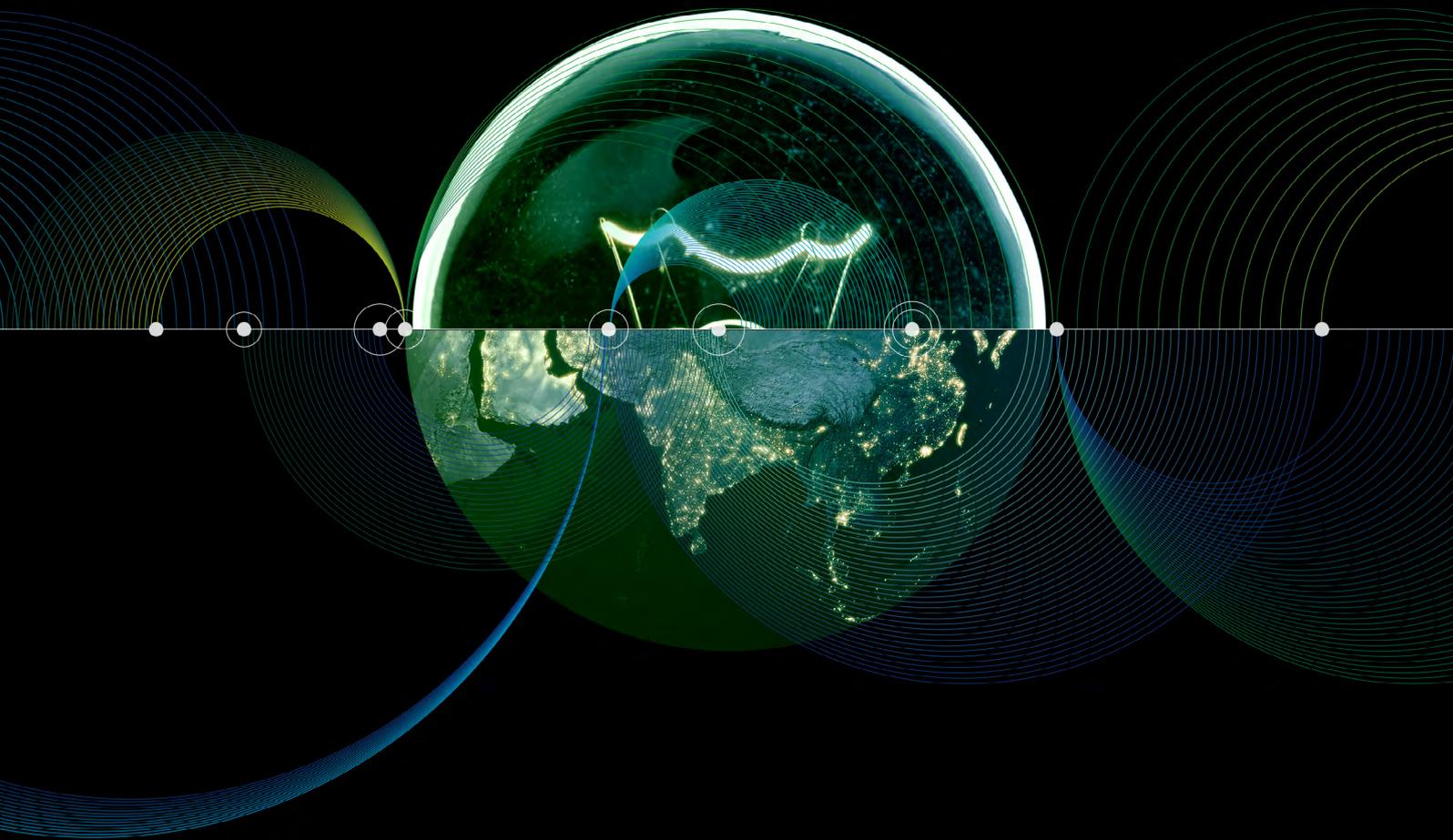


Deloitte.

The 2030 decarbonization challenge

The path to the future of energy



Oil and gas



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Foreword

The global energy mix is shifting from fossil fuels to renewables. There are abundant examples of both public and private organizations working hard to decarbonize the economy. As this energy transformation or “Green Deal” gains momentum, new ecosystems are forming and new technologies are emerging. These developments are helping to grow renewables, develop new energy carriers, improve energy efficiency, reduce emissions and create new markets for carbon and other by-products as part of an increasingly circular economy. At the same time many of these commonly pursued steps to decarbonization, such as increased electrification, wide-scale use of renewable energy and intensifying energy efficiency measures pose unique challenges.

Many participants in the Energy & Resources (E&R) industry have publicly declared their intention to become carbon neutral by 2050. While their long-term vision is clear, the more perplexing challenge for E&R companies lies in the immediate future. Many companies are struggling to understand the material impacts that their stated goals are going to have on their valuations, operations, employees and markets over the next few years.

This report explores how companies in certain sectors of the E&R industry—chemicals, oil and gas, mining and metals, and power, utilities and renewables—can accelerate decarbonization over the next decade and achieve meaningful interim targets by 2030.

Introduction

The transition toward a clean energy future is underway and it will change almost every aspect of E&R companies' assets and operations. Taking a global view across sectors, the top drivers of decarbonization include:

- Customer, employee and community demands.
- Investor pressure.
- Policy and government targets.
- Technology and operational cost reduction—a more efficient frontier.

A closer examination of each driver suggests that the energy transition is anchored in long-term trends, which is likely to make it capable of withstanding the current economic downturn.

Customer, employee and community demands

A groundswell of support for climate action has arisen across the globe. 2019 saw the biggest climate protests ever as millions took to the streets to demand immediate action to tackle climate change and reduce pollution.¹ In the estimated 185 countries where demonstrations took place, protesters put pressure on governments and businesses to address urgent sustainability issues, such as rising sea levels in the Solomon Islands, toxic waste in South Africa, air pollution and plastic waste in India, and expansion of coal extraction in Australia.² The economic shutdowns in 2020 in response to the coronavirus pandemic have further highlighted the environmental damage and pollution that have become the norm for much of the world's population. In China and India, for example, the skies cleared over industrial centers for the first time in years.^{3,4}

The change in consumer attitudes, activism and the positive impact of reduced mobility and industry on the environment is apparently getting through to companies and industries. More and more are acknowledging that they need to embrace a low-carbon future not only for the sake of the planet, but to improve customer loyalty and assure their long-term viability. A growing body of evidence reflects this shift in sentiment. For instance, nearly three-quarters of United States business respondents in the [2020 Deloitte Resources Study](#) said their customers are demanding that they procure a certain percentage of electricity from renewable resources, and a rising portion (77%) actively publicize sourcing of renewables.⁵ From sustainable building materials to green minerals, demand is also increasing for other carbon-neutral products beyond energy. Meanwhile, a shift in generational values has occurred. Younger employees increasingly want to work for companies that benefit society in addition to producing a profit.⁶ The recent rise in employee activism suggests that employees are increasingly monitoring company responses to issues, ranging from gun control to climate change to the coronavirus pandemic.

Policy and government targets

Where the public leads, policymakers eventually follow. Climate strikes and marches around the globe have illustrated that both employees and customers mean business when it comes to emission reductions. With large swathes of the public demanding action on climate change, many governments now have a mandate to set carbon-reduction targets and enact green legislation.

The European Union (EU), for instance, aims to be climate-neutral by 2050. Pursuing an economy with net-zero greenhouse gas (GHG) emissions is at the heart of the [European Green Deal](#) and aligned with the EU's commitment to global climate action under the [Paris Agreement](#).⁷

China has also announced ambitious carbon-reduction goals, having set 2030 as a target for peak emissions as part of the Paris Agreement.⁸ China's near-term goal is to reduce emissions intensity: energy use and carbon emissions for every unit of gross domestic product.⁹ It is currently on track to reach its goals after reducing emissions per GDP by 5.1% and 4% in 2017 and 2018, respectively.¹⁰ More recently, China's decarbonization progress received an unexpected boost: an analysis by Carbon Brief, a UK-based website specializing in climate change, estimated that the coronavirus shutdown from December 2019 through February 2020 had temporarily cut China's carbon emissions by 25%.¹¹

Beyond setting reduction targets, some governments are using carbon pricing schemes to accelerate progress toward their goals. More than 40 governments worldwide have now adopted a price on carbon, either through direct taxes on fossil fuels or through cap-and-trade programs.¹² These programs have so far produced mixed results. Some are perceived to be wildly successful while others are viewed as ineffective and expensive at a time when energy customers cannot bear the added costs. That may be why some governments are choosing to tax carbon indirectly through subtler methods such as renewable portfolio standards, energy efficiency mandates, emissions regulations, and carbon-offset pricing.

Investor pressure

In response to policy shifts and customer needs, investors too are taking decarbonization seriously. BlackRock, the world's largest fund manager, with about US\$7 trillion of

assets under management, is an example¹³. In 2020 Larry Fink, BlackRock's chief executive, declared that "climate risk is investment risk," and published two letters, one to clients and one to CEOs, stating that the group would begin to "place sustainability at the center of its investment approach."¹⁴ He also predicted that "in the near future—and sooner than most anticipate—there will be a significant reallocation of capital to address the climate threat."¹⁵

Key aspects of BlackRock's sustainability strategy include:

- Selling direct investment in companies that derive more than 25% of their revenues from thermal coal.
- Pledging to vote against management teams that do not publish reports in line with the recommendations of the Task Force on Climate-Related Financial Disclosures and the Sustainability Accounting Standards Board.
- Using economic, social and governance (ESG) criteria more rigorously in active investment strategies.
- Offering more sustainable investment funds.¹⁶

While BlackRock's strategy made headlines due to the fund's size and influence, other investors have also been pressuring companies to take more action on climate change. For instance, Climate Action 100+, which BlackRock has joined, targets high-emission companies and has grown into one of the largest investor-led engagement initiatives, with over 450 investor signatories and representing over US\$40 trillion in assets under management across dozens of markets.¹⁷ Although short-term financial returns generally remain at the forefront, investor efforts such as these could have profound long-term implications for global business and finance, particularly for the E&R industry.

Technology cost reduction

Steep reductions in technology costs are helping E&R companies enable their decarbonization strategies.

Energy storage, which is key to large-scale adoption of renewable energy, is a case in point. Average market prices for battery packs have plunged from US\$1,100/kilowatt hour (kWh) in 2010 to US\$156/kWh in 2019, an 86% fall in real terms, according to a report released by Bloomberg New Energy Finance (BNEF).¹⁸ Battery-pack prices are projected to fall even further to around US\$100/kWh by 2023, driving electrification across the global economy, according to BNEF's forecast.¹⁹

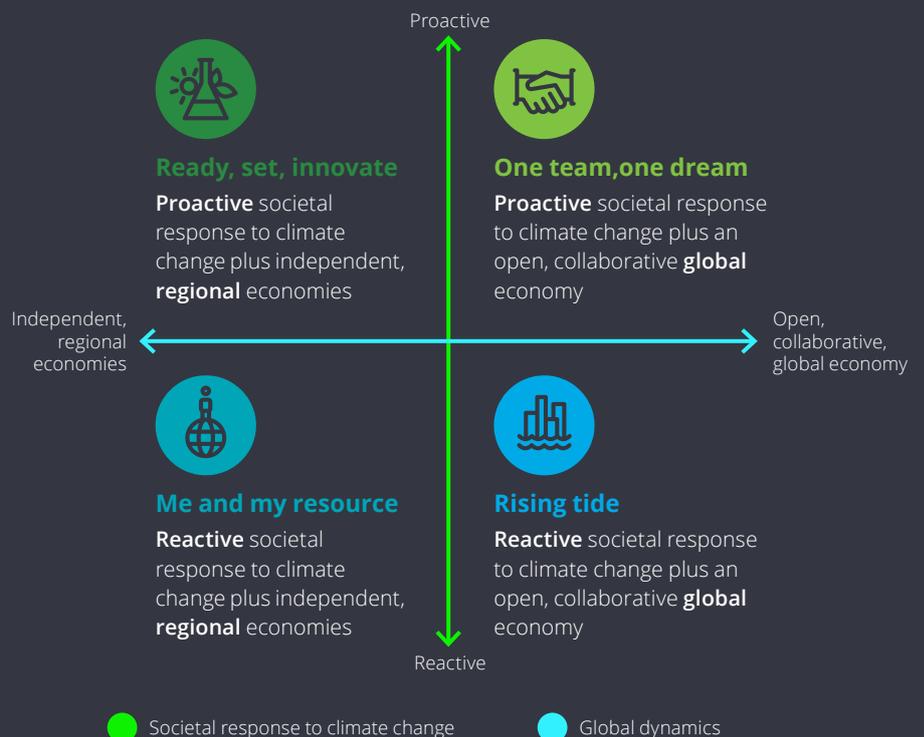
In addition, advancements in digital technology, such as the Internet of Things (IoT), blockchain, digital twins, and AI-enabled energy-management and trading platforms, also promise to boost efficiency and drive costs down across both conventional and renewable energy value chains.

An opportunity to transform

As these drivers intensify and converge, many leading E&R companies are publicly announcing goals related to reducing emissions, utilizing renewable energy, and addressing climate-related risks. In Deloitte's recent energy transitions survey entitled Navigating the energy transition from disruption to growth, 89% of E&R executives reported that they either already had a plan in place or were developing a strategy to reduce reliance on fossil fuels.²⁰ 30% of those executives already had a fully developed plan in place. While some E&R companies are mainly responding to government mandates, others see the energy transition as an opportunity to transform themselves via long-term scenario planning over the next 10 to 30 years.

The future of energy

Scenario modeling traditionally arrives at a potential future by examining trends and considering the effects of variables that could be encountered along the way. But what if researchers took a fundamentally different approach based on the idea that the future is not determined by trends but by what will shape their trajectory? To find out, the Deloitte Energy, Resources & Industrials industry team identified 19 uncertainties that will likely influence the speed and scope of the macro trends that are underway today. Working backward along their trajectories, the team arrived at four plausible and divergent scenarios for what the future of energy might look like in 2035 from a global perspective. For more information on Deloitte's Future of Energy Scenarios visit our [website](#)



Thus far, the transition to a low-carbon economy has largely been led by the power and utilities (including renewables) sector. Emissions from leading power and utilities companies around the globe have fallen dramatically since 2015, according to an analysis commissioned by the World Economic Forum.²² Point380, a specialist data analytics firm, performed the analysis using company data reported to the CDP, a not-for-profit organization that monitors global emissions.²³ The reductions are likely due to a combination of factors, including:

- Green policies, such as carbon pricing schemes and renewable portfolio standards, which are driving power generators away from coal-fired thermal generation.
- An abundance of low-cost, cleaner-burning natural gas, which is being used as a bridge fuel in transitioning away from coal.
- Supportive incentives to invest in renewables and bring down the price of technology.
- Commitments from large commercial and industrial customers such as those in the RE100 initiative to source 100% of their power from renewable sources²⁴.

Building on the progress made, some power and utilities companies are raising the bar on their own, without further prompting from regulators. For instance, the Italian multinational energy corporation, Enel, set a carbon-neutral ambition for 2030, well before the 2050 goal of many companies.²⁵ To attain this goal, the company is pursuing an ambitious global investment plan to expand its renewables generation portfolio.²⁶

Mining and metals organizations came under public pressure early to reduce GHG emissions as part of preserving a social license to operate. Consequently, some are already working toward electrifying their operations and are collaborating with industry associations and other groups to develop innovative solutions for decarbonizing energy-intensive

processes, such as smelting and calcining. For instance, in July 2019 BHP announced their intention to invest US\$400 million over five years on low emissions technologies and natural climate solutions and support partnerships to address Scope 3 emissions.²⁷ Since then, they have identified approximately US\$350 million of investment opportunities and are now beginning to allocate funding. The initial investments will focus on reducing operational emissions initially through the purchase of renewable energy and on Scope 3 emissions in the steelmaking sector, with a particular focus on emerging technologies that have the potential to be scaled for widespread use²⁸. Similarly, Rio Tinto plans to spend US\$1 billion over the next five years on climate-related projects.²⁹ It has also exited coal production, agreed to an asset-by-asset review of its emission reduction targets, and joined the Energy Transitions Commission to accelerate progress on hard-to-abate sectors.³⁰ Meanwhile, CEMEX has announced an ambitious strategy to reduce its carbon dioxide (CO₂) emissions by 35% by 2030.³¹

Companies in the oil, gas and chemicals sectors, whose core business models are based on producing and processing hydrocarbons, have generally been slower to change. Nonetheless, several companies are now seizing upon the transition to a low-carbon economy as a means to transform not only how they operate, but also what they offer. Shell, Repsol, Equinor, Total, and bp have developed initial investment plans to diversify their businesses and have set long term energy intensity targets to reduce emissions.³² Their plans include investing in renewable energy sources, such as solar, wind, hydrogen and biofuels, as well as expanding into ancillary low-carbon businesses such as battery packs and grid-balancing technologies.³³

With cross-sector intentions, the scale of Oil Majors' commitments could be a game-changer for the E&R industry. For instance, within 10 years bp anticipates having increased its annual low-carbon investment 10-fold to

around US\$5 billion per year.³⁴ This investment is expected to encompass a variety of low-carbon technologies, including renewables, bioenergy and early positions in hydrogen and carbon capture, usage and sequestration (CCUS).³⁵ Likewise, Total has announced its intention to become a leading international player in renewable energies and has allocated significant funds toward achieving this goal.³⁶ The company currently allocates more than 10% of its capex to low-carbon electricity, and it plans to increase this allocation to 20% by 2030 or sooner.³⁷

Similarly, several multinational chemical companies have launched transformational initiatives centered upon sustainability. DuPont, for instance, has committed to: integrating circular economy principles into its business models; designing 100% of its products and processes using sustainability criteria including the principles of green chemistry; and reducing GHG emissions by 30% by 2030, including sourcing 60% of its electricity from renewable energy.³⁸

The desire to refashion themselves is not limited to the world's largest companies. For example, Occidental, an integrated energy company with oil, gas, and chemicals operations and low-carbon ventures, recently announced its bold aspiration to become completely carbon-neutral by using CCUS and by developing other economic applications for CO₂.³⁹

Navigating the future of energy

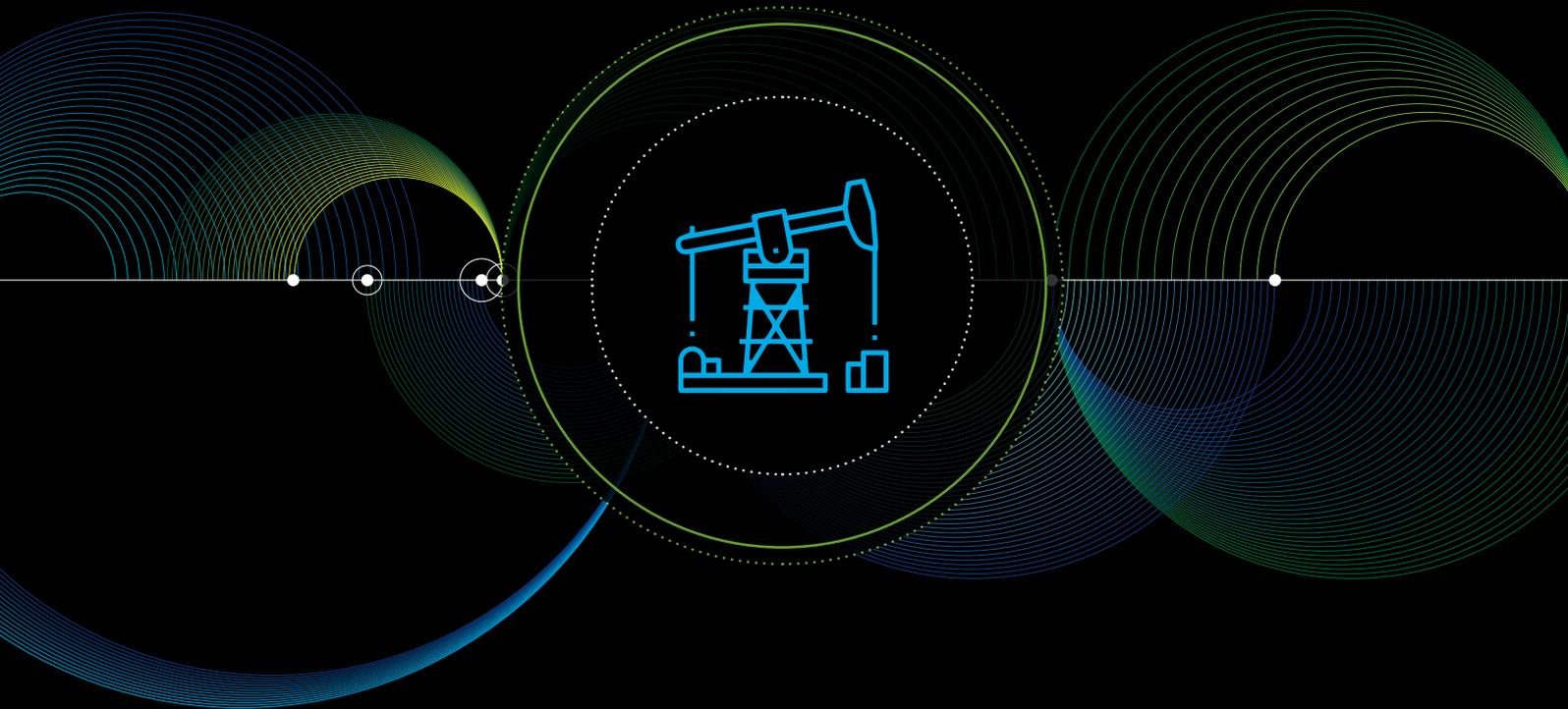
Although the transition to a low-carbon economy is gaining momentum, there is still much work to be done. In a 2019, Monitor Deloitte Australia conducted a market study of 112 companies around the world, 69% of them in the Energy, Resources & Industrials industry. Data came from publicly available disclosures and sustainability reporting from

2017 to mid-2019. During this period, these 112 companies collectively emitted 4.53 billion tonnes of carbon dioxide, of which 96% was attributable to E&R—oil and gas, chemicals, mining and metals, and power and utilities. Though these figures can only be approximate given variations in reporting standards, they still illustrate the magnitude of the challenge that lies ahead.

Decarbonization involves heavy lifting. For companies pursuing these goals, it requires a transformational shift in the way they operate: how they source, use, consume and think about energy and feedstocks and how they engage with multiple stakeholders. It also requires a significant financial commitment from investors and governments. The energy transition also has sector-wide implications for how E&R companies interact with each other as well as for how the sectors themselves may combine and converge.

To help companies navigate their way to the future of energy, the following sections examine the current state of decarbonization across four E&R sectors: chemicals; oil and gas; mining and metals; and power, utilities, and renewables.

Each analysis examines the current state of decarbonization in the sector; distinct or outsized macro drivers; which emissions are within a company's control; and potential decarbonization pathways and practical considerations that may influence a company's decarbonization strategies and tactics. For the purposes of this paper we will use the emissions taxonomy put forth by the Greenhouse Gas Protocol: Scope 1 emissions are direct emissions from owned or controlled sources; Scope 2 emissions are indirect emissions from the generation of purchased energy; and Scope 3 emissions are all indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.⁴⁰



Oil and gas

Global oil and gas markets have been upended. The contraction in global demand caused by the coronavirus pandemic and excess supply from the oil price war between OPEC and other major producers have hit upstream and downstream operations hard. Cutting carbon emissions may be a priority for some companies in the short-term, but the difficult market conditions are likely to encourage those who survive the current crisis to articulate decarbonization pathways, examine different business models and demonstrate a disciplined approach to capital expenditures.

Distinct or outsized drivers

Like the other sectors, oil and gas companies are feeling pressure from all sides to reduce emissions. However, investor pressure has been particularly intense and direct. On March 6, 2020, UBS announced that it would no longer fund offshore drilling in the Arctic.⁴¹ Multiple United States banks, including Wells Fargo & Company and Goldman Sachs, had previously announced similar policy shifts⁴². Investors want to understand the long term investment strategies of oil and gas companies in a world seeking to limit the increase in global temperatures to well below 2°C.

Which emissions are under an oil and gas company's control?

Scope 1 and 2 emissions, those that are produced during operations, are largely under an oil and gas company's control. Accordingly, common mitigation strategies focus on lowering the carbon intensity of the value chain by:

- Electrifying operations and incorporating renewables to fulfill power needs.
- Enhancing energy efficiency and reducing energy intensity.
- Adopting low or no emission fuels such as hydrogen, efuels/synthetic fuels, biofuels and ammonia.
- Improving logistics to reduce fuel consumption. For instance, invoking the principles of a sharing economy, some operators coordinate logistics, including trucks, marine vessels and helicopters, to optimize transport times and volumes.
- Establishing common standards and leading practices for improved energy efficiency and decreased emissions.

- Reducing routine flaring.
- Employing methane capture.
- Optimizing production and reservoir management through the use of digital tools such as IoT sensors, digital twins, and virtual reality to model scenarios, monitor operations, track emissions and energy usage and proactively maintain equipment.
- Producing lower-emission products—moving from one hydrocarbon to another (for example, from coal to natural gas) or creating another product (such as biofuels or syngas).
- Increasing reuse or employing additive manufacturing to decrease waste and increase supply-chain flexibility.

Practical considerations

To satisfy investors and remain viable during the transition, oil and gas companies essentially have two primary avenues for transforming their business models.

- **Diversifying into other forms of energy and enabling technologies:** Some companies have decided to build up competencies in renewables, such as wind and solar power, smart technologies to help balance the electrical grid as more intermittent renewables come online, or energy-efficient methods for producing green hydrogen. Others are acquiring companies in ancillary sectors, such as solar installers or electric vehicle (EV) charging stations, to expand their portfolio of low- to no-emissions offerings. Regardless of the strategy, an overarching trend is emerging. Many oil and gas companies are shifting their business models so that more value is created through downstream customers, rather than upstream assets. For instance, an oil and gas company might purchase a retail power provider to offer biofuels bundled with renewable electricity.

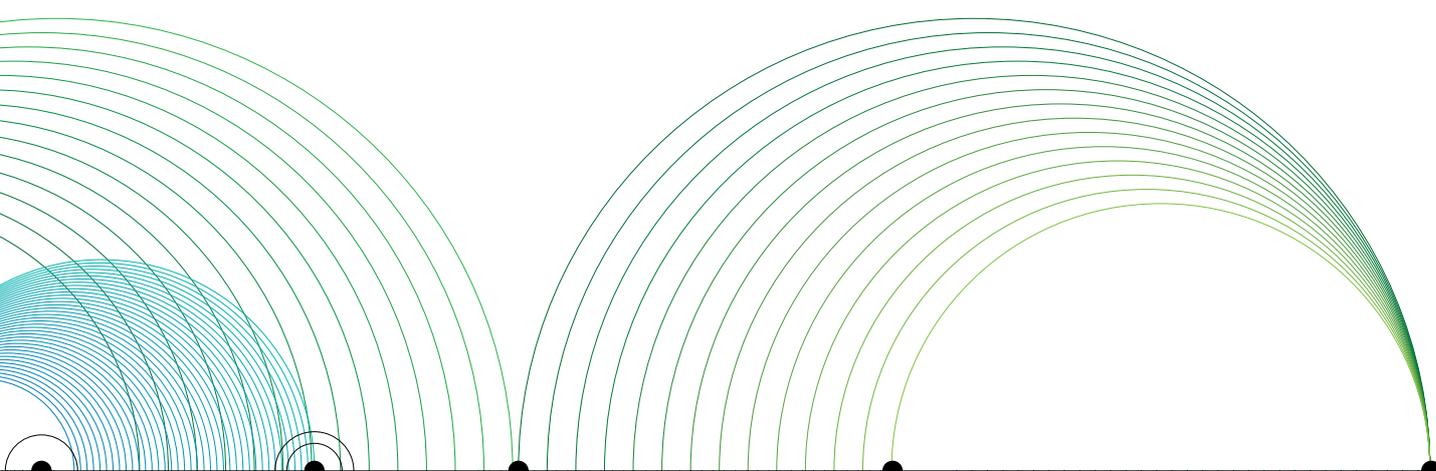
- **Turning Scope 3 emissions into a business**

opportunity: Another path is to turn CO₂ into a valuable raw material, not just a waste product that must be controlled. Trillion dollar markets have been predicted for the use of CO₂ as a feedstock for a variety of building materials, chemicals and fuels. The value of CO₂ has already been demonstrated in enhanced oil recovery processes. Some uses for CO₂ sound more like science fiction than fact. For instance, C2CNT, a Canadian company, is using “molten electrolysis” to transform CO₂ directly into carbon nanotubes, which are stronger than steel and highly conductive.⁴³

Carbon capture technologies have been rapidly evolving on a parallel track. Engineers at the Massachusetts Institute of Technology recently developed a new way to remove carbon dioxide from the air.⁴⁴ Unlike traditional carbon capture technologies, this system can remove any concentration of CO₂, from the high levels in power-plant emissions to the relatively low ones in open air.⁴⁵ Although they may not yet be commercially viable, breakthroughs of this kind could gain traction. If they do, there could be a race to capture carbon emissions and sell them as a valuable commodity.

As they transform their business models, many oil and gas companies are simultaneously considering decarbonization pathways for their existing upstream and downstream businesses, often proactively working with ecosystem partners to accelerate that process.

For instance, bp recently announced its ambition to become net zero by 2050 if not sooner, along with a new strategy for pivoting from “an international oil company focused on producing resources to an integrated energy company focused on delivering solutions for customers.”⁴⁶



As part of this transformation, bp intends to develop approximately 50 gigawatts (GW) of net renewable generating capacity, partner with 10-15 cities and three core industries in decarbonization efforts, and double its customer interactions to 20 million per day—all by 2030.⁴⁷

Meanwhile, Repsol states that it was the first energy company to make the commitment to achieve net zero emissions by 2050 in alignment with the climate objectives set out by the Paris Agreement.⁴⁸ The company has established intermediate decarbonization goals for 2025, 2030, and 2040, and it has outlined a decarbonization strategy that addresses emissions from both its operations and its products.⁴⁹ This strategy includes collaborating with auto manufacturers to develop sustainable mobility markets.⁵⁰ For example, Repsol has partnered with Kia Motors Corporation to create WiBLE, a car-sharing service that uses fully electric, hybrid, and plug-in hybrid vehicles.

Shell has outlined a net carbon footprint ambition that includes diversification and ecosystem involvement. It recently announced a short-term target of reducing its net carbon footprint by 3% to 4% by the end of 2022, along with its intention to set targets annually, with each year's target covering either a three or five-year period.⁵¹ The company has also partially linked executive pay, and that of around 16,500 employees, to its carbon-reduction targets.⁵²

In addition, Shell aims to address value-chain emissions by helping other sectors decarbonize.⁵³ To this end, the company has published a joint report with Deloitte that outlines industry perspectives on how to reduce emissions in the shipping sector.⁵⁴ [Decarbonising Shipping: All Hands on Deck](#) presents the views of 80 senior shipping executives, representing 22 countries and almost all segments of

the industry, and it presents 12 potential solutions or recommendations for action.⁵⁵

Despite ambitions like these, obstacles exist. For some, differences in finance models are a barrier. On the one hand, upstream businesses have historically generated higher margins than renewables, although the recent oil price reductions have helped to close that gap. On the other hand, developing a portfolio of renewable generation assets generally carries much less risk than drilling offshore or in other challenging geographies.

There are many questions as to how these shifting risk and financial factors could play out for traditional oil and gas investors since they will probably need to adjust to having a portfolio of different businesses within the same corporation. Also, oil and gas companies will likely need to review their dividend policies to make sure they are consistent with the risk profiles and returns of their existing businesses as well as those they are trying to develop. However, the supply and demand imbalance may have permanently altered the dividend context.

Amid difficult market conditions almost all oil and gas companies are looking more rigorously at their capital allocations. Some are choosing to invest only in known geographies. Others are limiting capital expenditures to projects that are likely to be viable in a lower demand environment. This includes developing new technologies to support a circular economy, such as CCUS, waste-to-fuel and waste-to-feedstock conversion, and smart grids to support the two-way flow of power and information. With capital allocations coming under greater scrutiny, new large-scale exploration and development projects may be constrained for some time.

Collaboration on the Norwegian continental shelf

The oil and gas industry in Norway set the goal of cutting emissions by 40% by 2030 compared to 2005 levels. To accomplish this goal, the sector has begun to exploit synergies between the petroleum sector and offshore floating and fixed wind power. These efforts include Equinor's commitment to floating wind power in the Tampen area of the North Sea. Norway also has a carbon tax, which has prompted companies to focus on reducing their power needs throughout the lifecycle of a field. For instance, Equinor has developed the technological capability to simulate the entire drainage strategy for a field, optimizing it not just from an economic point of view but also in terms of the power that will be needed throughout its life cycle.

Norway's national approach to meeting the Paris Agreement's goals demonstrates the power of cross-industry collaboration. Interrelated sectors come together to develop leading practices and decarbonization strategies through KonKraft, a collaboration arena for the Norwegian Oil and Gas Association, the Federation of Norwegian Industries, the Norwegian Shipowners

Association, the Norwegian Confederation of Trade Unions (LO), and LO members of the United Federation of Trade Unions, and the Norwegian Union of Industry and Energy Workers (Industry Energy).

Low- and zero-emission fuels are a current area of focus for the group since they are essential to achieving large emission reductions in the maritime sector, where only energy-dense products such as biogas, hydrogen and ammonia can deliver the power a ship requires. Hydrogen-powered offshore supply ships are already under development. The oil and gas sector in Norway is also engaged in various projects to produce hydrogen from water and renewable electricity as well as from natural gas with CCS. Also, Equinor has entered into an agreement with the shipping company Eidesvik Offshore to enable the Viking Energy supply ship to run for long distances on pure ammonia without GHG emissions.

Source: KonKraft Report 2020, "The energy industry of tomorrow on the Norwegian Continental Shelf: Climate strategy towards 2030 and 2050," <https://konkraft.no/wp-content/uploads/2020/02/The-energy-industry-on-the-NCS.-climate-strategy-towards-2030-and-2050.pdf>. Accessed August 20, 2020

Cross-sector solutions

Understanding the financial impact of climate-related risks and opportunities on their businesses is imperative for companies across all sectors. In time, greater scrutiny will be placed on organizations to not just disclose but respond to the transition and physical risks that lie on the path to the future of energy.

Transition risks include depressed asset values, stranded assets and changing market demand. For example, midstream companies that own gas pipelines may someday encounter decreased utilization or disuse, the odds of which increase with time. An unintended consequence of the transition could be that the big companies will exit the space. This has happened with coal mining and coal-fired power plants in the United States and Europe to some extent, raising the question of who ends up owning high-emissions assets as they wind down. It might be a race to the bottom, with the least socially responsible companies the only ones willing to take these assets on, potentially creating new risks. Another question is at what stage do asset valuations start to take into account the eventual phase out of fossil fuels.

Physical risks include direct and indirect impacts of severe weather on infrastructure, worker safety and productivity. The industry has already seen far too many real-life examples. The E&R industry in Australia offers a case in point; stronger typhoons in Northern Australia have repeatedly caused shutdowns because some mine sites

and all LNG facilities are close to the coast. There have also been many days of extreme heat, above 40°C (104°F), where workers need more breaks, reducing productivity⁵⁶. Fires, too, have come close to critical infrastructure, triggering shutdowns and pre-emptive power outages.

In this environment, markets are beginning to scrutinize the methodologies companies use to prepare for the energy transition to ensure they are adhering to science-based targets and developing effective strategies for risk mitigation and carbon abatement. Robust, science-based analytical tools and frameworks are likely to become essential. Such tools can help companies to identify decarbonization pathways and prioritize abatement projects by analyzing their costs and linking them directly to science-based targets.

As executives figure out how to manage the decarbonization challenges within their company and sector, they should not forget that vertical integration and cross-sector consolidation may be part of the solution. This could begin with bilateral partnerships but evolve into partnerships or acquisitions throughout the value chain. For instance, a mining company could merge with a cement-maker, or an oil and gas company could acquire a battery manufacturer or enter into a joint venture with an EV automaker. In a world where the traditional lines between sectors are blurring, these types of non-traditional amalgamations may become routine.

Conclusion

Towards the new circular economy

For companies that emit and/or produce hydrocarbons, the pressure to change is building on all sides. But as the problems become more urgent, they are also becoming more feasible to solve. The emergence of a low-carbon, circular economy is now possible and many governments and regulators are starting to show their support. They now stand to gain, rather than lose, political capital by enacting policies that spur climate action and establish a circular economy.

While the economic shock of the coronavirus pandemic may slow progress in the short term, it is also shining a spotlight on the human impacts of pollution and climate change, thus advancing the decarbonization agenda in the long run. What emissions or waste products are attractive to acquire is an interesting question that arises.

New technologies make it possible to use CO₂ as a feedstock for chemicals and plastics. Waste-to-hydrogen plants are being built. Renewable electricity is rapidly descending the cost curve. This suggests the E&R industry is on the cusp of a paradigm shift that could transform waste from a problem to a solution.

Instead of pondering how to dispose of CO₂ and other waste, many companies may by 2030 view everything they produce, including emissions, by-products and end-products, as a resource that can be traded to create economic value. New partnerships and markets are likely to form. Substances long emitted or discarded as costly nuisances can become products that companies want to buy. And a new, cleaner, more circular economy can emerge.

About Deloitte's Decarbonization Solutions

The [Decarbonization Solutions](#) package provided by Deloitte member firms, includes modules relating to abatement portfolio management, decarbonization scenarios, abatement pathways, and impact analysis as well as modules to help consider physical climate risk. The modules leverage scientific information from leading bodies and methodologies including Represented Concentration Pathways from the Intergovernmental

Panel on Climate Change, shared socio-economic scenarios from the International Institute for Applied Systems Analysis, and methodologies from the Science-based Targets Initiative, among others. The modules compare forecast emissions reductions from selected abatement projects with short, medium and longer-term aspirations and pathways as well as identify physical climate risks.

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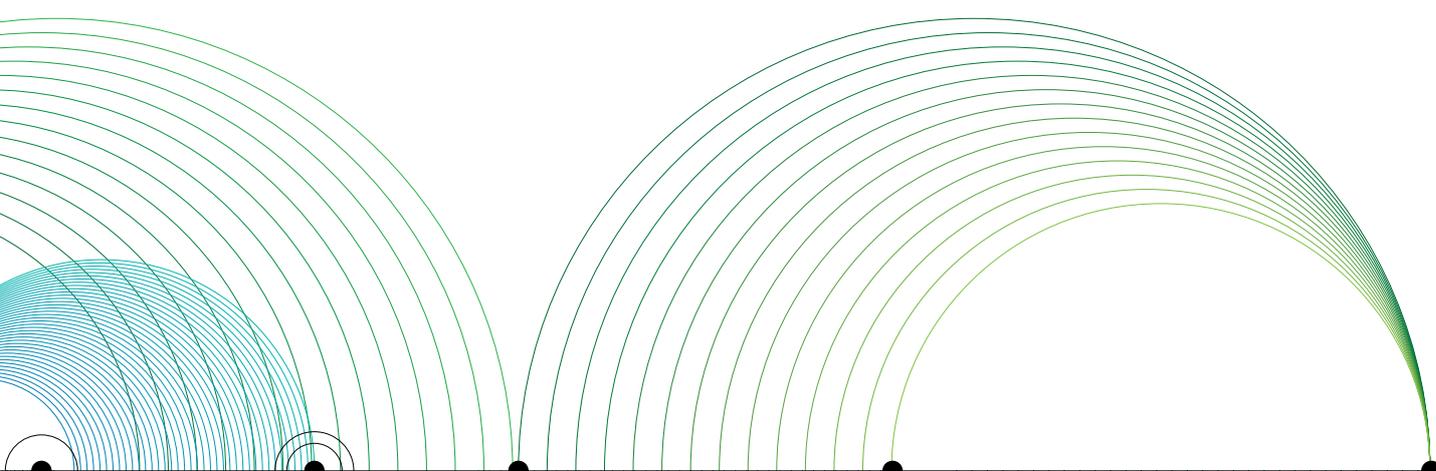
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