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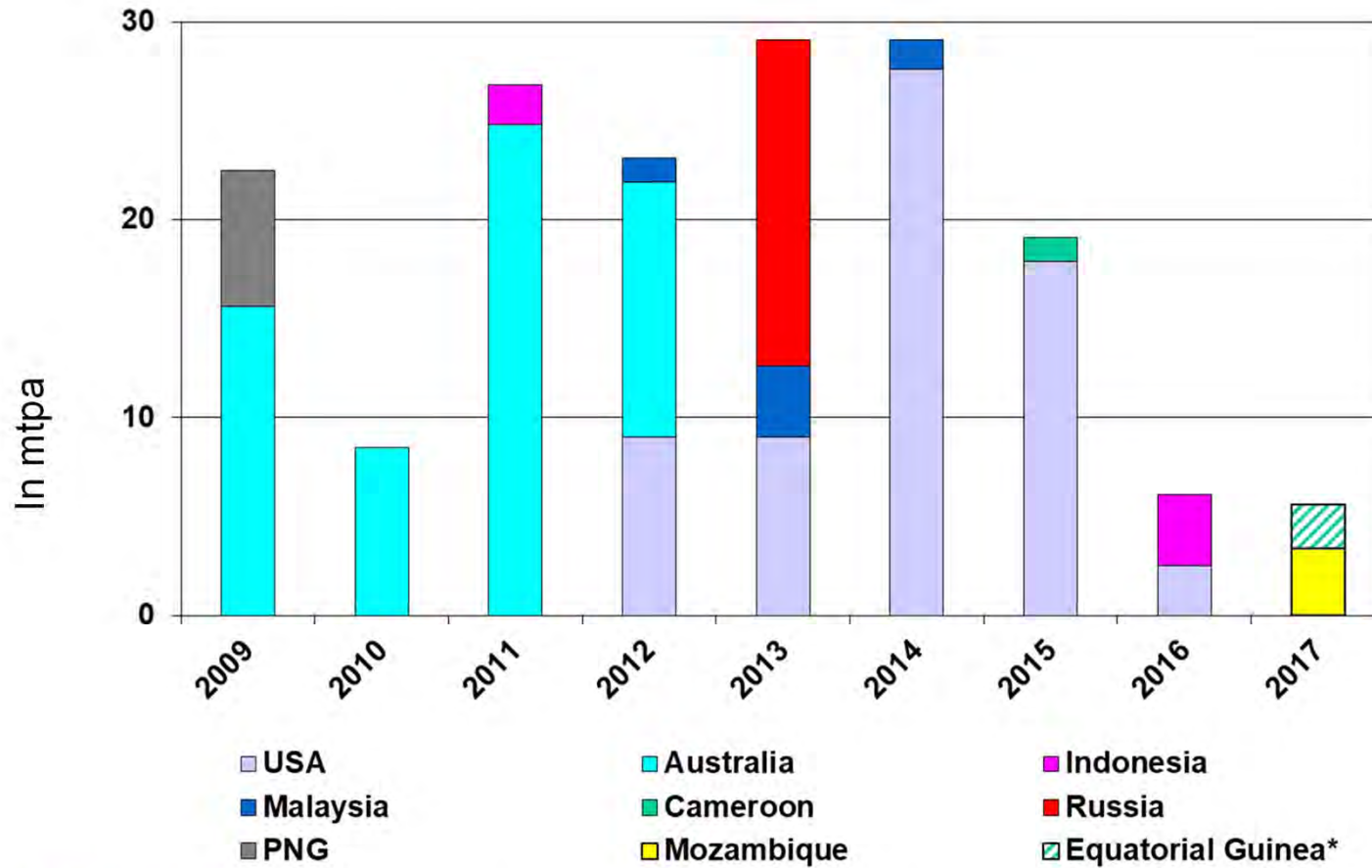
**CEE**  
 CENTER FOR  
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 ECONOMICS

Bureau of Economic Geology  
 Jackson School of Geosciences  
 The University of Texas at Austin

**Commercial Frameworks for LNG**

# ***RISK AND UNCERTAINTY IN GLOBAL GAS/LNG***

Figure 1: FIDs on Liquefaction Capacity 2009 to 2017



Note: FID on Equatorial Guinea Expected by End-2017

**Figure 3: Forecast Production from Plants in In Operation and Under Construction in September 2017**

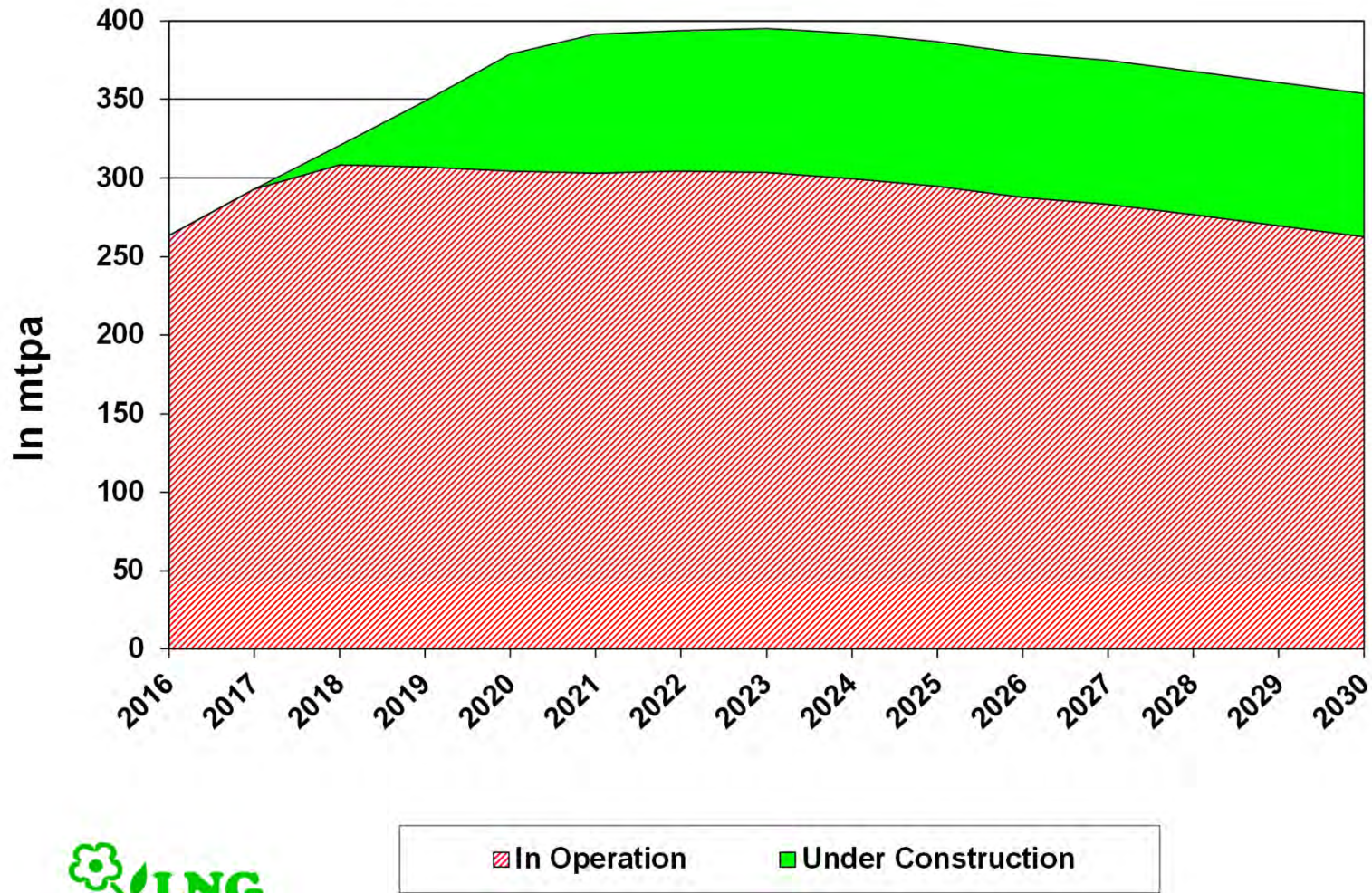




Figure 4: Comparison of 2016 and 2017 Forecasts of LNG Supply from Projects in Operation and Under Construction

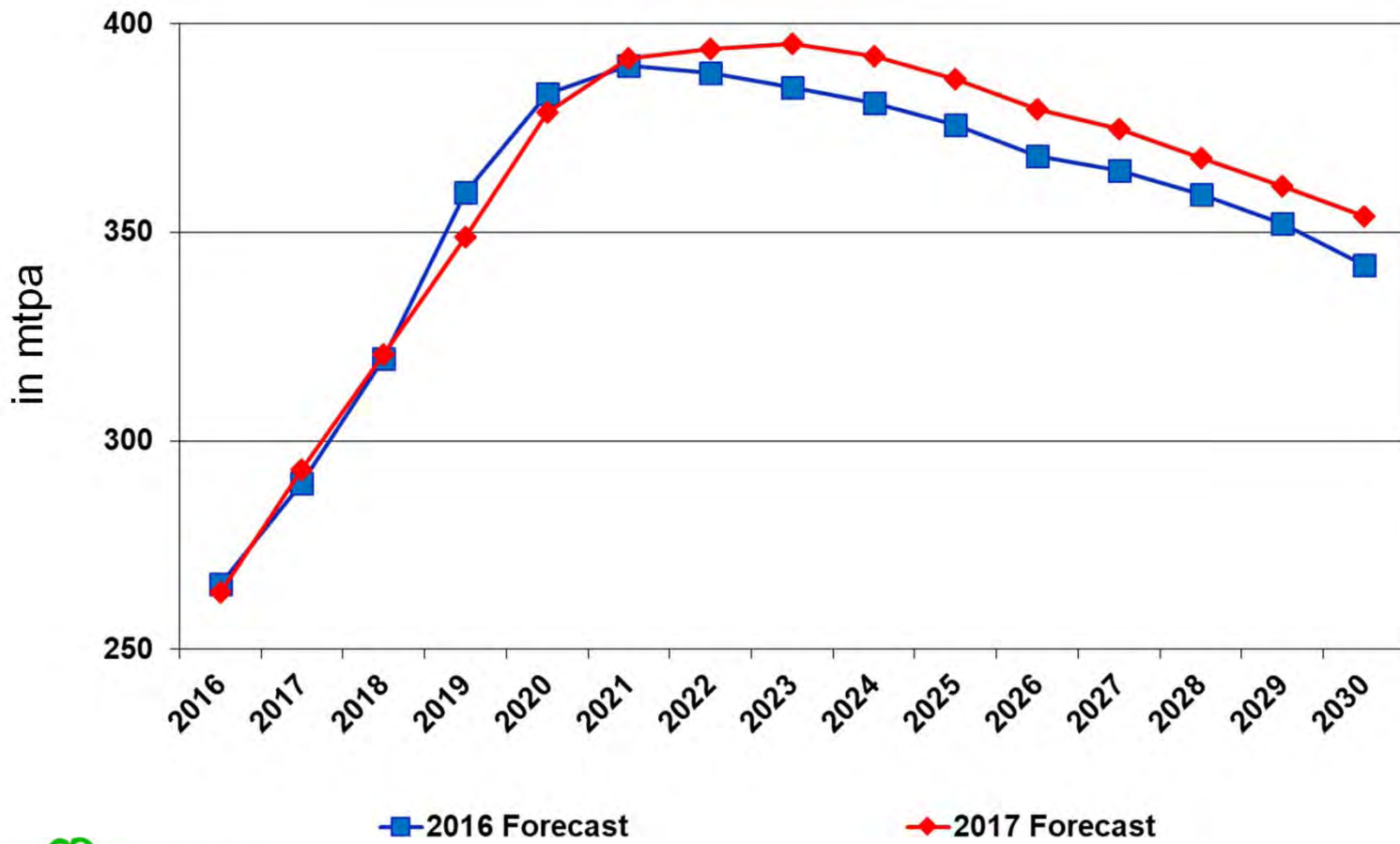
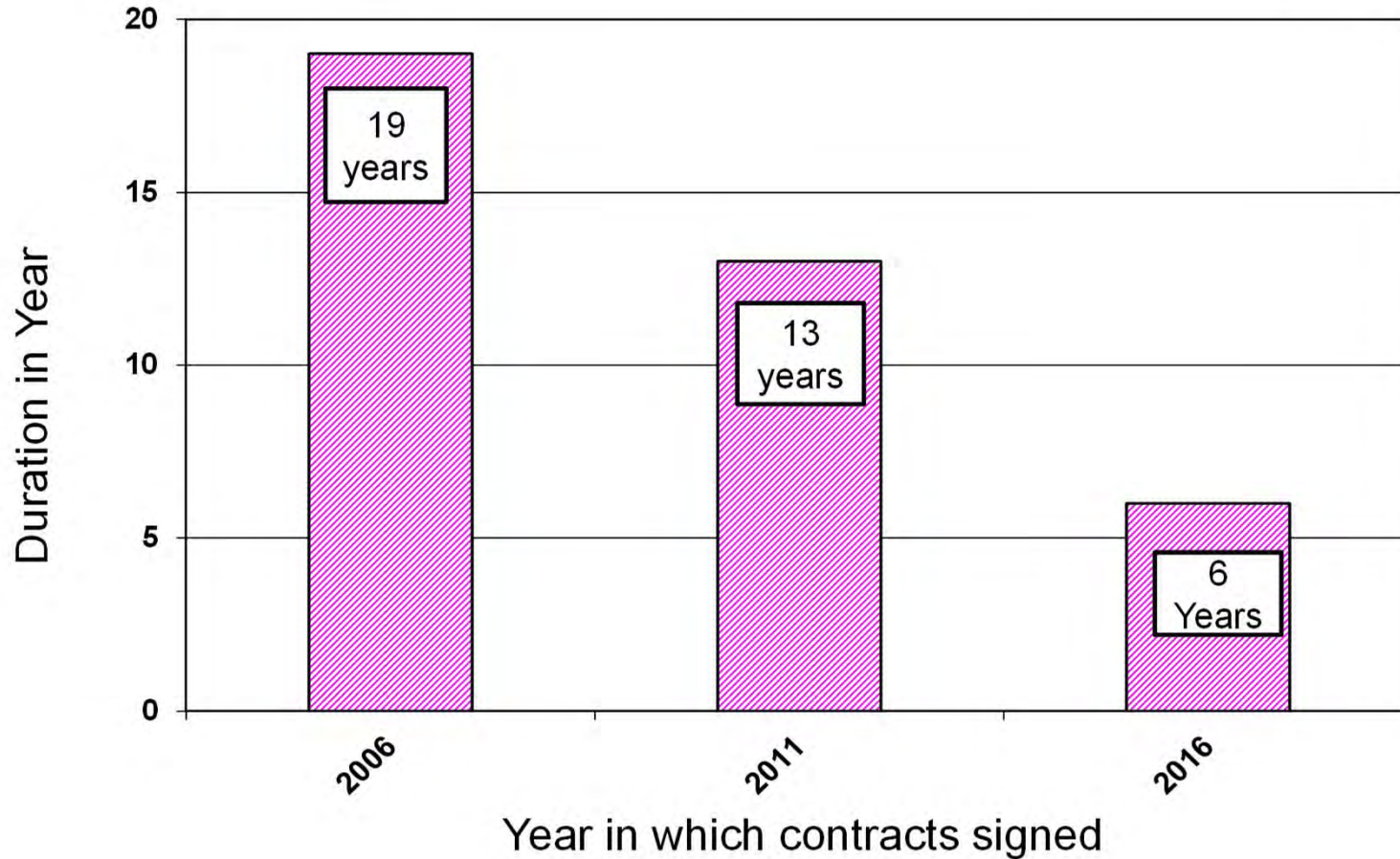


Figure 3: Average Duration of LNG Sales and Purchase Agreements



Source: GII-GNL

# CHINA NATURAL GAS USE

*Partly sunny with periods of thunderstorms, some severe*

## PROS



- Nine months 2017 gas use of 168 BCM up 17% from first nine months 2016
- 2017 gas use estimated around 230 -245 BCM LNG and pipeline imports up 48% and 6%, respectively, YTD Oct. 17 vs, YTD Oct. 16
- LNG 54% of total gas imports, up from 45% in 2016
- 2017-2018 Autumn and Winter Air Pollution Comprehensive Crackdown Action Plan: First environmental enforcement action favoring gas in 28 northern cities. “No coal” zones established. 10 BCM/Yr. in new gas demand for heating.
- 24 MTPA of new regas capacity to come online 2017-2018
- 30 BCM of new annual capacity added to West-East pipeline serving northern regions became operational in Dec. 2017
- Sinopec to invest \$5 billion in new gas pipeline to start 2019 serving areas near Beijing
- Economy has stabilized with “sustainable” GDP growth rates of 6.4% expected by IMF 2018-2020
- Excess capacity reductions in coal and steel sectors
- Gov’t plans to cut 170 MM kilowatts of coal power by 2020

## CONS



- Possible political backlash against gas due to “hasty” implementation of Crackdown Action Plan and midstream infrastructure inadequacies
- Significant number of northern homes, schools, hospitals without heat; industrials are being curtailed up to 20% in some areas
- Capacity utilization rates over 130% at northern and eastern LNG regas terminals limiting scope for winter import growth
- China LNG prices up 47% since mid-November
- Dec. 4: Residences, schools, hospitals and some industries in 28 cities permitted to use coal, wood as fuel
- Insufficient gas storage capacity
- Continued gov’t intervention in natural gas pricing. Gas prices for most users in northern cities subsidized. NDRC recently warned industry participants against hoarding and price manipulation. NOCs to take subsidy losses??
- Economic growth fueled by debt increasing medium term risk (IMF)

# INDIA NATURAL GAS USE

*Stationary low pressure system with clouds and intermittent fog*

## PROS



- Gas used increased 6% to about 55 BCM in 2016-17\*
- April-Oct. 2018-18 Y-Y gas use up 2.3% from 32.7 BCM to 33.5 BCM\*
- LNG imports increased 15% to 25 BCM in 2016-17
- Utilization rate of regas terminals increased from 50% in 2015 to 75% in 2017
- Construction has started on 15 MMTPA of new regas capacity to come online 2017-2019 at Jafrabad, Ennore and Mundra
- Major pipeline networks increased slightly between 2015 and 2017: 16,470 kms vs. 13,000 kms with capacity increasing 6%
- 13,489 kms of major gas pipelines “under execution/construction” as of Oct. 2017
- Piped gas cheaper than diesel for back up generation in areas where there are power shortages
- Real GDP (at market prices) grew 6.6% in 2016-17; IMF expects 7.2% growth in 2017-18
- Economic growth continues to be led by consumption and favorably influenced by “big bang” reforms-new bankruptcy code, national GST, inflation control framework
- Currency exchange initiative negative impact on growth near term, positive impact medium term (IMF)



# CONS



- **Lack of midstream infrastructure a major impediment to gas market growth**
- LNG imports April-Oct. 2017-18 of 14.8 BCM did not grow from the same time period in the previous year
- India has been reporting 13,000 of major gas pipelines under construction for several years. Progress?
- Gov't remains heavily involved in natural gas pricing which declined from \$3.06/MMBTU 9/30/16 to \$2.48/MMBTU 4/1/17. Oct. 2017 price of \$2.89 “remains well below the average cost of production.” (ICRA) Gas producers asking for a price floor.
- Domestic gas production has remained flat at about 31 BCM since 2015
- \$10 delivered LNG not competitive in power market against coal, wind and solar (ICRA)
- Gas generally has not been competitive with light diesel oil, furnace oil and naphtha for industrial fuel use-requires environmental enforcement
- Excess capacity in key industrial sectors and high corporate and government debt levels has constrained capital investment