Black swan and energy transition webinars

Natural gas markets and the pandemic

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Please remember that antitrust/competition law continues to apply

Information not discussed under normal circumstances during such sessions should not be discussed now either - even with the current uncertainty in markets as a result of Covid-19

With the evolving Covid-19 situation and broader implications for industry supply chains, there is the potential for questions to arise concerning current or future production levels, impact on product pricing or supply strategies - these are matters that should not be discussed with, or broadcast to, competitors.
Agenda

• Natural gas evolution and outlook: the world before 2020
• Challenges facing the natural gas industry
• Impacts of COVID19
• The Brazilian gas market
World Primary Energy Consumption by Fuel

- Coal : the predominant source of primary energy in non-OECD countries
- Natural gas share stable at 24%

SOURCE: BP 2020
Historic 2008-2018 rate: 2.5%
2018/2017: 5.3%
2019/18 consumption growth: 2%
  - Slower growth in China (slower coal to gas switch/lower GDP growth/infrastructure bottlenecks)
  - Warmer weather in Russia
  - Weak demand in Latin America
Coal switch to gas accounted for 75% of additional demand
Japan and S. Korea: nuclear coming back
- Production outpaced demand by circa 60 BCM (2019)
- Led by US shale (70% of growth)
- Strong build up of storage in US and Europe in 2019/2020
LNG trade 2019: 355 mtpa

Record increase in LNG trade: 13% (2019/2018): +40 mtpa

Pushed by lower prices and energy policy

+42.5 mtpa of liquefaction capacity

826 mtpa regas capacity

LNG accounts for 49% of the world gas trade

SOURCE: BP, IEA
Global CO2 emissions continue to rise, at slower rate

- Emissions 2019/2019: 0.5%
- Non-OECD accounts for 2/3 of global emissions
- Share of CO₂ emissions 2019
  - OECD = 35.2%
  - Non-OECD=64.8%
  - China=28.8%
  - US=14.5%
  - Brazil=1.3%
Key challenges facing natural gas

- Energy transition: what is the role of gas?
- Impact of pandemic on demand
- Weaker global prices: impact on new investment
- Emerging markets: lack of infrastructure and price policies
• Global energy demand expected to grow +40% by 2040
• Natural gas consumption grows until 2040 then start moderate decrease
• Asia is the driver for gas growth
• Upstream and LNG investment 20-30 years project lifetime
• Decision is needed now for a contraction in demand in 2040-2050

SOURCE: IEA, IEEE
Advanced Technologies Scenario: solid lines
Reference Scenario: Dotted line
Natural gas demand: impact of and pandemic

- World GDP expected to contract by -5% to -7% in 2020
- IEA predicts a drop in consumption of 4% in 2020
- Expected loss of 75 BCM in demand by 2025
Impact of pandemic on natural gas consumption: US and Europe

- US: sharp contraction in residential and industrial demand YTD April 2020
- But production still growing YTD April
- Europe demand down 16% in April and May year on year

**SOURCE:** FERC, OIES
Before pandemic: convergence of Japanese and European spot prices (over supply)

Oil prices drop below $20/barrel
  - OPEC lack of agreement in early 2020
  - Demand curtailed by pandemic

Pandemic impact: spot prices converging to HH (<USD 2.0/MMBtu)

USD 2/MMBtu = USD 11.6/barrel

Industry response: CAPEX cuts, LNG cargoes cancellation (>120 June-August)

Potential deferral of >80 mtpa LNG by 2030

SOURCE: IEEE, IEA, FERC
How to develop new oil & gas in a world below $40/barrel

Global liquid supply curve
Real Brent Break-even price, USD/bbl

- Future oil supply growth depends on oil prices>$42/barrel (USD 7.2/MMBtu for dry non associated gas)

Source: Rystad Energy UCube

The case of BRAZIL
Brazil: a large energy player

- 10th largest world primary energy consumer
- 11th largest oil producer: 2.8 mm barrels/d, 2019 (62% from pre-salt)
- Renewable energy
  - 38% of primary energy offer
  - 75% of electricity capacity (wind + solar = 10%)
  - 78% of electricity generation

SOURCE: MME, EPE, ANP, BP
• Gas consumption share: 11.4%
• Industrial energy demand dropped 8.2% before COVID(2019/2017)
• Potential to replace wood, LPG, HFO: 8.8 Bcm/y, at the right price
• April 2020: 18.8% drop in industrial output

SOURCE: EPE
Residential energy demand: gas plays a small role

- Natural gas: 1.6% of residential consumption
- Wood is extensively used in rural areas, no gas grids
- 6.8% YoY growth due to network expansion
- Potential market: 2.3 Bcm/y, if replacing 30% GLP

SOURCE: EPE, ABEGAS
Brazil: lots of gas but slow demand growth

- Reinjection: 41% of domestic production
- Power market volatility, stagnant industrial demand and lack of offshore infrastructure inhibits offshore gas monetization
- Industrial demand: stagnant (high gas prices, Brazilian economy)
- Flexible model of power auction do not favour domestic associated gas

SOURCE: MME, ABEGAS, EPE
Brazil: a net gas importer

- LNG imports
  - 1Q20: 0.32 mtpa
  - 2019: 2.32 mtpa
  - 2015: 5.75 mtpa
- LNG imports will increase with dedicated private LNG powered plants in 2020/2025
- Bolivia imports: Petrobras uses downturn flexibility (ToP=80%)
- Petrobras/YPFB March 2020 contract renewal:
  - 20 MMm3/day vs former 30 MMm3/day
  - Space for new players
Brazil: limited natural gas infrastructure is a challenge

- LNG terminals: 3 in operation, 1 deactivated, 1 in construction, 1 in development
- Pipelines:
  - Transmission: 9409 km, 3 main systems
  - Distribution: 36,429 km, 3.7 million gas consumers
- 14,100 MW gas fired power plants
- Distribution companies investment in grid expansion

SOURCE: OIES/STEUER, MME BRAZIL, ABEGAS
Brazil: LNG and natural gas prices

- Average LNG FOB price:
  - 1Q2020: $4.04/MMBtu
  - 2019: $5.35/MMBtu

- City gate prices (March 2020) converging to HFO:
  - Bolivia: $7.94/MMBtu
  - Domestic: $7.47-7.57
  - HFO: $7.69/MMBtu
  - Wood ($6-7/MMBtu)

- LNG prices for power plants:
  - Market/auction prices
  - Price indexation: HH, JKM, Brent

SOURCE: MME, ABEGAS
• LNG: doesn’t include Guanabara/Barcarena. Pecem at 7 MMm3/d
• Bolivia: 30MMm3/d by 2022; 20 MMm3/day thereafter
• Domestic gas: doesn’t include Maranhao, Amazonas
• Power: LNG CCGTs dispatching at 30% and 50%
• New Gas Market creates new demand post 2024 – industries and power
• Suspension of power and E&P auctions in 2020: concerns about demand and investment capacity
  – 2019 power auctions > 2400 MW,
  – 2019 E&P auctions > USD 25 billion in bid bonus
• Consumers unable to pay monthly rates: gas distribution companies seeking Government support
• Substantial drop in demand expected in 2Q2020
• April consumption 2020/2019: -25% (circa -0.4 BCM in one month)
  – -35%-40% industrial
  – -60% commercial market
  – -40% NGV
• Pandemic aggravated situation of a already sluggish market
Conclusions

- Pandemic aggravated the challenges for a globally oversupplied gas market
- Oil majors CAPEX cuts > USD 40 billion will impact new upstream and LNG investment
- Gas at USD 2.0/MMBtu (USD 12/barrel) is much below breakeven of USD 40-50/MMBtu: challenge for associated gas
- No quick recovery until 2025
- Emerging markets recovery dictated by government policy, infrastructure investment and prices
- But then, how investment decisions will be impacted by energy transition goals?
Thanks!

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