumers
- **Cost Recovery & Distribution Efficiency**
 - Reduce transmission and commercial losses
 - Efficient power generation, distribution and revenue collection
- **Strategic Planning**
 - Holistic value chain approach – Upstream to the electricity consumer
- **Regulatory Environment**
 - Diversify gas purchasing base- Encourage private sector participation and investment

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