



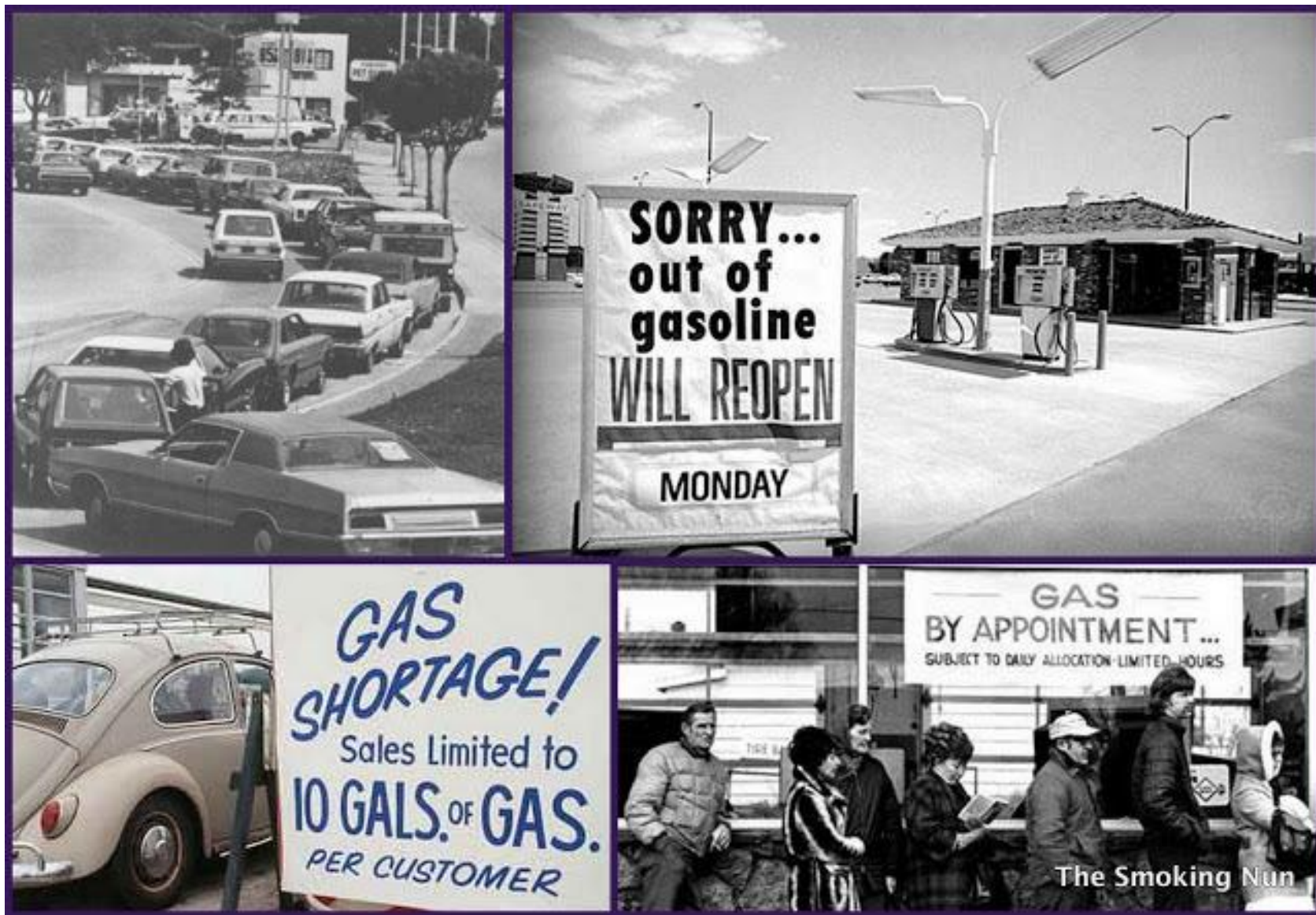
COVID19 Update:

**Deconstructing Recent Oil Price
Volatility & Opportunities**

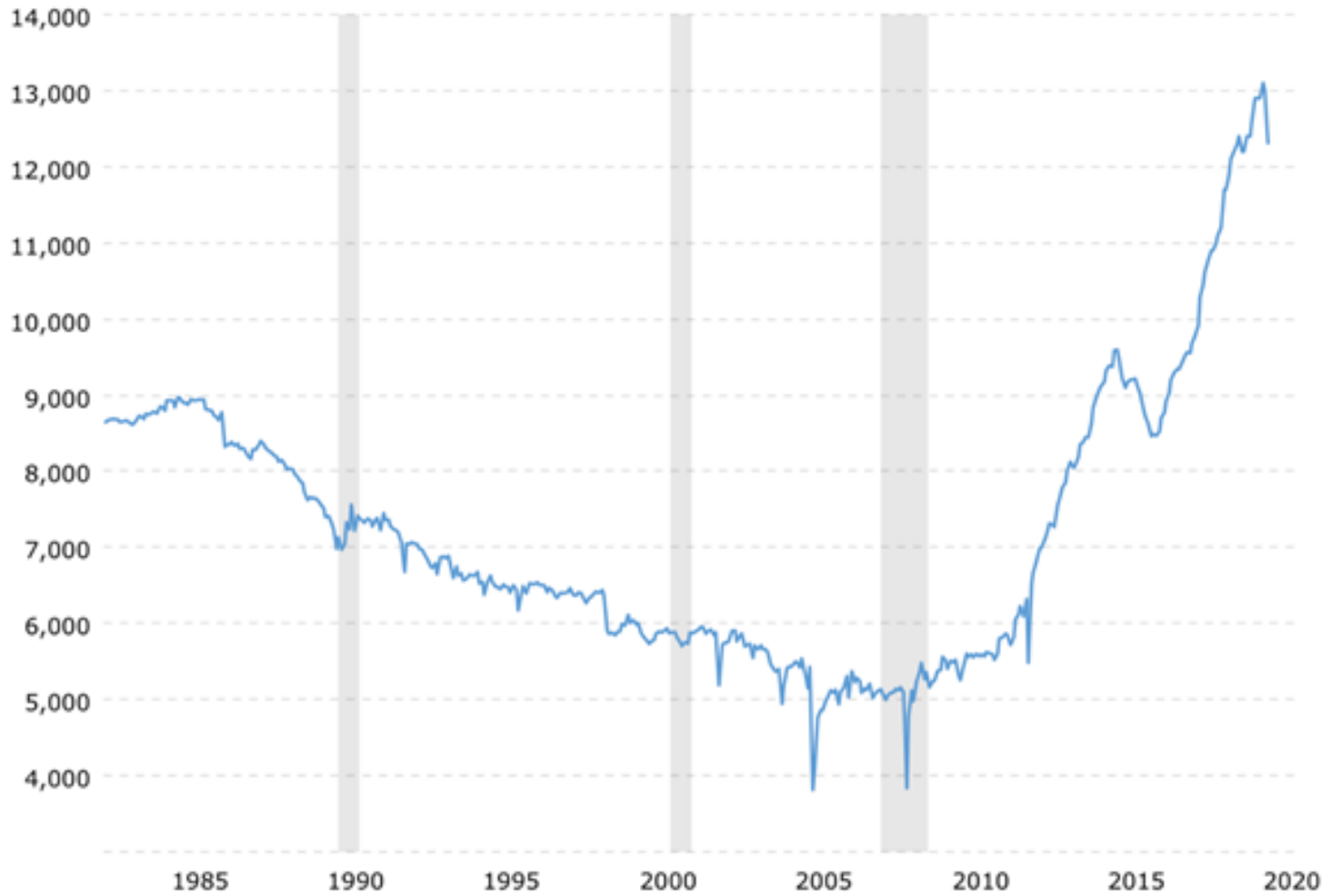
Robotti & Company Advisors, LLC

May 2020

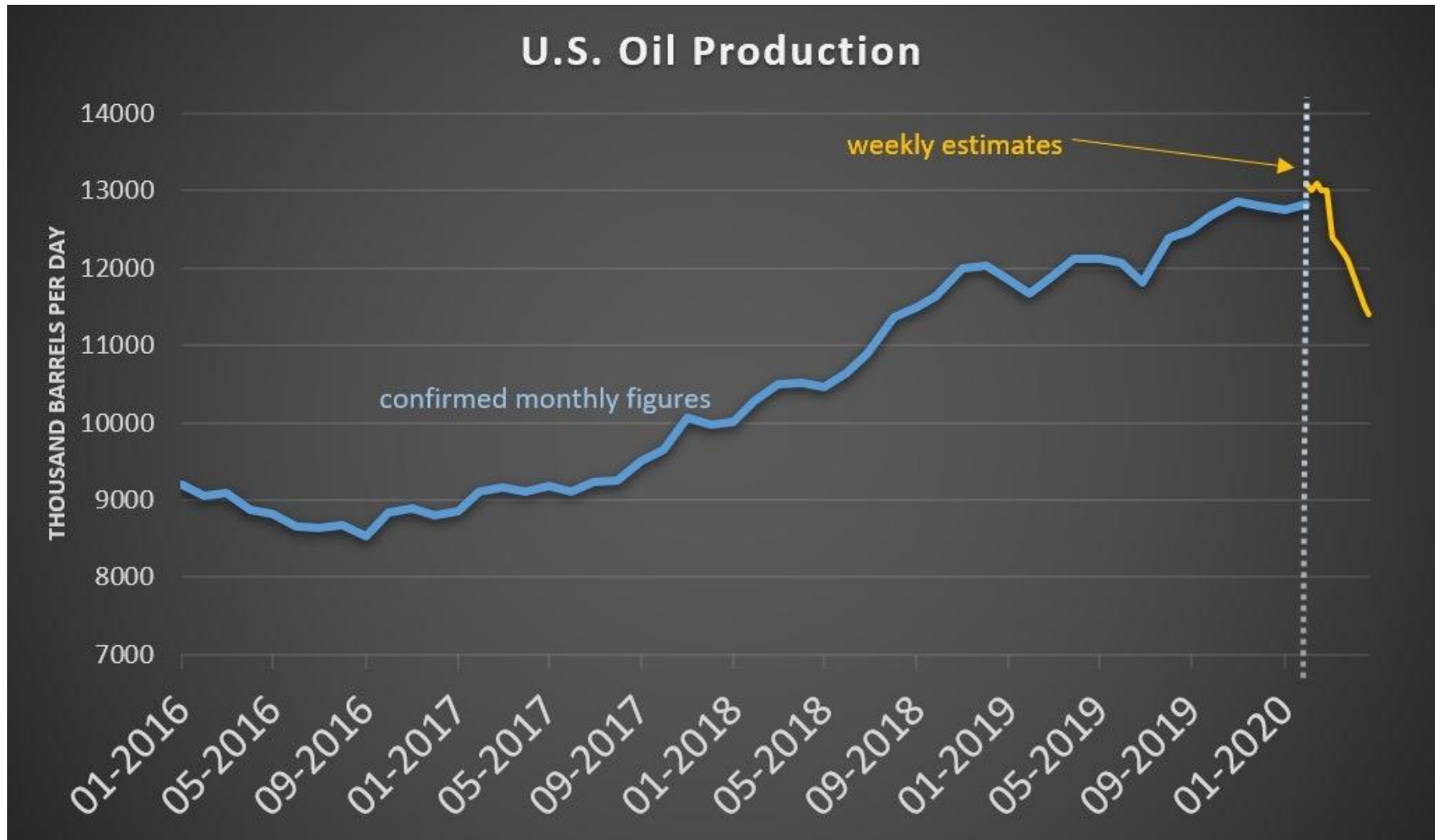
Gas Rationing of 1973



Oil Production: US Oversupplying World Markets



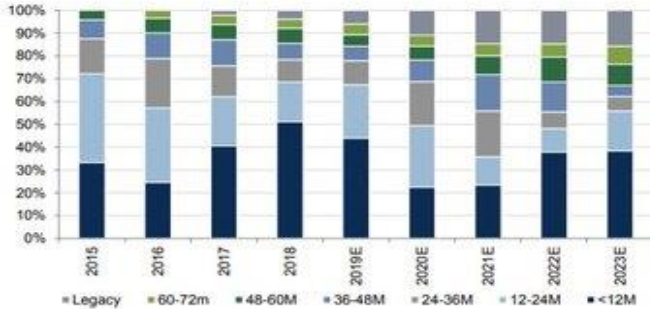
Oil Production: US Oversupplying → Steep Decline



Steep Declines → Death of Onshore Shale

Exhibit 98: At present c. 70% of shale production comes from wells that are <3y in age (i.e. in hyper decline), but as activity drops, the age of the wells will lengthen through 2021, reducing the base decline rate

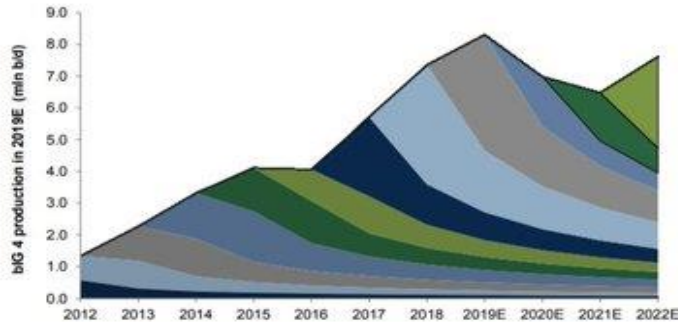
% of shale production volume, split by well vintage in the Big Four



Source: Goldman Sachs Global Investment Research

Exhibit 100: In 2019, new well capacity of 3.7mln b/d was added – 70% for countering base declines, 30% for growth

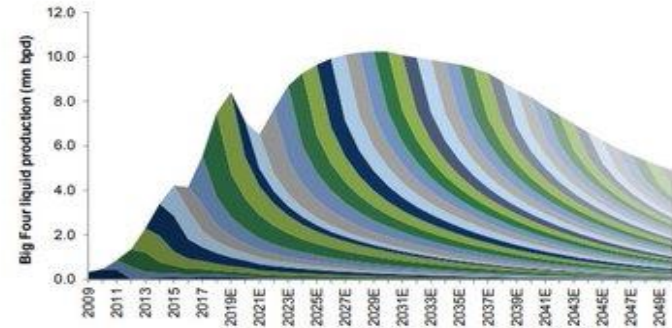
Big Four production in 2012-22E



Source: Goldman Sachs Global Investment Research

Exhibit 99: The 2020 reduction in activity could likely enable a resumption of rapid growth in 2022E, albeit from a lower base

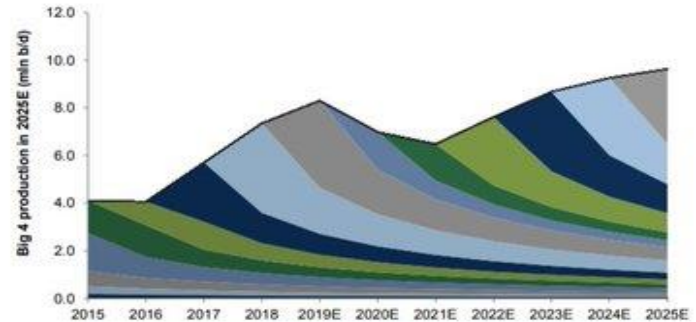
Big Four unconventional liquids production in mln b/d (ex impact of shut ins)



Source: Goldman Sachs Global Investment Research

Exhibit 101: In 2020, we estimate 1.6mln b/d of new well capacity, only half of the 2.9mln b/d needed to keep production flat

Big Four production in 2015-25E



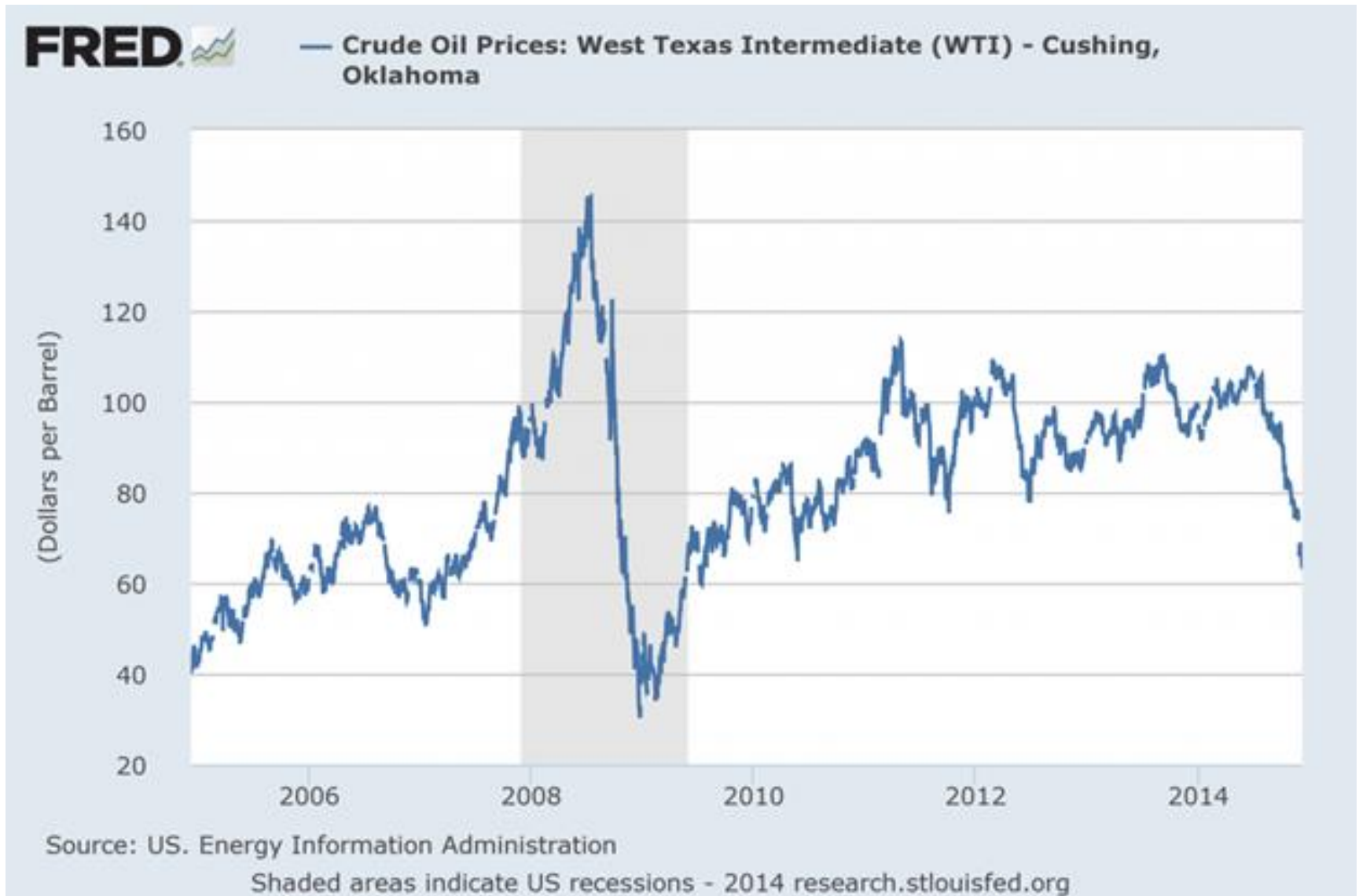
Source: Goldman Sachs Global Investment Research

COVID19: Greatly Accelerating Existing Trends

CNBC May 27, 2020: IEA says the coronavirus crisis has set in motion the largest drop of global energy investment in history

- “the IEA said that the unparalleled decline in worldwide energy investment had been “staggering in both its scale and swiftness”
- “spending set to plummet in every major sector this year”
- “ ‘The historic plunge in global energy investment is deeply troubling for many reasons,’ Fatih Birol, executive director at the IEA, said in a statement. ‘It means ... lost energy supply that we might well need tomorrow once the economy recovers,’ he continued.”

Oil Price Volatility – Pricing Snaps Back After Falls



Short Term Disruption with Long Term Implications

Short-term price scenarios have strong implications for the mid to long-term, linked by how much the industry will be investing in its future

OPEC CONTROL CASE

Major supply disruption underway.

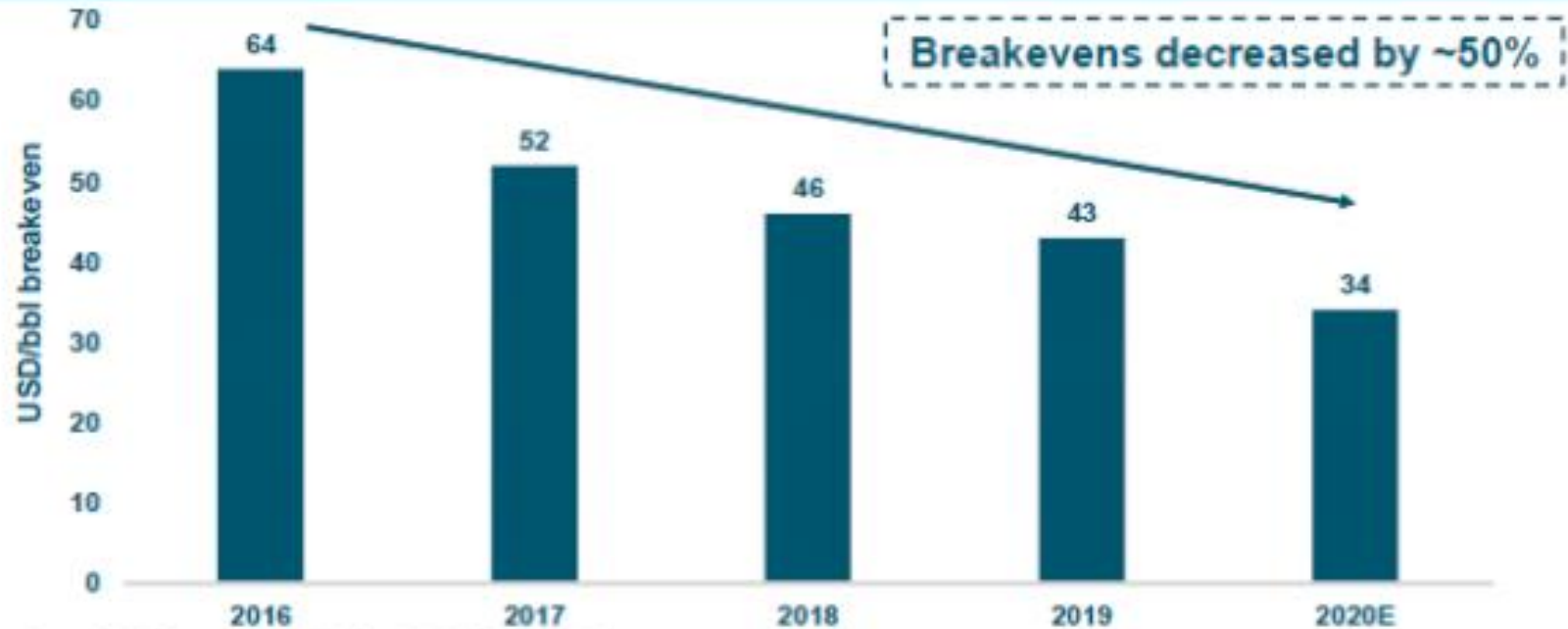
Shale oil downsized quickly now and stay moderate till sustained higher prices.

Short term scenario	Long-term price scenario ¹	What you need to believe	■ Deep dive follows
<p>Massive underinvestment</p> 	<p>>\$100/bbl</p> 	<ul style="list-style-type: none"> Major supply disruptions remove production permanently from the supply stack and shale oil declines proved to be higher than expected Strong demand growth in Asia and other non-OECD 	
<p>Stagnation and oversupply</p> 	<p>\$80-90/bbl</p> 	<ul style="list-style-type: none"> Under-investment: Years of underinvestment in exploration and infrastructure catch up with the industry, prices go up above USD80/bbl as OPEC does not have sufficient spare capacity to balance the market Dampened long-term demand growth 	
<p>OPEC control</p> 	<p>\$65-75/bbl</p> 	<ul style="list-style-type: none"> New normal: OPEC remains in control of the market balance. Oil prices remain stable with enough shale oil and offshore coming online at USD65-75/bbl Dampened long-term demand growth 	
<p>Supply disruption continues</p> 	<p>\$50-60/bbl</p> 	<ul style="list-style-type: none"> Long-term oversupply: Medium-term price fly-ups result in increased investments and FIDs in early 2020s. Due to this supply build-up, market gets into another wave of oversupply and low prices Dampened long-term demand growth 	
<p>Higher prices likely will dampen demand long term and accelerate peak oil demand and reducing climate burden long term.</p>	<p><\$40/bbl</p> 	<ul style="list-style-type: none"> Technology disruption or significant factor cost adjustments drive down breakeven costs across multiple resource types to ~\$40/bbl levels Demand peaks earlier than expected 	

¹ Reflects Brent real prices Source: EIA, Energy Insights

Future is Offshore - More Cost Effective

OFFSHORE BREAKEVENS ARE DECREASING*

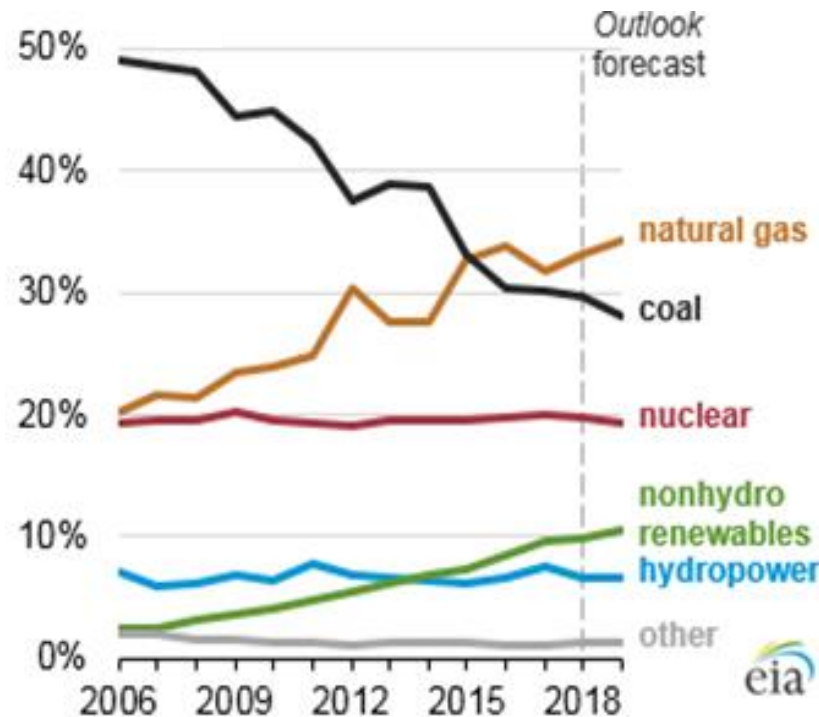


Source: Rystad Energy, Clarkson Platou Securities AS, Arctic Securities
*Average breakevens of discovered but undeveloped offshore resources weighted by project size

Not Just Oil, Growing Role of Natural Gas

- Natural Gas is growing in importance as a bridge fuel, displacing coal and increasing dependence on renewables

U.S. electricity generation by energy source (2006-2019)
billion kilowatthours share of total generation



Growing Demand from China and EM

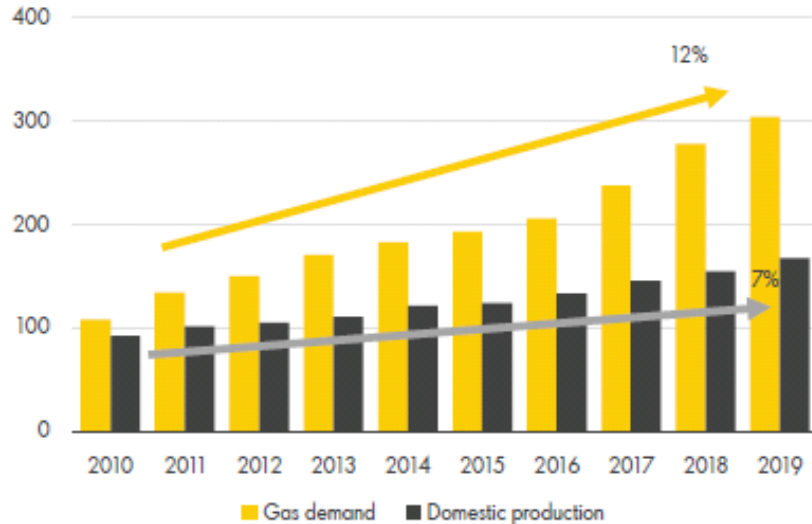
- China increasingly reliant on imports for natural gas needs
- Also expected in emerging economies like SE Asia, India and Africa as energy consumption increases with modernization

LNG imports continue to meet China's growing need for cleaner energy

Shell LNG
Outlook 2020

China gas demand vs domestic production

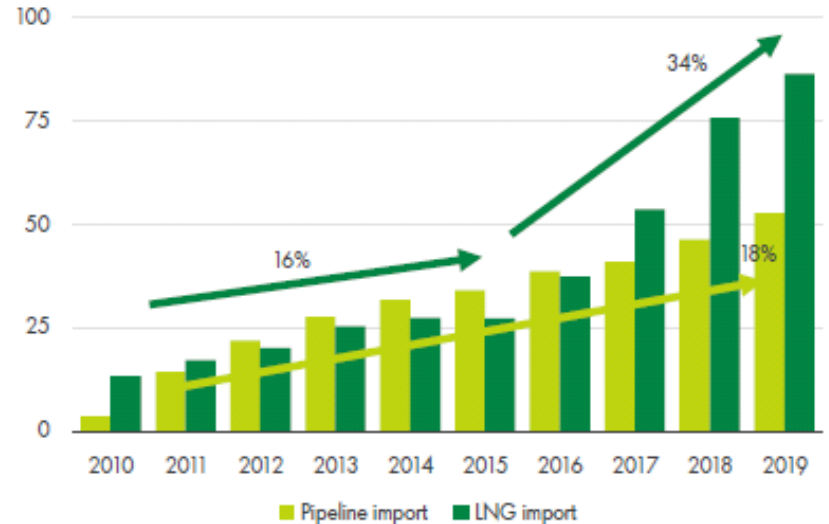
BCMA



Source: Shell interpretation of NDRC 2019 data

China LNG and pipeline gas imports

BCMA

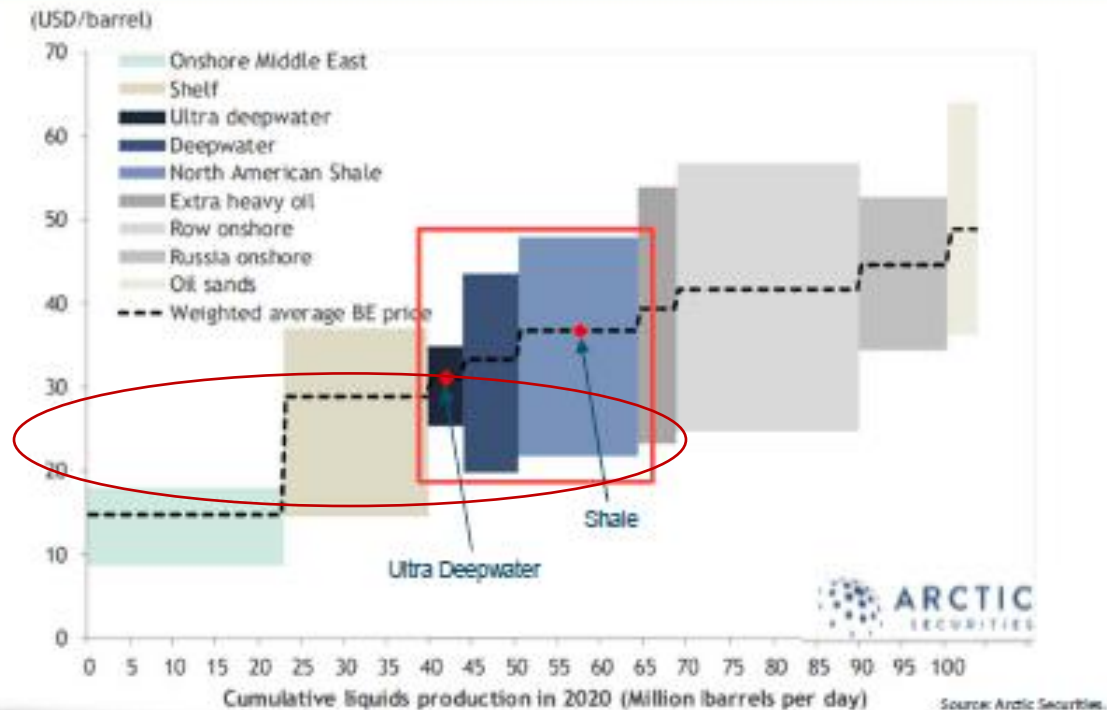


Opportunities Abound – Once in a Generation

- Majority of projects are economic from lows of \$30 / bbl - \$20 / bbl

ULTRA DEEPWATER WEIGHTED AVERAGE BREAK-EVEN BEATS SHALE

Estimated
2020 Break-
Even Prices
by Segment



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