ANITA McBAIN

Redefining Sustainability in a Contested Age

Redefining Sustainability in a Contested Age

Sustainability Meets Security, Resilience and Defence

A.D. McBAIN

April 2026

Redefining Sustainability in a Contested Age

Sustainability Meets Security, Resilience and Defence

This paper argues that there is no long-term sustainability in food, energy or water without resilience in the critical infrastructure that underpins economic security, inextricably linked to national security, resilience and defence.

Sustainable investment has reached an inflexion point. There can be no long-term sustainability in food, energy or water without resilience in the critical infrastructure that underpins economic security. The two are mutually reinforcing. Sustainable and responsible investment, with USD$16.7 trillion under management, has been forced to recalibrate.

This paper makes three points. First, there are converging risks between food, energy, water, climate change & biodiversity loss, supply chain risk and digital sovereignty that constitutes a single nexus of physical risk, not six independent themes. Second, legacy defence exclusions from sustainable investment are incongruous in a contested age. Third, capital must move with speed and ambition into resilient infrastructure, dual-use defence capability domains, food, energy & water security, and nature-based solutions at scale (Citi, 2025).

In Europe, security is a precondition for growth and investment into digital sovereignty, decarbonisation and defence will be essential (European Union, 2024). During the next decade the sustainable pool of capital will need to align with this reality.

Capital Pool Too Large to Ignore

In 2024, *"fund assets reporting use of responsible or sustainable investment reached USD$16.7 trillion"* (GSIA, 2025). Sustainable investment has had to evolve, and this paper makes the case for investment into security, resilience and defence aligned to long-term sustainable outcomes in a contested age.

This has implications for sustainable investment strategies that, for the right reasons, historically excluded investment into the defence industrial sector. In a world that, for the last three decades, has benefited from a peace dividend[1], is today the right time to reconsider how capital should be deployed to deliver long-term sustainable outcomes aligned to national security?

[1] *A peace dividend is an economic boost to a country during a period of peace that follows a war. During this period of peace, a government can usually afford to reduce its defence spending and during this time would reallocate investment to prioritising a domestic policy.*

Transatlantic Alliance Under Strain

The invasion of Ukraine in 2022 and events in the Middle East in 2026 have put immense strain on the transatlantic alliance. This has accelerated the urgency among UK and European policymakers to scale up defence spending.

In 2025, the UK Government launched the Strategic Defence Review to *"move to warfighting readiness to deter threats and strengthen security in the Euro-Atlantic"* (MOD, 2025). The UK Prime Minister put security and defence front and centre signifying landmark investment into deterrence and defence, radical reforms to defence procurement, commitment to operate, sustain, and renew the nuclear deterrent and the largest sustained increase to defence spending rising to 2.5% of GDP by 2027, and 3% in next Parliament.

> *"We are underprepared. We are underinsured. We are under attack. Britain's national security and safety is in peril."*
>
> *Lord George Robertson, lead author of the UK Strategic Defence Review and former defence secretary under Labour. (FT.com, April 2026)*

In 2025, the European Commission set out the ReArm Europe Plan to use all financial levers to *"act with speed and ambition to mobilise an EUR 800 billion boost defence procurement of critical areas to support the European defence industry"* (European Commission, 2025). Together with EU Member States, seven critical capability domains were identified.

ReArm Europe Seven Critical Capability Domains

Investment into some (or all) of these seven critical capability domains are now being discussed alongside future sustainable and responsible investment objectives. For investors wishing to avoid investment in lethality understanding the role of: (i) drones, submersibles, counter drone systems and land drone swarms; (ii) military mobility for road, rail, sea, air; (iii) AI, quantum, cyber & electronic warfare and (iv) strategic enablers to protect critical infrastructure all offer new investment pathways to integrate into a broader framework.

The three remaining capability domains: (v) air and missile defence; (vi) artillery systems and (vii) ammunition and missiles are considered to have direct links to lethality and are contested by sustainable investment objectives that set out to do no significant harm (DNSH).

Strategic Shift

Investors across France, Germany and Sweden have responded. This strategic shift has *"reshuffled the deck"* as responsible investors acknowledge the role of democratic regimes to support their defence industry with safeguards that ensure universal and effective respect for human rights (Mirova, 2025).

Well-governed and resilient European defence is integral to socioeconomic development, growth and sovereignty offering significant opportunity for private finance to guide the defence industry (Allianz GI, 2025). One could argue that a responsible investor, with a long history of active engagement and stewardship on climate-, environmental- and social-related issues is primed and question a portfolio company's contribution to security, resilience and defence in protection of liberal democracy and critical infrastructure.

Defence, digital sovereignty, cybersecurity, and civil protection are aligned to security, democracy, stability and UN sustainable development Goal 16 (Swedbank, 2025). In the last decade, responsible investment assets have demonstrated great agility, innovation and willingness to be part of the solution to finance the energy transition, climate adaptation and biodiversity with labelled issuance ringfenced for environmental and societal outcomes. Could similar mechanisms be developed to meet defence and resilience?

Common Priorities

By exploring conditions under which sustainable finance investment can contribute to European sovereignty, strengthen the industrial chain and deliver sustainable development sustainable investors have arrived at a set of common priorities that include satellite and electronic intelligence, production of drones and anti-drone technology, cybersecurity, naval systems, artillery and military fleet and protection of critical infrastructure.

Weapons considered controversial, as defined by international conventions, remain on the exclusion list: anti-personnel mines, cluster munitions, biological, chemical, radiological, or nuclear weapons that can kill, maim or injure large groups of people or cause significant damage to man-made structures or the biosphere this includes deployment of white phosphorus and depleted uranium.

Case for Resilience

Resilience can be defined as the means to adapt, resist threats, deliver flexibility of response, and regenerate in a rapidly changing and complex world (Borkowski, 2022) and the changing scale of threat makes it necessary to search for new foundations to create an effective defence policy.

> *"We have transitioned into a new era of global affairs… [ ] …the greatest risk we face isn't the threat of conflict, but our lack of preparedness and resilience is our strongest deterrence."*
>
> *General Sir Richard Barrons, former Commander of Joint Forces Command and co-author of the Strategic Defence Review. (The Resilience Imperative, 2026)*

Resilience is also about ensuring that everyday systems and institutions, civil, financial, economic and military can withstand disruption without a major economic shock, national security breach and loss of life (Barrons, 2026). We would be naïve to assume resilience is all about defence.

Six converging threat domains. One nexus.

The framework below, see Figure 1, presents six converging threat domains. Each is assessed for materiality, vulnerability and abatement. Together they constitute the analytical architecture of this paper.

Figure 1. Six converging threat domains. One nexus.

Domain 01: Food and Water Security

The 2026 Middle East conflict and closure of the Straits of Hormuz has disrupted a vital corridor for transit of around 1.3 million tonnes of fertiliser per month (FAO, 2026; UN News, 2026).

Staples such as wheat, maize, rice and soybean, responsible for over 66% of human calorific intake, will be impacted by reduced availability of ammonia-, urea-, phosphate- and sulphur-based fertilisers. Agricultural

production is further susceptible to global temperature increase (Zhao et al., 2017) and invasive alien species further compounding threat to global food security (IUCN, 2018).

Water is a vector through which the most acute impacts of climate change are experienced. Water stress is the sum of several factors: population growth; water-intensive manufacturing processes; rapid expansion of AI data centre build-out; demand for agricultural production and changing climate patterns.

For water insecure regions, the need for water resiliency has driven investment into solutions to alleviate water stress. The reduced availability of freshwater resources and growing demand are expected to drive the global desalination market estimated to reach US$34 billion by 2032 (Coherent, 2026). In a world where drones threaten desalination plants in water stressed regions ensuring access to water and sanitation for all remains a core sustainable outcome (The Water Diplomat, 2026).

Domain 02: Energy Sovereignty

Total energy investment in 2025 reached US$3.3 trillion, with US$2.3 trillion invested in renewables, nuclear, grids, storage, low-emissions fuels, efficiency and electrification (BloombergNEF, 2026), twice as much as the planned US$1.1 trillion in oil, natural gas and coal and up 8 per cent year on year (IEA, 2026). The 2026 to 2028 period is expected to see the largest annual expansions in LNG capacity in history.

Over 25% of seaborne oil and 20% of LNG has been impacted by the closure of the Straits of Hormuz on 28 February 2026 directly impacting global energy markets. Europe can strengthen its energy sovereignty and energy independence with continued development of low carbon energy sources, energy efficiency, conservation, and grid networks to deliver a decarbonisation strategy. The increase in solar PV capacity is expected to more than double by the end decade, dominating the global growth of renewables (IEA, 2025).

Domestic renewable generation is, by definition, insulated from maritime chokepoint risk. This is the structural argument for energy sovereignty in a contested age.

Domain 03: Climate and Biodiversity Loss

If left unchecked, climate change imperils and destabilises future economic security. Over the last decade extreme weather events have resulted in approximately US$ 2 trillion in economic losses (Zurich Insurance, 2025). In 2024, worldwide, natural disasters caused losses of US$320 billion, of which around US$140 billion were insured (Munich RE, 2025).

Weather catastrophes were responsible for 93% of overall losses and 97% of insured losses. Losses from non-peak perils such as floods, wildfires, and severe thunderstorms reached US$136 billion.

Biodiversity is being destroyed at an unprecedented rate with an estimated 68% decline in population sizes of mammals, birds, amphibians, reptiles and fish between 1970 and 2016 (WWF, 2020). An estimated US$44

trillion of global GDP, which is around half of the world's total GDP, is moderately or highly dependent on nature (WEF, 2020) yet for every dollar invested in protecting nature, US$30 is spent destroying it. In 2023, US$7.3 trillion flowed into nature-negative activities (such as habitat loss, deforestation, pollution and over exploitation) while only US$220 billion supported nature-based solutions (such as green infrastructure, mangrove restoration, management of watersheds) (UNEP, 2026).

A nature security assessment on global biodiversity loss and ecosystem collapse, by the UK government, concluded that cascading risks from ecosystem degradation include geopolitical instability, economic insecurity, conflict, migration and increased inter-state resource competition (HM Government, 2025).

Without significant investment, the UK, which is heavily reliant on food and fertiliser imports, would struggle to deliver food security if there is geopolitical competition for food. To reverse the decline in ecological loss and close the biodiversity finance gap an estimated US$700 billion needs to be identified (The Paulson Institute, 2020).

Domain 04: Supply Chain Integrity

Climate change significantly disrupts operational performance of global supply chains, increasing risk, causing delays and forcing businesses to adapt to extreme weather and dislocation. Hurricanes, floods and droughts have unleased chaos to global supply chains.

When Germany experienced severe drought and heat stress low water levels in the River Rhine hindered safe transport of grains, minerals, ore, coal and oil products along a major European artery (BairdMaritime, 2025).

Disruption to major transport networks cascades through the global economy. The recent blockade of the Straits of Hormuz has seen transit collapse from 130 ships a day in February to six ships in March, a 95 per cent collapse in traffic (UNCTAD, 2026). The impact moved from gas to grain disrupting energy and one third of seaborne fertiliser increasing risks to food production, supply and prices.

Domain 05: Defence and Deterrence

Global military expenditure reached US$2.89 trillion in 2025, the eleventh consecutive year of growth and total military expenditure accounted for 2.6 per cent of global GDP. European NATO spending was up 14 per cent, the largest jump since 1953 and Germany crossed 2 per cent of GDP for the first time since 1990 with spending up 24 per cent to US$114 billion (SIPRI, 2025).

Deterrence is an intentional set of actions aimed at influencing an adversary such that it chooses restraint over aggression. There are three fundamental elements to deterrence: capability to deny gains or impose costs via instruments of power, credibility with consistent and visible behaviour that demonstrates resolve and

communication with clear messaging of intentions, thresholds and consequences (NATO, n.d.). The defence paradox states that if you must use weapons, deterrence has failed.

Critical National Infrastructure (CNI) underpins food, energy and water systems, it defends road, rail and marine infrastructure and protects, for example, financial, health and retail IT systems from cyberattacks and extreme weather events. Critical undersea infrastructure (CUI) includes subsea telecommunications, oil and gas pipelines and energy cables. Space is also a highly contested domain and demands the same level of defence as land, sea and air. Disruption, dislocation, and in extreme cases, severance of critical infrastructure poses a direct threat to national security.

Around 600 fibre-optic undersea cables carry more than 95% of internet data and underpin tens of billions of pounds of economic activity annually (Babcock, 2026). The 1.5 million kilometres of submarine cable (TeleGeography, 2026) delivers US$10 trillion dollars' worth of financial transactions every day (Desai, 2026). The threat to grey-zone disruption including undersea cables, pipelines and trade routes is now a national priority issue.

A statement by UK Minister of Defence that Russian submarines conducted a *"covert"* operation over cables and pipelines in waters north of the UK in April 2026 has been described as *"hybrid warfare"* and *"an act of hostility"* (BBC, 2026; UK GOV, 2025). Defence capability required to protect critical undersea infrastructure includes advanced surveillance and detection capabilities, naval escort, maritime patrol aircraft, layered sensor networks, uncrewed systems, and submarines to conduct sustained operations.

Domain 06: Digital Sovereignty and Cyber Security

With the rise in frequency, sophistication and scale of cyber threats, it is important to enhance digital defence capabilities to deliver digital sovereignty. Cyber threats have evolved in complexity and scope with the growth of hybrid warfare, AI adoption, geopolitical fragility and widening capability gaps. Global cybercrime cost approximately US$10.5 trillion in 2025 making cybercrime one of the largest economic forces in the world today (CyberSecurityVentures, 2020).

Cyber threats are not only debilitating for individuals when personal data is exfiltrated but can be financially crippling for public companies and national infrastructure. In 2025, UK retailer Marks & Spencer (LSE: MKS) reported a £229 million financial impact from a cyber incident (M&S, 2025). Even though partly offset by £100 million of insurance proceeds the cyberattack exposed the fragility of deeply interconnected supply chains setting off a chain reaction with disruption to employees, suppliers, partners and customers (TechRadar, 2025).

A cyber resilience strategy enhances the response to cyber threats with secure design, rapid detection and response and secure foundations. The growth in misinformation, disinformation and cognitive manipulation has the potential to destabilise populations and sow seeds of discontent, distrust and disappointment in

democratically elected leaders. This not only puts human safety at peril but can obviate need for actual physical warfare if institutions are weakened from within with a cognitive campaign.

Implications for Capital Allocators

(i) Resilience infrastructure: critical national infrastructure protection, undersea cable surveillance, water and desalination security, electrical grid hardening. (ii) Dual-use defence capability: drones and counter-drone systems, military mobility, AI, quantum, cyber and electronic warfare, strategic enablers. (iii) Food, energy and water security: distributed renewable generation, precision agriculture, water smart and advanced membrane technology, reverse osmosis, green infrastructure, watershed management (iv) Nature-based solutions at scale: biodiversity finance, ecosystem restoration, mangrove restoration and climate adaptation infrastructure.

Conclusion

Sustainable investment in 2026 is inseparable from security, resilience and defence. The food system has been weaponised by adversaries. Blockades have re-routed energy markets, placing immense strain on oil and gas and undersea infrastructure is under attack.

Climate change and environmental degradation are eroding operational reliability of global supply chains that underpin economic security. None of these threats can be addressed in isolation and within a legacy framework that has excluded defence from sustainable mandates.

USD$16.7 trillion of capital sits within these mandates. The EUR 800 billion ReArm Europe programme creates immediate procurement needs across drones, military mobility, AI, quantum, cyber & electronic warfare, and strategic enablers. UK, European and global sustainable investment mandates are encouraged to engage with this shift.

Security is a precondition for sustainable growth. The work of the next decade is to align this pool of capital to the warfighting readiness to deter threats and strengthen security. This paper presents an argument to act with speed, discipline, and conviction.

References

Allianz GI. (2025). *Defence: Your questions answered*. https://www.allianzgi.com/en/insights/defence-your-questions-answered

Babcock. (2026). *Babcock International Group Submission to House of Commons Defence Select Committee AUKUS Inquiry*. https://committees.parliament.uk/writtenevidence/142289/pdf/

BairdMaritime. (2025). *Rhine river shipping in Germany disrupted by low water despite rainfall*. https://www.bairdmaritime.com/shipping/rhine-river-shipping-in-germany-disrupted-by-low-water-despite-rainfall

Barrons, G. S. R. (2026). *Why Resilience is our Strongest Deterrence*. Resilience Imperative. https://www.resilienceimperative.com/post/general-sir-richard-barrons-on-why-resilience-is-our-strongest-deterrence

BBC. (2026). *UK says Russia ran submarine operation over cables and pipelines*. https://www.bbc.co.uk/news/articles/cre13qn9z7do

BloombergNEF. (2026). *BloombergNEF Finds Global Energy Transition Investment Reached Record $2.3 Trillion in 2025, Up 8% from 2024*. https://about.bnef.com/insights/clean-energy/bloombergnef-finds-global-energy-transition-investment-reached-record-2-3-trillion-in-2025-up-8-from-2024/

Borkowski, R. (2022). *The resilience theorem as a new way to conceptualise security and defence*. Oficyna Wydawnicza AFM Uniwersytetu Andrzeja Frycza Modrzewskiego w Krakowie. https://www.ceeol.com/search/article-detail?id=1097777

Citi. (2025). *Pivot 2025: Security, Resilience, Defense*. https://www.citigroup.com/global/insights/global-risk-adaptation-investment-strategies-pivot-2025-security-resilience-defense

Coherent. (2026). *global desalination market estimated to reach US$34 billion by 2032*. https://www.coherentmarketinsights.com/industry-reports/global-water-desalination-market

CyberSecurityVentures. (2020). *Cybercrime To Cost The World $10.5 Trillion Annually By 2025*. https://cybersecurityventures.com/cybercrime-damage-costs-10-trillion-by-2025/

Desai, R. (2026). *Undersea Optical Fiber Cable*. https://drrajivdesaimd.com/2026/04/27/undersea-optical-fiber-cable/

European Commission. (2025). *Factsheet. ReArm Europe Plan / Readiness 2030*. https://defence-industry-space.ec.europa.eu/document/download/13ec18d2-8366-4fc8-a4ff-2bdfdf8e1f5f_en?filename=REARM Europe factsheet v17_1.pdf

European Union. (2024). The future of European competitiveness. In *The future of European competitiveness: A competitiveness strategy for Europe*. https://doi.org/10.2872/1823372

FAO. (2026). *Agrifood policy highlights | April 2026*. https://www.fao.org/agrifood-economics/news/detail-events/en/c/1758248/

FT.com. (2026). *Starmer accused of 'corrosive complacency' on UK defence by former Nato chief*. FT.Com. https://www.ft.com/content/88b1f17a-28d1-4706-b1ee-cbe6a1278496?syn-25a6b1a6=1

GSIA. (2025). Global Sustainable Investment Review 2024. In *Global Sustainable Investment Review*. https://www.gsi-alliance.org/

HM Government. (2025). *Global biodiversity loss, ecosystem collapse and national security. A national*

security assessment. https://assets.publishing.service.gov.uk/media/696e0eae719d837d69afc7de/National_security_assessment_-_global_biodiversity_loss__ecosystem_collapse_and_national_security.pdf

IEA. (2025). *Renewables' global growth, driven by solar PV, remains strong amid rising headwinds*. https://www.iea.org/reports/renewables-2025/executive-summary

IEA. (2026). *IEA World Energy Investment 2025*. https://www.iea.org/reports/world-energy-investment-2025/executive-summary

IUCN. (2018). *Invasive alien species and sustainable development*. https://iucn.org/resources/issues-brief/invasive-alien-species-and-sustainable-development

M&S. (2025). *M&S Half Year Results 2025-26*. https://corporate.marksandspencer.com/sites/marksandspencer/files/2025-11/m-and-s-half-year-results-2025-26.pdf

Mirova. (2025). *Rearm Europe, Rearm Finance. What role for responsible investment in the financing of European defense?* (Issue June). https://www.mirova.com/sites/default/files/2025-06/Position-Paper_Defense_EN_0.pdf

MOD. (2025). Strategic Defence Review 2025. In *House of Lords Library Focus*. https://www.gov.uk/government/publications/the-strategic-defence-review-2025-making-britain-safer-secure-at-home-strong-abroad

Munich RE. (2025). *Climate change is showing its claws: The world is getting hotter, resulting in severe hurricanes, thunderstorms and floods*. https://www.munichre.com/en/company/media-relations/media-information-and-corporate-news/media-information/2025/natural-disaster-figures-2024.html

NATO. (n.d.). *What is deterrence?* Retrieved May 3, 2026, from https://www.act.nato.int/activities/deterrence/

SIPRI. (2025). *World Military Expenditure 2025*. https://www.sipri.org/sites/default/files/Military Expenditure 2025.pdf

Swedbank. (2025). *Launch of the new fund Swedbank Robur Security and Defence*. https://www.swedbankrobur.se/en/news.dfde9e8f-26da-4255-9e86-8ff5639a1022.html

TechRadar. (2025). *Cyberattack exposes fragility of interconnected supply chains*. TechRadar.Com. https://www.techradar.com/pro/a-chain-reaction-inside-the-cyberattack-that-brought-m-and-s-to-its-knees

TeleGeography. (2026). *Submarine Cable*. https://www2.telegeography.com/submarine-cable-faqs-frequently-asked-questions

The Paulson Institute. (2020). *Financing Nature: Closing the global biodiversity financing gap. Foreword and Executive Summary*. https://www.paulsoninstitute.org/conservation/financing-nature-report/

The Resilience Imperative. (2026). *General Sir Richard Barrons on why Resilience is our strongest deterrence*. https://www.resilienceimperative.com/post/launch-of-the-resilience-imperative

The Water Diplomat. (2026). *Freshwater desalination plants under attack in the Middle East?* https://www.waterdiplomat.org/story/2026/03/freshwater-desalination-plants-under-attack-middle-east

UK GOV. (2025). *Defence Secretary oral statement on Russian Maritime Activity and UK Response*. https://www.gov.uk/government/speeches/defence-secretary-oral-statement-on-russian-maritime-activity-and-uk-response-22-january-2025

UN News. (2026). *'Clock is ticking': Hormuz disruption raises fears of global food crisis*. https://news.un.org/en/story/2026/04/1167289

UNCTAD. (2026). *Hormuz disruption deepens global economic strain across trade, prices and finance*. https://unctad.org/news/hormuz-disruption-deepens-global-economic-strain-across-trade-prices-and-finance

UNEP. (2026). Nature in the red: Powering the trillion dollar nature transition economy. In *Nature in the Red*. https://wedocs.unep.org/items/a4a8edaa-3896-4811-b527-1583dfce7201

WEF. (2020). Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy. In *New Nature Economy Series* (Issue January). http://www3.weforum.org/docs/WEF_New_Nature_Economy_Report_2020.pdf

WWF. (2020). *Living Planet Report 2020 - Bending the curve of biodiversity loss*. http://www.ecoguinea.org/papers-development.html

Zhao, C., Liu, B., Piao, S., Wang, X., Lobell, D. B., Huang, Y., Huang, M., Yao, Y., Bassu, S., Ciais, P., Durand, J. L., Elliott, J., Ewert, F., Janssens, I. A., Li, T., Lin, E., Liu, Q., Martre, P., Müller, C., … Asseng, S. (2017). Temperature increase reduces global yields of major crops in four independent estimates. *Proceedings of the National Academy of Sciences of the United States of America*, *114*(35), 9326–9331. https://doi.org/10.1073/pnas.1701762114

Zurich Insurance. (2025). *Climate risks: Strategies for building resilience in a more volatile world*. https://www.zurich.com/insights/business/strategies-for-building-resilience-in-a-more-volatile-world

Copyright and Distribution

Important Notice

This paper is independent thought leadership prepared for a global audience interested in environmental, physical and systemic risk. It is provided for information and discussion purposes only.

Nothing in this paper constitutes investment advice, a recommendation, or an offer or solicitation to buy or sell any security or financial instrument. Readers should not act on the contents of this paper without obtaining specific advice from a regulated financial adviser.

Past performance is no guarantee of future results. The views expressed are those of the author at the date of publication and are subject to change without notice. The author makes no representation as to the accuracy or completeness of the information contained herein.

Anita McBain. Redefining Sustainability in a Contested Age.

anitamcbain.com