

The background of the slide features a silhouette of an oil pumpjack against a vibrant sunset sky. The sun is a large, bright yellow circle positioned in the lower center, partially obscured by the horizon line. The sky transitions from a deep orange near the horizon to a darker, more muted orange at the top. The pumpjack is a complex mechanical structure with a long, angled arm and a counterweight, rendered in black silhouette. A white vertical bar is visible on the left side of the slide, and a white diagonal bar is in the bottom left corner.

# 2023: THE NEAR FUTURE OF OIL & GAS

# INTRODUCTION

## INNOVATION HAS TWO SIDES TO IT: PROMISE AND PERIL



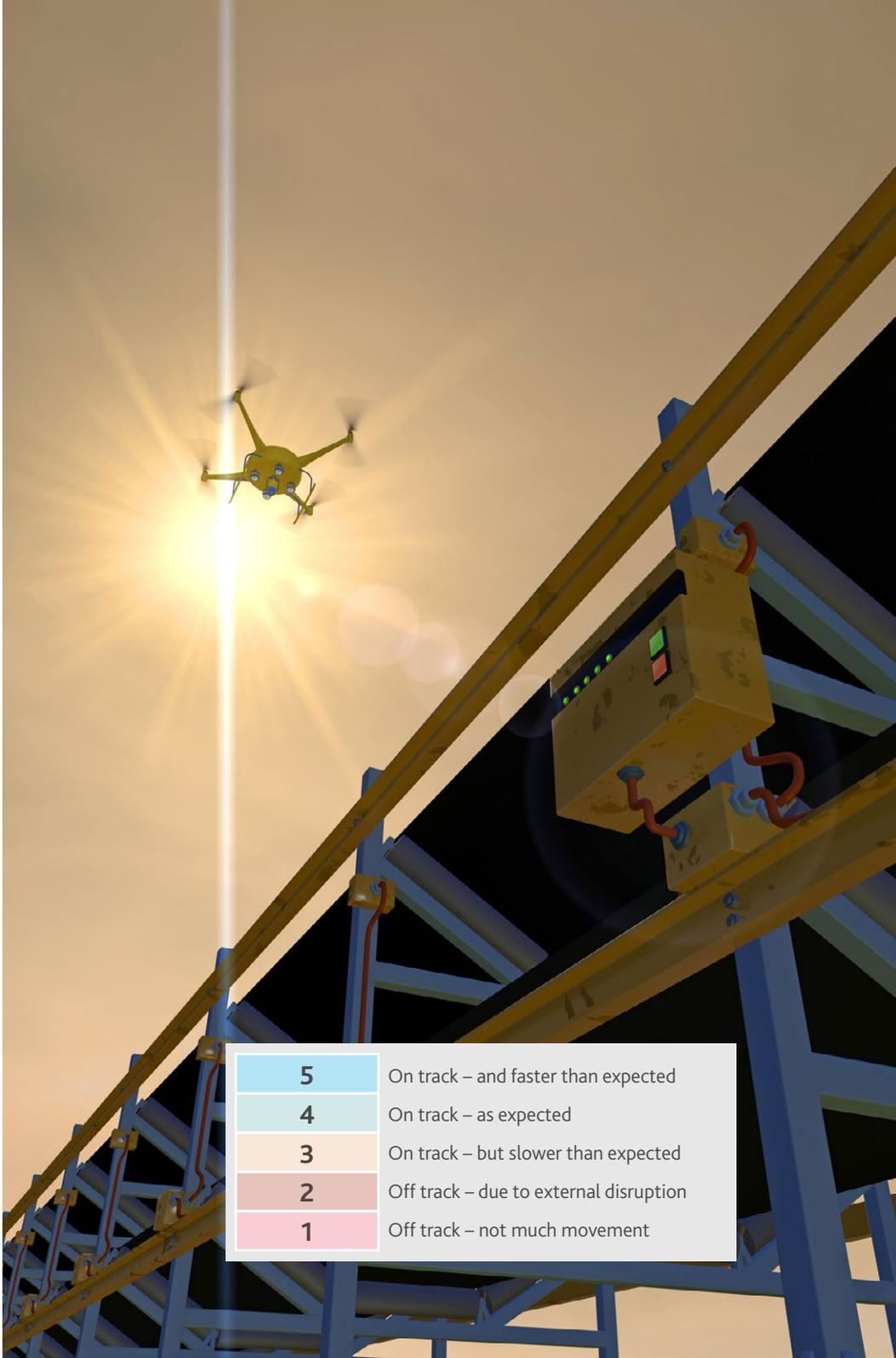
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In [2020: The Near Future of Oil & Gas](#), our Natural Resources practice leaders in Australia, Canada, the U.S., the UK and Saudi Arabia predicted how these two sides would shape the oil and gas industry globally and in their respective markets by 2020. We forecast that by 2020, the industry would evolve into one more focused on LNG and solar power, greater diversification and better use of technology. That opportunity, however, would be tempered by increased cyber risk.

Since we released our predictions in December 2017, more affordable renewables and the uptick in electrification initiatives have continued to moderate global demand for oil. Ongoing technological innovation—including the [use of artificial intelligence](#) to better make decisions and predict asset performance—against a backdrop of proliferating cyber-attacks on [industrial control systems](#) has also taken hold.

Using a heatmap, our global leaders codified how our 2020 predictions have fared so far around the world. Higher values indicate predictions that have progressed more quickly. As we sit back and take measure, we also offer new predictions for how the oil and gas industry in our initial five focus markets will evolve by 2023.

Read on for [2023: The Near Future of Oil & Gas](#).



5	On track – and faster than expected
4	On track – as expected
3	On track – but slower than expected
2	Off track – due to external disruption
1	Off track – not much movement

# GLOBAL

## 2020 PREDICTION EVALUATIONS

02

OIL & GAS 2020 PREDICTION	STATUS	VALUE	INTERPRETATION
By 2020, the average E&P company will make use of 10 percent of its big data—up significantly from today, but nowhere near full potential.	On track – and faster than expected	5	When it comes to the potential use of big data, the oil and gas industry has only just scratched the surface, but companies are catching on. Data-recording sensors in exploration, drilling and production operations, if used right, can reduce drilling time and improve safety, optimise production pumps, improve supply chain management and improve broader occupational safety, as the University of Regina outlines in a <a href="#">recent report</a> on big data analytics for the industry.
By 2020, low oil prices—expected to remain at or below the \$60 per barrel mark—will spur Gulf Cooperation Council countries to diversify their energy mix within the power sector using auctions to subsidise renewable energy projects.	On track – as expected	4	Variables like volatile oil prices and the need to address youth unemployment have pushed GCC countries to diversify their economies by focusing more on sectors like technology and renewable energy. For example, Saudi Arabia's <a href="#">Vision 2030</a> plan aims to reduce the country's dependence on oil by privatising part of its national oil company, Aramco; expanding the resources and role of the Saudi Public Investment Fund; and further developing its ports and cultural attractions.
While overall spending on R&D may decline, most of the spending that does occur will go towards technologies that enhance exploration and production (E&P) efficiencies.	On track – as expected	4	As new global energy priorities continue to disrupt the traditional oil and gas model, companies must increasingly focus on driving cost efficiencies and enhanced recovery techniques to better protect their growth. In fact, the global market for advanced exploration and downhole technology is forecast to hit \$233.4 billion in 2021, up from \$175.8 billion in 2016 and reflecting a compound annual growth rate of nearly 6 percent, according to the <a href="#">Advanced Oil and Gas Exploration and Downhole Technologies: Global Markets to 2021</a> report from Research and Markets.
By 2020, at least five countries will see foreign hackers take all or part of their national energy grid offline through <a href="#">Permanent Denial of Service</a> (PDoS) attacks.	Off track – not much movement	1	Not many attacks against specific countries' energy grids have been publicly disclosed, though the number and level of sophistication of cyberattacks on national power grids have grown. But according to <a href="#">E&amp;E News</a> , on March 5, 2019, a U.S. utility company providing power to people in California, Utah and Wyoming fell victim to a "cyber event" that hampered operations just shy of causing a blackout. As hackers grow in sophistication and countries diversify their <a href="#">power sources</a> , governments will have to remain hyper-vigilant to the growing threats facing their power systems.
By 2020, the growth of LNG imports and solar power will bring electricity to four in five African people.	Off track – not much movement	1	According to the World Bank, about half (53 percent) of Africans have access to electricity. Within sub-Saharan Africa specifically, that number drops to about two in five (43 percent), according to the <a href="#">Electricity Access in sub-Saharan Africa Report</a> , released in March 2019. We expect this prediction to pick up speed as more African countries transition out of poverty and governments focus on supporting equitable distribution of wealth resulting from oil and gas production.

# GLOBAL

## TOP OIL & GAS PREDICTIONS FOR 2023



For the oil and gas industry, innovation can be a lifeline—used to optimise finances and operations—or an Achilles heel—ignored until it's too late.

By 2023, here's our predictions for how innovation, paired with evolving oil and gas priorities, will change the industry:

1. The application of nanotechnology at every stage of the oil and gas lifecycle will be a key driver of efficiency and innovation—from exploration and appraisal drilling and production, to transport and subsequent refining.
2. The digital oilfield market, consisting of the internet of things, analytics and cloud computing, will surpass U.S.\$20 billion. In response, oil and gas companies' investment in cybersecurity will increase substantially.
3. Taxation of oil-derived products as a means of controlling demand to address environmental and oil and gas security issues will increase—especially among countries belonging to the Organisation for Economic Co-operation and Development.
4. Close to half of all oil and gas contracts will use blockchain technology, resulting in faster, more accurate transactions with less room for disputes.



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# OIL & GAS AROUND THE WORLD

CLICK ON THE + BELOW TO READ COUNTRY-SPECIFIC EVALUATIONS & OUR TOP 2023 PREDICTIONS FOR EACH MARKET



# AUSTRALIA

## PREDICTION EVALUATIONS

OIL & GAS 2020 PREDICTION	STATUS	VALUE	INTERPRETATION
By 2020, Australia will take the top spot among the world's LNG exporters.	On track – as expected	4	By 2020, Australia is on track to surpass Qatar as the world's largest exporter of LNG, as its newly commissioned projects ramp up and operate to full capacity, according to Australia's <a href="#">Department of Industry, Innovation, and Science</a> .
By 2020, regulators will demonstrate greater scrutiny and surveillance of oil and gas companies.	On track – as expected	4	<a href="#">Public pressure</a> around the tax contributions of industry projects and scrutiny of the use of certain materials in <a href="#">offshore projects</a> are just two examples of how regulators are homing in on the industry.
By 2020, there will be a shift in economic activity which will redefine trade flows and call for novel methods of financing new projects.	On track – but slower than expected	3	Looking ahead, the industry's focus will be on leveraging existing infrastructure for lower-cost development, leading to a global spot market for LNG. <a href="#">In 2018</a> , LNG imports grew by 8.3 percent to 313.8 MMt, with spot cargoes making up 25 percent of total LNG imports—compared to just 20 percent the year prior, according to the International Group of Liquefied Natural Gas Importers. While producers will need locked-in sales to some extent to mitigate financial risk, it won't be to the extent previously needed to sanction a project. Development of an LNG spot market will help give them shorter-term commercial alternatives, as opposed to always having to lock in long-term sales contracts. This will also afford buyers flexibility to break locked-in high prices.
By 2020, all oils will be subject to proof-of-origin testing.	Off track – not much movement	1	Though proof-of-origin testing would be helpful to the oil and gas industry in policing export/import restrictions and pinpointing interconnectivity of reservoirs that span adjacent permits, the use of the concept has been so far largely limited to the <a href="#">food and beverage</a> industry.
By 2020, LNG infrastructure in Western Australia will be the source of LNG imports into the East Coast.	Off track – not much movement	1	Australia still lacks a nationally connected network to facilitate the flow of gas from coast to coast, and Western Australia's pipeline infrastructure is particularly immature. Both the industry and government sides of the issue lack an appetite for such capital investment, largely because of existing LNG projects underwritten by long-term export sales contracts. Looking ahead, one alternative could be to transport more LNG by trucks, which provides an alternative, more cost-effective option as Australian <a href="#">LNG operator Woodside</a> has initially demonstrated.

# AUSTRALIA

## TOP OIL & GAS PREDICTIONS FOR 2023

1. Consolidation of third-party drilling service providers will accelerate, driven by a greater focus on data-driven, digitally-enabled seismic processing, smart drilling and operations—all geared toward more effective decision-making.
2. Collaboration between operators—especially in Western Australia—will increase, as they work toward shared logistical resources like helicopters, fixed wings, supply boats, anchor handlers and more.
3. The buying and selling of oil and gas cargoes using cryptocurrencies will become common.



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# CANADA

## PREDICTION EVALUATIONS

OIL & GAS 2020 PREDICTION	STATUS	VALUE	INTERPRETATION
By 2020, traditional accounting rules will present new challenges for financial planning, forecasts, and asset management, as oil and gas companies increasingly leverage innovative software solutions.	On track – as expected	4	The International Financial Reporting Standards (IFRS) 16, which took effect for annual reporting periods beginning on or after Jan. 1, 2019 and changes the way organisations report lease transactions, has presented especially tough challenges for oil and gas companies in Canada, with particular impact on asset retirement obligations (AROs).
By 2020, conventional approaches to business planning will no longer be sophisticated enough to respond to dynamic changes to today's business environment.	On track – as expected	4	Canada's oil and gas sector has <a href="#">struggled</a> in recent years to maintain investment in innovation, which is required for organisations to rethink their approach to business.
By 2020, oil and gas organisations will be forced to re-evaluate their enterprise resource planning (ERP) platforms.	On track – but slower than expected	3	Though most are re-evaluating ERP platforms, we've seen others take a wait-and-see approach.

# CANADA

## TOP OIL & GAS PREDICTIONS FOR 2023

1. Biofuels, which generate \$3.5 billion in annual economic activity, will gain speed as alternatives to fossil fuels.
2. Oil and gas service companies will continue to consolidate. The companies that adopt digital innovation will survive, while those reliant on low labour costs alone will struggle.
3. The number of alternative energy ventures listed on the TSX will quicken as Canadian companies continue to fuel innovation from energy giants. Such ventures will include companies whose operations centre around energy efficiency, low-impact material, renewable energy equipment, waste and water management, and more.
4. An organisation will build a pipeline to increase the capacity for bringing crude oil to tide water.



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# UNITED STATES

## PREDICTION EVALUATIONS

OIL & GAS 2020 PREDICTION	STATUS	VALUE	INTERPRETATION
In 2020, a U.S. presidential election year, there will be discussions about constructing a natural gas pipeline from the U.S. to Central America, using Mexico as the route.	On track – and faster than expected	5	The United Nations Economic Commission for Latin America announced plans for a gas pipeline from Texas through Central America in mid-2019.
The U.S. National Electric Grid will be the target of permanent denial of service attack (PDoS) by 2020.	On track – as expected	4	Following an attempted cyberattack in the Western Interconnection in early 2019, a PDoS attack remains a potent threat.
By 2020, 30 percent of liquefied natural gas (LNG) export capacity will be built in the U.S., making it one of the largest gas exporters in the world.	On track – as expected	4	The U.S. is on track to becoming the world's third-largest LNG exporter by 2020, according to the EIA.
The U.S. renewables energy market will provide 20 percent of the nation's electricity by 2020.	On track – but slower than expected	3	Although impacted by the trade war, renewables adoption continues apace.
Digitisation and technological advancements—the next generation of seismic imaging and predictive analytics—will nearly eliminate exploration risk for oil and gas drilling and will propel the U.S. industry to achieve a drilling success rate between 95 to 100 percent.	On track – but slower than expected	3	Digital transformation is revolutionising the industry, but lack of capital and steep competition is making it hard for smaller organisations to profit.

# UNITED STATES

## TOP OIL & GAS PREDICTIONS FOR 2023

1. U.S. shale prices will plateau over the next five years between \$50-\$60 dollars per barrel, as growing demand for U.S. product in Asia and Europe and increased geopolitical uncertainty balance out increasing U.S. shale exports.
2. The U.S. oil and gas industry will experience increased revenue streams from expanded domestic and international markets, delivering to more than 45 countries.
3. Deal value in the oil and gas industry will soar to new heights as bigger companies try to buy up mid-sized firms and smaller firms seek consolidation to stay competitive.
4. Natural gas will make up 50 percent of the power generated for electricity in the United States.
5. American LNG exports will grow as the country becomes the world's largest LNG exporter. To do so, the U.S. will need to grow both midstream and downstream capacity. The speed with which the industry is able to do so will determine just how quickly the U.S. is able to top the charts in LNG exports.



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# SAUDI ARABIA

## PREDICTION EVALUATIONS

OIL & GAS 2020 PREDICTION	STATUS	VALUE	INTERPRETATION
Saudi Arabia is taking steps to reduce the dominance of oil and gas in the energy sector, and we predict investments in alternative energy sources will reach U.S.\$50 billion by 2020.	On track – as expected	4	Saudi Arabia has announced plans to invest up to <u>\$80 billion</u> in renewable energy by 2030.
Saudi Aramco will step up its drive to increase the use of local goods, services, and labour, reaching 79 percent localization by the end of 2020.	On track – but slower than expected	3	Aramco reached <u>50 percent</u> by the end of 2018, with a goal of reaching 70 percent by 2021.

# SAUDI ARABIA

## TOP OIL & GAS PREDICTIONS FOR 2023

1. Saudi Arabia will grow its capabilities and investments in unconventional oil and gas production capabilities. The country will go on to become a player in shale and LNG. As part of this growth in capacity and output, natural gas will grow to 60 percent of domestic power generation.
2. R&D and collaboration with China will power Saudi Arabia to develop 30 GW of clean energy—surpassing current goals.
3. The future of oil and gas is global—much like Saudi Arabia's flagship Aramco in 2023. Cross-border investment by Saudi Arabia will bloom over the next four years, which will see Aramco purchasing oil and gas assets in the U.S., China, Russia and Australia to diversify its portfolio.
4. Already touting the lowest carbon intensity of any oil-producing country's operations, Saudi Arabia will lower its carbon footprint further—reducing its carbon intensity by an additional 30 percent through carbon capture and other emerging technologies.



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# UNITED KINGDOM

## PREDICTION EVALUATIONS

OIL & GAS 2020 PREDICTION	STATUS	VALUE	INTERPRETATION
By 2020, investors will have diversified their investment portfolios in the oil and gas sector.	On track – as expected	4	With oil prices not quite where they were anticipated to be throughout this year, some people may be investing in the hopes of picking up under-valued assets. In addition, several high-profile climate change <a href="#">demonstrations</a> have influenced public opinion and brought greater attention towards and support for renewables.
By 2020, robots and other technologies will replace some of the energy labour force.	On track – but slower than expected	3	Adoption of these innovative technologies has been slower than expected, some of that due to concerns related to Brexit and economic development. That said, innovation in robotics and other technologies is happening, with one example being the <a href="#">University of Lincoln's</a> use of AI to create self-learning robots for deployment to hazardous nuclear sites instead of people. We expect more development in this area to occur on the heels of a recently <a href="#">published report</a> from the Departments for Business, Energy & Industrial Strategy and Digital, Culture, Media & Sport. The report outlines a plan for the UK to lead in the area of AI-driven innovation and includes a pledge to invest £93 million towards the "research and development of robotics and AI technologies" in industries like offshore and nuclear energy, space and deep mining.
By 2020, the UK will have commercialised its substantial shale gas reserves and will be energy self-sufficient.	Off track – due to external disruption	2	On <a href="#">Aug. 20, 2019</a> , the University of Nottingham and British Geological Survey reported that there may be five times less shale gas in the UK than 2013 estimates. They also reported that fracking may only generate 10 years' worth of fuel, signifying challenges around commercialising shale reserves. Additionally, other factors such as licencing issues and political distractions have interfered with this prediction.
By 2020, the UK will have developed the most robust planning, licencing, and operating regime for fracking in the world.	Off track – not much movement	1	Because of Brexit, UK policymakers steered away from crafting policies around fracking to mitigate risk of upsetting the public. However, in light of Boris Johnson's appointment to prime minister, alongside his new business minister Andrea Leadsom, it may be time for change. Johnson has previously openly voiced support for fracking in the UK.
The UK national grid will be the target of a major cyberattack by 2020.	Off track – not much movement	1	Though there have been numerous high-profile power outages reported, none have been publicly attributed to cyberattack as of Sept. 5, 2019.



## UNITED KINGDOM

### TOP OIL & GAS PREDICTIONS FOR 2023

1. UK-focused independents and single-asset small cap companies will dominate investments into UK North Sea assets, which are currently owned by oil majors and other groups.
2. The UK oil and gas industry will need 20,000 new workers, including for brand new roles in areas like automation and data science.
3. Significant developments in technology will make it possible to increase recovery from a number of large fields in the UK North Sea, which were previously declared uneconomic and non-profitable.
4. Most demand will be gas, nuclear and renewable energy sources. Coal and oil will contribute negligible amounts to the energy mix.



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