

CWC WORLD LNG & GAS
11th ASIA PACIFIC SUMMIT, SINGAPORE



Middle East Gas and LNG Present & Future

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Conclusions

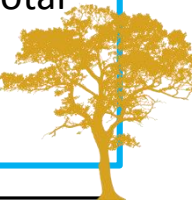
L/T Price
elasticity for gas | -1.25%

Strategies

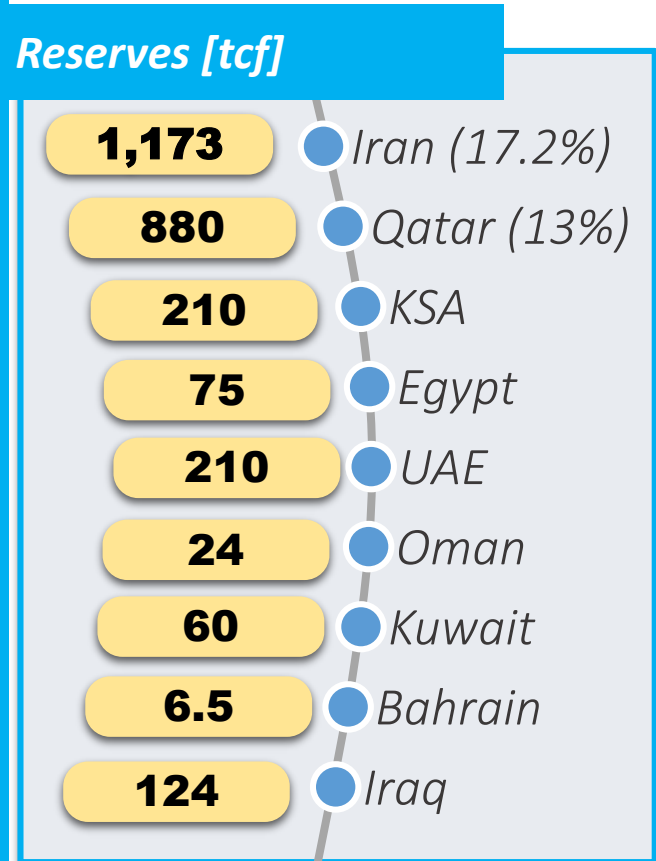
- ✓ KSA is casting “a wide net” (25% equity Port Arthur, 5mmtpa) ++
- ✓ Iraq deprived of power (up to 4,000 MW of electricity) if Iran gas imports stop. Post 2022, Iraq will become a gas exporter
- ✓ UAE gas surplus post 2021. Redirected to?
– multiple options.
- ✓ UAE Gas in power <68% by 2030
- ✓ Kuwait gas shortages led to power interruptions. \$ 15bn to expand power gen to 24GW. Not supply-secure.

Challenges

- ✓ GCC gas demand per capita among the highest in the world
- ✓ KSA: natural gas supply national priority. Every 100 kbbbl/d saved generates \$ 2.bn/yr in revenue
- ✓ KSA will confront **supply challenges** in an effort to move away from oil-generated power and aggressive increase in demand beyond 2020
- ✓ Politics between Qatar and 5-GCC may hinder cooperation
- ✓ Development of non-associated gas fields still problematic despite int'l collaboration
- ✓ KSA unlikely to meet NTP production targets of: 178 bcm/2020 and 230 bcm/2026
- ✓ Inter-LNG trade (ME → ME) only 30% (2.2 mmtpa) of total ME LNG imports

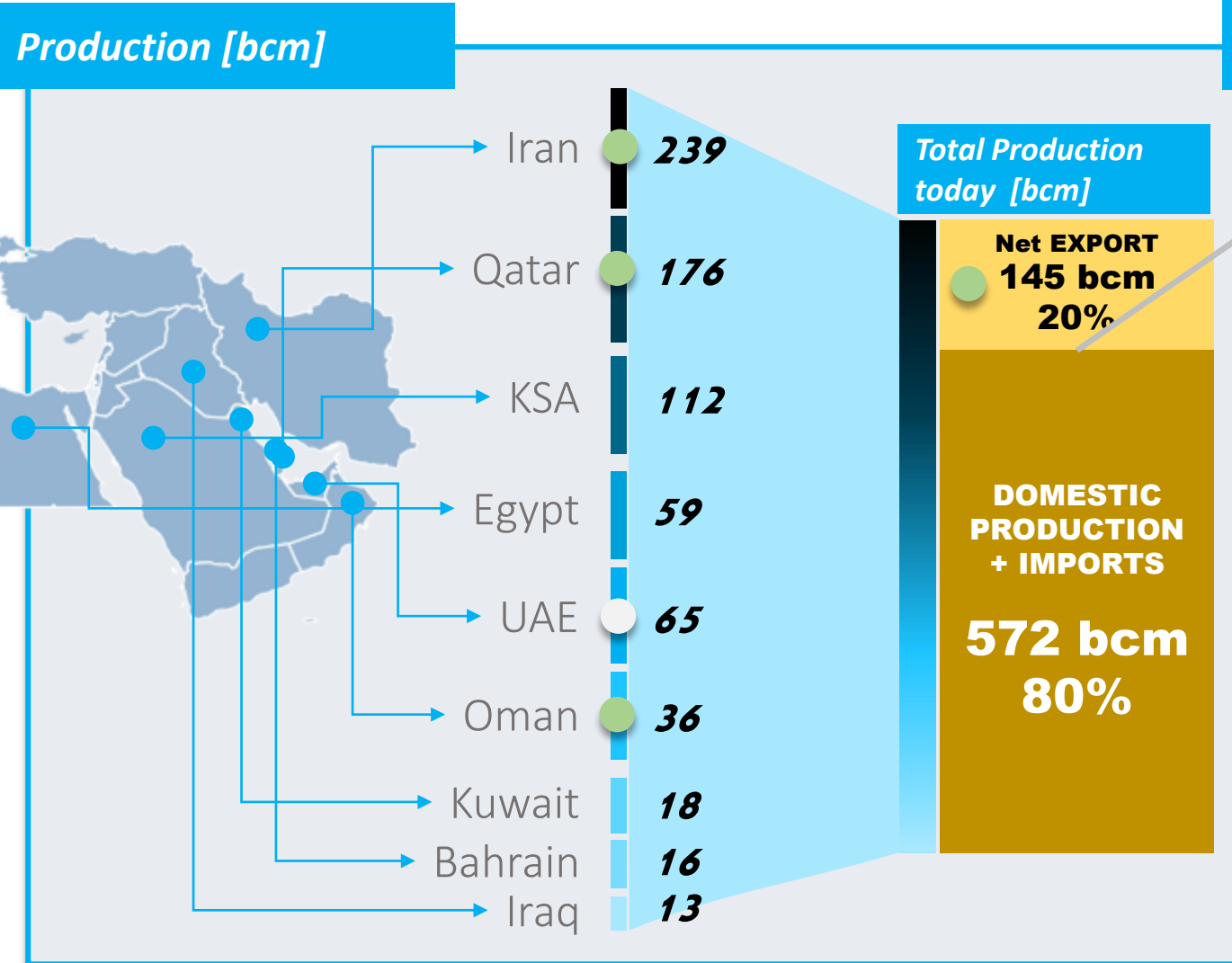


GCC, Iran, Iraq and Egypt



MENA gas reserves

45% of global



Total Production today [bcm]



Total Demand forecast 2030 base case [bcm]



GCC in focus

Insights | Moves

5-GCC (except Qatar) on a pursuit for gas-supply security

Bahrain will join the LNG importers club in Q3, 2019

15.5 bcm

5-GCC Gas Supply Gap 2022

~45%

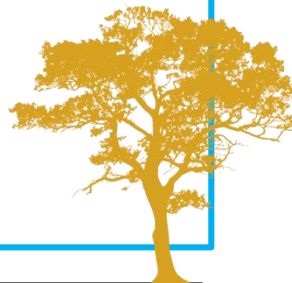
Qatar's share of GCC production

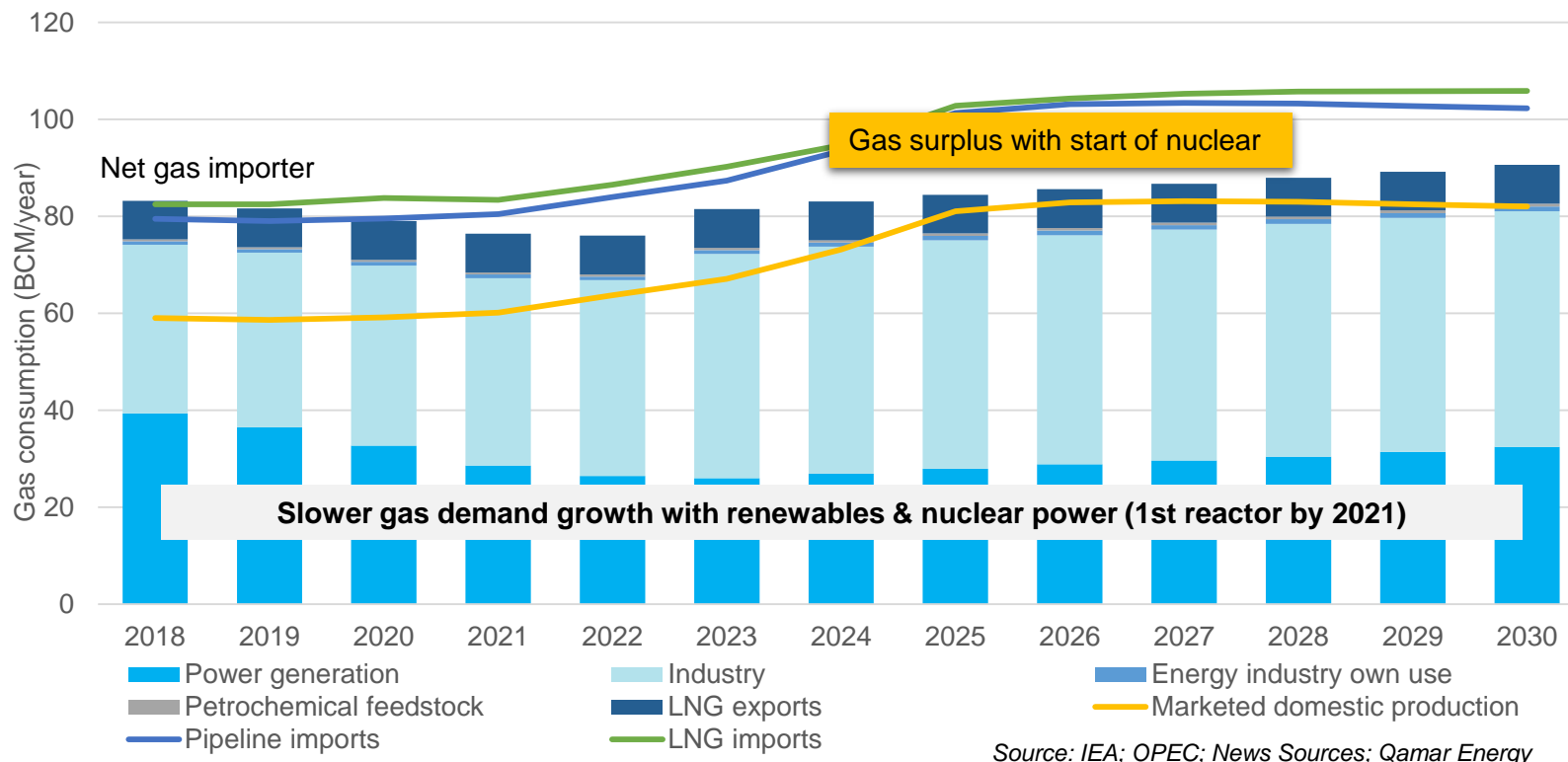
Qatar production increase:
politics and economics at play

5 mtpa

Aramco moves to become a world LNG player with Sempra deal

KSA will struggle to reach its d/production target of 230 bcm by 2026



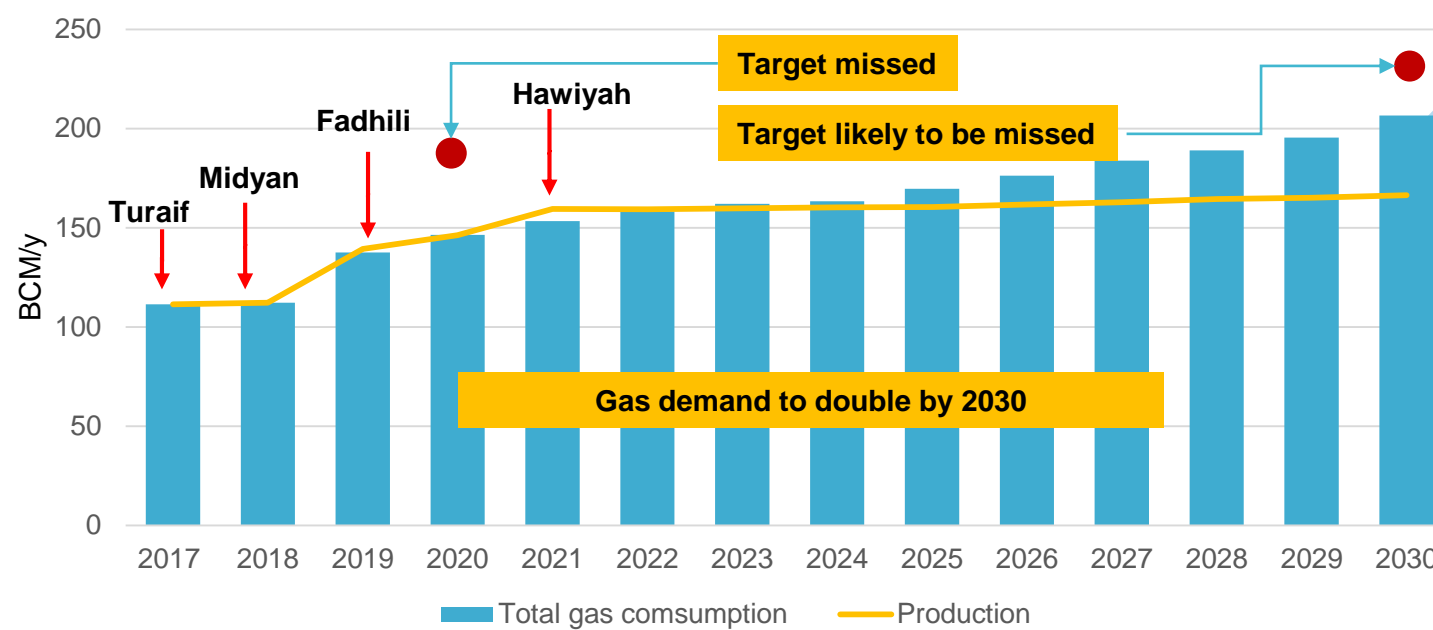


Future Situation

- Sharjah to start LNG imports by 2020 reducing pressure on Abu Dhabi
- Increased CO₂ injection for EOR to reduce reliance on natural gas
- New petrochemical plants & industries to increase gas demand
- ADNOC plans for LNG bunkering to adapt for IMO 2020 & higher domestic supply

Current Situation

- Little production outside Abu Dhabi (Sharjah, Zora & Umm Al Quwain ~0.7 BCM)
- New gas exploration – Abu Dhabi, Sharjah and RAK licensing rounds, unconventional
- New gas in place discoveries amount to addtl. 15 tcf
- Qatar low price to UAE (\$ 1.6/mmbtu) vs int'l LNG prices



Current Situation

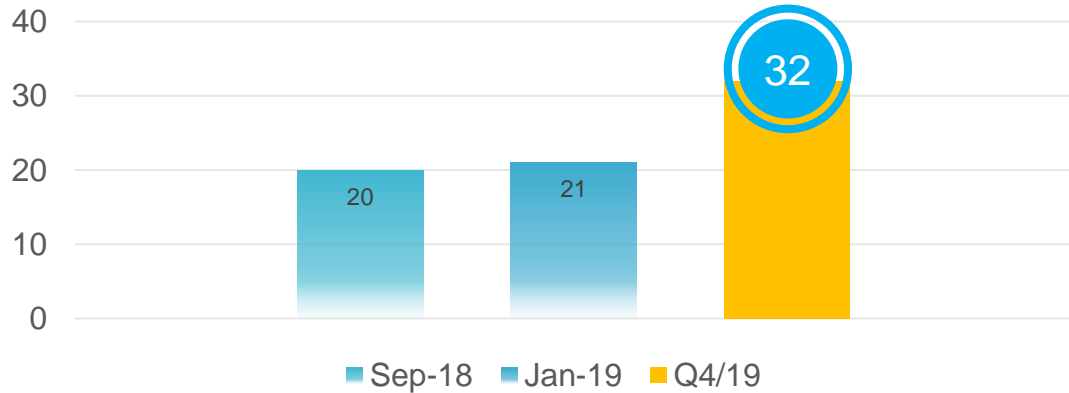
- All production consumed domestically
- Power sector the main source of demand, followed by industry and petrochemicals
- Burns crude oil, heavy fuel oil and diesel in peak summer demand for power
- Due to rising power and gas demand, some new plants coming online are oil fired

Future Situation

- Fadhili (26 BCM) to come online in 2019 and Hawiyah (11 BCM) in 2021
- Gas imports (not exports) look likely in 2023 (seasonal) but depends on gas prices and oil strategy
 - LNG from closest neighbors excl. Qatar, so Egypt, Yemen, East Africa to provide lowest cost option?
 - If it does import LNG, it will export more crude to the market so would depress prices
 - Otherwise it could continue burning oil for power instead of gas imports
- Investments in US and potential Russian LNG to benefit from the temp. anticipated LNG supply gap

A GREAT STORY

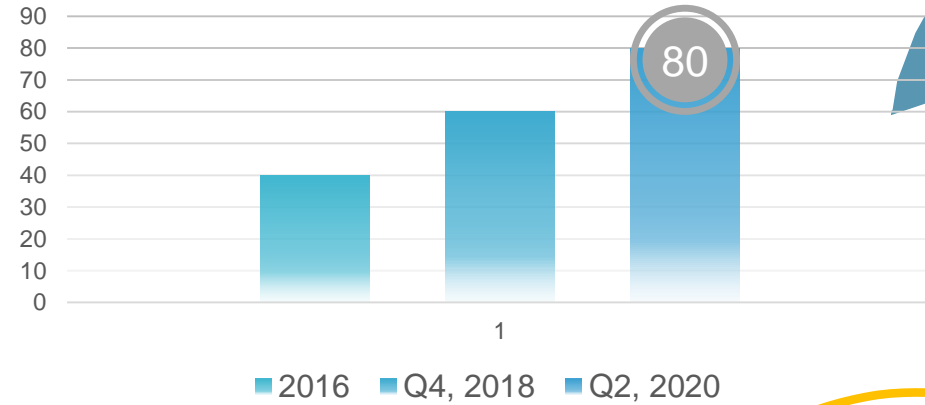
ZOHR OUTPUT [BCM]



- a. Exports of LNG from Damietta and Idku to increase
- b. Dolphinus Hldgs: contract to buy 64 bcm for domestic and LQ/LNG provides optionality
- c. More gas to LQ plants possible from Aphrodite/ Cyprus via \$1bn subsea pipeline

EGYPT

EGYPT'S TOTAL PRODUCTION [BCM]



\$ 3bn/yr

Savings by ending LNG imports

Forecast LNG Exports

2019 | 2.7 mmtpa

2020 | 5 mmtpa

- a. Will remain 3rd largest producer for the foreseeable future
- b. 2016-2022 economic plan forecasted 450 bcm by 2023.
- c. If unconstrained politically, large volumes could be available for export by 2023.

46
bcm

Current p/l export capacity
(Turkey, Iraq, Azerbaijan, Armenia)

365
bcm

2030 production estimate

Considerations

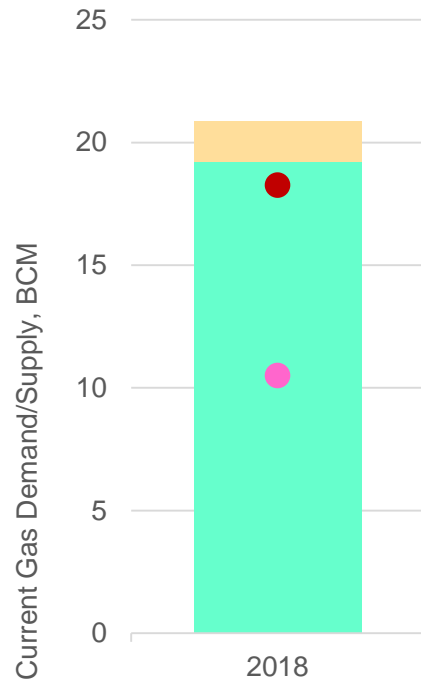
Iranian natural gas is today the single most critical energy import in Iraq.

Potential for export

120 bcm | p/l + LNG

12 bcm | 2019 exports to Iraq

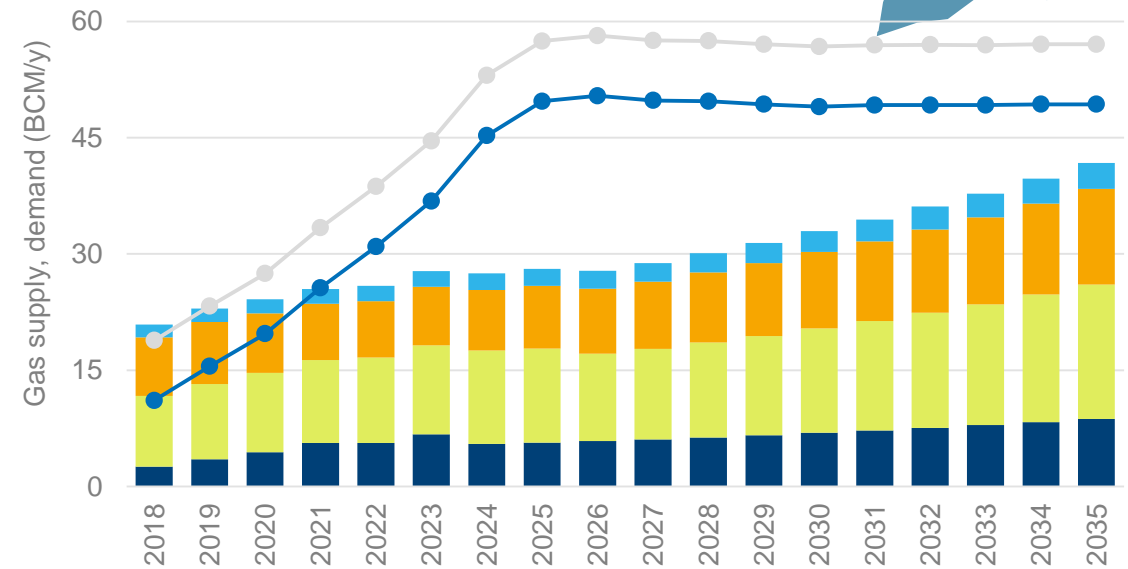
Current Situation



- Industry
- Power
- Supply
- Supply + Imports

- Iraq unable to meet domestic gas demand, even with **7-9 BCM** imports from Iran
- Fast progress on flared gas capture and non-associated gas, but Iraq does not build power plants fast enough
 - Can lead to significant gas surplus in the near term, if enough gas is captured
- But summer peak demand (~40 GW by 2030) likely to remain unmet, even if domestic gas production increases
- Better management: every day 16BCM is being flared
- Iran supplies around 19% of Iraq's total gas-fired power consumption

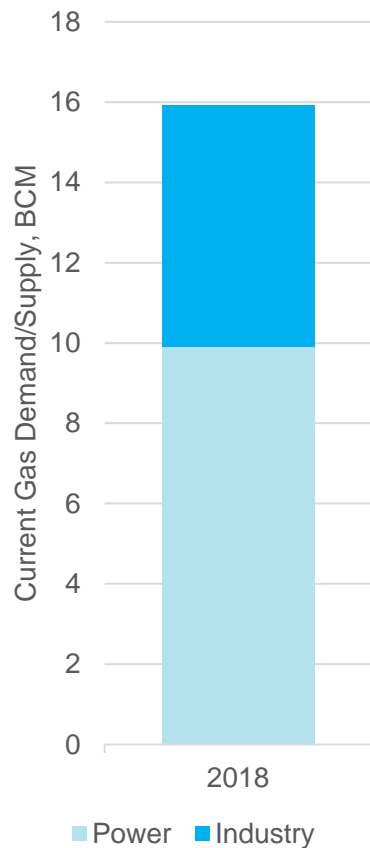
Future Situation



- Industry
- Power: South
- Power: Middle
- Power: North
- Supply
- Supply+Imports

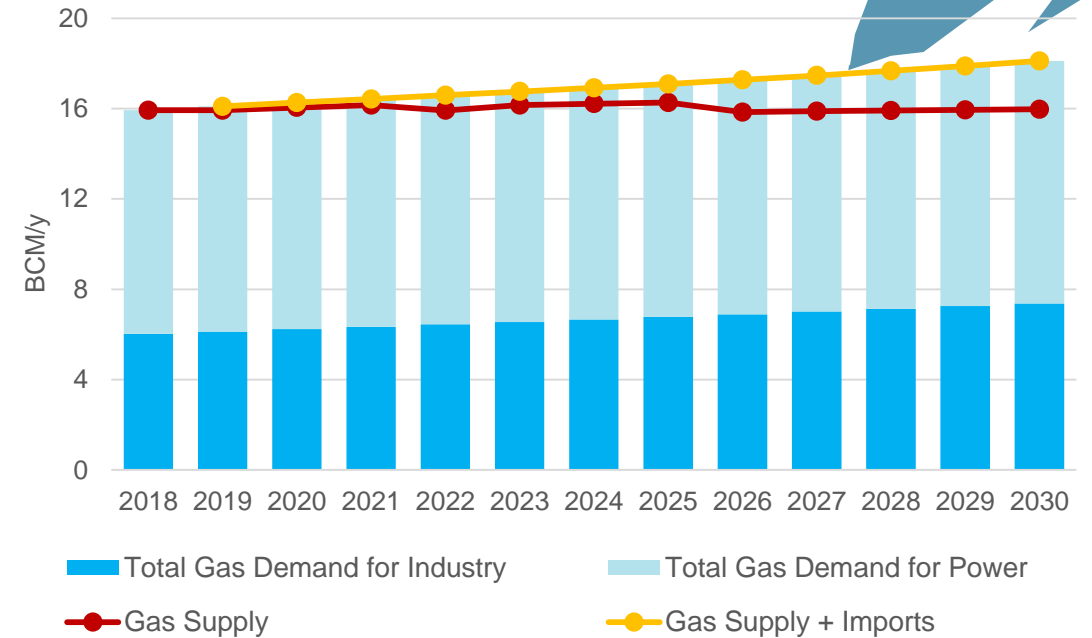
- Opportunity for more gas power and industry, or for exports to Kuwait/Jordan, or reducing Iranian imports
- KSA Iraq relationship developing as well as Kuwait-Iraq

Current Situation



- Bahrain currently able to meet all domestic gas demand but occasionally unable to meet summer peak demand
- **Deficit reaches 2.1 BCM by 2030.**
- ~4-8 BCM LNG import facility to be online in 2019, but will only import amount needed to meet domestic demand (PPP)
- Re-export of LNG to Saudi Arabia currently unlikely:
 - Concentration of Saudi Arabia's gas fields and gas processing stations on the East coast
 - Logistics for laying pipeline infrastructure from Bahrain to West coast of Saudi Arabia (which is gas poor) still unplanned

Future Situation



- Gas demand in Bahrain grows by ~14% to reach 18.1 BCM by 2030
 - Electricity gas demand grows slower due to significant gains in gas generating efficiency
- Gas supply receives temporary boost with some production from the Khaleej al Bahrain find coming online, but becomes insufficient to meet demand by 2022.

Thank you

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