



CIO autumn update:

To COP and beyond



A new urgency

The Glasgow Climate Pact will just remain words on a page unless countries and companies alike deliver on their commitments, in an even more perilous environment.



Sonja Laud
Chief Investment Officer



“COP26 marked an important step forward”

As delegates gather at COP27, they confront the same long-term challenge posed by climate change as they did at [COP26](#) last year. But the context has shifted dramatically: in light of the war in Ukraine, governments need to balance net-zero goals with a new imperative for energy security.

In this report, which shares LGIM research on sustainability themes ahead of the climate summit in Sharm El-Sheikh, we argue that these objectives are not mutually exclusive; rather, they are inextricably linked. The document, penned by our Investments and Investment Stewardship teams, also addresses:

- The underlying causes of the energy shock
- What Europe’s return to coal means for climate targets and investors
- The threat to nature and biodiversity presented by the climate crisis
- The oil-producing winners and losers of a 1.5°C world
- How energy infrastructure can and must play a pivotal role in the transition

COP26, held in Glasgow in 2021, marked an important step forward in global efforts to address climate change. Notable achievements included fresh commitments to reduce emissions worldwide; rules on reporting emissions and international carbon trading; and a clutch of new initiatives and sector-level deals.

We look to COP27 to build on this momentum, not least with regard to strengthening 2030 emissions targets. But also in making material progress towards a global carbon tax and in tackling the imbalances between developed and emerging economies – the cause of last-minute talks back in 2021.

Engagement, with consequences

Most importantly, we would stress that it is only by understanding the problem that we can reach the right solution. This is as true of the energy shock, whose roots we believe lie in underinvestment in clean power, as it is of the role asset managers should play in advancing a low-carbon economy.

At LGIM, we believe that engaging with companies critical to the energy transition – with the threat of consequences should they fail to listen – is the best way to deliver systemic change. Blanket divestment usually means ignoring the problem, by shunning some of those companies without which there will be no transition. It also risks decreasing transparency around emissions, as the most climate damaging assets move onto private or sovereign-related balance sheets that may not share the same transition objectives.

Through programmes like our [Climate Impact Pledge](#), we encourage and cajole long-term corporate action, on behalf of our clients, aimed at benefiting entire markets and society at large. In doing so, we seek to fulfil our purpose: to create a better future through responsible investing.

That’s why we have partnered with [Lewis Pugh](#), the endurance swimmer and UN Patron of the Oceans. Many of the images you will see throughout this report are taken from his latest swim across the Red Sea. Lewis has undertaken this challenge to raise awareness of the rising water temperatures that are starving and even killing coral reefs, which support essential biodiversity. Biodiversity loss, due in large part to the climate crisis, is one of the greatest challenges we face and one that we urge COP27 to combat, as it builds on last year’s gains.

Indeed, the Glasgow Climate Pact will just remain words on a page unless countries and companies alike deliver on the promises made at COP26 – and take urgent steps to address those outstanding issues highlighted above. Inaction is not an option.

No decarbonisation, no energy security

We believe a major cause of the current energy crisis is the lack of investment into renewables on the vast scale required.



Nick Stansbury
Head of Climate Solutions

The global energy shock has reminded policymakers, investors and the general public of the importance of safe and secure supplies – and the economic havoc wrought by shortages and price volatility. This has prompted calls for a U-turn on decarbonisation.

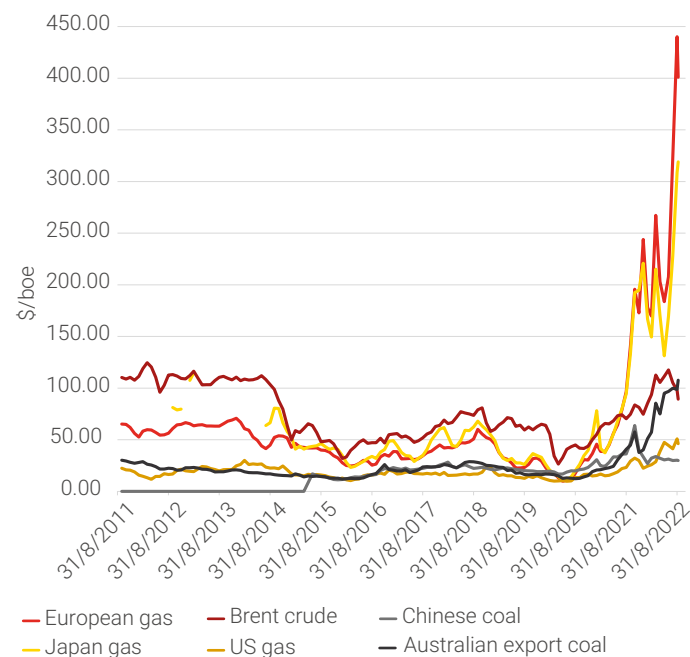
We believe, however, that there will be no energy security without decarbonisation. Indeed, the solution involves an even speedier energy transition, alongside an increase in investment in all forms of clean power, especially in the short term.

Cause and effect

Europe is at the epicentre of this crisis, in which the price of energy in all forms has risen dramatically, as noted in Jonathan's piece on p8. Inflationary pressures are growing, government finances are increasingly strained and consumers – especially those on the lowest incomes – fear the onset of winter.

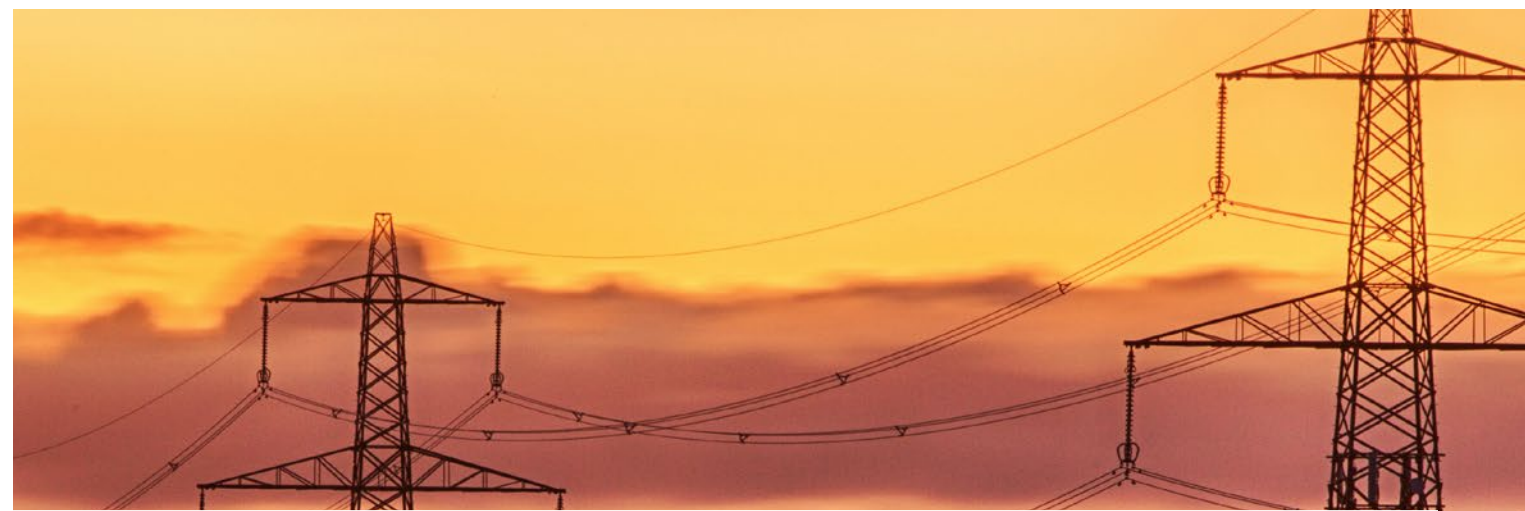
An analysis of the underlying causes underpins our view that investors should not abandon, or deprioritise, climate goals in the interests of energy security and affordability.

Global energy prices spike



Source: Refinitiv, as at 8 September, 2022

First, what brought us to this situation? There are a number of plausible suspects – not least geopolitical events. But in our view, at its heart, this is a crisis of underinvestment in which the world is simply not deploying capital into renewables on the vast scale required.



This has been compounded by understandable caution from the oil and gas industry. Companies in the sector have been investing, broadly speaking, in line with an expected decline in demand for their products of around 1-2% a year. Unfortunately, demand for hydrocarbons has proven far more resilient.

Funding the energy transition is not going to be – and is not proving to be – capital neutral. When reallocating capital from oil and gas to low-carbon alternatives, significantly greater amounts of funding will be required to produce the same amount of usable energy. That's because energy is not yet a homogenous product; for example, electricity and petrol are not yet fungible with each other for consumers who still have petrol-powered cars.

But there is a more fundamental challenge: low-carbon energy is far more capital-intensive than the carbon-intensive system. This is intuitive – with a solar panel, you spend almost all of the money upfront, then it produces electricity 'for free' (or nearly) thereafter. By contrast, after building a coal power plant, each year you will have to spend a significant amount of money buying the fuel to burn in it. This uplift in capital intensity is difficult to calculate – but in our view it is anywhere from two times to 10 times the original amount, depending on what and where you are measuring.

Low-cost and long-term

This is, in our view, the heart of our current energy crisis. Decarbonising our energy system is going to require an immense injection of capital – certainly at least \$1 trillion extra each year – and we are just not investing enough.

Over the short term, it is likely that Europe – and probably Asia – will experience elevated energy prices for several years. While there are no easy answers, we are unconvinced by the argument that we are caught in a conflict between financing decarbonisation and financing energy security. We believe the lowest-cost, long-term solution is to do both.

In most global markets, including Europe, renewables are the energy source with the cheapest marginal cost. We agree that conventional measures of energy cost do not capture all costs of renewable electricity generation. However, compared to current energy prices, renewables are clearly a highly attractive source of new supply, in our view.

Not only is scaling new renewable energy likely to be cheaper than many alternatives, it can also present significant benefits for costs and carbon. It reduces dependence on third-party suppliers of inputs – like oil or coal. And while renewables can increase price fluctuations volatility over short periods of time, over longer periods, a decarbonised energy system in Europe may result in lower volatility as the impact of commodity cycles is dampened. Finally, scaling renewable energy reduces companies' vulnerability to the risk of holding 'stranded assets', which suffer from unanticipated or premature write-downs, devaluation or conversion to liabilities.

Has Europe’s coal phase-out been phased out?

The reversal of a recent trend amid the Russia-Ukraine conflict puts climate targets in jeopardy and has important implications for utility investors.



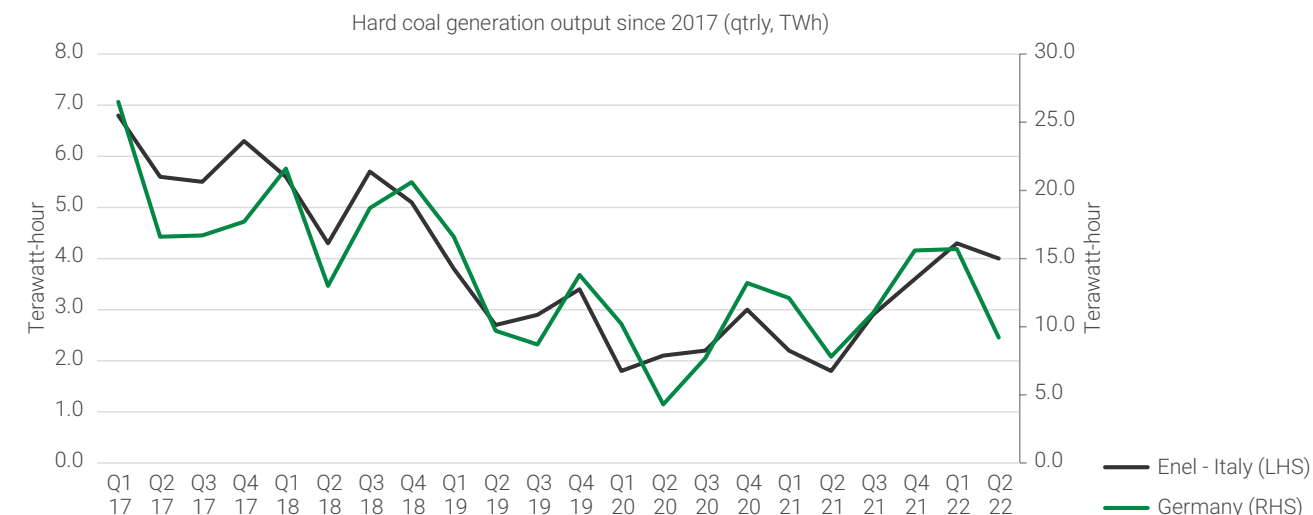
Jonathan Constable
Senior Credit Analyst

During the haggling over whether COP26 should call for a “phase out” or “phase down” of coal-fired power, few delegates probably imagined that within months, Europe would be witnessing a renaissance of the most polluting fossil fuel.

Yet this is exactly what happened. Dormant coal power stations were fired up following a rise in European gas prices during 2021, as Russian supplies fell ahead of the conflict in Ukraine; prices rose further once the conflict began. The tightening in gas markets was felt in the European power generation markets, where gas generation has historically been an important fuel source. With other power generation sources struggling to respond, coal generation moved in to fill the gap.



European hard coal output was on a downward trend... until the energy crisis



Source: Fraunhofer ISE, company data as at June 2022.

Prior to the energy crisis, there had been a multi-year trend of falling coal power generation in Europe, driven primarily by policy, which had made coal generation uneconomical and accelerated capacity closures. The recent reversal of this trend prompts several questions: is the European coal phase-out finished or just on pause? What does this mean for climate targets? And what does it mean for investors in the utility sector?

In the short term, we expect the energy crisis to mean that coal generation may perform an important role in energy security in Europe. We also think some additional scepticism is justified around certain medium-term coal phase-out targets. In particular, the German coalition government’s aspiration to bring the country’s coal exit forward to 2030 from 2038 seems more challenging now without Russian gas. Despite this, the EU’s communications indicate that, looking beyond the crisis, the objective is still eventually to exit coal-power generation. And even though, in a 1.5°C world, more coal now means a lower carbon budget will be available, and we will likely see steeper emissions cuts in the medium-to long-term, the bloc remains confident in delivering long-term climate targets.

“We think some scepticism is justified around certain targets”

Taxes and disposals

Some coal-generation assets might make large profits in the current environment, once hedges at low prices roll off, but there is also the risk that taxes or similar policies may claw profits back for consumers. This risk has been underscored by the proposed EU price cap on ‘inframarginal’ (i.e. low cost) power generation – the scope would cover lignite, a carbon-intense form of coal.

At LGIM, we believe the fuel will be a shrinking part of the energy mix of the future and one that is incompatible with reaching net zero. We are committed to withholding investment from companies involved in thermal coal mining and power generation above certain thresholds, and where there is a lack of evidence of plans to transition.

Looking beyond the crisis, utility companies may seek to sell coal operations to new owners, to focus on investments enabling the energy transition. We need to be mindful of historic examples of utility demergers being blocked by the authorities. It is important that any separation of activities comes with the support of the local authorities, in our view.

In the case of state involvement, we have seen some progress on a plan to transfer coal-generation operations to the state in Poland, and prior to the crisis there was talk of a similar plan using a “foundation” in Germany, both with a view to running down assets sooner. While some of these plans might be on hold for now, we think this is more of a temporary detour rather than a change in direction, and we still expect Europe to exit coal in due course.



Why nature is so necessary to net zero

In addition to a looming climate catastrophe, we are also facing a nature crisis – both of which are inextricably linked.



Catherine Ogden
Manager, Sustainability and Responsible Investment

A credible pathway to net zero must include meaningful action on deforestation, and nature. That’s because an estimated 22% of total Greenhouse Gas emissions originating in human activity come from agriculture, forestry and other land use¹ – and given the role of natural carbon sinks in climate mitigation.

Between 1990 and 2020, around 420 million hectares of forest were lost due to conversion to other land uses.² A significant contributor was agricultural production, which is expected to increase by about 50% by 2050.³ From 1970 to 2016, there was on average a 68% decrease in population sizes of mammals and birds, as well as amphibians, reptiles and fish;⁴ such declines are occurring at an unparalleled rate.⁵

So, in addition to a looming climate catastrophe, we are also facing a nature crisis. Indeed, they are bound up together: we cannot afford to address global warming, deforestation and biodiversity loss in isolation.

A changing climate threatens natural ecosystems – such as coral reefs – while nature loss amplifies climate change by reducing the ability of ecosystems to store carbon. Biodiversity keeps ecosystems functioning and economies productive.

“1 in 5 countries globally face significant operational risks as a result of collapsing ecosystems”



Source: oceanliteracy.unesco.org, 2022

1. SPM_Updated-Jan20.pdf (ipcc.ch), page 8
 2. <https://www.fao.org/3/cb9360en/cb9360en.pdf>
 3. WRI, 2019
 4. <https://www.worldwildlife.org/press-releases/68-average-decline-in-species-population-sizes-since-1970-says-new-wwf-report>
 5. <https://climatechampions.unfccc.int/wp-content/uploads/2022/06/Why-net-zero-needs-zero-deforestation-now-June-2022.pdf>

Economic impact

What’s more, nature is critical to the global economy: an estimated \$44 trillion of economic value generation – more than half of the world’s total GDP – is moderately or highly dependent on nature.⁶ As an example, the annual value of crops that depend on animal pollination is worth \$235 billion to \$577 billion.⁷ The World Bank estimates that a partial ecosystem collapse could cost 2.3% of global GDP (or \$2.7 trillion) per year.⁸

We know that investment in climate and nature-based solutions is key to mitigating these risks. However, the United Nations Environment Programme has illustrated a stark financing gap, with an estimated \$4.1 trillion of investment needed in nature-based solutions by 2050 to meet the Paris climate agreement’s goal. Only 3% of this sum has been allocated, mainly through public financing.⁹

As a result, we believe investors and the companies in which they invest should look to take steps to integrate – where relevant – nature considerations into climate commitments, strategies and transition plans.


An important first step is analysing and addressing deforestation risks within portfolios, company operations and supply chains. As a systemic issue, we believe companies should assess their impacts and dependencies on biodiversity and nature more broadly; investors should consider the potential direct and indirect risks to their portfolios.


Tackling these complex issues effectively entails challenges; for example, insufficient reporting and data, as well as the multifaceted characteristics of natural capital and biodiversity loss.¹⁰ But while assessing the severity of risks and the related opportunities is complex for companies and investors, we believe this is no excuse for inaction.


6. https://www3.weforum.org/docs/WEF_New_Nature_Economy_Report_2020.pdf
 7. <https://www.oecd.org/environment/resources/biodiversity/Executive-Summary-and-Synthesis-Biodiversity-Finance-and-the-Economic-and-Business-Case-for-Action.pdf>
 8. <https://www.worldbank.org/en/news/press-release/2021/07/01/protecting-nature-could-avert-global-economic-losses-of-usd2-7-trillion-per-year>
 9. <https://www.unep.org/resources/state-finance-nature>
 10. Which can be location and geographically specific, as well as location and company specific


Our approach

At LGIM, we are committed to assessing and combating risks related to [biodiversity loss](#) and [deforestation](#). This involves:

- 

Enriching the data used to inform our analysis
- 

Integrating our findings into investment tools and processes
- 

Exploring opportunities in nature-based solutions
- 

Expanding our [engagement activity](#) with companies, policymakers and broader market participants

As part of this commitment, over the coming months, we will continue to focus on agriculture and on companies with direct exposure to deforestation and biodiversity risks, particularly in relation to soy, palm oil and cattle; we are also addressing the complex supply chains of the consumer goods industry.

Did you know?

Coral reefs are at risk

As climate change increases ocean temperatures, the **CORAL** which **SUPPORT** **ESSENTIAL** **BIODIVERSITY** become more at risk of disease and death.



SPECIES and **HABITAT LOSS**



are not just an **ENVIRONMENTAL ISSUE**,

they also pose serious **ECONOMIC**, **FINANCIAL** and **SOCIAL RISKS**.



If the temperature of the **PLANET** rises by just **1.5°C** we will **LOSE** more than **70%** of the world's **CORAL REEFS**. If it gets to **2°C**, **99%** of **CORAL REEFS** will disappear forever.



Source: IPCC Reports 2021 and 2018

We're proud to partner with **Lewis Pugh**, UN Patron of the Oceans, to highlight the growing danger to biodiversity.

The winners and losers of an oil demand slump

We've developed a framework to show which oil-producing countries should continue to thrive in a 1.5°C world – and which will need to promote growth elsewhere



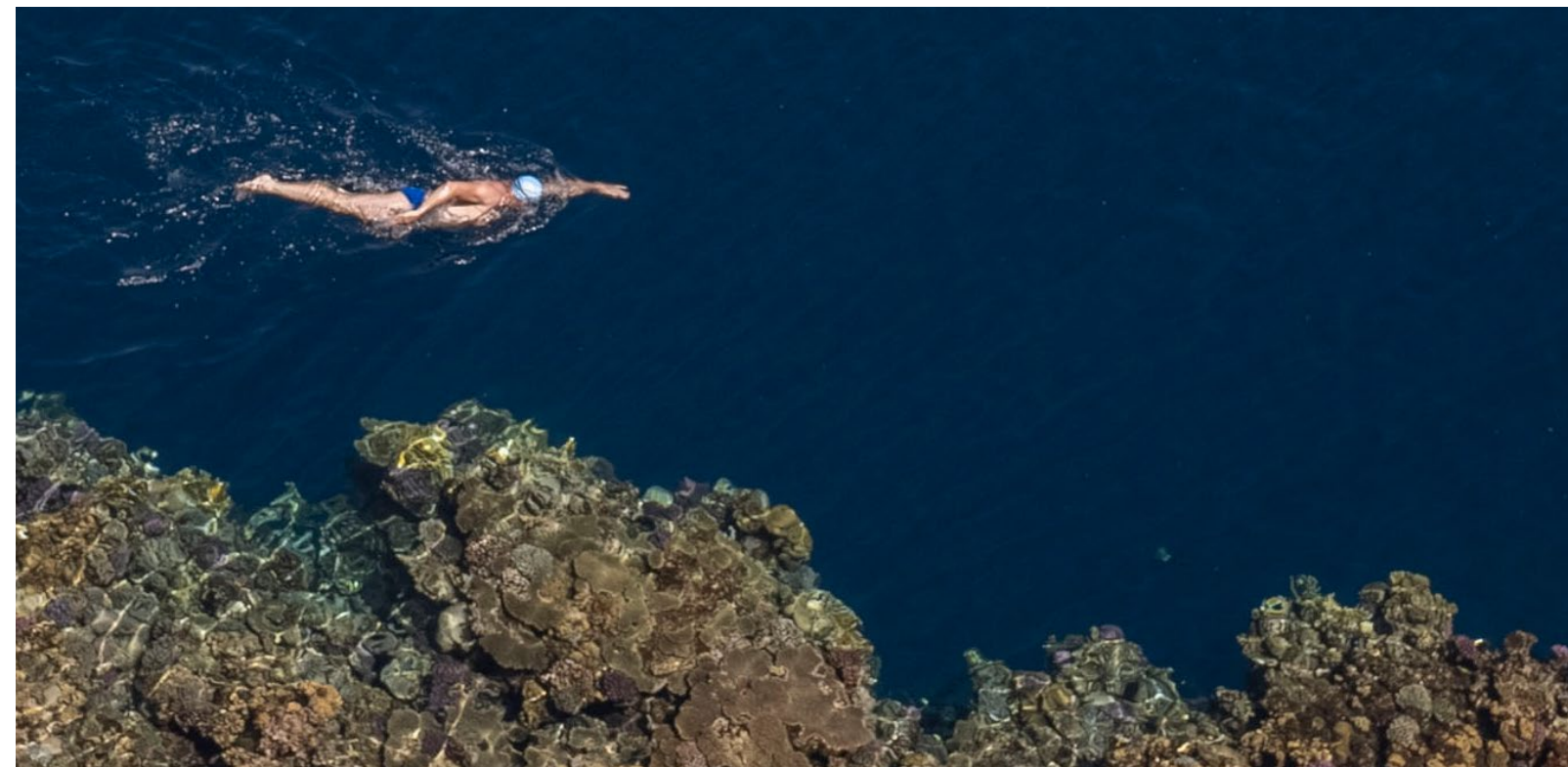
Court Gilbert
Senior Credit Analyst

To meet global climate goals, oil consumption will need to shrink dramatically over the coming decades. The sources of those barrels that are still needed – and those that are not – will likely have profound effects on the economic performance and creditworthiness of individual countries.

Under our LGIM Destination@Risk model's 'well-below' 2°C global warming scenario, the world will probably still require 48.6 million barrels of oil per day in 2050, and 43.4 million under our 1.5°C scenario. That compares to roughly 100 million today.

Broadly speaking, we think the fortunes of oil-dependent nations in such demand environments will be largely determined by economics, with low-cost producers continuing to satisfy reduced demand levels and high-cost producers increasingly marginalised.

“We expect high-cost producers to become increasingly marginalised”



Cost curves

To identify the winners and losers, our energy Global Research and Engagement Group created a global cost curve using estimates of average cost per barrel for each country.¹¹ We then adjusted the cost curve by adding an estimated cost of carbon emissions per barrel on a scope 1-3 basis.¹²

According to our model, remaining on the pathways to well-below 2°C and 1.5°C in 2030 will require a global carbon cost of \$28 per tonne and \$159 per tonne, respectively. With various oils emitting between 463 kilograms and 668 kilograms of CO₂-equivalent emissions per barrel, this implies a range of carbon costs

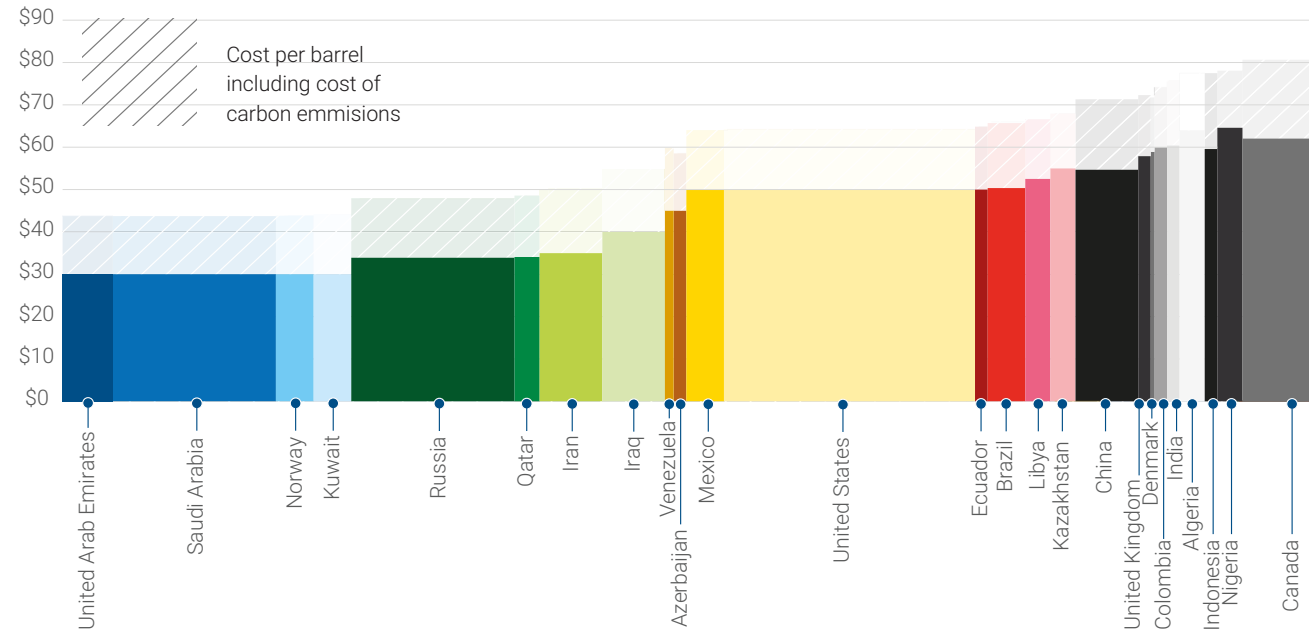
between the lowest and highest emitter of \$5.74 per barrel in our well-below 2°C scenario and a whopping \$32.62 per barrel in our 1.5°C scenario.

Including these carbon costs shifts the overall cost curve higher and affects the relative competitiveness of each country's barrels – particularly for higher-cost and higher-emitting producers. Nigeria, for example, meaningfully improves its competitive position at a higher carbon price, while Venezuela's heavy oil becomes far less competitive as CO₂ prices increase.

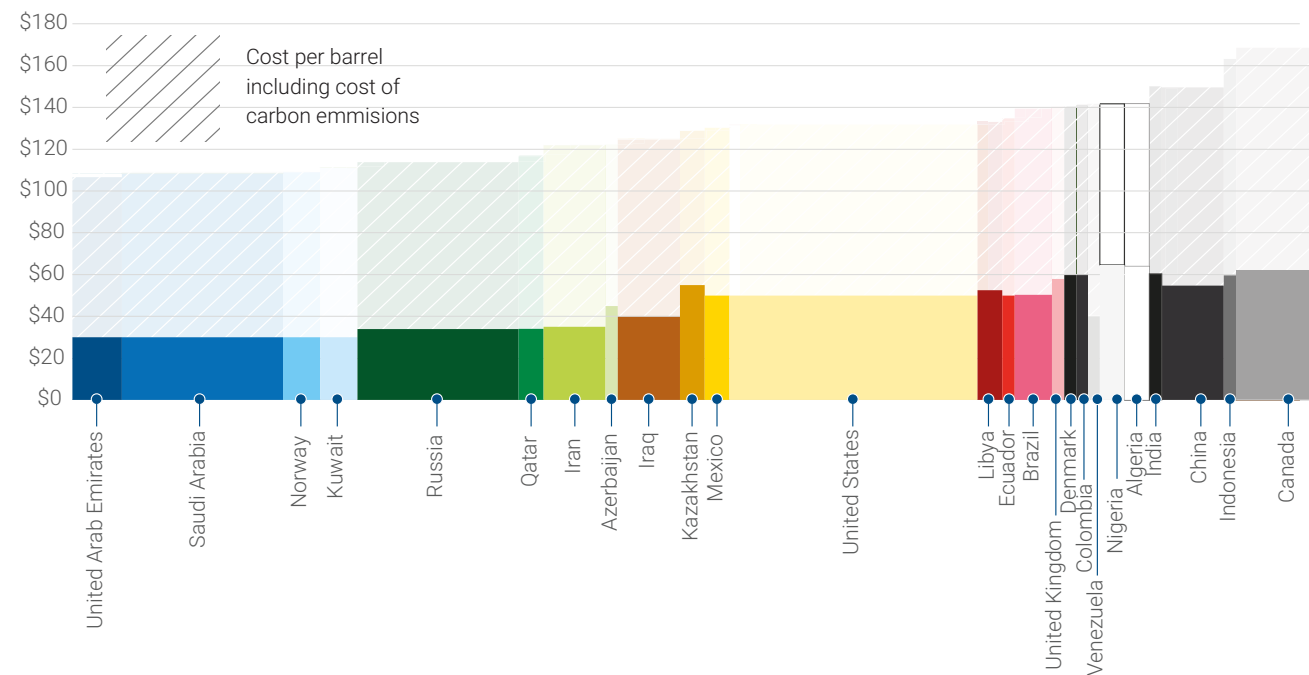
11. Estimated emissions per barrel from Carnegie Endowment Oil-Climate Index <https://oci.carnegieendowment.org/#total-emissions>. Estimates include scope 1-2 emissions of producing the oil and scope 3 emissions based on the slate of products typically produced by each crude grade

12. Goldman Sachs research, LGIM estimates. **Assumptions, opinions and estimates are provided for illustrative purposes only. There is no guarantee that any forecasts made will come to pass.**

Carbon-adjusted cost curve for <2°C \$/bbl



Country cost curve (breakeven) for 1.5°C \$/bbl



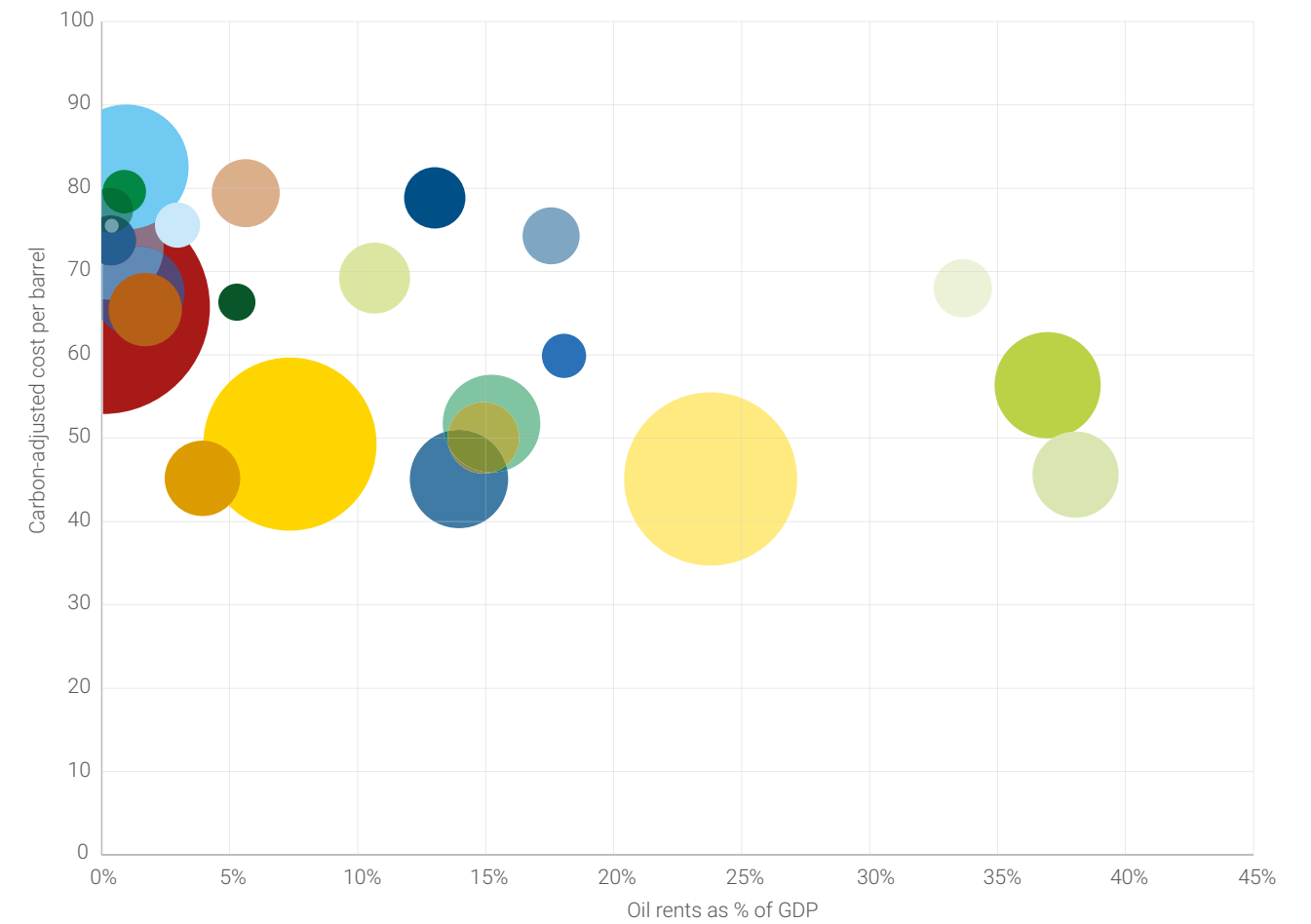
Source for both charts: Carnegie endowment, Goldman Sachs and LGIM analysis as at September 2022. **Assumptions, opinions and estimates are provided for illustrative purposes only. There is no guarantee that any forecasts made will come to pass.**

Considering these cost curves against each country's oil dependence as measured by the World Bank (oil rents/GD¹³) gives a picture of which countries are most exposed to their crude being marginalised.

Highly exposed, high-cost producers such as Libya look particularly vulnerable. By contrast, Saudi Arabia's significant oil dependence is mitigated by very low production costs.

13. World Bank 2015-2019 average oil rent/GDP

Countries in a well-below 2°C scenario in 2030



- Algeria
- Angola
- Azerbaijan
- Brazil
- Canada
- China
- Colombia
- Denmark
- Ecuador
- India
- Indonesia
- Iran
- Iraq
- Kazakhstan
- Kuwait
- Libya
- Mexico
- Nigeria
- Norway
- Qatar
- Russia
- Saudi Arabia
- UAE
- UK
- United States

Bubble size represents current oil production. Source: World Development Indicators, as at 16 December, 2021. **Assumptions, opinions and estimates are provided for illustrative purposes only. There is no guarantee that any forecasts made will come to pass.**

Taxes and royalties comprise a significant portion of the price of producing oil for many countries, which may seek to reduce or eliminate these costs to keep their oil competitive in a declining demand environment. While this would negatively impact government revenues, countries like Nigeria could see their oil move from the fourth quartile of the global cost curve to somewhere in the middle. Some revenue from oil production is certainly better than none.

We will never be able to account for every variable in this type of analysis, with the example of Russia this year highlighting just how quickly circumstances can change for oil-producing nations. But our framework does shed light on which countries have oil industries that should continue to thrive in a 1.5°C world and which will need to promote growth – vigorously – in other areas of their economies to fill the gap left by oil production the world will no longer need.

Clean energy infrastructure in the race to net zero

Coordination between policymakers and investors will be key to delivering much-needed clean energy infrastructure.



Shuen Chan
Head of ESG, Real Assets



Marija Simpraga
Infrastructure Research Manager

The Russian invasion of Ukraine has put into sharper focus the need for renewable energy and energy security. Ironically, in the short term at least, it has made the demand for fossil fuels even greater, as we discuss on p8. The absolute priority in Europe this winter is ensuring there is enough gas to heat homes and keep economies going. Longer term, the current situation only serves to highlight the fact that renewable deployment and energy security go hand in hand.

The investment needs for the energy transition are vast – trillions of dollars in capital will have to be deployed over the coming decades to avert the dangerous impacts of climate change. While significant progress has been made in renewable energy, with deployment growing exponentially over the last decade, the pace needs to accelerate even further.

“Trillions of dollars will have to be deployed”

The most ambitious policy to date has been from the EU Commission with the aim of implementing legally binding targets to reduce net carbon emissions by 55% by 2030 from 1990 levels, and to eliminate them by 2050. To meet this goal, the share of renewables target in the energy mix has been raised to 45% by 2030.¹⁴ For context, as of 2018, the 2030 target was 32%.¹⁵ We believe this represents a significant opportunity for the private sector to step in.

This is not to say that transition finance won't face headwinds. There have been challenges with matching the right kind of investors to the right kind of assets. While the demand for stable or de-risked assets from institutional investors has outstripped supply, investment in less established sectors such as hydrogen, heat pumps and energy efficiency rollout has been less rapid.

Investors in clean energy infrastructure are also grappling with how to manage their soon-to-be-legacy exposures to fossil fuels and reconciling those with their own net zero commitments.

We believe, direct investments in clean energy are one of the most tangible ways for investors to allocate to the energy transition. This typically involves construction of new wind and solar farms which contribute directly to decarbonising the global economy.

Diversification opportunities

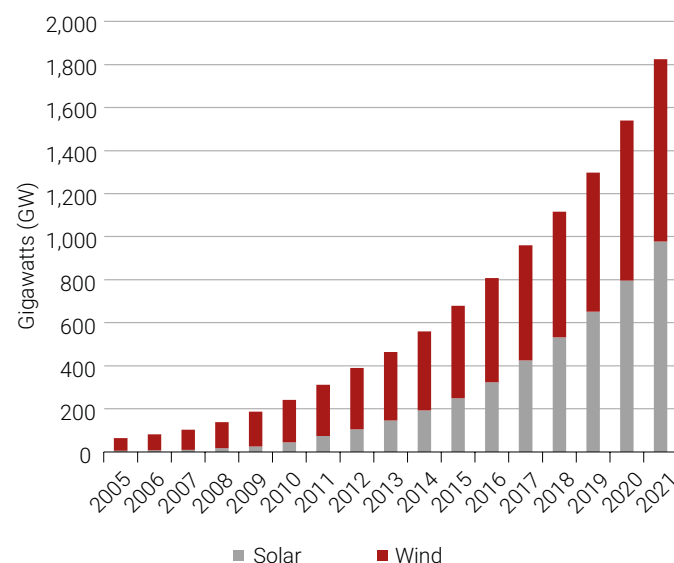
Clean energy assets can differ significantly in terms of their characteristics. Depending on investors' risk preferences, they can range from offering bond-like, government-backed cashflows, to those with considerable exposure to volatile commodity markets and/or development and construction risk.

Risk appetite aside, we believe direct investments in clean energy tend to provide investors with portfolio diversification and a degree of inflation sensitivity, while supporting a portfolio rotation towards lower carbon intensity.

Despite the challenges, we firmly believe that clean energy infrastructure investing will play a crucial role in delivering on global climate goals. Enabling a timely and orderly energy transition goes beyond the infrastructure investing community, however. It will involve coordinated action and consensus between governments, financial institutions and the real economy.

Collaboration between the public and the private sectors has never been more important.

Global installed solar and wind capacity (GW)



Source: Bloomberg New Energy Finance, as at 06 October 2022.

13. World Bank 2015-2019 average oil rent/GDP

14. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en

15. Renewable energy | Fact Sheets on the European Union | European Parliament (europa.eu)

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Key risks

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