



**Managing Reinvention:
The Oil & Gas Industry's
Challenge Post-COVID**

Prepared by Crystal Energy

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Foreword

For the oil and gas industry worldwide, the COVID-19 crisis could hardly have come at a worse time. Already facing chronic over-supply problems, along with the prospect of weaker demand growth, stronger competition from other energy sources and increased political hostility, the pandemic brought a vertical drop in world energy consumption and disruption on a grand scale. To many, this must have seemed “the unkindest cut.”

Yet if oil executives were unprepared for this additional burden, they were in the same category as most industries and governments around the world.

It is possible to get an exaggerated picture, especially in an age of journalistic hyperbole and digital oversimplification. Surveys such as this one by Crystol Energy and Aspen Technology are badly needed to help balance out the oil and gas future and its capacities to adapt and adjust under pressure.

There are at least three reasons why some of the hyper-negative predictions about the future of oil and gas need to be put into perspective.

First, with the rollout of several different vaccines across the planet, the end of the COVID economic paralysis is in sight, even if still several months away. A demand pickup for oil and gas, as for almost every other sector, is certain.

Second, the entire world energy outlook is split between two mutually contradictory views, with little dialog between the two. On one side, we have ultra-green views that the oil industry will be history in a world of zero emissions by 2050. This is now the loudest voice.



On the other side sits the fact that oil and gas will continue to fuel the planet well beyond 2050 and this need will require to be met, even if less profitably than in the earlier years of this century when crude prices tended much higher.

This is something which many in the low carbon campaigning camp, including most signatory governments to the Paris Accord, just don't want to hear or work around. For them, it's the official words and pledges that count, with their confidence boosted by America's return under Biden to the Paris fold. The signs that a full-blown energy transformation by 2050 and a real halt to global emissions growth, may involve costs and social upheaval beyond capacities to manage or sustain in an orderly way are simply dismissed.

Third, within the upstream oil and gas sector itself, several disparate conditions prevail. Generalizations become valueless. The survey here gives us three categories—publicly listed oil and energy companies, state-owned enterprises and private sector businesses.

Yet one can put it in an even more granular way. Some big oil producers with low production costs, led by the Saudis and their other Arab-OPEC confreres, will do okay. If a few years out, investment in new oil falters because of pessimism and price volatility, they may do considerably better, as new capacity fails to appear in the medium term and the existing producers are left to fill the output gap. That will help on the plus side as an offset to the undoubtedly dangerous and unstable milieu into which the whole Middle East region continues to flounder.

New technology married to existing exploration, development and production—in some areas, a marriage accelerated by the COVID experience—may help protect margins further for these fortunately placed producers, even if revenues run lower and social budgets have to be trimmed.

Others, typically the last of the former great international oil majors, will hang on, diversify as fast as they can into renewables and the like, hopefully re-emerging, butterfly-like, as across-the-board energy supply and service companies. Survival will depend on agility, on bringing in new talent and on openly embracing the newest and latest technologies in all departments.

Others again, such as the multiple firms at the smaller end of U.S. shale and the long “tail” of service and supply companies, will either batten down and hope for stronger, or at least more stable, crude prices, or if too heavily indebted, close up shop. But the resilience and elasticity of the U.S. shale oil and gas business have been persistently underestimated and their swift bounce back to near U.S. record levels of 13 million barrels per day of only a few years back is possible.

A post-COVID picture begins to emerge through the mists of uncertainty, both political and economic, of an oil industry not on the path to the graveyard but on the verge of further major transformation, mixed with further interesting opportunities. For the bigger energy corporations of the past, it will be, as often in times of transition, a matter of being dexterous enough to ride two horses in the ring—meeting continuing fossil fuel needs efficiently and competitively, while at the same time, building strong and profitable positions in renewables and the hoped for “green recovery,” to which many political voices now give such strong verbal commitment.

The message of this survey is that it can be done.

Lord Howell of Guildford

Chairman of the Advisory Board, Crystol Energy
Former Secretary of State for Energy in the UK



Executive Summary

The report analyzes the findings of a survey to assess the impact of the COVID-19 crisis on the global energy industry. The survey is a collaboration between Crystal Energy and AspenTech. It was carried out during the third quarter of 2020, just at a time when both the industry and the global economy began their slow recovery from the deep freeze that hit in the previous quarter.

The main findings of the survey are highlighted below, some are in line with expectations, others were much less predictable:

- Most companies surveyed were not well/very well prepared for the crisis, though technology providers were the exception. One can interpret such a result in different ways, including the need for some companies to revisit their risk scenario analysis and the highly specialized nature of oil and gas activities, which makes them less agile than other sectors—in addition to the importance of embracing the latest technologies, particularly digitalization, to allow for better predictability, preparedness and response for highly disruptive scenarios.
- Ensuring safety of workers was the most important challenge faced by various organizations during the pandemic. Already a strong safety culture exists in the industry, given the inherently risky nature of oil and gas activities as well as strict regulations. While this is understandably a key priority, it raises other important issues, such as ensuring the safety of assets.
- Adopting a flexible working environment, mainly home office, has been a common response to the crisis. It is unclear, however, whether this new pattern will persist post-COVID. It has a wide range of implications on business costs, HR policies, and cybersecurity.
- Engineering, procurement and construction, downstream refining and petrochemicals, and major oil and gas companies, placed particular emphasis on the pressure on margins due to the crisis. COVID-19 caused an unprecedented decline in oil prices in April 2020. However, since the collapse in





prices in 2014, the industry has been operating in a lower oil price environment. Some companies, like service providers, faced the COVID-19 crisis with a weak financial position, only to be find the position amplified by the pandemic.

- Although the industry's strategic priorities pre- and post-COVID remained largely unaffected, the pandemic has created a new sense of urgency to accelerate the speed of reforms, with digitalization capturing greater attention. Surprisingly, cybersecurity did not gain similar interest even though it is closely related to digitalization. Better diligence from companies is needed to balance between these two important aspects.
- Open dialog and transparency between various stakeholders—particularly industry, regulators and policymakers—are essential to support the longevity of the industry, especially in a more digital and greener world.
- The industry should also break the vicious relationship between staff layoffs and lower oil prices, if it is to address the shortage of skills identified by respondents as one key concern in the coming years.
- COVID-19 has caused a setback in Economic, Social and Corporate Governance (ESG) indicator. However, this is likely to be temporary. While funding taps are not being turned off (not for all traditional energy companies, at least), the cost of funding will increasingly reflect ESG risks.
- Peak oil demand does not appear to be a main concern for the industry for the next 10 years, except for major oil and gas companies and state-owned companies.
- A combination of conventional recipes (primarily improving efficiencies and ensuring cost discipline), while adopting the latest technologies (particularly digitalization), maintaining a flexible working environment and embracing the energy transition, are identified as key pillars for the industry to emerge leaner, stronger and greener post-COVID.
- Looking back at 2020, several rays of hope can be identified, leaving us confident that it will be reinvention—not retreat—for the global energy industry.

1. Introduction

The COVID-19 pandemic took the world by surprise, hitting economies, society and health systems like a tsunami. For the oil and gas sector in particular—to change the metaphor somewhat—coming on top of the rise of renewables, the general surpluses of both oil and gas worldwide and the marked hostility of a growing number of governments to fossil, the pandemic must have seemed like the fourth horseman of the apocalypse, arriving to spell doom for the whole giant industry and the once dominant age of oil. Many other businesses have clearly suffered substantial financial pain, especially airlines, hospitality, and of course, retail enterprises in their millions. In the energy sector, it was so visible and dramatic, that some are expecting the end of the oil and gas age to be more imminent than ever.

However, a word of caution before accepting all that green campaigners say about “making the oil industry history.” All enterprise is built on creativity, adaptability and hope, which the energy sector worldwide has never been short of. So bleak as things have looked during the past year, it may well be that the gloom is overdone, and that within the quagmire of pessimism seeds of a new pattern are beginning to sprout.

First the facts. According to the International Monetary Fund (IMF), the global economy shrank by 3.5 percent in 2020 after growing at 2.8 percent in the previous year, noting that in January 2020 the fund expected a growth of 3.3 percent for world Gross Domestic Product (GDP)¹. In regions such as the Euro area, that figure was as low as -7.2 percent in 2020. No wonder the IMF describes the crisis as “a crisis like

no other,” with the resulting recession being the worst since the Great Depression that preceded World War II. Although recovery is already underway, it might take a while for the economy to reach pre-COVID levels, and many fear lasting structural damage.

For the oil and gas industry, the second quarter of 2020 was particularly tough. Global oil demand, with major implications for supply, became hostage to an enormous shock from lower economic activity—which in turn, was hostage to the lockdowns intended to stop the pandemic. The consequences have been unprecedented—including an unparalleled collapse of oil demand (close to 19 million barrels per day, or 18% in the first four months of 2020), a freefall in prices (West Texas Intermediate—WTI, a major benchmark crude, hit a historic \$ -40 USD per barrel on April 20), the largest cooperation of oil producers in the history of the industry, and the biggest oil output cuts to prevent inventory overflow and salvage prices, investment and government revenues.

The economic consequences of the pandemic are evident from the actions taken across the industry, from reductions in capital expenditure, operating costs, oil field shut-ins, and in the case of Shell, the first dividend reduction since 1945. According to the International Energy Agency (IEA), global investment in upstream oil and gas fell by 32 percent.² In the U.S. alone. The oil, gas and chemicals industry eliminated 107,000 jobs (7 percent of total) between March and August 2020, many of which may not come back by the end of 2021.³ Share prices of publicly traded companies did not fare any better.

1 [World Economic Outlook Update, January 2021: Policy Support and Vaccines Expected to Lift Activity \(imf.org\)](#)

2 [World Energy Investment 2020 - Analysis - IEA](#)

3 [The Future of Work in Oil, Gas and Chemicals | Deloitte Insights](#)

We can go on and on about the detrimental consequences of the crisis. Endless reports and papers will surely be written about it. However, as in every crisis, there is a silver lining as there are crucial lessons to be learned. The COVID-19 crisis has exposed vulnerabilities that were previously overlooked and has amplified existing problems. But it has also shed light on some opportunities. While some see it as a transitory shock whereby sooner or later things will go back to “business as usual,” others see it defining a new path, with its own challenges and opportunities. We tend to subscribe to the latter. The gloom is overdone, the potential for meeting the world’s ever-growing energy needs in a variety of new ways and by new methods is opening out before our eyes.

Valuable lessons and hints of new scenes to come, can be gleaned from how some, but not all, of the largest companies and corporations, both national and international, state and private, have faced the crisis, which hit just at a time when the global push to fight climate change and end the fossil fuels age was intensifying. Such a push has only gained traction since.

How have these companies coped with the crisis? Have they been forced to rethink their strategy and priorities? Who will fail and who will emerge competitively stronger? What needs to be done to succeed in a post-COVID world? These are some of the questions that Crystol Energy, in collaboration with Aspen Technology (AspenTech), tackled in a survey carried out in the third quarter of 2020.

The survey gathers valuable insights from leading practitioners in the industry, worldwide. Its findings are presented and analyzed in this report. The analysis is further supported by interviews carried out with industry leaders from a wide range of backgrounds and expertise, working in different regions.





2. Survey Overview

The survey targeted industry executives operating throughout the oil and gas supply chain—upstream, midstream and downstream—as well as chemicals, worldwide. The aim was to gauge their opinions on the COVID-19 crisis and gain insight into their own experience with the troubling situation and their outlook for the industry post-COVID. The survey also attempted to provide a comprehensive overview of the industry’s short- and long-term trends, and the impact of the pandemic on business priorities, investment decisions and strategy—what is temporary and what is structural.

The survey was carried out online from September 15, 2020 and closed on November 9, 2020. A total of 186 respondents were sampled; Figure 1 illustrates their distribution by function, country, company and industry types.

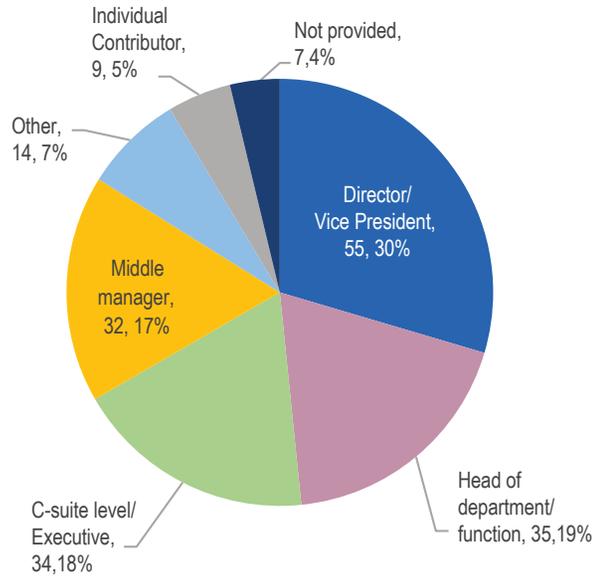
Target personas included senior executives and management level professionals working in the global energy industry. Respondents came from 44 countries. The top five countries were the United States of America (30 respondents; 16 percent); India (28 respondents; 15 percent); the United Kingdom (20 respondents; 11 percent); Ghana (11 respondents; 6 percent); and The United Arab Emirates (8 respondents; 4 percent). Twenty respondents or 11 percent of the total respondents did not disclose their country of residence. Most respondents (103 respondents or 55 percent of total respondents) worked in small- and mid-sized private companies, followed by publicly listed companies (27 percent) and state-owned companies (13 percent). Eight respondents (4 percent of the sample) did not disclose their company type.

The industry profile of the respondents included professional services firms (27 respondents or 15 percent of the total respondents); major oil and gas companies (14 percent) and diversified chemicals (12 percent). Additionally, respondents came from downstream refining and petrochemicals (10 percent); oil and gas field service (10 percent); small-or mid-sized oil and gas (7 percent); diversified energy (6 percent of the total respondents); engineering, procurement and construction (6 percent); and technology licensors (2 percent). Eight respondents (4 percent of the sample) did not disclose their industry type.

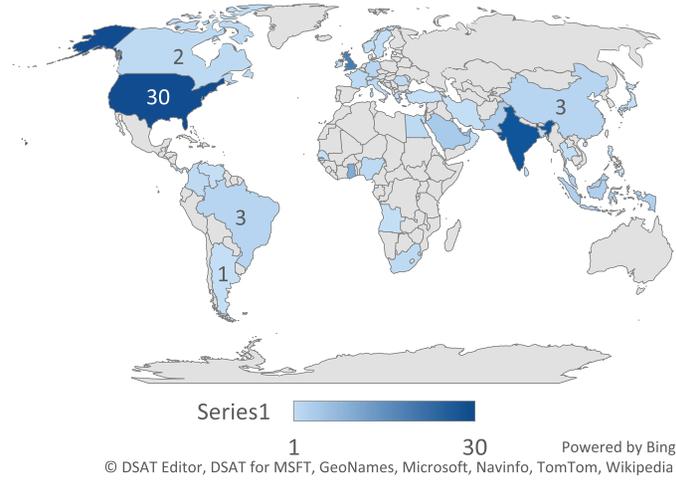
As it can be seen, the survey comprises a colorful international pool of industry operatives and organizations with strategic interests in the oil and gas industry.

Figure 1: Distribution of Respondents

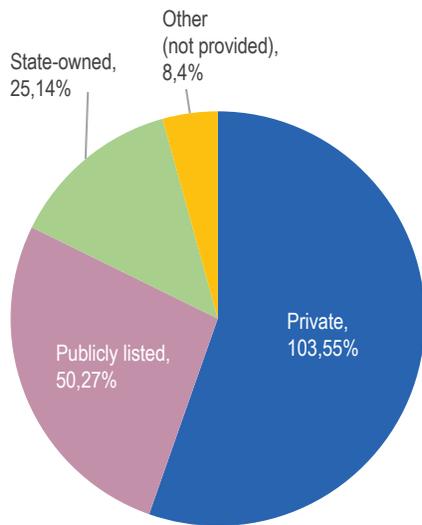
By Function (Absolute and Percentage)



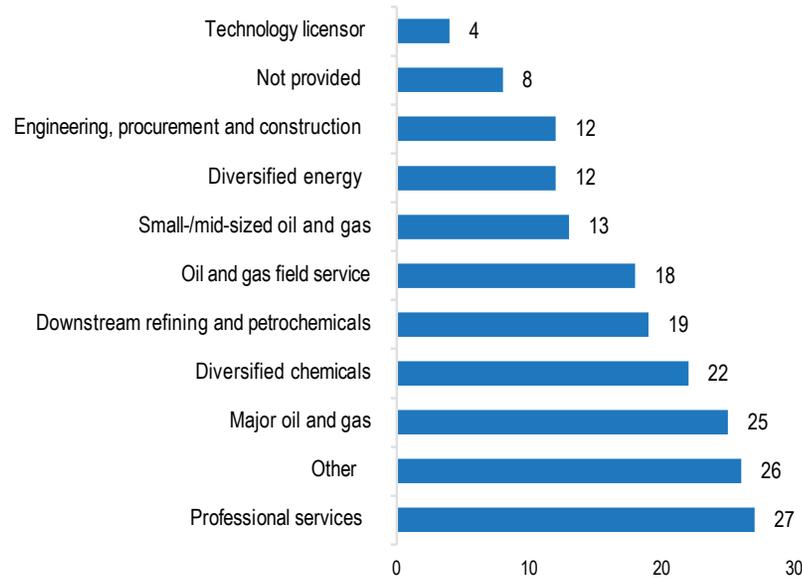
By Country (Absolute)



By Company Type (Absolute and Percentage)

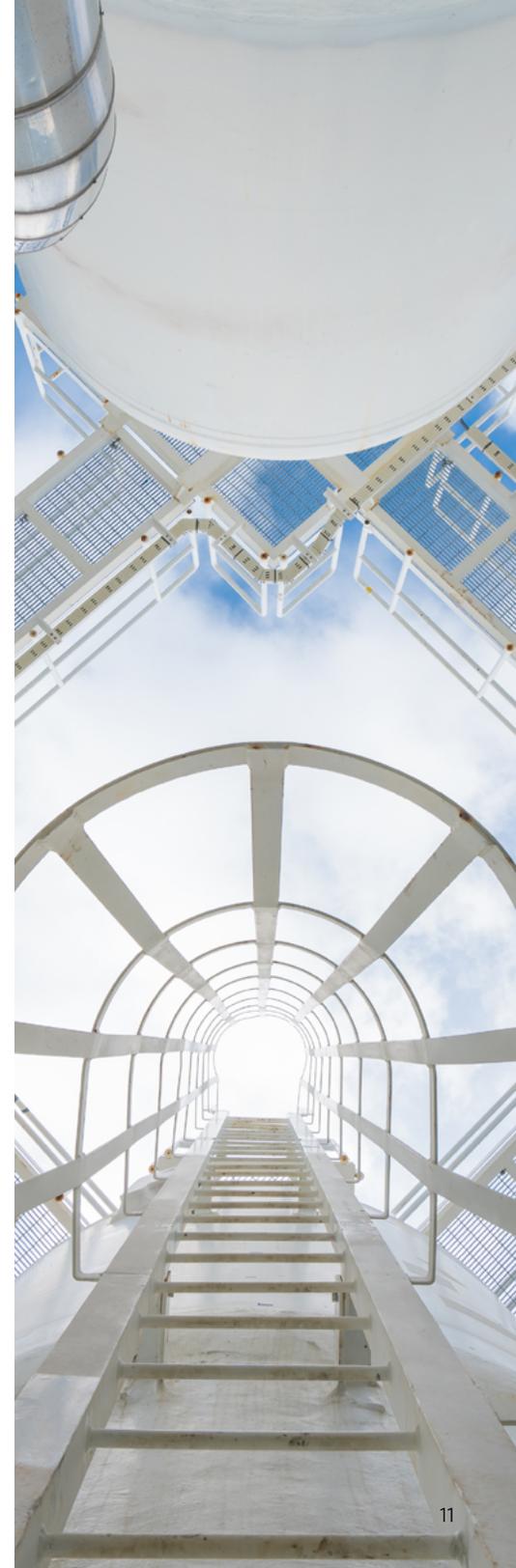


By Industry Type (Absolute)



N=Number of Respondents

Figure 1: Distribution of Respondents (N=186)



3. Findings

3.1 Preparedness to Deal with COVID-19

Most respondents (58 percent) believed that their organization was not well/very well prepared to deal with the pandemic. Such a finding does not seem to be surprising for industry observers and practitioners. Rafael Bermudez, Chief Executive Officer of Drillinktech International, an integrated oil field service consultancy based in Houston, argues that “the oil and gas industry is most of the time behind the curve. By the time of COVID-19, very few companies were really prepared.” Similarly, Dr. Nils Kaageson-Loe, Assistant Director Strategic Initiatives at the Society of Petroleum Engineers International (SPE)⁴, does not think that “anyone or any company was truly prepared for what befell us all as COVID impacted. Nobody had crisis contingency plans for how their organization could function effectively over prolonged periods of time if it were forced to dislocate from its physical office locations partially or fully. Sheltering plans for inclement weather like hurricanes or typhoons were just that and very short term in nature.”

Dean Foreman, Chief Economist, Policy, Economics and Regulatory Affairs at the American Petroleum Institute, the largest U.S. trade association for the oil and natural gas industry, explains: “Compared with many other industries, the natural gas and oil industry tends to have personnel who specialize to a high degree, so the bench strength of personnel with those skills is limited in the event that employees contract COVID-19 or are required to quarantine.” Thus, for the foregoing reasons, “pandemic planning can be more challenging in the natural gas and oil industry compared with many others,” he says.

Further disaggregation of the responses shows that by industry type, technology licensors (four out of four respondents), diversified energy (seven out of 12 respondents) and professional services (14 out of 26 respondents) were the top three most prepared companies to deal with COVID-19. By contrast, small- to mid-sized oil and gas (five out of 13 respondents), oil and gas field service (seven out of 18 respondents) and downstream refining and petrochemicals (six out of 19 respondents) were the top three least prepared companies to deal with the pandemic (Figure 2). Technology companies have indeed fared well during the crisis. According to a study by the Drucker Institute, such companies dominate the top effective companies in 2020 due to high levels of innovation and financial strengths, as well as the fact that they were already able to digitalize their value chains even before the pandemic took place.⁵

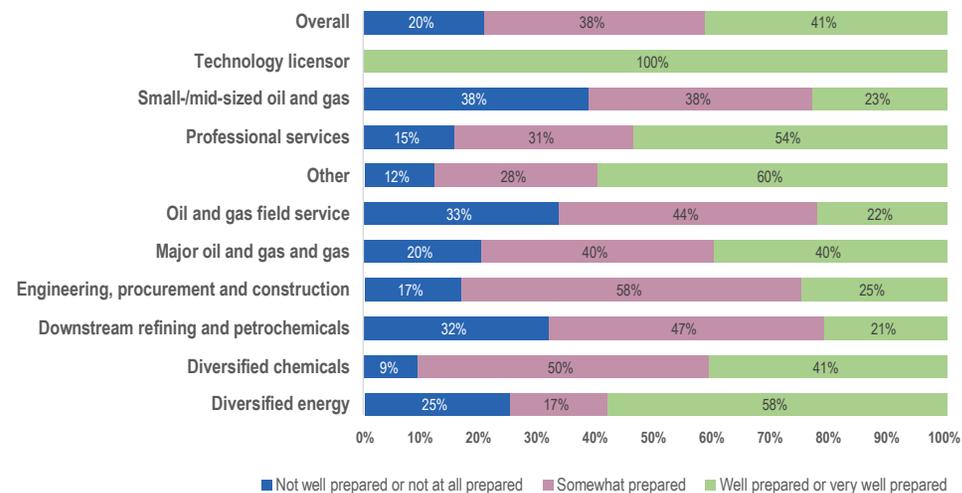
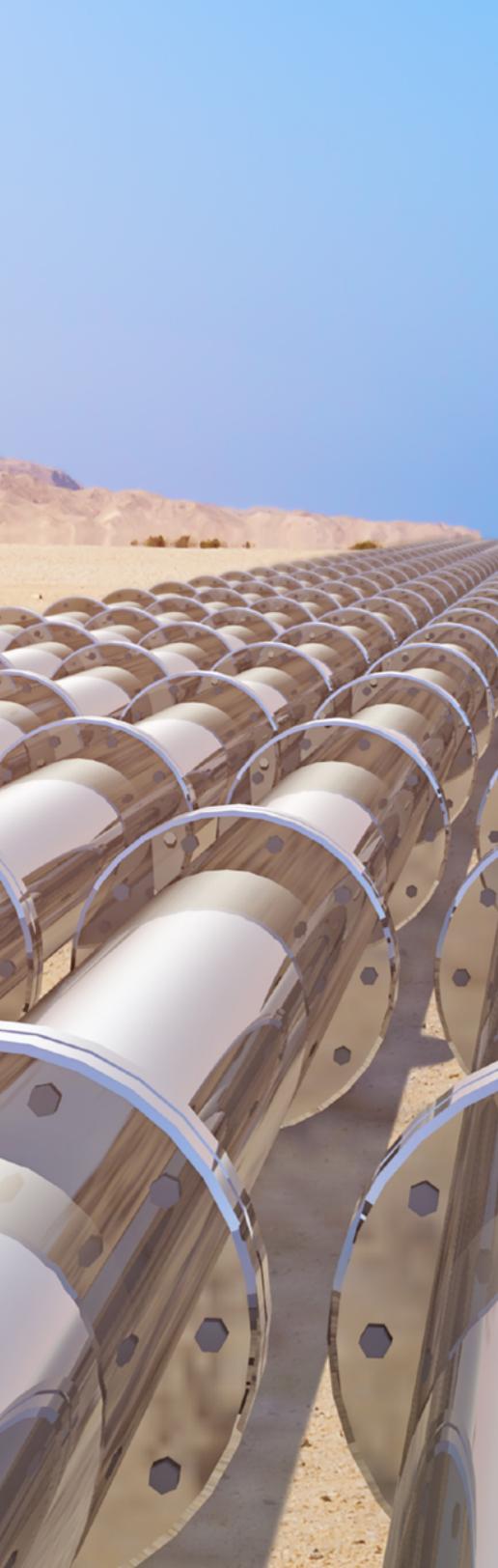


Figure 2: Preparedness to Deal with COVID-19 by Industry Type (N=176)

⁴ The SPE is a professional association whose more than 140,000 members in 144 countries are engaged in oil and gas exploration and production.

⁵ [2020 Drucker Institute Company Ranking, Drucker Institute](#)



In terms of company type, publicly listed companies were the most prepared (26 out of 50 respondents), followed by state-owned companies (10 out of 25 respondents), while private companies were the least prepared (38 out of 101 respondents) to deal with the pandemic (Figure 3).

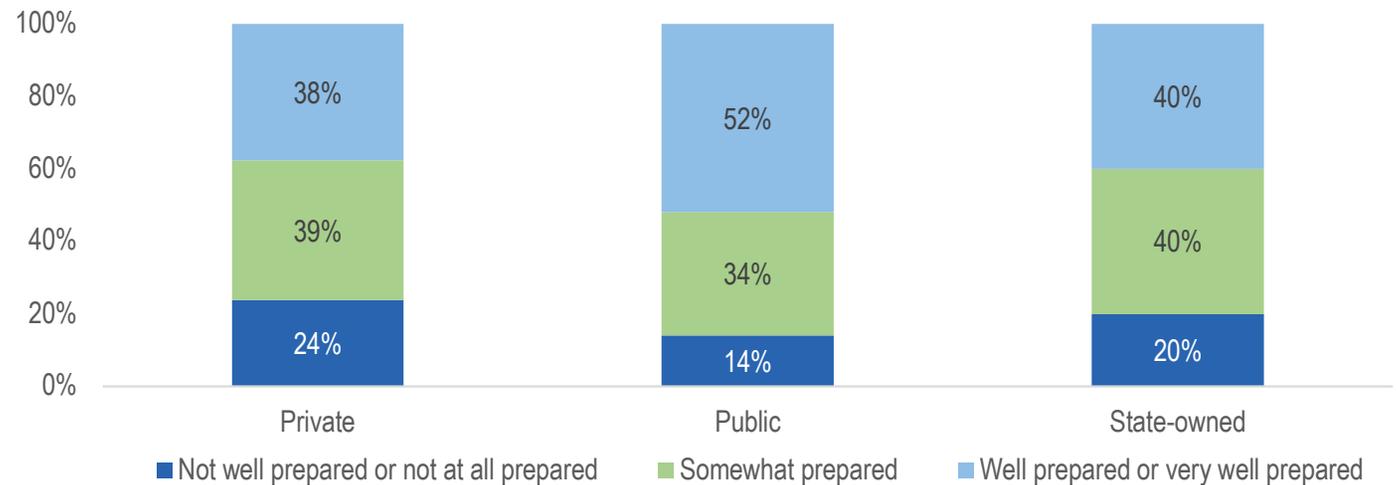


Figure 3: Preparedness to Deal with COVID-19 by Company Type (N=176)

Data from S&P Market Intelligence corroborates some of these findings as it shows 147 percent (or 13.4 percentage point) increase in the median probability of default for oil and gas drilling companies from 9.1 to 22.5 percent from 1 March to 31 March, 2020.⁶ While the probability of default has dropped across industries, oil and gas drilling still remained in the top five by August 2020.⁷ Dr. Muhammed Abed Mazeel Al-Aboudi, Director General at the Iraqi Oil Ministry, argues that “the biggest effect of the crisis has been felt in the upstream industry; the international oil companies in Iraq were not well prepared. This reflected negatively on the service companies like drilling and others.” For Rami Bakir, Vice President Operations Middle East and North Africa at NOV Completion and Production Solutions, a service company headquartered in Houston, the areas that were the least prepared in business are those that were paralyzed by the pandemic, namely “face-to-face customer meetings, supply chain, field operation—moving workers.”

⁶ Probability of default is the likelihood over a specified period that a borrower will not be able to make scheduled debt repayments <https://www.investopedia.com/terms/d/defaultprobability.asp>

⁷ <https://www.spglobal.com/marketintelligence/en/news-insights/blog/industries-most-and-least-impacted-by-covid-19-from-a-probability-of-default-perspective-march-2020-update>

Dean Foreman argues that “the difficulty to implement countermeasures for COVID-19—including company coordination, personal and work environment sanitation, flexible work policies and social distancing—can vary based on the industry segment, physical plant, degree of work specialization and individual organization. For example, offshore operations present distinct physical conditions, while many services require teams that can work together in proximity.” Rafael Bermudez adds that “new customers were more prepared to beat the COVID-19 environment as they were working on the planning stages of their projects.”

3.2 Organizational Challenges Due to COVID-19

The survey reveals that the most important challenge faced during the pandemic has been ensuring worker safety, with 90 percent of respondents saying it was extremely important or very important. This was followed by readiness to work digitally⁸ (76 percent) and pressure on margins (65 percent) (Figure 4).

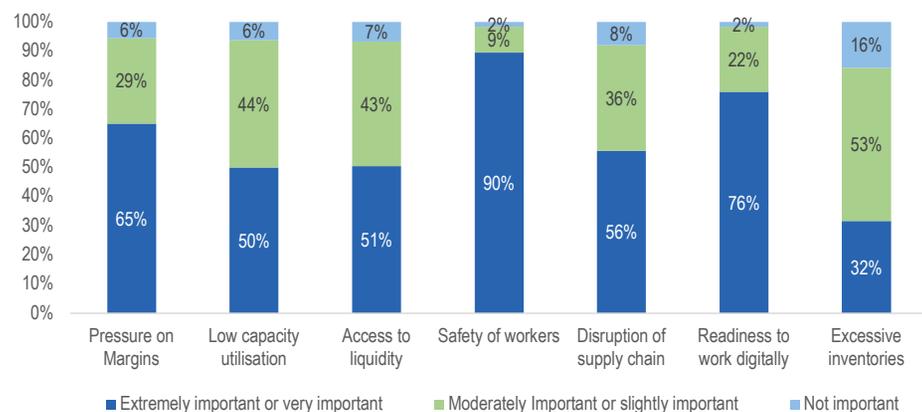


Figure 4: Challenges for the Organization Due to the COVID-19 Crisis

⁸ Further discussed in Section 3.4

⁹ <https://www.iogp.org/blog/news/fatalities-and-injuries-down-in-2019-says-new-iogp-report/>

¹⁰ <https://www.api.org/oil-and-natural-gas/health-and-safety>

Safety at Work

Jim Robertson, Member of the Advisory Board of Crystol Energy and former Global Head of Oil and Gas Tax at Shell, asserts that “given the enduring importance of safety in the energy industry, it was no surprise to see that issue ranking as the top priority irrespective of the time horizon.”

Working in the energy industry, such as offshore and other process-related settings like petrochemical plants, is inherently risky. When it comes to safety, the industry is therefore highly regulated. Safety awareness and safety-related investments by the energy industry have generally increased over the past decade, especially following the tragic Macondo Deepwater Horizon oil spill in the Gulf of Mexico in 2010, which resulted in 11 offshore workers killed. Industry safety data from the International Association of Oil & Gas Producers (IOGP) shows a 200 percent decline in reported fatal accidents from three to one fatality per 100 million hours work between 2010 and 2019.⁹ This is due to improved occupational safety and health standards; safety training opportunities; safety of exploration and drilling operations; transportation (pipeline and marine) safety; and refinery and plant safety, among others.¹⁰

Ron Beck, Industry Marketing Director at AspenTech, however, warns that while safety of employees has always been a top concern, it’s even more so today. “This leaves less people running assets, and the question is ‘how can we protect those assets as well?’” The solution resides in technology: “artificial intelligence (AI) can fill the gap,” he adds.

Pressure on Margins

A sub-analysis of the pressure on margins shows that state-owned companies placed relatively less importance on margin pressure (only 36 percent said it was important) as compared to publicly listed companies (43 percent) and private companies (50 percent) (Figure 5). After all, the *raison d'être* of privately owned businesses is to maximize profit. By contrast, state-owned companies, which are owned by host governments, have non-commercial objectives to meet, such as creating jobs in the country. This partly explains why Saudi Aramco stood out from its private peers in the third quarter of 2020 when it stuck with plans to pay \$18.8 billion USD in dividends despite failing to raise enough cash to cover the payment and a 45 percent drop in earnings.¹¹

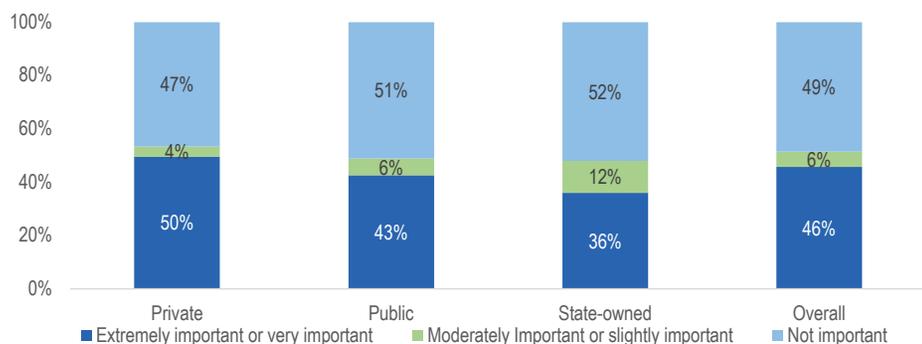


Figure 5: Pressure on Margins by Company Type (N=173)

The top three types of businesses which placed the most importance on pressure on margins were engineering, procurement and construction (100 percent); downstream refining and petrochemicals (84 percent) and major oil and gas (80 percent) (Figure 6).

Rami Bakir, however, asserts that the pressure on margins started back in 2016 and is not simply due to the COVID crisis, adding that “the first wave of discounts requested from the service companies started when oil prices

slumped from \$100 to \$43/bbl USD in 2014. The pressure on national and international oil companies was due to inflated margins, which needed to come down with the fall in oil prices. The average discounts offered by service companies reached 60 percent between 2015 and 2020. While these discounts were ongoing, service companies still performed the same work. Thus, when COVID-19 hit and sent prices to \$29/bbl USD, requests to service companies for further discounts were barely complied with, as these companies were healing from the four years of profitability agony.”

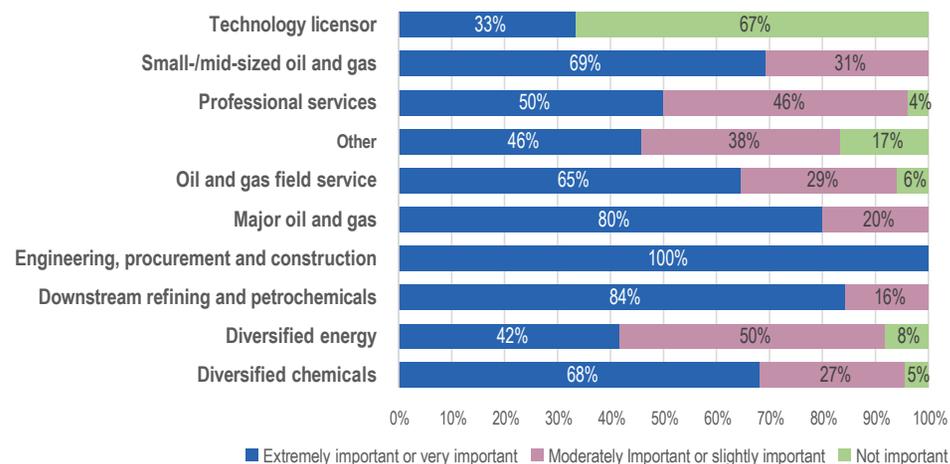


Figure 6: Pressure on Margins by Industry Type (N=173)

3.3 Pre- and Post-COVID Strategic Priorities

When respondents were asked about their organizations’ strategic priorities pre- and post-COVID, at first glance the listing barely changed (Figure 7). The exceptions were expansion and investment which, pre-COVID ranked eighth only to drop to ninth, post-COVID. Raising capital dropped from ninth to tenth, taking the bottom rank—not surprisingly as financing simply dried out, while diversification of assets and activities jumped from tenth to eighth.

¹¹ Saudi Aramco to pay bumper dividend despite earnings blow, Financial Times (ft.com)

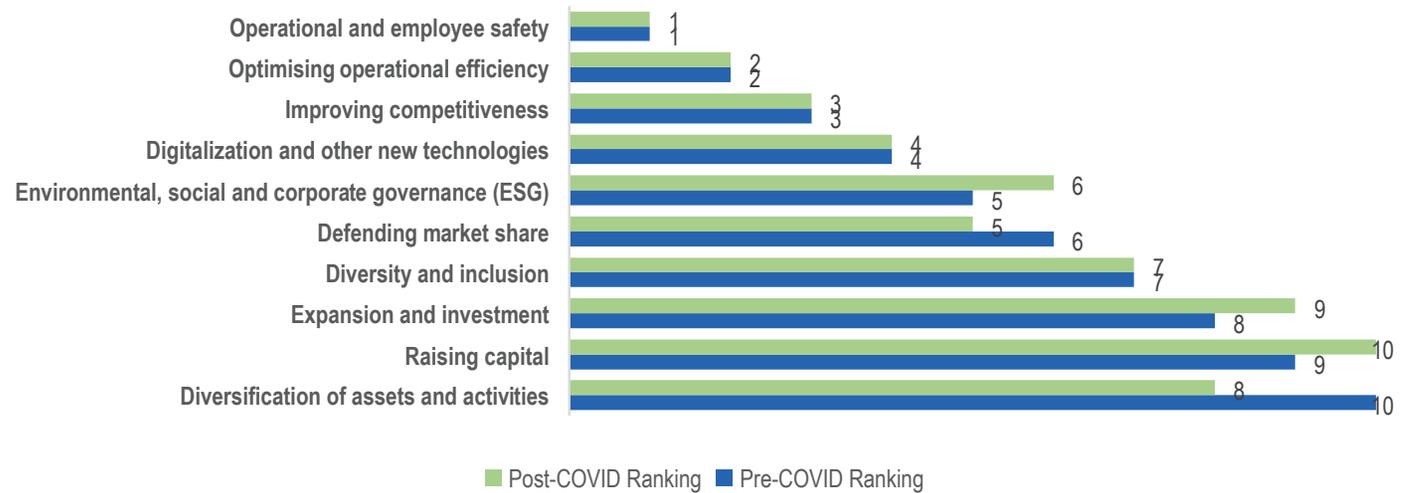
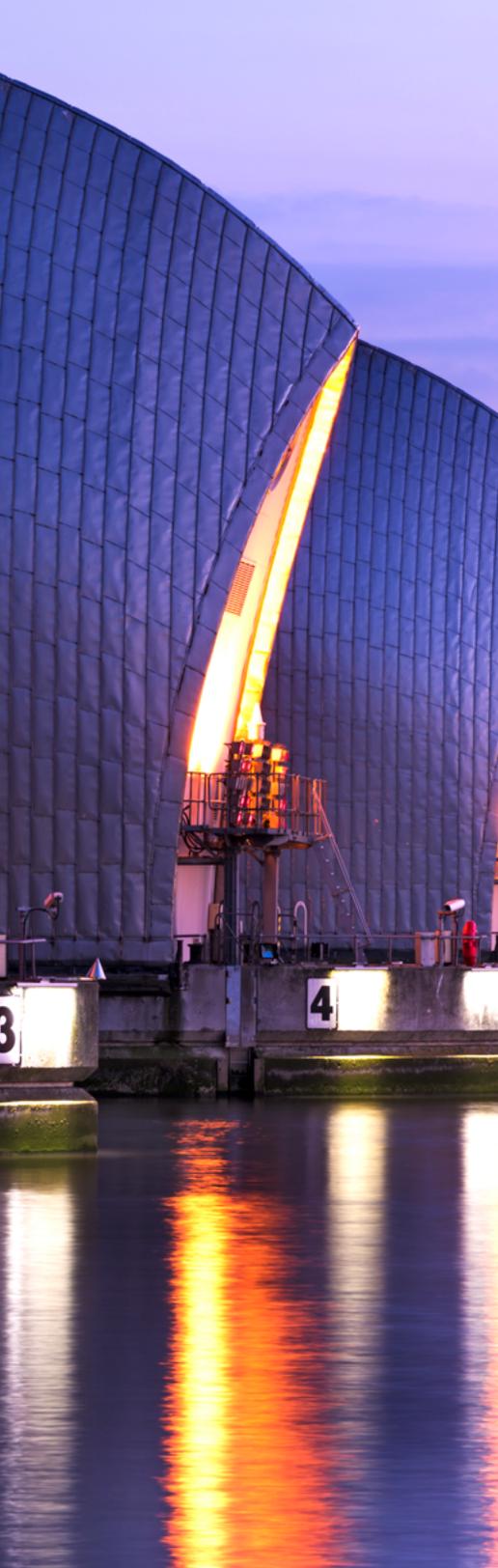


Figure 7: Pre- and Post-COVID Ranking of Strategic Priorities

Several of the underlying structural changes in the energy industry, such as optimizing operational efficiency and improving competitiveness, were already taking place before the pandemic.

The 2014-17 oil price slump incentivized several companies to undertake necessary reforms to maintain their profit margins and competitiveness, especially in light of the “lower for longer oil price” world, or even “lower forever,” to quote Shell’s CEO in 2017.¹²

Nonetheless, what that pandemic has done is catalyze the pace of the energy industry’s reforms and priorities, as shown in Figure 8. As Marco Annunziata, Co-founder of Annunziata Desai Advisors, elegantly puts in an article published in *Forbes*, there is a clear increased sense of urgency for all 10 strategic priorities as “the share of industry respondents who rank them as ‘very important’ has increased since the pandemic began. Companies feel that the environment has become so much more challenging, that they need to redouble their efforts across the board.”¹³

¹² [Shell Prepares for ‘Lower Forever’ Oil Prices, WSJ](#)

¹³ [The Self-Optimizing Plant Is Within Reach, forbes.com](#)

One priority, however, stands out. The net change in extremely important or very important pre-and post-COVID priorities shows digitalization and other new technologies increasing by 14 percentage points despite ranking fourth. Likewise, diversification of assets and activities increased by eight percentage points, although being ranked eighth while improving competitiveness gained seven percentage points despite being the third priority.

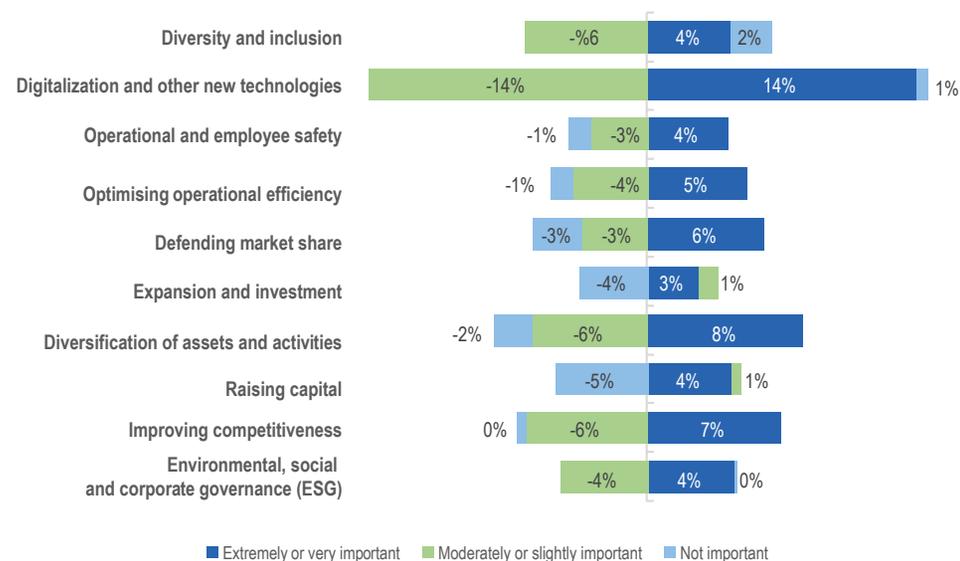


Figure 8: Net Change in Pre- and Post-COVID Strategic Priorities

Digitalization Trend

The energy industry is not new to digitalization. Rafael Bermudez confirms that his organization was “having regular online meetings with customers around the world before COVID-19. In fact, our consultants were working remotely for upstream projects from the U.S. and LATAM, while the project was physically executed in Nigeria, among other countries.” Nils Kaageson-Loe agrees but argues that going digital was not as widely spread as today. “We’ve had virtual and remote communication tools and capabilities for more than two decades (e.g.,

videoconferencing and teleconferencing) but they weren’t necessarily ubiquitous. Development has largely focused on remote operation centers and surveillance of rig/platform operations. Pre-COVID, several major oil and gas operating companies and service providers were adopting remote operation centers, but these focused around assembling teams in physical locations to oversee remote operations; not dispersed teams and individuals working together remotely,” Nils argues.

COVID-19, however, has not only accelerated the digitalization trend but has also led to “the dawn of a second wave of digital transformation sweeping every company and every industry,” to quote Microsoft’s Chief Executive Satya Nadella.¹⁴ Rami Bakir comments that “when the pandemic hit, everyone looked into effective digital communication platforms and operational automation for field production and drilling aspects. These two came as a priority to sustain and maintain the day-to-day operation without interruption.”

Rami adds that his company “accelerated the R&Ds into digitization and automation, in addition to R&D for cost-effective equipment and/or operational efficiencies, to produce more or to drill faster.” Rafael Bermudez makes a similar point, arguing that “the crisis has served to better understand the purpose of the company, focusing our attention on providing only innovation and sustainable technologies to improve upstream integrated solutions which can be rolled out digitally for our customers.”

Nils Kaageson-Loe adds that many executives have spoken about how they have not only managed to continue their operations, service customers and lead teams, but also begun to take advantage of remote communication technologies available to them to create new efficiencies,

synergies, and even business opportunities. “It has been really interesting to hear from a number of oil and gas executives, and senior managers, their surprise (and delight) as to how quickly their organizations adapted to remote working, their admiration of their staff, their resiliency and that of the organization itself,” Nils says. Surely, this wouldn’t have been possible without digitalization.

Figure 9 illustrates the areas of digital technology that offer the greatest opportunities as identified by the survey’s respondents, with Mobility/Cloud/Remote operations capturing most attention.

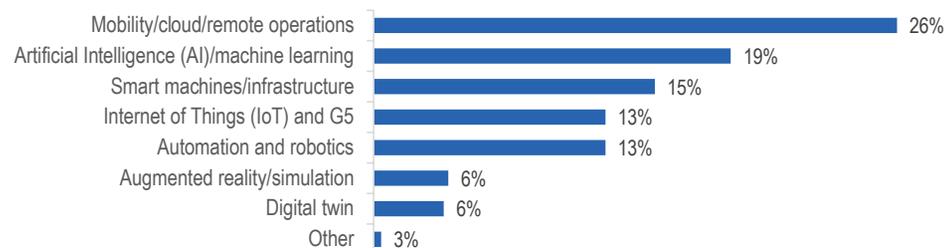


Figure 9: Areas of Digital Technology that Offer the Greatest Opportunities (N=487)

Economic, Social and Corporate Governance

Most of the strategic priorities listed earlier require significant funding. The question then becomes, how accessible will funding be post-COVID? Here, Economic, Social and Corporate Governance (ESG) is considered playing an increasingly important role in directing investment decision.

Although the survey reveals that ESG dropped one rank post-COVID, such a drop is likely to be a temporary setback. Dean Foreman argues that “addressing ESG-related concerns is both an opportunity and a challenge. It will enable the industry to contribute to global solutions and innovative business lines but will also present challenges intertwined with public policies.”





Box 1 below summarizes the interview we carried out with ESG specialist Silvia Pavoni, Editor of Sustainable Views and Economics of *The Banker magazine* (*Financial Times*) on this special topic.

Box 1: ESG in the Energy Industry – Interview with Silvia Pavoni

1. Do you think the pandemic has enhanced or dampened the importance of ESG when it comes to energy companies' financing? And why?

Silvia Pavoni: COVID-19 has made conversations about sustainability and ESG principles more urgent. Just as a health crisis can bring businesses on their knees, so can other global risks, like climate change. But reactions have been mixed. While investors and lenders have generally intensified their efforts to analyze and respond to ESG risks—with some big names being very vocal about their concerns, particularly about the energy sector—ESG as an investment decision was deprioritized by many because of the immediate fallout of COVID-19, according to a survey by consultancy Edelman at the end of last year. Funding taps are not being turned off (not for all traditional energy companies, at least), but cost of funding will increasingly reflect ESG risks.

2. To what extent can ESG support the emergence of a stronger oil and gas industry post-COVID?

Silvia Pavoni: Investor pressure on energy companies to disclose plans to transition to a low-carbon economy can help create more sustainable business models. They can also encourage investment in new technology. It is only logical to assume that the expertise of the oil and gas industry can be used to find solutions to environmental problems, including the ones it's helped to create.

3. Is it possible to quantify the effect of ESG on financing or is it rather sentiment based?

Silvia Pavoni: Looking at the capital markets, investors seem to be happy to pay a premium for ESG assets. French lender BNP Paribas found that between January and November 2020, investors in bonds that financed green or social projects, or a combination of the two, were willing to pay up to seven basis points more than they would for “regular” bonds. In 2019, this differential was only two basis points. Future ESG issuers, including those in the energy sector, will likely find eager investors. In fact, it's interesting to note the effectiveness of sustainability-linked bonds pioneered by Italy's Enel. With these products, investors fund not individual projects but the whole company's efforts toward meeting the UN sustainable development goals, which, of course, include fighting climate change. Enel says that its latest sustainability-link bond—£500 million (around \$680m USD) for the sterling market raised in October 2020—gave it a financial advantage of 15 basis points.

3.4 Organizational Response to COVID-19

When COVID-19 hit, the survey reveals that energy companies took several actions in response (Figure 10). Chief among them is adopting flexible work environment/home office (15 percent); introducing new safety rules (13 percent) and accelerating digitalization¹⁵ (12 percent). These three main responses were consistently selected by diversified chemicals, major oil and gas and professional services in the sample.

The adoption of a flexible work environment and accelerating digitalization are closely intertwined. “The ability to enact flexible work arrangements varies depending on the technology and systems in place. To address COVID-19 and improve their productivity, many companies have invested in new systems for remote operations and monitoring,” Dean Foreman comments. Nils Kaageson-Loe makes a similar point, “COVID-19 has been a true disruption. It forced everyone to go home and work. Those companies that had networking tools like Microsoft Teams installed could quickly adapt. Others had to quickly catch up.”

Notable differences emerge when further breaking down the answers by company type. For example, publicly listed firms sought to restructure their physical asset composition (highest response rate of 38 percent within all the considered categories); restructured financials (34 percent); and suspended operations (34 percent). Smaller, private firms prioritized reducing capital costs (highest response rate of 59 percent within all the considered categories), followed by accelerating digitalization (59 percent) and cancelling projects (58 percent). Meanwhile, the response by state-owned companies was to delay FIDs (20 percent); suspend operations (19 percent); and defer maintenance (18 percent).

Energy companies have clearly pursued different objectives. Suspending operations was the only response among the top three, which is in common for both publicly listed and state-owned companies, though not smaller, private companies.



Figure 10: Organizational Response to COVID-19 (N=1016)¹⁶

Home Office

Many are asking today whether working from home will become a more acceptable method of doing business post-COVID. Before the pandemic hit, around 25 percent of employed Americans worked from home. That figure increased to 62 percent in April 2020.¹⁷ The nature of work post-COVID will have various consequences, not just in terms of business cost and human resources, but also more broadly on oil demand through its effect on transport. It also sheds further light on cybersecurity, as discussed in Section 3.5 below.

A June 2020 McKinsey report found that 80 percent of the persons they surveyed indicated they not only enjoyed working from home but 41 percent of them said they were “more productive than they had been before.”¹⁸ Nils Kaageson-Loe argues that “pre-COVID, among the very few oil and gas companies that encouraged or supported extensive work-from-

¹⁵ Further discussed in Section 3.5

¹⁶ Respondents could select all that applied

¹⁷ [Reimagining-the-office-and-work-life-after-COVID-19-final.pdf \(mckinsey.com\)](https://www.mckinsey.com/business-functions/organization/our-insights/reimagining-the-office-and-work-life-after-covid-19)

¹⁸ <https://www.mckinsey.com/business-functions/organization/our-insights/reimagining-the-office-and-work-life-after-covid-19>

home policies, a lot of management and Human Resources teams were hung up on how to police Health, Safety and Environment (HSE) risks and work-related injuries (e.g., bad seating posture) for people working from home. COVID-19 has changed that perception. Staff can be trusted to work effectively from home. But a new issue arises —how to prevent staff from overworking from home.”

Polling data from Gallup shows that 57 percent of American workers said their employer was offering them flexible time or remote work options, up from 39 percent at the start of the pandemic and about 25 percent only a few years before.¹⁹ However, given the nature of oil and gas and chemical activities, even with the currently most advanced technologies, the human factor continues to play a central role. Nikolaos Liapis, Supply and Operation Director at ElinOil, a Greece-based company primarily engaged in energy-trading sector for the trade of fuel, lubricants and gas, argues that although “digitalization will help oil companies, general physical presence will return as soon as the pandemic is over due to the nature of our business.”

Staff Reduction

Staff reduction is an established practice in the cyclical oil and gas industry; it worsens, the lower oil prices go. A study by Deloitte found that between 2014 and 2019, a single dollar swing in oil prices affected 3,000 exploration, production and oilfield services jobs.²⁰ COVID-19 compounded job losses in the energy industry across the board. The job losses experienced in 2020, in the U.S. alone, was the fastest rate of layoffs in the industry’s history, according to Deloitte.

While in the short-term, it may help in cutting costs, such an unfortunate practice will only plant the seeds of future challenges; the survey reveals that “shortage of skills” is a major concern for the industry in the coming years.²¹ While reducing costs and protecting margins are the industry’s priorities during downturns, it’s important for the industry to strike a balance between balancing its books and safeguarding its labor force. Large-scale layoffs, coupled with the heightening cyclical in employment, further challenge the industry’s reputation as a reliable employer, as Deloitte puts it, making future hiring more difficult and costly as companies need to offer competitive packages to attract young talent.

3.5 Top Concerns for the Next Five and Ten Years

The earlier questions of the survey focused on how companies faced the COVID-19 challenge. The following questions concentrate on the all-important industry outlook post-COVID, starting with the main concerns, first, for the next five years, then beyond. Figure 11 summarizes the results. While the top concerns are in line with expectations, the least concerning issues come as a surprise especially since they reveal contradictions between respondents’ preferences.

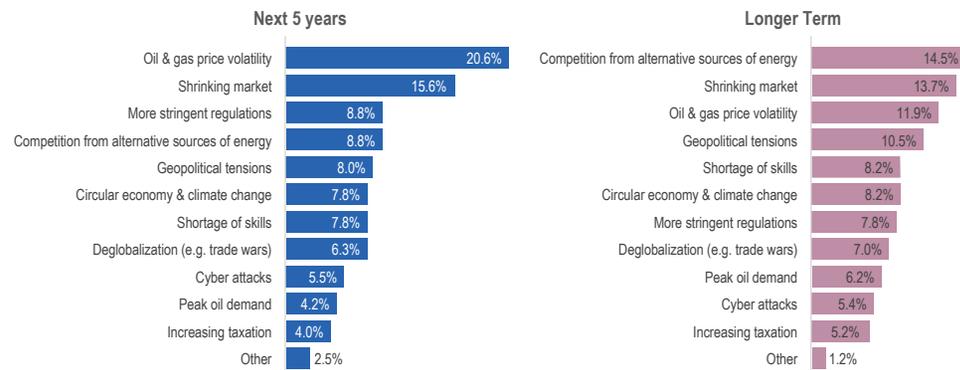


Figure 11: Top Concerns for the Next Five and Ten Years

19 <https://news.gallup.com/poll/306695/workers-discovering-affinity-remote-work.aspx>

20 <https://www2.deloitte.com/us/en/pages/about-deloitte/articles/press-releases/deloitte-study-future-of-work-oil-gas-chemicals.html>

21 See Section 3.5

3.5.1 Top Concerns: Usual Suspects

The energy industry’s major concern over the next five years is by far oil and gas price volatility. Shrinking market comes second. More stringent regulations, competition from alternative sources of energy, circular economy and climate change and shortage of skills followed—capturing almost the same response rate. The order does not change significantly in the longer term, though competition from alternative sources of energy gains more track.

The survey further reveals that major oil and gas companies (19 percent of respondents in the subcategory), downstream refining and petrochemicals companies (14 percent) and professional services firms (12 percent) expressed the most concern regarding the impact of oil and gas price volatility on their operations.

Jim Robertson “cannot remember a time when commodity prices and the demand/supply factors that influence them, were not close to the top of the list of industry concerns—as true in the past as it is today.” For Rafael Bermudez, the top concern for the next 10 years is “without a doubt oil volatility along with its inherent consequences. Currently, we’ve added other factors to the oil price industry equation called ‘pandemic.’ Therefore, business decisions will be taken with extreme conservatism.”

3.5.2 Bottom Concerns: Surprise and Conflict

It is surprising to see that the much-talked-about peak oil demand figuring among the bottom concerns. Similarly, despite the strong push for digitalization, cyber attacks are not a major concern either. However, when the results are further broken down by company type (Figures 12 and 13), peak oil demand emerges as one of the top three concerns in the next five years for private companies and in the longer term, for publicly

listed companies. Cyber attacks are among the top three concerns for publicly listed companies both in the next five years and beyond, as they are for state-owned companies in the longer term.

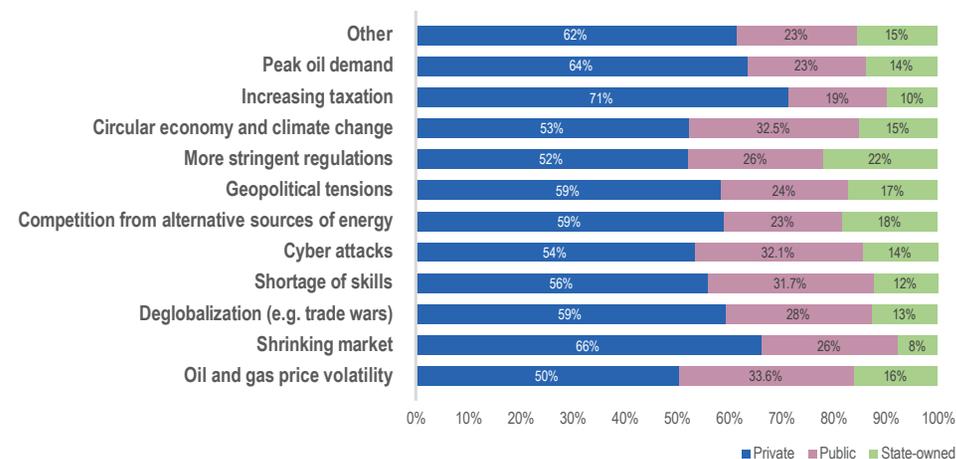


Figure 12: Top Concerns for the Next Five Years by Company Type

Peak Oil Demand

Nobody knows for sure when oil demand will reach its peak, nor how long it would stay at that maximum level before starting to decline. Wide disparities exist between various forecasts.

However, one thing is for sure: the pandemic has intensified debate around the subject, with some arguing that much of the demand destruction in 2020 is structural, i.e., not coming back, irrespective of economic recovery. In an interview given in May 2020, Bernard Looney, BP’s CEO, stated that it has “gotten more likely that oil will be less in demand.”²² Similarly, the U.S. Energy Information Administration (EIA) argues that “the possibility of lasting behavioral changes to transportation and oil consumption patterns present considerable uncertainty to the increase in liquid fuels consumption, even with a significant increase



in GDP.”²³ Even the Organization of Producing and Exporting Countries (OPEC), in its “World Oil Outlook” published in October 2020, placed for the first time, a date on the likely point of peak oil demand.²⁴

Commenting on the survey’s findings, Dean Foreman argues that “for the natural gas and oil industry as a whole, I generally agree that the potential for global peak oil demand per se is not among the top concerns over the next five to 10 years.” He nonetheless adds “public policies and proposed support mechanisms that could influence oil supply/demand, access and affordability, are important and contentious issues that are likely to be confronted within these periods.”

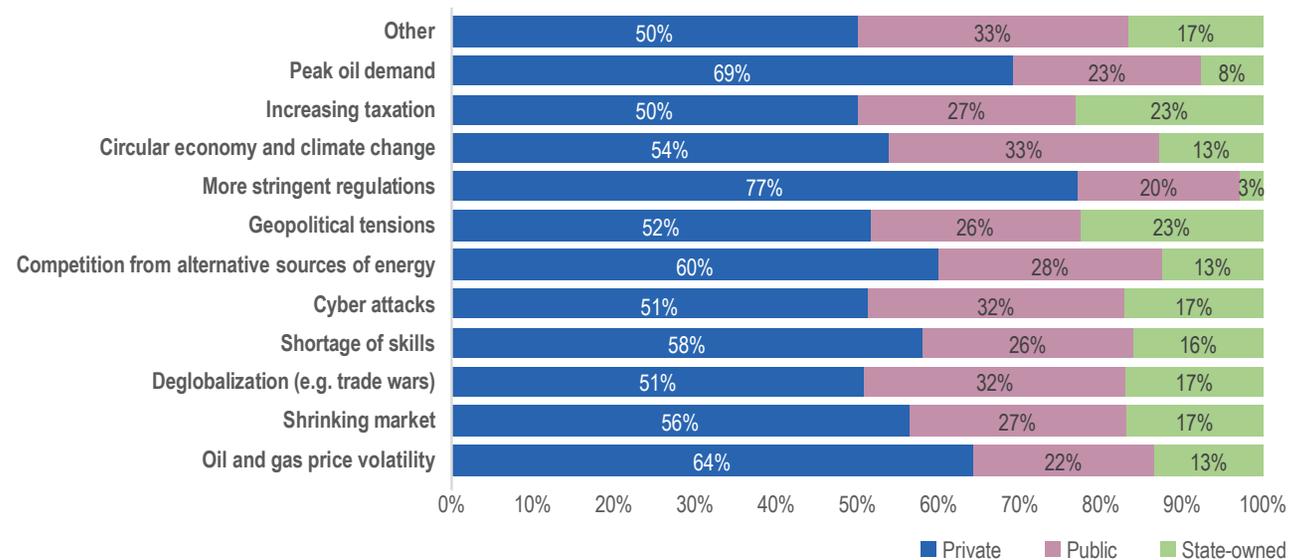


Figure 13: Top Concerns for the Next Ten Years by Company Type

Digitalization, Working from Home and Cyber Security

The survey shows a disconnect between, on the one hand, the greater push for digitalization which in turn, has facilitated working from home following COVID-19, and on the other, the concern about cyber attacks, which appears to be marginal in the survey’s results. In reality, the three should be closely intertwined. Ron Beck explains, “When people work from home, they don’t think too much about cybersecurity. They often take it for granted and

²³ [EIA expects record liquid fuels inventory builds in early 2020, followed by draws - Today in Energy - U.S. Energy Information Administration \(EIA\)](#)

²⁴ [OPEC : OPEC launches 2020 edition of the World Oil Outlook](#)

expect IT specialists to deal with cyber threats.” A study prepared by MIT Technology Review Insights recommends that cyber security must be at the core of every aspect of a company’s digital transformation strategy. “Tremendous financial and geopolitical value of oil and gas products, and infrastructure, make them attractive targets for both criminal organizations and state-backed attackers able to invest significantly in novel attacks.”²⁵ The oil and gas industry must therefore balance between embracing digitalization and boosting cyber security: two sides of the same coin.

Increasing Taxation

Increasing taxation is the least concerning for the industry despite the looming risk of environmental taxes and higher taxation on the oil and gas industry post-COVID. That risk is real; governments are highly indebted following their generous fiscal stimuli to support the economy during the pandemic. They will therefore seek various ways to reduce budgetary pressure—the oil and gas industry is an easy target. Some governments will brand such a move as part of their agenda to fight climate change. As soon as he assumed office, U.S. President Biden announced he would seek to cancel all subsidies given to the oil and gas industry.²⁶ Such a decision equates to an increase in taxation on the industry.

“The energy transition brings the prospect of government intervention in the form of regulation, targeted incentives and carbon taxation, which could be a concern depending on the organization’s strategic diversification,” argues Jim Robertson.

Box 2: Digitalization and Cyber Security: The Need for a Different Mindset, Ron Beck, AspenTech

If a company wants to implement digital transformation, a different mindset should be adopted. As such, it must accept a certain level of risk that typically it wouldn’t accept.

Traditionally, chemical plants, refineries and oil fields are completely locked out from internet and security points of view, and with them, the risks of cybersecurity. The minute the company starts introducing data analytics and other tools, almost by nature, it is forced to accept some level of risk. The question then is how much can you ameliorate that? In AspenTech, we have a whole department that focuses on checking the potential level of risk for each new development on our software and to what extent this risk could be solved. As a supplier, we need to ensure that, even when people aren’t thinking about these risks, we’re able to create solutions that minimizes these risks. However, the risks will still be there. Cybersecurity protection is a key point in choosing which vendor and software to select. It’s broader than pieces of software; it’s the entire infrastructure within the company.

At AspenTech, we’re aware of the impact of cyber security (some our customers are encountering significant hacks, but not from our software). However, we aren’t allowed to talk about customers’ incidents involving cybersecurity; this affects companies. The fact that companies are not willing to publicize it, creates more risk to everyone else.

In the U.S. and EU, for example, it’s required by law that banks disclose that somebody could have hacked information for a certain number of people. Yet outside the sector, there are no such requirements currently. The information is not publicized and therefore, other companies may not be as aware of another company’s issue in cybersecurity. Such things must be shared more often, especially since the digitalization transition has occurred extremely fast in the COVID environment, and people haven’t necessarily thought about it. With all things considered, the benefits of digitalization outweigh the risks, by far.

25 [MIT Study, Transforming the Energy Industry with AI \(siemens-energy.com\)](#)

26 [Remarks by President Biden Before Signing Executive Actions on Tackling Climate Change, Creating Jobs, and Restoring Scientific Integrity | The White House](#)

3.6 Industry's Outlook Post-COVID

The survey reveals that post-COVID, the top three trends that are likely to define the oil and gas industry are: first, major companies diversifying outside of oil and gas (22 percent)—which is a shared belief across different types of companies (private, publicly listed and state-owned). Ron Beck argues that this is already happening.

Second, the transition toward cleaner fuels will accelerate across the world (20 percent), and investment cuts today will lead to a tight market in the next five years (20 percent). The third trend is that low oil and gas prices are here to stay (Figure 14).

The results confirm some of the existing and ongoing structural transformational trends taking place in the energy industry, namely the energy transition and its impact on company decarbonization investment plans. These are further catalyzed by renewed government and activist pressure to achieve the Paris climate target goals and for energy companies to reduce their carbon footprint. Jim Robertson finds it less straightforward to interpret the response to questions around the energy transition, with perspectives probably driven by an organization's own strategic positioning and/or their dependence on revenues from fossil fuels.

Muhammed Abed Mazeel Al-Aboudi adds that “we are speaking about a new era of energy use worldwide. Also, the industry post-COVID will be fighting to stay on track with the new development of energy use. This leads to new investment and new types of market.” Additionally, for the industry to emerge “stronger or weaker depends on how successful it is able to position itself in the emerging trends. The oil industry has the capital to invest in new technology, human resources and dynamic reforms. This gives the industry an opportunity to be stronger again.”

However, a notable conflict in views emerges with respect to potential market tightness versus low oil and gas prices; a tight market simply implies high prices. It was interesting to see that publicly listed companies and state-owned companies both included “low oil and gas prices are here to stay” among their top three trends.



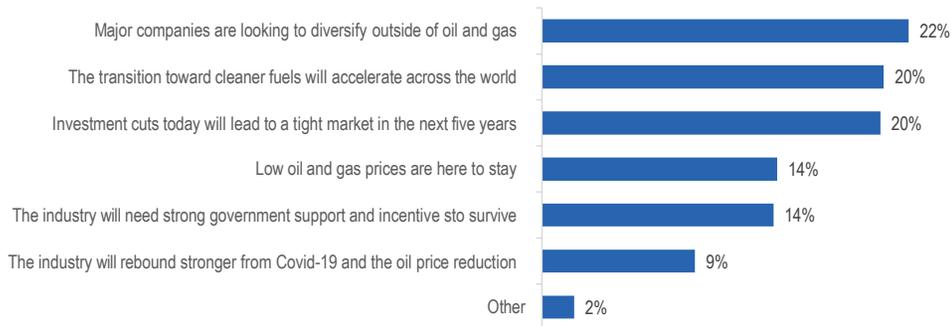


Figure 14: Industry's Outlook Post COVID-19

The fear of “investment gap” leading to tight future supplies and in turn, to spikes in prices is common after each oil price collapse. Several industry reports point to major project cancellations across the board and in multiple jurisdictions. For example, annual upstream spending in 2020 was slashed by 32 percent year-on-year due to the pressure from the collapse in oil prices and demand, according to the IEA. By comparison, there was a 26 percent average cut in investment between 2014 and 2016, following the oil price crash in 2014.²⁷ As a result, in June 2020, JP Morgan predicted the return of “super cycle” in oil markets precisely for that reason. Similarly, in December 2020, the Riyadh-based International Energy Forum (IEF) and Boston Consulting Group (BCG) released a report arguing that “inadequate investment would set off another wave of unwanted boom-and-bust pricing.” The report states that “industry investment will have to rise over the next three years by 25 percent yearly from 2020 levels to stave off a crisis” and “ensure sufficient production to guarantee market stability.”²⁸

There is, of course, no denying that a positive relationship between current investment and future production exists. However, to date, such warnings have failed to materialize. The prime reason is that in oil markets, costs follow prices. Every time after severe price downturns, the cost of

investment has turned down equally severely (if with a small lag), so that a nominally much smaller amount of investment expenditures bought, relatively speaking, the same investment in real terms. Such a development is not obvious when looking only at the monetary expenditures. For example, if the price of renting a drilling rig falls by half following an oil price decline, then half the investment expenditure on drilling rigs still buys the same amount of investment in real terms as before. Rami Bakir confirms, “we are seeing a healthy activity and expenditure for the oil and gas industry post-COVID-19.” Similarly, Dean Foreman contends that “while 2020 has been an especially challenging year and business climate, what we’re seeing is that the U.S. natural gas and oil industry has resiliently increased its productivity to record levels, lowered its costs and expanded critical infrastructure to position for growth in a potential recovery.”

3.7 Industry's Focus in the Post-COVID World

Looking beyond the crisis, the survey reveals that the top three areas of focus in the industry in the post-COVID world should be: 1) improving efficiency and cost reduction (24 percent); 2) adopting digitalization and other new technologies (20 percent) and 3) embracing a more flexible work environment such as home office (19 percent) (Figure 15).

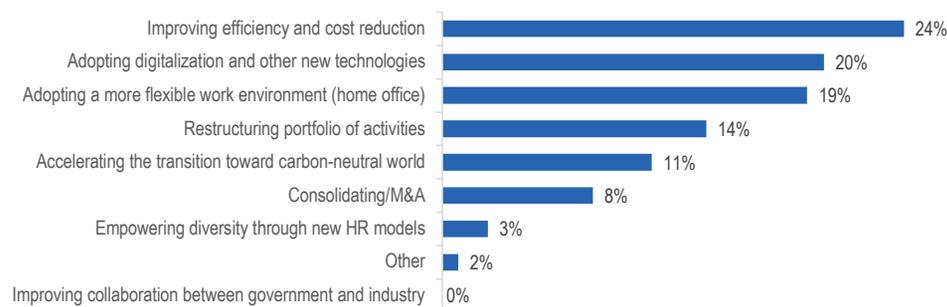


Figure 15: Industry Focus to Meet Post-COVID Challenges

27 <https://www.iea.org/reports/world-energy-investment-2020/fuel-supply>

28 IEF BCG Report - Oil and Gas Investment in the New Risk Environment

It is not surprising to see that improving efficiency of operations and reducing cost take the first spot—not only to support margins during the recovery but also to remain competitive in a greener world, especially if the market for oil and gas is expected to shrink (peak demand) and prices therefore come under pressure. Under such circumstances, the low-cost producer is typically the last to leave the market.

Two aspects, however, stand out. First, the low score of “empowering diversity through new HR models” rather contradicts “shortage of skills” identified earlier as a key concern in the coming years.²⁹ From a gender perspective, the oil and gas industry remain one of the least diversified sectors. The participation of women also dwindles with seniority.³⁰ Encouraging more women to join the sector can help the industry to hit the twin goals of overcoming potential shortage of skills and increasing diversity at work. However, in addition to the discouraging cyclical nature of the industry as discussed in Section 2.4, Nils Kaageson-Loe brings an often overlooked problem that can limit the pool of talent that companies can target—that is the “long term, heavy under investment in university departments with engineering and laboratory-based teaching and research facilities. These facilities take space, and space is money based on most university/faculty/department funding models. It is cheaper to prioritize computational-based teaching and research. Traditionally, most petroleum engineering/geoscience-focused university departments have been reliant on external sponsorship from oil and gas businesses, but this funding source has been significantly impacted by the last three oil-price down turns.” Ron Beck believes that digitalization will help; it creates efficiencies but does not remove the job. On the contrary, it creates new jobs, which will be accessible to both talented men and women.

The second result that stands out in Figure 15 is the little importance respondents gave to the collaboration between the industry and government. This may be due to several factors. For instance, some respondents come from countries where such cooperation is already well established (the North Sea—both the UK and Norway—is a good example), or they can be operating in countries where they have little confidence in government policies.

Jim Robertson emphasizes the importance of collaboration between the two key players—the government and industry—for the longevity of the industry. “In my experience, the industry is extremely resilient, particularly if given enough notice of changes and time to adapt. Provided there is adequate and timely consultation around any change proposals, I am confident that all of the organizations involved in this survey will be able to contribute to a brighter energy future for us all.”

²⁹ See Section 3.5

³⁰ Women in energy: the other half, Crystol Energy



4. Retreat or Reinvention?

There is no doubt that the COVID-19 crisis will leave lasting marks on the energy industry, globally. The pandemic hit at a time when talks about the energy transition to a cleaner, greener future and the whole package that comes with it—from peaking oil demand to shrinking market and ending the fossil fuels' age—were intensifying. Many believe that COVID-19 has accelerated those trends. Any oil and gas producer, be it private or public, large or small, therefore ought to be concerned.

However, one cannot help but noticing not one, but several rays of hope for the industry to emerge leaner, stronger and greener.

First, the average oil price for 2020 is around \$42/bbl USD, which is relatively high given the scale of the crisis. This price level does not significantly differ from recent years, like that achieved in 2016, when oil demand was much healthier. Even in April, the worst month of 2020 for the industry when strict national lockdowns were introduced, planes were grounded and streets were calm, oil demand was still at a staggering 75 to 80 million barrels a day.

Second, the crisis has offered companies a snapshot of how the market will look like when oil demand finally hits its peak. In this respect, wise companies should now seize the opportunity to tackle the weaknesses exposed during the pandemic so they are better prepared for such a scenario, when the market starts to shrink, and competition intensifies.

Finally, there is of course, no suitable time for a pandemic to hit. However, imagine the crisis had hit in the pre-digital age—the damage would have been by far much more pronounced. Thanks to digitalization,

however, many businesses were able to quickly adjust to what would have otherwise been crippling restrictions. Even on a personal level, although most people clearly miss their pre-COVID social life, thanks to digitalization, the pain from the loss of physical contact has been relatively pacified.

The survey covered in this report highlights the wide range of experiences of different businesses, of different sizes and ownerships, from all around the world and operating throughout the entire supply chain, in terms of facing the 2020 crisis. It further shows company priorities post-pandemic and what ought to be done to succeed thereafter, including embracing the energy transition.

The survey exposes lack of comprehensive focus among industry operatives. For instance, many companies responded to the crisis by reducing the size of their labor force, just at time when shortage of skills was identified as a major concern for the next few years. Similarly, there is a strong belief in the benefits of digitalization, yet cybersecurity has not been given much thought even though the two go hand-in-hand. Furthermore, while many respondents acknowledged the risk of more stringent regulations, they seem to underestimate the importance of collaborating with key stakeholders, such as the government, to ensure a win-win outcome. One could blame those contradictions on sheer oversight—the hangover phase post-crisis—and it could be a matter of time before they are properly addressed and resolved.

On balance, to answer our question: will it be retreat or reinvention for the global energy industry? We remain hopeful it will be the latter.



About Crystal Energy

Dr. Carole Nakhle founded Crystal Energy in 2012, to provide tailored advice, client-focused training and bespoke research focusing on the global energy markets, energy policy and geopolitics. From governments, private clients, financial institutions, international associations and non-governmental organizations, Crystal Energy works with a wide range of stakeholders, providing a proven mix of services to a diverse clientele around the world. Dr. Nakhle and the entire team advise, train and prepare clients to solve complex energy issues, optimize investment propositions and develop sound energy policy and strategy. In 2018, the company was awarded "Best Independent Energy Consultancy in the UK."

www.crystolenergy.com

About Aspen Technology

Aspen Technology (AspenTech) is a leading software supplier for optimizing asset performance. Our products thrive in complex, industrial environments where it is critical to optimize the asset design, operation and maintenance lifecycle. AspenTech uniquely combines decades of process modeling expertise with machine learning. Our purpose-built software platform automates knowledge work and builds sustainable competitive advantage by delivering high returns over the entire asset lifecycle. As a result, companies in capital-intensive industries can maximize uptime and push the limits of performance, running their assets safer, greener, longer and faster. Visit [AspenTech.com](https://www.aspentech.com) to find out more.

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