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The future O&G sector, now

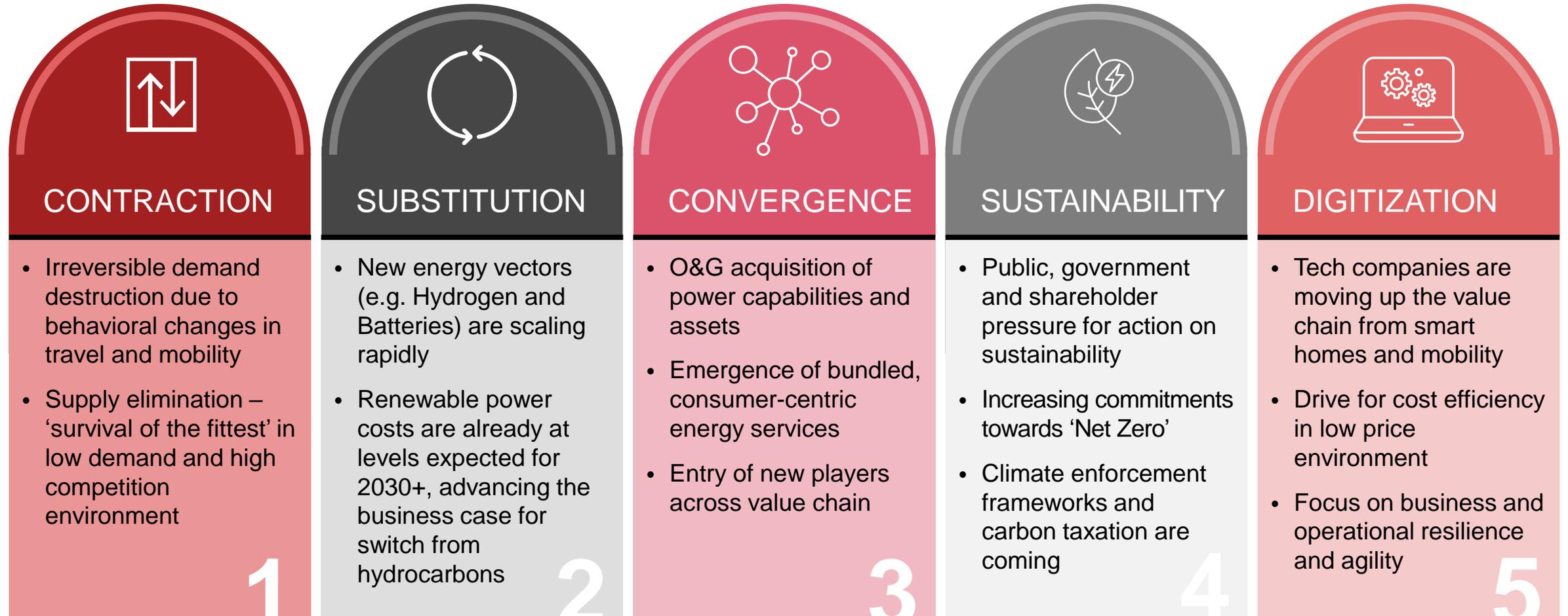
*Five unstoppable forces
will permanently change
the O&G landscape*

May 2020



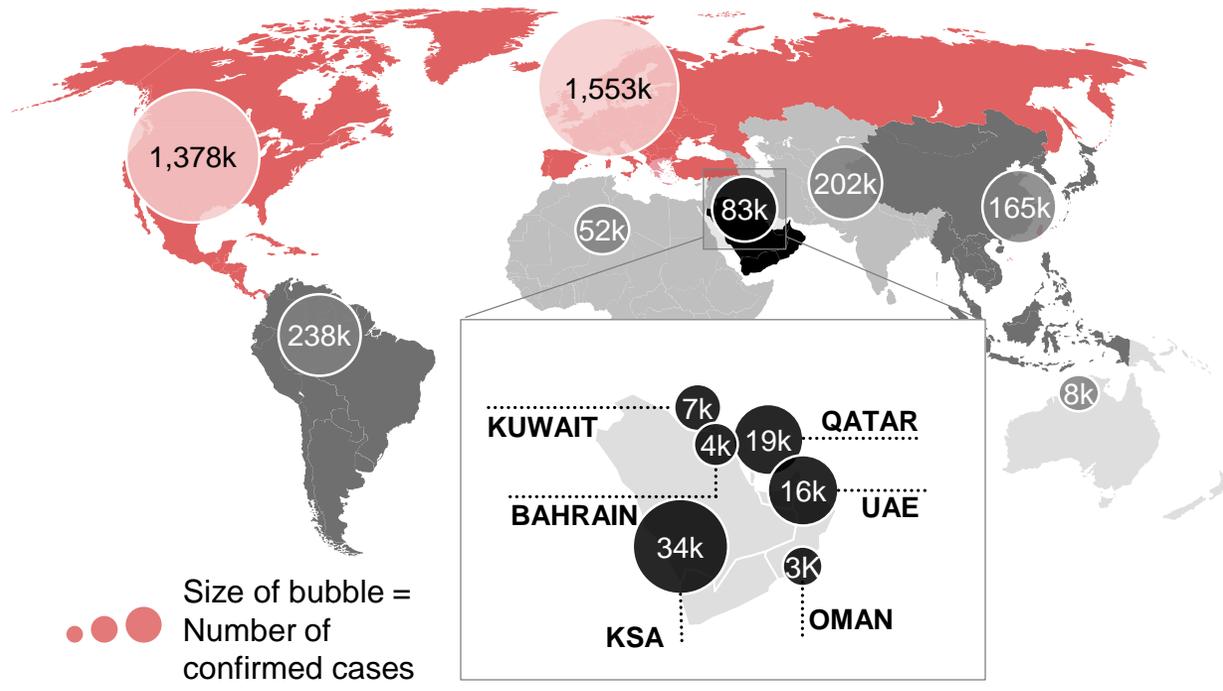
Five unstoppable disruptive forces are gaining momentum and changing the energy landscape as we currently know it

Five Disruptive Forces

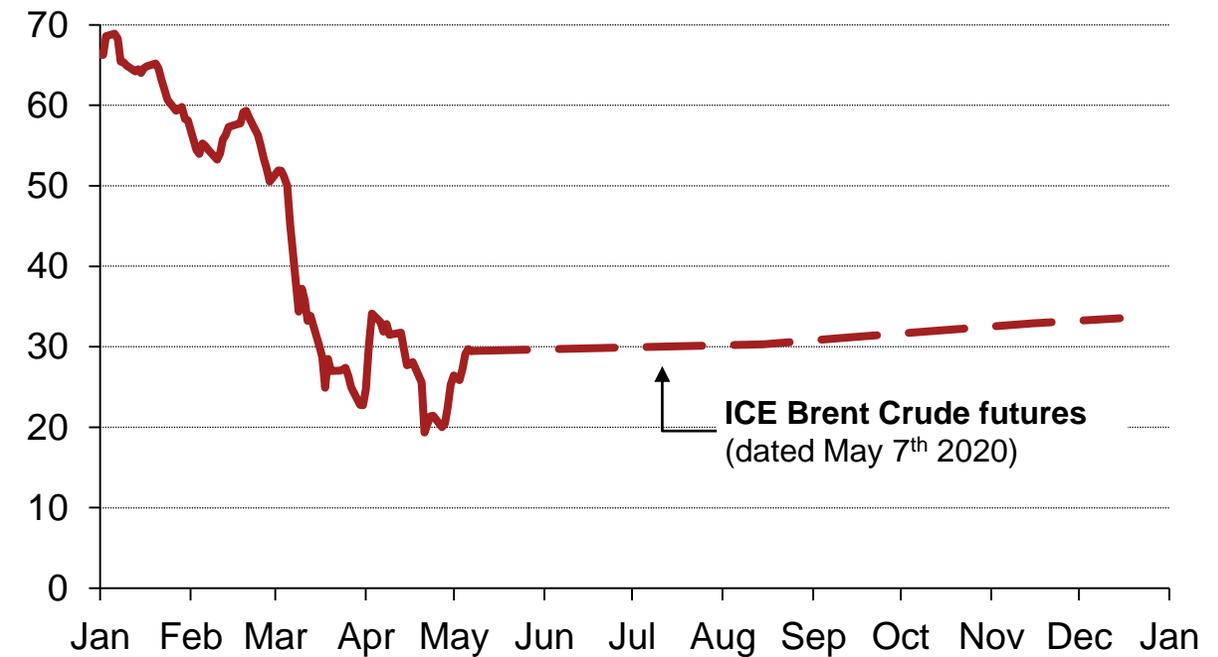


The “dual shock” of COVID-19 and collapse in oil prices will only accelerate the impact of the five forces

Global COVID-19 Pandemic (as of May 7th)



Drop in Oil Prices [\$/bbl Brent Crude daily price, 2020]



Permanent impact of Dual Shock



Change in travel and mobility patterns



Localization of supply chains



Focus on business and operational resilience

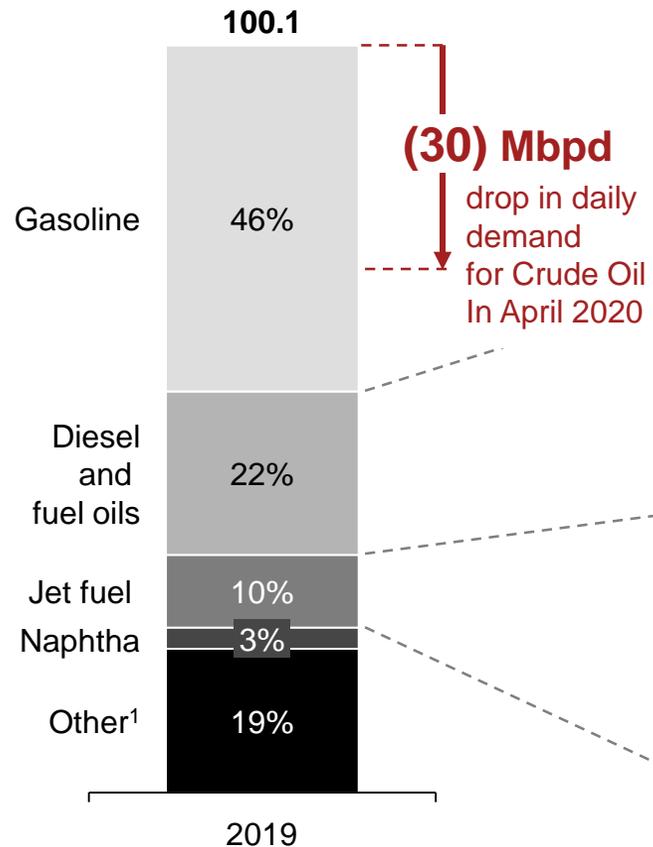


Government stimulus focus on green energy

Oil demand may never fully recover from its post COVID-19 slump due to permanent structural changes in mobility patterns

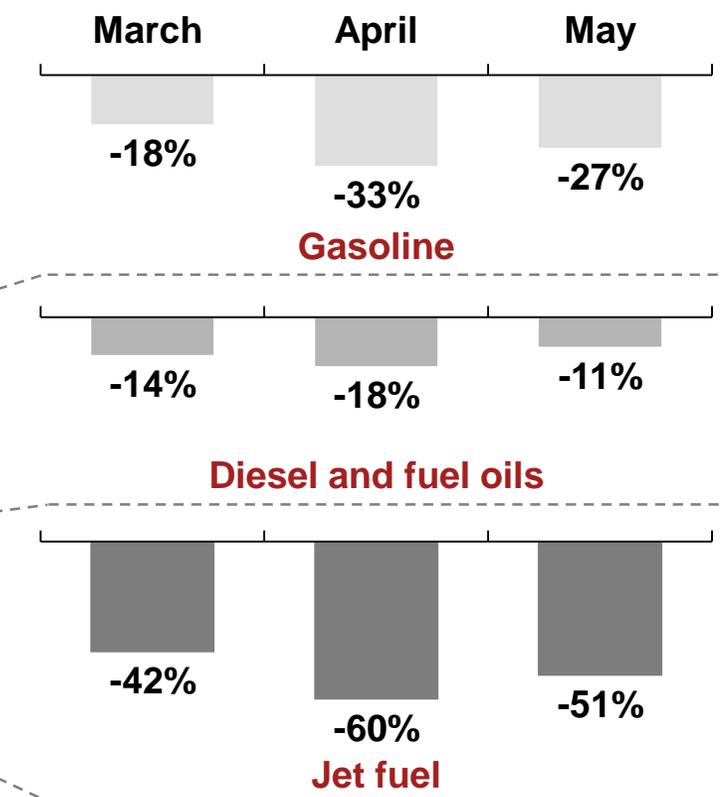
Crude Oil Breakdown

[Mbpd, % by products]



Transport Fuels Consumption Drop

[2020, % drop in consumption – YoY basis]



IMPLICATIONS

- **Fuels demand unlikely to fully recover** due to **behavioral changes** post COVID-19 in local and international mobility
- **Competition will increase** among **suppliers to secure access to end-markets**
- **Unviable supply will be eliminated** based on revised market balance and pricing forecasts, leading to permanent contraction of oil and gas markets

1) Other refined products comprise of LPG, coke, lubricants etc.
Source: IHS Markit; Rystad, Strategy& analysis

Batteries are already substituting hydrocarbon demand, with electric vehicles rapidly gaining competitiveness

Applications

Transport

- Battery Electric Vehicle (BEV)
- Hybrid Electric Vehicle (HEV)
- Plug-in Hybrid Electric Vehicle (PHEV)

Renewables

- Capacity Firming
- Time Shift

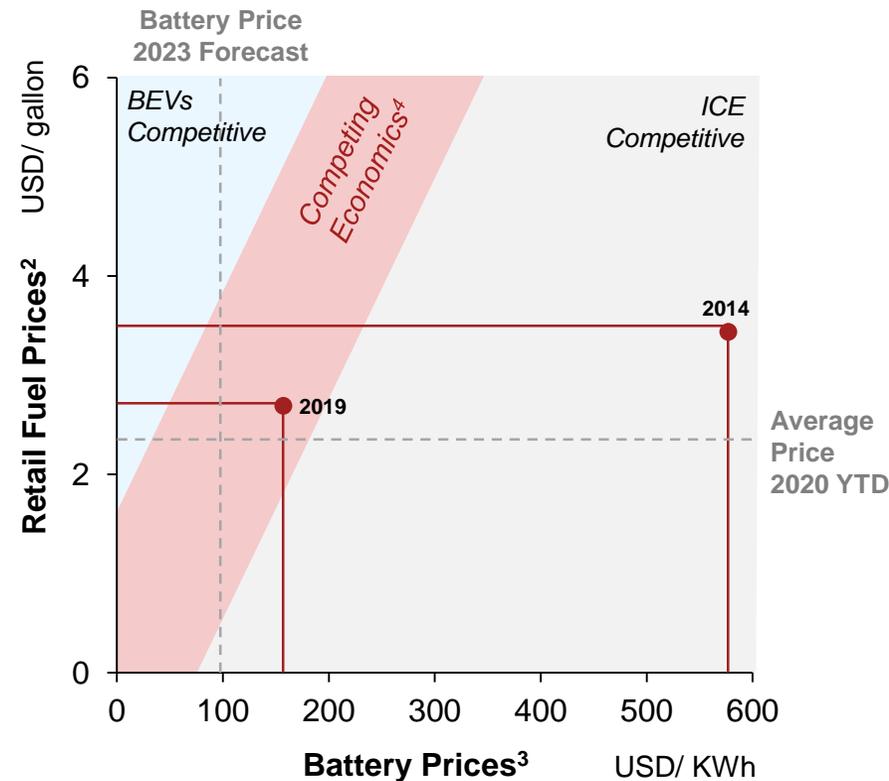
Grid Balancing/ Optimization

- T&D Deferral
- Frequency Regulation
- Load Levelling

Power Back-up

- Uninterrupted Power Supply (UPS)
- Diesel Genset Replacement/ Fuel Optimization

BEV vs. ICE¹ Vehicles Competitiveness



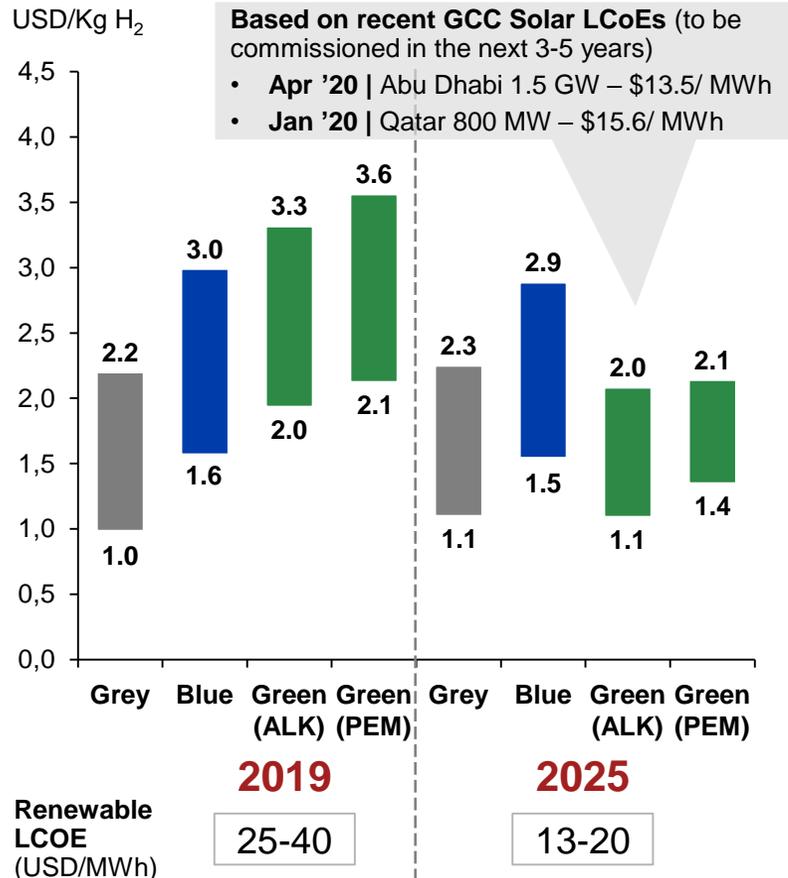
IMPLICATIONS

- Rapid reduction in battery costs in recent years have making **EVs increasingly competitive**
 - **Incentives** (subsidies, public procurement) and **infrastructure** being introduced in most markets **to encourage EVs uptake**
 - **Carbon taxes** will further **strengthen economics** of EVs
 - At current battery prices, **lower oil prices** are **unlikely to slow down or reverse shift to EVs**
- Applications for **stationary energy storage** also rapidly gaining traction led by **growth of renewables** and **smart grid**

1) Battery Electric Vehicles; 2) US prices – average all grades gasoline (PADD 1-5) – nominal USD; 3) Lithium ion battery pack global prices – real 2018; 4) Based on total cost of ownership of C-segment (Compact), D- (midsize) and E-segment (full-size) vehicles
Source: EIA, European Commission, Bloomberg New Energy Finance, Strategy& analysis

Hydrogen as a new energy vector is becoming competitive with hydrocarbons faster than expected, driven by renewables costs

Hydrogen Production Cost



Applications

- Transport fuel**
 - Road transport (FCEV)
 - Maritime and aviation (Synth. fuel)
- Heat and power fuel**
 - Industrial/Commercial/Residential heat
 - Power generation
- Feedstock/Chemical agent**
 - Steel
 - Methanol
 - Refining
 - Ammonia

Transportation methods

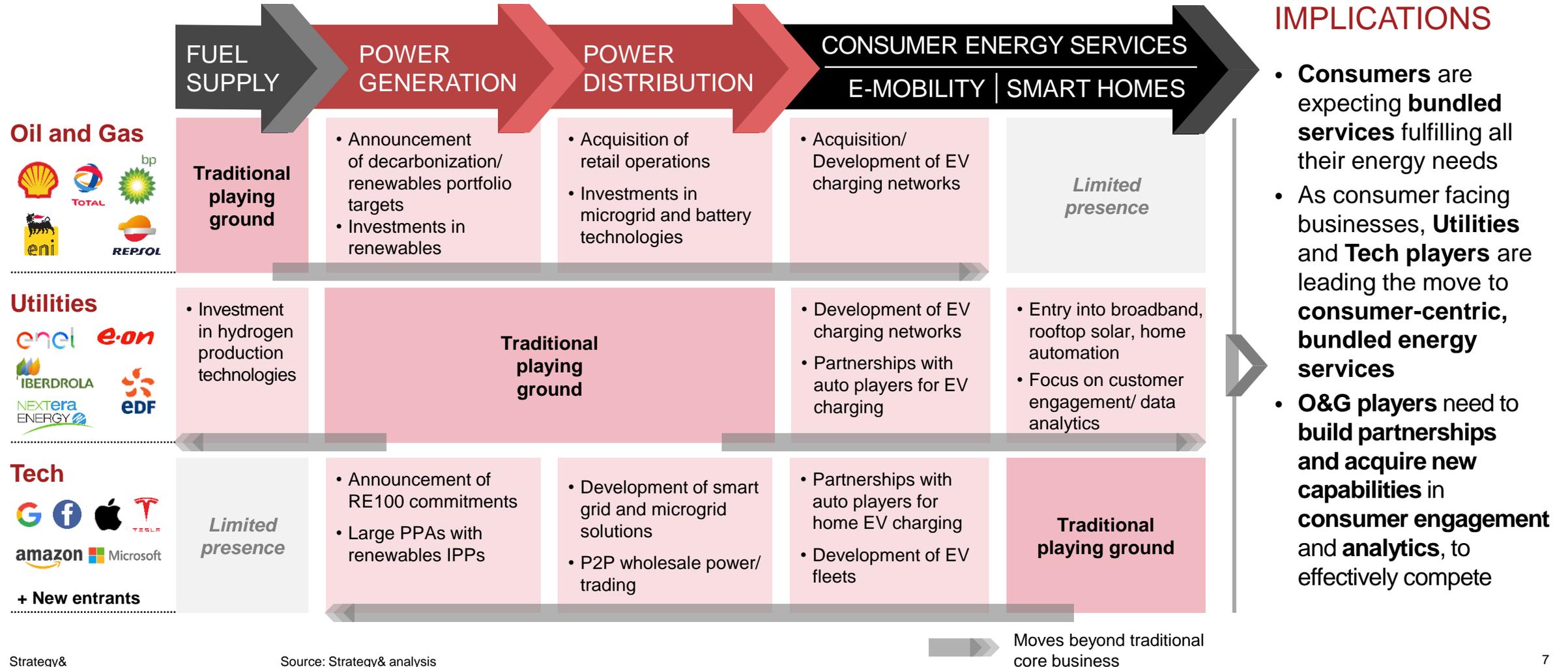
Hydrogen	As compressed or liquefied Hydrogen	} via ship or pipeline
Ammonia	In the form of ammonia as energy carrier	
LOHC¹	By hydrogenation of an organic carrier molecule	

IMPLICATIONS

- Hydrogen emerging as a **new energy vector** with potential to **substitute hydrocarbons**
 - Significant **overlap** in Hydrogen **applications** with **hydrocarbons**
 - High potential to use **existing infrastructure**
 - Green Hydrogen **production cost decline accelerating** based on reducing **renewables LCOEs**
- Reduction in Hydrogen costs, combined with **increase in carbon taxes** will **rapidly erode the cost advantage of hydrocarbons**

The traditional hard delineation between oil and gas, utilities and technology companies is already eroding

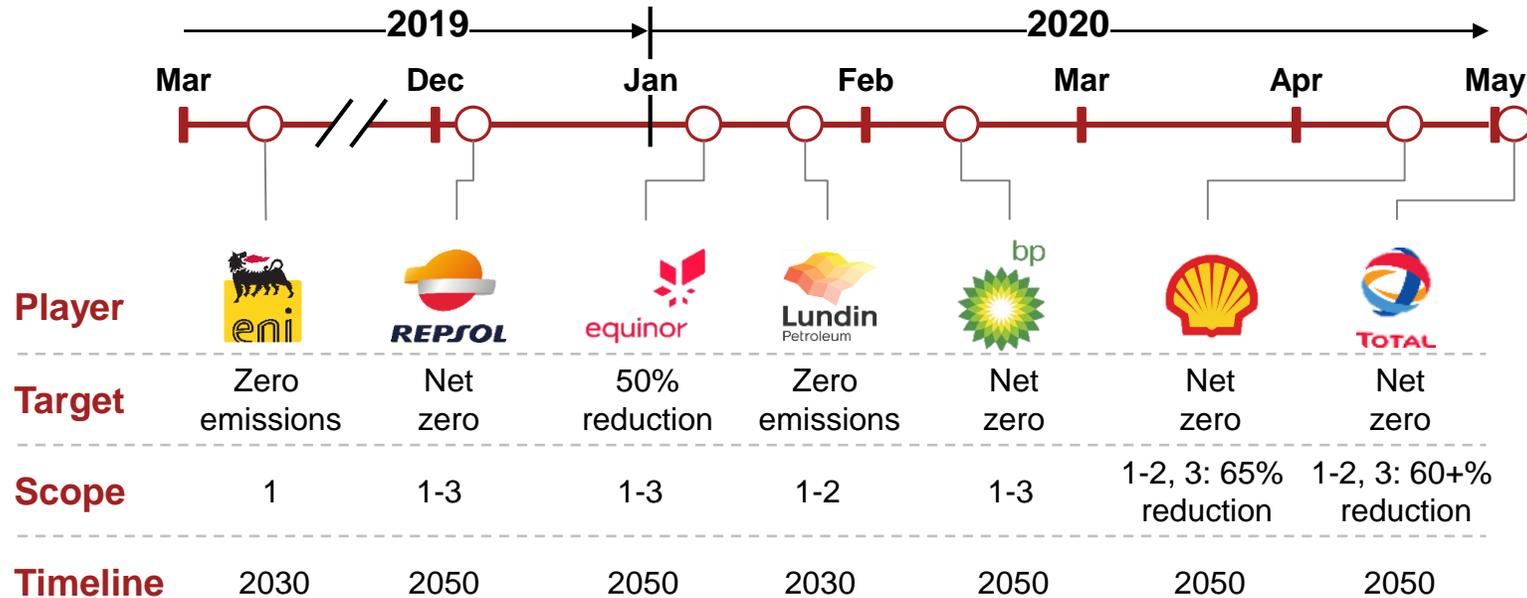
Convergence along Energy Value Chain



Climate legislation and shareholder pressure is compelling major players to make big sustainability commitments

'Net Zero' Targets Announcements

Oil and Gas

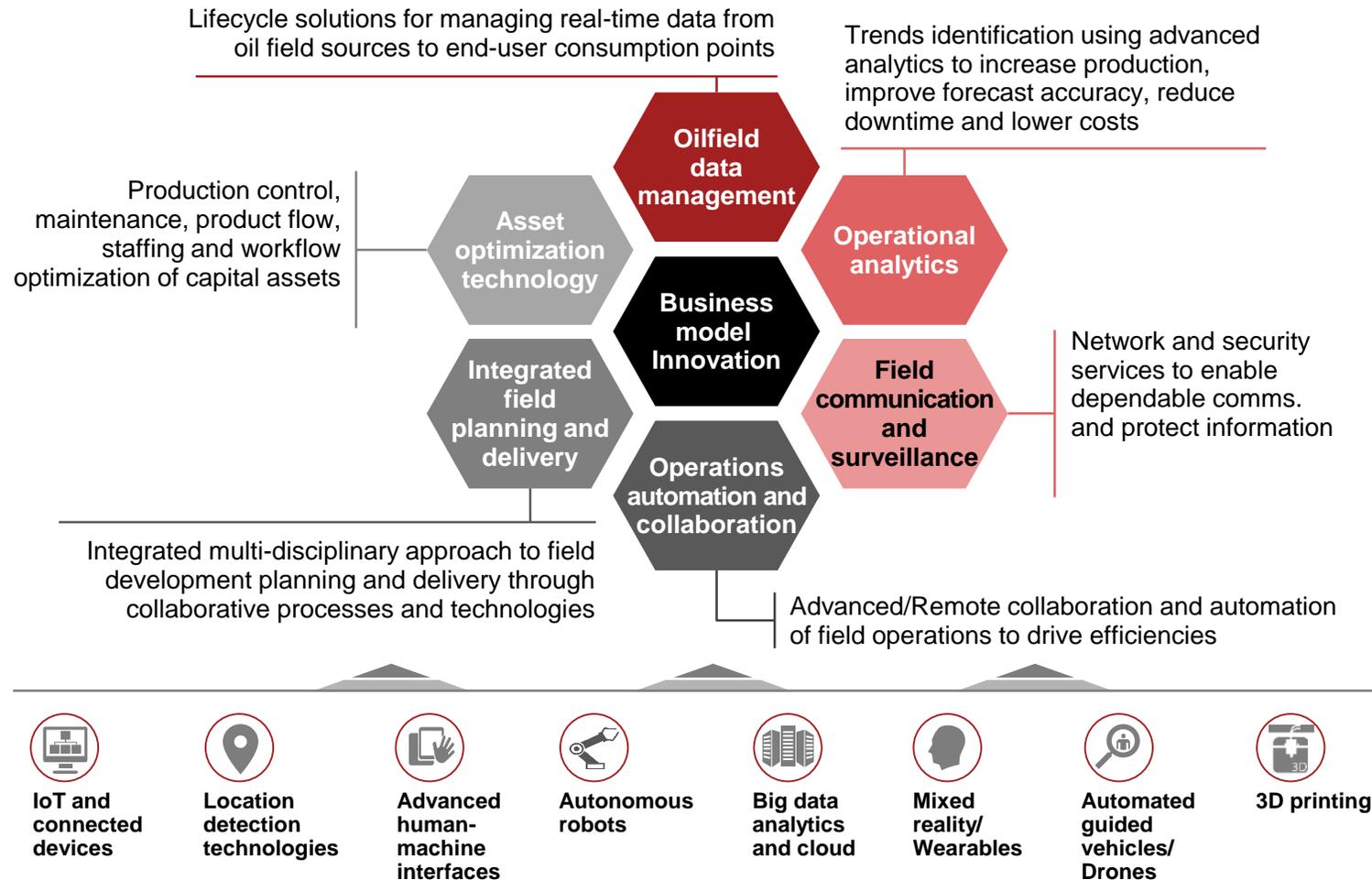


IMPLICATIONS

- **Climate targets** set in the **Paris Agreement (COP21)** have called for **reduction in emissions**
- **Government targets** and **shareholder pressure** have led an increasing number of companies to announce **emissions reduction/‘Net zero’ targets**
- **European O&G majors** have announced **ambitious targets** in recent months, with **others likely to follow suit (e.g. Total)**
- **Sustainability agenda will accelerate** in response to the **dual shock**, driven by **stimulus packages** focused on **green technologies**

After decades of investment in digital technology, it is now finally disrupting ways of thinking and working

Digital Applications and Technologies in O&G



IMPLICATIONS

- **Digital** technologies and tools are shifting from incremental efficiency improvements and starting to be **disruptive**:
 - **Automation** removing manpower from safety-critical situations
 - **IoT** and **Big Data** analytics creating real-time insight and optimization
 - **Predictive maintenance** and **3D printing** are shortening supply chains for parts and materials
- Digital will be critical for **cost leadership, value chain optimization and customer insight and responsiveness**
- **Existing talent** will need to be **reskilled to adapt to changes** in ways of working

The energy sector has dealt with heavy shocks in the past, but we believe it is very different this time

	Past shocks	Current shock
Impact on Oil & Gas	<ul style="list-style-type: none"> • Temporary reduction in economic activity leading to demand-supply imbalances • Rebound to pre-shock levels in 2-5 quarters • Industry reorganized, consolidated and cut costs to offset impact on margins 	<ul style="list-style-type: none"> • Structural destruction of demand for transport fuels due to permanent behavioral changes • Doubling down on clean energy through stimulus packages focusing on new technologies • Limited further room for efficiency and productivity improvements
Source of impact	<ul style="list-style-type: none"> • Geopolitical events • Financial crises 	<ul style="list-style-type: none"> • Behavioral shifts in travel and mobility • Acceleration of energy transition

Nature of impact



Temporary shift



Structural shift

Many players are not ready to respond to these five disruptive forces and must now act fast

Current Situation of Major Energy Players

	1	2	3	4	5
	 CONTRACTION	 SUBSTITUTION	 CONVERGENCE	 SUSTAINABILITY	 DIGITIZATION
 National Oil Companies (NOCs)	<ul style="list-style-type: none">• Natural production cost advantage is being eroded• Heavily reliance on long-term crude contracts limits agility in volatile markets• Renewable power, energy efficiency and digital initiatives are siloed and sub-scale				
 International Oil Companies (IOCs)		<ul style="list-style-type: none">• Highly diversified portfolios, but downstream hedge doesn't protect against overall value contraction• Consumer interface is limited to retail fuel stations• Big commitments on sustainability and digital, but limited at-scale disruptive traction			
 Service Companies (EPC, O&S and M&O)			<ul style="list-style-type: none">• Large base of services are rapidly being commoditized and localized• Even high-end, technology-led revenues are extremely sensitive to oil prices• Focused on maximizing extraction of oil and gas rather than value creation and sustainability		

Resource-rich NOCs will need to drive de-carbonization and take steps to squeeze value from their resource base

Key Actions for NOCs



Maximize value from existing resources

Protect natural cost advantage

- Embrace digitization – Prioritize focus areas, transform operating model, reskill the workforce
- Aggressively identify and contain sources of cost creep across the value chain

Secure 'short' positions

- Aggressively internationalize trading, marketing, distribution and retailing capabilities
- Further invest in downstream chemicals and power to build long-term natural hedges



Drive de-carbonization agenda

Reduce domestic hydrocarbon consumption

- Lobby government to drive legislation to reduce domestic consumption of hydrocarbons to reduce environmental impact and maximize availability for export
 - Electric vehicle uptake and infrastructure
 - Carbon, capture and storage (CCS)
 - Renewables for power-intensive sites/Processes

Lead development of green hydrogen

- Develop clear action plan for development of a Hydrogen economy
- Pilot Hydrogen production to build capabilities, demonstrate viability and test use-cases
- Influence government to drive utility-scale renewables capacity
- Take lead in deployment of distribution, storage and end-application technologies

IOCs will need to choose between two distinct paths – Oil and gas specialists or energy leaders – as hedging bets won't work

IOCs Today



Diversified Portfolio Players

- **Diversified portfolio** along the value chain
- **Typically cash-rich** due to the nature of their upstream investments
- Advanced capabilities in **resource evaluation and development**
- Experienced in dealing in **challenging political, economic and physical environments**

IOCs in the Future



Oil and gas specialists

- Hyper-efficient vertically-integrated hydrocarbon value chain operators
- Aggressively accessing and extracting economic resources, adding value through refining and petrochemicals and distributing to customers



Energy leaders

- Integrated energy services players seamlessly combining multiple fuel/power sources to meet consumers' needs
- Rapid incubation of energy generation, storage, trading, marketing and distribution, based on deep end-consumer insight

Key Actions

- Vertically (re-)integrate along the oil and gas value chain
- Divest non-core assets
- Implement digital-led cost and value chain optimization
- Develop lean operating/Financing models
- Integrate along the power value chain – Utility-scale M&A
- Invest in renewables and H₂, storage and distribution assets
- Partner with tech players on data analytics
- Transform operating model and build digital capabilities focused on consumer insight

Services companies will need differentiate and diversify to demonstrate the value of their independence

Key actions

Service companies

Maintenance, Modifications, and Operations (MMO)

Oil-Field Services (OFS)

Engineering, Procurement and Construction (EPC)



Differentiate

- Differentiate on core technology offerings through selective consolidation and M&A
 - Support customers' narrative of value chain optimization
 - Demonstrate cost/Efficiency leadership
 - Be a digital leader and enabler
 - Demonstrate sustainability advantage



Diversify

- Follow customers into hydrogen, renewables and power sectors
 - Augment and showcase existing capabilities that can be leveraged across sectors (e.g. Seismic and subsea services for offshore wind)
 - Invest in development of new capabilities (e.g. Emissions monitoring, carbon capture and storage, hydrogen, geothermal, wind and batteries)
 - Build partnerships to develop new innovative solutions (e.g. Offshore floating concrete wind platforms, modular utility scale PV deployment)

Demonstrate value of independence or face:

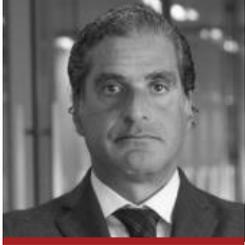
- **Commoditization**
- **Localization**
- **Consolidation**

In summary, the five unstoppable forces are accelerating and the energy sector needs to act



- **Five unstoppable forces** will change the energy landscape as we currently know it
- The “**Dual Shock**” of COVID-19 and collapsing oil prices has accelerated these forces and will cause a structural shift in the market
- In order to survive, energy players need to act now:
 - **Resource-rich NOCs** must drive the **decarbonization agenda** in their host countries and take steps to **maximize value** from their hydrocarbon resources
 - **IOCs** will need to choose between **two distinct paths** – Being Oil and Gas specialists or energy leaders
 - **Services companies** will need **differentiate** and **diversify** to demonstrate value of independence or face consolidation, localization and commoditization

Authors



DR. RAED KOMBARGI

Partner at Strategy&

and the leader of the firm's Energy, Utilities and Resources practice in the Middle East

+971-4-436-3000

raed.kombargi@strategyand.ae.pwc.com



GIORGIO BISCARDINI

Partner at Strategy&

and the leader of the firm's Energy, Utilities and Resources practice in EMEA

+39-02-725091

giorgio.biscardini@strategyand.it.pwc.com



JAMES THOMAS

Partner at Strategy&

and a member of the firm's Energy, Utilities and Resources practice in the Middle East

+971-4-436-3000

james.thomas@strategyand.ae.pwc.com



DAVID BRANSON

Senior Executive Advisor at Strategy& Germany

+49-89-545-250

david.branson@pwc.com



ADITYA HARNEJA

Manager at Strategy& Middle East

+971-4-436-3000

aditya.harneja@strategyand.ae.pwc.com



FABIO GUNGUI

Principal at Strategy& Italy

+39-02-725091

fabio.gungui@strategyand.it.pwc.com

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