



Balance of power

A successful energy transition will be defined
by security and sustainability

Meet the authors



Muqsit Ashraf
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Muqsit leads [Accenture Strategy](#), a multibillion-dollar business unit across more than 40 industries in over 120 countries that helps clients tap new market opportunities and execute large-scale transformation initiatives. He is also a member of Accenture's Global Management Committee. Prior to this role, Muqsit led Accenture's Energy industry sector, helping companies reinvent to improve returns and become more sustainable. Muqsit attended Yale University and now lives in Houston.



Jack Azagury
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Jack serves as Accenture's Group Chief Executive—Strategy & Consulting. Jack's team of more than 45,000 global experts works with C-suite executives and boards of the world's leading organizations, helping them accelerate their total enterprise reinvention to enhance competitiveness, grow profitability, and deliver sustainable 360° value to all their stakeholders. Throughout his distinguished career, he has held numerous senior leadership positions within Accenture, including lead of the Resources North America business, which serves the energy, utilities, chemicals, forest products, metals and mining industries. Jack is a member of the company's Global Management Committee and lives in New York.



Aleek Datta
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For more than 15 years, Aleek has been advising oil and gas leaders across the energy value chain on business strategy, large-scale transformation programs and enterprise innovation. He has a particular passion for helping energy leaders unlock and maximize the potential of their workforces. Aleek also leads Accenture's Energy Industry Assets and Insights team, which is responsible for producing market-leading thought leadership. Aleek earned an MBA from Carnegie Mellon University and lives in London.



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Diana works with oil and gas companies across the value chain in the US and Latin America, helping them optimize operations, develop their digital strategies and prepare their talent and organizations for industry shifts. More recently, she has been advising oil and gas leaders on how to reinvent their companies for the energy transition, including integrating new businesses into their portfolios. Diana earned an MBA from the MIT Sloan School of Management and lives in Houston.



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Lasse has 15 years of market and business research expertise in economic value modeling and indexing, along with global executive and consumer surveys. Most recently, his work has focused on the reinvention of the oil and gas industry, cross-sector energy transition topics and overall industrial decarbonization. Lasse speaks regularly at major industry events and is based in Düsseldorf.

Special thanks to the following contributors: Sneha Agrawal, Amey Ahirrao, Mohd Arif, Rhea Bisaria, Sagnik Dey, Arpit Johari and Marnus Witte.





The energy industry has embarked on a transformation of epic proportions. Driven by consumer demands for a cleaner energy system and growing investor demands for improved environmental, social and governance (ESG) performance, the industry is racing to decarbonize.

As described in Accenture's [Decarbonizing Energy: From A to Zero](#), that race is grueling. Despite bold and noble actions by many companies, it is unlikely that the industry as a whole will achieve its 2050 net-zero goals. But that doesn't mean the industry shouldn't try to get as close to its goals as possible.

Energy sustainability is an absolute imperative.

Now, another imperative demands equal attention: **energy security.**

Once considered an issue primarily limited to the developing world, energy access and affordability are now global challenges. The collapse in energy demand brought about by the pandemic was extraordinarily painful. So was the aftermath, characterized by a lack of energy supplies.

The war in Ukraine has widened the gap between supply and demand even further. Supply chain disruptions and inflationary pressures make it difficult for the energy industry to close it anytime soon. In the near- to mid-term, the threat of energy insecurity hangs over many parts of the world.



Many energy companies believe the dual imperatives of energy security and sustainability are at odds with one another. They are not.

While it is likely that a near-term focus on energy security may result in companies paying less immediate attention to sustainability, that imbalance won't be long-lived. In fact, we believe a focus on energy security now will actually serve to accelerate the drive to net zero over the medium and longer term. That is because companies reimagining their strategies around energy security will quickly learn that future security depends on a more diversified mix of energy sources, from wind and solar to hydrogen and nuclear, as well as investments in new technologies, from battery storage to carbon capture, utilization and storage (CCUS) solutions. In this regard, the near-term focus on energy security could provide a catalyst for more ambitious and achievable sustainability goals.



Secure energy is sustainable energy.

The challenge for energy companies is, therefore, no longer about ensuring energy sustainability or energy security.

The challenge is about addressing both simultaneously, with an equal sense of urgency. We believe five actions can help energy companies strike the right balance. These include ramping up investments in solutions that will accelerate the transition to a cleaner and more secure energy system, redesigning future-ready operations and portfolios, compressing transformations across the energy value chain, setting near- and medium-term targets to keep long-term objectives on track, and pursuing partnerships to scale the innovations and efficiencies that will be the hallmarks of a secure and sustainable energy system.

Our energy future depends on a balanced approach to both security and sustainability. We can't have one without the other.



Security:

Energy for all



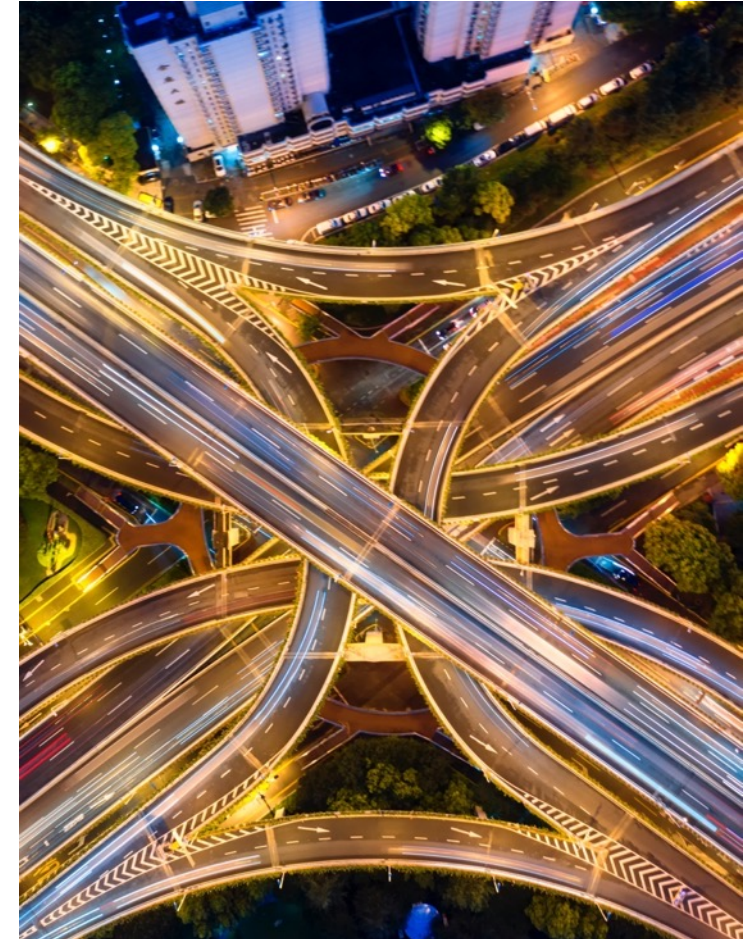
Energy is one of the critical enablers of economic prosperity, sustainable development and societal health.

Accenture analysis has found that low per-capita energy consumption (<60 gigajoules, or GJ) is typically linked to below-average GDP/capita (<\$17,000 in purchasing power parity, or PPP). An affordable energy supply is needed to meet low-income countries' needs and enable them to pursue economic growth.¹

Their livelihoods and wellbeing are perpetually at risk. Today, nearly two billion people have either no access or just limited access to energy.²

That number has been growing and will continue to climb as the world adds another two billion people in the coming years, mostly in developing nations where energy security already poses the greatest challenge.³

But the challenge is no longer limited to emerging markets. OECD countries and developed economies are also experiencing energy insecurity—many for the first time.



Before the war in Ukraine, the imbalance between energy supply and demand was expected to grow to 2% in 2022.⁴

After Russia's invasion, the projected gap between supply and demand grew significantly, depending on European countries' access to alternative supplies and the potential curtailment of Russian gas imports.

Our analysis found that demand could outstrip supply by 21% in Europe overall. In the United Kingdom, the imbalance would only reach 5%, but near 17% in Italy and over 30% in Germany.⁵ Supply shortfalls such as these won't be easily corrected.

Today's historic supply shortfall, rising inflation and supply chain disruptions have converged to make energy much less available and affordable than it was. Energy security has become a global issue. Resolving it, for now, requires an increased production of oil and gas.

An aerial photograph of an offshore oil and gas platform in the middle of a vast, clear blue ocean. The platform is a complex of steel structures with two tall derrick towers. A small support vessel is positioned to the left of the platform, and a large supply vessel is to the right, connected to the platform by several thick mooring lines. The water is a vibrant turquoise color.

**Energy security depends
on oil and gas...for now**

Ramping up the capacity of alternative energy sources such as renewables or nuclear energy will take considerable time. Coal could be used to fill some of the energy demand-supply gap, but that approach jeopardizes the world's commitment to decarbonization. Increasing energy supplies—and bolstering energy security—will require more oil and gas. Put another way, the threat of energy insecurity has reaffirmed the role that oil and natural gas must play in the energy mix for the foreseeable future.

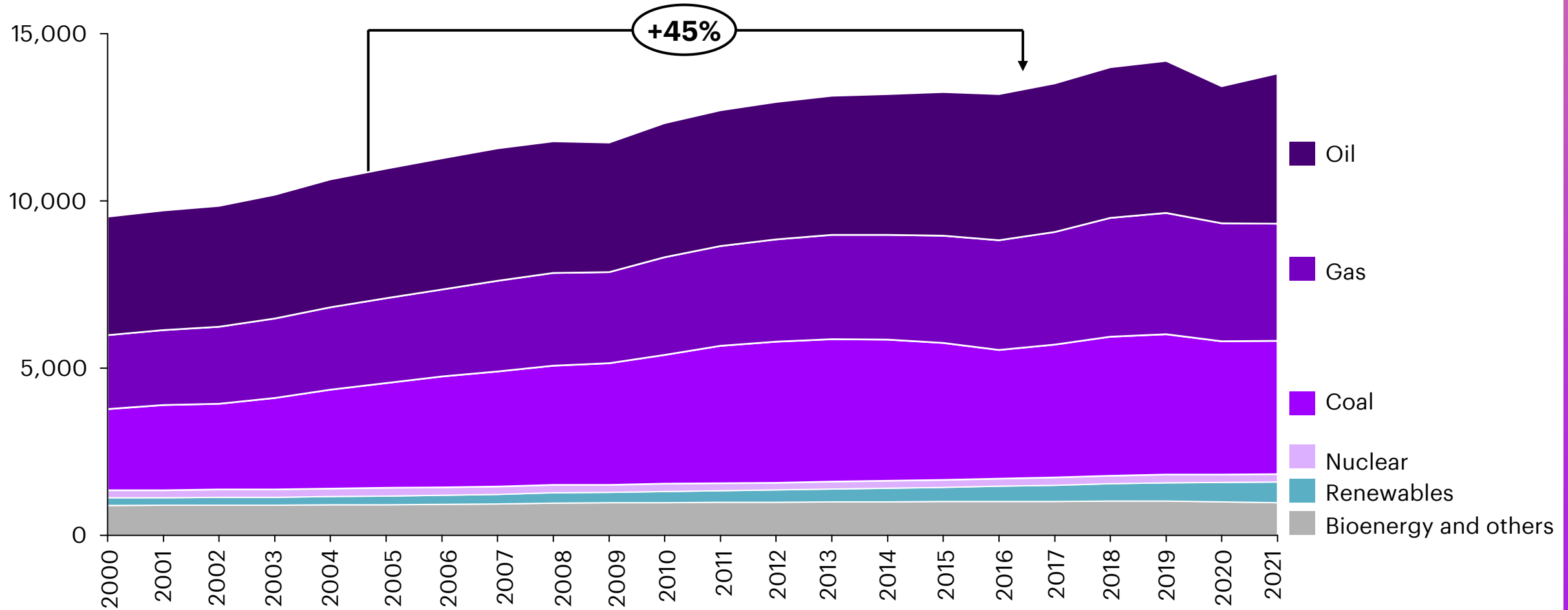
Over the past 20 years, global demand for energy has grown by approximately 50%. In that period, the proportion of fossil fuels in the mix has remained relatively stable at about 80%, which means total demand for fossil fuels has increased by roughly 50%, as well.

Oil and gas will remain very relevant in an evolving energy mix through 2050.



Historical energy demand by source, 2000-21

(in mtoe)



Source: Thunder Said Energy, March 2022.

Demand for oil and (to a lesser degree of likelihood) natural gas may peak in the next decade as new technologies and alternative energy sources become more competitive.

But even if oil and gas lose share in the global energy mix by 2050, total volumes of oil and gas are expected to grow for at least the next decade, and possibly beyond.

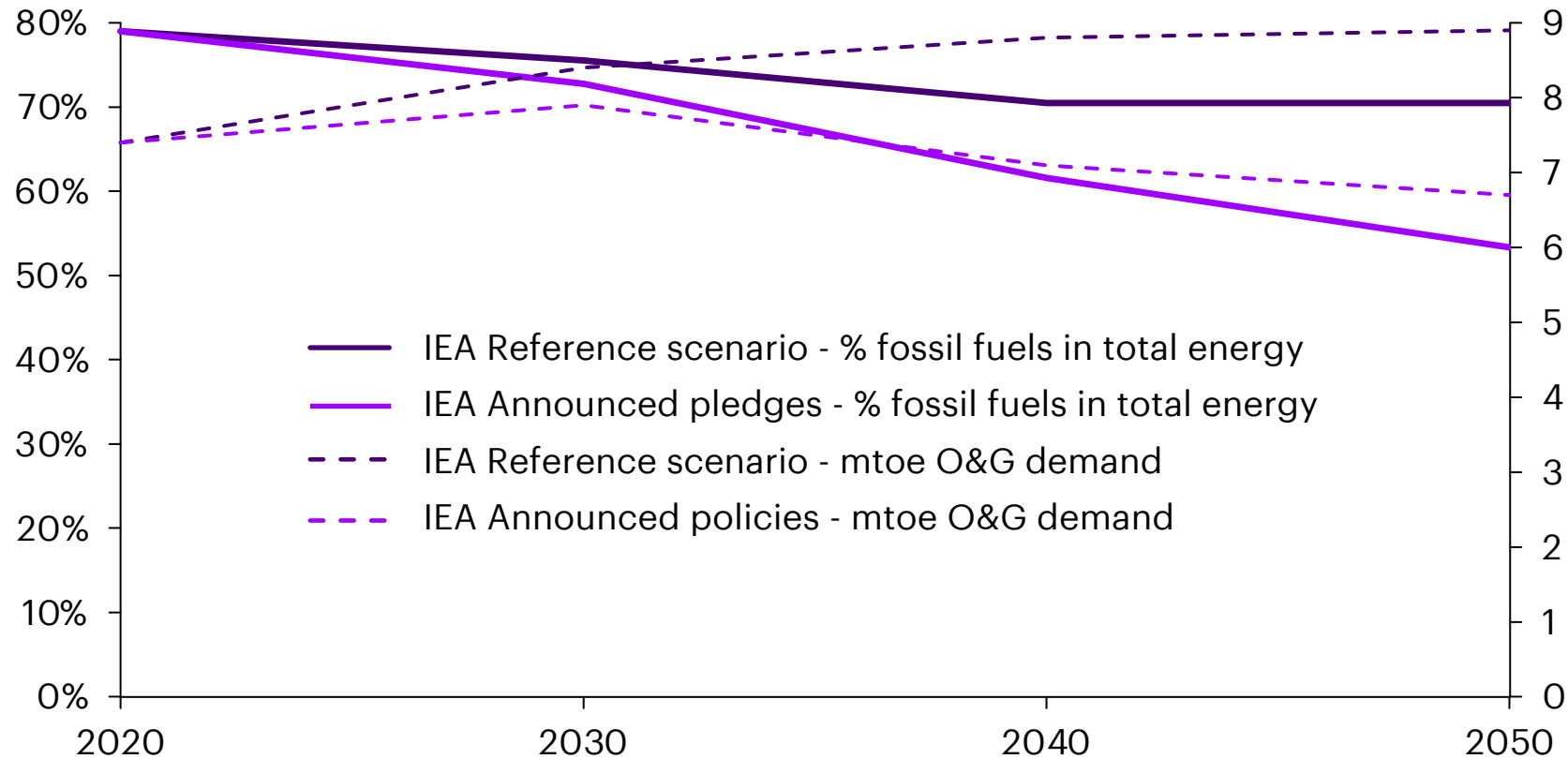


Demand for oil and natural gas may peak in the next decade

Projected demand of fossil fuels, through 2050

% of fossil fuels in the total energy system

O&G demand
(Thousands of mtoe)



Source: Accenture analysis with data from the International Energy Agency, World Energy Outlook 2021.

An aerial photograph showing a dense, vibrant green forest. A multi-lane asphalt road with a central median runs diagonally from the top right towards the bottom right of the frame. The road is flanked by the forest on both sides. The text 'Sustainability: Energy for good' is overlaid on the left side of the image in white.

Sustainability: Energy for good

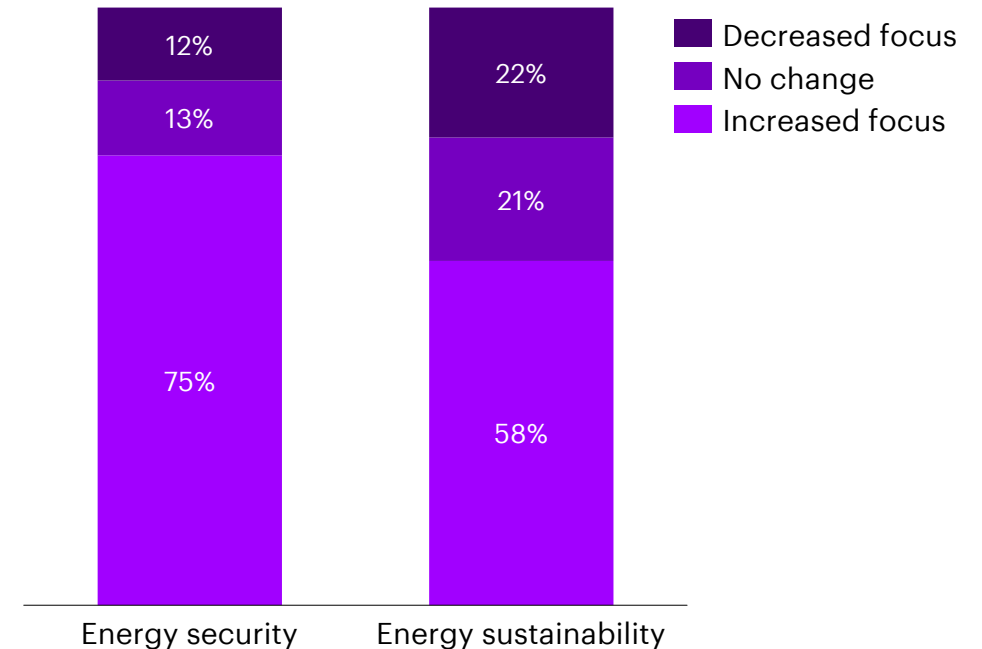
Energy security cannot be achieved in a vacuum.

It must be accompanied by a strong focus on sustainability, Scope 1-3 emissions reductions, and scaling and expanding clean energy technologies and supplies. Secure energy is sustainable energy. And sustainable energy can be a compelling business.

Recent Accenture research confirms that oil and gas companies are placing greater importance on both security and sustainability. From an overall sample of 201 companies, energy security is getting the most attention. But companies identified as reinvention leaders in our survey are emphasizing both.

Source: Accenture Oil and Gas Reinvention Index 2022 (N=201 c-suite executives from 201 oil and gas companies globally).

Among oil and gas companies, both energy security and sustainability are growing in importance



Please indicate the level to which the geopolitical events in the past months have changed focus of your company in terms of energy security vs. energy sustainability?

There are several reasons why energy companies have embraced the sustainability agenda.

For one thing, environmental stewardship continues to be top-of-mind for customers and investors. Also, regulators are toughening their stance on carbon emissions by implementing carbon taxes and other price initiatives. Meeting climate and other ESG commitments and disclosures will be essential if energy companies want to maintain their social license to operate.

Additionally, the benefits of energy sustainability are significant and can extend beyond goodwill and investor interest. While it's too early to attribute causation, a correlation appears to be emerging between ESG performance and competitiveness. In short, energy companies that achieve better financial performance seem to be the ones paying greater attention to ESG.



Companies with better-managed ESG risks and high ESG ratings demonstrate:

Lower cost of capital

~0.5%

Lower average for companies with high ESG score based on the MSCI World Index

Less volatile share price

~4%

Lower average volatility of leading ESG stocks on CAC40

Better stock performance

25%+

Outperformance of S&P 500 companies ranking high on ESG between 2014 and 2018

Higher shareholder returns

2.3X

Over the past five years, companies across all industries with high ESG performance delivered twice the returns

Sources: Accenture 2021 analysis with data from various industry reports; Climate Disclosure Standards Board; [Ceres](#) database.



Growth in the coming decades will be driven by sustainable energy.

Sustainable energy is the field in which companies can capture future growth and related market multiples. In a world with increasing energy needs and a compression of fossil fuels' share in the energy mix (from 80% to up to 50% by 2050⁶), low-carbon energy can grow by leaps and bounds.

We have seen that in wind and solar, with healthy double-digit growth (CAGR of >20% over the past decade or doubling in size every four years⁷) compared to low single-digit growth for oil and gas. We are now set to see, or at least require, faster growth in areas like CCUS, hydrogen, alternative fuels, nuclear and energy storage. In other words, low-carbon plays are essential for the long-term vitality of energy companies.

Key low-carbon technologies available today represent less than 1% of what is needed for a net-zero system.⁸ CCUS solutions, which accommodate less than 50 megatons (Mt)/year today, will need to grow to nearly 8,000 Mt/yr.⁹ Green hydrogen production will need to grow from less than 1 Mt/yr today to more than 300 Mt/yr by 2050.¹⁰ Each of these are projected to become multi-trillion-dollar markets by 2050,¹¹ rivaling oil and gas revenues.

The fact that energy companies are emphasizing sustainability is good news.

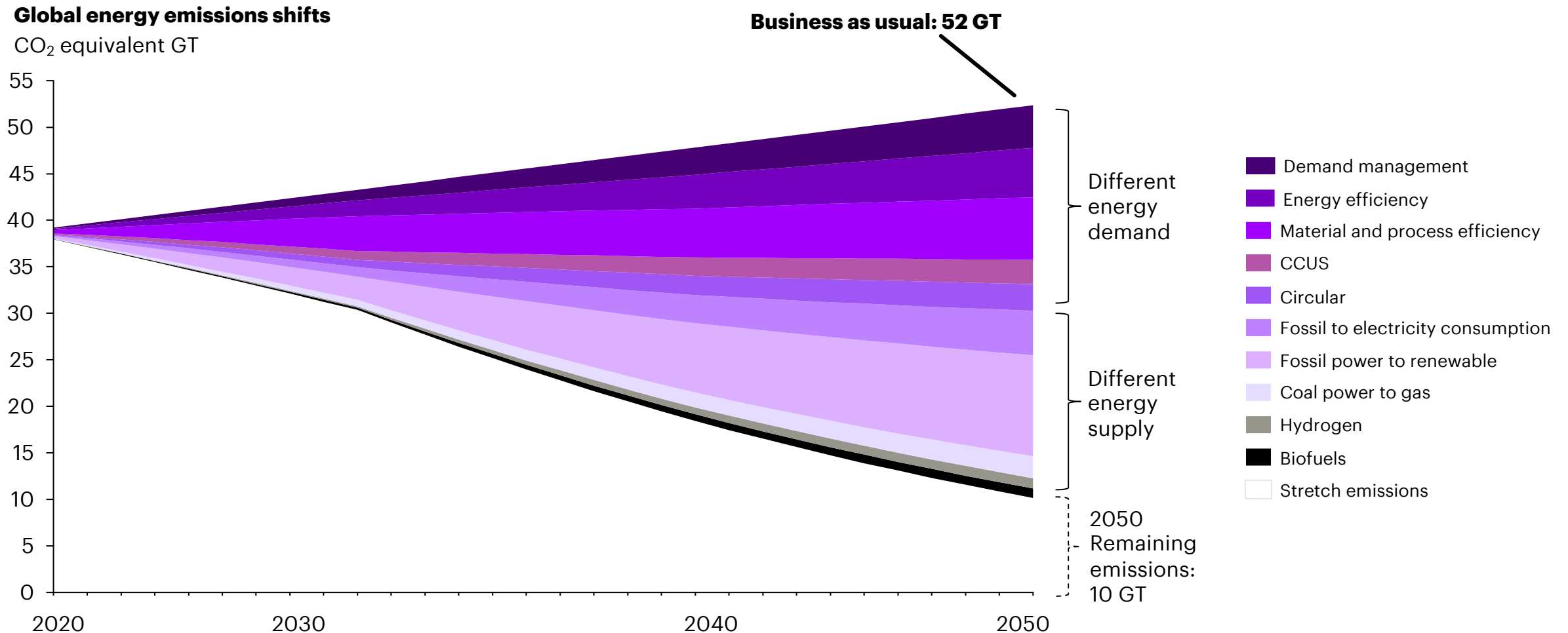
But it will likely not be good enough.

Accenture's analysis of industry emissions between now and 2050 includes a "stretch case" scenario, which suggests that achieving net zero by reducing 80% of emissions and off-setting the remaining 20% is theoretically possible.

However, this will require significant shifts and investments both on the energy demand and supply sides. Declining energy intensity, increasing efficiency, and scaling up of circularity will all be needed.



The urgency to act on sustainability remains. Our stretch case scenario suggests the industry can achieve net zero by 2050, but only by shifting both energy production and consumption.



Source: Decarbonizing Energy: From A to Z, (2021, May). Accenture:
<https://www.accenture.com/us-en/insights/energy/decarbonizing-energy-overview>



A reversal of fortunes

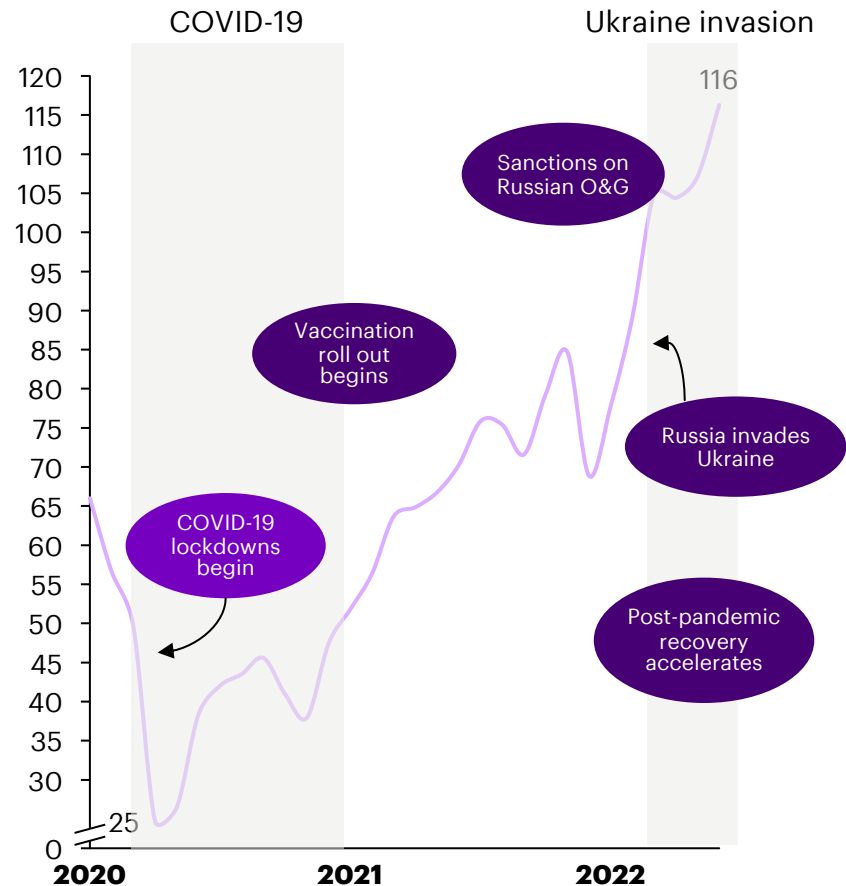
Energy companies will need to play a critical role in leading the joint security and sustainability imperative.

That, in turn, will require investor confidence in the industry's ability to deliver healthy returns. That has proved to be challenging—until recently. Since the previous economic downturn in 2010, the energy industry consistently underperformed. But in 2021, with high commodity prices driving high profitability, investor confidence returned.



In 2021, investor confidence returned

Brent crude oil price, 2020-June 2022 (USD/bbl)



Source: Accenture analysis with data from S&P Capital IQ.

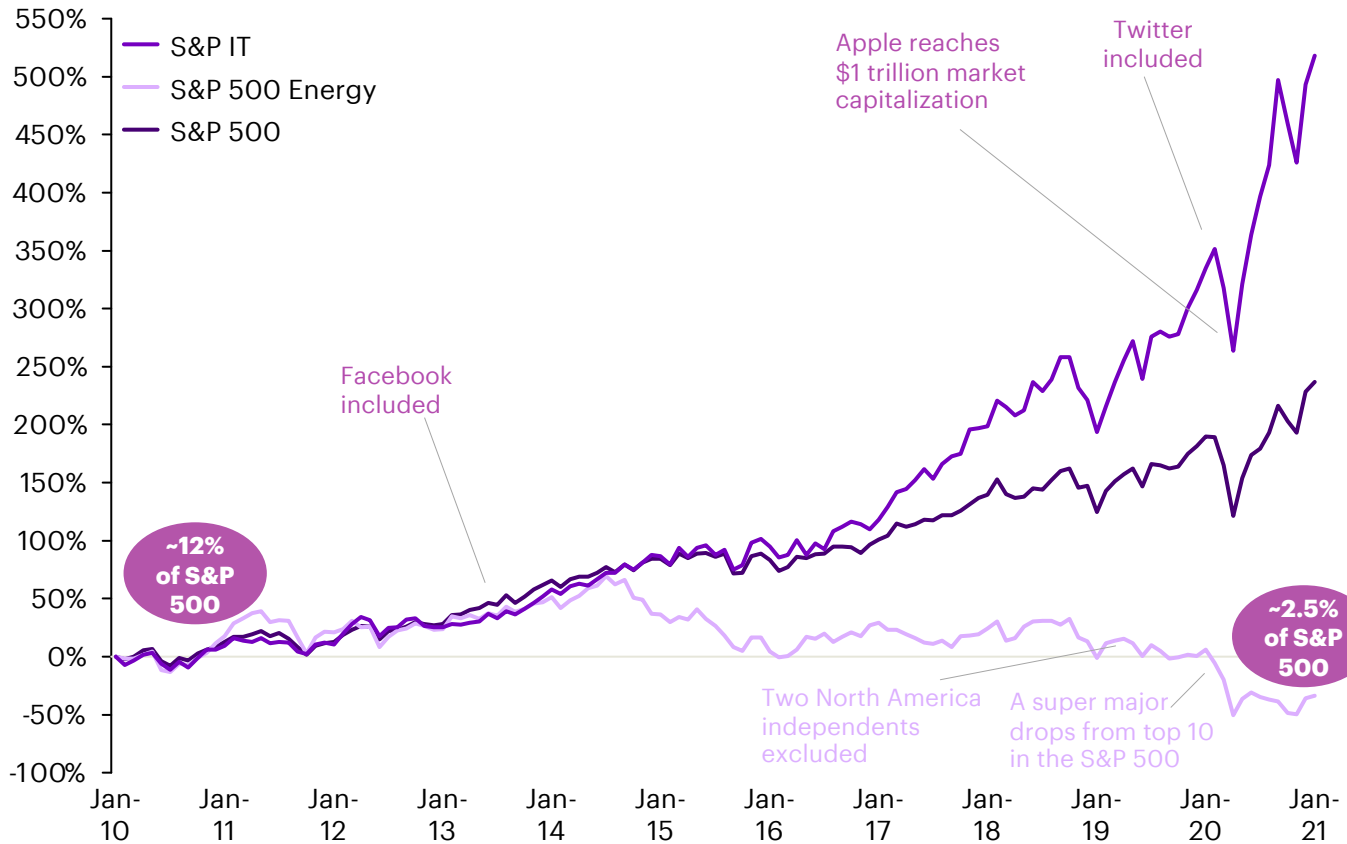
As prices have recovered since 2021, returns have been making a comeback along with record cash flows (2-3x of prior upcycles).

Despite its growth, the industry has struggled to deliver returns to investors since 2015...but that has changed recently.

Since the previous downturn, the industry consistently underperformed...

Energy performance vs. market average

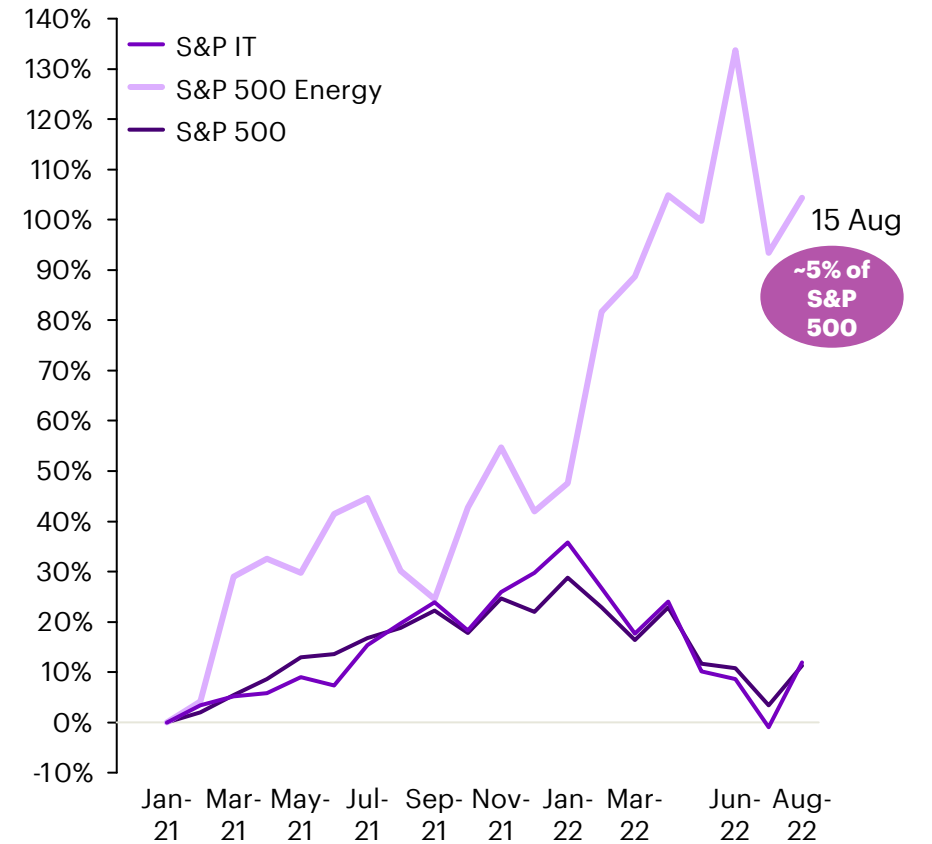
(index points, Jun 2002 = 0)



...until last year which saw regained investor confidence

Energy performance vs. market average

(index points, Jan 2021 = 0)



Source: Accenture analysis with data from S&P Capital IQ.

Rising commodity prices due to supply constraints are only part of the story, however.

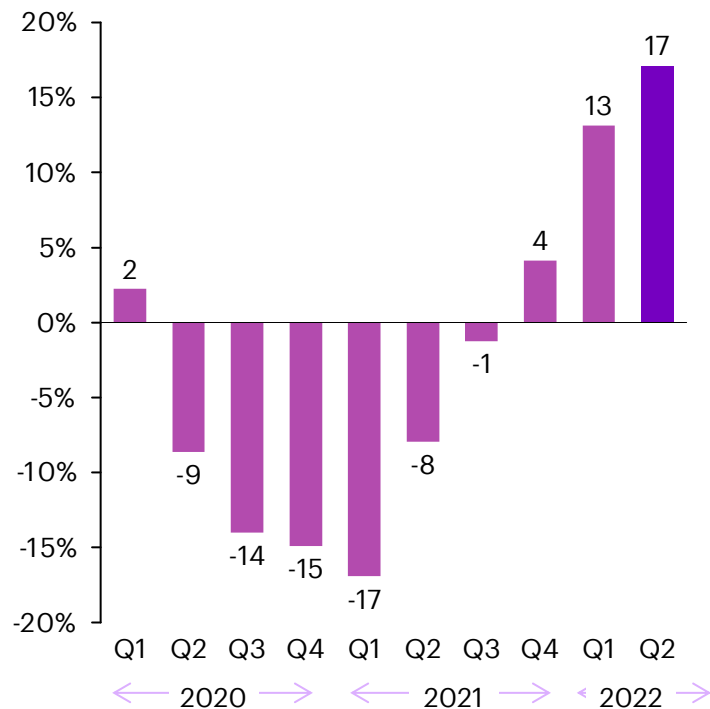
The energy industry's reversal of fortunes has likely also been propelled by improvements from companies' compressed digital transformations, which have enabled them to operate more responsively and responsibly, as well as improved financial discipline, which has allowed them to achieve higher returns on capital and record cash flows of two to three times previous upcycles.



Strong returns are also enabled by compressed transformations and financial discipline

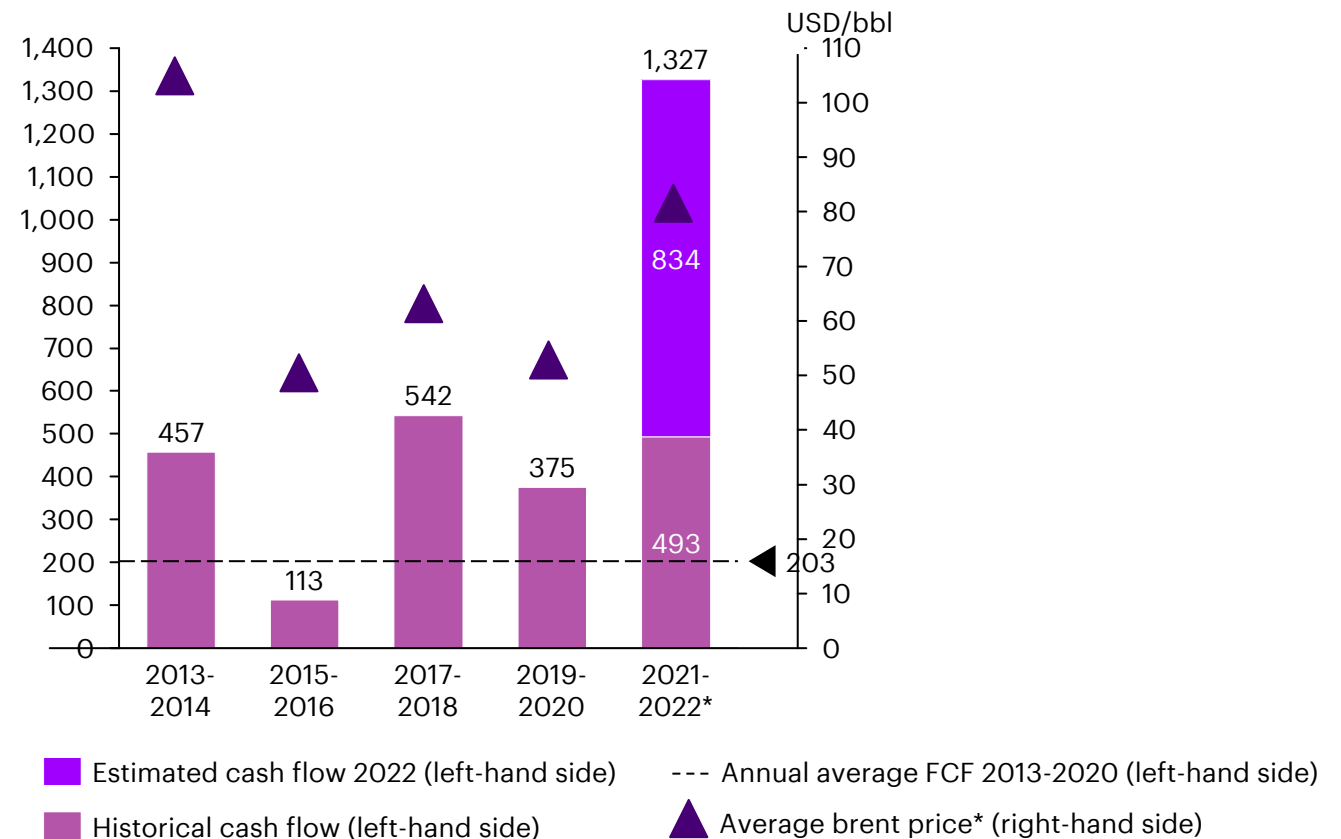
Returns and cashflows have been making a strong comeback.

ROCE in the oil and gas sector 2000 - Q1-22
(SP500 Energy)



■ ROCE
■ Estimated ROCE

Total free cash flow (FCF) for all public exploration and production companies
(Billions USD, real)



*Unweighted average Brent price. In 2022 about \$103/bbl versus the \$82/bbl 2021-2022 average.

Source: Accenture analysis with data from Rystad Energy.

Source: Accenture analysis with data from S&P Capital IQ.

An aerial night view of a city skyline, likely Dubai, with numerous skyscrapers and illuminated buildings. Overlaid on the city are numerous vertical lines of varying colors (blue, purple, red) that extend upwards from the city, each ending in a small glowing dot. These lines represent a digital network or data flow. The overall scene is dark, with the city lights providing the primary illumination.

Investing in energy security

In addition to investor confidence, a successful transition to a secure and sustainable energy future will require appropriate investments in hydrocarbon and non-hydrocarbon energy production, as well as in decarbonization technologies. The level of investment required is enormous.

When it comes to investments in oil, Accenture analyses show that the industry needs to increase its spending by 20-30% this decade.

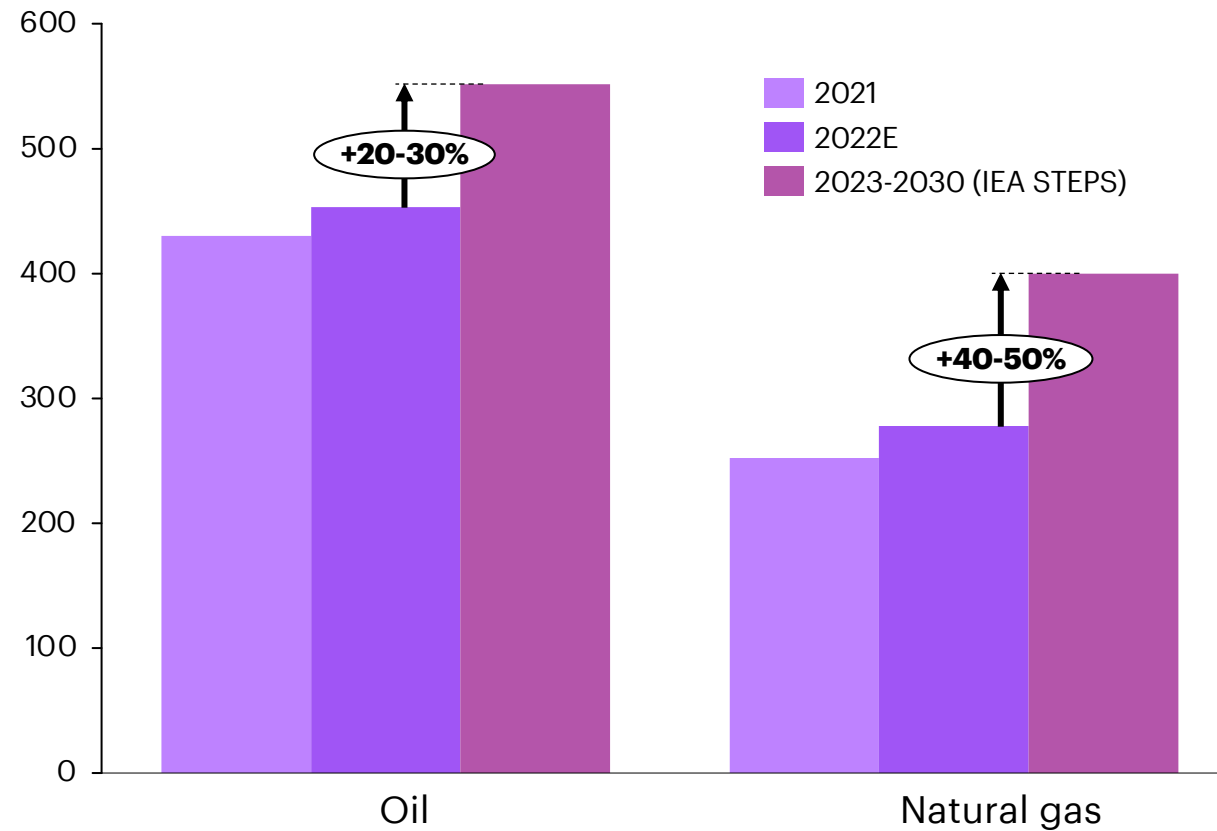
That translates into new investments of approximately \$100 to \$125 billion each year.

Why so much?

Oil production is expected to grow from less than 100 million barrels per day (mmb/d) to at least 105 mmb/d by 2030, or roughly 0.5 mmb/d each year. Meanwhile, oil production from existing assets is set to decline by 4-7 mmb/d per year. OPEC's spare capacity of approximately 3 mmb/d is already approaching historic lows. And US output remains about 1 mmb/d below the pre-pandemic high. Investments in oil, therefore, will need to not only accommodate new demand, but also make up for declines in existing production.

To achieve energy security over the short- to medium-term, the industry needs to increase its “real” spending by 20-30% on liquids and 40-50% on gas this decade.

Expected investment in 2022 vs. annual average investment needs 2023-30
(Billions USD)



Source: Accenture analysis with data from IEA World Investment 2022, June 2022; IEA WEO 2020 / [API.org](https://www.iea.org/), Reuters; 2022 demand from IEA Oil market report May 2022; LNG: Rystad Energy “Long-term liquefaction outlook revised” (May 2022).

A similar story unfolds for gas. To meet future demand, natural gas volumes need to increase from 4 trillion cubic meters (tcm) to up to 5 tcm in the longer run.






Production declines of >200 billion cubic meters (bcm) per year also need to be replaced. Additionally, with expanding global gas trade, massive investments are needed to increase liquified natural gas (LNG) capacity from 500 to up to 800 million tons per year this decade. Together, these factors call for additional annual investments of >\$125bn. in the natural gas system.

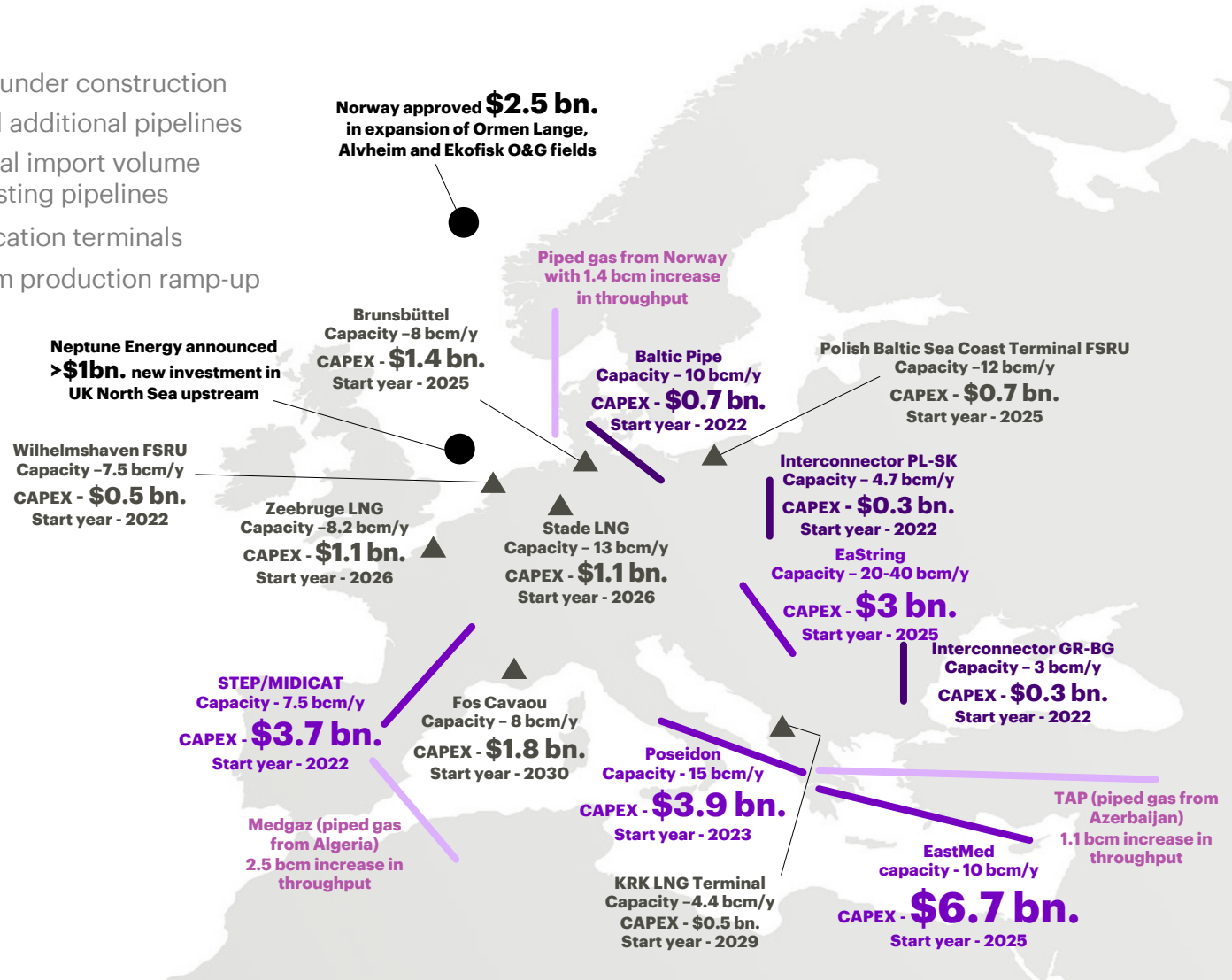


Complicating matters is the need for the industry to “rewire” the energy system to account for shifting trade flows driven by recent geopolitical events.

For example, just in the next 12-40 months, Europe is investing at least \$15-20 billion (and likely more) to develop new pipelines, regasification terminals and other infrastructure upgrades as a consequence of the war in Ukraine.

Key planned and upcoming gas infrastructure additions in Europe

-  Pipeline under construction
-  Potential additional pipelines
-  Additional import volume from existing pipelines
-  Regasification terminals
-  Upstream production ramp-up



- **Over \$15-20 billion in CAPEX** is invested only in the near term across Europe to enable alternatives to Russian gas
- Development includes new **pipelines, regasification terminals**, as well as expanding capacity and throughput in **existing infrastructure**
- However, significant **upgrades take time, often 3-5 years**, and **capacity constraints** will limit the flow of gas in Europe, even if investments are ramped up
- **Additional investments** will be needed in the rest of the world to offset potential decline in Russian oil and gas supply

Sources: Umlaut/EWI analysis for Accenture; Accenture analysis based on information available at EIA, IEA, FERC, Global Energy Monitor, Gas Infra Europe LNG Database, press releases (LNG terminals, upstream production and interconnection completion years). Not showing the Trans-Mediterranean pipeline with about 32 bcm/a capacity from Algeria to Italy.



Investing in energy sustainability

Despite the short- and medium-term focus on ensuring energy security, energy sustainability and the energy transition remain priorities across the industry

Energy companies are not slowing their efforts to create a sustainable energy system. Consider this: mentions of sustainability within the market communications of five energy “majors” have increased by more than 400% in the last decade. Coverage of their efforts by market analysts has soared by over 1000%.¹²



Ensuring energy sustainability will require nations and energy companies to significantly ramp up investments in clean technologies, energy efficiency solutions and low-carbon fuels. We estimate that the spending on clean energy will need to at least double, and likely triple, to scale the solutions that are needed to drive the energy transition.

So, where should these investments be focused?

According to our “stretch-case” scenario, achieving net zero by 2050 will require energy companies to accelerate the deployment of solutions like wind and solar, hydrogen, biofuels, CCUS, as well as solutions that improve energy efficiency and circularity. For example, the share of renewables in the energy mix will need to grow by nearly 90% in order to bring about the shift away from coal.

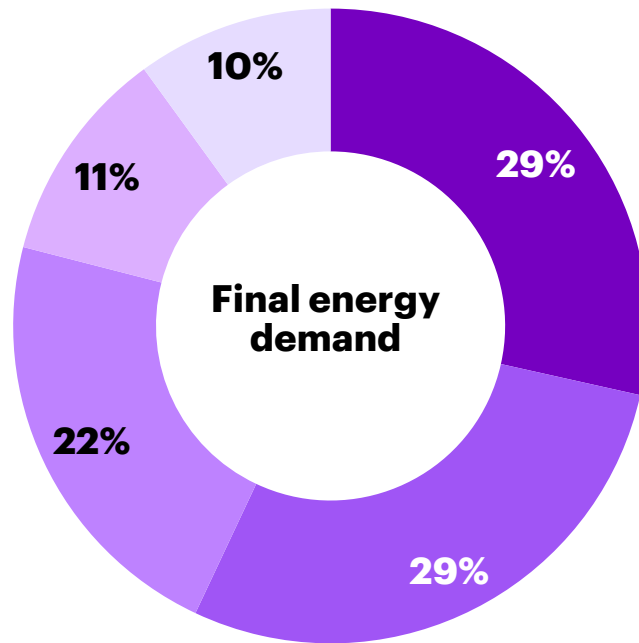
The new investments that are needed could exceed \$4 trillion per year by 2030.

To meet the world’s announced pledges, the industry will have to at least double its annual spend on clean technologies to drive this energy transition.

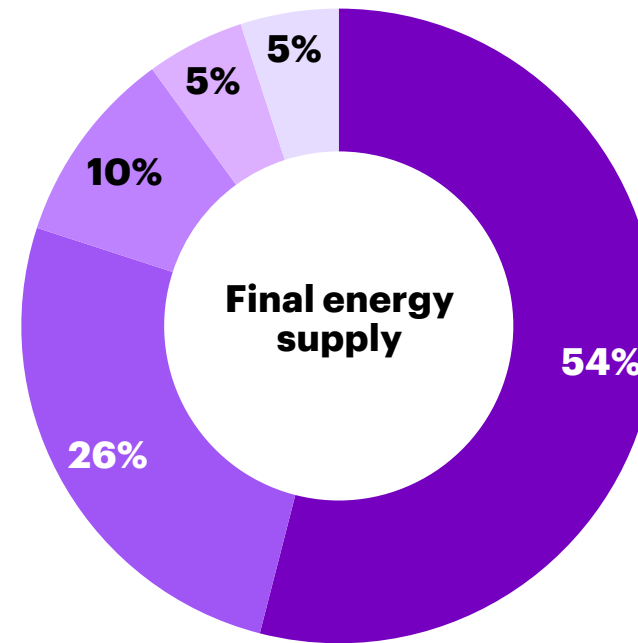


Demand and supply shifts needed to achieve Accenture's stretch case for emissions in 2050.

(% of total GT of CO₂ eliminated by solution)



- Energy efficiency
- Process and material efficiency
- Demand management
- CCUS
- Circularity solutions



- Coal to solar or wind
- Fossil fuel to electricity consumption
- Coal to gas
- Hydrogen
- Biofuels

Such investments can't wait.

According to our analysis of IEA data, investments in energy efficiency solutions need to grow by 94% in just the next eight years. Investments in low-carbon fuels and CCUS will need to grow by more than 850% over the same period. This is a tall order. But technological advances in hydrogen, biofuels and CCUS are already prompting greater investment interest.

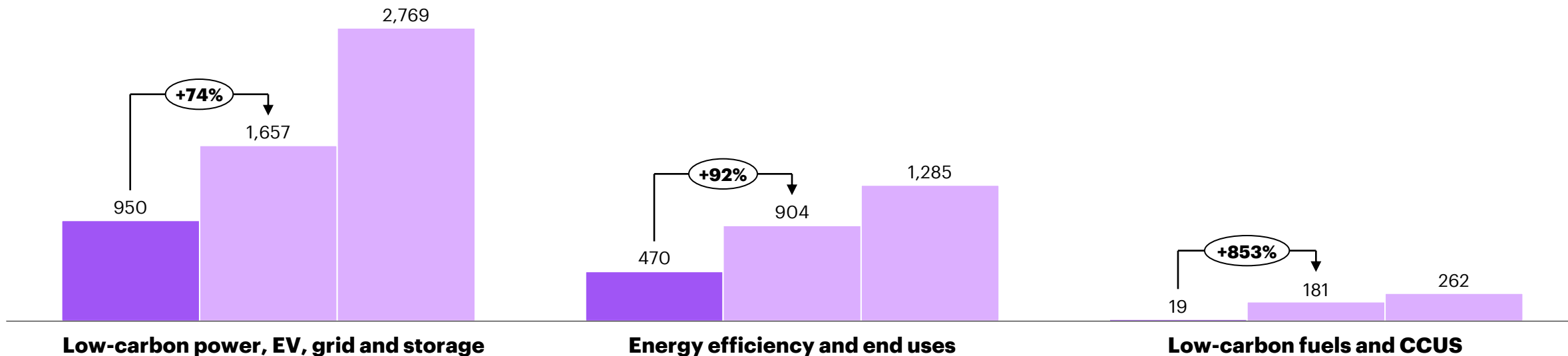


Investments in energy efficiency solutions need to grow by 94%

Expected clean energy investment in 2022 vs. annual average investments needed in 2030

(Billions USD, by technology and IEA scenarios)

■ 2022 ■ 2030 APS ■ 2030 NZE*



- Power has a clear trajectory to meet investment demands over the next decade if growth continues at current rate
- Higher costs, supply chain and limited supply of critical minerals can slow growth

- Demand side actions are key to displacing fossil fuel's role in the energy mix
- Higher fossil fuel prices and government policies have driven most of the growth
- Inflation and rising rates are obstacles to reaching the required investment this decade

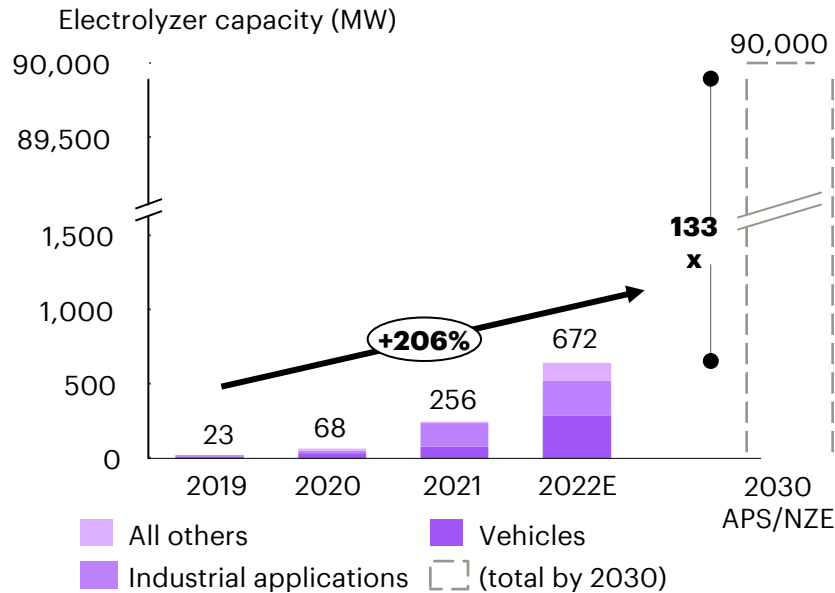
- While investment in biofuels has doubled, the competition with food production could reduce availability
- Hydrogen project pipeline continues to grow, but electrolyser manufacturing could be a bottleneck
- CCUS growth is being driven by low-carbon hydrogen production and new business models that improve viability

*NZE scenario in IEA WEO 2021.

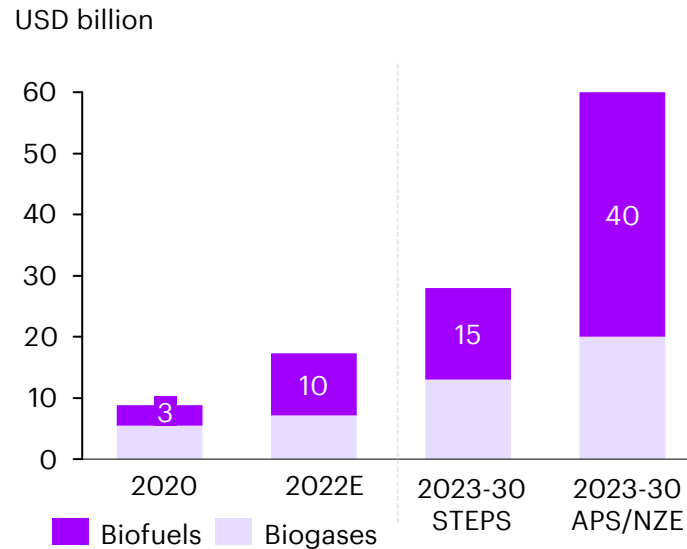
Source: Accenture analysis with data from IEA World Investment 2022, June 2022.

The industry has the opportunity to lead the energy sustainability charge by investing heavily — >\$200B per year – in key technologies

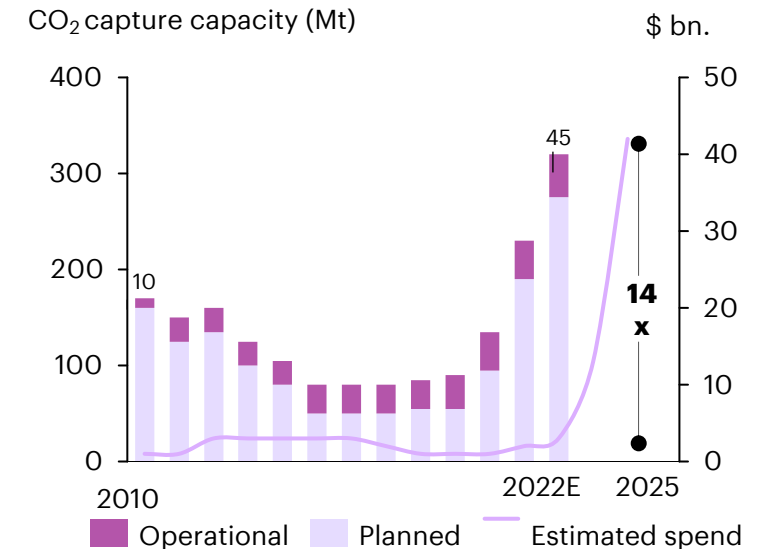
Hydrogen project pipeline has grown by 200% focusing on industrial and vehicle-related projects



Spending on biofuels needs to grow 1.5 – 4x annually to meet the world's net zero ambitions



CCUS operational capacity has grown 13% annually, with planned spend growing 14x between '22 – '25



Oil and gas capabilities relevant to the development of the low-carbon energy system:

- Expertise and infrastructure for H₂ (+CCS) and biofuel production in refineries
- Midstream and retail infrastructures and business models to serve end consumers
- Experience in building and developing large-scale capital projects
- Access to geologic formations and petrotechnical talent to assess how to store carbon

- Access to geologic formations and petrotechnical talent to assess how to store carbon
- Experience building and developing large scale capital projects

Sources: Accenture analysis with data from IEA World Investment 2022, June 2022; IEA WEO 2021.
Note: Total >\$200bn. including biofuels, CCS and hydrogen by 2030.

Energy companies are uniquely positioned to lead the charge in each of these areas.

They bring expertise and infrastructure for hydrogen and biofuel production in refineries. They have midstream and retail infrastructures in place, along with business models, to serve hydrogen and biofuel markets.

Additionally, they have experience building and developing large-scale capital projects, as well as access to geologic formations and petrotechnical talent that will be needed to store carbon.



Importantly, energy companies can further reaffirm their commitment to energy sustainability by acting promptly on direct emissions. While such emissions represent less than a fifth of total emissions, they can be considered the “low-hanging fruit” of net-zero programs. Methane mitigation presents a unique opportunity for energy companies to reaffirm their decarbonization commitment.

Methane emissions, which are 80 times more potent in the first 20 years than CO₂, make up a significant portion of the energy industry’s Scope 1 emissions. Getting to zero methane emissions is certainly possible. The technologies needed to abate it are mature and readily available. What is now needed is a shift in focus—from methane detection and repair to prediction and prevention. Digital methane-management platforms that integrate monitoring, measuring and predictive management capabilities will also be important, along with enabling regulatory frameworks. Norway has proven that methane emissions from the energy industry can be brought to zero, but rigorous measurement and reporting are required.

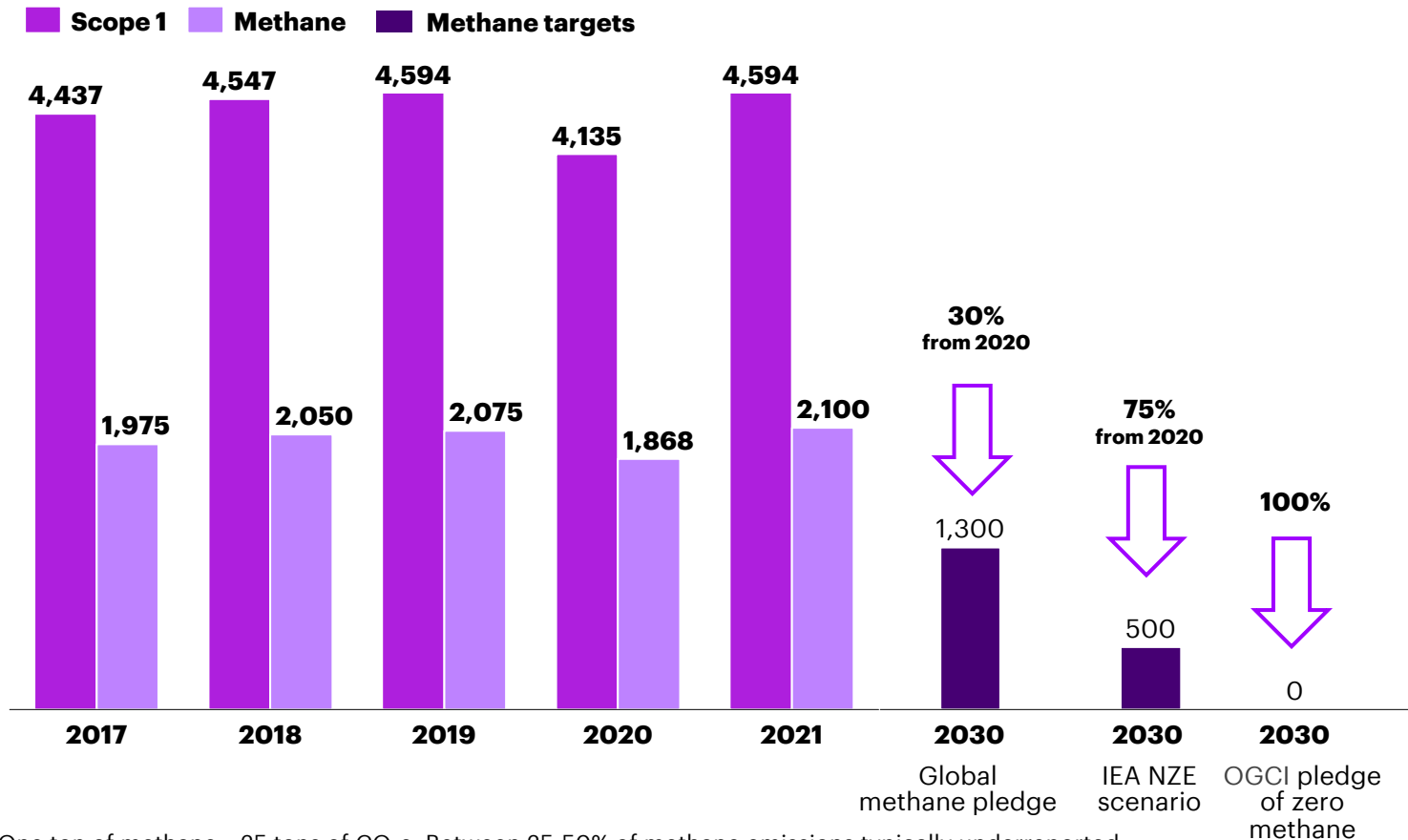
The business case for tackling methane is strong.

Preventing methane leaks could bring an additional 180 billion cubic meters of gas to market (or more than the volume of gas imported by Europe from Russia before the Ukraine invasion).

Reducing emissions by just 30% by 2030 could have the same effect as moving global transport sectors to net zero by 2050.

One of the pressing sustainability priorities is the reduction of direct emissions, particularly methane.

Estimated global O&G sector scope 1 GHG and methane emissions
(Million tons CO₂e)¹



¹One ton of methane = 25 tons of CO₂e. Between 25-50% of methane emissions typically underreported.
Source: Accenture analysis with data from IEA, CAIT, S&P Capital IQ ESG.

The background is a complex, abstract composition of numerous thin, overlapping lines in shades of purple, magenta, and blue. These lines create a sense of depth and movement, resembling a long-exposure photograph of light trails or a tunnel with a grid-like structure. In the center-right, a blurred silhouette of a person is visible, walking away from the viewer, which adds a human element to the otherwise abstract scene.

A reversal of investment strategies

The good news is that the industry now has the money to start making the types of investment needed to ensure energy security and sustainability. There are some encouraging signs that investments will ramp up. For example, upon announcing second quarter 2022 earnings, the chief executive officer of one energy major commented: “We are using our financial strength to invest in secure energy supplies which the world needs today, taking real, bold steps to cut carbon emissions, and transforming our company for a low-carbon energy future.”¹³

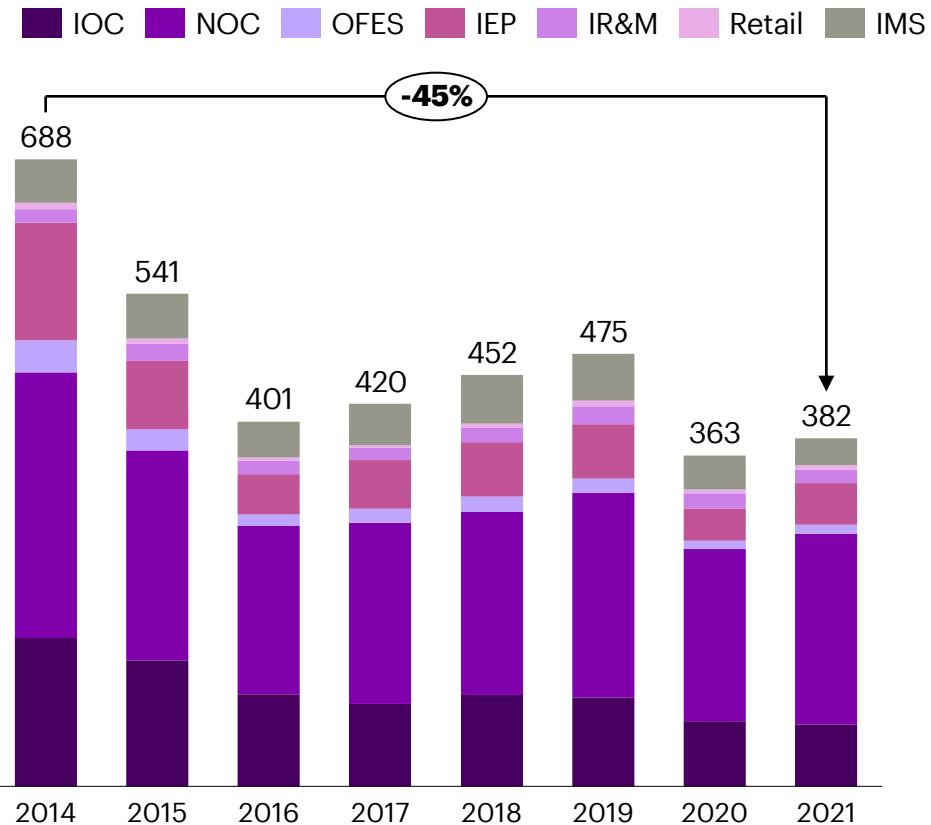
This is precisely the dual commitment to security and sustainability that the industry—and the world—needs. But actions will speak louder than words. The industry has slashed its capital expenditures over the past eight years. Spending on capital projects is not keeping pace with the growth in demand for oil, gas and LNG.

“We are using our financial strength to invest in secure energy supplies which the world needs today, taking real, bold steps to cut carbon emissions, and transforming our company for a low-carbon energy future.”¹³



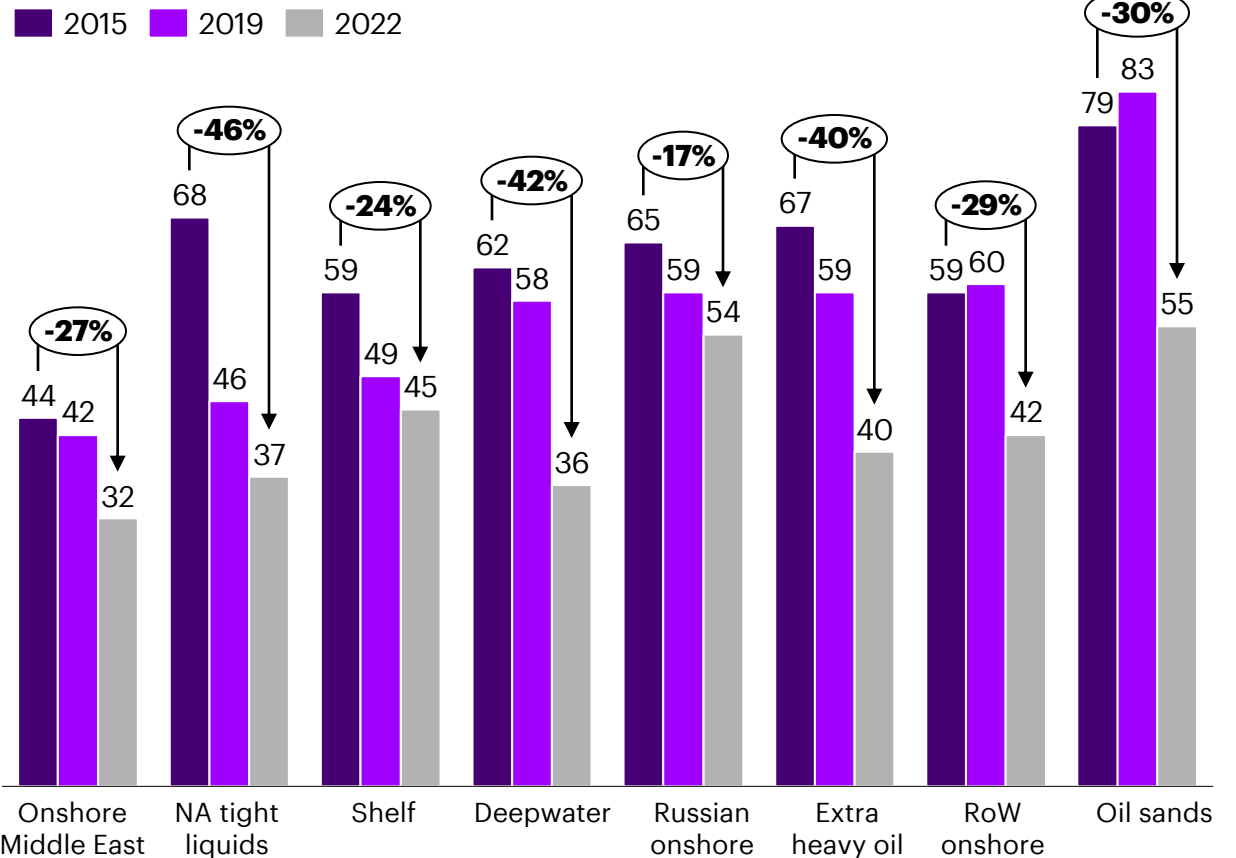
Rising prices aren't the whole story, years of underinvestment and accelerated transformations have helped fuel returns.

O&G companies' CAPEX per year, 2014-2021
(Billions USD)



Source: Accenture analysis with data from S&P Capital IQ.

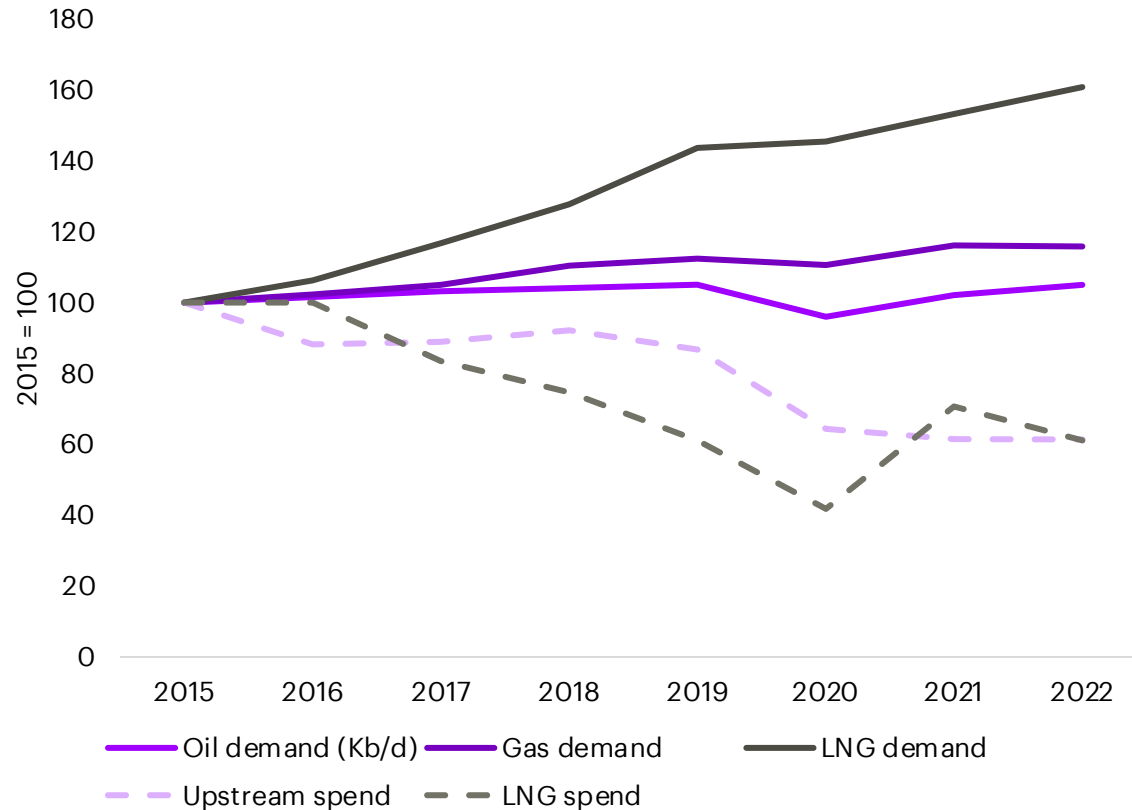
Weighted average oil break even by asset class, 2014-2022
(USD/bbl)



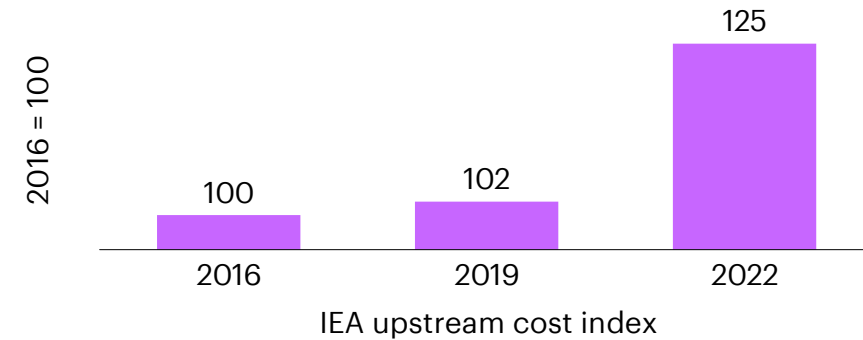
Source: Accenture visualization of Rystad Energy data/insights.

Underinvestment, coupled with rampant cost inflation, poses a supply (and energy security) risk for energy companies.

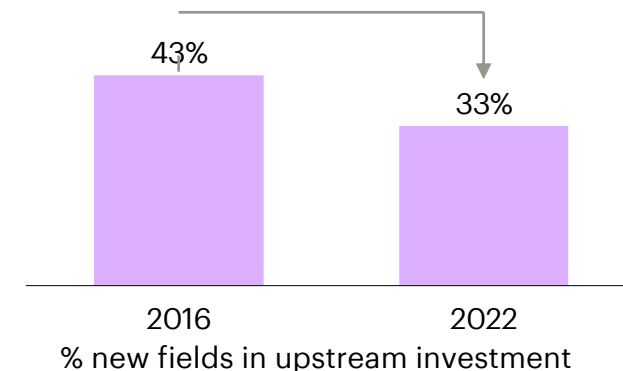
Oil and gas demand has continued to increase, however, spend has been scaled back



In a high inflationary environment, additional CAPEX needs to cover significantly higher costs, limiting actual net investment



Investment in new assets has dropped, complicating the industry's ability to create future supply



Sources: Estimates based on data from IEA World Investment Report 2022, BP Statistical Review, IEA oil market report, IEA quarterly gas market report and SP Global.

Note: LNG spend represents annual investment spending on sanctioned projects; Downstream spend represents investment in new refineries and upgrades, Rystad Energy "Inflation Bites..." (June 2022).

There is a good chance that this lack of investment may continue.

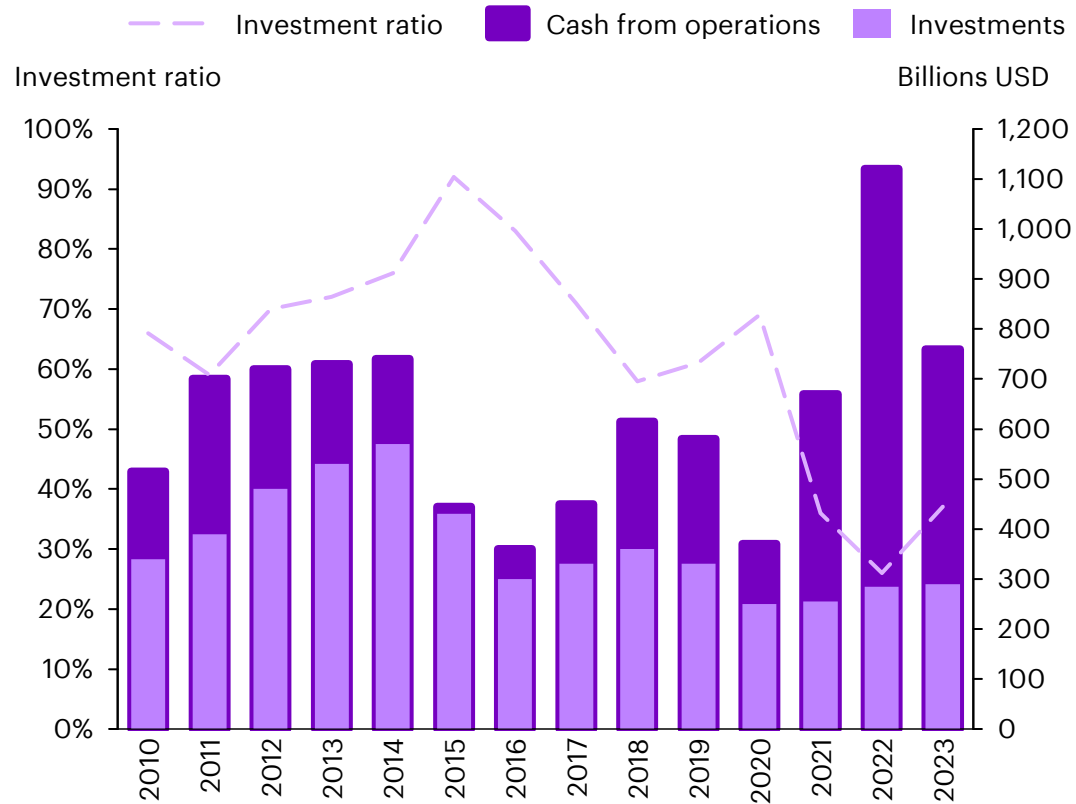
Our analyses suggest that, despite their improvements in financial performance, energy companies will be slow to jumpstart their investment strategies—both in securing energy and in making it more sustainable.

Today's high inflationary environment complicates matters. Costs that are 25% higher than five years ago will need to be covered by additional CAPEX spending, which limits the actual net investment.

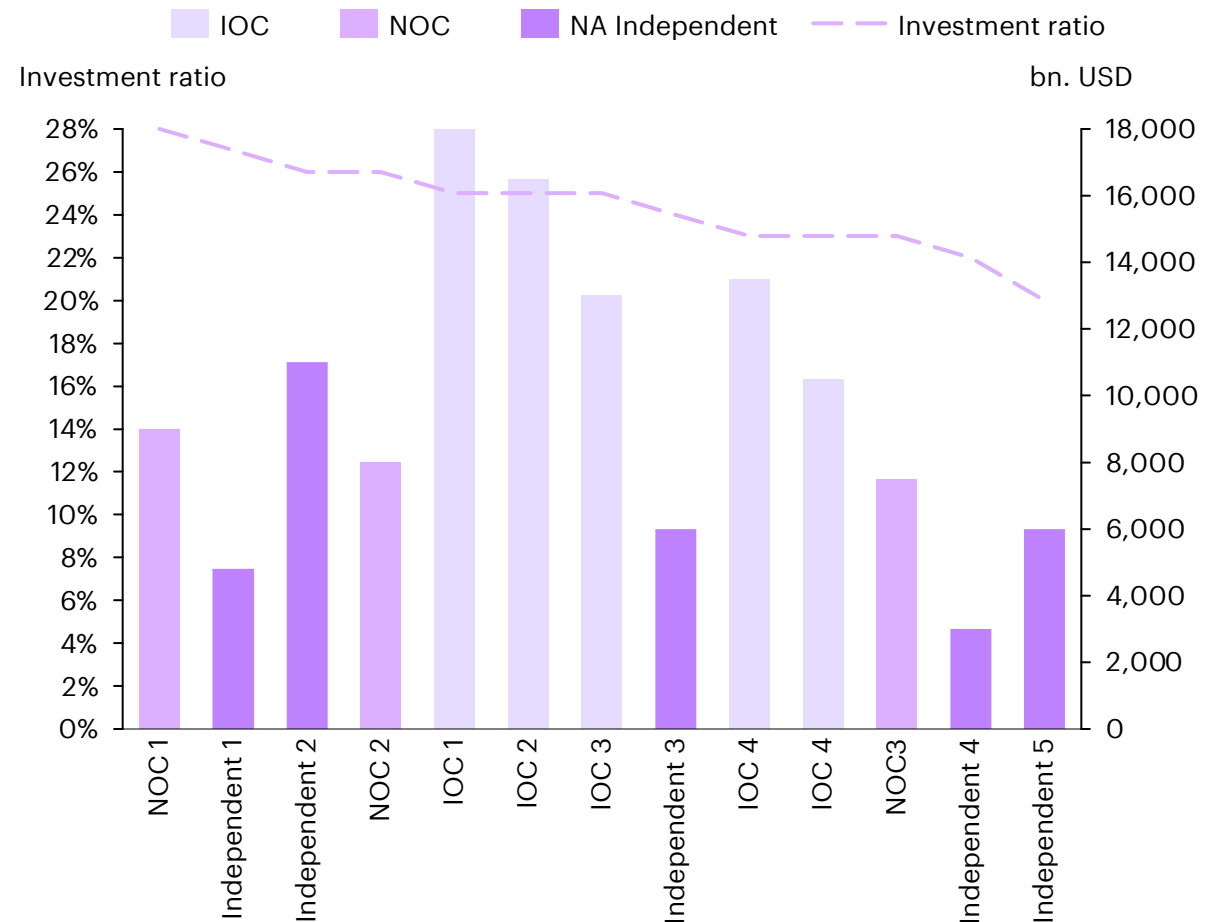


Despite the improvements, investment ratios are not expected to increase significantly.

Cash from operations, investments and ratio



Estimated FCF* growth and investment ratio by operator, 2022



*FCF includes all cash flows from upstream activity and does not include cash related to financing.
Source: Accenture analysis with data from Rystad Energy.

A photograph of two people walking on a beach at sunset. The sun is low on the horizon, creating a warm orange and yellow glow. The people are silhouetted against the bright sky. They are walking across a shallow area of water, stepping on a series of dark, flat rocks that form a path. The water is calm, reflecting the sunset and the figures. The overall mood is serene and contemplative.

Striking the right balance

The energy industry has made strides in the past decade to build a more sustainable energy system for the future. Recent global and geopolitical events, however, have revealed how vulnerable the energy system is to supply and demand disruptions. As a result, many companies have shifted their focus from long-term energy sustainability to near- and medium-term energy security.

**This reassessment is understandable.
But it is also shortsighted.**



A sustainable energy system that does not ensure energy security is not sustainable at all. Conversely, a secure energy system that is not sustainable will do little to ensure long-term energy access and affordability. Energy security and sustainability go hand-in-hand.

Striking the right balance is critical. A successful energy transition that achieves net-zero targets by 2050 rests on people's ability to access (and absorb the cost of) energy supplies in the near term. Taking actions that address the long-term sustainability imperative, while ensuring energy security in the short and medium terms will allow companies to earn the support of governments and citizens, alike. Their relevance and social license to operate will be assured.

Focusing on either energy security or sustainability at the expense of the other will potentially derail the entire energy transition.



We believe there are five actions energy companies need to consider when balancing their energy security and sustainability agendas.

01. Accelerate investments to accelerate decarbonization
02. Organize and allocate for success
03. Compress transformations and total enterprise reinvention journeys
04. Don't rely solely on long-term targets
05. Collaborate for change



01.

Accelerate investments to accelerate decarbonization.

Accenture estimates that global demand for energy will grow by approximately 16% by 2035. Some regions may see market growth exceed 40% for natural gas and near 20% for oil.¹⁴ This means that the calls for energy companies to temper their production are not realistic. Demand dynamics confirm that hydrocarbon providers will play a critical role in the energy system for years to come. This also means traditional hydrocarbon investments must be maintained and expanded to achieve short- and medium-term energy security.

But the future of the energy industry does not lie in hydrocarbons. Our analyses show that other energy sources and solutions are gaining considerable traction and will, in fact, grow exponentially relative to hydrocarbons.¹⁵ We found, for example, that by 2035:

The global biofuels market is set to at least double, albeit at a different pace by region and transport subsector (and then will accelerate further through 2050¹⁶)

64% of 80 sector-specific decarbonization solutions will be economically attractive.

The carbon capture and storage (CCS) solutions market will reach the scale of the oil sales market in multiple heavy industries (with an annual market size exceeding \$3 trillion by 2050¹⁷)

The market for combined CCUS and hydrogen solutions will be worth \$220 to \$780 billion (in turn multiplying by 2050 to become a multi-trillion-dollar market¹⁸)

The long-term imperative for energy companies must involve scaling technologies that offer the fastest route to decarbonization.

We believe renewable power, hydrogen, biofuels and CCUS hold particular potential for creating an energy system that is as sustainable as it is secure. They will be important components of the balanced fuel mix that will be needed by 2050. And they will be big markets by then; CCUS and hydrogen are expected to rival oil and gas revenues of nearly \$7 trillion/year.¹⁹

Equally, if not more, important will be investing in solutions that will reduce the energy intensity of the entire system. Our “stretch-case” analysis suggests that demand management investments can eliminate 22% of the industry’s CO₂ emissions. Energy efficiency solutions can eliminate 29% more. We are already seeing some energy-efficiency solutions gain maturity in the cement, iron and steel, refining and petrochemical sectors. But large opportunities still exist. For example, our analyses suggest that the industrial asset management market may be worth \$150+ billion by 2025. Energy companies are uniquely positioned to develop innovative efficiency solutions and extend them to other industrial sectors.²⁰



02.

Organize and allocate for success.

The homogenous energy system we've grown accustomed to is becoming much more heterogeneous. The new system will enable consumers to tap different sources of energy to meet the needs of different industries and geographies. To compete in this new environment, energy companies need to define the role they want to play in a secure and sustainable energy future.

As described in previous research,²¹ companies can be:

Hydrocarbon Specialists, which build competitive asset portfolios, extend their assets' viable lives, and capture disproportionate value from oil and gas—even beyond the upcoming volume peak. They will deliver the most efficient, lowest-cost oil and gas production and integrate CCUS and methane emissions-management capabilities.

Energy Majors, which build or add clean energy businesses to their existing hydrocarbon assets. Over time, they will increasingly rotate to low-carbon energy, while unlocking trapped value by integrating oil and gas into a portfolio of energy businesses.

Low-Carbon Solutions Leaders, which will refocus their operations and strategy to scale new areas of the clean energy system such as offshore wind, energy efficiency services, hydrogen or alternative fuels.

Leaders across these archetypal roles will need to reshape and balance their portfolios to deliver on the dual security/sustainability imperative. This can be challenging.





With so much “noise” and uncertainty around the energy transition, industry leaders struggle to identify, understand, or even acknowledge the imminent risks to which their existing portfolios may expose them.

New capabilities will be needed to understand market-by-market and sector-by-sector demand dynamics, as well as returns on all their capital allocations. This will enable them to adjust their asset portfolios to the most economical plays on a per-joule basis.

03.

Compress transformations and total enterprise reinvention journeys.

[Accenture research](#)²² has found that enterprise reinvention leaders in the energy industry are moving beyond pilots and rapidly deploying new strategies and ways of working across the value chain. They are using frontier technologies, data, artificial intelligence (AI) and agile methods to drive a step change in performance. And perhaps most significantly, they are compressing their transformations by focusing on several aspects of change simultaneously.

For example, they may focus on shaping resilient portfolios and operating models, including ways of working, that achieve accretive returns through cycles.

At the same time, they may shift investments, operations and products to achieve carbon neutrality and sustainability. Finally, they might scale their digital capabilities and end-to-end platforms for managing operations, new business models and customers.

It's about scaling transformation and creating an outcome that is greater than the sum of its parts.

Compressed Transformation involves transforming multiple parts of the enterprise at the same time or executing a single large transformation much faster.

04.

Don't rely solely on long-term targets.

Energy companies have embraced ambitious net-zero targets for 2050. But the scale of investments and scope of actions needed to achieve their sustainability (and security) goals require a steady pace. The only way energy companies can stay on track is by setting interim targets for 2030 and 2040 and introducing greater rigor and consistency to carbon measurement and intelligence.

Earlier this year, the World Economic Forum, in collaboration with Accenture, released its Net-Zero Industry Tracker²³ to assess the decarbonization progress of six high-emitting industries. After assessing each industry's net-zero readiness, we were able to propose interim actions that can help them keep their longer-term decarbonization goals on track. Recommendations applicable to energy players include:

- Rapidly deploying existing technologies to drastically cut vented and fugitive methane (and, for oil companies, flaring emissions).
- Boosting the number of low-emission projects to drive costs down and accelerate commercial readiness for new technologies.
- Developing renewable power capacity and CO₂ transport and storage infrastructures. Oil companies can go even further to develop clean hydrogen production capabilities.
- Multiplying demand signals for low-carbon energy to incentivize producers and investors to direct capital towards clean energy technologies and low-emission production assets.

05.

Collaborate for change.

The level of investments required to achieve energy security and sustainability are so significant that the onus of responsibility cannot fall to a single company, industry or country. Private-public partnerships and collaboration with industry peers and across sectors will be key. This is especially relevant in the development and scaling of new technologies.

It is also particularly important when tackling Scope 3 emissions of hard-to-abate industries. Energy companies need to consider how their actions and solutions might influence changes in adjacent sectors. This broader thinking is a must for energy companies that want to position themselves as partners to their customers, jointly committed to supporting their emissions-reduction strategies.

Working together will allow industry players and public partners to achieve economies of scale and drive system-wide efficiencies. Collaboration will spark further innovations that would drive costs of these new technologies down and enable the development of full-scale projects. It will help create a secure and sustainable energy future.



Collaboration in action

Last year, the World Economic Forum joined forces with Accenture and EPRI to launch a global initiative to help “industrial clusters” standardize and accelerate their net-zero journey.

This work focused on four solutions: Energy Efficiency and Circularity, Direct Electrification and Renewable Heat, Hydrogen, and CCUS. Implementing these solutions is more impactful when pursued through a cross-sectoral, multi-stakeholder approach, where different industries within a cluster can create synergies.



The end of the “either-or”

The energy industry is at a pivotal moment. The ongoing decarbonization transition, coupled with more recent concerns about energy access and affordability, are forcing industry players to re-evaluate how they will compete in the reinvented energy system. How they will deliver—and generate—value. And how they will balance the energy security and sustainability imperatives.

Units and abbreviations

APS	Announced Pledges Scenario (IEA's World Energy Outlook 2021 scenario)
bbl	Barrel of oil
bcm	Billion cubic meters
bn.	Billion
boe	Barrel of oil equivalent
CAGR	Compound annual growth rate
CAPEX	Capital expenditure
CCS	Carbon capture and storage
CCUS	Carbon capture, utilization and storage
CO₂	Carbon dioxide
ESG	Environmental, social, and governance
EV	Electric vehicle
FCF	Free cash flow
GDP	Gross domestic product
GHG	Greenhouse gas
GJ	Gigajoules (one billion joules)
GT	Gigaton (one billion tons)
H₂	Hydrogen
IEP	Independent exploration and production company
IOC	International oil company

IMS	Integrated midstream
IR&M	Integrated refining and marketing
LNG	Liquefied natural gas
mmb/d	Million barrels of oil/day
Mt	Megaton (one million tons)
mtoe	Million tons of oil equivalent
MW	Megawatt
NZE	Net Zero Emissions by 2050 (IEA's World Energy Outlook 2021 scenario)
NOC	National oil company
OECD	Organisation for Economic Co-operation and Development
OPEC	Organization of the Petroleum Exporting Countries
OFSE	Oilfield and equipment services company
OGCI	Oil and Gas Climate Initiative
O&G	Oil and gas
PPP	Purchasing power parity
ROCE	Return on capital employed
RoW	Rest of the world
STEPS	Stated Policies Scenario (IEA's World Energy Outlook 2021 scenario)
tn CO₂e	Tons of CO ₂ equivalent
tcm	Trillion cubic meters



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