2020: Embracing Volatility

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Personalization of Politics and the Erosion of Global Governance

Source: Lowy Institute | Source: CNN | Source: Reuters | Source: Hürriyet Daily News | Source: The Sun | Source: The National

Source: El País | Source: The Star | Source: El Financiero | Source: Wikipedia

Share of Global GDP: 48%

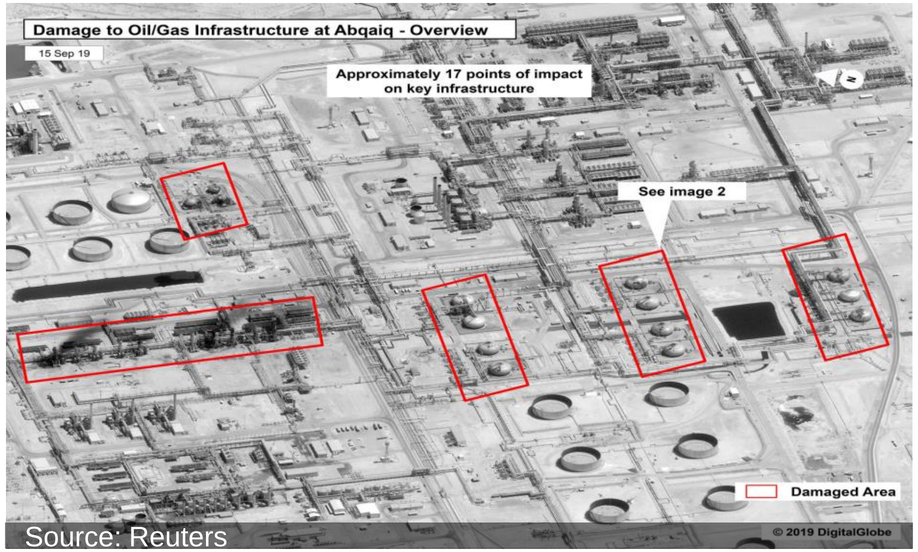
Share of Global Military Expenditures: 61%

Share of Global CO2 Emissions: 50%

Whither Governance?

Source: CIA Factbook

Attacks on Saudi Arabia, US Withdraws from Syria, and the New Dynamics of the Middle East



Source: Reuters

5.7 million bpd | 60% production | 5% global

MBS:"…The political and peaceful solution is much better than the military one."

Pompeo: "We'd like a peaceful resolution."

Iran Sanctions

- Exports ↓ 2M bpd
- Finance: closed
- Impact on GDP: ↓ 6% in '19

Dueling Drones

- Iran: June 20
- US: July 18
- Iran: Sep 14

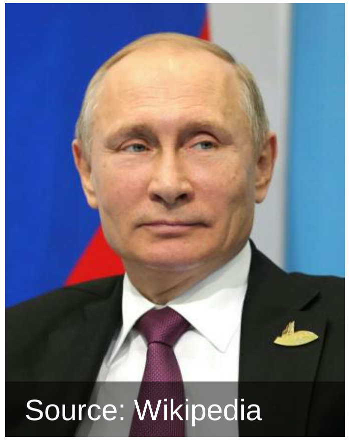
Perceived Encirclement

Syria
Hezbollah
Iran
Hamas
Yemen

Yemen War

- 4 years
- How many billions?
- US: Role?

Russia's Return to Prominence: Friends of each Enemy?

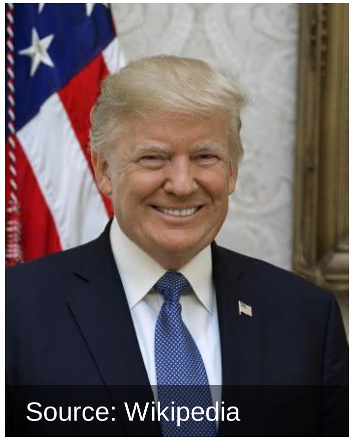

Source: Wikipedia


Source: Jakarta Post


Source: CNN


Source: Wikipedia


Source: The Times of Israel


Source: Wikipedia

Source: Sputnik News


Source: Fleeson


Source: ArkLatex

A Reversal of Military Asymmetry and the Future of War?

Military Prowess


Source: Shutterstock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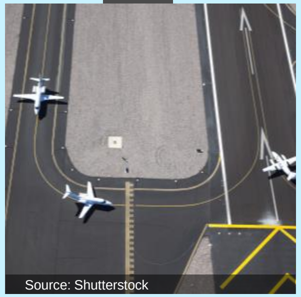
Source: NY Post

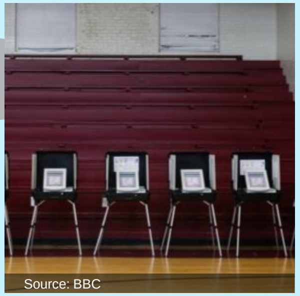
Technology Access … and Risk

Source: Times


Source: Brainstorm


Source: Shutterstock


Source: The Nation


Source: BBC


Source: Shutterstock

Climate Change, Energy Transition and a Void of Leadership

Paris Accord

Goal

- Keep global temperature rise in 21st century well below 2°C and pursue efforts to 1.5°C

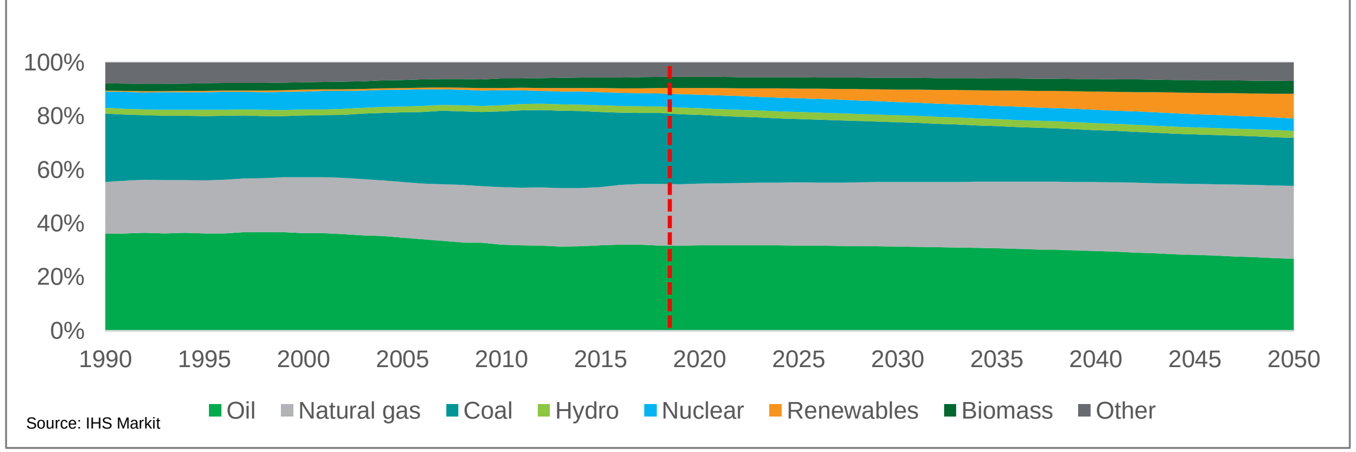
Countries

- 195 signatories
- 186 ratified

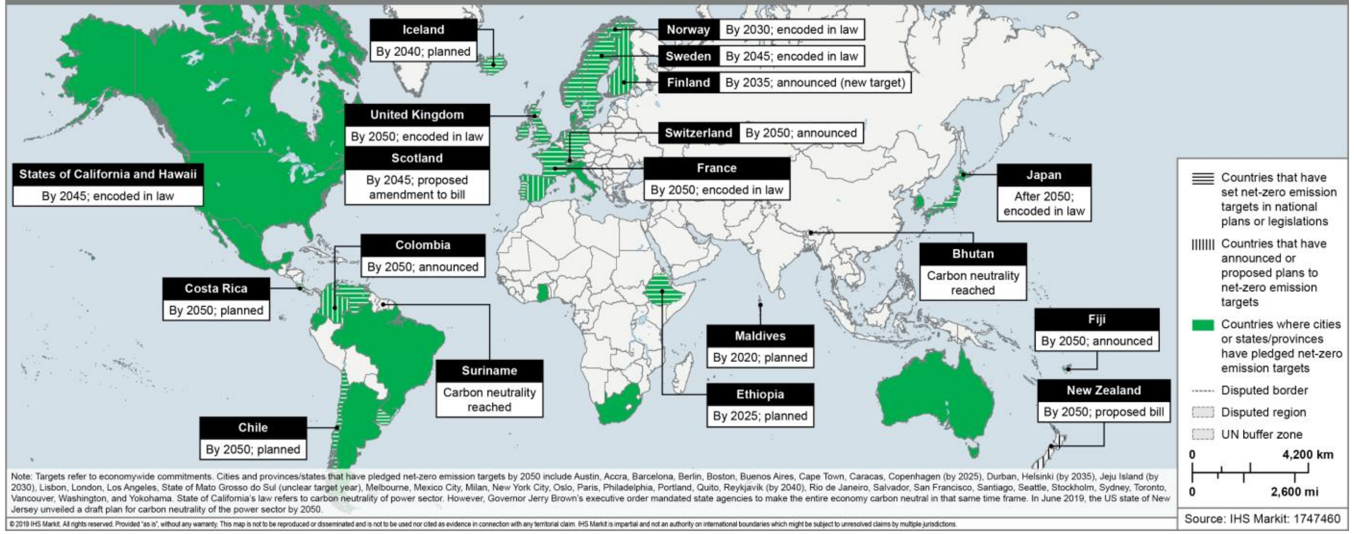
2015

- US-China
- European embrace
- G-77 support

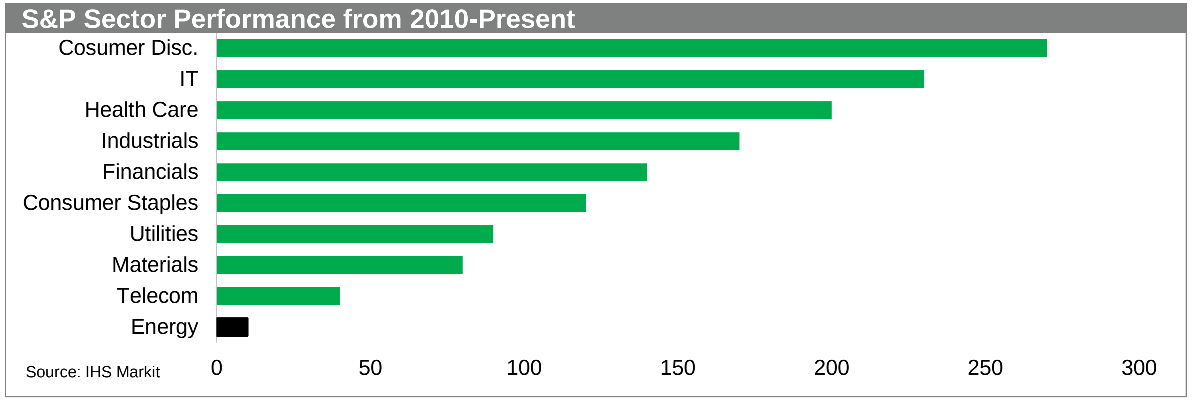
Total primary energy consumption mix by fuel, 1990-2050

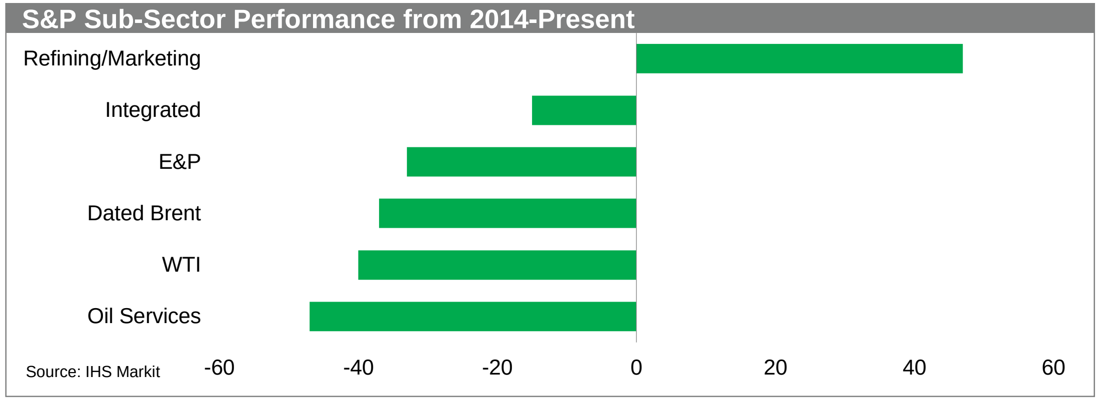


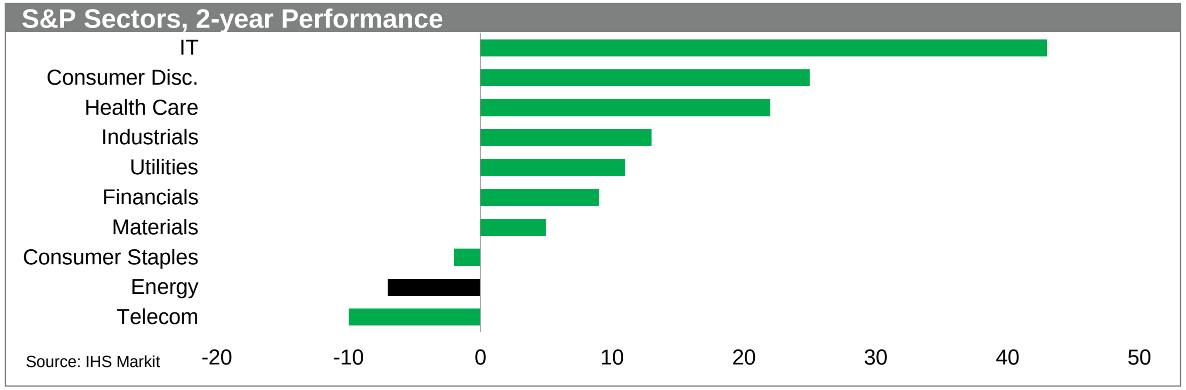
Net-zero emission targets by jurisdiction

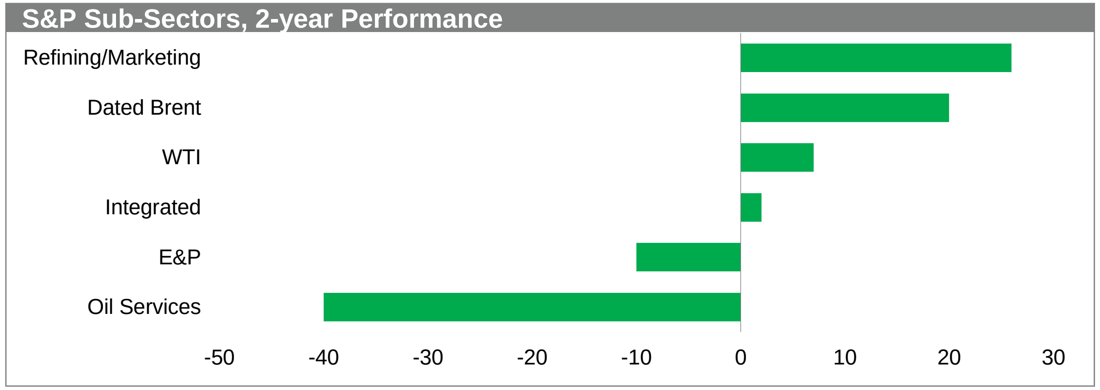


Energy Investments have Underpeformed and Financial Investors have Fled





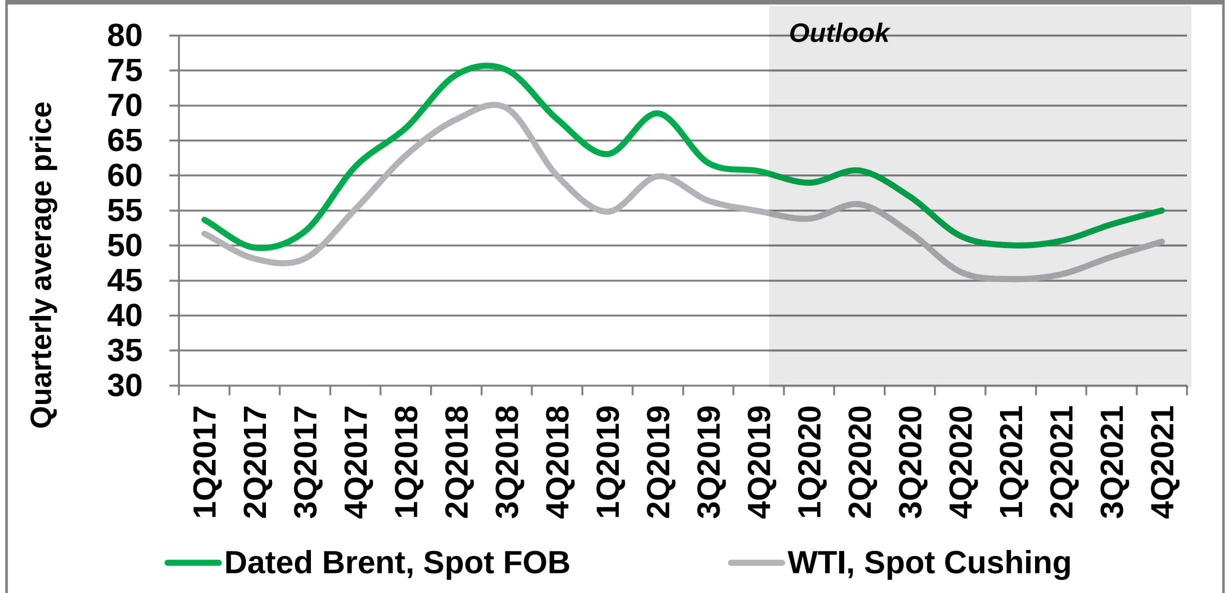




"There is a general apathy . . . . as a result of not having made money over a one-, three-, or five-year period. Investors have really pushed for a conversion into a more returns-based model."
North American private equity firm (energy focused)

Price Swoon Ahead: Brent Prices Languish Below $60/bbl in 2020 and 2021 Although Risks Abound

Dated Brent and WTI-Cushing crude oil price outlook to 2021



Source: IHS Markit, Argus Media Limited (historical)

- **Given the looming sharp deterioration in global market conditions in 2020 and 2021 and the ease with which oil markets have brushed aside real (and proven) supply risk in favor of demand fears, we have significantly lowered our price forecast for Brent and WTI relative to our July outlook.**
- We now expect Brent prices to average $64/bbl in 2019 and $57/bbl in 2020, down $3/bbl and $7/bbl, respectively from our July outlook.
- In our first look at 2021 market fundamentals and prices, the enduring and worsening oversupply in our base case balances lead us to initiate our annual Brent forecast at $52/bbl.

Benchmark crude price outlook ($/bbl)

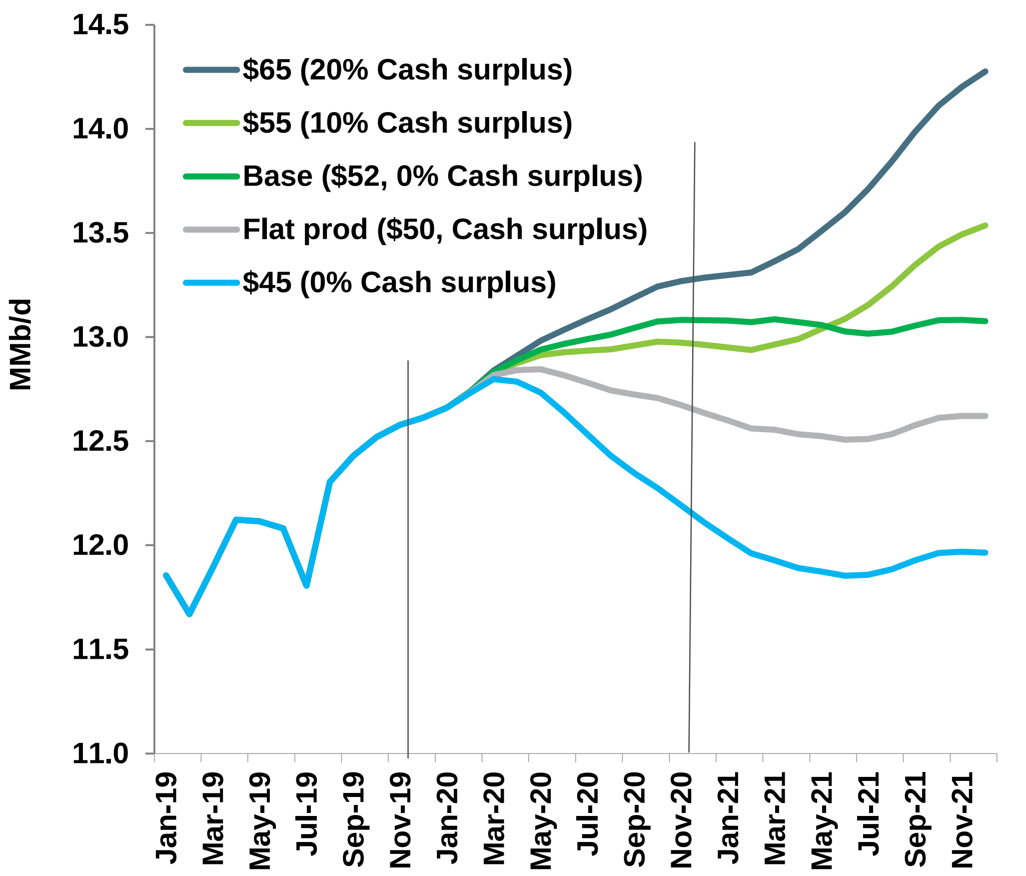
	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	2021
Dated Brent	$66.81	$74.40	$75.08	$68.06	$63.06	$68.88	$61.79	$61.00	$59.00	$61.00	$57.00	$51.00	$52.00
WTI	$62.89	$68.03	$69.63	$59.97	$54.83	$59.89	$56.41	$55.00	$54.00	$56.00	$52.00	$46.00	$47.50

Source: IHS Markit, Argus Media Limited (historical)

Shale Growth Is Vulnerable To Even A Modest Price Downturn

- E&Ps’ inability to outspend cash flow, coupled with high decline rates following years of rapid growth, leave it exposed to a sharp deceleration with WTI prices around $50/bbl, tipping into contraction if prices fall into the $40s/bbl.

Oil production scenarios based on various prices and cash return strategies



Source: IHS Markit

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Scenario details

Base Case	2019	2020	2021	2022
WTI Price ($/bbl)	59.44	52.00	48.00	55.00
Entry-to-exit growth (b/d)	757,638	420,433	(2,570)	98,184
Rig count	924	759	776	864
Well count	18,578	16,673	15,285	15,197
Capex ($bn)	102	90	83	90
Cash flow ($bn)	129	111	104	135
Interest Expense ($bn)	(21)	(21)	(21)	(21)
Cash Surplus (Deficit)	5%	0%	0%	17%
Recovery and returns ($65, 20% yield)	**2019**	**2020**	**2021**	**2022**
WTI Price ($/bbl)	59.44	65.00	65.00	55.00
Entry-to-exit growth (b/d)	757,638	624,043	977,154	(493,419)
Rig count	924	801	981	864
Well count	18,578	17,230	18,339	16,500
Capex ($bn)	102	94	113	99
Cash flow ($bn)	129	143	164	149
Interest Expense ($bn)	(21)	(21)	(19)	(17)
Cash Surplus (Deficit)	5%	20%	20%	22%
Downturn ($45, Live within cash flow)	**2019**	**2020**	**2021**	**2022**
WTI Price ($/bbl)	59.44	47.06	45.00	55.00
Entry-to-exit growth (b/d)	757,638	(551,126)	(69,337)	514,719
Rig count	924	543	671	864
Well count	18,578	13,809	12,593	14,565
Capex ($bn)	102	69	64	86
Cash flow ($bn)	129	90	85	123
Interest Expense ($bn)	(21)	(21)	(21)	(21)
Cash Surplus (Deficit)	5%	0%	0%	13%

Reduced financial flexibility and high base declines leave shale exposed to price decline

Source: IHS Markit

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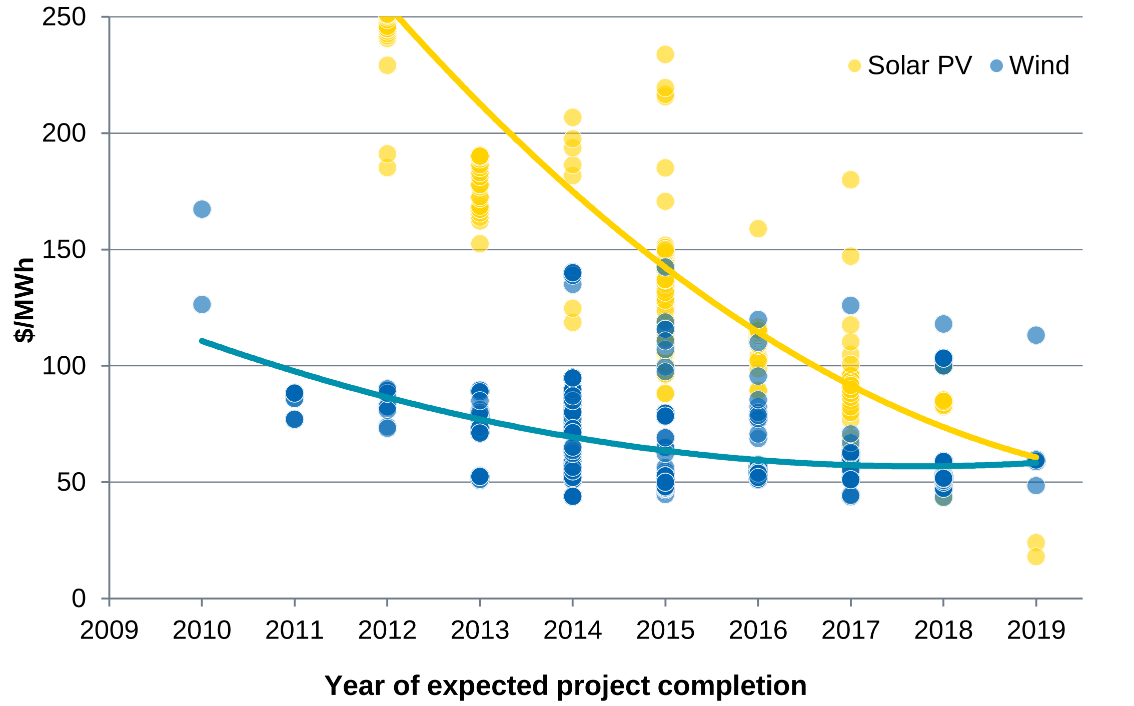
Brazil: The depth and breadth of regulatory reforms approved over the past two years is unprecedented – Is That Enough?

Reform	Objective	Implications
Presalt reform	• Approval of a law removing Petrobras's mandatory operatorship of new areas in the presalt polygon with a minimum 30% working interest. • Further presalt opening possible if both houses of Congress approve bill allowing Petrobras to take on partners for the Transfer of Rights areas	• Petrobras retains preferential right to decide which new presalt areas it will operate. Preferential rights regulations add complexity for IOCs. • Potential for increased competition for areas Petrobras opts not to operate
Bid rounds	• Implementation of multiyear bid round calendar • Creation of Open Door regime, under which relinquished areas and unawarded blocks from past bid rounds are made available to companies on a permanent basis.	• More frequent bid rounds and inclusion of more attractive acreage has led to resurgence in IOC interest in Brazil
Local content (LC)	• Remove LC as biddable item in licensing process • Lower LC requirements for new bid rounds and offer IOCs possibility of amending LC terms in contracts awarded in previous rounds	• Reduce probability of project delays and cost escalations • Increase flexibility in procurement decisions • Improve economics of future presalt developments
REPETRO	• Extend special customs regime for the import and export of E&P equipment to 2040 • More items/activities included	• Provide greater stability for existing projects • Improve economics of future presalt developments
Royalty rate reductions	• Lower royalty rates for frontier blocks included in new bid rounds • Possiblity of royalty reduction for incremental production volumes from mature fields	• Royalty reduction incentive could encourage new investment in mature fields in the Campos Basin

Source: IHS Markit

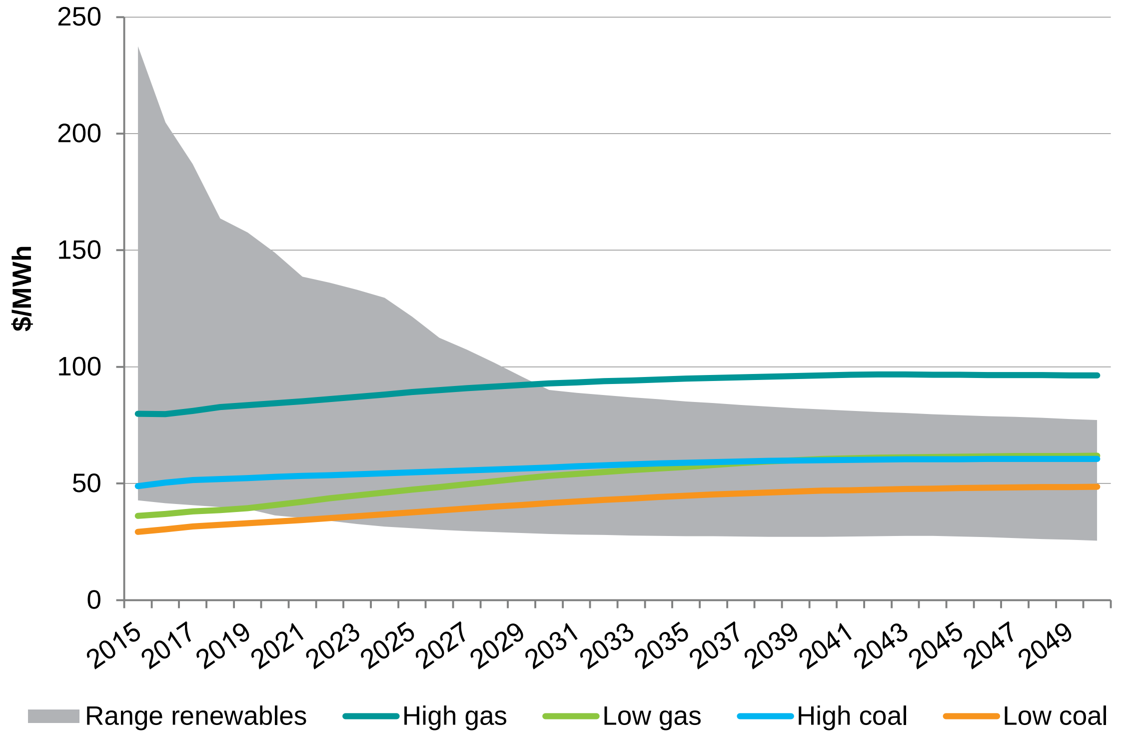
Tender awards reflect cost declines in solar PV (80% since 2012) and wind (50% since 2010) – bringing solar and wind into gas and coal competitive range

Disclosed tender prices by expected year of completion for wind and solar projects, 2010–19 ($/MWh)



Note: Prices shown for more than 1,000 tracked projects selected or short-listed in competitive auctions or tenders and plotted based on expected year of completion in accordance with tender terms and schedule.
Source: IHS Markit

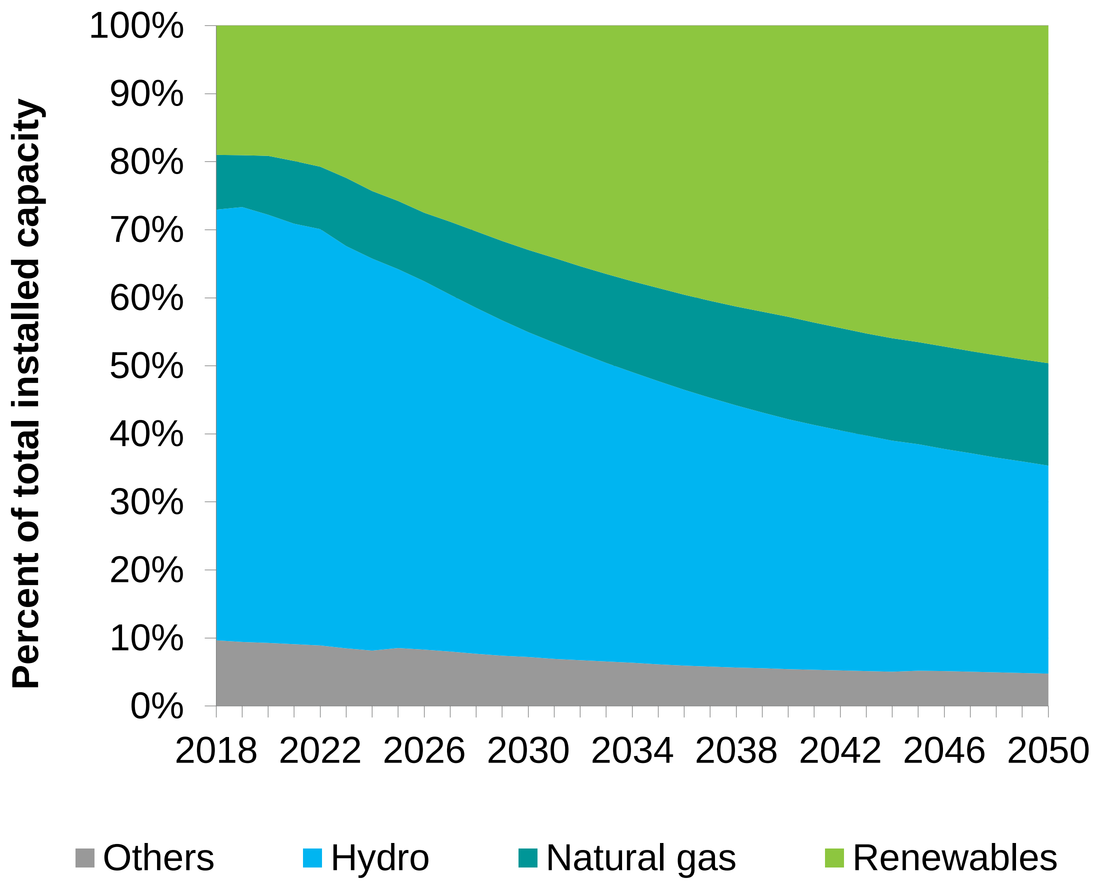
Benchmark fuel costs for power generation and renewable price ranges, 2015–50



Source: IHS Markit

Brazil: Renewables will continue to lead capacity additions, but requirements for dispatchable capacity with competitive costs increase

Capacity outlook share



Source: IHS Markit

Brazil's capacity expansion

- From 2020 to 2030, Brazil power demand will require nearly 63 GW of new capacity, and renewables will account for more than half of it.
- Despite challenging economic and political conditions, power demand continues to grow, mostly driven by commercial and residential sectors.

Regulated market

- Stronger competition in power auctions
- Higher exposure to the free market
- Lower demand (free market migration and distributed generation)

Free market

- Shorter PPAs (more liquidity in the free market)
- New revenue streams (energy and capacity)
- New financing mechanisms

Source: IHS Markit

2020: What are the challenges?

- Global markets, local politics
- Volatility – political & economic
- End of alliances? Or interim confusion?
- Bearish markets for oil and gas
- New Climate Narrative?
- Brazil – Power of Resources