UKSIF
UK Sustainable Investment and Finance Association

trex

Stranding:

Modelling the UK's Exposure to At-Risk Fossil Fuel Assets

Executive Summary

Fossil fuel assets are subject to unique pressure from a global shift aiming to avoid the cascading impacts of climate change. Many countries including the UK have set decarbonisation targets, looking to curtail demand for fossil fuels through policy which supports renewables, energy efficiency, and electrification.

A future in which CO_2 emissions are significantly reduced is one in which many currently operational fossil fuel rigs, pipelines, and projects are rendered unviable. Indeed, to give us a greater than 50% probability of remaining below 1.5 degrees of global warming, 58% of oil, 56% of fossil methane gas, and 89% of coal reserves must remain unextracted (*Welsby et. al*).[1] While policy and legislative measures exert pressure on fossil fuel companies from one direction, market pressures from consumer choice and price competition from renewable energy alternatives exert pressure from the other direction. The result is a mounting risk of value erosion for fossil fuel assets.

Fossil fuel companies already face regulatory and legal challenges, but in recent years they have nevertheless seen record profits, in part due to the oil and gas market rally sparked by Russia's invasion of Ukraine. As such, some investors and other firms have piled in to fossil fuel markets again. The disjoint between global decarbonisation targets and some investors' expectations of long-term fossil fuel returns, gives rise to a distributed risk of loss from stranded assets.

In this report, Transition Risk Exeter (TREX) and UKSIF have produced new analysis of the disproportionate exposure of the UK economy, including UK pension savers, to stranded fossil fuel asset risks.

Total global losses from stranding reaches $2.28 trillion by 2040. Accounting for around 2% of global GDP, our analysis shows the UK holds only 1% of global stranding risk where the physical fossil fuel resources and capital infrastructure is accounted. But the UK's ultimate ownership of risk increases to 6% of total global losses at the individual and government level, totalling $141 billion by 2040, equivalent to $3,279 (£2,595 GBP) per working adult in the UK. The UK ranks 9th globally for losses per capita (above the United States, Italy and France), and second out of OECD countries (after Norway).

Around $19 billion (£15.2 billion) of UK pensions are at risk of loss due to stranding by 2040 if only countries' currently announced decarbonisation pledges are fulfilled.[2] That is equivalent to around 17% of the approximately £88 billion[3] of UK pensions directly invested in fossil fuel assets. If the pace of the global climate transition increases (to keep 1.5°C within reach), fossil fuel asset stranding, and thus losses, would be more severe still.

As such, it is incumbent upon UK and global investors to carefully examine the transition plans of oil and gas companies to identify where they are misaligned with a global policy trajectory that will increasingly curb demand. For policymakers in the UK, consistent and high-ambition climate policy signals to enable the transition, alongside measures such as robust transition planning, have emerged as essential to empower investors to minimise their exposure to stranded asset risk. And crucially, to soften the blow of any eventual stranding, it is more important than ever for UK policymakers to remove barriers to investable opportunities in the high-growth decarbonising industries of the future.

$2.28 trillion
global losses by 2040

$141 billion
at risk in the UK.

$19 billion
in UK pensions at risk of loss by 2040

UK ranks 2nd
of OECD countries for losses per capita.

UK public own 6%
of global losses from stranded fossil fuel assets.

1 Welsby, D., Price, J., Pye, S. *et al*. Unextractable fossil fuels in a 1.5 °C world. *Nature* **597**, 230–234 (2021). https://doi.org/10.1038/s41586-021-03821-8
2 As a proportion of the total £3 trillion UK pension pot, that amounts to a 0.5% stranding.
3 Make My Money Matter, *Fossil Fuels in UK Pensions: An analysis of Fossil Fuel exposure in UK Pension Funds*, June 2023 Fossil Fuels in UK Pensions report

Research Context

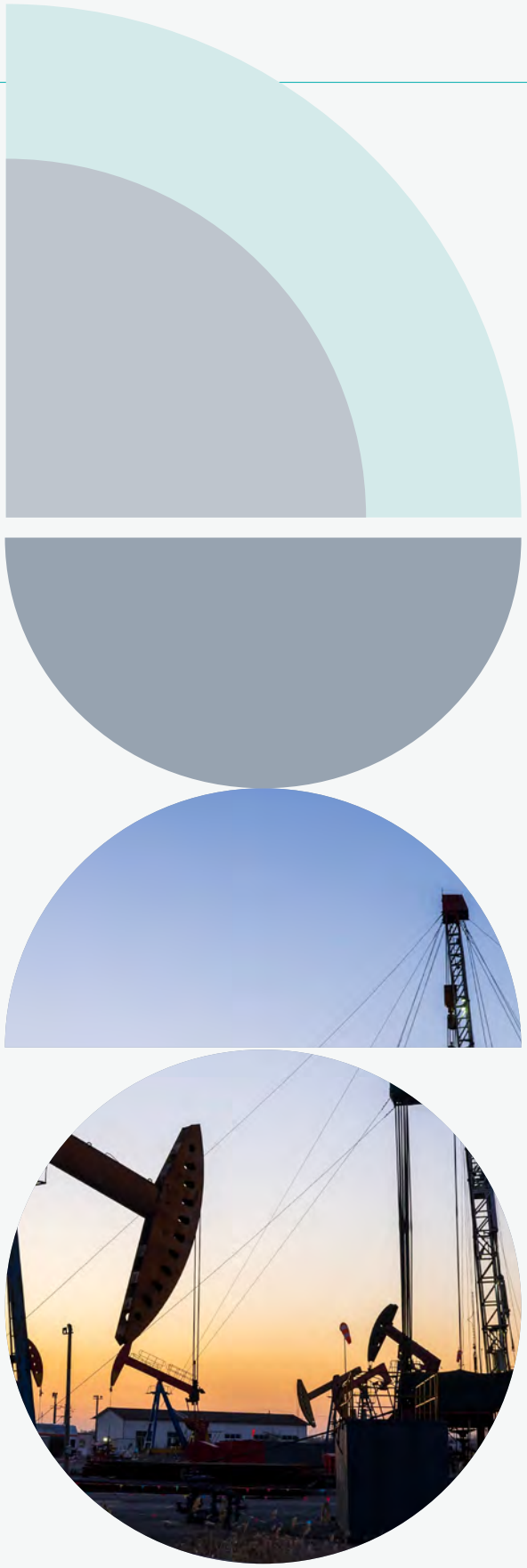
This report updates the findings of a 2022 paper published in *Nature Climate Change* with new global data and a specific focus on UK ownership of at-risk assets.[4] The FRANTIC model, which formed the basis of that paper, has been updated with data to 2024, bringing it up to date by 5 years. A new academic paper containing the full global analysis of the updated modelling will be published in the coming months. In the FRANTIC model, stranded fossil fuel assets are defined as losses in the present value of expected future profits from upstream oil and gas assets as expectations are realigned to accommodate climate policies, technological changes, or shifting market conditions.

Oil and gas demand projections of major players in the sector are misaligned with demand projections associated with all the IEA's three transition scenarios including the most laggard, 'currently stated policies' (STEPS) scenario. To the extent that investments into oil and gas companies are based on expectations of continued extraction and steady demand, they are exposed to a significant risk of stranded assets in any future version of the transition, with knock-on implications for people, including pension savers, and the world economy at large. The alternative, whereby oil and gas companies' strategies better reflected declining demand projections, would reduce this risk.

For the purposes of this report, we will focus on the Announced Pledges Scenario (APS) of the International Energy Agency (IEA) in its *World Energy Outlook 2024*. We refer to it as a 'medium' ambition scenario because it sits between the ambitious net-zero trajectory, and the laggard, 'currently stated policies' (STEPS) scenario. The APS takes current policies combined with countries' mid-term action plans to cut emissions (their Nationally Determined Contributions) and stated long-term net zero targets. To be clear, this scenario is not aligned with the Paris goals of reaching net zero by 2050.

This scenario does not limit warming to 1.5°C (as a net-zero transition would), but the IEA calculates it limits warming to 1.7°C with a 50% probability. In itself, it requires deep, systemic, and global change from the current rate of global emissions, and the UN Environment Programme's 2024 Emissions Gap report shows that "collectively, the G20 members are also still assessed to miss their NDC targets for 2030, with current policy projections exceeding NDC projections by 1 $GtCO_2e$ in 2030."[5]

Please see the Annexe for further detail on the methodology.



4 Semieniuk, G., Holden, P.B., Mercure, JF. et al. Stranded fossil-fuel assets translate to major losses for investors in advanced economies. *Nat. Clim. Chang.* **12**, 532–538 (2022). https://doi.org/10.1038/s41558-022-01356-y

5 United Nations Environment Programme (2024). Emissions Gap Report 2024: No more hot air … please! With a massive gap between rhetoric and reality, countries draft new climate commitments. Nairobi. https://doi.org/10.59117/20.500. 11822/46404

Section 1

What are Stranded Assets?

Asset stranding describes the unexpected write-down in the value of an asset. Since financial valuations are based on forward-looking indicators, such as discounted cash flow modelling, a change in expectations about the future ability of an asset to generate cash flow after investment has taken place, can (partially) strand the asset. Underlying such financial revaluations are real-world processes, such as the premature shutting down of fossil fuel extraction sites due to a lack of demand. In the context of this report, we focus on equity valuations of upstream oil and gas assets, the most valuable part of the fossil fuel industry.

How Fossil Fuel Assets Might Strand:

Climate policies and regulations that limit the use of fossil fuels, such as carbon pricing mechanisms, emissions standards, or outright bans on certain types of fossil fuel extraction, can render some projects unviable.

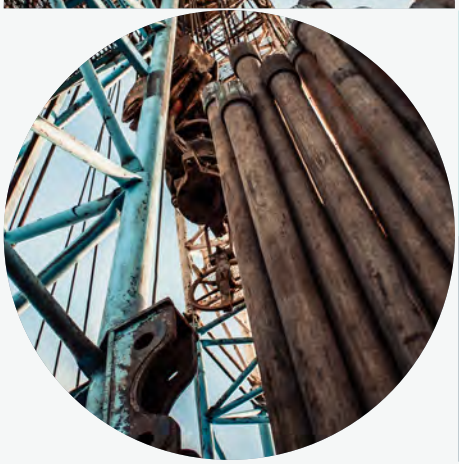
Fossil fuel infrastructure, such as oil wells, rigs, platforms and vessels, may face early retirement due to stricter emissions standards or declining demand in their relevant geographies.

Advances in technology like the rapid development and deployment of solar, wind, and grid-level battery storage are driving down the cost of clean energy, making fossil fuels less competitive.

In geographies where extraction costs are high, it can simply become uneconomical to drill.

As renewables become cheaper and more accessible, consumer demand for fossil fuels is expected to decline.

Legal and reputational risks associated with fossil fuel companies are growing due to their contribution to climate change, which can further depress asset values.[6]



6 See also van der Ploeg, Frederick, and Armon Rezai. 2020. Stranded Assets in the Transition to a Carbon-Free Economy. *Annual Review of Resource Economics* 12 (1): 281–98. https://doi.org/10.1146/annurev-resource-110519-040938; and Semieniuk, Gregor, Emanuele Campiglio, Jean-Francois Mercure, Ulrich Volz, and Neil R. Edwards. 2021. Low-Carbon Transition Risks for Finance. *WIREs Climate Change* 12 (1): e678. https://doi.org/10.1002/wcc.678.

Section 2

Results

The FRANTIC model traces ownership of loss risk through four stages:

1. **Stage 1** quantifies losses and attributes stranding to the country where the fossil fuel assets are located.
2. **Stage 2** aggregates the ownership of stranded assets by fossil-fuel company and the loss is allocated to the country where the parent company has its headquarters.
3. **Stage 3** traces losses through corporate ownership and fund fund managers, including most of the world's large financial companies, to around 16,000 ultimate corporate owners.
4. **Stage 4** tracks losses to their ultimate owners, governments and individuals, as shareholders or outright owners of companies or investors in funds, including pension funds.

Our findings show that the UK financial system is disproportionately exposed to stranded fossil fuel asset risk, both as a proportion of our GDP share, and for our population size. Total global asset stranding reaches $2.28 trillion by 2040 in the announced pledges (APS) trajectory. Of that, the UK's ultimate owner exposure is $141 billion, equivalent to $3,279 (£2,595 GBP) per working adult in the UK.

At stage 1, where physical fossil fuel resources and capital infrastructure are accounted for, the UK holds just 1% (or $26 billion) of global stranding risk, reflecting our limited domestic oil and gas reserves compared to petrostates like Saudi Arabia, Qatar, and Russia. However, this exposure increases dramatically at stage 2, rising to 6% (or $126 billion). Some of the UK's exposure at stage 2 arises from the headquarters for two of Europe's largest oil and gas firms, BP and Shell, which are located in London. The UK's risk intensifies at stage 3, where the FRANTIC model traces financial losses through corporate ownership and fund management to corporate owners. The UK's share of risk peaks here at a 7% share of global losses (or $150 billion) by 2040, primarily due to UK-based companies' investments in overseas oil and gas assets.

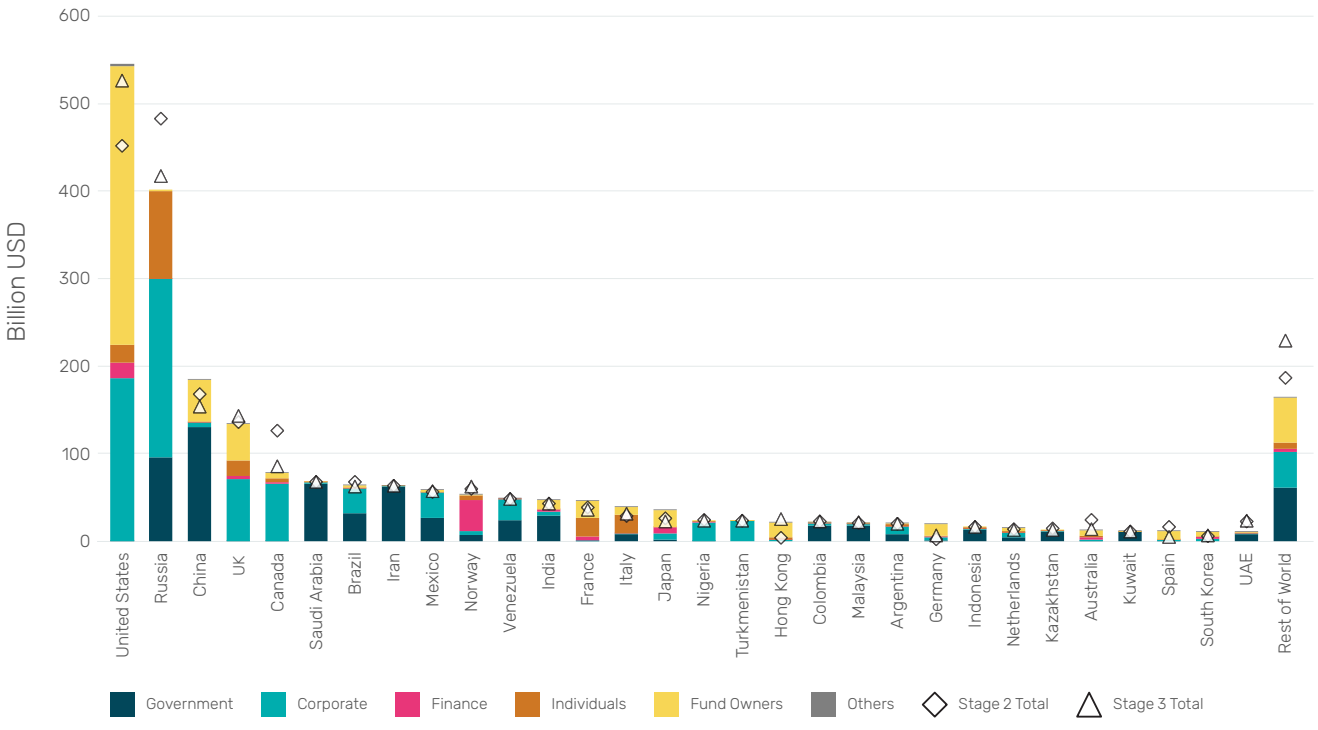
Stage 4 calculates losses for individuals, as shareholders or outright owners of companies or investors in funds, including pension funds. It also traces government ownership, which in the UK is negligible, but which in states like China is much more significant. Individual and government ownership of losses in the UK constitutes 6% of the global total, at $141 billion (Fig. 1).

By 2040, Global asset stranding reaches

$2.28 trillion

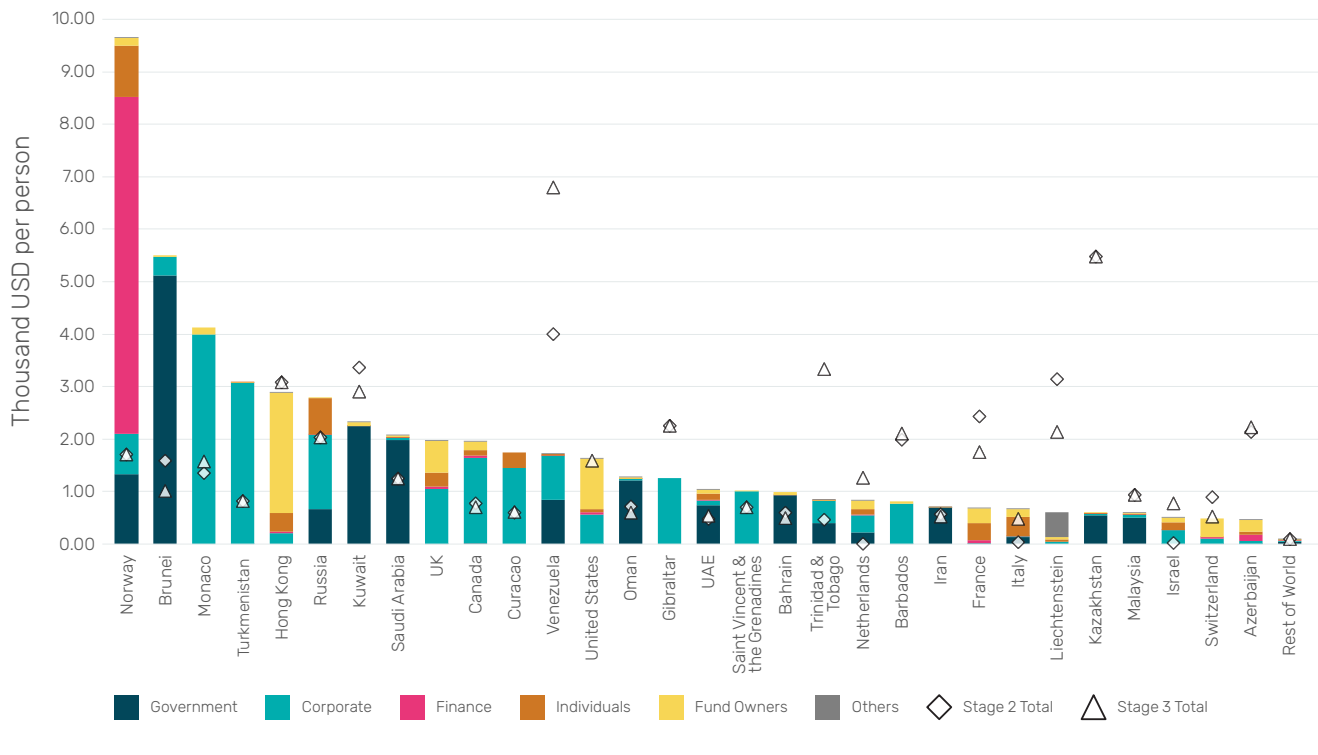
UK's exposure is $141 billion, equivalent to $3,279 (£2,595 GBP) per working adult

Fig. 1: Asset stranding by regional owners at stage 4



The UK is the fourth most exposed country to stranded asset risk for ultimate owners after the United States, Russia, and China. Given in proportion to our population, we are 9th most exposed globally, and more exposed than both the United States and China (Figure 2). Adjusted for population we are the second most exposed country in the OECD, after Norway.

Fig. 2: Asset stranding by regional owners at stage 4 adjusted per capita



The impact on pensions is significant. Pension funds typically take a longer-term view of investment viability and many of our members have long led the way in the incorporation of sustainability factors within the scope of their fiduciary duties. However, the knock-on effects of asset stranding can be difficult to diversify away from. Investment in a parent company which themselves have investments in fossil fuels can lead to exposure to risk.

The UK pension pot is estimated to total £3 trillion, with around £962 billion (around 33%) invested in equities.[7] Using data from the Investment Association's *Investment Management in the UK 2023-24*, The FRANTIC model estimates that £15.2 billion in pensions investments is at risk of loss due to stranding of future profits to 2040, if only current policies and announced pledges are fulfilled.[8] Compared with the approximately £88 billion pensions estimated by Make My Money Matter to be invested in fossil fuel assets, [9] that is equivalent to around 17%. As a proportion of the total £3 trillion UK pension pot, that amounts to a 0.5% loss from fossil fuel asset stranding by 2040. If the pace of the global climate transition increases (to keep 1.5°C within reach), fossil fuel asset stranding would be more severe still.

Alongside global decarbonisation efforts that include electrification, power demand is projected to show strong growth. According to the IEA, "Global electricity demand rose by 4.3% in 2024 and is forecast to continue to grow at close to 4% out to 2027."[10] In this context, renewable energy investment is expected to soar.

Energy generated from renewable sources is increasingly cheaper and more accessible. Bloomberg New Energy Finance (BNEF)'s 2024 Energy Outlook states: "Even if the transition is propelled by economics alone, with no further policy drivers to help, renewables could still cross a 50% share of electricity generation at the end of this decade."[11]

While the FRANTIC model does not currently calculate profits for renewables in different scenarios, the order of magnitude of these profits can be compared to the lost-profits from fossil fuel assets in a back-of-the-envelope calculation. Assuming a return on new build investment of 10% and renewable energy investment figures from Trex's estimates global new renewables profits in the APS scenario are projected to total $2.9 trillion between 2025 and 2040. In a net-zero scenario, those profits are projected to total $5.4 trillion in the same period. If investors in the UK only invest in proportion with our share of GDP (2%), the UK's share of profits in the reference scenario grow to $59 billion by 2040, whereas in the net-zero scenario they grow to $108 billion.

£15.2 billion

in pensions investments is at risk of loss due to stranding by 2040

Between 2025 and 2040, new renewables profits are projected to total

$2.9 trillion

7 Wells, J. (2024). *Pension scheme assets – how they are invested and how and why they change over time.* Pensions Policy Institute. https://www.pensionspolicyinstitute.org.uk/media/c00dra0k/20240909-ppi-pension-scheme-assets-main-report-final.pdf p.3

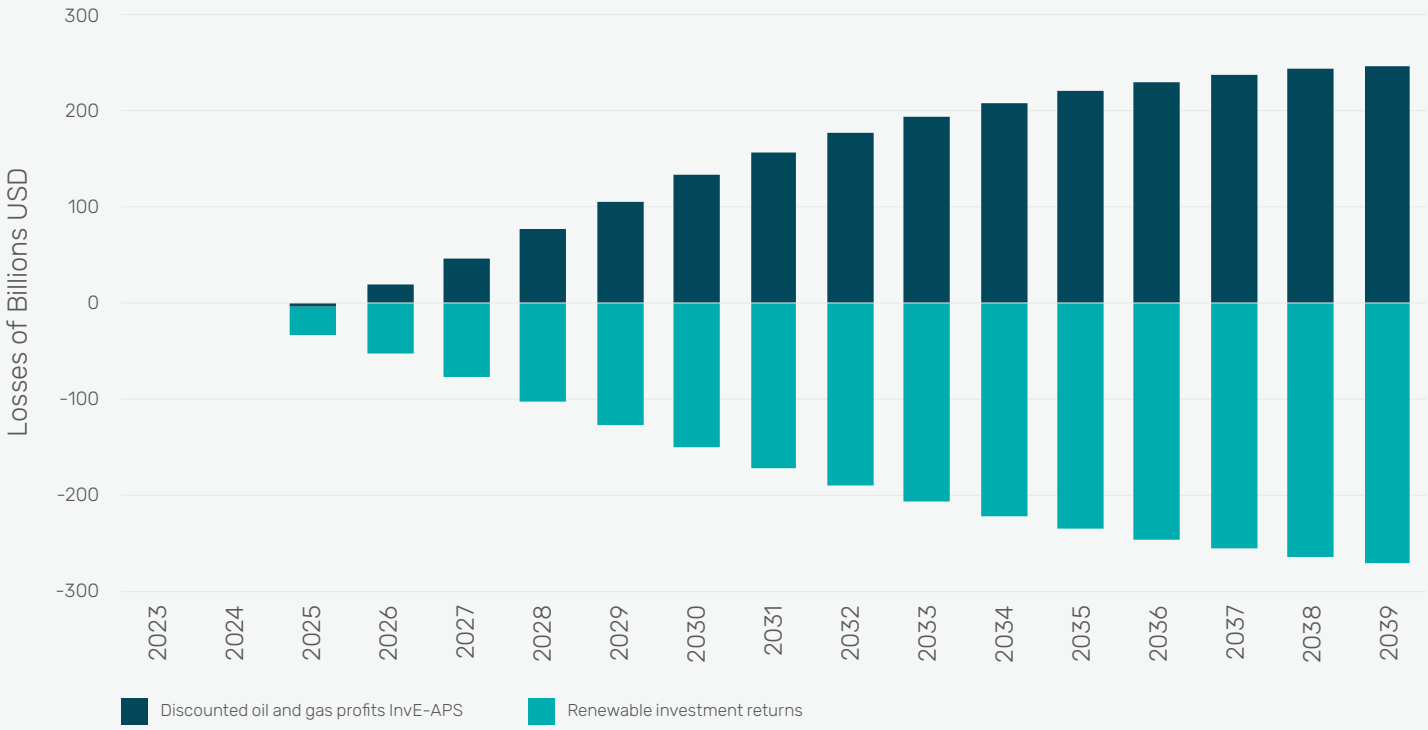
8 The Investment Association's report only details the split of assets under management at UK desks, but not necessarily for UK fund holders. Only 40% of UK AuM are managed on behalf of UK fundholders. The pension exposure assumes that the share of UK based pension funds as a share of UK based investors is the same as for the global average, for UK AuM.

9 Make My Money Matter, *Fossil Fuels in UK Pensions: An analysis of Fossil Fuel exposure in UK Pension Funds*, June 2023 Fossil Fuels in UK Pensions report

10 IEA (2025), *Electricity 2025*, IEA, Paris https://www.iea.org/reports/electricity-2025, Licence: CC BY 4.0

11 New Energy Outlook 2024 | BloombergNEF | Bloomberg Finance LP

Fig. 3: Comparison of stranded oil and gas assets by year and extra profits from renewables, both discounted.



Positive values are stranded assets, negative values are capital gains.

The cost of inaction

The physical impacts of climate change have already begun to accelerate, and their impacts have been felt keenly by communities and regions ravaged by flooding, storms, wildfires and heatwaves in 2024 alone. The physical damage costs of unabated climate change will already dwarf the stranding of fossil fuel assets, with climate-related extreme weather events having cost the global economy $2 trillion in the last decade. [12] A no-transition scenario is therefore significantly more expensive.

While the worst effects of climate change will be felt in countries that are already vulnerable, through geography, climate or socio-economic factors, in a 2°C scenario there would also be very serious consequences for the UK. [13] Temperature rises in that range would have very serious impacts on the UK's precipitation and surface temperature.[14] The total losses arising from climate change in the UK is estimated to reach at least 7.4% of GDP annually by 2100 (from a 2022 baseline).[15]

The World Economic Forum estimated in 2024 that in a warming scenario between 2.5°C and 2.9°C, climate-intensified natural disasters may lead to $12.5 trillion in economic losses by 2050.[16] FRANTIC's projection of total losses from stranded fossil fuel assets in a net-zero realignment, at $4.57 trillion globally, are far less severe in comparison.

In a 2.5°C + warming scenario, climate-related losses could reach

$12.5 trillion

by 2050

12 Oxera, *The economic cost of extreme weather events* 2024-ICC-Oxera-The-economic-cost-of-extreme-weather-events | DocumentCloud

13 Park, T., Hashimoto, H., Wang, W., Thrasher, B., Michaelis, A. R., Lee, T., Brosnan, I. G., & Nemani, R. R. (2022). What Does Global Land Climate Look Like at 2°C Warming? 3.7 Heat Stress, Earth's Future, 10, e2022EF003330. https://doi.org/10.1029/2022EF003330

14 Ibid.

15 Rising J, Dietz S, Dumas M, Khurana R, Kikstra J, Lenton T, Linsenmeier M, Smith C, Taylor C, Ward B (2022) What will climate change cost the UK? Risks, impacts and mitigation for the netzero transition. London: Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science. p.12.

16 Eitelwein et. Al., World Economic Forum. (2024). *Quantifying the impact of climate change on human health. Geneva: World Economic Forum.* WEF_Quantifying_the_Impact_of_Climate_Change_on_Human_Health_2024.pdf

Case study:

Brunel, Greater Manchester, and Merseyside Pension Funds' Co-Filed Shareholder Resolution (Shell PLC)

In January 2025, Brunel Pension Partnership co-filed a shareholder resolution alongside Greater Manchester Pension Fund, Merseyside Pension Fund, and the Australasian Centre for Corporate Responsibility (ACCR) calling on Shell to provide disclosures on its stated growth strategy for its Liquified Natural Gas (LNG) business, given its apparent departure from Shell's climate goals. Shell's plans to expand its LNG business by 20-30% by 2030 raised concerns from investors like Brunel, who sought greater disclosures from Shell in order to assess alignment with the company's climate commitments and gain assurance that they were managing the risks associated with their LNG portfolio appropriately.

A shareholder resolution is a core stewardship activity, representing a formal mechanism through which investors can request disclosures on specific issues. It typically follows engagement efforts and is employed where dialogue alone has not yielded results, making it a powerful tool in the stewardship escalation ladder.

In the case of Brunel's co-filed resolution, their concerns centred on the disconnect between Shell's LNG growth strategy and its Paris-aligned pathway. Research released by the ACCR highlighted that Shell's projections for future LNG demand exceed all International Energy Agency (IEA) scenarios, alongside the disparity between current lifecycle costs of LNG assets, which average $8/MMBtu, and the need for LNG prices to fall below $5/MMBtu to compete with renewables. The ACCR report estimated that Shell's LNG business could see a value erosion of $13 billion for every $1/MMBtu reduction in gas price.

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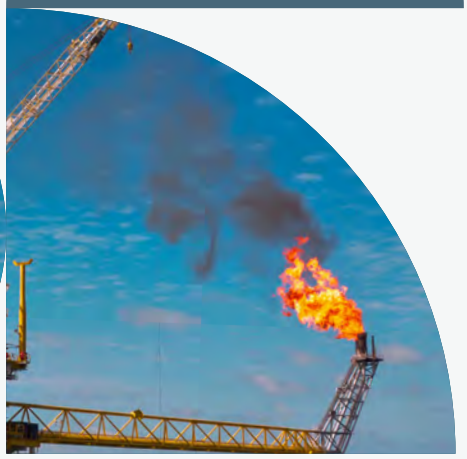


Section 3

Recommendations

The carefully controlled transition away from fossil fuels is both an environmental and a financial imperative. The surest way to offset the risk of losses through fossil fuel asset stranding is to support industries that will help grow into the space created by their decline, while also continuing to incentivise hard-to-abate sectors to accelerate their transition pathways.

Governments have a key role to play in setting out ambitious near-term targets and clear sector decarbonisation plans to foster sustainable investment into growth industries of the future such as renewable energy, energy saving and efficiency improvements, and zero-emissions vehicles. Alongside other supportive steps, these investments have the capacity to both 'soften the blow' of any eventual asset stranding from fossil fuel assets while also helping to avoid locking in investment into these high carbon intensity assets that may ultimately strand.

Below is a summary of some of UKSIF's policy positions that could help to mitigate these financial risks which we continue to raise with policymakers, regulators, and wider stakeholders.

1. Create positive, enabling conditions for decarbonising investment opportunities

Even factoring in energy efficiency gains, global demand for energy is projected to increase over the coming decades.

In order to meet this demand, Bloomberg NEF expects total global energy investment and spending from 2024 to 2050 will be between $181 trillion and $215 trillion. Much of that will be necessarily domestically constrained, such as spending for build-out of national electricity grids, but some of it represents export industries and technologies which the UK can and should capture a share of, such as electric vehicle factories, battery manufacture, wind turbines and heat pumps.

Actions taken by policymakers now, including addressing systemic investment barriers to the growth of the low-carbon economy (e.g. planning rules, grid connectivity, and energy market reform), will determine how much of that global investment the UK is able to capitalise on domestically. UKSIF's 2024 'Financing the Future' thought leadership report series outlined concrete recommendations to government on behalf of investors aimed at tackling each of these systemic barriers. Redressing skills gaps in strategic growth areas will also allow the UK to attract greater green investment and capitalise on the full benefits of our climate leadership through long-term job creation and economic growth.

2. Industrial decarbonisation strategies

Linked to this, as we set out in our Transport report as part of our 2024 Financing the Future series, long term sector decarbonisation strategies can provide welcome clarity and certainty for investors on a sector's direction of travel. This will allow the UK government to support specific sectors and foster supply chains in those areas in which the UK can excel, increasing our competitiveness at home and in global markets.

For example, the Government should deliver on its commitment to publish an ambitious long-term decarbonisation plan for freight, with a focus on HGVs and larger vehicles. This would deliver certainty and unlock more investment in the production of alternative fuels. Across the board, we continue to strongly support granular decarbonisation pathways for individual sectors, as recommended by the independent Transition Finance Market Review (TFMR), including for those sectors where policy certainty may be particularly lacking.

3. A clear regulatory framework to support sustainable finance and transition finance, including robust transition planning

In our view, another essential component of an orderly transition will be a clear and credible regulatory framework to support sustainable finance and transition finance. This includes requirements for all large financial and non-financial companies to disclose (and subsequently implement through best efforts) climate-related transition plans in line with the framework set out by the Transition Plan Taskforce (TPT), alongside other measures we recommended in our response to the independent Transition Finance Market Review (TFMR). We believe high-quality, credible transition plans can support investors, banks, and other financial market participants by giving them the data they need to better inform their investment decisions, facilitating green investment and investment at large by UK companies across all sectors. Specifically, the forward-looking data provided by transition plans is crucial and can provide a powerful tool for investors to assess how companies' future investment plans are aligned with a low-carbon future and which businesses will remain profitable in future. According to an OECD global survey, 79% of financial market participants have cited the lack of detailed information on corporate transition plans as a barrier to transition finance.[17] At present, the continued absence of credible transition plans from many businesses makes it more complex for investors to navigate investment risks and opportunities on behalf of their clients.

As with any major economic transition, starting early and progressing steadily is typically better for extant businesses than sudden shocks and precipices. Accompanied by complementary measures such as clear sector decarbonisation pathways, mandating transition plans across the economy that are both ambitious and practical can give UK businesses a long-term horizon and direction of travel as we progress towards 2050.

4. UK leadership on investor stewardship should be further cemented and continue to evolve, including accounting for systemic stewardship approaches

Many of our members have been leading the way in company engagement, but systemic risks such as a climate change and nature loss increasingly require a broader approach and further consideration of resourcing of engagement activities. Asset owners and asset managers should look to enhance not only their corporate engagement but also their engagement with wider actors, including governments, regulators, and international standard-setting bodies (e.g. IFRS Foundation, IOSCO). This role could help to ensure a more enabling policy environment for net-zero, with consistent policy signals supporting the competitiveness of assets and holdings and the ultimate effectiveness of investor stewardship.

UKSIF has also responded to the Financial Reporting Council's consultation on the UK Stewardship Code. In our response we particularly highlight the need to maintain the 'stewardship' definition's emphasis on the importance of considering wider environmental systems and society as part of investor stewardship practice to deliver long-term value for clients and beneficiaries. More broadly, positive signals provided by policymakers on stewardship's role in the wider economy could better support its contribution to value creation and its purpose. You can read our full response to the Stewardship Code consultation here.

17 OECD, OECD Guidance on Transition Finance: Ensuring Credibility of Corporate Climate Transition Plans, 2022. https://www.oecd.org/en/publications/oecd-guidance-on-transition-finance_7c68a1ee-en.html

Annexe

Methodology

The FRANTIC model compares an 'investor expectations' reference scenarios with the trajectory of transition scenarios to which expectations could realign. For the purposes of this report, we focus on the Announced Pledges Scenario (APS) of the International Energy Agency (IEA) in its *World Energy Outlook 2024*.

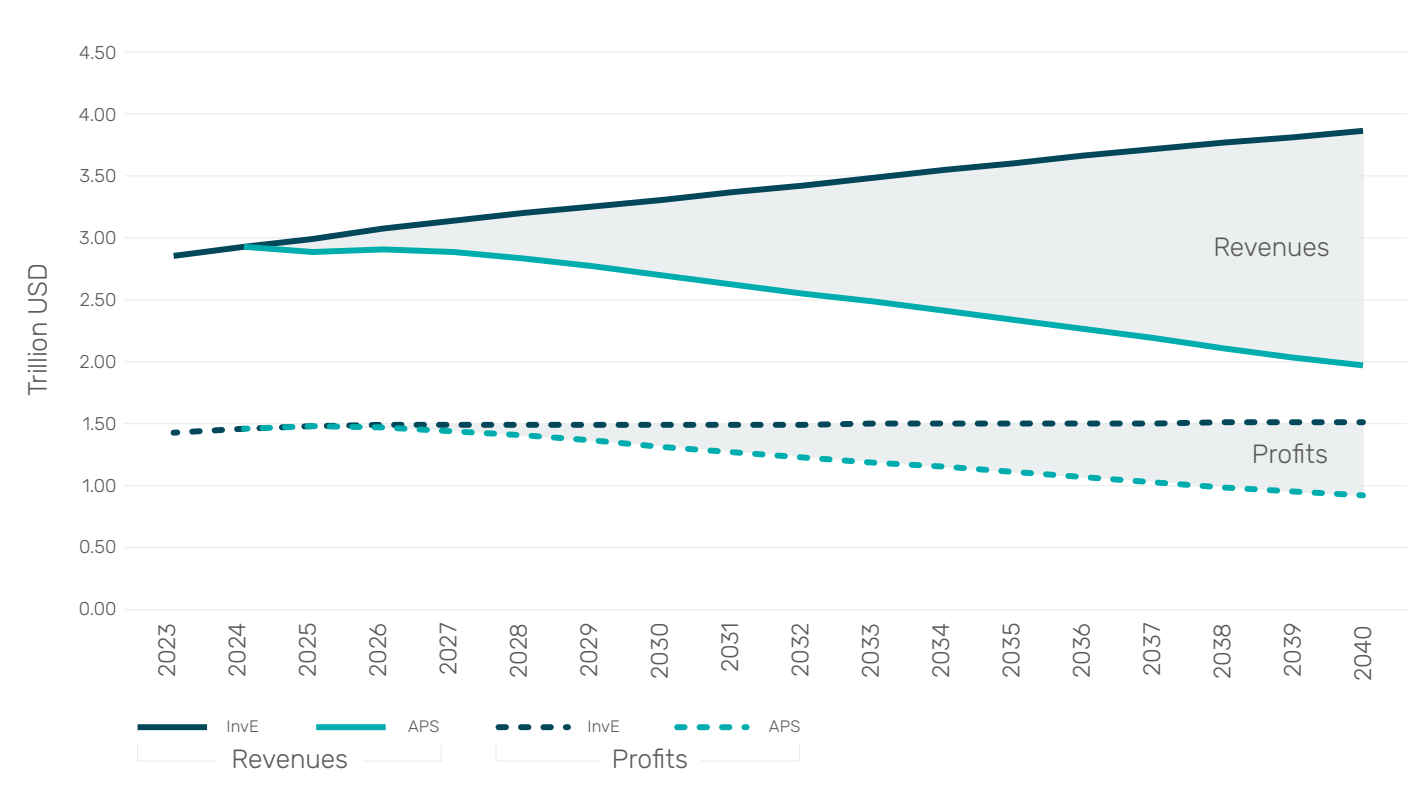
The International Energy Agency's scenarios are used to provide a view of a comparison between 'ambitious', 'medium' and 'laggard' approaches to the transition. These are imperfect labels, not least because the 'laggard' transition still entails extensive asset stranding. It also entails a global temperature rise of between 2.4 and 2.9°C.[18]

With Investor expectations given as a reference scenario, the three transition scenarios are:

- STEPS/Laggard: Stated Policies Scenario, aligned with 2.4°C of warming or more – Implements only current policies and actions
- APS/Medium: Announced Pledges Scenario, aligned with 1.7°C of warming – implements countries' mid-term action plans to cut emissions (their Nationally Determined Contributions) and long-term net zero targets
- NetZero/Ambitious: Net Zero Energy scenario, aligned with 1.5°C warming above pre-industrial levels. This is a normative scenario as it works backwards from a defined outcome

The projected global oil and gas revenues and profits in all of these scenarios are reported in Figure 4.

Fig. 4: Global undiscounted oil and gas revenue and profit projections by scenario.



18 The IEA's STEPS model projects 2.4°C of warming, but the UN Environment Programme has put its own version of current stated policy global temperature rise trajectory at 2.9°C.

The model uses the average of the U.S. Energy Information Agency, OPEC, and ExxonMobil outlooks and Enerdata's EnerBase scenario as the investor expectations (InvE) reference scenario for oil and gas demand, following the Resources for the Future's classification of energy scenarios.[19]

The APS takes current policies combined with countries' mid-term action plans to cut emissions (their Nationally Determined Contributions) and stated long-term net zero targets. Its counterpart in the Network for Greening the Financial System (NGFS) is the middle 'disorderly' transition scenario. To be clear, this scenario is not aligned with the Paris goals of reaching net zero by 2050. This scenario does not limit warming to 1.5°C (as a net-zero transition would), but the IEA calculates it limits warming to 1.7°C with a 50% probability. In itself, it requires deep, systemic, and global change from the current rate of global emissions, and the UN Environment Programme's 2024 Emissions Gap report shows that "collectively, the G20 members are also still assessed to miss their NDC targets for 2030, with current policy projections exceeding NDC projections by 1 $GtCO_2e$ in 2030."[20]

The FRANTIC model is designed to allocate input shocks, such as fluctuations in profits, dividends, adjusted profit expectations, and changes in net present value, from a company or equity to its ultimate beneficiaries. The model propagates these input shocks through all intermediaries, including parent or holding companies and financial institutions, to the ultimate beneficiaries. This includes individual investors, pension funds, and governments. For the analysis in this report, like for the original 2022 analysis, future profits are discounted by 6% per year.[21]

The model traces ownership of loss risk through four stages:

1. **Stage 1** quantifies losses and attributes stranding to the country where the fossil fuel asset sites are located.
2. **Stage 2** aggregates the ownership of stranded assets by fossil-fuel company and the loss is allocated to the country where the parent company has its headquarters.
3. **Stage 3** traces losses through corporate ownership and fund management nodes, including most of the world's large financial companies, to around 16,000 ultimate corporate owners.
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19 https://www.rff.org/publications/data-tools/global-energy-outlook/

20 United Nations Environment Programme (2024). Emissions Gap Report 2024: No more hot air … please! With a massive gap between rhetoric and reality, countries draft new climate commitments. Nairobi. https://doi.org/10.59117/20.500.11822/46404

21 The level of the private discount rate chosen by financial investors affects the magnitude of the losses and can also have distributive consequences if asset loss time profiles vary across assets. However, in the 2022 study, the transition scenario chosen for the expectations realignment had a greater influence on losses than the discount rate.

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