# 1AC---Transition

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**The Advantage is the Transition.**

**Collapse of the current energy economy is inevitable and quick:**

**1. VOLATILITY. Legal and geopolitical headwinds cause rapid price fluctuations, spurring cascading overreactions**

**Farrell et al. 23** (Nathaniel Farrell [Ph.D., Columbia University, Professor at Washington University St. Louis, written in collaboration with attorneys from the Climate Defense Fund in a letter penned to the Attorney General of the State of Missouri cosigned by a litany of WashU faculty and Missouri organizations available in the letter] ("Complaint to Attorney General Andrew Bailey, Climate Defense Fund," 10-30-2023, https://climatedefenseproject.org/wp-content/uploads/2023/11/WashU-Complaint.pdf)//Shwillett

The **pandemic** and Russian **invasion** further strained the industry's traditional **value** thesis. Russia's invasion of Ukraine caused **short-term** pressure in **energy** markets, resulting in **sky-high** commodity prices for **fossil fuels** in 2022. However, the invasion also **hastened** demand **destruction** for fossil fuels, with **higher prices** accelerating the shift toward **renewables** and **low-carbon** technologies and ultimately undermining the industry's long-term interests.137 For instance, dramatic **price volatility** has undermined future **demand** for liquified natural gas in Asian countries, seen as a growth market for the industry.138 See-sawing **fossil fuel** commodity **prices** illustrate the **erosion** of the industry's traditional **value** thesis. While **fossil fuel** investment was once **predicated** on the industry's ability to produce **reliable** and steady **returns**, the industry now finds itself at **the mercy** of factors outside its control. "[H]oping for **war**, or relying on a global **oil cartel** to manipulate prices, is the **opposite** of a **sustainable**, low-risk business **model**. Any financial endeavor that depends on bloodshed and geopolitical machinations for its profits is, by its nature, a speculative, **high-risk** endeavor—a **far cry** from the **blue-chip** investment thesis that **investors** historically **demanded** from the oil and gas industry."139 Crucially, even the temporary increase in oil prices and subsequent record-breaking profits for the fossil fuel industry could not reverse the pattern of long-term financial decline. In 2023, broad stock market indices continue to underperform fossil-free variants on a ten-year basis (see discussion of index returns above). The market tumult instigated by Russia's invasion of Ukraine did not close this gap. As markets adjust to the impact of the invasion of Ukraine, the industry finds itself exhibiting a familiar pattern. Throughout 2023, the sector has been at or near last place out of all components of the S&P 500.140 In Q2 2023, the oil majors once again found themselves in deficit spending.141 Annualized returns yielded by fossil fuel investments have lagged behind the S&P 500 in the last five years (2.67 percent annual return compared with 11.86 percent) and particularly in the last ten years (0.58 percent annual return compared with 10.5 percent).142 To put that in perspective, projections show that $100 invested in the broader stock market in 2013 would be worth about $232 in early 2021, while that same $100 would be worth just $42 if invested in fossil fuel production.143 Although fossil fuels posted market-leading gains in 2021 and 2022, this performance is an anomaly after ten years of poor returns. The cumulative effect of these returns is neatly captured in a comparison of broad stock market indexes, for example MSCI's All Country World Index (ACWI) and a fossil-free version of the same index.144 The fossil-free index consistently outperformed the full ACWI, with annualized gross returns of 9.53% for the ten years to August 31, 2023, compared to 9.12% for the full ACWI. The difference of 0.41 percentage points is significant because repeated outperformance leads to a large difference in total return. A hypothetical $100 million investment in MSCI's fossil-free index from Nov. 30, 2010, to Aug. 31, 2023, would have grown by nearly $18 million more than the same amount invested in the standard ACWI index. The implication of this data is that broader portfolio diversification into fossil fuels has resulted not in value maximization but in value losses, and a prudent investor would investigate the factors underlying this phenomenon to evaluate continued holdings in fossil fuels. The fossil fuel industry has barely improved its overall weighting among sectors of the economy as measured by the Standard & Poors 500 index. The energy sector started 2021 at 2.3% of the total value in the index and currently stands at 4.4%.145 The leading sectors of the economy comprise a far larger portion of the index: information technology (28%), healthcare (13%), financials (12.5%), and consumer discretionary (10.6%). These weights represent investors' expectations about which sectors represent the economy's long-term profit centers. In 2021, in the United States, forty percent of electricity from the electric power sector was from non-fossil fuel-based sources.146 This was in part due to an increased reliance on wind and solar power, which overtook nuclear power in 2021. A 2022 study from Ipsos revealed that consumer demand is shifting away from fossil fuels in favor of renewables: eighty-four percent of those surveyed globally and seventyfive percent of those surveyed in the U.S. feel it is important for their country to shift to climate-friendly energy sources in the next five years.147 In 2023, energy stocks have once again begun to fall, indicating the volatility of the fossil fuel industry. Through the start of August 2023, energy stocks lost 1.3 percent in 2023, while the broader stock market had an increase of 17.2 percent.148 The International Energy Agency has determined that, under current scenarios, we cannot develop new oil or gas fields besides those already producing oil or

under development.149 Looking forward, fossil fuel companies face significant investment risks. Nearly all major financial regulatory bodies have noted that climate change and the energy transition create material financial risks for the global economy. The Securities and Exchange Commission is currently preparing disclosure rules to helpg investors better navigate climate risk. One commissioner recently noted that, "[w]ith climate change, we have ample, well-documented warning of potentially vast and complex impacts to financial markets. . . . Indeed, we have more than just warning as many of those risks have already materialized. Climate change thus poses a pressing and urgent risk — for investors, companies, capital markets, and the economy."150 The Federal Reserve Board noted in 2021 that "[c]limate change poses significant challenges for the global economy and financial system, with implications for the structure of economic activity, the safety and soundness of financial institutions and the stability of the financial sector more broadly."151 In its 2020 financial stability report, the Federal Reserve reported that "climate change, which increases the likelihood of dislocations and disruptions in the economy, is likely to increase financial shocks and financial system vulnerabilities that could further amplify these shocks."152 In a 2020 report, the Commodity Futures Trading Commission warned that "[c]limate change poses a major risk to the stability of the U.S. financial system and to its ability to sustain the American economy."153 According to a 2019 study by the Mercer consulting firm, investment portfolios will be greatly affected by future global warming. If warming is held to two degrees Celsius — the target set by the 2015 Paris Agreement and one which will still result in widespread harm — the global economy will suffer significant damage from climate change while also transitioning to a renewable energy base. In this scenario, according to the study, portfolio assets in the coal industry will suffer cumulative impacts of 58.9 percentage points by 2030 and 100 percentage points by 2050, while assets in oil and gas will suffer cumulative impacts of 42.1 and 95.1 percentage points, respectively.154 Other studies have concluded that major energy companies that continue to rely on fossil fuels will lose between thirty and sixty percent of their value.155 Many fossil fuel assets "are likely to become 'unburnable' or stranded" as a result of the clean energy transition.156 Stranded assets are expected to add up to USD $1 trillion globally under a two-degrees-Celsius warming scenario.157 Fossil fuel **investments** can be **unstable**, as losses due to **stranded assets** can **"cascade"** back to their ultimate **owners**.158 If anticipated losses in the United States are summed "along the ownership chain," "an upper bound of $681 billion in potential losses could affect financial companies."159 Despite the risk of **stranding**, financial **markets** and fossil fuel **companies** have continued to **invest** in fossil fuel **assets**: fossil fuel **reserves** owned by publicly traded **companies** increased from 700 gigatons of $CO_2$ in 2011 to 1,060 gigatons in 2022. The Carbon Tracker Project, a nonprofit think tank, warns that this **could make** the ultimate financial **fallout worse**.160 Referencing potential losses from stranded assets, The Carbon Tracker initiative concluded that "potential **losses** for investors [are] clearly a **function** of **how much** of this risk is already **priced into** market **valuation** of fossil fuels **companies** — it is up to individual institutions to assess how the transition will pan out, and their risk exposure as a result."161 A 2022 study from academic economists found that pensions and other institutional **investors** are disproportionately **on the hook** for stranded assets: "We calculate that global stranded assets as present value of future lost profits in the upstream oil and gas sector exceed US**$1 trillion** under plausible **changes** in expectations about the effects of climate **policy**. . . . Most of the **market risk** falls on private **investors**, overwhelmingly in OECD countries, including substantial **exposure** through pension funds and financial **markets**."162 Investment in the **fossil fuel** sector is now **unacceptably** risky thanks to price **volatility**, the rise of **renewable** energy sources, government climate **regulations**, and **other** factors that leave the industry ill-prepared to manage shareholder value in the years to come. The traditional value thesis that justified investment in the sector — based on the assumptions that demand for oil, gas, and coal will continue to grow and that companies' extensive untapped reserves will ensure future profits — is no longer tenable.163 There are several **structural headwinds** facing the industry: Transition and competitive risk: As the economy **decarbonizes**, global **demand** for oil, gas, and coal **will fall**. Meanwhile, competitive pressure from green **technologies** is **crowding out** fossil fuels in the electricity and transportation sectors, which have traditionally been the primary customers for fossil fuel companies.164 Physical risk: Much of the oil **industry's** physical **assets** lie in **flood-prone** areas. As sea levels rise and severe weather grows more frequent, climate **chaos** could **hinder** the ability to access these **assets**.165 Asset risk: Meeting Paris Agreement goals will require keeping vast swaths of proven reserves in the ground. When a company's valuation is rooted in assumptions that this extraction will take place, the collision between market assumptions and reality becomes a source of financial instability. A similar story is true for the pipelines and other infrastructure supporting the fossil fuel economy: changing market conditions may force the early retirement of some infrastructure, creating losses for investors betting on their continued operation.166 Legal risk: The **fossil** fuel **industry** faces serious **legal challenges**, including claims that it **misled** investors and the public about climate change, that it is tortiously **liable** for climate **damages**, and that its business operations **violate** environmental protection **laws** and emissions reduction commitments. With many of these cases **moving forward**, the industry could find itself facing significant **legal exposure**. A report from the law firm Clyde & Co LLP concludes that "[o]il majors are currently facing threatened or pending litigation on a number of fronts and across a number of jurisdictions. Their liability insurers and reinsurers will undoubtedly be watching these cases with keen interest . . . Companies in a number of sectors may find themselves exposed not just to

damages claims for climate change, but also the cost of defending **litigation**, the **reputational** harm of being associated with such litigation and the consequential **impacts** on operations and **value**."167 Since the Clyde & Co report, there have been sixty-six global climate suits against corporations worldwide.168 In Milieudefensie et al.v. Royal Dutch Shell (2022), The Hague District court ruled Shell had a duty to comply with the Paris Climate Agreement, and subsequently ordered the company "to reduce CO2 emissions associated with its prod ucts by 45 per cent from 2019 levels by 2030."169 Regulatory risk: The fossil fuel industry faces a **patchwork** of policy responses from the world's **countries** that cumulatively pose significant **risks** to its business model. Regulatory approvals of **infra**structure projects are **no longer** certain, economic taxonomies that define categories of "clean" and "dirty" investments threaten to realign investment capital away from the industry, electric **utilities** face regulatory **obligations** to increase the use of **renewable** energy, and **end-use** regulations like **bans** on single-use **plastics** threaten to decrease **demand** for petrochemical products.170 Geopolitical risk: As discussed above, the industry's profitability has become reliant on a factor largely outside its control: the commodity price of fossil fuels. As nation states deploy oil and gas as a tool of political leverage in global power bloc alignments, market **volatility** is likely to **intensify**, putting **long-term** capital plans and existing contractual arrangements **at risk**.171 Fossil fuel **companies** seem to be **doing little** to mitigate these **risks**, with "fossil fuel companies [having] refused to meaningfully participate in the necessary energy transition. As a result, they are **structurally** unprepared for the **low-carbon** future."172 In other words, "[t]he energy sector has gone from a reliably consistent, stable, blue-chip contributor to institutional investment funds to a high-risk set of companies and national governments with a speculative investment rationale and a negative long-term financial outlook. The business model no longer works. Based on this history, investors should carefully consider whether their interests and the industry's interests still align."173 From a financial perspective alone, "investors should move away from fossil fuels because the coal, oil and gas sectors are confronted with competitive pressures that they are illprepared to navigate."174

## 2. RACING. Importers are transitioning faster than America, shutting out US products and stranding assets

**Semieniuk 23** (Gregor Semieniuk [Ph.D., Assistant Research Professor in the Political Economy Research Institute and Department of Economics at the University of Massachusetts, Amherst.], Testimony to the Senate Budget Committee: Hearing on 'Left Holding the Bag: The Cost of Oil Dependence in a Low-Carbon World'," Senate Budget Committee, 3-29-2023, https://www.budget.senate.gov/imo/media/doc/Dr.%20Gregor%20Semieniuk%20-%20Testimony%20-%20Senate%20Budget%20Committee3.pdf)//Shwillett

Thank you for inviting me to testify. My name is Gregor Semieniuk. I am an assistant research professor of economics at the University of Massachusetts Amherst. I research the economic drivers and consequences of structural change in the energy transition. Recent publications of my team in Nature Energy and Nature Climate Change analyze the macroeconomic and financial risks of global oil and gas asset stranding due to uncertainty about the pace at which energy demand is shifting to low-carbon alternatives. The **US** economy is a **major** oil and gas **producer** and therefore **exposed** to these risks. A key problem is that final **investment decisions today** have to be made for projects that require returns **years** into the **future**. And financial investors must make decisions today about how to **value companies** based on their ability to **deliver** shareholder **distributions** years into the **future**. The energy transition creates major uncertainty about future fossil fuel demand. Here I focus on reasons for downside risk, that is, demand for fossil fuels that turns out to be lower than was expected at the time of investment. That can lead to a stranding of the invested asset. There are 3 key causes for such downside risk that depend on the actions of the whole world, not just the US. First, **importers** of oil and gas have always had the energy **security incentive** to wean themselves off fossil fuel imports. Thanks to the **fast decline** in costs of low-carbon alternatives, there is now also an **economic incentive** to substitute fossil fuel imports. Cost declines and deployment of renewables continue to outpace even bullish projections. Since Russia's invasion of **Ukraine**, transition efforts in importing countries have only **intensified** with global record investments into renewables in 2022. Thanks to the **robust negative correlation** between cumulative **investment** and the price of various renewable technologies, called **Wright's law**, these efforts will lead to even stronger economic incentives for a fast 2 transition in a **self-reinforcing cycle**. That is advantageous for fossil fuel importers but creates stranded asset risks for exporters. Second, the United States does **not** produce the **lowest-cost** product in the world. If other, **lowercost producers** expect fossil fuel demand to decline, they are incentivized to attempt to capture

as much of the remaining market as they can. They would do this by **flood**ing the market to lower prices. We find that this is the dominant strategy for low-cost producers to play, which leaves a diminished market share for US producers. We calculate that these two causes of downside risk combined could lead to revenue **losses** in the US fossil fuel sector of **$1.6 trillion** over 15 years. That in turn would spell a GDP loss of $1.8 trillion over 15 years. Both figures are discounted to present values. These losses do not account for medium-term lower competitiveness in low-carbon sectors if the US economy remains specialized in fossil-fuel compatible technologies longer than its competitors. Third, US investors are globally active, thereby exposed to **stranded** fossil-fuel **assets** not just in the US. We calculate that $400 billion in potentially stranded assets are sitting on US balance sheets, a third more than the value of stranded US-based production assets, and **30% of the global total**. In light of the interconnectedness of financial markets and herd behavior, such financial risks could have systemic implications. The current undersupply of fossil fuels may suggest that stranded assets are just an illusion. But it is precisely the uncertainty about future demand for their product that makes oil and gas companies more reluctant to proceed with new projects. Capitalist economies are unrivalled in their ability to supply an expanding market. The same cannot be said of a declining one. Energy security in the short and long-run must consider a robust diversification away from relying mainly on fossil fuels whose prices will only become more volatile in a declining global market. One of the problems of the transition to a low-carbon economy is that while **demand** for fossil fuels is set **to decline**, it is **uncertain** how **fast** and by **how much**. Fossil-fuel asset stranding (in short: asset stranding) refers to a sudden decline in market value of fossil fuel-related assets. For this to happen, expectations about demand for the product that the asset produces, e.g. crude oil, must decline after the investment decision has been made. The causes may be faster than expected technological improvements in and diffusion of low-carbon energy supply and end-use devices: unexpected stringent climate policy or changes in consumer preferences (Semieniuk et al., 2021). All have the effect of an unanticipated decline in expected future profitability of fossil fuel-related assets, which cannot be cheaply repurposed for other uses (van der Ploeg and Rezai, 2020). Asset stranding is relevant to the current energy transition because assets must be paid for upfront in the hope of earning returns often many years in the future. That is true both of fossil fuel producing industries and of those that rely on them as inputs, such as fossil fuel-based utilities, manufacturers of fossil fuel-compatible end-use devices (e.g. internal combustion engine vehicle manufacturers), and petrochemical manufacturers. Since there is uncertainty about the pace and nature of the energy transition, investments that may have been made in the expectations of sufficient future returns to justify the upfront expenditure may eventually turn out not to pay back, as the actual future course of events disappoints expectations (see also Caldecott, 2017). [[FIGURE 1 OMITTED]] Uncertainty about just how demand evolves going forward is documented in scenarios of the future global energy system. The International Energy Agency (IEA) publishes one of the most widely used set of global energy scenarios in its annually appearing World Economic Outlook. The most recent 2022 version contains three scenarios that report on global energy demand, including for oil. One is called Stated Policies, that projects what governments are currently doing to reach stated targets (which may be insufficient to meet them). The next one, the Announced Pledges Scenario, projects demand conditional on governments reaching their self-set climate policy targets. Finally, the Net Zero Emissions by 2050 Scenario is a normative scenario that calculates what would need to happen for the global economy to emit net-zero CO2 emissions in 2050 (IEA, 2022). Figure 1 reports each scenario's demand for oil in 2030 and 2040. Oil demand in the Stated Policies Scenario is projected to stagnate at about 90 million barrels per day through 2040, down only slightly from the 100 million barrels per day demand in 2022. In the Announced Pledges Scenario, demand is 10% and 30% lower respectively in 2030 and 2040 than in the Stated Policies Scenario. If there were additional pledges that governments would make and fulfill, such as updated Nationally Determined Contributions under the Paris Agreement in 2025, demand would decline even faster, narrowing the gap with the Net Zero by 2050 Scenario. Oil producers weighing investments and looking at these scenarios must make up their mind about what they believe to be true. If producers make investment decisions under Stated Policy Scenario expectations that are not borne out by subsequent events, this will lead to stranded assets for a share of the global production fleet. Thus, stranded assets are the result of downside risks for fossil fuel demand in the energy transition. Fossil fuel importers: two reasons to substitute fossil fuels. One **cause** of downside **risk** to global fossil fuel **demand** are the incentives faced by **importers**. Many important economies are net fossil fuel-**importers**, notably in the **E**uropean **U**nion and East **Asia**. These countries have always had an energy security rationale for trying to **substitute** fossil fuel **imports** with domestic **non-fossil** energy sources. Until recently, such substitution would have **come** at a **hefty price tag**. However, this may **no longer** be the **case**; low-carbon **energy** and **econo**mic advantage go **hand in hand**, at least for **importing** countries (Aklin and Mildenberger, 2020; Ansari and Holz, 2020; Goldthau et al., 2019; Mercure et al., 2021). Not only are low-carbon alternatives becoming cheaper. They also improve the balance of payments as precious foreign currency need not be spent on fuel purchases anymore. Importers thus have **every incentive** to **decarbonize** and may be doing so **faster** than previously **expected**. One reason why the pace at which this happens may surprise fossil-fuel investors is that low-carbon energy has a history of surpassing expectations. Past scenario projections tend to lag systematically behind actual subsequent deployment as well as cost declines (Creutzig et al., 2017; Mohn, 2020; Way et al., 2022; Wilson et al., 2013). One way to illustrate this phenomenon is to compare how successive Stated Policies Scenarios (or their predecessors) from the above-introduced IEA project cumulative solar PV capacity with the actual subsequent deployment. The result is shown in Figure 2 left panel.1 And the right panel of Figure 2 reports a similar process for scenarios of the cost of producing electricity with solar PV. Clearly, every scenario overestimates subsequent cost and underestimates subsequent capacity, and the discrepancy can grow large after only a few years. A similar process is unfolding with electric vehicles (Haensel and Naughton, 2021; Lam and Mercure, 2022). [[FIGURE 2 OMITTED]] Since Russia's invasion of Ukraine, **transition** efforts in **importing** countries have only **intensified**.t 2022 was a **record year**

for investment in clean **energy** at $1.3 trillion, up 19% from 2021 and 50% from 2019 (IRENA and CPI, 2023). These **scaled up** investments may create path-dependencies that **steer** to an **even faster** low-carbon **transition**. There is a robust negative correlation between cumulative investment or experience in making and deploying a manufactured low-carbon technology and its price. In Figure 3, both axes are on logarithmic scales, which means a straight downward facing pattern correlates a given percentage cost decline with a 1 percent deployment increase. In other words, for every doubling of deployed capacity, costs come down by a certain fraction of what they were before, leading to powerful cumulative cost declines. In economics, this phenomenon has long been known as 'learning by doing' (Arrow, 1962), and recognized as leading to path-dependencies (Arthur, 1994). These robust patterns are also known as Wright's law (Nagy et al., 2013). To the extent that Wright's law continues to hold for low-carbon technologies, the upscaled investment efforts will lead to even lower cost. That in turn will create stronger economic incentives for a fast transition resulting in yet more investment in a self-reinforcing cycle. [[FIGURE 3 OMITTED]] Low-cost producers: flood the market. If **low-cost** fossil fuel producers **expect** that the market for their product **will shrink**, not least as a result of the above-described dynamic, they may decide to try and **capture** as much of the remaining **market** as they can before **demand** for the resource underneath their territory **dries up**. Estimates of scenarios that project 2°C global warming by 2100 (and are consistent with importers moving away fast from fossil fuels) calculate that one third of oil reserves and one half of gas reserves have to be left untapped between 2010 and 2050 (McGlade and Ekins, 2015). Reserves are resources of fossil fuels that are recoverable under current economic conditions. **Flooding** the market with **low-cost** fossil-fuels will likely **drive down** the price thereby making it **uneconomic** for higher-cost producers **to supply**. Figure 4 shows that the United States is not the lowest cost producer, especially of oil. As such, a decline in the price of oil and gas could curtail the market for US producers. In Mercure et al. (2021) we calculate that when importers move away from fossil fuels quickly, flooding the market is indeed a dominant strategy for low-cost producers, chiefly OPEC countries. Dominant strategy is here used in the game-theoretic sense: it is economically beneficial for OPEC to flood the market, regardless of whether high-cost exporters of fossil fuels decarbonize quickly or not. [[FIGURE 4 OMITTED]] Together, these two downside risks – a **fast** transition in importers to net zero emissions in accordance with their policy pledges and fossil-fuel **market flooding** by low-cost producers – could substantially **affect** the US economy if **they materialize**. In our research on this subject reported in Mercure et al. (2021), we call this scenario the European Union-East Asia Net Zero Selloff (EUEA Net Zero SO). If the US **invested** in its fossil energy industry as if the world was on a trajectory like the IEA's Stated Policies Scenario, **expecting** 'business as usual', but demand materialized according to EUEA Net Zero SO, this could lead to **revenue losses** in the upstream US fossil fuel **sector** of $1.6 trillion over 15 years relative to the States Policies Scenario. That in turn would spell a GDP loss of $1.8 trillion over 15 years.2 Both of these figures discount future losses back to the present with a 6% discount rate. Key here is that whether or not these downside risks materialize lies in the hand of countries other than the US. The health of the US fossil energy sector depends substantially on what happens in the world as a whole, not just in the domestic economy. Figure 5 reports these figures for the US and also for other countries. The considerable upside opportunity for fossil fuel importers is evident in the positive bars, underscoring these economic incentives. [[FIGURE 5 OMITTED]] The calculations above only include the losses in the upstream fossil fuel sector incurred directly from the lack of demand for US fossil fuels, especially oil and gas. Additional losses could arise from other sectors, which depend for the use of their capital stock on fossil fuels to varying degrees (Cahen-Fourot et al., 2021). Furthermore, a more subtle consequence must also be considered. To the extent that the US maintains substantial domestic demand for fossil fuels to take off a high level of domestic production, there could be an additional longer-term economic cost. If the US relies longer on less-and-less competitive fossil-fuel powered technologies than its international competitors, those competitors will gain the experience and expertise in the new low-carbon sectors faster than the United States. This could leave the US in the medium term with diminished competitiveness in the low-carbon economy, as it would have been slow to develop the capabilities associated with low-carbon manufacturing and these industries would have agglomerated elsewhere. Financial markets: importing stranded asset risks. US investors are globally active, thereby exposed to stranded fossil-fuel assets not just in the US. In Semieniuk et al. (2022) we calculate that in the same scenario as above – with investment undertaken based on expectations about a stated policies world that subsequently realign to those of a EUEA Net Zero SO scenario – $400 billion in potentially stranded assets are **sitting** on US **balance sheets**. Only **$300 billion** stem from assets producing on **US territory**. The rest is **imported** either by US listed oil and gas **companies** operating globally, or **US**-based financial **investors** holding **shares** in oil and gas companies **abroad**. Figure 5 shows how the stranded assets shift across **institutional** and **geographical boundaries** as their financial ownership is traced through a **network** of **shareholding** relations to the ultimate owners. In light of the **interconnectedness** of financial **markets** and **herd behavior**, such **financial risks** could have **systemic** implications (Battiston et al., 2021, 2017; Bolton et al., 2020; Vermeulen et al., 2021). These are the 'transition risks' that can materialize when the structural **change** toward the **low-carbon** economy is **disorderly**. Uncertainty about whether **investments** could turn into **stranded** (financial) assets **contribute** to the potential for **disorder** (Alvarez et al., 2020; Campiglio et al., 2022; Semieniuk et al., 2021). <<<FIGURE OMITTED>>> Short term requirements and energy security. The current undersupply of fossil fuels may suggest that stranded assets are just an illusion. At the time of this testimony there are

fears of an 'energy crunch' as underinvestment in the energy sector portends demand-supply mismatches (Jacobs et al., 2023). But it is precisely the uncertainty about future demand for their product that makes oil and gas companies more reluctant to proceed with new projects, with one estimate suggesting the oil and gas sector's investment is consistent with that needed for a Net Zero in 2050 scenario (Jain and Palacios, 2023). Capitalist economies are unrivalled in their ability to supply an expanding market. The same cannot be said of a declining one. Moreover, as the world emerges from the COVID-19 pandemic and its disruptions to economies, it grapples with a war in Europe while the effects of climate change are set to become more and more disruptive. These 'overlapping emergencies' have the potential to continue disrupting economies and induce **volatility** into fossil fuel **prices**, which can lead to wider inflationary pressures when prices are high (Weber et al., 2022) and economic **losses** to producers like the **US** when they are **low**. Here it is important to realize that **oil prices** are determined **globally** and gas prices increasingly, too, as LNG exports are becoming more important. Energy security and economic **resilience** in the **short** and **long-run** both suggest a robust **diversification** away from relying mainly on **fossil fuels**.

## The current trajectory doesn't stop warming

**Ahmed 23**, (Nafeez Ahmed [D.Phil., International Relations, Sussex University, Director of the Futures Lab at Unitas Communications.], "America's Fossil Fuel Economy is Heading for Collapse – It Signals the End of the Oil Age," Resilience, 3-29-2023, https://www.resilience.org/stories/2023-03-29/americas-fossil-fuel-economy-is-heading-for-collapse-it-signals-the-end-of-the-oil-age/)//Shwillett

All this implies that we are sleepwalking into a global **energy crisis** that will, without **accelerating** the clean transformation of the **energy** system, create **severe** economic and financial **consequences** by undercutting the fundamental energetic basis of global **economic flows**. This will compound **accumulated** vulnerabilities in the **banking** system linked to **unsustainable** forms of **debt**. .The reverberations and bailouts seen in the cases of the **S**ilicon **V**alley **B**ank, **Credit Suisse** and **others** are merely the **opening cracks**, that will become widening **fissures** in the absence of root-and-branch economic restructuring linked to the rapid development of a new energy system. While that new system is still emerging, it is perhaps unavoidable that we will hit a number of bottlenecks. The danger is that instead of using these bottlenecks to restructure and adapt positively, we may end up regressing, with a loss of capital and energy that forestalls the full potential of transformation. The **window** for action is **extremely short**: we need to act **within this decade**. Along the way, we need to be aware of the major trends which are likely to emerge as a result of the end of the US shale boom: 1. The illusion of cheap oil is evaporating While we may still see fluctuating prices, it is becoming clearer that the glut of cheap oil this last decade was not a permanent feature of the energy system, but a temporary symptom of highly specific circumstances as the energy system moves deeper into a state of increasing inputs and diminishing returns. The immediate impact of the peak and plateau of US shale will be sustained high oil prices. 2. The near-term beneficiaries of this will be Gulf oil and gas producers They currently appear to be the only fossil fuel energy suppliers with sufficient capacity to maintain production. They will therefore not only begin to dominate market share, they will also of course continue to reap higher profits from this more advantageous market position amidst high oil prices. 3. Some capital will move into OPEC for safety, but this is a mirage Just as this last decade created the illusion of fossil fuel abundance due to the US shale boom, we may see that OPEC's near-term ability to ramp up spare capacity as shale production declines perpetuates this illusion. We can expect to see lots of bullish statements from Gulf oil producers vindicating grand plans to expand their oil and gas production. Capital will move rapidly into OPEC countries, seen as a last safe space for investors looking for stability and growth. However, OPEC producers will also begin experiencing their twilight very shortly after the decline of US shale, which means that investors will begin to make serious losses as a result far sooner than they imagine. 4. Oil prices will **fluctuate** within a **higher range** as US shale peaks While we can expect **significant** oil price **volatility** due to the recessionary impact of **high** oil **prices** which would **lower demand** and therefore allow prices to drop, as we move further into the era of plateau and decline across US and OPEC production, the overall decline in supply is likely to lead oil price fluctuations to narrow within a far higher range which will become a 'new normal' as long as oil demand remains high. This may also incentivise near-term conviction in the idea that new oil and gas investments are economical. That would be a colossal mistake, though, as we will see below due to coming reductions in oil demand in the latter half of this decade that will ameliorate high prices and make fossil fuel enterprises increasingly unprofitable. 5. We can expect heightened political polarisation Incumbent industry ideology will likely blind many energy actors from recognising the writing on the wall – which explains the regressive self-defeating actions of the Biden administration in committing to Arctic drilling. This is like betting on the losing horse after being told it's about to be overtaken by cars. It illustrates the power of America's oil lobbies in their last ditch desperate attempt to stay alive on the back of taxpayer subsidies – flying in the face of hard economic realities (a few years ago I broke the story of the British military study which concluded that Arctic drilling was pointless for economic reasons because the costs are so high and returns so low as to make it commercially infeasible). That in turn suggests the political battleground between fossil fuel lobbies and clean energy advocates will become more fraught as the incumbency seeks to double-down in demanding more government subsidies. Millions of jobs will be at risk as the US shale industry declines, and this could create further negative economic and cultural consequences as the US

returns to net import status. 6. Clean energy transformation will be critical to stabilise the global economy and restore prosperity The **only viable** pathway through this crisis will be to **accelerate** the clean **energy** transformation focused on the deployment of exponentially improving technologies which are **already scaling** because they are **cost-competitive** with fossil fuels – namely, solar, wind and batteries. This will lay the groundwork for other potential applications such as e-fuels or green ammonia from green hydrogen. This transformation is **already underway**, and provides the opportunity for the **US** and others to produce larger quantities of **energy** at a **fraction** of the costs of **fossil fuels**. In Rethinking Climate Change, a RethinkX report for which I was contributing editor, we found that **even** in the **absence** of appropriate policy-decisions and major institutional barriers, economic factors will **inevitably** drive incumbent industries **to collapse** by 2040 as they are replaced by new solar, wind and battery systems. Unfortunately, while this is far faster than conventional analysts acknowledge, this is **not fast enough** to avoid dangerous **climate** change. 7. Oil demand is going to haemorrhage, because the clean energy transformation is now unstoppable The data examined by RethinkX implies that oil **demand** is likely to **peak** far **earlier** than incumbent energy agencies predict, and decline far more rapidly following the peak. The RethinkX report suggests that oil demand will likely peak sometime between 2025 and 2030, followed by an escalating drop out to 2040. It's critical to recognise that the **economic drivers** of this approaching decline in **oil demand** are not confined to disruptive energy technologies, but **include** the disruption of the transport and food systems by **e**lectric **v**ehicle**s**, autonomous electric vehicles, precision fermentation and cellular agriculture. This also shines a light on the knife-edge civilisation is moving into this decade: as the incumbent energy industry declines, bringing with it the economy, there is a **risk** that it **derails** the economic factors currently driving the exponential adoption of **clean energy** technologies. Which **means** that we need to **accelerate** adoption **this decade**. 8. High **volatile** oil **prices** will be followed by **crashing** oil prices once demand **peaks** and declines In the **late 2020s**, then, we will likely see **oil demand** begin to **peak**. This will be exacerbated by the fact that the **global oil** industry is going to become economically **unsustainable** by around **2030**, when it will begin consuming a quarter of its own energy just to keep pumping out more oil. Even the Journal of Petroleum Technology published by the Society of Petroleum Engineers is taking this prospect seriously. As oil demand **declines**, oil prices will **also decline**. At this point, assuming the accuracy of the latest EROI studies, the collapse of the global industry will begin to accelerate because once prices go below a certain point and with EROI levels already unsustainable, the industry will simply become impossible to sustain economically. What to do? A big question that emerges here, of course, is how to **accelerate** the **transformation**. The main task is simple: we need to raise awareness of the fact that the end of the Oil Age is fast approaching and will arrive within the next two decades. This **inevitable arrival** will not in itself mean that we **avoid** dangerous **climate change**. But it will mean that oil and gas **assets are stranded** – they have been vastly **overvalued** and therefore **investments** in them will **never incur** the projected **returns**, resulting in **trillions** of dollars of **losses**. This is not simply due to the prospect of climate policy action, but the reality of unfolding technological disruptions of energy, transport and food, and the internal EROI dynamics within the industry itself. But while the immediate implications of this for conventional investments in incumbent industries are dire, the wider implications are mind-blowing. It means that the most lucrative areas of new investments where the **highest** potential for returns can be **found** will ultimately not be in the **dying fossil fuel** industries but in exponentially **improving tech**nologies which are on track to transform our societies for the better.

## It outweighs on timeframe and probability and is systematically underestimated

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In September 2015, then Bank of England Governor Mark Carney gave a landmark speech on the "Tragedy of the Horizon." The concept was simple: climate change creates **tremendous** risk for financial markets, but these **mounting risks** are

**ignored** by investors due to the market's **tendency** towards **myopia.** The speech marked a significant turning point in finance: the starting gun in the **race** to internalize climate-related financial risks. Eight years later, the "**tragedy of the horizon**" has become a central concept of much climate risk **discourse**. Efforts to incorporate climate risk through activities like scenario analysis and target-setting have tended to **focus** on **long-term** time horizons, focusing on emissions trajectories and climate impacts that resolve **later** in the **century**. But the horizon most relevant to the markets is **much nearer**. Climate risks like **abrupt responses** to **policy** and consumer demands – or the **now-inevitable** early **shockwaves** of physical climate impacts – are far more relevant to the economics of business decisions today than what happens in 2050. **Capital decisions** made **now** create and maintain real **assets** that will **exist** in a vastly different world a **decade hence**. Despite the progress made since 2015 to prepare companies for climate risks, the **corporate decisions** are **underpinned** by economic and financial **assumptions** that still **poorly reflect** both predictable physical **risks** and the zero-carbon **transition**. Under efficient markets theory, the medium term is reflected in asset prices and company valuations, but in practice it is not. Consistent with the core recommendation of this blog, the Federal Reserve should be praised for focusing its recent transition risk scenario exercise on a 10-year time horizon. But the **actual scenarios** employed in the **risk** oversight **project**, borrowed from the Network of Central Banks and Supervisors for Greening the Financial System (NGFS), are not **appropriate** for illuminating this decade-long period. The scenarios approach the transition through stylized GHG concentration reductions **over time**. They are not tied to any **particular policies**, even existing and predictable ones. **Efforts must shift** to helping regulators and financial actors appreciate "**medium-term**" climate risks. In particular, the economic assumptions embedded in firms' current capital plans and financials must be scrutinized and updated for the transition that is now indisputably underway. Getting markets to look out Two years after Carney's speech the Taskforce on Climate-Related Financial Disclosure (TCFD) developed the now widely adopted recommendations for the analysis, management, and disclosure of climate-related financial risks. While introduced as a market-led and voluntary framework, the TCFD's recommendations have served as a framework for many financial regulators around the globe as they work to upgrade climate risk oversight and disclosure rules. Chief among the TCFD's recommendations to overcome one aspect of the tragedy of the horizon—paralysis in the face of uncertainty—firms are encouraged to use scenario analysis. The TCFD's initial discussion encouraged firms simply to develop narratives of different possible futures and their business implications – scenario analysis at its most basic level. Discussion of climate-related scenario analysis has evolved to imply the application of complex, data-intensive climate economic modeling (modeling of climate-related economic change rather than modeling solely of the behavior of greenhouse gases or their effect on natural systems) that allows for more information-rich quantitative analysis to accompany those narratives. For example, the **NGFS-commissioned** integrated **assessment** model scenarios are **used** for financial supervision and have also been **widely adopted** by non-financial firms for their own **analysis** of climate **risks** and opportunities. How far the horizon? Transformative as it was, Carney's metaphor left out a key detail for firms seeking to navigate the rough seas of climate disruption: how far out is the horizon? A natural answer emerged from the climate science and policy communities. Global mean temperature change caused by rising atmospheric GHG levels is conventionally measured out to 2100. There is already a tremendous amount of modeling to develop stylized emissions scenarios as they resolve over the course of this century as a guide to policy-makers on both the transition and physical impacts of climate change. For example, efforts to stabilize atmospheric GHGs have converged on a global mean temperature threshold of 1.5°C by 2100 as an optimal societal goal. Thus, so it seemed, transition risk could be captured by working backward from achieving this end-of-century outcome and understanding how firms fair if society were to emulate modeled outputs. For example, a 1.5°C change by 2100 also implies net zero carbon dioxide emissions by 2050 leading to somewhat nearer-term implications. It has been **natural** to **assume** that these time horizons were the most important ones to draw into financial decision-making. This **assumption** is **mistaken**. It is, of course, **terrifyingly probable** that extreme climate-related impacts and potential **tipping points loom** in the second half of this century (and over that horizon, into the next century), but some extreme climate-related impacts are already evident. Tangible-yet-**neglected** financial risks are beginning to **accumulate, right now**, and in the **near future.** These nearer-term risks are increasingly priceable by the market, and yet **not being priced.**

## **Disorderly** transition causes **global nuclear war** and magnifies every existential risk

**Anderson-Samways '21** (Bill Anderson-Samways [MPhil student in Anthropocene Studies at Cambridge University.], "Limits to the Market, Limits to the International Order: Climate Change, Nationalism, and Existential Risk," Cambridge Journal of Political Affairs, 4-11-2021, https://web.archive.org/web/20210411190117/https://www.cambridgepoliticalaffairs.co.uk/issue-01/limits-to-market)//Shwillett

Since the Club of Rome first published The Limits to Growth – now the best-selling environmental work of all time – in 1972, the debate on 'limits' has expanded considerably. Indeed, the debate now ranges across notions not only of environmental overshoot and collapse, but of social limits to growth, '**green growth' and 'degrowth'** (Jackson and Webster 2016, 17-18,13-14). However, this literature – and indeed the discipline of environmental political economy in general – has been slow to recognize the emerging reality, particularly visible within the past five years, of **rising economic and political nationalism**, which threatens to render the cosmopolitan and globally-minded solutions advocated by most environmentalist authors **completely unviable**.[1] In this essay I argue that both this resurgent nationalism and our most pressing environmental problem, climate change, have their common origins in particular limits to growth which are similar in nature. The article posits that understanding these limits is particularly urgent, as their interaction may come to represent a **major source of existential risk** – denoting risks which might 'cause the **extinction of Earth-originating intelligent life** or… reduce its quality of life… permanently and drastically' (Bostrom and Ćirković 2011, 4). My argument is not so much that climate change and nationalism are in themselves existential risks, but rather that they act as drivers of international instability, which in turn **severely increases existential risks** such as **nuclear conflict** (Centre for the Study of Existential Risk n.d.; Benedict 2018, 49). Whereas the Club of Rome focused on absolute limits to growth, such as declining absolute levels of resources, the most important limits at play in the intersection between climate change and nationalism are 'relative' – that is, they are dependent both upon particular political values and upon relative rates of growth. This is another way of saying that the limits to growth are actually somewhat 'elastic'. I define 'limits to growth' fairly liberally – referring to limits to the growth not just of Gross Domestic Product (GDP), but of any particular form of human activity. My contention is that climate change and nationalism both arise from limits to the 'free' market. The free market's historic failure to internalise the cost of carbon emissions means that, **due to the rapidity** at which we now **have** to **cut emissions** in order to meet our climate change targets, the future growth rate of the world economy is **likely to be zero or less**. I posit that this will exacerbate pre-existing nationalist competition arising from already-declining relative growth rates in the Global North when compared to countries like China, making such competition even more of a zero-sum game and thereby contributing to increasing international instability which fuels **existential** risks such as **nuclear war**. In the free market economies of the Global North, declining growth rates lead to financial crisis and inequality which aggravate the above-mentioned risks by fuelling **nationalist** sentiment amongst ordinary people. The blind adherence to free market economics in the Global North has also led to a high rate of growth of migration, which is another key factor contributing to the rise of nationalist sentiment, and one that climate change will once again exacerbate. I therefore contend that **climate change** and **nationalism** may come to interact with one another in a series of **devastating feedback loops**, with potentially catastrophic consequences. **To break this cycle**, liberal-minded political actors must abandon certain economic means – such as the expansion of the 'free' market, 'free' migration and Gross Domestic Product at all costs – the consequences of which ultimately undermine the very values of freedom and equality which they claim to support. Economic means **must** instead **be embedded in the broader social, cultural and physical environment**. My argument draws upon the work of Karl Polanyi, but goes beyond his position by suggesting that the nation-state alone may be inadequate as a site of 'embedding', given the potentially terrifying consequences of nationalism which this article attempts to draw out.

Climate change: limits to the market In the original Club of Rome report we can identify two conceptions of limits. A first category involves limits which are inherent to the activity itself, such as with the consumption of finite resources – they just 'run out'. Such limits 'could be avoided' (Blanchard 2015, 105), at least in the near-term, for instance through the creation of resource substitutes or through efficiency improvements, both of which are in theory deliverable through the market mechanism (Milanovic 2019, 200). A second category, however, involves limits relating to the unintended consequences of an activity, such as with pollution. These limits present much more of a problem for defenders of the free market. Unlike with resource scarcity, markets do not automatically 'price in' pollution – in economists' terms, it is an 'externality'. This lack of an 'equilibrating mechanism' makes the transgression of such limits much more likely. The most important example of this is rising carbon emissions. Markets are particularly unable to respond to the problem of carbon emissions because its major consequences, climate change and ocean acidification, are far removed in time, and often space (Kareiva and Carranza 2018, 44). Carbon emissions therefore represent in some respects the limits of the 'free' market, understood in 'soft' Polanyian terms as the ultimately utopian ideal of the 'self-regulating' or 'laissez-faire' market and the economic policies which come with this (Carton 2014, 1004-1005). The fact that the price mechanism cannot value environmental degradation also means that GDP cannot either, and so GDP may grow even as degradation increases (Randers 2012, 75). Herman Daly, the key proponent of the 'steady-state' economy, argues that the main problem today is that 'the

growth that continues is now uneconomic; it costs more than it is worth at the margin' (Randers 2012, 73). However, the poor empirical connection between GDP and environmental impact also means that the former is not by necessity correlated with the latter – it is theoretically possible for GDP to 'decouple' from carbon emissions (Hickel and Kallis 2019, 13-14). It is therefore not very instructive to begin with a focus on GDP. Instead, we should start by looking at our targets for cutting carbon emissions – which are necessarily determined by what we value and do not wish to see destroyed – and then see whether GDP growth is empirically possible given these targets. We should not therefore regard GDP as an inherently limiting factor, but rather as a dependent variable which may or may not be limited by our 'ends' – in other words, our values. I thus follow Jeroen van den Bergh in adopting an 'a-growth' perspective with respect to GDP and environmental impact (Schor and Jorgenson 2019, 325). However, the empirical data suggests that future GDP growth will probably be limited by our emissions targets. This is due to the extremely high rates at which, given our past inaction, we now need to cut emissions in order to stay inside our carbon budgets to avoid 1.5-2°C of global warming relative to preindustrial levels (Hickel and Kallis 2019, 12). Even Robert Pollin, who is committed to a 'Green New Deal' as a driver of economic growth, now admits that based on its latest findings '[the International Panel on Climate Change] now concludes that limiting the global mean temperature increase to 1.5°C will require ... that the net increase in global clean energy investments will need to average 2–2.5 percent of global GDP per year between now and 2050', a higher rate than he originally stated (Pollin 2019, 330). However, this would effectively mean a zero-growth scenario because 'if these costs really represented an annual hit of around 2–3 per cent of GDP [per annum] they would essentially already wipe out [global] growth', which is projected to stand at around this level in the near future (Jackson 2009, 83-84). Existing empirical models bolster this. Except under unrealistically optimistic technological scenarios, aggregate global GDP growth much above 0% per annum is probably not possible given the rate of emissions-cutting now necessary (Hickel and Kallis 2019, 7, 11). Given that **growth is still absolutely necessary in the Global South** if it is to avoid the catastrophic effects of climate change, this situation of zero global growth may well necessitate some 'degrowth' on the part of **the Global North** (Schor and Jorgenson 2019, 325). This kind of zero-sum redistribution from **Global North to South** is unlikely to be **popular in the North**. Consequently, this zero global growth is likely to intensify nationalist conflicts that already exist regardless of climate change, for reasons that I outline in the next section. Climate change and nationalism: limits to the international order Although I have argued in favour of being 'agnostic' about GDP growth in itself, and against regarding it as an inherent driver of environmental degradation, GDP still matters enormously according to certain economic-nationalist values. This is because states still believe in GDP growth as a metric of their power – and not without reason, for 'economic strength is critical for the industrial militarisation that helps ensure geopolitical dominance' (Seaton 2019, 128). I thus take competition for economic growth as a key element of great power competition (O'Brien and Williams 2013, 9-10). This helps to explain the contemporary rise in nationalism across the world. Because of the relative maturity of their economies, countries in the Global North are currently experiencing relatively low rates of GDP growth compared to industrialising nations in the Global South, particularly China (Milanovic 2019, 234-5). Indeed, the Global North may experience even lower growth rates in the future than currently predicted because of 'declining populations and a shrinking workforce' increasingly employed 'in services and care … which are harder to make more efficient' (Randers 2012, 71-2). This resonates with the idea of a 'secular stagnation' of economic growth rates in the Global North, driven by declining productivity growth (Jackson and Webster 2016, 15-16). All of this means that the balance of political-economic power is shifting south-eastwards, away from the United States and towards China, fuelling the potential for conflict between the two. This conflict is not merely one of economics, but of economic models, much as the conflict between the US and former Soviet Union was – although today the conflict is between different forms of capitalism, rather than between capitalism and communism. Branko Milanovic argues that the Chinese model represents a form of 'political capitalism', based on the arbitrary application of the rule of law in the service of state power. This represents a threat to Western 'meritocratic capitalist' states – that is, those based on the rule of law – principally 'because of the high growth rates that it seems to promise' relative to their own (Milanovic 2019, 11). Of course, the ultimate economic aims of the United States and China are the same; each country desires higher levels of GDP than the other as a means to national power. Nonetheless, the difference in economic models between the two countries makes the competition over relative growth rates something of a more fundamental conflict. As such, the challenge to the existing international order posed by limits to the relative growth rate in the Global North is considerable. Climate change could exacerbate this, with volatile weather conditions further dampening productivity growth in the Global North (Randers 2012, 72). Declining growth rates will also **hamper attempts to combat climate change**. Joel Wainwright and Geoff Mann point to the emergence of an insular, nationalist 'Climate Behemoth' which stands in opposition to 'Climate Leviathan' – that is, international regulation as part of the liberal world order –exemplified by the Paris Climate Accords (Wainwright and Mann 2018, 52 and 40). They agree that the rise of China is a key factor driving both this conflict and geopolitical instability in general (Wainwright and Mann 2018, 123-126). The Trump administration's withdrawal from the Paris agreement on the basis that it gives China an economic advantage over the United States illustrates this well (Farand 2019). This economic-nationalist perspective leads to a classic collective action problem, similar to the limitations of the market. In particular, as respect for international rules declines, states become

stuck in a logic of zero-sum competition for political-economic power, resulting in **environmental catastrophe which is ultimately detrimental to all**. Indeed, the original Limits to Growth report emphasised that states 'retreating into isolationism and attempting self-sufficiency' in the face of environmental crises would merely exacerbate such crises, and lead to 'contagious social disintegration' due to the interconnectedness of the world-system (Meadows et al. 1972, 189). This increase in international instability **heightens nuclear risk**. In 2017, the Bulletin of the Atomic Scientists moved their famed Doomsday Clock – which refers to the proximity of humanity to existential annihilation – forward to two and a half minutes to midnight, citing not only climate change but the ascent of nationalism across the world, and Trump's attitude towards nuclear weapons in particular (Lallensack 2017). Nationalism is indeed driving growth in nuclear acquisitiveness and risk, partly because the above-mentioned disembedding of states from international rules as rapid shifts in the balance of power decrease trust and heighten 'the danger of miscommunication and miscalculation' (Benedict 2018, 49; World Economic Forum 2018). Although by no means necessarily a precursor to a nuclear arms race, it is worrying that at the time of writing tensions between the United States and China appear to be morphing from a trade war over economic power to a more fundamental conflict over the two countries' differing models – a highly dangerous situation for two nuclear powers, especially when we recall that a similar type of conflict was the foundation of the Cold War (Financial Times Editorial Board 2020). Thus the **global instability** caused by nationalism, which climate change will only exacerbate, **greatly amplifies** the **existential risks** posed by weapons of mass destruction.[2] More limits to the market: domestic drivers of nationalism However, there is **nothing 'natural' or inevitable about interstate competition as a response to declining relative growth rates** in the Global North. If the prevailing domestic mood in the Global North was more cosmopolitan and egalitarian, then the rise of China, for instance, would not necessarily be viewed as a problem. Here I suggest that **particular limits to growth**, arising principally from processes of globalisation, are of enormous importance for understanding the rise of nationalist sentiment on the level of the agent. Firstly, certain limits asserted themselves strongly during the financial crisis of 2008. Many scholars regard the crisis as a key driver of nationalism due to the stagnation and anxiety it caused amongst large demographics in the Global North (Hopkin 2017, 476; Tooze 2018, 576-577). The crisis occurred because elites in the Global North sought to compensate for the pressures of declining productivity gains on economic growth by enabling the massive expansion of household credit and therefore debt (Fulcher 2015, 113-114; Streeck 2016, 62). To use Polanyi's phrase, this represented an 'excessive commodification' of money, turning apparently 'limitless suppl[ies…] of cheap credit into ever more sophisticated financial "products"' which were then sold on by the banks, fuelling 'a real-estate bubble of a size unimaginable at the time' (Streeck 2016, 62). Unfortunately, this bore almost no relationship to actual productivity growth, which remained stagnant (Ryan-Collins, Lloyd and Macfarlane 2017, 173). Households' debt-to-income ratios therefore grew rapidly. This meant that, when the bubble burst, sub-prime, meaning poorer, mortgage borrowers could not afford to pay their debts, leading to a generalized contagion in the financial system (Fulcher 2015, 113-117). Therefore limited productivity increases led to the expansion of credit as an alternative means of generating growth, but the latter was ironically also limited by the former, causing financial crisis and the concomitant rise of nationalism. Limits to the relative growth rate in the Global North are also leading to high levels of inequality. This can be understood through Thomas Piketty's famous formulation that inequality increases when the rate of return on capital, which is currently relatively high, exceeds the rate of growth in income or output, which is currently relatively low (Piketty 2014, 25). Herman Daly believes that we are currently experiencing a 'dystopian' steady-state economy, where both growth and levels of redistribution are insufficiently high to counteract the rise in inequality (Daly and Kunkel 2018, 98). Low growth also makes redistribution appear more of a zero-sum conflict, meaning that achieving it is more difficult (Randers 2012, 72). Over time, however, increasing inequality exacerbates social tensions, which 'tend to morph into populism or nativism' as elites 'attempt to placate the "losers" of globalization' through targeting migrants, who are often poorly assimilated into the societies of the Global North in part due to income inequality between themselves and the 'native' population (Randers 2012, 72; Milanovic 2016, 191,197, 206). Limited economic growth in the Global North therefore increases inequality, reactions to which frequently take on a nationalist hue. Migrants are not only targeted due to economic inequality, however. Rapid cultural change, caused by high rates of growth of migration, is also driving nationalism in the Global North. This is a contentious point and so merits elaboration. It is clear that people often experience the processes of uncontrolled growth and change that characterize modern economies as extremely disruptive – and this includes the relative cultural changes that come with migration (Weisskopf 1965, 85; Polanyi 1957, 33; Milanovic 2019, 140). One contemporary example is that support for Brexit 'was strongest in communities that had experienced higher rates of ethnic change in immediate years prior to the 2016 vote' on the United Kingdom's membership of the European Union (Goodwin and Milazzo 2017, 452). This 'contained a strong cultural component, especially among older voters who are less threatened by the labour market consequences of migration', which is something that resonates with Polanyi's focus on the 'broader social upheavals to "habitation" (place and community) [as] a major source of the distress wrought by labour commodification' (Hopkin 2017, 471). This reinforces the idea that 'limits to growth' refer not simply to GDP growth and narrowly-defined 'physical' constraints such as climate change, but to the disruptions that the free market causes to people's 'environment' in a broader sense. In this respect free migration represents the 'limits to market expansion' (Streeck 2016, 61) just as much as climate change, financial crisis or inequality. Some may object that migration does not truly constitute a limit for two reasons. Firstly – and this is a crucial point – the rate of growth of migration matters much more than the absolute level. This is because the cultural differences caused by large inflows of migrants will not be as noticeable in a community which is already home to many migrants, as in one where the absolute level is lower yet where the number has doubled in a short time (Goodwin and Milazzo 2017, 452). This is an important qualifier because it means that many communities with high levels of anti-migrant sentiment actually contain relatively low overall numbers of migrants (Goodwin and Milazzo 2017, 451-3). Moreover, the rate of growth of

migration is only one factor amongst the broader free market ramifications driving nationalism, and others may indeed act as a multiplier of its impact (Milanovic 2016, 204; Goodwin and Milazzo 2017, 459). Recognition of all this does not make migration less of a limit to growth, however. This is because the rate of growth of migration in these communities was indeed high, rather than being an instance of 'false consciousness' whipped up by the media, and many other factors commonly regarded as limits – such as carbon emissions – also depend on the relative rates of change in different variables. The second potential criticism is that high rates of international migration only represent a 'major source of future conflict' due to people's perception of migration, which is in principal adjustable, rather than its actual effects. Indeed, wealthy countries possess ample capacity to support higher levels of migration in terms of their levels of wealth and welfare, and migrants contribute strongly to both (Merritt 1995, 416, 420-421). But this does not make the situation any less difficult, for it is clear that there are limits to the rate at which we will be able to change people's worldviews, and we must accept that such constraints exist rather than basing our conclusions about the optimal rate of migration on what we would ideally like people to accept in the present (Goodwin and Milazzo 2017, 462; Milanovic 2019, 145). This does not mean that adjusting anti-immigrant worldviews is not possible or desirable – I would maintain that it most certainly is – but simply that it will take time for such an adjustment to occur, and that a managed rate of growth of migration will therefore be key in facilitating this adjustment. Thus, the point is not to give up on liberal values, but to preserve and extend them. Indeed, countries which manage the rate of growth of migration are actually more tolerant of migrants – whereas, as Polanyi would have recognized, relying on ultimately utopian liberal means such as freedom of movement has the unintended consequence of ethnic nationalism which destroys liberal values (Economist 2019, 16; Polanyi 1957, 254-255). Climate change is likely to exacerbate the tensions already surrounding migration. The International Panel on Climate Change recently found that 2°C of warming beyond preindustrial levels would lead to 'mass migration from the regions most affected by climate change' (Ocasio-Cortez 2019, 2). The reaction in Europe to refugees fleeing recent conflicts in the Middle East, which were escalated by environmental problems, provides a grim foreshadowing of the welcome that climate refugees are likely to receive (St'ahel 2016, 487). More horrifyingly still, Wainwright and Mann argue that Hannah Arendt's analysis of the 'denationalization' of the 'stateless' – Jewish – people as 'a powerful weapon of totalitarian politics' in the 1930s and 1940s presages 'the political reaction we should expect to a world with hundreds of millions of climate refugees who are not recognized as such' (Wainwright and Mann 2018, 33). Possible manifestations of 'Climate Behemoth' therefore include 'the terrifying potential realized in the Nazi state' (Wainwright and Mann 2018, 56). Such extreme ethnic nationalism involves curtailing the 'non-natural' population through denied entry, ethnic cleansing, eugenics and extermination (Merritt 1995, 408-409). Moreover, 'the movements of potentially hundreds of millions of climate migrants in Asia' is likely to destabilise China, threatening the emergence of a totalitarian 'Climate Mao' which mobilises revolution on the basis of a 'just terror' to contain climate change and its consequences – somewhat like Polanyi's 're-embedding' – whilst simultaneously gearing towards world domination (Wainwright and Mann 2018, 127, 48). Such a scenario could lead to existential international nuclear conflict (Wainwright and Mann 2018, 58). Nonetheless, even if it does not, the above picture shows that the combination of climate change with nationalism may have consequences that would be regarded as 'catastrophic' at the very least (Bostrom and Ćirković 2011, 3-4). The potential for such a terrifying feedback loop between climate change and nationalism as outlined in this article, as well as the common origins of these phenomena in the 'free' market, are outlined in Figure 1 (below). Figure 1: feedback loop between climate change and nationalism in the Global North: Conclusion This essay employs a 'limits to growth' framework to explore the relationship between climate change and nationalism, arguing that similar limits are at play with respect to both, and that the **transgression of these limits represents a major source of existential risk**. These limits are not absolute but relative, dependent upon both our values and the **policies we undertake to manage the rates of change in the relevant variables**. For instance, the limit to the relative growth rate of mature economies in the Global North is not some kind of inexorable driver of nationalism in itself. Whether or not it constitutes a problem will **vary depending on whether citizens and elites in the Global North can be convinced to adopt a cosmopolitan and egalitarian outlook** upon it as opposed to a nationalist one, and on whether their governments institute policies of redistribution to make up for the decline in growth. Most important as causes of both climate change and nationalism are the **limits to the 'free' market** and its ability to value particular unintended consequences. These are: climate change caused by the growth of carbon emissions; financial crises and rising inequality arising from the combination of limited rates of productivity and income growth with an increasing concomitant share of capital and debt in the free market economies of the Global North; and the cultural consequences of rapid rates of growth of migration. These limits also interact in potentially devastating ways. Either the effects of climate change itself, **or the cost of meeting our emissions targets** at **such a late stage**, are likely to **significantly limit future economic growth rates**. This will in turn **further intensify nationalism** both by making international economic competition between nation-states more of a zero-sum game, and by **fuelling the inequality and financial crises** that are core drivers of nationalism at the domestic level. If unaddressed, climate change is also likely to lead to increases in the rate of growth of migration, which is already another key domestic component in the rise of nationalism. Such problems are not a simple case of market correction that a discussion of mere externalities would imply. Instead, the **limits of the market represent an existential threat to**

**humankind**. The market **must** therefore, in Polanyi's terms, **be brought under control and re-embedded in the political sphere**, with our economic means aligning more tightly with liberal political values in terms of their consequences (Polanyi 1957, 251). This implies that the most important limits to growth today are **intensely political** – dependent upon our values and (**the rapidity of**) our political response. Importantly, this leaves open the kind of international order that would be able to deal with such limits. This is where Polanyi's theory meets its own limits – his ideal of 're-embedding' at the level of the nation-state alone is probably not enough, given that nationalism, as we have seen, severely exacerbates the global risks posed by carbon emissions and nuclear weapons. Given their dependence on values and rates of change, limits are somewhat **more 'elastic' than the original concept implies**. But this should not trick us into thinking that they are not limits. **If societies do not act quickly enough**, then the **limits will be breached**. The **consequences of such inaction could be disastrous** indeed.

# Solvency---1AC

## Solvency!

## Transition now solves before the brink

**Stiglitz 21**, (Joseph E. Stiglitz [Economics Nobel laureate, Professor of Economics at Columbia University, Ph.D., Massachusetts Institute of Technology], "The Cost of Inaction on Climate Change," United States Senate Committee on the Budget, 4-xx-2021, https://www.budget.senate.gov/imo/media/doc/Joseph%20Stiglitz%20-%20Testimony%20-%20U.S.%20Senate%20Budget%20Committee%20Hearing.pdf)//Shwillett

Risks Let me spend a few moments discussing the real risks our economy and society face if we do not take stronger actions than we have so far. We have been treating truly **scarce** resources, our **environment**, our water, our air, as if they **were free**. But economics teaches us that there is no such thing as a free lunch. We will have to pay the check someday. And **delay** is **costly**. Taking carbon out of the atmosphere is far more expensive than not putting it into the atmosphere. A smooth **transition** is far **less costly** than the one we will surely **face** if we do not take action **urgently**. In 2008 we saw the financial destruction that came about as a result of the sudden readjustment in the pricing of one part of our housing market. The failure there would have brought down our financial system if governments had not acted forcefully. A full accounting of the costs to our societies over the succeeding years suggests that they were in the trillions of dollars. There will be a **repricing** of carbon **assets**. This I firmly believe. Carbon assets, such as those associated with **coal** and **oil** companies, **do not** today adequately **reflect** the realities of **climate change**. The **longer** we **delay** dealing with **climate change**, the **larger** the necessary **adjustments** will be, and the **greater** the potential for **huge** economic **disruption**—an **economic** disruption that could **make** the **2008** Great Recession **look like child's play** by comparison.6 The **danger** of a **crash** is **particularly acute** for the **U.S.** economy, given that large **U.S. banks** are the largest **financiers** of fossil fuel.7 The insurance industry is heavily exposed, too. Over time, I would expect that they will be more careful in providing coverage—and that means more Americans will have to manage these risks on their own. And ultimately, we know what that means: When large calamities occur, as seems inevitable, the government will pick up the bill. This is a huge hidden liability on the government's balance sheet. Opportunities Economics has, for good reason, been called the dismal science. The scenario of doom and gloom that I have painted is, unfortunately, all too real. But I want to end on a sunnier note. Doing something about climate change could be a real boon for the economy. Too often, critics of taking action point to the job losses. **Change** is **costly**. But change provides **opportunity**. I am also firmly convinced that the **opportunities afforded** by addressing climate change are **enormous**. The number of jobs that will be lost in the old fossil fuel industries are dwarfed by those that will be created in the new industries. The **value** created in the **new industries** will also **dwarf** the **value** of the **stranded assets** in the fossil fuel and related sectors. As just two examples: the number of **installers** of solar panels already is a **mbultiple** of the number of **coal miners**; the auto company with the **highest valuation** today is **Tesla**. .The current focus on changing to a green economy is already stimulating enormous innovation, innovation that holds out the promise of significant increases in standards of living. The price of renewable energy has been plummeting, and in many areas outcompetes fossil fuels. The drive for a greener society is stimulating the design of new buildings and new ways of doing agriculture, which turn out actually to save resources, particularly if we value them appropriately. Our country especially has much to gain, because innovation is a key comparative advantage. If we are ahead of the game—rather than a laggard—we will develop technology that will be in demand around the world. If we are behind the game, we will pay a high price. It is almost inevitable that other countries will demand cross-border adjustments that will put our companies at a disadvantage. Government has an important role in enabling, facilitating, and encouraging the transition to a green economy. One might say we are in good luck: The deficiencies in public investment over the past decades has made it imperative that we undertake such investments now; and we can make those investments "green" investments. The investments themselves will create an enormous number of jobs, stimulating the economy and banishing to the past discussions of secular stagnation that have abounded for the past two decades. They will also crowd-in private investment. Basic research and technology investments by government, for instance, provide the foundations for investments by the private sector. We saw that in the case of the internet; we saw that in the case of the vaccines that were produced with such rapidity in response to Covid-19. And we will see it with these green investments as well. More To Be Done There is much more to be done to protect the economy from the risks I have described.8 For instance, we need immediately to end fossil fuel subsidies and require full disclosure of climate risks—both the risks of physical damage and the financial risks. Markets on their own don't provide adequate disclosure, necessary both for the efficient allocation of scarce capital and for protecting investors. We need to change statutes governing fiduciary responsibility to mandate looking at these long-run risks, and especially where government is at risk, as in government insurance pension schemes. When the government is providing insurance or finance—whether it's through FDIC or through Fannie Mae—we as taxpayers need to be apprised of all

these risks; or more pointedly, we shouldn't be taking on these risks. We shouldn't be insuring banks that make loans that put our planet at risk. We also know that when all is said and done, the government will pick up the pieces when there is systemic financial fragility—and that's why it's imperative that we start assessing, and regulating, systemic climate risk. We have long been aware that in certain key areas there may be deficiencies in the provision of adequate finance. Economists have explained why that's the case, and governments around the world have stepped into the breach. There is, I believe, the need for the founding of a national infrastructure bank and for seeding the creation of community, state, and regional banks to facilitate green investments. We should never again allow the deficiency in infrastructure, which I referred to earlier, to be built up. Social Cost of Carbon Within the **economy**, within **companies**, and within **government**, prices help **guide decisions**. That's why assigning a **near-zero** price to resources that are scarce is such a bad **mistake**, and leads to such **bad outcomes**. We need to **be aware** of the social **cost** of carbon. Unfortunately, the **interim** social **cost** of carbon that was arrived at was much, **much too low**. If used as a **basis** for guiding the economy, it would **result** in temperature increases of 3.5 to **4 degrees** C.— temperatures we have not seen in millions of years, with untold risks that the international community has rightly shied away from.9 We need to **employ** a significantly **high** social **cost** of carbon, accompanied by regulations, and public investments that will **enable us** to deal **with risks** that have rightly been called **existential**.10

## Overwhelming consensus and data conclude nuclear is needed now

**Lehotsky 11-8** (Lukáš Lehotský [Director General, International Atomic Energy Agency (IAEA).], "Climate goals require a step change in nuclear investment," World Economic Forum, 11-8-2024, https://www.weforum.org/stories/2024/11/meeting-global-climate-goals-requires-a-step-change-in-nuclear-investment/)//Shwillett

Nuclear power is now **officially recognized** as **crucial** for global **decarbonization**, **complementing** renewables such as wind and solar. Tripling nuclear capacity by 2050 requires annual **investments** to grow from $50 billion to $150 billion, driven by **public-private partnerships** and **new financial** mechanisms. **Small modular reactors** are **key** to the energy **transition**, offering **flexibility** and **scalability** but require regulatory harmonization and further **development** for **widespread** adoption. Including nuclear power in the first Global Stocktake agreed at last year's United Nations Climate Conference in Dubai (COP28) was nothing short of historic. After almost 30 years of COPs, nuclear power was, for the first time, explicitly mentioned in a negotiated outcome. All countries – not just those 31 operating nuclear power plants – party to the **UN Framework** Convention on Climate Change **agreed** that nuclear **acceleration** was **needed** to achieve **deep global decarbonization**. The first stocktake under the Paris Agreement said wind, solar and other low-carbon sources should be accelerated too but the **overwhelming consensus** was that renewables **needed** nuclear power. And **time** is of the **essence**. Climate change-driven events such as heat waves, floods and powerful storms have affected every part of our planet. Last year was the **hottest** in the **174 years** we have **data** and this year threatens to break that record. Acknowledging nuclear energy's crucial role in accelerating the energy transition reflects how much global attitudes have shifted in the past few years. Global push to triple nuclear capacity In addition to the agreement reached at COP28, 25 countries (and the nuclear industry) pledged to work towards tripling nuclear power capacity by 2050. The urgency of mitigating carbon emissions was joined by a renewed push for energy security. It shows that **fact-based analysis** and **science** have finally overcome **misunderstanding** and ideology regarding nuclear, which is **evident** in the **data** too. The International Atomic Energy Agency's (IAEA) recently released nuclear capacity projections show that the high-case scenario sees nuclear capacity in 2050 as two and half times greater than today. This expansion will require extending the operational years of existing nuclear power plants, many built in response to the 1970s oil shocks and an ambitious effort to build 640 gigawatts of new reactor capacity. We will need to build a greater number of large reactors than the 415 that operate today and introduce a significant number of small modular reactors. Small modular reactors are **not** yet **available** on the **market** but will **need** to account for a **quarter** of the increased capacity in 2050 if **climate targets** are to be **met**. **Massive investment needed** to **scale** nuclear To **fulfil** this **demand** will necessitate a **step-change** in **financing**. Between 2017-2023 the world spent an average of about $50 billion on nuclear energy every year. That must increase to $125 billion from 2030 onwards. Tripling nuclear capacity by 2050 would require yearly investments of about $150 billion. To put that into perspective, it is just a tenth of what is needed every year to triple renewable capacity by 2030. Nuclear energy is sometimes pitted against wind and solar energy, with some opponents arguing that a dollar of investment in nuclear energy is a dollar less invested in wind and solar energy. That's not true. Because nuclear is available **24-7**, **investing** in it actually **facilitates investment** in **intermittent renewables** such as wind and solar. Having nuclear power

in the grid **lowers** overall **costs** because it **negates** the need for **expensive battery storage** and investment in **overcapacity**. A nuclear power plant built today will pay off by providing low-carbon energy at affordable rates for about a century. **No other** scalable, proven, low-carbon energy source can do that, making investing in nuclear **highly attractive** to those who can take a long-term view. In other words, financing nuclear power plants, particularly the upfront costs, **requires government participation**.

## SMRs are quick, cheap, interoperable, safe, and remote

**Liou '23** (Joane Liou [IAEA Office of Public Information and Communication.], "What are Small Modular Reactors (SMRs)?" International Atomic Energy Agency, 9-13-2023, https://www.iaea.org/newscenter/news/what-are-small-modular-reactors-smrs)//Shwillett

Many of the benefits of SMRs are **inherently** linked to the **nature** of their **design** – **small** and **modular**. Given their smaller footprint, SMRs can be sited on locations not suitable for larger nuclear power plants. Prefabricated units of SMRs can be **manufactured** and then **shipped** and **installed on site**, making them more **affordable** to build than large power reactors, which are often custom designed for a particular location, sometimes leading to **construction delays**. SMRs offer savings in **cost** and **construction time**, and they can be **deployed incrementally** to match increasing energy demand. One of the challenges to accelerating access to energy is infrastructure – limited grid coverage in rural areas – and the costs of grid connection for rural electrification. A single power plant should represent no more than 10 per cent of the total installed grid capacity. In areas lacking sufficient lines of **transmission** and **grid capacity**, SMRs can be installed into an **existing grid** or **remotely** off-grid, as a function of its smaller electrical output, providing low-carbon power for industry and the population. This is particularly relevant for microreactors, which are a subset of SMRs designed to generate electrical power typically up to 10 MW(e). Microreactors have smaller footprints than other SMRs and will be better suited for regions inaccessible to clean, reliable and affordable energy. Furthermore, microreactors could serve as a **backup power supply** in emergency situations or **replace** power **generators** that are often **fuelled by diesel**, for example, in **rural communities** or **remote businesses**. In comparison to existing reactors, proposed SMR designs are generally **simpler**, and the **safety concept** for SMRs often relies more on **passive systems** and **inherent safety characteristics** of the reactor, such as **low power** and **operating pressure**. This means that in such cases no human intervention or external power or force is required to shut down systems, because passive systems rely on physical phenomena, such as natural circulation, convection, gravity and self-pressurization. These increased safety margins, in some cases, **eliminate** or **significantly lower** the potential for **unsafe releases** of radioactivity to the environment and the public in case of an **accident**. SMRs have reduced fuel requirements. Power plants based on SMRs may require less frequent refuelling, every 3 to 7 years, in comparison to between 1 and 2 years for conventional plants. Some SMRs are designed to operate for up to **30 years without refuelling**. What is the status of SMRs? Both **public** and **private** institutions are actively participating in efforts to bring SMR technology to **fruition within this decade**. Russia's Akademik Lomonosov, the world's first floating nuclear power plant that began commercial operation in May 2020, is producing energy from two 35 MW(e) SMRs. Other SMRs are under **construction** or in the **licensing stage** in Argentina, Canada, China, Russia, South Korea and the United States of America. More than 80 commercial SMR designs being developed around the world target varied outputs and different applications, such as electricity, hybrid energy systems, heating, water desalinisation and steam for industrial applications. Though SMRs have lower upfront capital cost per unit, their economic competitiveness is still to be proven in practice once they are deployed. Read how international collaboration will help bring SMRs, including microreactors, to fruition. SMRs and sustainable development SMRs and nuclear power plants offer unique attributes in terms of **efficiency**, **economics** and **flexibility**. While nuclear reactors provide dispatchable sources of energy – they can **adjust output** accordingly to electricity **demand** – some renewables, such as wind and solar, are variable energy sources that depend on the weather and time of day. SMRs could be **paired with** and **increase** the **efficiency** of renewable sources in a **hybrid energy system**. These characteristics position SMRs to play a **key role** in the clean energy **transition**, while also helping countries address the Sustainable Development Goals (**SDGs**). Efforts to achieve the target of universal access to energy, SDG 7, has made visible progress; however, **gaps** are still **prevalent**, mainly concentrated in **remote** and **rural regions**. As global efforts seek to implement **clean** and **innovative** solutions, the

increased use of renewable energy **coupled** with the introduction of SMRs has the potential to **fill** such **gaps**. .The IAEA has established the Platform on SMRs and their Applications, a one-stop shop for countries to coordinate support related to all aspects of SMR development, deployment, oversight and their electric and non-electric applications, such as use in district heating and desalination systems. The IAEA is assessing the level to which existing IAEA safety standards can be applied to innovative technologies. The IAEA expects to publish a Safety Report on the applicability of IAEA safety standards to SMR technologies in 2022. The IAEA's Technical Working Group on Small and Medium Sized or Modular Reactors (TWG-SMR) and the SMR Regulators' Forum unites experts to discuss challenges and share experiences related to the development and future deployment of SMRs. The IAEA fosters sustainable nuclear energy development. The IAEA hosts technical meetings, produces scientific and technical publications and facilitates coordinated research projects.

## **Only** US leadership can **model globally**

**Hultman and Gross '21** (Nathan Hultman [Former Senior Fellow at the Brookings Institute.], Samantha Gross [Director - Energy Security and Climate Initiative at the Brookings Institute, PhD.], "How the United States can return to credible climate leadership", The Brookings Institute, 3-12-21, https://www.brookings.edu/research/us-action-is-the-lynchpin-for-successful-international-climate-policy-in-2021/)//Shwillett

In this context, the reaction in the global climate community to Joe Biden's election as U.S. president has been overwhelmingly positive. The world sees the importance of U.S. action to limit overall global temperature rise, and President Biden's campaign, appointments — including former secretary of state John Kerry as special presidential envoy for climate — and early actions in office indicate his interest in a new approach to climate change. However, the Biden administration immediately faces a difficult challenge. Four years of U.S. absence from the global climate community — including global climate negotiations and international efforts to reduce greenhouse gas emissions — have left a big gap in international leadership and credibility. How does the new administration meet the moment? How does the United States regain its credibility on the world stage? Since greenhouse gas emissions mix throughout the global atmosphere and oceans, emissions in one part of the world impact the climate everywhere. The Paris Agreement calls for all countries to **reduce emissions** in line with their own development goals and political realities. But science suggests that a goal of net-zero emissions from the **largest** emitting countries by mid-century is **necessary.** In this context, credible **U.S. action is critical.** As the world's largest **economy**, second-largest greenhouse gas **emitter**, and **superpower** re-engaging on **climate diplomacy**, U.S. actions can either dampen or **accelerate global action**. If the **U**nited **S**tates fails to make **commitments** that the rest of the world views as serious, it will be harder to **pressure** other countries to take more serious action. **Credible** U.S. **action** could form the basis for **genuine leadership**, as the United States displayed preceding the Paris COP through its **bilateral commitments** with **China**. The good news is that Biden is appointing climate experts to positions throughout the executive branch and promises a "whole of government" approach to climate change. However, despite unified political control of the White House and (narrowly) Congress, the nation remains polarized on whether and how to respond to the climate crisis. Many actions that could move the **U**nited **S**tates toward a **low-carbon economy** do not require **legislation** and could be implemented with **little** or no **bipartisan support**, but given that such actions were reversed when the Trump administration replaced the Obama administration, these may not be enough to demonstrate U.S. credibility. U.S. leadership in **innovation**, financial **markets**, and civil society provide additional opportunities for **international engagement** and action. Changes in how we understand the low-carbon transition are an additional source of good news. The conversation on climate action is shifting from one focused solely on costs to one centered around opportunities: for low-cost renewable electricity generation, for growth in jobs and communities, for greater justice for communities that have long been disproportionately affected by pollution, for development in countries that currently lack modern energy services. The cost of renewable electricity has fallen rapidly and technological advancements in other sectors, like batteries, are reducing the cost of decarbonization. A zero-carbon world is coming into view. THE GLOBAL AND NATIONAL CONTEXT FOR ACCELERATING U.S. CLIMATE ACTION The United States sat on the sidelines for four years of global climate action, and the world changed while we were away. The science about climate change became clearer and our allies and partners abroad are stepping up their national climate strategies in response. Now that the United States is **back in the game**, they expect **ambitious action**, including a new U.S. climate target or nationally determined contribution (**NDC**). In this context, after whipsawing political positions on climate change, the United States must advance a credible strategy for robust and continued climate action at home that is seen as **reliable** and not subject to **reversals** over time.

## Its perceptual

**Buhaug et al. ’23** (Halvard Buhaug [Research Director and Research Professor at the Peace Research Institute Oslo, Professor of Political Science at the Norwegian University of Science and Technology, and Associate Editor of Journal of Peace Research.], Tor Benjaminsen [Norwegian University of Life Sciences, Norway.], Elisabeth Gilmore [Carleton University, Canada.], Cullen Hendrix [Peterson Institute for International Economics, United States.], “Climate-driven risks to peace over the 21st century,” Climate Risk Management, 2023, https://www.sciencedirect.com/science/article/pii/S221209632200078X?via%3Dihub#s0100)//Shwillett

4.4. Insufficient action to limits the adverse impacts of climate A final climate-related risk to peace considered here stems from **taking insufficient action**. As public experiences with climate impacts grow (cf. Fig. 1), individuals may become less tolerant to the commensurate risks. **Increasing perception** of a **government’s inability (or unwillingness**) to **protect** its citizens from **climate**-driven **harm** may foster **social unrest**, especially if the social environment is conducive to broad mobilization and collective action (Ide et al., 2020; see also Olson, 1965, Tilly, 1978). This dynamic also might play out at the **international scene**, where **vulnerable** societies in the **Global South**, perhaps supported by progressive green economies, become increasingly **impatient** with **sluggish mitigation** rates in much of the **industrialized world**. A related scenario is the notion of military eco-humanitarian interventions in protection of nature (Eckersley, 2007). Such risks to peace are perhaps not likely to become severe (i.e., armed conflict with widespread loss of lives is unlikely) due to the vast imbalance in military capabilities between actors, but it could alter the international political environment in other ways. .5. Illustrative scenarios of severe climate-driven risks to peace .The RKR assessment in AR6 judged that climate change does not presently constitute a severe risk to peace at the global level (O’Neill et al., 2022). However, depending on how the climate and societies change over the course of this century, climate-driven **risks** may become **severe** as a result of (i) **intensifying** climate-related **impacts** on sectors, processes, and systems, as well as **compounding** and **cascading** impacts, that in turn increase the **probability** of **major armed** conflict, and (ii) adverse **side-effects** of **societal responses** to climate change as described in previous sections. It was, further, assessed that the likelihood of severe risk will continue to be shaped primarily by non-climatic (i.e., vulnerability) factors in the near term, but higher levels of warming will have increasing bearing on risk outcomes (O’Neill et al., 2022, p. 2465). .In the following, we present three stylized scenarios to explore different implications for how climate change might affect future peace and security (Fig. 2), building on the RKR assessment and the extensions offered above. This qualitative scenario analysis is informed by the best understanding of the authors on how climate and conflict are connected today (drawing on the post-World War II record), along with distinct assumptions about how societies will respond to climate change over the 21st century. We do not evaluate the relative likelihoods of individual pathways or which scenario entails greater overall risk to peace but rather use these scenarios to illustrate pathways to conflict that are tied to specific societal futures. Moreover, although the three scenarios bear resemblance to specific Shared Socioeconomic Pathways (SSPs) (O’Neill et al., 2014, Riahi et al., 2017), our scenarios are decidedly simpler than the SSP framework in that we do not make assumptions about of how societies develop beyond their adaptive and mitigation response (i.e., we assume that underlying drivers of socioeconomic development and demographic change are similar across the scenarios). .Fig. 2. Stylistic climate and societal change scenarios with implications for risk to peace. Scenario A entails a future world with low mitigation and low adaptation; Scenario B denotes low mitigation but high adaptation; Scenario C implies high mitigation and high adaptation. For simplicity, all scenarios are placed at the same distance from the origin, which represents a theoretical world without climate change, although in reality overall climate-driven conflict potential probably would vary between these worlds. .Scenario A: Unmitigated climate change and continuation of current adaptation trends. The first scenario we consider assumes **mounting** climate change impacts and associated **risks**. It is defined by continued reliance on fossil fuels for energy production and economic growth, where transition to renewables is driven only by market forces and technological innovation and not induced through climate policy (beyond those currently in place, which are assumed to continue). Adaptation to climate change continues at historical rates, rather than at a rate that would be commensurate with the growing risks with hard limits being reached. This would result in a world that is around 2.8 °C warmer in 2100 than in the pre-industrial era (UNEP, 2022) and where countries increasingly fail to manage accelerating climate change impacts and the associated losses and damages. .In this world, more extreme and unpredictable weather constitutes a growing challenge for climate-sensitive economies and livelihoods, as current adaptation trends have failed to obviate these challenges in the present. Agriculture-dependent communities in Sub-Saharan Africa, South Asia, and Central America, and Indigenous Peoples in small islands and the Arctic are increasingly facing adaptation limits shaped by permanently altered environments, insufficient adaptation finance, and slow implementation of new technology. The result is compromised household economic security and increasing exposure to hazard events that would increase incentives for migration. For example, if resources cannot be marshalled to enhance local adaptive capacity in rural areas, larger number of households and communities may move to urban centers. With insufficient resources in the urban centers, this change in population could accentuate existing social challenges and expose the migrants to new risks (Bosetti et al., 2020, Spilker et al., 2020). .Increasing income inequality between social groups at different levels of vulnerability and rising socioeconomic marginalization in urban as well as rural regions imply lowered opportunity cost of dissent. In areas where economic hardship overlaps with

political exclusion, climate impacts would contribute to higher probability of radicalization and violent extremism (Cederman et al., 2013, Stewart, 2008). Increasing environmental degradation and more volatile agricultural yields also could contribute to armed conflict through accentuated incentives for capturing dwindling fertile land and resources (McGuirk and Burke, 2020), and rising food prices that serve as an important mobilization base for social unrest (Hendrix and Haggard, 2015). **Growing popular resentment** with **government inaction** is another **significant risk** to **peace** in this scenario that applies as much to **wealthy societies** as to **vulnerability hotspots**, especially through uncompensated losses and damages. Likewise, the industrialized world's collective **lack** of will to invest in mitigation measures or provide **adaptation finance** might **generate** powerful **popular resentment** within the **Global South**, as well as among citizens in high-income countries that support more stringent climate policy. A **major military confrontation** between key emitters and victims of climate change would certainly constitute a **severe risk to peace at regional to global scale**, although such tensions would more conceivably inspire **waves** of **'eco-terrorism'** within the developed world (Spadaro, 2020) or challenge the functioning of international trade agreements as well as the UN system.

# 2ac

## On Meltdowns

### Can't solve existing reactors or global targets

**WNA '25** (No Author, "Nuclear Power in the World Today," World Nuclear Association, 3-21-2025, https://world-nuclear.org/information-library/current-and-future-generation/nuclear-power-in-the-world-today)//Shwillett

The first commercial nuclear power stations started operation in the 1950s. Nuclear energy now provides about 9% of the world's electricity from about **440** power **reactors**. Nuclear provides about one-quarter of the world's low-carbon electricity. Nuclear is the world's second largest source of low-carbon power. Over **50 countries** utilize nuclear energy in about 220 research reactors. In addition to research, these reactors are used for the production of medical and industrial isotopes, as well as for training. Nuclear technology uses the energy released by splitting the atoms of certain elements. It was first developed in the 1940s, and during the Second World War research initially focused on producing bombs. In the 1950s attention turned to the peaceful use of nuclear fission, controlling it for power generation. For more information, see page on History of Nuclear Energy. Civil nuclear power can now boast around 20,000 reactor years of operating experience, and nuclear power plants are operational in **31 countries** (plus Taiwan) **worldwide**. In fact, through regional transmission grids, many more countries depend in part on nuclear-generated power, particularly in **Europe**. .When the commercial nuclear industry began in the 1960s, there were clear boundaries between the industries of the East and West. Today, the nuclear industry is characterized by international commerce. A reactor under construction in Asia today may have components supplied from South Korea, Canada, Japan, France, Germany, Russia, and other countries. Similarly, uranium from Australia or Namibia may end up in a reactor in the UAE, having been converted in France, enriched in the Netherlands, deconverted in the UK and fabricated in South Korea. The uses of nuclear technology extend well beyond the provision of low-carbon energy. It helps control the **spread** of **disease**, assists doctors in their **diagnosis** and **treatment** of patients, and powers our most ambitious missions to **explore space**. These varied uses position nuclear technologies at the heart of the world's efforts to achieve sustainable development. For more information, see page on Nuclear Energy and Sustainable Development.

### Investment resolves safety concerns

**Pomerleau '24** (Shuting Pomerleau [Director of Energy and Environmental Policy at the American Action Forum.], Renewed U.S. Interest in Nuclear Energy: An Update, AAF, 11-19-2024, https://www.americanactionforum.org/insight/renewed-u-s-interest-in-nuclear-energy-an-update/)//Shwillett

EXECUTIVE SUMMARY While the construction of new nuclear reactors has been stalled for the past three decades, nuclear energy still offers a cost-effective, clean, and reliable source of power – and with rising energy costs and a demand for clean energy, nuclear is seeing renewed interest from lawmakers and industry leaders. There recently has been unprecedented business investment in nuclear, as large technology companies **invest** in nuclear reactors with **improved safety** and lower costs; moreover, there has been **movement** on the **legislative** front to lower the upstart costs of constructing new nuclear energy facilities. .The successful implementation of the bipartisan **A**ccelerating **D**eployment **o**f **V**ersatile**,** **A**dvanced **N**uclear **f**or **C**lean **E**nergy **A**ct of 2024 is important for ensuring the timely **development** and **deployment** of the **new gen**eration of nuclear technologies, which are likely to be **safer**, more efficient, and have fewer limitations, with advancements in **fuel sources**, **cooling methods**, and reactor **size**.

INTRODUCTION Nuclear energy has been playing a quiet but important role in U.S. electricity production. Although public and legislative support has been stagnant over the past few decades, in particular since the Three Mile Island partial nuclear reactor meltdown incident in 1979, nuclear energy has been producing approximately one-fifth of America's electricity and about half of the country's carbon-free power.

### Best studies conclude no meltdown impact

**Wald '11** (Matthew Wald [Matthew L. Wald is an independent energy analyst and writer. He was a reporter for thirty-eight years at The New York Times where he covered climate, energy, and other subjects. He was also a policy analyst and communications consultant for six years at the Nuclear Energy Institute.] "N.R.C. Lowers Estimate of How Many Would Die in Meltdown," New York Tines, 7-29-2011, https://www.nytimes.com/2011/07/30/science/earth/30radiation.html)//Shwillett

The **N**uclear **R**egulatory **C**ommission is approaching completion of an **ambitious study** that concludes that a meltdown at a typical American reactor would lead to **far fewer** deaths than **previously assumed**. The conclusion, to be published in April after six years of work, is based largely on a radical revision of projections of how much and how quickly cesium 137, a radioactive material that is created when uranium is split, could escape from a nuclear plant after a core meltdown. In **past studies**, researchers estimated that **60 percent** of a reactor core's cesium inventory could escape; the **new estimate** is only **1** to **2 percent**. A draft version of the report was provided to The New York Times by the Union of Concerned Scientists, a nuclear watchdog group that has long been critical of the commission's risk assessments and obtained it through a Freedom of Information Act request. Since the recent triple meltdown at the Fukushima Daiichi nuclear plant in Japan, such groups have been arguing that the commission urgently needs to tighten safeguards for new and aging plants in the United States. The report is a **synthesis** of **20 years** of **computer studies** and **engineering analyses**, stated in **complex mathematical** terms. In essence, it states that if a prolonged loss of electric power caused a typical American reactor core to melt down, the **great bulk** of the radioactive material released would **remain inside the building** even when the reactor's containment shell was breached. **Big releases** of radioactive material would **not** be **immediate**, and people within a **10-mile radius** would have enough time to **evacuate**, the study found. The **chance of a death** from acute radiation exposure within 10 miles is therefore **near zero**, the study projects, although some people would receive doses high enough to cause fatal cancers in **decades to come**. One person in every 4,348 living within 10 miles would be expected to develop a "latent cancer" as a result of radiation exposure, compared with one in 167 in previous estimates. "Accidents progress **more slowly**, in some cases much more slowly, than **previously assumed**," Charles G. Tinkler, a senior adviser for research on severe accidents and one of the study's authors, said in an interview at a commission office building here. "Releases are **smaller**, and in some cases **much smaller**, of certain key radioactive materials." The N.R.C. did not intend to release the report until next spring and said its conclusions were still being adjusted after a peer review. The health effects of a catastrophic meltdown were hypothetical until the 1979 accident at Three Mile Island. That destroyed a billion-dollar reactor but caused no apparent physical harm to nearby residents, immediately or over time. Debate has persisted over whether the United States skirted a disaster or whether that accident was about as bad as it could get.

## On Russia

### 1. High prices cause war and instability

**Ashford 22**, Adjunct Professor of Security Studies at Georgetown University, Ph.D., Foreign Affairs, University of Virginia, M.A., International Affairs, American University, B.A., Foreign Affairs, University of Virginia (Emma Ashford, June 19, 2022, "The Problem With Being a Petrostate," Foreign Policy, https://foreignpolicy.com/2022/06/19/petrostates-oil-production-weapon-foreign-policy-war-economy/)

Cicero, perhaps apocryphally, is said to have written that "endless money forms the sinews of war." **War** and **wealth** are intrinsically **linked**. A nation's ability to wage war is inherently dependent on its ability to raise and fund armed forces.

Oil-wealthy states—defined here as those that earn more than $1,000 per capita in oil and natural gas revenues each year—hold vast, easily obtained wealth that makes them almost uniquely capable of waging war without sacrificing domestic priorities. Due to high levels of income

from oil and gas production, they can afford to build up military capacity, buy weapons, increase military salaries, or engage in research and development, all without substantial budgetary trade-offs. To put it another way: If they wish, leaders in **oil**-wealthy **states** can have guns **and** butter.

Oil-wealthy states are a diverse bunch, including **Russia**, small and large **Mid**dle **East**ern states (Qatar, Iran), several wealthy democracies (Norway, Australia), and various underdeveloped **African** and Central **Asian** nations (Libya, Equatorial Guinea, Turkmenistan). Yet although they face a diverse set of national security challenges, most **share** common **trends** in their military **expenditures**: As oil **prices rise**, so does military **spending**. When oil **prices crash**, military spending eventually **drops**. Cross-national **stat**istical analysis confirms that oil-wealthy states **spend more** on their militaries on an absolute basis, regardless of **regime type** or major-**power status**.

Likewise, data on arms sales shows a strong correlation between oil wealth and weapons purchases. According to a metric from the Stockholm International Peace Research Institute, although wealthy oil states are a relatively small proportion of all states globally, they have been well represented among top arms importers, both during the Cold War and after. Global arms sales have largely risen in line with oil prices in recent decades.

Of course, there are other ways to transform money into military capacity, notably in the research and development of advanced technologies. The most controversial investment in technological research is the development of a nuclear weapons program. Data on nuclear programs and nuclear latency reveals that oil **wealth** is strongly correlated with nuclear development, with oil-wealthy states on average more likely to have an active **nuclear** program or to have the **latent** nuclear **capacity** necessary to build one quickly.

Interestingly, oil wealth is not correlated with higher spending as a percentage of government expenditure. In plain English, this means that oil-rich and oil-poor states appear to spend comparable chunks of their overall budgets on their militaries. If the state budget is a pie, then oil-wealthy states simply have a much larger pie, with the government spending more overall.

And while oil-wealthy states may spend more on their militaries, that doesn't necessarily mean they have more combat capability to show for it. Arms must be chosen wisely to meet key threats, and troops must be trained on new weapon systems to use them effectively. Spending a lot on prestige weapon systems—fighter jets or the latest in high-tech gadgets—may look impressive but yield little military advantage.

Politically difficult changes in strategy, doctrine, or force structure may be necessary to improve military effectiveness, even with higher levels of spending. This is particularly the case in countries with high levels of corruption and underdeveloped institutions—maladies common in oil-wealthy states. Indeed, we've seen many of these flaws on public display in recent months in Russia's invasion of Ukraine. Despite billions poured into Russia's military modernization over the last decade, the military has performed abysmally.

Even well-implemented military spending doesn't always yield battlefield effectiveness. For authoritarian regimes, battlefield effectiveness may be impeded by other regime priorities such as coup-proofing. Consider Saddam Hussein's Iraq, where efforts at coup-proofing against his army resulted in poor performance and near disaster during the early years of the Iran-Iraq War in the 1980s. Any army that prioritizes domestic policing and repression is not necessarily an effective fighting force against peer competitors.

As in any state, therefore, military expenditure must be coupled with effective management and strategic doctrine to produce a capable force. What military expenditure does offer, mainly, is potential—the potential to substantially improve military capability if it is spent wisely.

The more difficult question is whether increased military expenditure itself makes a state more likely to initiate conflicts. One could argue that oil wealth doesn't cause war but merely facilitates it.

Yet **excessive** military **spending** could easily increase the risk of **conflict**. The connection is simple: Having a well-equipped and **well-funded** military gives leaders **more confidence** in their ability to win. These leaders can assume, perhaps wrongly, that they have **assembled** a superior fighting force. Baathist Iraq—a particularly belligerent petrostate—provides an illustration of this: Saddam's conviction in his own military genius, his faith in new armaments, and his belief that his troops performed well (despite all evidence) often led him to conflicts he could not win. Libya's Muammar al-Qaddafi made similar mistakes.

This offers one potential explanation for oil-wealthy states' tendency toward conflict: Their **overconfident** leaders mistake **high** military **spending** for actual capability. It also suggests an unfortunate corollary: Oil-wealthy states not only **are more likely** to start wars but may be more likely to lose them. Oil wealth may even cushion the negative impact of losing a war, providing ways to **buy off** segments of society and allowing a leader to **maintain power** despite repeated **conflict** losses

## 2. On the idea of decreased demand increasing exports, otherwise known as the green paradox

### A. Shifts solve the green paradox---empirics

**Maton '18** (Brendan Maton [Freelance Journalist from Oxford University; Paul Elkins, Director of UCL's Institute for Sustainable Resources.], "Disputing the Green Paradox", The Bartlett Review, 2018, https://www.ucl.ac.uk/bartlett/ideas/bartlett-review/disputing-green-paradox)//Shwillett

'The green paradox' sounds like the title of a mystery thriller. In fact, it is the label for a theory that, as humanity turns to cleaner energy, companies that extract and refine oil, coal and gas will increase production before environmental taxes and regulation (or both) render fossil fuel production too costly to continue. If you are **motivated** by profiteering, the green paradox makes **sense** – why not get the most out of an asset before its value diminishes? But Professor Paul Ekins, Director of UCL's Institute for Sustainable Resources, says that there is **no empirical ev**idence that major energy companies are **pursuing** such a course. There is more data for the **counter-argument**: as more **green taxes** and **regulations** appear in the chain of fossil fuel usage, affected companies will seek more **profitable alternatives**. However, this evidence is diffused across many industrial sectors. Ekins, in a paper written with the UCL Energy Institute's Christophe McGlade, academics from the Potsdam Institute for Climate Impact Research and the Mercator Institute on Global Commons and Climate Change, chose to focus specifically on the energy industry, modelling which course of action – increased production or alternative investments – would exert the **strongest pull** if it was known for certain that fossil fuels were going to become **more expensive**. The novel examination was how the energy industry might act between announcement of policy and its implementation. Most companies do not act before a policy comes into force. Having said this, energy majors have to plan further ahead than most because of the huge cost and construction time required for wells, pipelines, refineries and power plants. To reduce **complexity**, a single policy instrument was used: the **carbon tax**. It was **modelled**, however, using different prices and different periods between announcement and implementation. The authors assumed the tax was applied globally, with no backsliding by individual countries. The results show that when carbon taxes are **announced**, the divestment effect **dominates** the green paradox effect in all tax cases, regardless of the implementation delay. Some of the most powerful effects are felt in the coal industry, doubling the cost of coal under some scenarios.

### B. Semienuk says its already happening now and will inevitably flood the market.

## 4. Price volatility is structurally inevitable.

George **Steer 24**. Markets reporter covering equities, bonds, and currencies at Financial Times. "Who and what is driving oil price volatility." October 9th, 2024. Financial Times. https://www.ft.com/content/056810ef-1b9d-4641-b111-03b33c22a310

A "**geopolitical risk premium**" is a fuzzy concept, roughly equivalent in today's oil market to an extra $5 charged for each of the 6bn or so "virtual" barrels traded every day. That the planet consumes (just) 100mn real barrels every 24 hours shows how dominated by **speculators** the **oil market** has become. This in turn explains why, alongside the many other obvious catalysts, **prices** have been as **volatile** as they have over the past few weeks. **Israel's** exchange of **missiles** with Iran and the launch of **China's stimulus package** meant Brent crude last week notched its biggest five-session gain in more than a year. Prices briefly rose above **$80 a barrel** this Monday, only to **slump 5 per cent** on Tuesday after the Chinese National Development and Reform Commission's latest press conference proved a damp squib. The **initial rally** was "caused almost entirely by (justified) **risk premium,"** JPMorgan commodity futures and options strategist Tom Skingsley wrote in a note to clients — but **investor "positioning"** was a major factor too, he added. Over the past few months, perhaps the **biggest story** in oil **markets** has been **algorithmic selling** to historic extremes. Net positioning among speculative **trend-following hedge funds** (aka commodity trading advisors) — which analyse complex technical factors like the term structure of Brent and WTI prices rather than fundamentals like macroeconomics or geopolitics — had, until recently, **never been as**

**short.** "CTAs have been a dominant force this year," Ryan Fitzmaurice, a commodity portfolio manager and strategist at Marex, told FTAV. "Historically there was a lot of **sticky money** in oil markets, from index managers rolling passive longs and people that were looking for inflation hedges." But China's economic slowdown and the decline in US inflation meant a lot of this "sticky money" deserted the market in April and May. With Opec poised to ramp up supplies in December and global demand looking weak, Brent prices slipped from above $90 a barrel in mid-April to just below $70 by mid-September. **Trend-followers**, which **aggressively buy** when prices are rising and **aggressively sell** when prices are falling, accelerated the sell-off. China's initial fiscal package and escalating tensions between Israel and Iran flipped the market on its head. Eager to hedge their broader portfolios, discretionary investors who for months had watched on from the sidelines began to buy oil futures and call options as a result, snapping the negative momentum that had been driving CTA selling. The shift in sentiment was hardly profound, explains Ilia Bouchouev, the former president of Koch Global Partners. But it was enough. Discretionary investors "turned bullish but they don't really want to buy — they have no incentive to do so before the [US presidential] election," Bouchouev told us. "If **Trump wins** and we get **tariffs**, that's an extra risk, so why bother putting money on now when they can do the same thing on November 6?": A month ago, lots of put options were being bought by producers, and dealers had to sell futures to hedge against this risk. That flow subsided and started to go in the other direction a few weeks ago, when there was suddenly a lot of call option buying from retail investors via ETFs like USO and macro hedgers. There was aggressive buying of $100 calls, as a form of insurance given that no one really knows what will happen in the Middle East. What people do know is that if oil does go to $100, the Fed's plan would be derailed and other assets would be massively affected. Momentum-driven CTAs that were "max short" were mechanically forced to cover their positions, Bouchouev added. "Historically, their positions tend to mean revert. So if they're at one extreme already, there's no way for them to go but up." CTAs are now at 10 per cent, so they have 90 per cent left to go. The issue with CTAs... with momentum, if it's negative, they will continue to sell. But if the market **stabilises** for a **week** or so or you get a **small spike**, then all of a sudden it breaks this negative momentum. Momentum doesn't have to turn positive, it just has to stop being too negative. That's sufficient for CTAs to start buying back. We don't have positive momentum right now, but they're starting to cover all the same. In the past few days, however, the market has been **flipped on its head** yet again as fears that **Israel** might strike **Iranian energy** facilities have subsided and Beijing disappointed on further stimulus. Per JPMorgan's Skingsley, in a note published on Tuesday morning: Flows on the desk were polarizing throughout much of yesterday, there feels to be an increasing interest from the discretionary community to begin to fade the move at these levels, or at the very least take profit whilst systematic money continues to take the other side of that trade as their extensive short continues to unwind… With that in mind, where next? Still very hard to call until we get some definitive action from Israel but given the extent of the rally we have seen and the fact it has been caused almost entirely by (justified) risk premium and positioning, should the Israeli response 'disappoint' (read not impact oil balances/target nuclear facilities) there is now significant room to the downside from here and the risk reward for such a view that was non-existent a week or so ago is much more existent right now… Some interesting parties have joined in on the selling, according to research analyst Martha Dowding and market design expert Jorge Montepeque — both of whom work at Onyx Capital Group, a liquidity provider for oil derivatives which has almost certainly made a killing from all of the recent volatility. Trafigura, TotalEnergies, people like that have been selling [on Tuesday]. Exxon has been on the sell-side for a couple of months. They're reading fundamentals and selling their surpluses, but they could turn buyers whenever. Total flips from buyer to seller every few weeks... [On Tuesday] Austrian group OMV sold a north sea cargo, Ekofisk, to Total. And BP sold something like 700,000 barrels to Mercuria. OMV isn't a typical seller — they don't typically sell publicly, so this is unusual. It's also unusual to see Exxon selling for two months in a row. When the market next flips is **anyone's guess**. "**It's a never-ending cycle**," says Fitzmaurice at Marex. "CTAs aren't necessarily so concerned about Opec or the outlook in the Middle East. They're just trying to monetise momentum" — geopolitics being simply another number on a screen.