

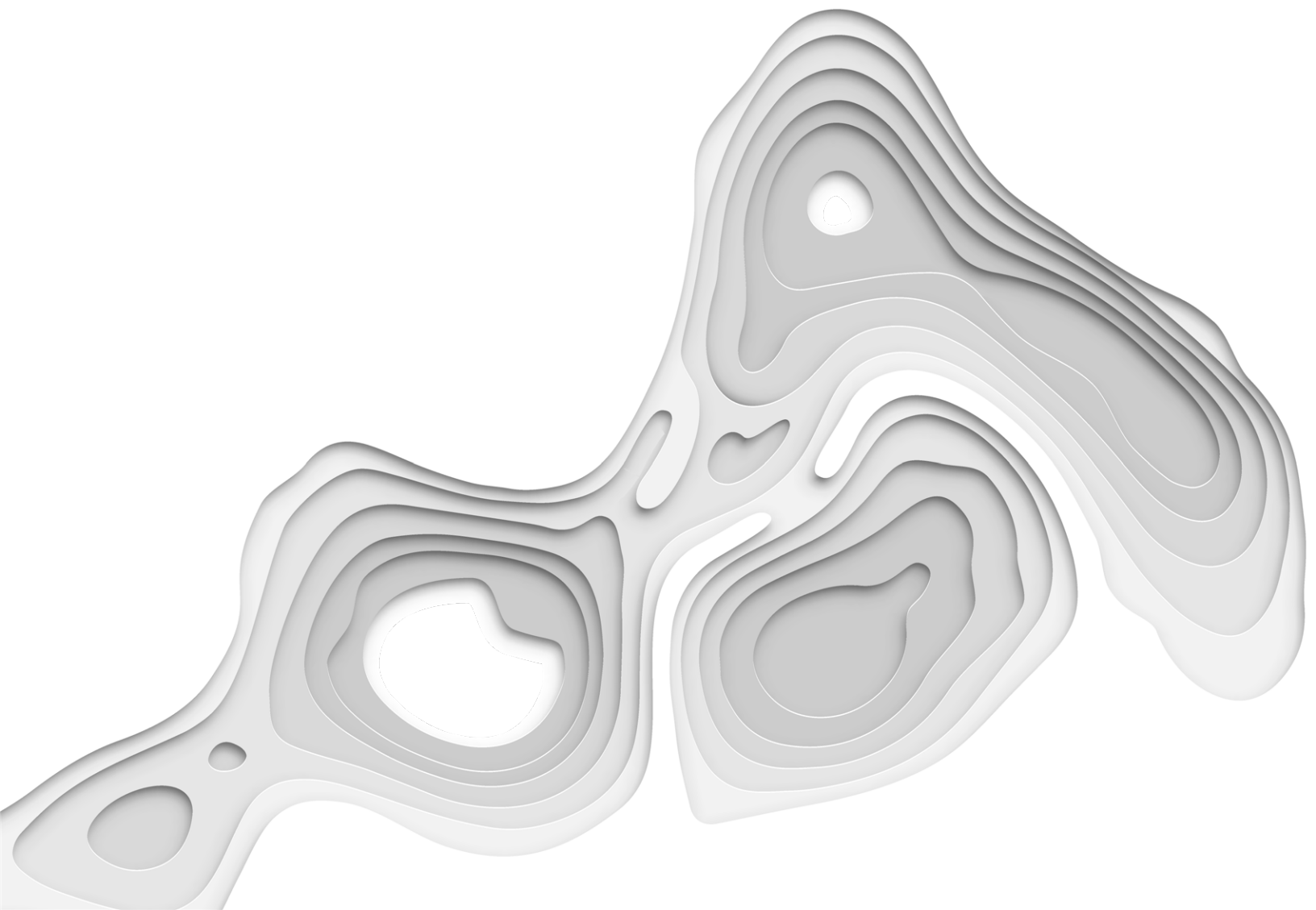


In collaboration with the
World Economic Forum



COLLABORATE TO REINVENT

An Oil and Gas Industry Imperative





Introduction:

CHALLENGING TIMES FOR THE OIL AND GAS INDUSTRY

The global oil and gas industry has faced difficult times before, but the situation it confronts in 2020 is unprecedented. The short-term outlook is challenging as the destruction of demand caused by the Covid-19 pandemic has staggered an already weakened industry. Despite prices averaging above \$70¹ per barrel over the last ten years, free cash flow from core operations has been insufficient to maintain shareholder returns above the cost of capital.² The leverage ratio of

total debt to total liquidity has more than doubled since the depths of the 2008³ financial crisis, and the industry's share of the S&P 500 has been cut by more than half over the last ten years.⁴ The mid-and-long-term also looks highly uncertain in the context of decarbonization headwind, structural changes in societal habits reducing energy intensity, and abundant and diverse energy supply availability. The industry needs to reinvent itself.



A HIGHLY UNCERTAIN FUTURE

When the industry encountered difficulties in the past, it was able to cut costs, defer investments and wait for an upturn in oil prices. This time is different, as some major shifts are attributable to fundamental demand economics in the context of a flat supply curve.

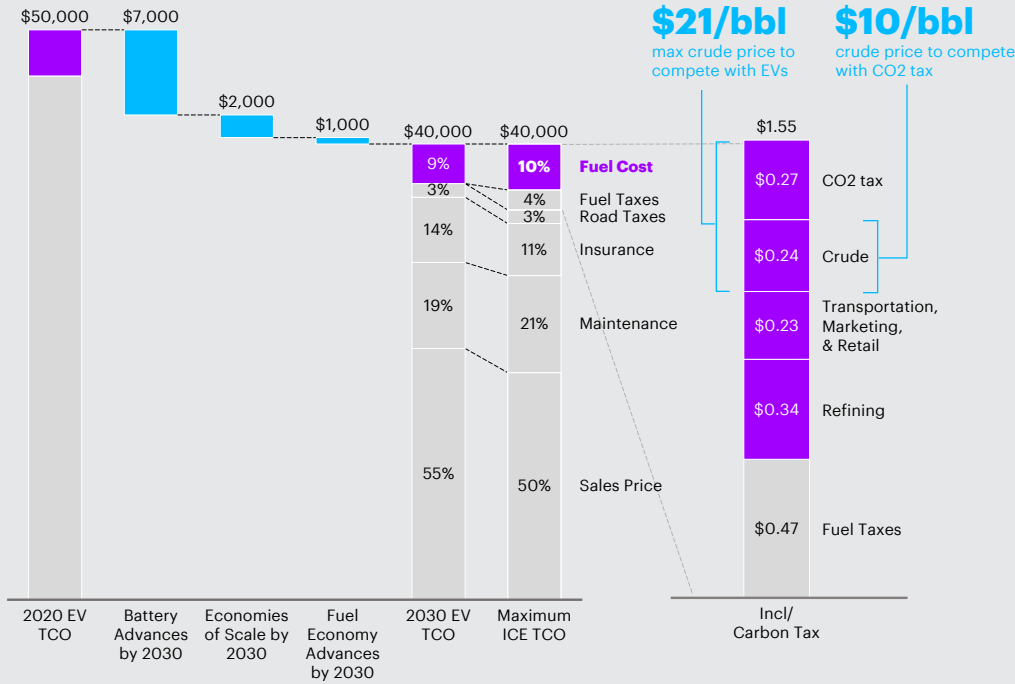
Transportation—a major demand sector for the oil and gas industry—provides a clear example. Vehicles using internal combustion engines (ICEs) still enjoy an economic advantage, along with greater convenience and flexibility, over electric vehicles (EVs) in most geographies. In the US, for example, the total cost of ownership (TCO) for EVs is over 20% higher than it is for ICEs.⁵ Fuel prices for ICE light vehicles could be over \$4 per gallon (reflecting \$120/barrel oil) and ICEs would still be competitive based on today's TCO.⁵

By 2030, however, we believe EVs will have the upper hand, particularly if the cost of carbon emissions is factored into the equation. Due to major improvements to the cost and efficiency of batteries, the TCO for EVs will drop sharply, putting pressure on the cost of fuel for ICEs as shown in Figure 1. We estimate that the maximum gasoline price for ICEs to remain competitive will need to be no more than \$1.50 per gallon, indicating a crude price of \$10 to \$20 per barrel in 2030⁵ in the absence of fuel tax parity with a carbon tax. If environmental and fuel tax parity is achieved, crude could sustain a maximum price of \$40 per barrel as seen in Figures 1 and 2.

FIGURE 1: WHAT IT TAKES TO COMPETE WITH EVS IN 2030

US SCENARIO

TCO for EVs will drastically reduce by 2030, which means fuel costs for ICEs should decrease.



Source: Accenture Analysis



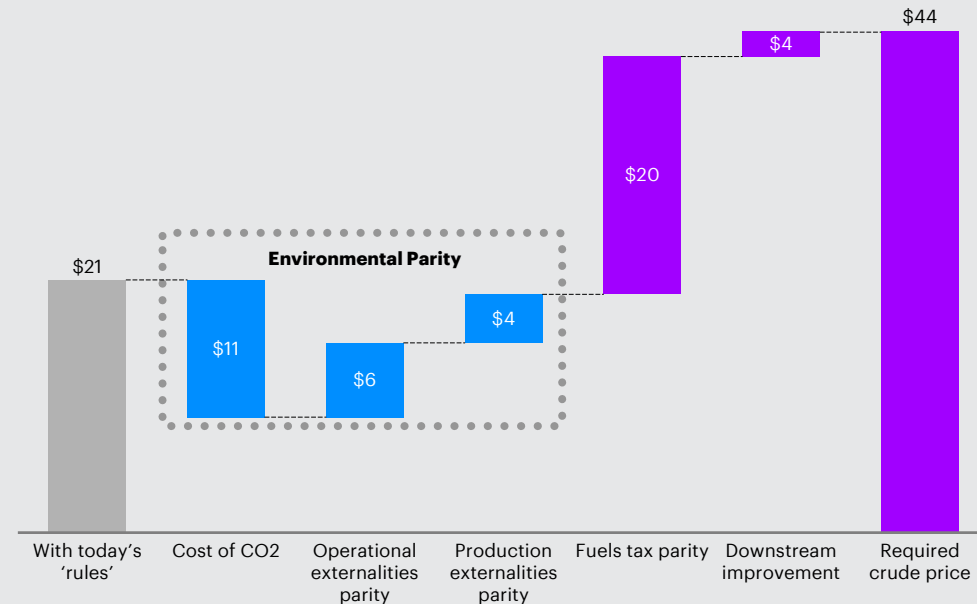
KEY TAKEAWAYS

- By 2030, under current market conditions, the **max crude price for ICEs to compete is \$21/bbl**.
- **25% of global oil demand could shift to EVs, as EVs become light duty vehicle of choice.**
- Every \$1k of EV purchase price subsidy reduces max oil price by an **additional ~\$11/bbl**.
- Large improvements to cost and efficiency of batteries reduces TCO drastically for EVs by 2030.
- With carbon tax of \$50/tonne, crude oil must be priced beneath \$11/bbl.

FIGURE 2: FUEL PARITY TO SUSTAIN CRUDE BREAK EVEN

US SCENARIO

Crude price factors for ices to compete with EVs, 2030 USD/BOE



Source: (1) Accenture Analysis



KEY TAKEAWAYS

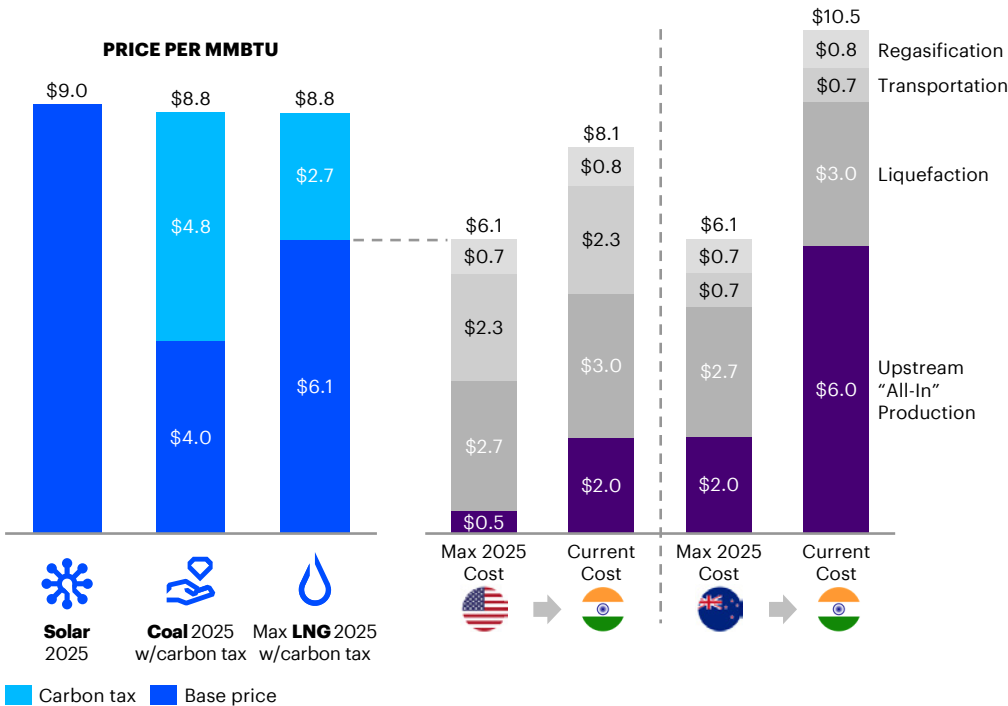
- If subsidies are eliminated and parity is reached in fuel taxes and externalities, crude reaches a max price of **\$41/bbl** in 2030 with projected electric mix.
- With 100% renewable energy, the maximum price is **\$35/bbl**.

Power generation is another major demand sector affected by competition from alternative energy sources.

The demand for alternative energy sources to replace coal and gas is increasing rapidly. The industry had been looking to liquid natural gas (LNG) to serve as a transition fuel particularly in key markets such as China and India, but this role is predicated on the basis that gas-fired power is competitive vis-a-vis renewable alternatives and coal. For this to happen, upstream LNG costs need to be reduced by as much as 40% by 2025.⁶

FIGURE 3: LNG COST COMPETITIVENESS VIS-À-VIS COAL AND RENEWABLE ALTERNATIVES

Carbon tax increases cost to supply gas, making coal and solar competitive. If LNG is to fill role as transition fuel, upstream costs must be reduced by 2025.



KEY TAKEAWAYS

- The future expanded role of gas is predicated on coal displacement in China and India.
- The max. price for LNG to be competitive with coal and solar in 2025 in India is between **~\$6.1/mmbtu**.
- Depending on transportation distance, upstream breakeven must be between **\$0.5-\$2.0/mmbtu** to remain competitive.
- Gas from both US and Australia is currently **priced out of the market**.

Source: (1) Accenture Analysis; (2) BP Statistics Analysis 2019, (3) Oxford Energy Outlook for Competitive LNG Supply 2019, (4) International Renewable Energy Agency: The Power to Change 2016

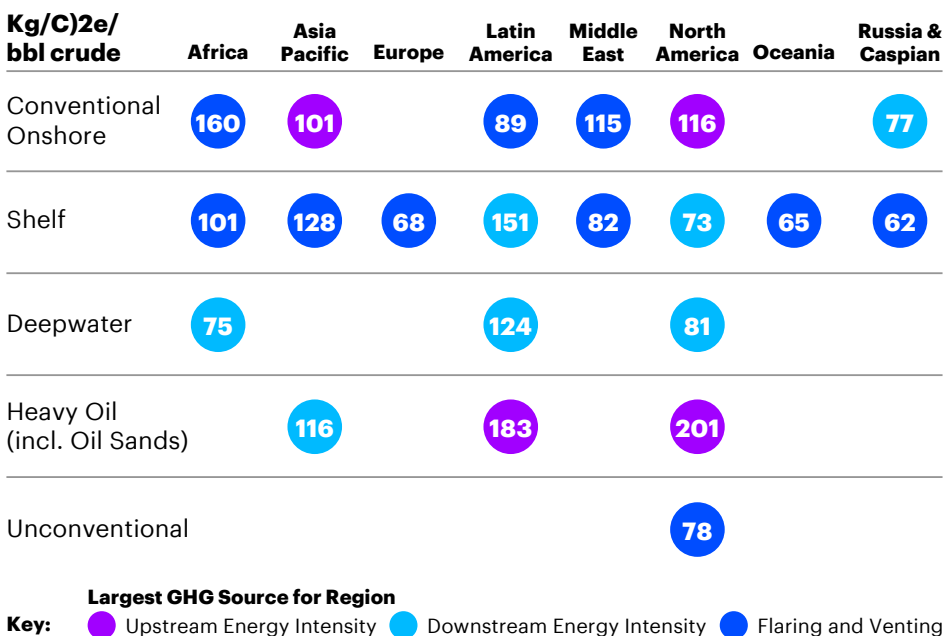
Other factors challenging the industry include:

- Increasing environmental, societal and governance accountability.** The desire to increase society's quality of life in line with Environmental, Social, and Corporate Governance (ESG) and Paris goals has added carbon value to production and processing costs. Carbon taxes will increase oil prices by \$3 to \$8 per barrel⁷ of oil equivalent (BOE), changing the cost curve and reshaping oil company portfolios. There are significant variations from region to region and from asset class to asset class. For example, North American shale flaring assets are likely to incur approximately \$5 per barrel in additional carbon taxes over non-flaring assets. Latin American assets, characterized by sour crudes requiring high energy intensity, will also incur higher carbon cost.

On average, these factors will increase the cost of supply by approximately \$5 per barrel.⁷ This will lead to major shifts in the oil supply curve as shown in Figure 4 below.

FIGURE 4: SCOPE 1 AND 2 CARBON TAXES IMPACT BY REGION AND ASSET CLASS

Oil supply curve will shift due to Scope 1 and 2 uniquely impacting each asset class and geography



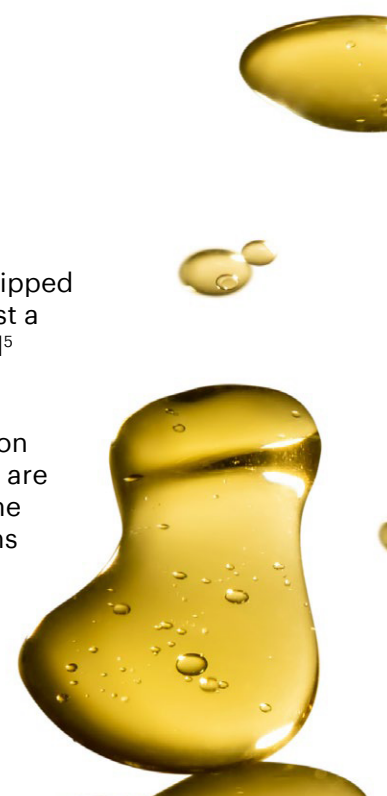
Source: (1) Accenture Analysis; (2) Carnegie OCI Emissions Database



KEY TAKEAWAYS

- Cost to supply increases across **all asset classes** by an average of **~\$5/bbl**.
- NAM Shale **flaring assets become costly**, with ~\$5/bbl add. carbon taxes over non-flaring assets.
- Onshore Africa assets' energy intensity leads to higher taxes than rest of asset class (**add. \$3/bbl**).
- LATAM assets hit hard due to sour crudes requiring high energy intensity.
- Offshore assets** must find a way to **monetize stranded gas**.
- Additional costs** will make new breakeven requirements even **harder to achieve**.

- Increasing competition for capital.** Years of poor returns and environmentally driven divestments are squeezing oil and gas companies' access to capital. The industry has flipped from double digit to negative returns within the last decade hence eroding value against a cost of capital of 9%. To change that, profit margins must be equalized above \$8/barrel⁵ under a \$40/barrel price scenario to deliver a return on invested capital (ROIC) of 12%.
- Increasing scarcity of talent.** The industry is finding it hard to recruit the next generation of workers. Recent cycles, the long-term outlook, rise of big tech and social perception are deterrents to recruitment; in the US alone, more than 100,000 jobs⁸ were cut from in the first half of 2020. The industry is looking at a shortfall of at least 40,000 skilled positions by 2025.⁹ Current recruiting strategies—aimed at hiring recent university graduates or rehiring recently separated employees—will need to consider technology and data science specialized talent to whom O&G is far from a preferred destination.

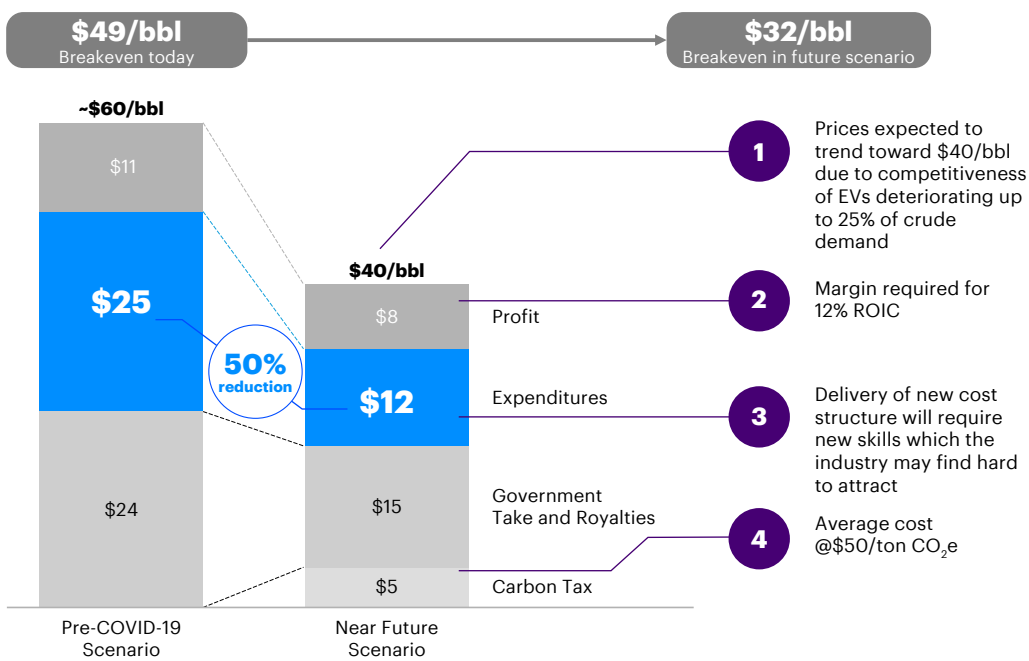


While the outlook for the industry may seem discouraging, the fact is that the world needs a vibrant oil and gas industry, to secure affordable and sustainable access to energy. The key question is: How can the industry secure such future despite the significant challenges it faces?

The answer is for the industry to control (and pay for) its environmental footprint while bringing investment efficiency in line with what the market will bear. This means improvements in efficiency to lower expenditure levels by 50%—about \$12 per barrel—based on target breakeven price estimate of \$40 per barrel to achieve fuel economics in the transportation sector before 2030. The journey for higher returns can be achieved even with lower profit margins of \$8 per barrel, along with a proportionally larger “take” from governments and increased carbon taxes per barrel, if the industry can deliver such efficiency as seen in Figure 5.

FIGURE 5: A NEW NORMAL FOR EXPENDITURES UNDER COMPRESSED BREAK-EVENS

Implications of pressures on oil and gas industry to 2030



Sources: Accenture Analysis



KEY TAKEAWAYS

- Top line pressure from changing Supply-demand balances.
- Bottom line pressure from imposition of carbon taxes.
- Margin pressure from returns requirements to attract capital.
- Implementation pressures from lack of talent and skills.
- Breakeven costs for industry must decline by ~50% to \$27/bbl to retain sufficient margin for 12% returns.

These trends are persistent and global. While individual companies can develop strategies to minimize the damage, the players will need to work together to meet demand challenges, recruit next-generation workers, attract investors and pay for its environmental footprint.



EXPLORING ALL OPTIONS

To meet ambitious goals over the next 10 years, the oil and gas industry must explore all options. There are major opportunities for reductions in both capital expenditures (CapEx) and operating expenditures (OpEx).

The exploration, development and production cycle for the oil and gas industry has many processes and practices that can yield efficiency gains.

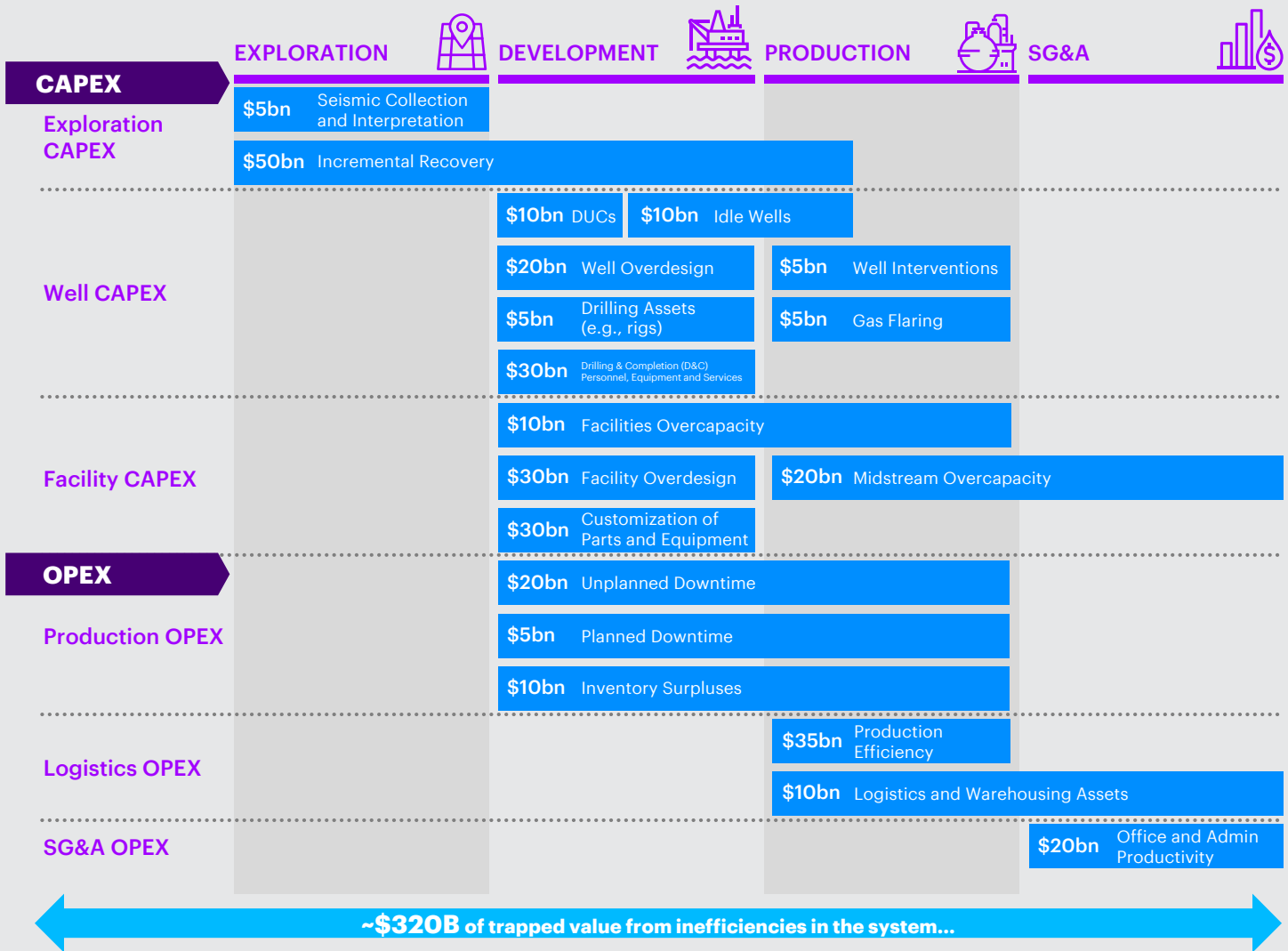
Among them:

- **Recovery factor**
The overall recovery factor for oil is around 35%,¹⁰ yet most reservoirs generally fall short of 20% and unconventionals typically below 10%, significant value can still come from enhanced recovery and lift improvements.
- **Unplanned downtime**
Over 23 days (6%) per year are consumed by unplanned downtime, resulting in \$150 billion at \$60/barrel on production lost or deferred and 3x higher maintenance costs.¹¹
- **Customization**
Customizing parts and equipment for each new design means spending 10 to 20% more than on a standardized alternative.¹²
- **Inventory surplus**
The industry carries inventory surpluses of greater than 10% on average.
- **Idle wells**
It is estimated that more than 30% of wells are idle, highlighting potential capital inefficiency in developing new wells.¹¹
- **Logistics and warehousing**
Logistics assets (such as vessels, aviation, and trucks) are utilized at around 55% across the industry, leading to capital inefficiencies.¹¹

Example of potential efficiency gains can be seen in Figure 6.

FIGURE 6: INDUSTRY TRAPPED VALUE IN EFFICIENT INVESTMENT

Global upstream oil and gas industry locked-in value (USD BN)



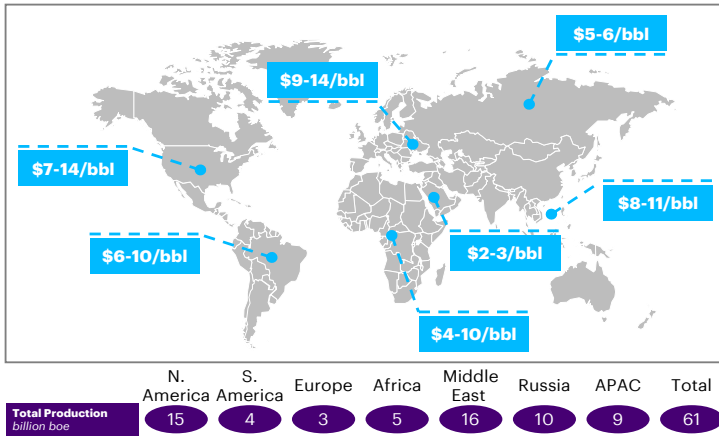
Sources: Accenture analysis

We have identified feasible efficiency gains of about \$320 billion in total. The industry can achieve these needed efficiencies, but only if companies work together. *Collaboration in a competitive environment* is key to the industry’s future.

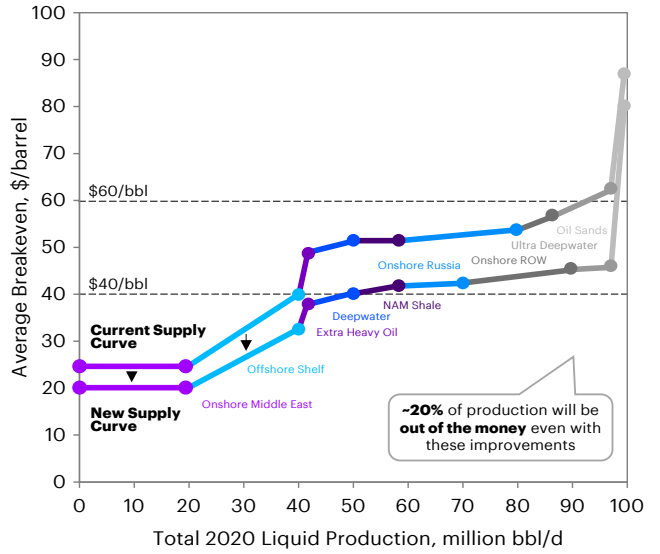
Even if all these efficiency gains are realized, not every company will benefit the same way, as reductions in expenditure have different effects on different asset classes across geographies. For example, the cost reduction potential for onshore drilling in the Middle East is only \$2 to \$3 per barrel, while it is much higher—\$7 to \$14 per barrel—for onshore assets in North America. However, at \$40 per barrel nearly 20% of current assets will still be “out of the money.”⁵ By collaborating on efficiency measures and further flattening the supply curve, the industry saves assets that would otherwise be uneconomical to develop.

FIGURE 7: IMPACT OF EFFICIENCY GAINS ON GLOBAL ASSETS

Upstream oil industry cost reduction potential by region
USD/BBL



Breakeven supply curve implications
USD/BOE



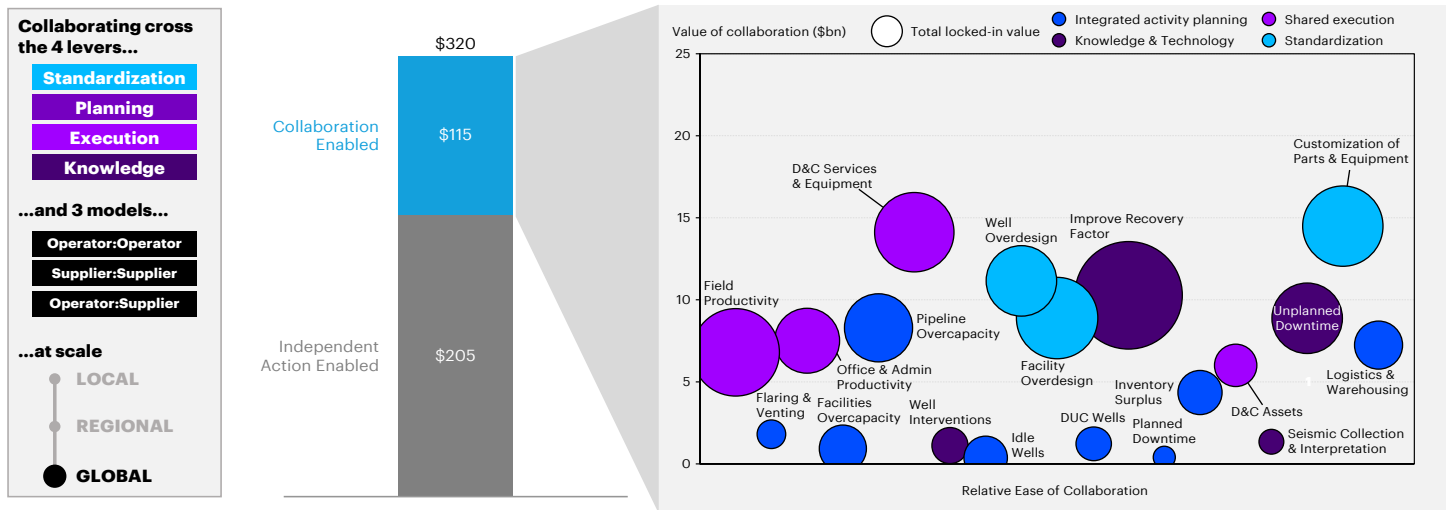
Source: Accenture Analysis; Rystad Energy

There are many areas of duplication or inefficiency that can benefit from collaboration among companies and suppliers, as shown in Figure 8. Before attacking specific targets, however, the industry should establish basic principles and design blueprints for collaboration.

FIGURE 8: VALUE OF COLLABORATION

Collaboration unlocks otherwise trapped value.

Collaboration unlocks otherwise trapped value with certain pockets being easier to achieve through collaboration.



Source: Accenture Analysis



Examples of potential increases in efficiency through collaboration ranked by ease to collaborate include:

\$7 billion can be unlocked through enhanced sharing of warehousing and logistics assets.¹¹

This entails increasing utilization by 20% of petroleum aviation, transport vessels, and onshore logistics.

\$15 billion can be unlocked through standardizing parts and equipment.¹³

Potential savings of 10% come from well commodities, subsea equipment, EPCI equipment and other capital expenditures.

\$9 billion can be unlocked through reducing unplanned downtime.¹¹

The use of analytics-driven predictive maintenance can increase production and decrease failure rates.

\$10b can be unlocked through improving recovery factors through new technologies.¹⁴

Collaborating in the development and dissemination of new technologies that can increase recovery of oil will bring the incremental cost of production down.

\$9b can be unlocked through minimizing facilities overdesign.¹¹

Standardizing the design and construction of facilities will reduce gold-plating and yield savings across the industry by 20 – 25%.

\$11b can be unlocked through minimizing well overdesign.¹¹

Standardizing the design and execution of wells will reduce gold-plating and yield savings across the industry by 10 – 15%.

\$14b can be unlocked through reducing excess drilling and completions services.¹¹

The use of systematic approaches across players to reduce excess spend on people, parts and equipment in the field can reduce D&C costs by up to 15%.

Potential efficiency gains in these and other areas are significant. To make collaboration work at scale, however, the industry must step out of its comfort zone and embrace the concept of collaboration at the regional, local and global levels.





LEARNING FROM MISSED COLLABORATION OPPORTUNITIES

The industry is not new to collaboration, in fact it is common practice amongst countless JVs. Large scale efforts were launched during past downturns in the North Sea, Gulf of Mexico and Southeast Asia, yet they haven't scaled when it comes to embracing them as modus operandi. We can learn from these experiences to change the tide.

- **Protecting the real core**
Operations and technology knowledge has been jealously regarded as a competitive differentiator. Now, under commoditized market conditions players can go back and rethink what is their true core while opening adjacent activities (such as exploration and logistics) through collaboration.
- **Tangled on legal and procurement**
Collaboration as a one-off exercise can lead into burden for multistakeholder efforts on terms, conditions and service level agreements. Business Unit led engagements enabled by pre-set smart contracts can open the doors to value and cost redistributions while delivering flexibility and trust.
- **Fractured information sharing**
Manual, offline or siloed data repositories have restricted visibility even within organizations. The rise of digital ecosystems and cloud environments now enables unstructured data and analytics to be shared real time in safe manner.
- **Engineering first**
Gold plating, redundancy and overspecification flags have been waved enough across projects under the banner of risk management. New standardization efforts for capital projects and equipment (e.g. JIP 33) are allowing for collaborative designs execution like never before.







SETTING THE COLLABORATION AGENDA

Operators must collaborate not only with each other, but with their suppliers, while suppliers will need to collaborate with each other as well as with operators.

Industry leaders need to create blueprints for the four key areas of collaboration shown in Figure 9.

FIGURE 9: IMPACT OF EFFICIENCY GAINS ON GLOBAL ASSETS

To enable this, collaboration blueprints across four key areas must be established

	Governance Models	Roles	Sharing requirements	
Standardization 	<ul style="list-style-type: none"> Centralized to maintain focus on core objectives X-industry decision-making steer co Limited pathways for divergence 	<ul style="list-style-type: none"> Neutral, globally respected facilitator Designated leads for different value chain players Designated leads per company SMEs guiding discussions/decisions 	Data <ul style="list-style-type: none"> Standardized formats for data CAPEX plans to assess demand by facility type 	Assets and Resources <ul style="list-style-type: none"> Dedicated resources to support initiatives SMEs
Shared execution 	<ul style="list-style-type: none"> Program mgt focused steer co with mechanism for proposing new ideas Chinese walls where commercial/competitive info is handled Scalable op model to incorporate other parties, geographies, areas 	<ul style="list-style-type: none"> Neutral facilitator to arbitrate and accelerate implementation Company lead to act as single POC Optimization identification lead for improvement and scope expansion 	Data <ul style="list-style-type: none"> Level of service requirements Activity forecasts Data required for execution 	Assets and Resources <ul style="list-style-type: none"> Execution resources
Integrated planning 	<ul style="list-style-type: none"> Rules based system with equal peers and conflict resolution mechanisms Single POC from company authorized to make decisions Equal weighting (operators/suppliers) 	<ul style="list-style-type: none"> Company lead to act as single POC Local, neutral facilitator to arbitrate and accelerate implementation Global facilitator to share learnings and templates 	Data <ul style="list-style-type: none"> Integrated activity plans Wkly/daily rosters Inventory levels and needs 	Assets and Resources <ul style="list-style-type: none"> 3rd party services Warehousing space Logistics bases
Knowledge and technology 	<ul style="list-style-type: none"> X-company steer co to set objectives and guide areas of exploration High degree of freedom in network to explore and discover new ideas Mechanism for closed loop learning 	<ul style="list-style-type: none"> Data lead to facilitate data transfer Company lead to act as single POC Designated initiative lead to drive progress 	Data <ul style="list-style-type: none"> Tech Challenges Research and findings Subsurface data Surface data 	Assets and Resources <ul style="list-style-type: none"> R&D resources

Source: Accenture analysis

These blueprints point the way to successful collaboration. The industry, however, also needs to change its existing mindset in each area.

- In **standardization**, the previous mindset was that oil prices would rebound to a level where true collaboration would not be required. The industry needs to adopt new collaboration ambitions, fostering facilitation and arbitration of global standardization initiatives.
- In **shared execution**, manual processes were believed to make scaling difficult. The new mindset—accelerated by the prevalence of remote working—aligns future workforce requirements to prepare the industry for the age of digitalization.
- In **integrated planning**, there has been limited global emphasis on establishing hubs and sharing lessons learned. The industry needs to plan and prepare through the creation of networks and hubs for collaboration initiatives.
- In **knowledge and technology**, competition within the energy space was focused on other oil and gas companies, rather than on emerging competitors from outside the industry. The industry should redefine what constitutes a true competitive advantage and what can be shared among industry peers. This may entail, for example, standardizing datasets and digital collaboration platforms.

THE POWER OF COLLABORATION

Despite current conditions, the lack of sustained pressure on margins has meant that many companies have not yet been forced to take drastic action. Instead of confronting the industry cost structure head-on, companies tend to cut operating costs, hunker down and hope that oil prices will go up.

The fiercely competitive, zero-sum mindset prevalent throughout the industry has led companies to invest heavily in customized products, seeking to differentiate themselves from their peers. Companies protect their own data, but they also protect their knowledge of best practices and other learnings that, if applied across the industry, could lower costs.

Companies replicate non-core activities in areas such as finance and the back office. Rather than sharing underutilized assets, companies add assets and create complex systems to monitor, maintain and update them.

PROFITABLE COLLABORATION

The Airline Example

The airline industry offers one example of a path to successful collaboration. Like the oil and gas industry, the airline industry is mature, with narrowing margins. It is a global, commoditized business. It is ultra-competitive, with small differences in margin distinguishing winners from losers. And it is strategically important to global economic activity.

Through collaboration, the industry improved performance by:

- Establishing hub-and-spoke operations, serving multiple markets through joint supply;
- Collaboration between airlines and aircraft manufacturers, with airlines advocating effectively for fuel-efficient planes; and
- Standardized technology, with 23 airlines working together, for example, on a new data transmission standard.¹⁵

Although the industry has been severely affected by the pandemic, these and other measures led to a 30% reduction in unit cost in the 15 years from 1980 to 2015. Even with a downturn in 2019, the global industry reported 10 straight years of profitability from 2010 to 2019.¹⁵

The industry has experimented with collaborative models. For example, as part of the “Logic” project in the UK, producers shared seats on North Sea helicopter flights; standardized industry contracts, such as Master Service Agreements; and shared certain types of information such as weather data and job certifications. While participants did not always find it easy to share information, collaboration did increase the efficiency of producers working in the North Sea. Similarly, Malaysia’s CORAL (Cost Reduction Alliance) 2.0 initiative promoted collaboration among upstream producers. CORAL 2.0’s programs included reduction of drilling costs through optimization of planning and well design, operating practices and application of new technology. Producers explored joint sourcing and implementation strategies and established common planning and scheduling of logistics resources through a common control tower. PETRONAS, Malaysia’s national oil company (NOC) said CORAL has led to savings of nearly \$1.2 billion since its inception in 2015.¹¹

While these and other initiatives have enjoyed sporadic success on a local or national basis, the industry must embrace a mindset of coordinated collaboration as “business-as-usual”.

THE PATH FORWARD

Accenture is working with the World Economic Forum to explore initiatives aimed at fostering collaboration among oil and gas industry companies and suppliers.

Examples include:

- **Creation of global networks and hubs**
Establishment of regional hubs to facilitate the sharing of offshore logistics, warehousing and surplus inventory to unlock \$14 billion annually from higher utilization of infrastructure and reduction in excess inventory.¹¹
- **Facilitation and arbitration of global standardization initiatives**
Standardization of equipment specifications for procurement of bulk materials and packaging, which is estimated to generate 10 to 20% reduction of capital expenditure on equipment and up to 40% schedule compression, along with other important benefits.¹²
- **Standardization of datasets and digital collaboration platforms**
Development of common standards for data architecture and APIs among the oil and gas ecosystem, enabling data exchange and laying the foundation for the implementation of digitalization and data-driven decision making.
- **Alignment on future workforce requirements**
Study of the implications of the Fourth Industrial Revolution on the industry, including the identification of upskilling and reskilling needs and opportunities for cross-industry redeployment.





CONCLUSION

The oil and gas industry faces multiple challenges at present and must plan for a difficult and uncertain future. The industry's survival—and its eventual return to sustainable profitability—depends on the ability of industry leaders to make the right decisions now.

One key decision is to pursue collaborative initiatives at the local, national and global levels. By working with industry peers as well as with suppliers, and by urging suppliers to join forces and collaborate with each other as appropriate, the industry can decrease waste, improve efficiency and lower its breakeven costs. Collaboration, in combination with needed actions by governments and regulators, can help the industry recover while playing a valuable role in the transition to a clean energy future.

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Authors



Muqsit Ashraf
Senior Managing Director,
Global Head of Oil & Gas



Pedro Caruso
Managing Director,
Global Head of Oil and Gas Downstream



David Elizondo
Senior Manager,
Oil and Gas Strategy

Contributors

Thomas Beswetherick
Senior Manager, Oil and Gas Strategy

Reef Al Awwad
Manager, Oil and Gas Strategy

Christopher Gardner
Analyst, Oil and Gas Strategy

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