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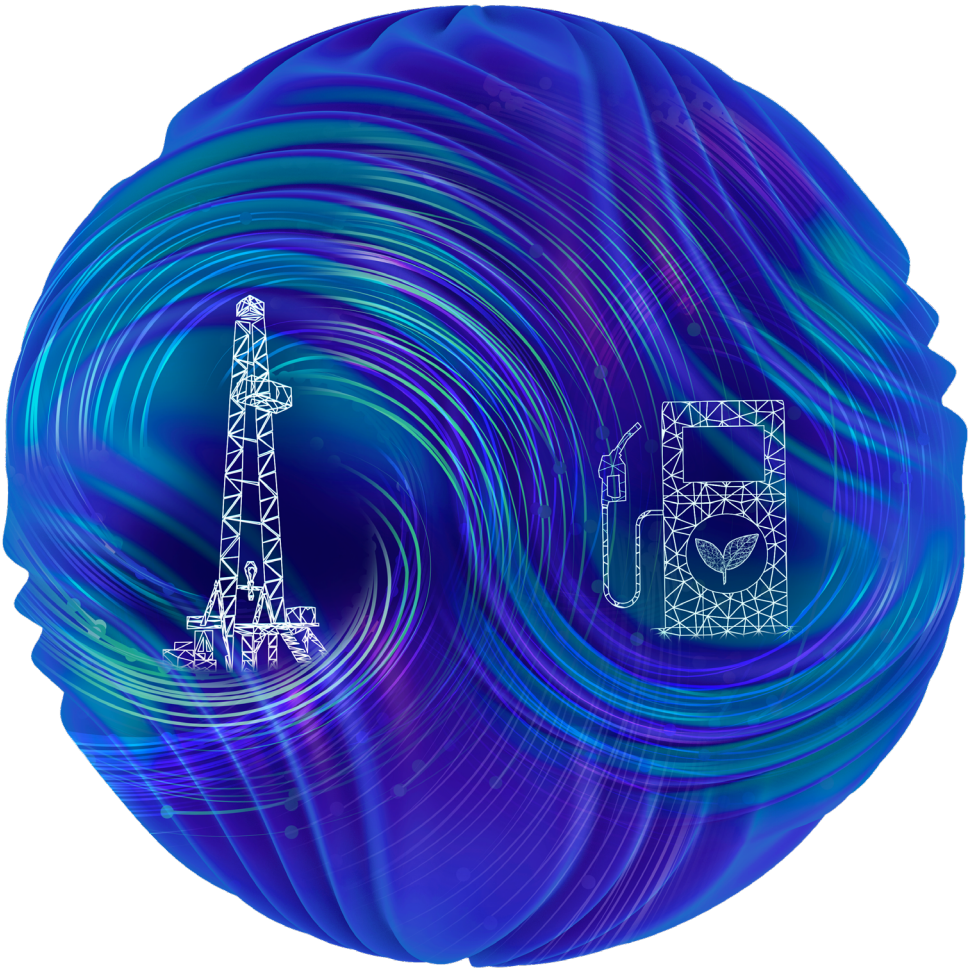

Addressing the challenge of decarbonization

An oil and gas perspective

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Contents

Introduction

The oil and gas sector is presently being confronted with the biggest task in society—addressing climate change. Perhaps more so than any other industry the oil and gas sector is being asked to take a leading role in transforming the world's energy system. In addition to the complex challenge of transforming their own business models, oil and gas companies are also being called up to rebuild the world's energy infrastructure while influencing the behavior of their customers to drive down value-chain, or Scope 3, emissions.

The oil and gas sector has developed many competencies over the years that are relevant to accomplishing these goals. These competencies include the ability to execute large, complex capital projects; proficiency in bringing security of supply to the world's growing population; and experience in leading major economic and societal transitions, such as the shift from coal to oil, from oil to gas, and now from fossil fuels to renewable energy. This skillset is essential because the shift to a global net-zero economy is estimated to take US$3.5 trillion in investment annually through 2050.[1]

Global pressure to reduce greenhouse gas emissions is intensifying and government action in many areas is accelerating, driven by both the quantification of the potential economic damages[2,3,4] and the recommendations of the Intergovernmental Panel on Climate Change (IPCC). Action to limit global warming to well below 2°C, and preferably 1.5°C, as stated in the Paris Agreement[5], will inevitably shift the cost competitiveness of renewable energy solutions and subsequently impact the oil and gas sector. However, the global energy transition is far from a straightforward process, with traditional energy sources deeply embedded into every aspect of the global economy and set to play an important role for decades to come.

To date European-based oil and gas companies have faced substantial and earlier pressure from investors amidst a backdrop of carbon constraining regulation. This has forced a more rapid movement towards biofuels and other sources of renewable energy. For many, this change has occurred without any material economic detriments, with profits from renewable industries bolstering balance sheets over the past year. As an example, TotalEnergies has demonstrated resilience since 2014 by focusing on low-cost oil with an organic cash break-even price below US$25/barrel and investments in biofuels and electricity generated primarily from renewables[6].

In comparison, while North American companies have been developing hydrogen and carbon capture, utilization and storage (CCUS) pilot projects, they have not experienced until recently the same level of investor and policy pressure as their European peers. There is, however, a growing imperative in the US to meet shareholder expectations for emissions reductions, and with it, comes hope that the Biden administration may kick-start a technology-led transition that includes CCUS and hydrogen.

Regardless of this or other policy decisions, delivering on the energy transition, both locally and globally, will require all participants along the value-chain to act. To strengthen the efficacy of this ecosystem, lessons can be shared across industries and geographies to help avoid stumbling blocks, maximize shareholder value, and look to diversify revenue streams more efficiently.

Global drivers

Climate impacts are directly related to cumulative, as opposed to annual, emissions. According to the IPCC 1.5 Degrees report[7], to have a medium chance of limiting warming to 1.5°C, the world can emit a further 610 gigatonnes of carbon dioxide ($GtCO_2$). To have a likely chance (67%), the remaining budget drops to 410 $GtCO^2$. With current annual global emissions of approximately 39 $GtCO_2$[8] and taking into account current forecast growth and country-level abatement commitments, this carbon budget will be expended by 2030.

2020 was an extraordinary year that accelerated the disruption that was already in motion. The wildfires of California and Australia heightened the focus on climate action at the start of the year and the pandemic-induced economic contraction prompted many governments to prioritize renewable energy production and investment. 2021 has continued in much the same vein with citizens and policymakers backing investments in decarbonization, and the financial sector finalizing global frameworks for emissions reporting ahead of the COP26 conference in Glasgow, in November 2021.

Despite the urgency, the expected rate of the energy transition is highly uncertain. Evidence from the UK suggests cost-parity thresholds can create tipping points with rapid substitution of energy production[9], indicating that the change will be far from a linear, incremental process. The risk of product substitution, as incentives for carbon mitigation increase, are substantial and require sector participants to have strategies in place to both lower the emissions intensity of current products and invest in alternative revenue streams. Although challenges are mounting, the oil and gas sector's foundation of ingenuity, strong management, and strategic decision-making position it well to lead the transition to a low-carbon economy.

Risks and opportunities

The impacts of climate change are already being felt physically and financially. In response, governments are setting new policies; investors are seeking clarity on risk and opportunity; technology costs are declining; and community expectations are evolving[10,11]. Such shifting behaviors among stakeholders are resulting in product and service alterations, lost asset values, and market dislocation[12]. Against this backdrop, the risk profile for oil and gas businesses is changing, even as new opportunities emerge in developing industries.

Policy risk

Government rhetoric in response to climate-related economic impacts points to the increasing probability of new policies that will alter the relative competitiveness of carbon-intensive products. If enacted, such policies will likely force companies to internalize the externalities, effectively pricing in the damages from CO2 emissions into the costs of their products, through carbon taxes, subsidies, etc. Clear policy signals will be needed to shift the expectations of the private sector so that capital can be mobilized and investments redistributed in an orderly manner. Late action could necessitate a more dramatic shift to reach the stated goals, consequently coming at a higher price. This in turn could lead to disruption and the potential stranding of assets[13]. Cap-and-trade policies or carbon taxes will likely need to come sooner, rather than later, in order to facilitate orderly, long-term investments in abatement and diversification.

For example, the European Union Emission Trading System represents one of the more economically efficient mechanisms for carbon reduction. It placed a cap on carbon emissions, which is further reduced by 2% per year. Market participants can purchase the option to produce carbon, the price of which serves as a proxy for the cost of carbon abatement as well as the potential costs to consumers. The 2021 second quarter average was 49 €/t CO2-e. With approximately 8.9kg of CO2 emitted per gallon of gasoline[14], this would equate to an additional 53 cents US[15], an increase of up to 20% on retail gas prices.

Technology

The cost-competitiveness of clean technologies today is vastly different than only a few years ago. Technological improvements reduce the cost of competing energy production methods and drive increased adoption. Declining costs are particularly evident in renewables. Solar photovoltaics have decreased in price by 80% since 2008[16], with lithium-based battery storage dropping 70% over the same timeframe[17]. Both are continuing to drop in price by approximately 20% per year[18]. There is relatively low friction for substituting of electricity generation with renewable power as the cost of storage declines, thus hastening the speed of transition.

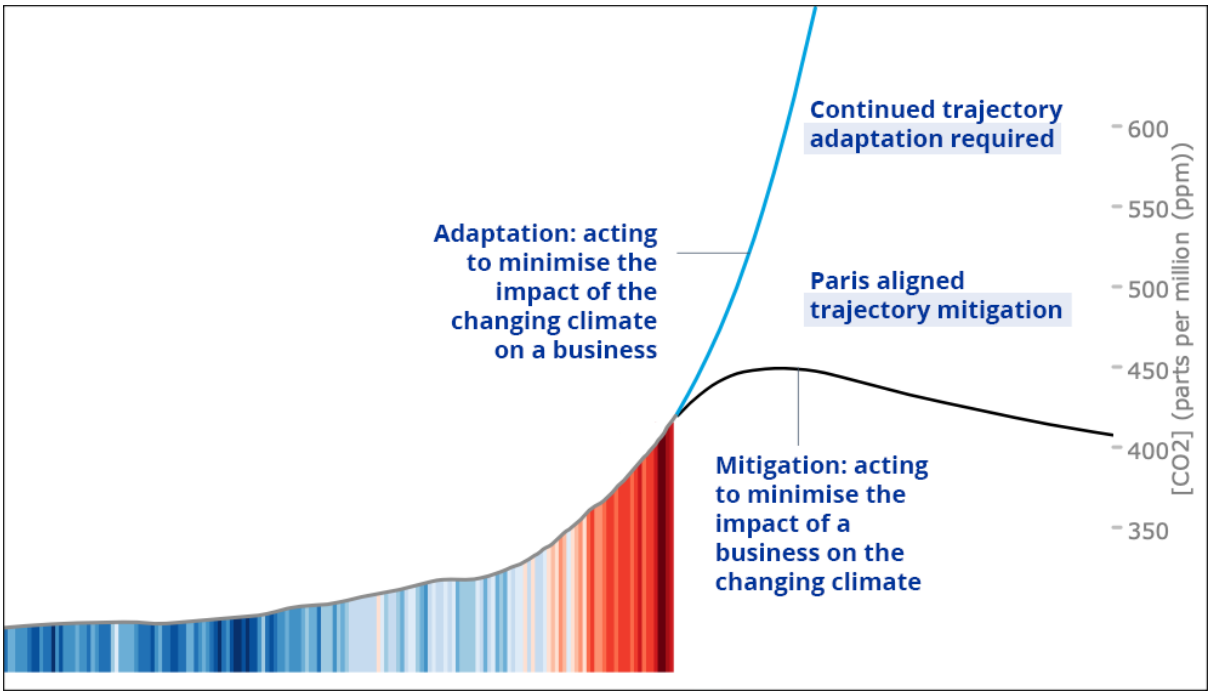
The economic benefits of decarbonizing electricity supply are now clear. Although there are capital costs to setting up the infrastructure to integrate distributed generation, the marginal production costs associated with renewable energy are negligible.

This price dynamic has the potential to radically alter the cost basis and business models of energy-intensive industry. For instance, in traditional mining operations, energy is generally the first or second most significant spend, accounting for 15% to 40% of operating expenses. Cheap electrons are starting to replace both stationary and liquid fuel solutions. In a world where energy has no marginal cost, the mining sector stands to unlock a huge wave of opportunity. This can be parlayed into the oil and gas sector where companies can pursue a similar path of electrifying production and refining with low-cost renewable energy.

Physical risk

Many companies are presently focused on their transition risks in terms of how climate-related changes to markets, regulations and finance will impact their operations. Physical risk, however, is growing as the frequency of extreme weather events increases. Physical risks can be event-driven (acute) or longer-term (chronic). In either case, companies need to consider both adaptation and mitigation strategies (see figure 1).

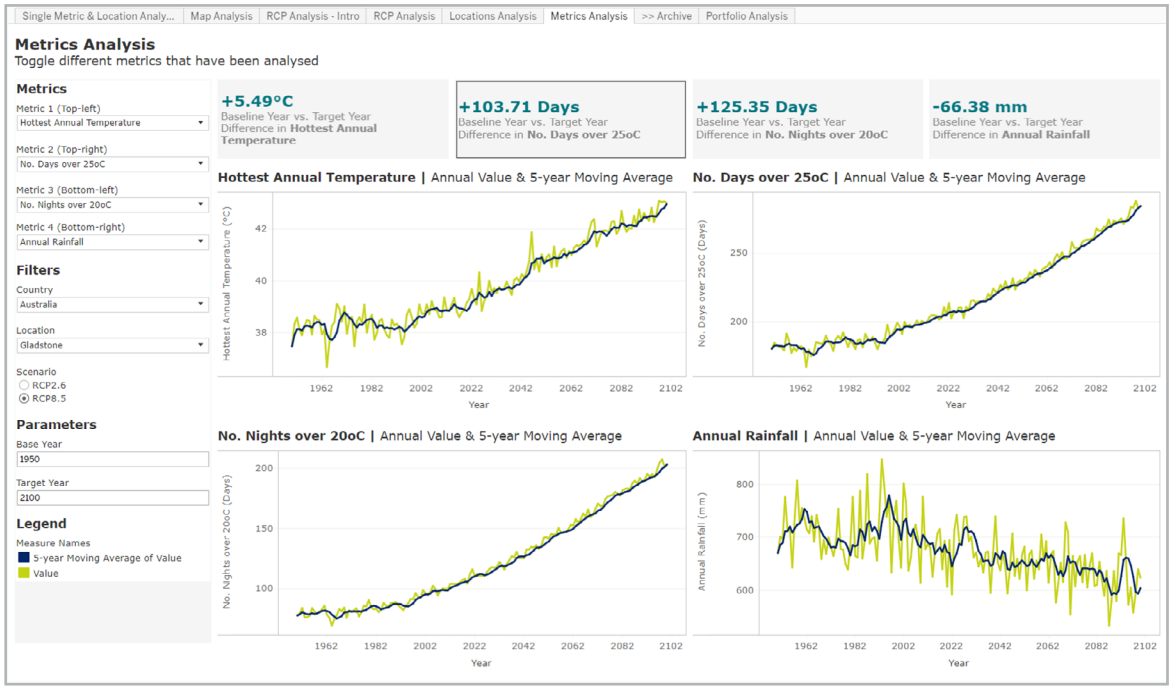
Figure 1 – Companies need to consider both adaptation and mitigation



Source: Deloitte

Adaptation is acting to minimize the impact of the changing climate, including the increasing likelihood of extreme weather events, on a business through operational or supply chain disruptions. Climate resilience means using forward-looking tools, such as scenario analysis, to adapt operations and business models before a crisis occurs. The likelihood of heatwaves, rainfall, droughts, hurricanes and floods occurring under different emissions scenarios can be examined using global climate models. Understanding what the future might look like is critical to effectively designing ongoing and future operations (see figure 2).

Figure 2 – Deloitte physical risk scenario analysis



Source: Deloitte

Businesses Step up

Recognizing the economic imperative, many businesses are already working to decarbonize their products, supply chains and strategies. They are publicly committing to science-based emissions-reduction targets in line with the Paris Agreement. A growing number of organizations are committing to renewables and net-zero emissions by 2050 or sooner. Of the world's 2,000 largest publicly traded companies, at least 21% have net-zero commitments, representing nearly US$14 trillion[19] in sales.

These actions are not altruistic. Businesses are largely seeking to remain strong and resilient as the world changes. Investors are increasingly seeking companies with lower climate risk; customers and communities are starting to demand lower-carbon products; and governments are introducing regulatory regimes to accelerate the transition. The cost of finance, which can be seen as a proxy for investor risk, has increased for carbon-intensive industries at a greater rate than for low-carbon sectors. Yet, by many measures, the financial markets may still be underpricing climate risk.

The oil and gas sector

Many oil and gas companies are already reducing upstream emissions and pivoting into rapidly growing new markets. They are informing their strategies with scenario-modeling and stress-testing their portfolios to determine their ability to provide products and services in a rapidly changing environment. There is little doubt that there will be demand for oil and gas over the coming decades; however, scale and profitability are uncertain. Adaptation strategies often involve continuing carbon mitigation and investing in CCUS technologies, along with developing new revenue streams to hedge against uncertainty.

The European market provides an example of possible future policy direction. An emissions cap-and-trade system is the cornerstone of the European Union's (EU) climate commitment. This system targets energy production facilities, covering 40% of the EU's emissions, with the goal of reducing emissions by 55% compared to 1990 levels by 2030 and achieving net-zero emissions by 2050. This has forced the market to move away from carbon-intensive fuel sources and towards biofuels and other renewable energy production.

To enhance efficiency, many of these new investments utilize existing infrastructure and market positioning across supply, distribution and retail activities. Examples include leveraging existing gas stations for biofuels, fast-charging (BP Pulse is the UK's largest public charging provider[20]), and hydrogen refueling; building upon existing trading capacity for new energy products; and utilizing current engineering and project-management capabilities for endeavors such as green hydrogen and offshore wind.

Some of the larger European companies (e.g., TotalEnergies and Equinor) are seeking to preserve their market share during the energy transition by investing heavily (i.e., approximately 10% of total capex or more) in new energies across the value chain. This transition from oil and gas into broader energy companies have led several to rebrand (e.g., Statoil to Equinor[21] and Total to TotalEnergies[22]). Electricity generation is the most significant area of investment to date, recognizing that electrification of global economies will be key to meeting emissions reduction targets. This has initially taken the form of wind and solar investments; however, increasingly the vast engineering and project-management capabilities of traditional oil and gas companies are being leveraged in the development of green hydrogen.

Biofuels are also a key part of the transition framework, allowing oil and gas companies to maintain existing end markets and distribution networks. Difficulties in substituting liquid fuels in hard-to-abate areas such as aviation, support continued investment in biofuels. For instance, 14% of European transport fuels must come from renewable sources by 2030, creating significant demand[23].

Compared to international oil companies (IOCs), both the mandate and trajectory of national oil companies (NOCs) is different and variable. Many of the NOCs have the mandate to manage the country's natural resources and to focus solely on oil and gas. In this case, other state-owned enterprises may be driving the growth in new energy infrastructure. Having said that, there remains some notable carbon-reduction activity from some of the major NOCs as follows:

- Saudi Aramco released verified Scope 1 and 2 emissions data and is working to improve efficiency and electrify gas production. The carbon intensity of Saudi Aramco's oil production is significantly lower than the industry average, largely due to the geology of their assets[24].
- Rosneft plans to invest US$5 billion in emissions reduction technologies and gas utilization, with a goal of reducing its greenhouse gas emissions by 8 million tonnes by 2022[25].
- Petrobras has established a climate-change division following the principles of transparency and quantification; portfolio resilience; and strengthening competencies aligned with a low-carbon economy[26].

North American oil and gas companies are also looking to solidify their low-carbon strategies. Some have already demonstrated the feasibility of using hydrogen for crude refining. Others are integrating hydrogen and/or fast electric vehicle (EV) chargers with diesel and gasoline at fuel stations. In April 2021, Chevron announced a memorandum of understanding with Toyota to develop commercially viable, large-scale businesses in hydrogen[27].

This is pertinent not just in terms of developing hydrogen as a transportation fuel but also in the context of developing markets with nations that import fuel for electricity generation, such as Korea and Japan. These countries have the desire and the capital to shift to low-carbon fuels, but they are not endowed with the natural resources to produce their own.

Hydrogen has the potential to fill this gap. With high engineering complexity, hydrogen development requires large capital infusions and project-management proficiencies similar to oil and gas ventures. This points to future revenue opportunities for oil and gas companies.

A wealth of business literature suggests that sectors are typically disrupted from the outside rather than the inside. Evolving from an oil and gas company into a clean energy business—voluntarily or at the prompting of undeniable market forces—will require impeccable navigation of the risks and opportunities, accompanied by significant redirection of capital and resources. With this in mind, some players are making targeted investments aligned with their existing capabilities. For example, Occidental Petroleum has made the strategic decision to focus its efforts on CCUS via its subsidiary Oxy Low Carbon Ventures[28]. Comparatively, Australian companies Santos and Woodside are focusing on producing hydrogen from natural gas, with CCUS included, to deliver carbon-neutral 'blue' hydrogen[29], initially in order to activate demand and learn how to cost-competitively produce and deliver renewable hydrogen.

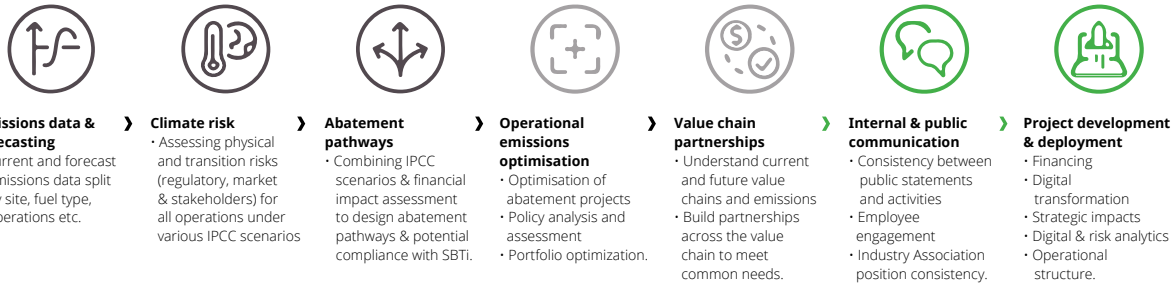
Meanwhile, several of the larger oil and gas companies are leveraging their molecular skills to play a leadership role in the energy transformation by developing CCUS, hydrogen and biofuels. ExxonMobil, for instance, has proposed a US$100 billion carbon capture and storage (CCS) hub in the U.S. Gulf Coast[30]. Some companies are also pursuing aggressive merger and acquisition (M&A) strategies to acquire new skills and capabilities for repositioning their operations in the long term.

Oil and gas companies have the opportunity to build upon their existing market presence and customer base, remembering that their customers will also have to undergo their own transitions. Many also have extensive capabilities across trading, asset management and logistics that will be equally relevant in a new low-carbon economy. Such advantages may create strength where new entrants may struggle.

Decarbonization roadmap

The decarbonization lifecycle stretches across every aspect of an organization's operations and value chain. Deloitte Decarbonization Solutions™ roadmap (see figure 3) provides a high-level guide to the deep tactical and transformational changes that are often required across structure, operations, relationships and culture. Against this framework, companies can assess their progress towards a comprehensive decarbonization strategy and plan out the next steps and future activities required.

Figure 3 – Deloitte Decarbonization Solutions™ Roadmap



Source: Deloitte

This roadmap has been used extensively in the mining, construction and industrials sectors. Many of the steps and lessons learned can be transferred to the oil and gas sector to accelerate change and avoid pitfalls. The seven main steps in the roadmap are detailed below, with an assessment of their importance, the risks inherent in the activity, and the key tasks that need to be completed to create a robust process. While the framework is presented as a linear series of activities, in practice it will entail multiple feedback loops and iterations on the pathway to net-zero.

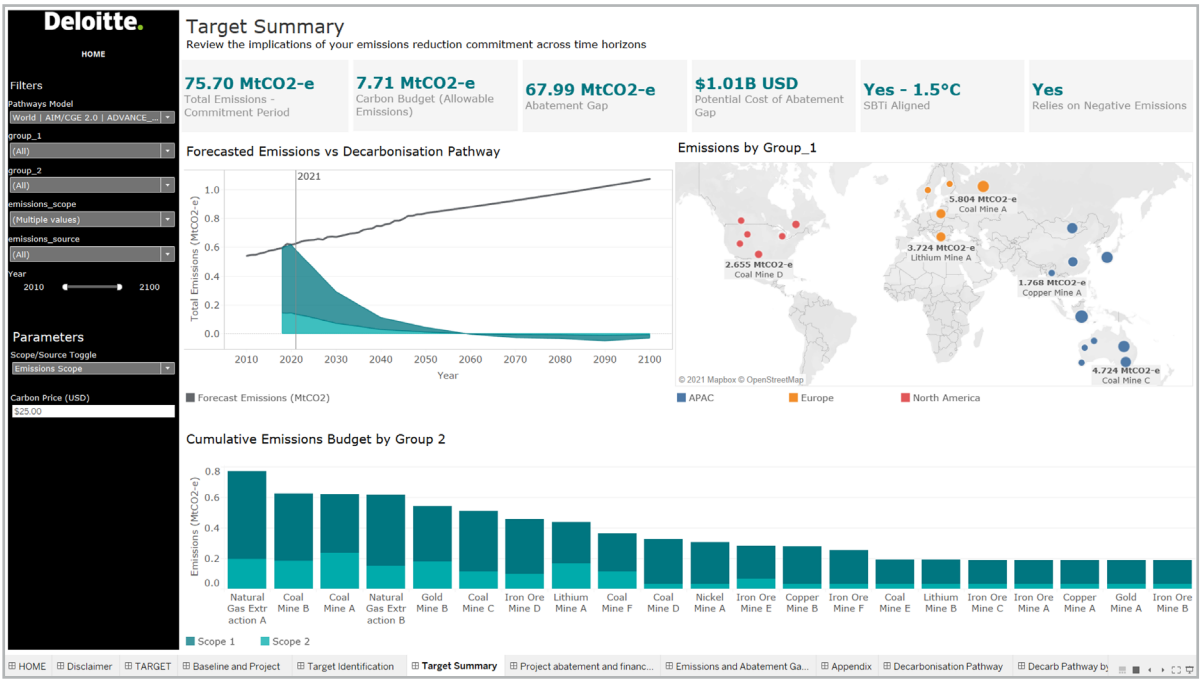
Compile emissions data and forecasting

- Emissions data establishes the baseline from which the organization can forecast, measure and monitor progress against targets, as well as critically evaluate the areas of the business with the highest potential for decarbonization.
- Companies will need to ensure that they do not underestimate or miscalculate the data. Otherwise, they risk incurring financial penalties from regulators and inaccurate valuation models from investors. If errors are made, they may also miss the opportunity to reduce liabilities or secure strategic advantage.

Key tasks for this step include:

- Compile and assess current and forecast emissions data delineated by site, fuel type, and operations.
- Developing emissions profiles and forecasts by region, operation and asset (see figure 4).
- Understanding emissions intensity across the entire value chain.
- Communicating complex climate data through simplified dashboards underpinned by extensive scientific-based data.

Figure 4 – Emissions profile mapping



Source: Deloitte Decarbonization Solutions™

Assessing climate risk

- The framework from the Task Force on Climate-related Financial Disclosures (TCFD) provides guidance on the types of climate-related risks and opportunities that need to be considered, including both transition risks and physical risks[31].
- Transition risks are those arising from the changes needed to achieve a low-carbon economy. These changes may occur in the areas of policies, legal frameworks, technologies, and markets, and depending on their nature and speed, they may pose varying degrees of financial and reputational risk to oil and gas organizations.
- A key aspect of transition risk is understanding how different stakeholder groups are likely to react over the next decade. Companies should consider the potential for extreme actions, and the impacts they could have on value-chain participants and the company itself, especially in terms of revenues and valuations.

Table 1 – Likely and possible stakeholder reactions

Stakeholder group	Likely future actions	Possible extreme action before 2030
Litigants	File more and larger lawsuits	Litigate for US$10 billion or more, similar to tobacco cases
NGOs and activists	Orchestrate high-profile protests	Engage in climate terrorism—cyber and/or physical attacks
Investors	Increase pressure to exit fossil fuels Raise the cost of capital	Wholesale divestment
Governments	Impose carbon border adjustment mechanisms and carbon taxes	Implement the 'Green New Deal'
Local communities	Prevent expansion of current operations	Revoke license to operate one or more assets
Suppliers	Refuse to sell to fossil-fuel producers	Disrupt supply chains more frequently
Customers	Impose import limits amidst the rise of nationalism	Adopt alternative solutions more rapidly than predicted
Employees	Disengage and seek other employment	Create an insurmountable talent vacuum

- Physical risks include direct damage to assets and indirect impacts from supply chain disruptions. In addition to fires, floods, and more frequent and sever hurricanes, such damages may be caused by changes in water availability, sourcing, and quality; food insecurity; and extreme temperature swings that affect physical structures, operations, supply chains, transport needs, and employee safety.
- A detailed climate risk assessment, performed in accordance with the TCFD framework, is critical for illuminating and mitigating the physical and transitional risks embedded in the current business model.

Abatement pathway options

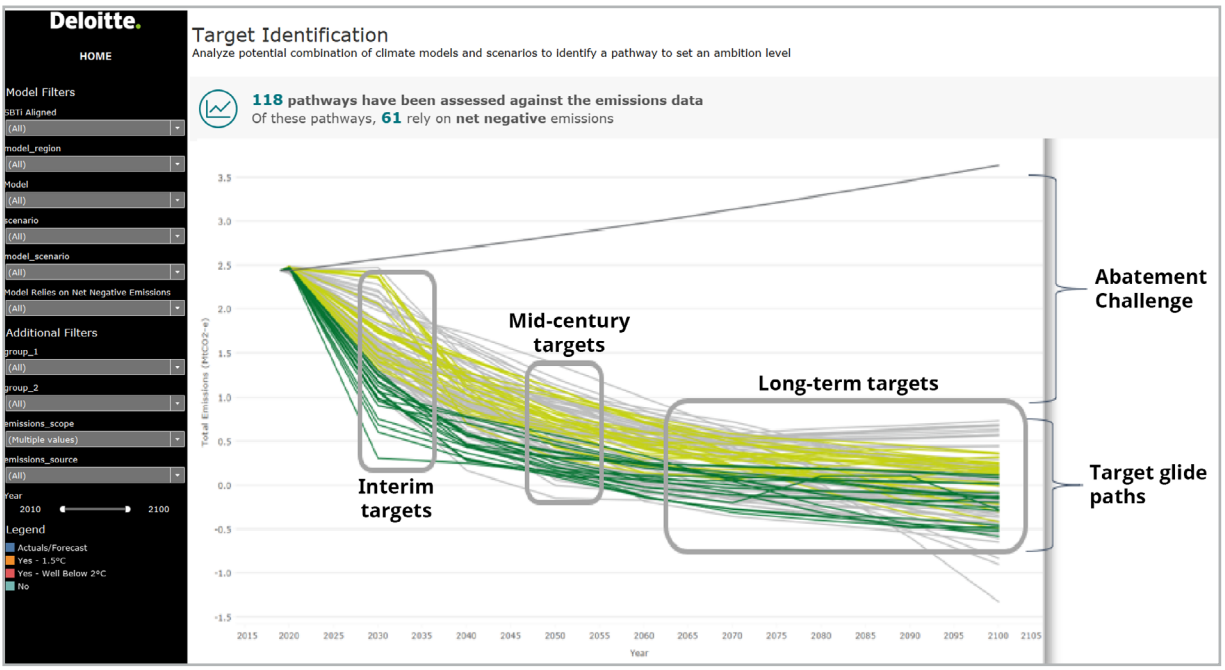
Before oil and gas organizations set targets, they need to understand the costs or other implications that future emissions trajectories might have for the business. They should also consider if the proposed targets meet societal expectations. In 2021, businesses are expected to do their fair share towards meeting a well-below 2°C scenario. This expectation may change going forward.

- If a company sets targets only by looking internally or at peers, it may overlook important implications and suffer reputational damage as a consequence. NGOs and activists are increasingly asking companies to prove that their targets are science-based and that they meet or exceed the Paris goals. If this cannot be done effectively, the company is likely to attract unfavorable attention.

Key tasks for this step:

- Determining emissions pathways under a well-below 2°C future.
- Understanding historical, current and future emissions profiles.
- Ascertaining the "abatement challenge," which is the gap between forecast emissions and abatement pathway options.
- Establishing science-based targets by selecting an appropriate abatement pathway and assessing the reduction goals across timeframes such as 2030 and 2050.

Figure 5 – Abatement target options



Source: Deloitte Decarbonization Solutions™

Operational emissions abatement

Financial viability is vital to the success of any project and emissions reductions are no exception. In conjunction with optimizing the financial outcomes of meeting emissions-reduction targets, companies should develop a comprehensive program of abatement projects, setting out the timelines, technologies and locations.

Many companies find that they can achieve short-term positive NPVs and competitive advantages from selecting the right 'shovel-ready' tactical projects, such as fuel switching, efficiency measures or process optimization (Table 2).

Table 2 - Oil and gas abatement potential

Upstream	**Extraction and drilling**	Improve and expand energy efficiency, electrification, CCUS, and enhanced oil recovery
	Flaring (CO_2)	Reduce flaring through maintenance improvements
	Venting (CH4)/ Fugitive emissions	Recover vapors, detect leaks and repair systems at compression stations
Mid-Stream	**Orchestrate high-profile protests**	Engage in climate terrorism—cyber and/or physical attacks
Downstream	**Refinery heat and power systems**	Improve energy efficiency, switch fuels (e.g., biogas and green hydrogen), electrify, and implement CCUS
	Hydrogen production	Deploy hydrogen steam methane reforming and CCUS
	Fugitive emissions	Recover vapors, detect leaks, maintain, and replace equipment

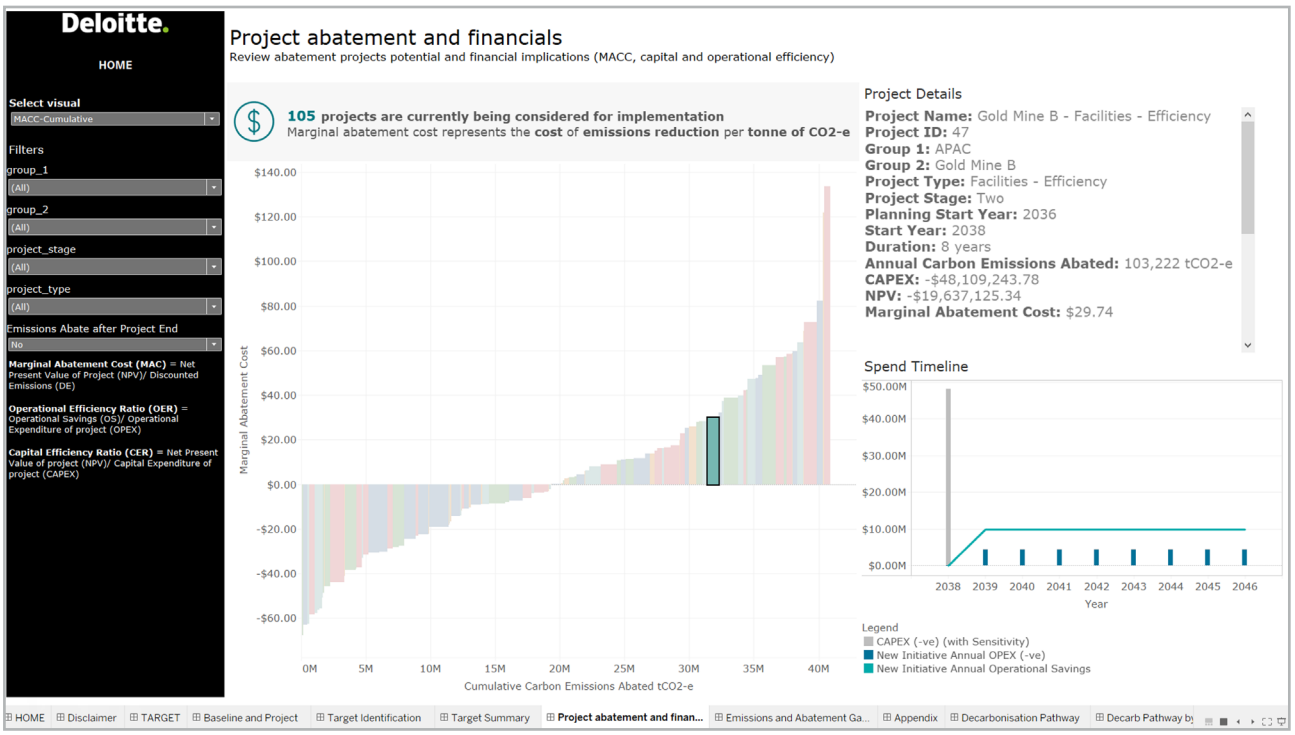
Companies may also need to embark on larger transformational projects with ecosystem partners to develop new abatement solutions in areas where there are no economically viable options at present.

Organizations that fail to decarbonize their operations in alignment with stakeholder expectations risk losing their social license or experiencing asset devaluation. They may also get stuck in a pattern of relying on carbon offsets to achieve emissions targets. This presents a financial risk since the price of offsets is forecast to increase significantly over the next decade.

Key tasks for this step:

- Assessing the costs, benefits and implementation risks of abatement projects across all assets and operations.
- Reviewing the value chain for each product line to assess if competitive advantage can be gained from decarbonizing some operations ahead of others.
- Optimizing abatement projects to reduce costs and unlock value while still achieving stated emissions-reduction targets.
- Prioritizing project deployment to maintain optionality and deliver the greatest benefit for the least cost.

Figure 6 – Prioritizing least cost abatement



Source: Deloitte Decarbonization Solutions™

Value chain partnerships

Organizations are increasingly being held accountable for their value-chain emissions, both upstream and downstream. Compared to operational emissions, this presents a very different challenge for oil and gas products. The behaviors of value-chain participants are largely beyond the control of a company, which poses certain risks. If suppliers are required to meet certain environmental specifications and emissions targets, it may increase input costs. If customers are required to reduce emissions, they may take their business elsewhere.

Value-chain emissions are more difficult to monitor and reduce than operational emissions, because an individual organization's power to influence may be low. That is why abatement solutions for value-chain emissions often demand partnership and collaboration. Joint initiatives with ecosystem participants who are under similar pressures can give companies more clout with laggards as well as the collective funding and brainpower to solve complex technical challenges. It may also be valuable to collaborate across sectors to define voluntary reporting standards for all major players including direct competitors.

Key steps for this activity are:

- Developing a detailed understanding of current and future value-chain emissions profiles.
- Forming partnerships across the value chain to solve the more complex emissions challenges.
- Initiating a dedicated ecosystem collaboration program to identify, nurture and manage partnerships with like-minded companies.
- Review product-traceability solutions to ensure value-chain integrity.

Internal and external communication

Both internal and external stakeholders are becoming increasingly vocal in expressing their expectations for companies to contribute to a financially efficient transition to a low-carbon economy. While companies may already be undertaking many decarbonization projects scattered across the organization, they may be missing an important step: collating these projects and communicating their actions to both the market and employees. To be effective, this communication needs to be transparent, authentic and consistent with the company's demonstrable actions.

Successfully delivering a coherent communications plan is critical to retaining stakeholder support and a social license to operate. However, without transparency and authenticity in communications, stakeholders may begin to lose faith. Ultimately, the dangers of poor communications include a disengaged workforce, an inability to attract top talent, dissatisfied communities, and an increased cost of capital.

Key tasks for this step:

- Devising engagement plans for employees, customers and shareholders, tailoring them as the company progresses on the journey to net-zero.
- Reviewing the public positioning of industry associations to which the company belongs.
- Determining if publicly stated targets are consistent with action plans, executive incentive schemes, and budget allocations.
- Mapping stakeholders to understand their interactions and intentions, identifying warning signs of harmful activity.
- Engaging and empowering employees to develop internal emissions-abatement projects.
- Reviewing asset portfolios to ensure optimum construction and the ability to maintain favorable valuations and cost of capital.

Project deployment

To preserve credibility, decarbonization goals and communications must be backed up by tangible activities across three horizons:

- Short-term tactical projects that can be delivered immediately.
- Development and preparation for medium-term material projects.
- Research and collaboration for long-term hard-to-abate solutions.

These activities must be supported by business plans and peer benchmarking to attract the necessary funding and reduce the cost of capital. Those that fail to deliver practical projects will likely lose stakeholder support. Common pitfalls include inadequate technology solutions, complex operating practices, and slow decision-making processes.

Key activities for this step:

- Embedding quantified emissions criteria into the organization's operating resource planning systems, upgrading them if necessary, to capture accurate performance data in real-time.
- Developing business plans and/or peer benchmarking to attract the required financing and reduce the cost of capital.
- Integrating the delivery of emissions-abatement projects with other strategic activities such as automation and optimization.
- Examining potential deployment barriers across people, processes and policies to ensure that the whole organization is enabling strategic priorities.
- Developing comprehensive product traceability solutions to ensure the benefits are valued by end customers.
- Avoiding any projects that will make the challenge of decarbonizing harder in the future.

Conclusion: Starting the journey

The road to decarbonization is not going to be easy and will require significant trade-offs and difficult decisions. For the oil and gas sector, it is going to be particularly hard. However, the technical, financial, and operational strength of oil and gas companies mean that they have the potential to lead the energy transition, rather than be at the mercy of it. And, if they develop their strategies carefully, they can remain powerful global companies during and after the shift to a sustainable, low-carbon economy.

Action is required now to ensure that the risks are fully understood. This is not an issue that can remain as a nice-to-do but it is of critical strategic and financial performance. It should be at the top of the board and executive agenda for any company that is serious about surviving the transition. The imperative to achieve emissions-reduction goals needs to be driven throughout the business and executive bonuses should be heavily weighted towards assisting the company to think towards the future.

To decarbonize, companies should assess the full range of potential abatement and offset opportunities that exist across all of their value-chain activities, beginning with operations and progressing toward Scope 3 emissions. Once this is understood, they can prioritize projects that confer the greatest abatement and strategic benefits at the least cost.

For those that are nimble and thoughtful, decarbonization is going to enable a new phase of growth and value creation. For those that delay, the risks are mounting and their survival is not guaranteed.

Contacts

Authors

Michael Wood
Partner, Risk Advisory
Deloitte Australia
Email: michwood@deloitte.com.au

Jonathon Curry
Manager, Financial Advisory
Deloitte Australia
Email: jocurry@deloitte.com.au

John O'Brien
Partner, Financial Advisory
Deloitte Australia
Email: johnobrien@deloitte.com.au

Global Contacts

Rajeev Chopra
Global Leader – Energy, Resources & Industrials
Deloitte Touche Tohmatsu Limited
Email: rchopra@deloitte.co.uk

John England
Global Sector Leader - Oil, Gas & Chemicals
Deloitte Touche Tohmatsu Limited
Email: jengland@deloitte.com

Country Contacts

Asia Pacific

Mike Lynn
Oil, Gas & Chemicals Leader
Deloitte Asia Pacific
Email: mlynn@deloitte.com.au

Argentina

Ricardo Cesar Ruiz
Oil, Gas & Chemicals Leader
Deloitte Argentina
Email: riruiz@deloitte.com

Australia

Bernadette Cullinane
Oil, Gas & Chemicals Leader
Deloitte Australia
Email: bernadettecullinane@deloitte.com.au

Brazil

Eduardo Raffaini
Oil, Gas & Chemicals Leader
Deloitte Brazil
Email: eraffaini@deloitte.com

Canada

Andrew Botterill
Oil, Gas & Chemicals Leader
Deloitte Canada
Email: abotterill@deloitte.ca

China

Paul Siu
Oil, Gas & Chemicals Leader
Deloitte Asia Pacific: China
Email: pausiu@deloitte.com.cn

Commonwealth of Independent States

Gennady Kamyshnikov
Oil, Gas & Chemicals Leader
Deloitte Russia
Email: gkamyshnikov@deloitte.ru

France

Olivier Perrin
Oil, Gas & Chemicals Leader
Deloitte Central Europe: France
Email: operrin@deloitte.fr

Germany

Stefan van Thienen
Oil, Gas & Chemicals Leader
Deloitte Central Europe: Germany
Email: stvanthienen@deloitte.de

India

Ashwin Jacob
Oil, Gas & Chemicals Leader
Deloitte Southeast Asia: India
Email: ashwinjacob@deloitte.com

Italy

Paola Rolli
Oil, Gas & Chemicals Leader
Deloitte North South Europe: Italy
Email: prolli@deloitte.it

Japan

Dai Yamamoto
Oil, Gas & Chemicals Leader
Deloitte Asia Pacific: Japan
Email: dai.yamamoto@tohmatsu.co.jp

Mexico

Valeria Vazquez
Oil, Gas & Chemicals Leader
Deloitte Mexico
Email: vavazquez@deloittemx.com

Middle East

Bart Cornelissen
Oil, Gas & Chemicals Leader
Deloitte North South Europe: Middle East
Email: bpcornelissen@deloitte.com

Netherlands

Willem Vaessen
Oil, Gas & Chemicals Leader
Deloitte North South Europe: Netherlands
Email: wilvaessen@deloitte.nl

Nordic

Johannes Wiik
Oil, Gas & Chemicals Leader
Deloitte North South Europe: Norway
Email: jwiik@deloitte.no

South Africa

Jenny Erskine
Oil, Gas & Chemicals Leader
Deloitte Africa
Email: jerskine@deloitte.com

Spain

Felipe Requejo Siguenza
Oil, Gas & Chemicals Leader
Deloitte Spain
Email: frequejo@deloitte.es

Turkey

Gökay Özdemir
Oil, Gas & Chemicals Leader
Deloitte Central Europe: Turkey
Email: gozdemir@deloitte.com

United States

Amy Chronis
Oil, Gas & Chemicals Leader
Deloitte US
Email: achronis@deloitte.com

United Kingdom

Oliver Holder
Oil, Gas & Chemicals Leader
Deloitte North South Europe: UK
Email: oholder@deloitte.co.uk

Endnotes

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