

Electric Power & Natural Gas and Oil & Gas Practices

How oil and gas companies can be successful in renewable power

The traditional business model of oil and gas players is under pressure. Investing in the sustainable-power value chain can provide an opportunity to diversify and play a leading role as the industry transitions.

by Clemens Kienzler, Alexandre Lichy, Humayun Tai, and Fransje van der Marel



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Climate change is here, and humanity is already grappling with its effects and taking action in all parts of the economy. As part of these efforts, the transition to a lower-carbon energy system requires urgent and fundamental shifts in how energy is produced and used the world over. Such shifts, in turn, require strategic responses from businesses.

Oil and gas companies, whose fossil-based products have long been integral to the energy-supply landscape, are no exception. They need to navigate an environment in which increasingly stringent carbon-reduction targets affect investment decisions, with strong uncertainty about where and how to support activities such as offshore generation, electric-vehicle (EV) charging, and hydrogen production and development. As a consequence, operating models for new and legacy businesses are changing fast.

According to McKinsey's *Global Energy Perspective 2022*, fossil fuels such as oil and natural gas will continue to make up a significant share of the energy mix by 2050, partly because of how they combine affordability and security of supply.¹ Nonetheless, we believe that oil and gas companies are well positioned to play a meaningful role in the energy transition. Reasons for this include their global scale, the risk appetite of their investors, their large balance sheets and cash positions, and their long-standing relationships with energy customers and stakeholders.

We have analyzed how strategic choices can help build a sustainable-power value chain and have outlined four ways oil and gas companies can lead in the energy transition. These include developing business models with customer centrality at the core, improving energy management and risk-exposure practices, diversifying energy portfolios, and pursuing capital excellence and project capabilities.

A global shift in how energy is produced and used

Shifting toward net-zero emissions requires replacing fossil-based electricity and heat with renewable energy and hydrogen power while balancing the demand for affordable energy as the world transitions (Exhibit 1). Projections to 2030 and 2050 illustrate how this shift could also further the electrification of industry, transportation, and construction while adding new sustainable fuel and hydrogen to industrial processes and transport.

The shift of oil and gas companies into the power industry is not new. In fact, private international oil companies (IOCs) and state-owned national oil companies (NOCs) started investing in cleaner energies decades ago. In the early 1980s, the first major oil company invested in renewables generation by supporting solar-component manufacturing as well as solar and wind project development. Nearly 40 years later, it bought a stake in one of Europe's largest solar developers. Another major oil company made several investments in the 2000s; in the past decade, it has established a renewables and energy solutions arm and invested more than \$5 billion in a variety of business models, including renewables generation, power retail, distributed generation, energy services, and EV charging.

One of the largest NOCs in the world recently announced a target of net-zero emissions by 2050 as well as significant investments in renewable energy. Others have committed to investing billions over the next few years to building a renewable-energy business and launching a fund of approximately \$500 million to invest in energy efficiency and renewable-energy solutions.

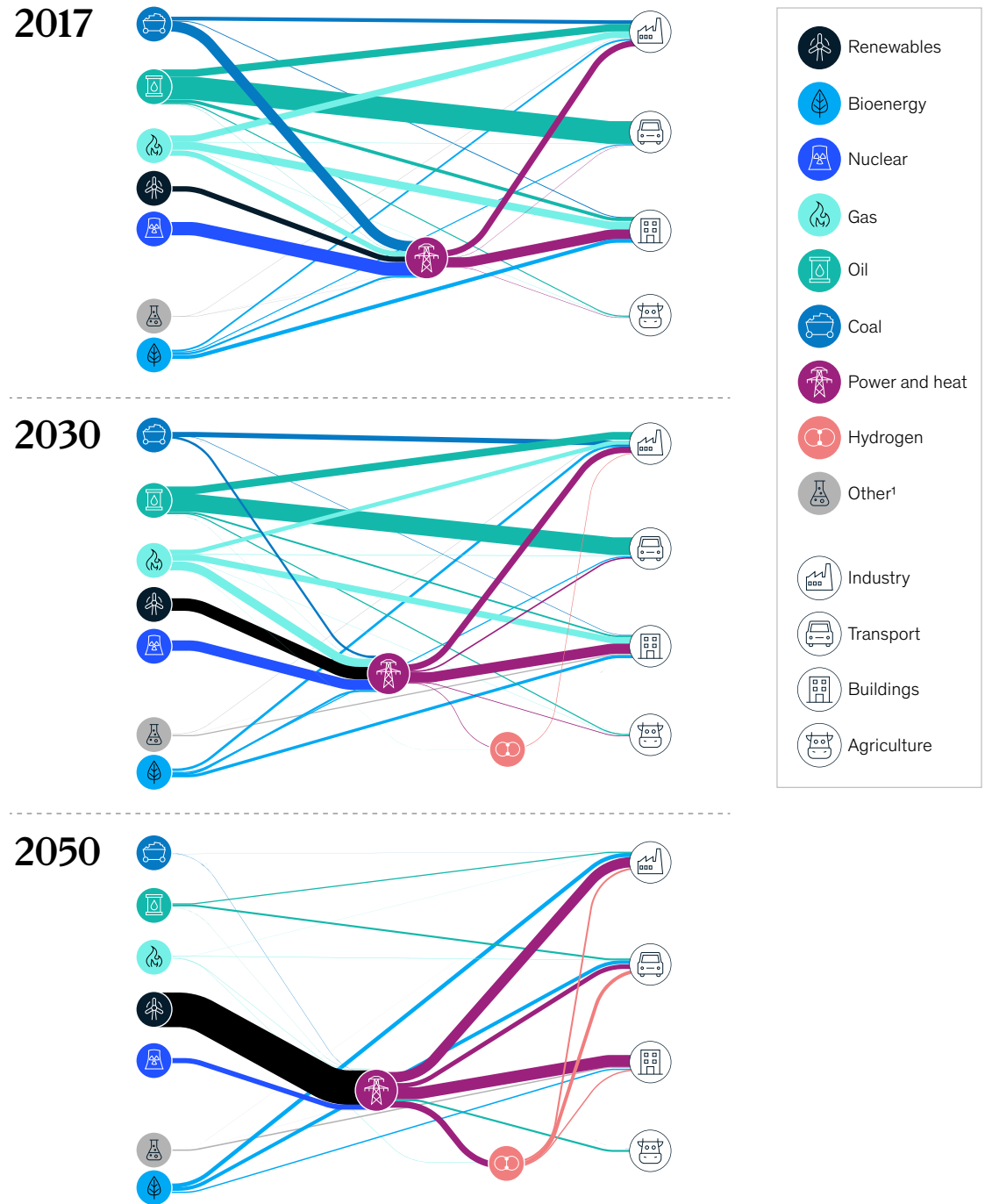
The success of these investments has been mixed, but there is evidence that momentum will not falter as customer demand for cleaner energy

¹ For more, see "Global Energy Perspective 2022," McKinsey, April 26, 2022.

Exhibit 1

The path to net-zero emissions requires a fundamental and global shift in how energy is produced and used.

Net-zero Europe decarbonization pathway, renewables and hydrogen, total primary energy demand



¹Other miscellaneous sources (eg, nonrenewable waste).
 Source: *Net-Zero Europe: Decarbonization pathways and socioeconomic implications*, McKinsey, November 2020

grows and regulatory incentives to decarbonize strengthen. Capital markets are placing higher value on firms that are structurally aligned with the energy transition across sectors such as liquid fuels, power, and equipment manufacturers. By contrast, the major oil and gas companies that are most invested in low-carbon markets have not yet benefited from material uplifts in company valuation. In fact, our research shows that the upside for some leading firms starts to materialize when more than 40 percent of total portfolios are low carbon, while leading oil and gas majors typically allocate less than 25 percent of their new investments into new energies.

Many oil and gas companies are well positioned to become leaders in the energy transition. This is not only because of their global scale, the risk appetite of their investors, their large balance sheet and cash positions, and their long-standing relationships with energy customers and stakeholders, but also because of their unique capabilities related to offshore projects and hydrogen and sustainable-fuel production and transport.

On these points, oil and gas players can offer distinctive value propositions in the following four areas of the energy transition:

- *Offshore project development.* Oil and gas players with extensive experience in large-scale projects can develop and build integrated projects, including renewables generation and hydrogen and heat production. In addition, some

bidders for projects provide offers that include heat and hydrogen investments.

- *Hydrogen production and transportation.* Oil and gas companies often have long histories with hydrogen production in their refining and chemical processes. In addition, existing capabilities in gas storage and transportation are relevant for hydrogen production and transportation because of their chemical similarities; both gas and hydrogen are flammable gases that need to be kept under pressure and carefully managed.
- *EV charging.* Players across the value chain, including retailers, refiners, and producers, can leverage their brands, customer relationships, real estate, and fuel stations near roads and highways to deliver fast-charging services for EVs.²
- *Decarbonization solutions.* Pressure on oil and gas companies to decarbonize has pushed them to develop technical solutions and know-how that can be relevant to other industries. Oil and gas companies can leverage these to offer decarbonization solutions, including renewables generation, energy retail, batteries, and carbon capture, utilization, and storage (CCUS). And because the industry currently relies on fossil fuels and has long-standing relationships with suppliers, its representatives also belong at the table when designing the transition pathway.

Many oil and gas companies are well positioned to become leaders in the energy transition.

² For more on fast charging, see Sean Kane, Florian Manz, Florian Nägele, and Felix Richter, “EV fast charging: How to build and sustain competitive differentiation,” McKinsey, June 4, 2021.

When, where, and how: Making strategic choices

Oil and gas companies aspiring to lead the energy transition need to take a stance on at least three strategic questions.

To begin, players need to time investments in sustainable offerings in a way that meets carbon emissions goals (current and projected) while delivering on shareholder expectations. Investing early requires confidence that demand will follow—otherwise, it risks subpar returns for capital expenditures. On the other hand, playing “catch-up” in new energy markets could affect players’ abilities to maintain a competitive advantage against those that invested “on time”—which would subsequently create risk exposure as CO₂-intensive sources of energy are increasingly regulated.

Players also need to choose the value chains and segments in which they’d like to operate. Within power, potential areas for investment by oil and gas players include offshore generation, EV charging, and hydrogen production and development. Each of these has different risk/return profiles, capital requirements, and needed capabilities.

Last, there are ideal operating models for both new and legacy businesses. To unlock value, an “arm’s length” setup can enable the new business to be independent. This in turn can lead to potentially higher valuations; maximize attractiveness for capital markets; allow greater access to environmental, social, and governance (ESG) capital; and enable different cost of capital and financing structures.



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Building a sustainable-power value chain

Oil and gas players can help create value in the integrated energy value chain by getting four things right (Exhibit 2). The upside can be substantial, leading to material improvements on the base rate of return for specific portfolios.

Customer centricity at the core

Business models are constantly evolving as innovation shapes the technology and services landscape. As technology changes, so do customer expectations. That said, winners in both B2B and B2C retail have shown that downstream power should be customer-centric. A deep understanding of product and service offerings can provide





customers with the right support as they transition to renewable energy.

Because of their existing business and deep technical capabilities, oil and gas players can help create value in key segments of the energy transition. For instance, “dual fuel” offerings already show promising synergies between oil and natural gas. And trading services can provide additional returns, offering “around the clock” green power (the delivery of zero-carbon electricity that meets demand at all times).

The art lies in the construction of specific and integrated customer offerings that are tailored to individual needs. For example, mining companies may require electrified trucks and machinery as

Exhibit 2

Portfolio diversification will likely have the largest impact on risk exposure for companies entering the sustainable-power value chain.

Value creation levers	Observed rate of return improvement, p.p. ¹	Impact on risk exposure	Where impact materializes	Rationale
Customer centricity	 +0.5	—	Power retail positions (B2B and B2C)	Decreased cost to serve or to acquire customers and tap into new revenue pools from digital offerings, for example
New energy management or risk-exposure practice	 +0.5–1.0	↓	Across portfolio	Arbitraging across “long” and “short” positions within portfolio (eg, selling power spot vs producing green H ₂)
Portfolio diversification	 +1.0–1.5 ²	↓	Across portfolio	Diversify exposure across various positions within portfolio to optimize risk/return profile
Capital excellence and project capabilities	 +1.0	—	Capital-heavy assets (eg, power generation, green H ₂ production)	Improve project management, procurement, and EPC ³ capabilities to get best-in-class project costs

Note: Rate-of-return improvements are not additive.

¹Percentage points.

²Risk adjusted; takes into account increased capital consumption to manage through cycles.

³Engineering, procurement, and construction.

Source: McKinsey analysis

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well as operations powered by renewable electricity, whereas steel players may shift toward producing green steel using hydrogen.³

The customer-centric approach is also fundamental to answering the three strategic questions of when, where, and how—ensuring that oil players enter production when demand is rising (when), invest available capital in the projects that best fit customers' needs (where), and help define the operating model (how). Answering these questions and accounting for the needs of customers could help players partner with green companies according to public commitments.

Energy management and risk-exposure practices

The oil and gas sector contends with fluctuating prices as well as unpredictable geopolitical events and demand shocks. As a result, oil and gas companies have developed an adaptable “risk culture” for investment decisions. In particular, the unique characteristics of the power value chain—including constraints to geographic arbitrage, high price and volume volatility, risks that covary between different investment positions, and different regulatory frameworks—make players more aware of risk. Generally speaking, returns in the power industry can be lower than those of fossil fuels, while market volatility can be higher and of a different nature.

Investors in renewables have already experienced the risks and benefits of exposure to power markets: in February 2021, winter storm Uri in the United States caused significant investment risk for power producers with firm commitments. More recently, rising gas prices have pushed wholesale power prices past €300 per megawatt-hour (MWh) over extended periods of time in many European countries (to the benefit of some renewables players).

Diversified portfolios and optimized risk returns

Oil and gas players that enter new energy markets typically have a competitive advantage because risk exposures across oil and gas and power can offset each other. When energy consumption remains fairly stable, reduced consumption of fossil fuels translates into increased consumption of power or hydrogen, and vice versa.⁴

Balancing risk exposures across the portfolio can improve the risk/return profile, compared with nondiversified portfolios. In other words, players that invested in only one source of energy are typically exposed to higher levels of risk (because 100 percent of the portfolio may be affected by a market event). Those with diversified portfolios, however, not only can reduce their overall risk exposure but also tend to be able to improve project returns through higher leverage. Achieving diversified risk/return profiles in a controlled manner, however, requires advanced portfolio and risk-management capabilities.

- *Geographic diversification.* Energy prices do not move in the same way across geographies. The sun in California does not shine at the same time the wind blows in the North Sea. With renewables increasingly setting the price of power, prices across geographies are increasingly uncorrelated.
- *Portfolio diversification.* Different types of assets and financial positions offset one another's commercial risks. Our research on global portfolios of energy companies shows that these portfolio effects can eliminate 50 to 80 percent of risk. This means that building a smart, diversified portfolio across geographies can reduce market risks to minimal levels.

³ For more on green steel, see Steven Vercammen, “Steel,” *McKinsey Quarterly*, August 1, 2022.

⁴ For more on energy consumption in the years to come, see “Global Energy Perspective 2022,” April 26, 2022.

Capital excellence and project capabilities

Significant investments are needed in the years to come, which means it's crucial that capital is strategically deployed to the right projects at the right times. Especially challenging is the sequencing of investments. Technologies are progressing at a fast pace, and assets can become obsolete without ever being operated profitably.

The risk of sunk capital is high if investments are made too early or during an immature market state. An example of this is the recent repowering of wind farms; operators are replacing older, smaller turbines with larger and more efficient ones. By contrast, investing capital too late could result in entering a market when competitors have already forged partnerships with customers, developed proprietary expertise, or established their brands and market positions.

History has shown that early investment in renewables often pays off. Yet the sheer size of these investments requires players to ensure that projects stay on time and deliver at optimized project costs. That said, the lack of materials and

pressured supply chains can create an additional challenge to project development.

Developing business capabilities and reskilling the workforce can help capture the full potential of returns. More power engineers will need to be trained to work with new technologies, and so will a workforce that understands power markets, regulatory frameworks, and customer needs in the energy transition. And new comprehensive reporting frameworks can be developed that cover profitability as well as environmental impact across Scopes 1, 2, and 3 emissions.

The rise in investments in clean and renewable technologies provides compelling evidence that power markets will continue to change rapidly. To stay ahead of the curve in the power value chain, oil and gas players will need to be thoughtful, strategic, and intentional in playing to their strengths. There is no time to waste; the industry cannot afford to wait to see what happens.

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