Striking the balance

How and where will oil and gas producers deploy their cash?

A report on investment choices and strategies of global upstream oil and gas producers by the Deloitte Research Center for Energy & Industrials

August 2022
About the Deloitte Research Center for Energy & Industrials

Deloitte's Research Center for Energy & Industrials combines rigorous research with industry-specific knowledge and practice-led experience to deliver compelling insights that can drive business impact. The energy, resources, and industrials industry is the nexus for building, powering, and securing the smart, connected world of tomorrow. To excel, leaders need actionable insights on the latest technologies and trends shaping the future. Through curated research delivered through a variety of mediums, we uncover the opportunities that can help businesses move ahead of their peers.

Connect

To learn more about Deloitte’s Energy, Resources & Industrials practice, including its solutions, thought leadership, and events, please visit www.deloitte.com/us/er&i.

Subscribe

To receive email communications, please register at https://my.deloitte.com/registration.html.

Engage

Follow us on Twitter at: @Deloitte4Energy and @DeloitteMFG.

Deloitte’s oil, gas, and chemicals professionals offer you the integrity, innovation, and insight to help you meet the most complex challenges. We support you in developing and executing initiatives that achieve your strategic objectives to deliver value to your stakeholders. Through audit & assurance, tax, consulting, and risk and financial advisory, our Deloitte OG&C team provides comprehensive services and solutions to help move your business forward.

Learn more
Executive summary: Investing in the future of energy

Recession worries and energy policy shifts present downside risks to energy markets. But disrupted trade flows and ongoing financial discipline of O&G companies, along with low inventories and spare capacity, could limit significant downside despite volatility in energy prices.

Over the next decade, O&G companies could have a key role in striking the balance between energy security and energy transition, while helping commercialize essential low-carbon technologies.

Backed by strong financial health and discipline, oil and gas (O&G) companies can play a big role in accelerating and securing the energy transition.

<table>
<thead>
<tr>
<th>Global O&amp;G upstream likely to generate highest-ever US$1.4 trillion in free cash flows in 2022.</th>
<th>O&amp;G industry’s financial health is excellent at 20% leverage and 4%-6% of dividend yield.</th>
<th>US shales can potentially become debt-free by early 2024 if prices stay strong and discipline prevails.</th>
<th>Global upstream likely to generate up to US$1.5 trillion in surplus cash by 2030, after meeting all its cash priorities.</th>
</tr>
</thead>
</table>

How big is this surplus? Enough to fund and balance both low-carbon and core O&G priorities in this decade. 70% of the surplus could be generated by 2024, making it an inflection point for investment in new energy solutions. Low-carbon capex as a percentage of total capex of global upstream could reach 30% by 2030 in certain scenarios, from the current 5%. Going green can reduce the overall internal rate of return (IRR) of an O&G company by 2% to 4.5%. Is the trade-off significant?

Notes: Please refer to sources and citations at the end for more details. Also, the analysis excludes the impact of the Inflation Reduction Act (IRA) of 2022, a bill passed by both chambers of Congress in August 2022. The bill contains a wide array of subsidies, taxes, credits, and pricing reforms, each with varying impacts on households and businesses. Additionally, the bill contains several energy, environment, and climate-related provisions that may influence production, cost competitiveness, profitability, tax payouts, and investment and share buyback decisions of US O&G companies. For more details, refer: The Inflation Reduction Act (IRA).
Oil prices have risen sharply and remain highly volatile as ongoing disruption exacerbates the underinvestment problem.

A series of disruptions amid ongoing underinvestment...

Oil markets are not new to geopolitics, wars, economic crises, or financial disruptions...

A history of disruptions and impact on oil prices...

---

**Average annual Brent prices**

**Average annual Brent prices, 2014 to now**

**Oil prices have risen sharply and remain highly volatile as ongoing disruption exacerbates the underinvestment problem.**

---

**Sources:** US Energy Information Administration and International Energy Agency.
triggering a readjustment in the broader energy market ...

- **Natural gas prices outpacing oil prices in Europe**
  Disrupted trade flows have spurred European natural gas prices to 8–10 times that of the United States and higher than oil in energy equivalent terms.\(^\text{17}\)

- **Widening margins between the US, European, and Asian refiners**
  Differential feedstock pricing (Russia’s crude to Asia is at a significant discount)\(^\text{18}\) and changes in gasoline taxes and energy subsidies have led to a significant divergence in downstream prices and profitability worldwide.\(^\text{19}\)

- **Energy transition faces energy security risks**
  Limited supply of key materials, high raw material prices, and ongoing supply chain disruption are adding pressure on renewable project economics, which are already characterized by single-digit IRRs.\(^\text{20}\)

- **Resource industries gaining interest of investors**
  Postpandemic recovery amid compressed oil price cycle supported by active capital management have crowned resource industries stocks as top market performers in 2021 and 2022 YTD.\(^\text{21}\)

### Major commodity prices (January 2021 to June 2022)

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Absolute change in price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore crude crack spread</td>
<td>+742%</td>
</tr>
<tr>
<td>European gas TTF</td>
<td>+629%</td>
</tr>
<tr>
<td>Lithium</td>
<td>+623%</td>
</tr>
<tr>
<td>USGC WTI crack spread</td>
<td>+377%</td>
</tr>
<tr>
<td>Henry Hub</td>
<td>+194%</td>
</tr>
<tr>
<td>Brent Crude</td>
<td>+125%</td>
</tr>
<tr>
<td>Ural Crude</td>
<td>+79%</td>
</tr>
<tr>
<td>Nickel</td>
<td>+30%</td>
</tr>
<tr>
<td>Zinc</td>
<td>+27%</td>
</tr>
<tr>
<td>Bloomberg oil &amp; gas Index</td>
<td>+26%</td>
</tr>
<tr>
<td>Aluminum</td>
<td>+21%</td>
</tr>
<tr>
<td>Copper</td>
<td>+5%</td>
</tr>
<tr>
<td>Bloomberg clean energy index</td>
<td>-12%</td>
</tr>
</tbody>
</table>

**Sources:** US Energy Information Administration; Bloomberg; Rystad Energy; E&E News; and Wood Mackenzie.
... which is likely to keep prices high for a while

Despite recessionary fears, higher short-term prices are driven by the underlying supply crunch and trade flow disruption.

Notes: *Brent oil price forecast estimate ranges are from US EIA, Goldman Sachs, Citigroup, Barclays, JP Morgan, World Bank, Fitch Solutions, and Bloomberg Base Case; Henry Hub natural gas price forecast estimate ranges are from US EIA, Goldman Sachs, Citigroup, Fitch Solutions, World Bank, and Bloomberg Base Case; Fed fund rates and real GDP growth rate forecast estimate ranges are from Deloitte’s United States Economic Forecast Q2 2022 report.

Sources: US Energy Information Administration; Bloomberg, and Deloitte’s United States Economic Forecast Q2 2022.

2021
- Economic activity recovered
- O&G capex remained muted
- Travel and consumption rebounded
- Supply chain disruptions persisted

2022
- Geopolitical driven supply constraints
- Low levels of oil and gas reserves
- Tightening monetary policy sparking recession concerns
- Rising LNG demand to keep natural gas prices high
- Rerouted trade flows

2023
- Economic slowdown or recession worries
- Continued O&G supply and trade flow constraints
- Tight US Federal monetary policy
- Uncertainty limits energy investment
The result: O&G producers set to report highest-ever free cash flows of US$1.4 trillion in 2022

The industry has been running ahead of the oil price cycle—for instance, it generated approximately US$793 billion of free cash flows in 2021, three times higher than the previous high price period of 2013–14.\(^3\)

Capital discipline is now a practiced norm for most in the industry. Despite oil prices recovering by about 70% in 2021 YoY, capex growth was below 10%.\(^3\)

Global upstream producers are projected to generate record free cash flows of US$1.4 trillion in 2022 (Brent at US$106/bbl assumed) in 2022.\(^3\)

Regional share of cash flows is shifting from Middle East & African producers (above 50% in 2010–20 vs. 30% in 2021–22) toward North American producers.\(^3\)

High prices and financial discipline could lead to as much as a three-fold jump in the industry’s cash flows.

Notes: Free cash flows are operating cash flows minus capex of global O&G upstream companies (US$ billion). The analysis excludes the impact of the Inflation Reduction Act (IRA) of 2022, a bill passed by both chambers of Congress in August 2022. The bill contains a wide array of subsidies, taxes, credits, and pricing reforms, each with varying impacts on households and businesses. Additionally, the bill contains several energy, environment, and climate-related provisions that may influence production, cost competitiveness, profitability, tax payouts, and investment and share buyback decisions of US O&G companies. For more details, refer: The Inflation Reduction Act (IRA).

Source: Deloitte analysis based on data accessed from Rystad Energy Ucube and US Energy Information Administration.
North American upstream to generate US$600 billion free cash flow in 2021–22, primarily led by shales

The North American upstream industry cumulatively generated only US$47 billion in free cash flows over the last decade (2010–2020) due to losses in shale plays. However, the industry is expected to generate US$600 billion in free cash flows just between 2021–2022, a 13-time quantum jump over the cumulative cash flows made between 2010–2020.

Shale producers, which generated negative cash flows in nine out of the last 10 years, will likely witness a record free cash flow in 2021–2022 that could overcome the decade-long loss of US$300 billion.

Source: Deloitte analysis based on data accessed from Rystad Energy Ucube.
Since 2014, the industry has been reducing debt, increasing efficiency, and practicing capital discipline

**Higher internal cash reliance:** Cash from operations funded over 90% of inflows in 2021 (vs. ~75% in 2014)\(^\text{18}\)

**Favorable debt equation:** Net debt is at the lowest in recent years with the debt equation shifting positively\(^\text{19}\)

**Prioritized shareholder returns:** Returns have become a key priority, up to about 30% in recent years (vs. 15–17% in 2013–15)\(^\text{40}\)

**Cautious/paced capital deployment:** Capex intensity consistently reduced YoY (77% pre-2016 to less than 50% in 2022)\(^\text{41}\)

### The changing equation of sources and uses of cash (2014–Q1 2022)

<table>
<thead>
<tr>
<th>Year</th>
<th>Sources</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>76%</td>
<td>13%</td>
</tr>
<tr>
<td>2015</td>
<td>79%</td>
<td>8%</td>
</tr>
<tr>
<td>2016</td>
<td>82%</td>
<td>1%</td>
</tr>
<tr>
<td>2017</td>
<td>86%</td>
<td>5%</td>
</tr>
<tr>
<td>2018</td>
<td>92%</td>
<td>8%</td>
</tr>
<tr>
<td>2019</td>
<td>90%</td>
<td>1%</td>
</tr>
<tr>
<td>2020</td>
<td>83%</td>
<td>9%</td>
</tr>
<tr>
<td>2021</td>
<td>92%</td>
<td>9%</td>
</tr>
<tr>
<td>Q1 2022</td>
<td>92%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Source: Deloitte analysis based on data accessed from Rystad Energy Ucube and S&P Capital IQ.
The O&G industry is strongly positioned due to its healthy financial state and industry-leading returns.

- **40%–135%**\(^*\) shareholder growth of O&G subsectors between 2021 and June 2022,\(^{42}\) reflecting renewed market appraisal.
- **20%** leverage ratio in 2021, the best in the history of upstream industry.\(^{43}\)
- **4%–6%** dividend yield, the highest among all industries over the last three years.\(^{44}\)
- **US$275 billion** free cash flows for US shale producers in 2022-2023, which could make the industry debt-free\(^*\) by 2024.\(^{45}\)

*Note: Assuming maintained capital discipline. Sources: Deloitte analysis based on data accessed from Rystad Energy Upstream Ucube and S&P Capital IQ.
Investing for an uncertain future

Faced with record-high cash flows, O&G companies have decisions to make—where to invest, and how much.

But the future path is not easy due to critical uncertainties, including price volatility and supply and trade disruption in the long road to a low-carbon world.
The ongoing energy trilemma is complicating investment decision-making for O&G companies.

Evolving questions around energy transition, security, and diversification are creating a “trilemma” of concerns.

**Slow transition to low-carbon energy**
Evolving low-carbon technologies and demand, hard-to-abate sectors, nascent infrastructure, low returns.

**Capital allocation impasse***

**Energy policy uncertainty***

**Underinvestment in O&G despite strong and resilient demand**
Low oil prices, investor pressures, and regulatory uncertainty limiting hydrocarbon investment.

**Abnormal spikes and variance in energy prices***

**Concentrated energy mix, limited energy choices for consumers**
Concentrated demand, production, supply, or trade of hydrocarbons and low-carbon energy and materials; inequitable availability and uneven distribution of energy sources.

Note: *Impact on energy markets and balance
Source: Deloitte analysis.
Solving the puzzle is possible, but it will take time.

High oil prices could spur short-term energy investment and diversification, while a clean, secure energy mix could reduce long-term prices.

**Rystad Energy price scenarios**
- **Low case** (black line)
- **Base case** (blue line)
- **High case** (green line)

**Changing energy priorities influence oil prices and investment strategies**

- **Short term (2021–2023)**
  - High O&G prices and heightened energy security concerns could spur energy investment and diversification.

- **Medium term (2024–2026)**
  - Energy diversification could support an accelerated and sustainable energy transition, reducing pressure on O&G prices.

- **Long term (2027–2030)**
  - Scale and technology could improve commercial maturity of low-carbon solutions, while energy diversification could secure the energy transition, making energy affordable and accessible.

**Sources:** Deloitte analysis; Rystad Energy forecasts (June 2022).
Balancing priorities

Would a maintained, disciplined capex program amid a high oil price environment help the industry deliver on its priorities?

US$3.6 trillion is the projected hydrocarbon capex at base price\(^\text{a}\) to maintain operations and generate significant cash flows during 2022–2030.\(^{47}\)

Significant investments are required to strike a careful energy balance, but they would be competing with growing priorities for cash irrespective of changes in oil prices.

### Priorities*

<table>
<thead>
<tr>
<th>Oil prices</th>
<th>Low-carbon growth</th>
<th>Shareholder payouts</th>
<th>Buybacks</th>
<th>Debt repayment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strong</strong></td>
<td>Accelerate ↑</td>
<td>Accelerate ↑</td>
<td>Maintain →</td>
<td>Reduce ↓</td>
</tr>
<tr>
<td><strong>Weak</strong></td>
<td>Accelerate ↑</td>
<td>Maintain →</td>
<td>Accelerate ↑</td>
<td>Accelerate ↑</td>
</tr>
</tbody>
</table>

**Notes:** *Growing priorities are majorly applicable for public, nongovernment-owned companies such as IOCs and public E&Ps mainly based out of the United States and may differ for NOCs with differing priorities. For more details on the split between capex and cash flows between company types, refer to the Appendix. *Rystad's base case scenario is covered in the previous page. Source: Deloitte analysis.*
After meeting all priorities, global O&G could still have a cash surplus of US$1.5T between 2022–2030

The global upstream industry is expected to generate US$5.2 trillion in free cash flow by 2030 after taking care of core hydrocarbon capex requirements.48

Base corporate financial priorities such as shareholder payouts, buybacks, debt repayment, and interest charges are expected to take up about 70% (US$3.7 trillion) of the future cash flow.49

Even after taking care of all priorities, global upstream is likely to have a cash surplus balance of about US$1.5 trillion between 2022 to 2030.50

Of the estimated free cash flows of US$5.2T, about 70% would go toward rewarding shareholders and strengthening the balance sheet.

Future cash flows, inflows and outflows (2022–2030)*

Notes: Numbers may vary slightly due to rounding off in the detailed financial model. *Refer to the methodology page in the Appendix for more details. The analysis excludes the impact of the Inflation Reduction Act (IRA) of 2022, a bill passed by both chambers of Congress in August 2022. The bill contains a wide array of subsidies, taxes, credits, and pricing reforms, each with varying impacts on households and businesses. Additionally, the bill contains several energy, environment, and climate-related provisions that may influence production, cost competitiveness, profitability, tax payouts, and investment and share buyback decisions of US O&G companies. For more details, refer: The Inflation Reduction Act (IRA).

Source: Deloitte analysis based on data from Rystad Energy Ucube database.
How big is the projected cash surplus of US$1.5 trillion?

Cash surplus of US$1.5 trillion

(For theoretical comparison only, each example is singularly compared with the surplus)

2X
- Of the global low-carbon and green capex in 2021* across all industries51

100%
- Of global investments required for low-emission fuels (hydrogen, biofuels) and carbon capture, utilization and storage (CCUS) between 2022–2030 to stay on the net-zero course52

30
- Mega and integrated LNG projects, including CO2 injection plants53

1X
- Enough to fund one more US shale revolution54

Debt-free, 15% buyback
- Sufficient to make the O&G industry debt-free and even buy back 15% of its shareholder capital by 203055

15%
- Of cumulative clean energy infrastructure investments required across industries for accelerated energy transition56

Note: *IEA projections for low-carbon fuels and CCUS, 2022–2030.
Sources: Deloitte analysis; International Energy Agency, World energy investment 2022; and Goldman Sachs, Carbonomics.
Sensitivity of hydrocarbon profits to market risk (scenarios)

<table>
<thead>
<tr>
<th>Impact on the US$1.5 trillion surplus (recent headwinds)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>US$125 billion</em> if US Fed rates increase by an additional 1% over and above the assumed increase of 2.5% in 2022 and 2023^{57}</td>
</tr>
<tr>
<td><em>US$650 billion</em> if crude oil and natural gas prices fall to projections before Russia’s invasion of Ukraine^{58}</td>
</tr>
</tbody>
</table>

Notes: *Assumes direct impact on pretax cash flows with other things equal. Also, the analysis excludes the impact of the Inflation Reduction Act (IRA) of 2022, a bill passed by both chambers of Congress in August 2022. The bill contains a wide array of subsidies, taxes, credits, and pricing reforms, each with varying impacts on households and businesses. Additionally, the bill contains several energy, environment, and climate-related provisions that may influence production, cost competitiveness, profitability, tax payouts, and investment and share buyback decisions of US O&G companies. For more details, refer: The Inflation Reduction Act (IRA). Sources: Deloitte analysis; S&P Capital IQ.
But the renewed focus on natural gas for energy security and decarbonization could limit major downsides to hydrocarbon markets

Enabling energy security

- Europe is increasingly relying on imported natural gas for energy security, shifting focus from pipelines to LNG terminals (15+ new import terminals proposed in Europe since February 2022).\(^\text{59}\)
- Major capacity expansions are being planned across top LNG exporters, including the United States, which aims to increase production by at least 1.5 times by 2030.\(^\text{60}\)
- Rising natural gas demand is also driving exploration and production (E&P) activity across Africa that is estimated to result in a 30% rise in gas production by the end of the decade.\(^\text{61}\)

Ensuring energy decarbonization

- Natural gas is a viable low-emission fuel source, especially for developing nations aiming for electrification, but volatile and high natural gas prices could occasionally incentivize fuel switching toward coal.\(^\text{62}\)
- Natural gas, along with CCUS, supports deeper decarbonization of hard-to-abate industrial sectors, which utilize fossil fuels to run high-temperature processes economically.\(^\text{63}\)
- Some major national oil companies (NOCs) are utilizing natural gas to produce low-carbon fuels such as ammonia and hydrogen.\(^\text{64}\)
2024 will likely be an investment inflection point for the O&G industry

Annual free cash flows, base priorities on cash, and balance (2022–2030)

About 70% of the O&G industry’s projected US$1.5T cash surplus will likely be generated by 2024

Note: *Refer to the methodology page in the Appendix for more details.
Source: Deloitte analysis based on data from Rystad Energy Utube database.
Commitment to a low-carbon world was already gaining momentum

Over the past five years, O&G companies have been accelerating their low-carbon investment commitments by reducing emissions at source, investing in carbon management technologies to develop the ecosystem, and boosting renewable power generation and electrifying transportation.

- **50% reduction** in direct carbon emissions (scope 1) over the last three years by select O&G majors\(^6^6\)

- **75% of global** CCUS investment in 2021 made by O&G companies\(^6^7\)

- **10.5 GW** operating renewable capacity of O&G companies in 2021, with a 100% growth over the last three years\(^6^8\)
What could be the low-carbon capex share of O&G companies by 2030?

The industry’s low-carbon capex could see new momentum, technically raising the share to 30% by 2030.
**The trade-off in low-carbon investments**

The question: Is this trade-off worth pursuing?

A 30% low-carbon capex allocation by 2030 could mean a hit of 2%–4.5% to the overall corporate IRR of an O&G company.

| Low-carbon capex as a percentage of total investable amount (2022-2030) | Impact on corporate IRR (scenarios)** |
|---|---|---|
| **BASE/business as usual** | **Economical green** | **High energy prices** |
| O&G: Base (US$45 by 2030, Avg IRR: 20%) | O&G: Base (US$45 by 2030, Avg IRR: 20%) | O&G: High (US$80, Avg IRR: 31%) |
| Renewables: Current (Avg IRR: 8%)* | Renewables: Beneficial (Avg IRR: 12%)* | Renewables: Rewarding (Avg IRR: 15%)* |
| 0% | 0.00% | 0.00% | 0.00% |
| 5% (current) | -0.45% | -0.35% | -1.13% |
| 10% | -0.90% | -0.70% | -2.17% |
| 15% (potential)* | -1.25% | -1.00% | -3.02% |
| 20% | -1.56% | -1.22% | -3.71% |
| 25% | -1.83% | -1.43% | -4.26% |
| 30% (highest)** | -2.01% | -1.56% | -4.61% |

Notes: Assumes existing regulatory and environmental policies.
* Current Avg IRR of renewables is based on returns of utility-scale projects. IRRs of solar, wind, and offshore wind projects vary significantly.
† Potential low-carbon capex share allocation by O&G companies by 2030 if entire cash surplus of US$1.5 trillion is invested in clean energy.
‡ If the entire projected surplus of US$1.5 trillion is invested in green energy businesses.
Source: Deloitte analysis.
Does giving away a bit of IRR for lower-emissions investments have a bigger benefit than cost for companies?

Even after adjusting for a drop in corporate returns by 2%–4.5%, the industry’s overall return profile appears strong and close to previous highs.\textsuperscript{71}

Benefits of “investing in low-carbon business”:
1. Enabling regulatory environment
2. Lower emissions profile
3. Higher revenue growth potential
4. Business model innovation
5. Supportive shareholders
6. Access to green environment, social, and governance (ESG) funds/investors

Note: *average 2022–2030
Source: Deloitte analysis based on data accessed from S&P Capital IQ.
Range of investment choices

As lower-carbon investments take center stage, how and where companies choose to play will depend on which “archetype”* they most identify with—hydrocarbon stalwarts, low-carbon producers, green followers, or net-zero pioneers—and how the broader green ecosystem evolves.

How will each of these archetypes approach and deploy the US$1.5 trillion surplus?

*For more details on the spectrum of O&G archetypes, read our previous research, Positioning for green: Oil and gas business in a low-carbon world.
Multiple pathways to deploy cash across the spectrum, from low-carbon O&G to green energy

Each company archetype* should play complementary, and not conflicting roles to make the new energy system efficient

<table>
<thead>
<tr>
<th>Archetypes72*</th>
<th>Hydrocarbon stalwarts</th>
<th>Low-carbon producers</th>
<th>Green followers</th>
<th>Net-zero pioneers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar</td>
<td>Gain market share in hydrocarbons business with the least costs and risks</td>
<td>Build a lean, decarbonized, &amp; optimal hydrocarbon portfolio</td>
<td>Operationalize and scale in-progress utility-scale projects</td>
<td>Build scalable positions in renewables by making them economical and developing a strong decentralized end-customer base</td>
</tr>
<tr>
<td>Onshore wind</td>
<td>Invest via sovereign wealth funds to align with national and broader energy goals</td>
<td>Favor buying green power, as against producing and selling it, apart from that developed for captive power usage</td>
<td>Invest cautiously due to rising competition from utilities and specialists</td>
<td>Start building new positions in less competitive, engineering and tech-oriented plays</td>
</tr>
<tr>
<td>Offshore wind</td>
<td></td>
<td></td>
<td>Invest by leveraging operational synergies with upstream</td>
<td></td>
</tr>
<tr>
<td>Green fuels (hydrogen, ammonia)</td>
<td>Invest to build a circular economy in downstream</td>
<td></td>
<td>Build and own a centralized, differentiated, and connected green ecosystem to both store and sell carbon</td>
<td>Engage in partnerships for hydrogen derivatives</td>
</tr>
<tr>
<td>CCS++ clean fuels</td>
<td>Foster public-private partnerships to develop infrastructure</td>
<td>Invest primarily for a CO2 offset strategy</td>
<td>Take minority stakes in large-scale CCS projects</td>
<td></td>
</tr>
<tr>
<td>Mobility solutions</td>
<td>Elevate retail experience and invest in EV infrastructure</td>
<td>Part of a wider commitment to provide a range of lower-carbon transport options</td>
<td>Move investment along the electrification value chain</td>
<td></td>
</tr>
<tr>
<td>Biofuel/bioenergy</td>
<td></td>
<td></td>
<td>License and/or build partnerships for setting up biomass refineries</td>
<td></td>
</tr>
<tr>
<td>Hydrocarbons</td>
<td>Develop low-cost, most competitive O&amp;G projects</td>
<td>Digitize to decarbonize and specialize</td>
<td>Initiate structural cost reductions and reduce carbon intensity</td>
<td>Maintain marginal position for cash flow support</td>
</tr>
</tbody>
</table>

* Notes: Please refer to Deloitte’s earlier publication Positioning for green: Oil and gas business in a low-carbon world for a more detailed understanding of the spectrum of O&G archetypes. ^ CCS denotes carbon capture and storage technology

Source: Deloitte analysis.
The balanced low-carbon world

Affordable and accessible hydrocarbons, especially for hard-to-abate sectors and when the broader demand is still transitioning, are necessary to strike the right balance for a low-carbon economy.

A healthy and disciplined O&G industry could overcome the energy underinvestment and supply concentration issue and enable an accelerated energy transition.

The pace and direction of this transition hinges on a supportive regulatory and stable policy environment, coordinated alliances across the low-carbon ecosystem, and innovative business models complementing core values and capabilities.
APPENDIX
### Methodology

**Assessment of surplus cash**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Source</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
<th>2028</th>
<th>2029</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil price forecast (base, US$/bbl)</td>
<td>Rystad</td>
<td>106</td>
<td>75</td>
<td>54</td>
<td>51</td>
<td>52</td>
<td>55</td>
<td>57</td>
<td>59</td>
<td>60</td>
</tr>
<tr>
<td>Operating cash flows (A)</td>
<td>Rystad</td>
<td>A bottom-up estimate for all assets of a company at the above base case oil price scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance capex (B1)</td>
<td>Rystad</td>
<td>A bottom-up estimate for all “producing assets in 2022” of a company at base case oil price scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth capex (B2)</td>
<td>Rystad</td>
<td>A bottom-up estimate for all “nonproducing assets in 2022” of a company at base case oil price scenario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free cash flows (A–B=C)</td>
<td>Formula</td>
<td>Operating cash flows (OCF) minus capex is equal to FCF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Dividends (E)** | Capital IQ, Deloitte | 1. If operating cash flows is negative, no dividends  
2. If operating cash flows in CY is > PY, 2% annual growth rate over the past five-year average dividends*  
3. If operating cash flows in CY is < PY, 0.5% annual growth rate over the past five-year average dividends*  
*Subject to a maximum of distributable cash (operating cash flows–maintenance capex)/operating cash flows |
| Special dividends (F)** | Capital IQ, Deloitte | • Special dividends kick in if leverage ratio is below 25% and oil prices trade above US$60/bbl  
• Special dividend ratio is 20% of incremental free cash flows (FCF base case minus FCF at US$60) |
| Buybacks (G)** | Capital IQ, Deloitte | • Buybacks kick in if oil price is below US$60/bbl and FCF minus dividends is greater than zero  
• Buyback proportion is past 5-year average multiplied by (CY FCF / LY FCF) |
| Unlevered surplus cash (C–F–G–H) | Formula | Free cash flows minus (dividends, special dividends, and buybacks) |
| Debt repayment (I)^ | Capital IQ, Deloitte | • If unlevered surplus is negative, then debt increases by unlevered cash surplus  
• If unlevered surplus is positive and PY leverage ratio is <25%, then debt reduces by 1/7th of unlevered surplus  
• If unlevered surplus is positive and PY leverage ratio is >25%, then debt reduces by 1/5th of unlevered surplus |
| Interest charges (J)^ | Capital IQ, Deloitte | Assumes “global average” interest rate increases by 1% in 2022, 1.5% in 2023, and stays flat until 2030 |
| Adjusted surplus cash (H–I–J) | Formula | Unlevered cash flows minus debt payment minus interest payment |

Notes: Small-sized companies having production below 5 kboed in 2022 have been excluded for the purpose of this analysis  
** Dividends by an unlisted NOC is ascertained using aggregated dividend proportion of listed companies on its FCF; dividends are not considered for unlisted private E&Ps; Common and special dividends for IOCs have been adjusted to proportionately reflect their upstream segments.  
*** Buybacks are not considered for unlisted upstream companies (NOCs and E&Ps).  
^ Debt repayment and interest charges for an unlisted upstream company are ascertained using the aggregate proportion of listed companies on its FCF.
Operating cash flows, capex, and free cash flow share by company types

Share of operating cash flows, capex, and free cash flows split by company groups (2022–2030)\textsuperscript{73}

- **NOC (National oil companies)**
- **IOC (Integrated oil companies)**
- **Public E&Ps**
- **Private E&Ps**

- Operating cash flows (US$8.8T)
- Capex (US$3.6T)
- Free cash flows (US$5.2T)

Sources: S&P Capital IQ; Rystad Energy Ucube database.
Funding a sizeable share of the total green pie

The O&G industry could effectively undertake 15% of the total clean energy infrastructure investment required for net-zero targets over the next eight years.

Rising focus on energy security, energy transition, and energy diversification driving a new era for clean energy investments.

US$10.3 trillion of cumulative investments in clean energy infrastructure is estimated between 2022 and 2030.75

Infrastructure investments for power generation dominates with an average share of 80% of clean energy infrastructure until 2030.76

Biorefineries and hydrogen plants expected to grow fastest with a CAGR of 33% and 28% respectively, between 2022 and 2030.77

Note: *only includes incremental infrastructure investments but does not include maintenance and other end-use capex. Sources: Deloitte analysis; Goldman Sachs, Carbonomics.
O&G companies have a lot to offer in the energy transition

As O&G companies have a lot to offer in the energy transition, tapping their existing capabilities can unlock synergies for green energy space. The Specialized skill set includes:

- **Engineering and project management capabilities and experience.** Leveraging large-scale engineering and project management capabilities and experience helps upscale while reducing the costs of green technologies.78
- **Subsurface expertise and infrastructure planning expertise.** Specialized upstream skills, including geological and geophysical knowledge, guiding selection of underground carbon storage sites while also supporting geothermal production.79 Moreover, expertise in pipeline and associated infrastructure supports hydrogen and carbon transfers.80
- **Well-versed in navigating complex trade and political landscape.** Prior experience in working with international governments by overcoming political, cultural, and trade barriers.
- **A long history of shareholder focus and economic returns.** Stringent capital discipline showcased by O&G companies could help boost the returns of renewable projects.81
- **Developing centralized and decentralized end-use markets.** Establishing ecosystems for green energy markets aids in coordinating across decentralized and fragmented end-use markets.

Source: Deloitte analysis.
1. Deloitte analysis based on data accessed from Rystad Energy Ucube Upstream database, June 2022.
3. Deloitte analysis; Rystad Energy Ucube Upstream.
4. Deloitte analysis; S&P Capital IQ; and Rystad Energy Ucube Upstream.
5. Ibid.
6. Ibid.
7. Ibid.
8. Ibid.
19. Huileng Tan, “China and India now account for about 50% of Russia's seaborne oil exports, as Asian demand props up Moscow's energy revenues,” Markets Insider, June 2022.
22. International Monetary Fund (IMF), World Economic Outlook, October 2021.
23. Ibid.
24. Ibid.
27. Deloitte analysis based on Rystad Energy Ucube Upstream.
28. Tan, “China and India now account for about 50% of Russia's seaborne oil exports, as Asian demand props up Moscow's energy revenues.”
32. Ibid.
33. Ibid.
34. Deloitte analysis based on data accessed from Rystad Energy Ucube Upstream database, July 2022.
37. Ibid.
39. Ibid.
40. Ibid.
41. Ibid.
43. Deloitte analysis; S&P Capital IQ, July 2022.
44. Ibid.
45. Ibid.
46. Rystad Energy oil price forecasts, June 2022.
49. Deloitte analysis based on modeling of data accessed from Rystad Energy Ucube and S&P Capital IQ.
50. Ibid.
52. IEA, World energy investment 2022, June 2022.
55. Ibid.
56. Deloitte analysis; Goldman Sachs, Carbonomics, March 17, 2022.
57. Deloitte analysis; S&P Capital IQ, July 2022.
58. Ibid.
60. Claudio Galimberti and Emily McClain, “The great trade-flows reshuffle, and the fragmentation of supply chains.
65. Refer to the methodology page in the Appendix for more details. Deloitte analysis based on data from Rystad Energy Ucube database.
66. Bloomberg; Deloitte analysis.
68. Ibid.
69. The estimated clean capex in 2022 is based on investment spending announced on March 31, 2022, and assumes that this pace of investment is maintained throughout the year. Deloitte analysis; IEA, World energy investment 2022.
70. Deloitte analysis; S&P Capital IQ; Rystad Energy Ucube database, July 2022.
71. Ibid.
73. Deloitte analysis; S&P Capital IQ; Rystad Energy Ucube Upstream.
75. Ibid.
76. Ibid.
77. Ibid.


About the authors

Amy Chronis | achronis@deloitte.com

Amy Chronis is vice chair and US Oil, Gas & Chemicals (OG&C) leader as well as the managing partner for Deloitte’s Houston practice. Chronis has more than 30 years of experience serving public and private enterprises—from emerging businesses to Fortune 500 companies—with a focus on the OG&C, technology, and manufacturing industries. She has served as Deloitte’s US lead relationship partner for one of the world’s largest integrated oil and gas companies, as well as other Houston enterprises. In addition to her Houston practice leadership role, she is the US lead relationship partner for several international OG&C companies.

John England | jengland@deloitte.com

John England is the sector leader for Deloitte’s Global OG&C practice, working closely with some of Deloitte’s largest global energy clients to solve problems and enhance value. He brings a unique mix of commercial, risk management, operational, and financial knowledge gained over more than 30 years spent serving the industry.

Kate Hardin | khardin@deloitte.com

Kate Hardin, executive director of Deloitte’s Research Center for Energy and Industrials, has worked in the energy industry for 25 years. She leads Deloitte’s research team covering the implications of the energy transition for the industrial, oil, gas, and power sectors. She has served as an expert in residence at Yale’s Center for Business and Environment, and she is also a member of the Council on Foreign Relations.

Anshu Mittal | ansmittal@deloitte.com

Anshu Mittal is a vice president, Deloitte Services India Pvt. Ltd., and he serves as the oil and gas research leader for the Deloitte Research Center for Energy & Industrials. Mittal has more than 17 years of experience in strategic and financial research across all oil and gas subsectors and has authored many studies in the areas of energy transition, business strategy, digital transformation, M&A, portfolio management, operational performance, and market landscape.
Acknowledgments

The authors would like to thank Stanley Porter, Noemie Tilghman, Peter Buettgen, Tom Bonny, and Bart Cornelissen from Deloitte Consulting LLP and Katie Pavlovsky from Deloitte FAS LLP for their subject matter inputs, and contributions toward the development of this study.

The authors would also like to thank Abhinav Purohit and Shreya Shirgaokar from Deloitte SVCS India Pvt. Ltd. for their extensive research and analysis support, Ashlee Christian from Deloitte Services LP for her inputs, Rithu Thomas from the Deloitte Insights team for providing support with the report’s editing and publication processes, and Katrina Hudson, Dario Failla, Alyssa Weir, Clayton Wilkerson, and Jennifer McHugh from Deloitte Services LP for their operational and marketing support.
Contact us

Our insights can help you take advantage of change. If you're looking for fresh ideas to address your challenges, we should talk.

Industry leadership

Amy Chronis
Vice chair | US Oil, Gas & Chemicals leader | Deloitte LLP
+ 1 713 982 4315 | achronis@deloitte.com

Amy Chronis serves as vice chair and US Oil, Gas & Chemicals leader as well as the managing partner for Deloitte’s Houston practice.

Noemie Tilghman
Principal | Deloitte Consulting LLP
+ 1 312 486 0453 | ntilghman@deloitte.com

Noemie Tilghman serves as the US Oil, Gas & Chemicals Consulting leader.

Katie Pavlovsky
Principal | Deloitte Risk & Financial Advisory
+ 1 713 982 4358 | kpavlovsky@deloitte.com


John England
Partner | Deloitte & Touche LLP
+ 1 713 982 2556 | jengland@deloitte.com

John England serves as the Global Oil, Gas & Chemicals leader.

Deloitte Research Center for Energy & Industrials

Kate Hardin
Executive director | Deloitte Research Center for Energy & Industrials
+ 1 617 437 3322 | khardin@deloitte.com

Kate Hardin is the executive director of the Deloitte Research Center for Energy & Industrials.