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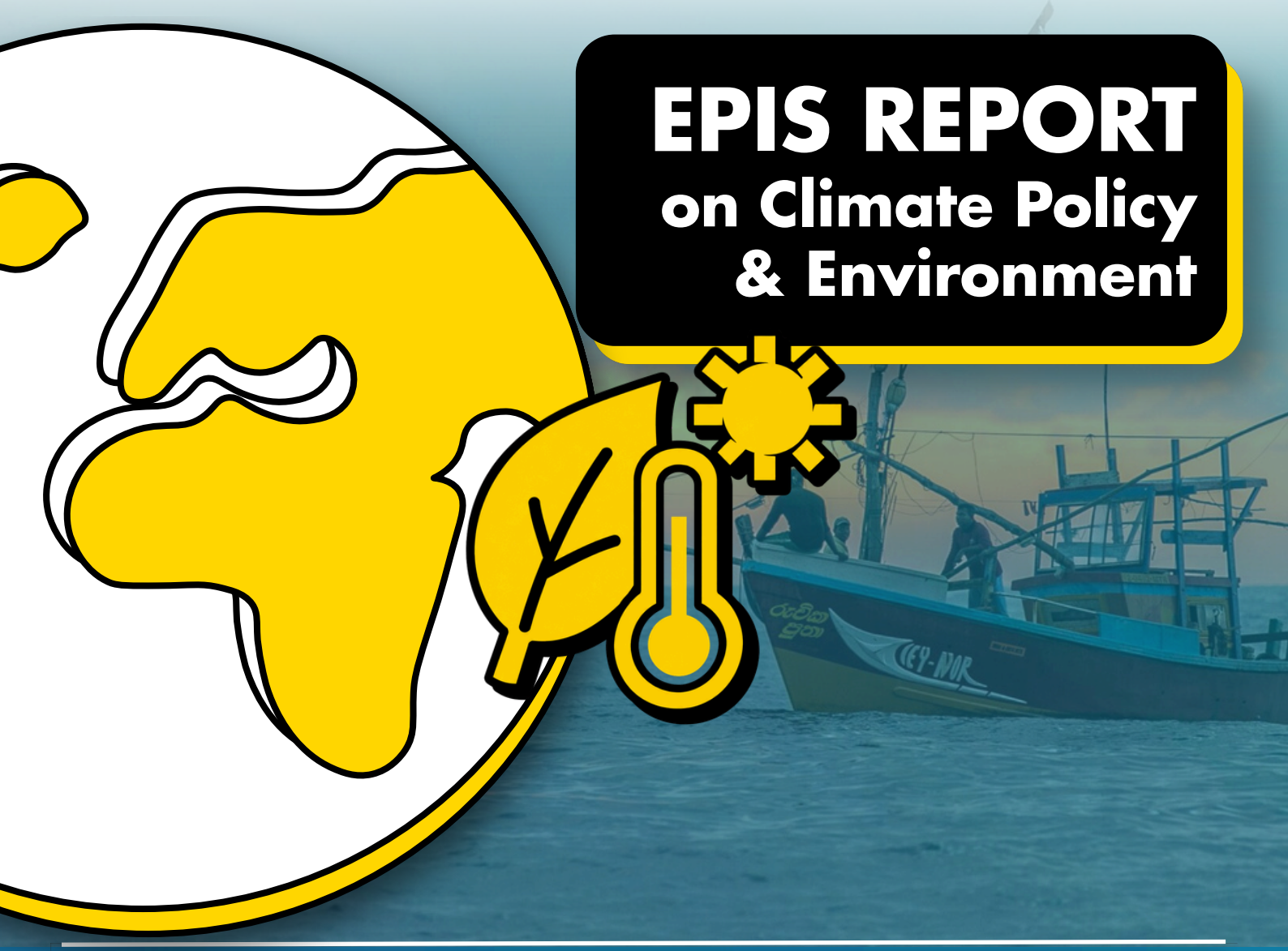

Drifting Apart: The EU Green Deal in the Age of Rearmament

Climate Policy in the Age of European Rearmament

Fish Wars: Climate and Fisheries Conflict in the South China Sea

How climate-driven fisheries disputes are reshaping maritime security

Table of Contents

Editorial

4 Editorial Team and Contributors

7 Editorial by Matilde Torti

Articles

9 **Drifting Apart: The EU Green Deal in the Age of Rearmament**

Penelope Celario examines how rearmament is pushing the European Green Deal down the EU's list of priorities – not by abolition, but by gradual erosion.

21 **Smart Grids, Same Dumb Trust?**

Polina Pienkina shows how flexible, digitalised energy systems strengthen independence – and create new technological and material vulnerabilities.

31 **The South Caucasus: Europe's Energy Security amid Middle East Crisis**

Ani Iaralishvili assesses the South Caucasus as a non-Russian, non-Gulf energy corridor for Europe.

41 **The COVID 'Anthropause' and Planetary Health**

Kate Whitelock asks what the pandemic's sudden economic halt revealed about emissions, planetary health and the European Green Deal.

Table of Contents

Articles

53

Fish Wars: Climate and Fisheries Conflict in the South China Sea

Nicoline Petersen shows how climate-driven fisheries disputes are reshaping maritime security in the South China Sea.

63

Australia's Border Security Dilemma

Antonio Valencic evaluates the effectiveness and morality of Operation Sovereign Borders in the face of climate migration.

Also Inside

20

FASP Newsletter

Recent publications, awards and accomplishments of our Think Tank for Foreign Affairs & Security Policy – and how to join FASP.

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Matilde Torti obtained a Bachelor's degree in European Studies from Maastricht University in August 2025. Her research focuses on European defence and security, especially European strategic autonomy. She has also researched EU enlargement, with a focus on Moldova. Since September 2025, she is enrolled in the Advanced Master in International Relations and Diplomacy at Leiden University. Her mission is to support European security and foreign policy through research and practical engagement.



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Editorial



Editor / Report Group Leader

Matilde Torti obtained a Bachelor's degree in European Studies from Maastricht University in August 2025. Her research focuses on European defence and security, especially European strategic autonomy. She has also researched EU enlargement, with a focus on Moldova. Since September 2025, she is enrolled in the Advanced Master in International Relations and Diplomacy at Leiden University. Her mission is to support European security and foreign policy through research and practical engagement.

EPIS Report on Climate Policy & Environment

Dear reader,

Climate policy no longer sits apart from security policy. As Europe rearms, secures new energy routes and responds to crises at its borders, environmental goals compete with – and increasingly depend on – strategic choices. This fourth issue of the EPIS Report on Climate Policy & Environment looks at where these agendas meet, where they collide, and what is at stake when one is traded for the other.

Penelope Celario opens the issue by asking what happens to the European Green Deal in an age of rearmament. She shows that climate ambition is not being abolished, but gradually pushed down the EU's list of priorities. Polina Pienkina then turns to the energy transition itself: smart grids and flexible, digitalised systems strengthen Europe's independence, but they also create new technological and material vulnerabilities. Ani Iaralishvili assesses the South Caucasus as a non-Russian, non-Gulf energy corridor and asks how far Europe can rely on it amid the crisis in the Middle East.

Kate Whitelock looks back at the COVID "anthropause" and what the sudden economic halt revealed about emissions, planetary health and the limits of green growth. Nicoline Petersen shows how climate-driven fisheries disputes are reshaping maritime security in the South China Sea, and Antonio Valencic closes the issue with Australia's border security dilemma, weighing the effectiveness and morality of Operation Sovereign Borders in a time of climate migration.

Taken together, these contributions show that climate change is a threat multiplier – and that climate policy is security policy. I would like to thank all authors for their careful research and the FASP team for making this issue possible.

I hope you enjoy reading it.

Matilde Torti
Report Group Leader, Climate Policy & Environment

CLIMATE POLICY & ENVIRONMENT



Drifting Apart: The EU Green Deal in the Age of Rearmament

Climate Policy in the Age of European Rearmament

Penelope Celario

About the Article

The European Green Deal faces not outright abolition, but a more insidious process of gradual erosion: delayed targets, reallocated funds, and diminished political attention.

About the Author

Penelope Celario is a European project and policy professional with a background in Political Science and a Master's in European Policies and International Relations. Her work focuses on EU project design, sustainability, and Equality, Diversity & Inclusion. She is currently involved in international and EU-funded initiatives that combine innovation, cultural heritage, and social impact, with the mission of advancing inclusive and sustainable European development.

Introduction: The Political Economy of Cannibalised Priorities

When the European Commission unveiled the European Green Deal in December 2019, it was explicitly framed as Europe's new growth strategy—a grand socio-economic project designed to achieve climate neutrality by 2050 while bolstering industrial competitiveness, energy sovereignty, and social fairness (European Commission, 2019). The initiative established a legally binding trajectory through Regulation (EU) 2021/1119 (the European Climate Law), committing the Union to cut net greenhouse gas emissions by at least 55% relative to 1990 levels by 2030 (European Union, 2021). The financial architecture underpinning this transformation relied on public earmarking, regulatory incentives, and sovereign leverage, anchored by the EU's Multiannual Financial Framework (MFF) and augmented by the historic €800 billion NextGenerationEU recovery package (European Commission, 2021).

However, the structural assumptions under which this green political economy was conceived have been shattered by systemic geopolitical shocks. Russia's 2022 invasion of Ukraine, Eurasian energy market disruptions, and heightened structural unpredictability in transatlantic security guarantees under the Trump administration have thrust hard security, territorial defense, and military deterrence to the absolute top of the EU's strategic agenda (Council of the European Union, 2022; Howorth, 2025). As European capitals scramble to rearm, re-establish sovereign defence industrial capacity, and fulfill elevated defense spending commitments, a profound structural tension has emerged between decarbonisation and military preparedness.

While European policymakers maintain that green sustainability and defense readiness are mutually reinforcing elements of "open strategic autonomy," fiscal reality demonstrates a zero-sum competition for limited public funds, state aid capacity, borrowing allowances, and industrial supply chains. Lacking the political consensus required to formally repeal the European Climate Law, European institutions and national governments are resorting to stealth adjustments: stretching baseline definitions in budget earmarks, shifting research capital toward defense technologies, granting legislative waivers to heavy industries, and allowing critical funding instruments to expire without replacements (European Council on Foreign Relations, 2025; Ten Brink, 2026).

ReArm Europe Plan (Readiness 2030): The European Commission's 2025 initiative to mobilise up to €800 billion in defence investments by 2030, including €150 billion SAFE facility for joint procurement.

A Green Deal Built for a Different World

The Post-2019 Climate Fiscal Architecture

The original fiscal architecture of the European Green Deal was constructed during a period of historically low interest rates, relaxed fiscal constraints, and relative geopolitical stability. In

Communication COM(2019) 640, the European Commission outlined an ambitious blueprint covering energy decarbonisation, circular economy, sustainable mobility, agricultural reform, and biodiversity protection (European Commission, 2019). To finance this transformation, European institutions embedded strict green spending targets across the EU budget. In the 2021–2027 MFF and NextGenerationEU (NGEU), the Union committed to directing at least 30% of total budgetary outlays toward climate-relevant objectives (European Commission, 2021). More importantly, the Recovery and Resilience Facility (RRF)—the centerpiece of NGEU providing €672.5 billion in loans and grants—mandated that member states allocate a minimum of 37% of their national Recovery and Resilience Plans (NRRPs) directly to green investments (European Commission, 2021).

For major beneficiary states in Southern and Eastern Europe, these allocations represented the primary engine of public capital formation. In Italy, the Piano Nazionale di Ripresa e Resilienza (PNRR) channeled tens of billions of euros into building energy efficiency (the "Superbonus" scheme), rail expansion, renewable integration, and hydrogen research. Similar dynamics unfolded in Spain, Poland, and Greece. The underlying economic model assumed that public green seed money would crowd in private investment, lowering capital costs for clean technologies and facilitating a smooth exit from fossil fuels.

The Fragility of Public Capital Crowding-In

This fiscal construct contained a fundamental vulnerability: it relied heavily on temporary, off-budget borrowing mechanisms (NGEU) and assumed member states would maintain the fiscal discipline required to fund green investments once emergency facilities expired. The entire framework operated under the implicit premise that soft power, normative regulation, and market-driven industrial transformation would remain the EU's primary instruments of international influence.

The structural flaw in this design became apparent when high inflation, rising interest rates, and soaring energy prices following the 2022 invasion of Ukraine escalated public borrowing costs. As sovereign debt servicing costs rose across Europe, national governments faced immediate pressure to subsidise energy bills for households and energy-intensive industries, drawing resources away from long-term capital investments in renewables. The green transition's dependence on debt-financed public intervention left it acutely exposed to sudden shifts in political or security priorities.

The Turning Point: Ukraine, Transatlantic Friction, and the Strategic Compass

The Geopolitical Realignment of EU Priorities

The structural crisis of the European Green Deal was triggered by the convergence of two major geopolitical disruptions: the return of high-intensity territorial war to Eastern Europe

and the political fracturing of the transatlantic security umbrella. Russia's 2022 invasion exposed dangerous energy dependencies that underpinned European industrial competitiveness, forcing the EU to spend over €800 billion in emergency energy subsidies and fossil fuel import diversification away from Russian pipelines toward global LNG markets.

Simultaneously, the re-election of Donald Trump intensified Washington demands for Europe to assume primary financial and operational responsibility for its regional security (Howorth, 2025). The traditional reliance on American hard power to deter external threats while Europe focused domestic capital on social welfare and ecological transition was no longer viable.

"The European Green Deal faces not outright abolition, but a more insidious process of gradual erosion: delayed targets, reallocated funds, and diminished political attention."

The Strategic Compass as a Fiscal Paradigm Shift

The groundwork for institutionalizing hard security within the EU's budget logic was established in March 2022, when the Council of the European Union formally adopted the Strategic Compass for Security and Defence. Framed as the EU's first comprehensive defense strategy, the Strategic Compass set out more than 80 concrete targets to close critical military capability gaps, enhance rapid deployment capacities, strengthen maritime and cyber defense, and secure defense supply chains (Council of the European Union, 2022).

Crucially, the Strategic Compass altered the normative hierarchy of the European Union. While previous European Council conclusions consistently positioned climate change as the existential threat facing the bloc, the Strategic Compass re-framed territorial integrity, military deterrence, and defense industrial capacity as prerequisite conditions for all other Union policies (Council of the European Union, 2022). This document initiated an institutional shift establishing military readiness as an urgent, short-term imperative directly competing with the European Green Deal.

Europe Rearms: ReArm Europe, SAFE, and the Fiscal Escape Clause

The €800 Billion Defense Mobilisation Framework

By early 2025, incremental increases in national military outlays were deemed insufficient to address European defense gaps. In March 2025, the European Commission officially unveiled the ReArm Europe Plan / Readiness 2030, an extraordinary framework designed to mobilize up to €800 billion in public and private defense investment by the end of the decade (European Commission, 2025a).

The structural core of the ReArm Europe framework rests on several new financial and regulatory mechanisms:

- Security Action for Europe (SAFE) Facility: A €150 billion joint procurement loan instrument backed by the EU budget to incentivize joint purchases of European-made weapons systems, air defense, ammunition, and military logistics (European Commission, 2025a).

• EDIS & EDIP: Regulatory initiatives forcing member states to procure at least 40% of defense equipment cooperatively and source at least 50% of defense budgets within the EU internal market by 2030 (European Commission, 2025a).

• EIB Lending Rule Revisions: Modifying the European Investment Bank Group's mandate, lifting ethical restrictions on financing ammunition, dual-use tech, and military hardware, thereby freeing up private lending for defense contractors.

The Stability and Growth Pact Escape Clause

To enable member states to fund rearmament without triggering formal EU excessive deficit procedures, the European Commission activated the national escape clause of the revised Stability and Growth Pact for 17 member states in 2025 (European Commission, 2025b). This explicitly allows member states to exceed treaty-mandated deficit thresholds (3% of GDP) by up to 1.5% of GDP annually until 2028 for military capital investments and defense infrastructure (European Commission, 2025b).

While national expenditures on green infrastructure remain strictly bound by fiscal rules, military purchases have been granted structural fiscal immunity. Total defense expenditure across the EU-27 reached €381 billion in 2025—an 11% real-term increase compared to 2024 and a 63% increase compared to 2020 outlays (Council of the European Union, 2026; SIPRI, 2026).

Year	Total EU-27 Defence Expenditure (€ Billion)	Year-on-Year Growth (%)	Cumulative Growth relative to 2020 (%)
2020	€234	Base Year	Base Year
2022	€262	+6.2%	+12.0%
2024	€343	+14.1%	+46.6%
2025	€381	+11.1%	+62.8%

(Data sources: Council of the European Union, 2026; SIPRI, 2026)

Case Study: Italy's Fiscal Re-orientation

Italy provides a clear empirical example of this fiscal substitution in action. Constrained by sovereign debt exceeding 135% of GDP, Italy's defense budget surpassed €30 billion for the first time in 2025, surging by over €2.1 billion year-on-year, with equipment acquisition jumping 20% in 2025 alone (Osservatorio Milex, 2025; SIPRI, 2026).

To finance military expansion while complying with EU fiscal rules, the Italian finance ministry implemented spending freezes and cuts to green transition programs. PNRR funds set aside for railway electrification, local transit decarbonisation, and building retrofits were delayed, scaled back, or reallocated to dual-use infrastructure projects and military transport corridors.

NATO's New Math: The 5% GDP Target and Fiscal Crowding-Out

The Hague Summit and the New Baseline

The fiscal pressure on European climate action reached a structural breaking point at the June 2025 NATO Summit in The Hague. Facing pressure from the United States and NATO's eastern flank, alliance members formally abandoned the historical 2% GDP defense target established at the 2014 Wales Summit (NATO, 2025).

NATO allies adopted a binding commitment to invest up to 5% of annual GDP on total defense, security, and resilience by 2035, establishing a mandatory floor of at least 3.5% of GDP strictly for core military capabilities (NATO, 2025).

By late 2025, European allies and Canada increased real defense outlays by 20% year-on-year, with all European NATO members surpassing the old 2% target (Atlantic Council, 2026). However, moving from a 2% GDP military spend to a 3.5% floor requires reallocating an additional 1.5% of GDP annually—demanding the annual diversion of approximately €280 billion to €350 billion in public capital away from non-defense budget lines across the EU-27. Because political electorates resist deep cuts to healthcare, pensions, or education, fiscal adjustment falls almost entirely on discretionary capital investment programs—the exact category containing energy transition grants and grid modernization subsidies.

The Accounting Trick: How the MFF Dilutes Climate Funds

The 2028–2034 Budget Proposal and Denominator Expansion

The structural erosion of the European Green Deal is most explicitly visible in negotiations for the upcoming 2028–2034 Multiannual Financial Framework. In July 2025, the European Commission proposed an overall budget ceiling of €1,984 billion (equivalent to 1.26% of member states' GNI) (European Commission, 2025c).

While the Commission highlighted that the proposal retained a headline requirement allocating a minimum of 35% of total budget expenditure to climate and environmental objectives, detailed fiscal analysis revealed a critical accounting shift: for the first time in EU budgetary history, defense, security, and military mobility expenditures were incorporated into the underlying denominator used to calculate the 35% climate share (Centro Italiano per l'Economia Climatica, 2025; European Commission, 2025c).

Under this revised accounting framework, military investments claiming even marginal environmental benefits—such as energy-efficient barracks, synthetic fuel research for jets, or reinforced bridges for heavy tanks—are officially categorized as contributing to the 35% climate target (Centro Italiano per l'Economia Climatica, 2025). As defense expands to 8–10% of the EU budget, the absolute financial volume dedicated to genuine decarbonisation, renewable deployment, and biodiversity protection experiences a sharp contraction, even while headline political percentages appear to increase.

The 2026 NGEU Expiry and the Structural Financing Gap

This budgetary dilution is compounded by an upcoming institutional cliff-edge: the definitive expiration of NextGenerationEU and the Recovery and Resilience Facility at the end of 2026. NGEU was designed as a temporary borrowing instrument, and current treaty arrangements dictate that no new commitments can be made under the facility after December 31, 2026.

EU Funding Instrument	Operational Status	Total Climate Allocation (€ Billion)	Expiry / Transition Status
Recovery & Resilience Facility (RRF)	Active	~€250B (37% mandatory target)	Terminates December 2026; no successor agreed
MFF 2021–2027 Green Earmark	Active	~€360B over 7 years	Expires end of 2027; transitioning to diluted MFF
Security Action for Europe (SAFE)	Expanding	€150B loan facility	Expanding through 2030; prioritizes defense
Social Climate Fund (SCF)	Operational 2026	€86B over 6 years	Intact, but under pressure from delayed ETS II

NGEU's termination removes over €100 billion per year in direct public grants and loans, creating massive shortfalls in green infrastructure and industrial decarbonisation. Despite the September 2024 Draghi Report calculating that Europe requires €800 billion in additional annual investment to simultaneously achieve decarbonisation, technological sovereignty, and security, member states have failed to agree on any joint-debt successor instrument for climate (Draghi, 2024; European Council on Foreign Relations, 2025). A year after its publication, less than 12% of Draghi's recommendations were implemented, with clean technology, energy grid integration, and sustainable transport registering the lowest follow-through (European Council on Foreign Relations, 2025).

Death by a Thousand Delays: Legislative and Industrial Slowdown

The Military Carbon Footprint and Science Diversion

Military activities are inherently energy- and carbon-intensive. A 2025 synthesis of eleven peer-reviewed studies published by Scientists for Global Responsibility established that for every €100 billion increase in military expenditure, an average of 32 million tonnes of carbon dioxide equivalent ($MtCO_2e$) is generated in additional lifecycle emissions (Parkinson, 2025). Expanded military activities under ReArm Europe and NATO targets will add an estimated 132 million tonnes of additional $MtCO_2e$ annually to Europe's balance sheet, offsetting substantial emissions reductions achieved through renewable policies (Parkinson, 2025).

Simultaneously, rearmament causes a misallocation of human and technological capital. The same 2025 study identified a 10% to 25% drop in European patent applications for climate-mitigation technologies as research capital, engineering talent, and manufacturing capacity were redirected toward defense contractors, munition production, and military aerospace programs (Parkinson, 2025). Advanced foundries and semiconductor lines are increasingly prioritized for defense contracts under national security directives, forcing green

technology manufacturers to endure higher input costs and supply chain delays.

Legislative Backtracking of 2025–2026

Faced with rising energy costs, industrial pushback, and geopolitical uncertainty, European institutions executed a series of incremental legislative retreats throughout 2025 and early 2026:

• Emissions Trading System II (ETS II) Postponement: Extending carbon pricing to building heating fuels and road transport was officially delayed by one year to 2028, depriving the Social Climate Fund of early revenues designed to protect low-income households (European Environment Bureau, 2026).

• Automotive Fleet Target Averaging: Binding 2030 tailpipe emissions targets for automobile manufacturers were modified to introduce a flexible three-year compliance averaging window, allowing automakers to delay clean electric vehicle deployment without incurring immediate financial penalties (European Environment Bureau, 2026).

• Deforestation and Due Diligence Waivers: Compliance deadlines under the EU Deforestation Regulation (EUDR) and Corporate Sustainability Due Diligence Directive (CSDDD) were repeatedly extended under the banner of competitiveness reduction (Ten Brink, 2026).

• CAP Environmental Flexibilities: Environmental cross-compliance rules within the Common Agricultural Policy (CAP) were indefinitely relaxed to bolster food security and calm agricultural protests across member states.

Individually, each regulatory adjustment was defended as a pragmatic administrative calibration. However, when analyzed in aggregate, they represent a systematic legislative deceleration, slowing the EU's exit from fossil fuel dependence (Ten Brink, 2026).

Strategic Pathways: Protecting Climate Action in an Age of Hard Power

If the European Green Deal is to survive as an operational economic reality rather than a purely symbolic legal text, European policymakers must fundamentally re-frame the political economy of decarbonisation to align with the new security landscape:

• Re-Framing Decarbonisation as Energy Sovereignty and Hard Defense: Distributed renewable energy generation, decentralized heat pumps, localized battery storage, and smart microgrids are inherently more resilient to physical attack, cyber-sabotage, and foreign supply blockades than centralized fossil networks or LNG terminals. Framing green investments as hard infrastructure defense—reducing the EU's remaining €300 billion annual energy import bill—allows policymakers to justify green outlays under national security exemptions.

• Expanding Fiscal Escape Clauses to Net Green Capital Investment: If defense capital outlays up to 1.5% of GDP are granted immunity under the national escape clause of the Stability and Growth Pact, net public green capital investments contributing directly to the EU's binding 2030 climate targets must be granted equivalent fiscal protection.

• Establishing a European Dual-Resilience Sovereign Bond Facility: To bridge the massive funding gap created by the 2026 expiration of NextGenerationEU, the European Union should issue joint sovereign debt through a new European Dual-Resilience Facility. This off-budget facility should issue EU-backed sovereign bonds specifically dedicated to financing projects that deliver simultaneous climate and security benefits, such as grid fortification, raw material stockpiling, and zero-carbon dual-use logistics.

Conclusion: Standing in Name, Hollow in Substance

There will be no formal legislative repeal of the European Green Deal; its core commitments remain legally codified in the European Climate Law. However, legal enshrinement is not real-world execution. The substantive content of Europe's climate commitments is being steadily hollowed out through budgetary substitution (incorporating defense spending into MFF climate targets), institutional expiry (the termination of NGEU at the end of 2026 without a successor), and legislative deceleration (incremental delays in ETS II, fleet emissions, and agricultural standards) (European Council on Foreign Relations, 2025; Ten Brink, 2026).

The core policy challenge facing European governance is no longer whether the European Green Deal survives in name, but whether, by 2030, its institutional core will have retained enough capital, capability, and political authority to deliver the decarbonised, resilient economy it promised—or whether it will remain as a hollow administrative shell in a rearmed, warmer, and vastly more volatile continent.

The reallocation of scientific and industrial capacity away from decarbonisation generates a compounding drag on the green transition that goes well beyond what any budget line can capture. Meanwhile, the legislative record of 2025 tells its own story. The start of the Emissions Trading System II was delayed by one year to 2028, and binding car emissions targets for 2030 were replaced with a three-year averaging window. Each adjustment is defensible in isolation. Taken together, however, they slow the structural exit from fossil fuel dependence at precisely the moment when acceleration is required (European Environment Bureau, 2026). Despite formal reassurances that the Green Deal remains intact, analysts have noted that its institutional scaffolding is being quietly dismantled (Brink, 2026).

Conclusion: standing in name, hollow in substance

There will be no formal repeal of the European Green Deal. Its core commitments remain legally enshrined in the European Climate Law, and the political cost of openly abandoning them remains prohibitive for most member state governments. But legal enshrinement is not the same as implementation. The substantive content of those commitments is being steadily hollowed out through three interlocking mechanisms: budgetary substitution, where an expanding denominator absorbs the climate share without triggering formal renegotiation; institutional expiry, where the instruments designed to fund green investment wind down faster than their successors can be agreed upon; and legislative deceleration, where delays and waivers accumulate incrementally and without the visibility of a headline repeal. The question is no longer whether the European Green Deal

survives in name but whether, by 2030, it will have delivered anything close to what was promised.

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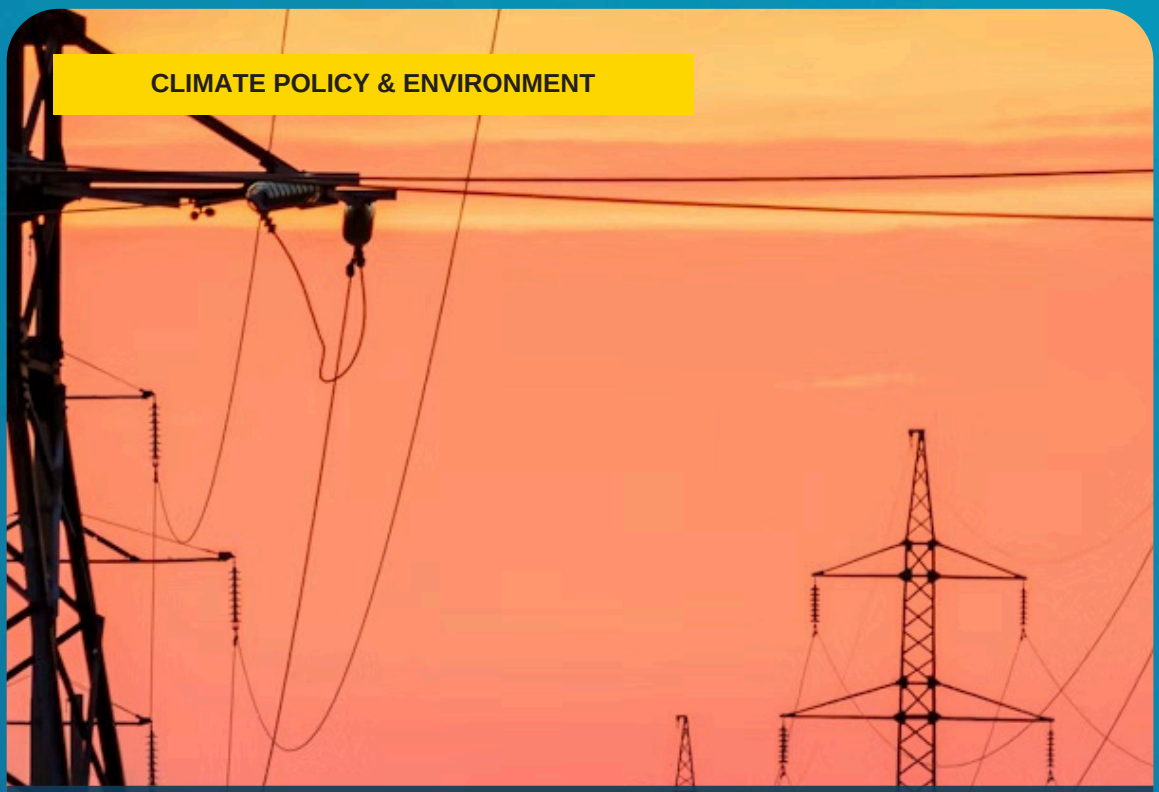

CLIMATE POLICY & ENVIRONMENT

Smart grids, same dumb trust? Strategic Grid Resilience & Critical Supply Risks

Balancing Decarbonisation, Technological Vulnerabilities, and Material Dependencies

Polina Pienkina

About the Article

Despite the many merits of flexible energy systems, the path toward greater energy independence will create new vulnerabilities.

About the Author

Polina Pienkina is a political science graduate from LMU Munich. She has a background in project management, as an organiser of educational events and pro-European campaigns within the Young European Ambassadors initiative. Additionally, she gained research experience due to her work at the German Academy of Science and Engineering. She has also obtained data analysis skills during her time as a Chair assistant at LMU. Her interests include energy and climate policy, as well as security and arms trade.

The strategic importance of energy is clear – power is required for critical sectors such as transportation, manufacturing, agriculture, and healthcare. Even a temporary failure in the energy system can have devastating outcomes. Take the Texas power crisis as an example: infrastructure lacked winter flexibility, which led to power outages, leaving millions of households and businesses without heat and electricity. With hundreds of people losing their lives, the consequences of the incident are comparable to those of a moderate natural disaster.

Naturally, energy security is a high priority within European politics. To limit dependence on Russian fuels and achieve decarbonisation targets, the EU introduced the "REPowerEU" initiative. To date, the results have been largely positive: member states have substantially reduced consumption of Russian oil, gas, and coal. Simultaneously, power generation from renewable sources has expanded dramatically.

Despite its many merits, the energy transformation also introduces a new set of increasingly complex and interconnected issues. And, as always, the path to independence is lined with emerging risks and significant political challenges.

Variable generation – when producers have to pay

The introduction of renewables, particularly wind and solar, has created significant challenges for energy systems. Power generation from these sources depends heavily on the time of day and weather conditions – indeed, solar panels generate most power on sunny days, whereas wind turbines are effective primarily during winter months. In summary, unequal production leads to unequal supply. As a result, the system must continuously adjust to balance energy surpluses and deficiencies.

To avoid power outages when production is lacking, the shortage should be compensated on demand, e.g., through fast-response backup generation, or by importing the necessary amount from reserves and neighbouring grids. When energy production exceeds demand, however, energy prices fall below zero, forcing producers to pay grid operators and large consumers to utilise or store the excess energy.

Variable generation is electricity production from power sources that fluctuate and cannot be precisely controlled on demand, mainly wind power and solar power.

Although negative energy prices are merely a natural consequence of the free-market dynamics – cost being determined by the supply-demand balance – they reveal a systemic challenge within the energy system – its inability to predict potential fluctuations and adjust accordingly. As the share of renewables in the European energy mix continues to rise, so will unpredictability around power generation. Therefore, energy transition demands a smart, flexible solution.

This structural instability is further compounded by market design flaws that penalise renewable energy developers during periods of overproduction while failing to incentivize rapid

curtailment or dynamic demand-side response. When regional electricity grids experience extreme weather events—such as summer heatwaves driving solar production to record peaks alongside surging domestic cooling loads—the sheer volumetric mismatch risks triggering cascading grid trips if power flows cannot be instantly rerouted or absorbed. Without real-time automated balancing mechanisms across national borders, negative pricing periods act as a severe economic drain on green investments, threatening the long-term financial viability and bankability of unsubsidised renewable projects across the European continent. Furthermore, traditional baseload power plants, such as thermal or nuclear facilities, face mechanical wear and reduced operational efficiency when forced to ramp up and down rapidly to compensate for volatile renewable inputs, increasing overall operational maintenance costs across the power fleet. Consequently, electricity wholesale markets require structural reform to incentivize flexible capacity rather than purely volumetric output.

Grid resilience – a common sense response

The stability of a system is deeply intertwined with its resilience. Resilience – the capacity to accommodate rapid changes – rests on the three pillars: interconnectedness, tech-powered adaptability, and storage robustness.

Interconnectedness is self-explanatory: large grids connect more districts, power plants and storage facilities – thus having a higher chance of balancing the unequal power provisions. Cross-border high-voltage transmission corridors allow surplus wind energy from the North Sea to offset solar power deficits in Southern Europe, effectively smoothing localized weather variations across an entire continent and establishing a unified internal energy market.

Adaptability requires the application of corresponding technologies, which are able to predict fluctuations in power generation, learn from existing consumption patterns, and steer the energy production and redistribution in the right direction. Automated distribution management systems, paired with artificial intelligence and advanced machine-learning algorithms, enable utilities to perform predictive load forecasting, dynamic line rating, and automated redispatch before localized network congestion causes rolling blackouts.

"Despite the many merits of flexible energy systems, the path toward greater energy independence will create new vulnerabilities."

Finally, secure storage is a vital element of any resilient energy system. The core principle is simple – saving excess electricity produced during peak hours and thus creating a safety net in case production becomes insufficient. Storage spans multiple operational timeframes, ranging from short-duration lithium-ion battery banks that manage sub-second grid frequency regulation to long-duration pumped hydro storage and emerging green hydrogen systems designed to bridge multi-week seasonal supply deficits during prolonged dark-calm periods ("Dunkelflaute").

However, building and operating a reliable grid is impossible without numerous critical materials, technologies and components. In many cases,

European nations still heavily rely on exports to cower the demand. Although legislative efforts are made to diversify the supply and increase domestic production (Critical Raw Materials Act), the scaling of environmental technologies has the potential to create new vulnerabilities. Moving away from fossil fuel import dependencies risks replacing geopolitical exposure to hydrocarbon cartels with strategic vulnerabilities to foreign mining monopolies and overseas processing bottlenecks.

Data is everything

Grid stability goes hand-in-hand with digitalisation, as technology is required to make accurate forecasts and guide production in an "intelligent" way. At the core of it are smart metering devices, which collect consumption data in real time and thus allow suppliers to plan accordingly – delivering only where and when it is needed. Industrial IoT sensors deployed along transmission lines provide operators with dynamic thermal ratings, allowing higher power throughput during cool, windy conditions.

A smart meter cannot operate without semiconductors. In the segment, several steps have been taken to encourage European production – including passing the European Chips Act and grounding ESMC joint venture. Furthermore, European companies such as ASML, Infineon do have a relatively strong position on a market. Nevertheless, dependence on global supply chains remains high – with TSMC (Taiwan) and NVIDIA (USA) remaining the leading manufacturers of semiconductors.

Given the current state of cross-strait relations, with China maintaining regular military activities around Taiwan, the likelihood of conflict escalation is on the rise. The persistent uncertainty surrounding the situation already impacts the supply chain, resulting in higher insurance premiums and shipping costs, as well as fuelling the cycle of export control measures between Beijing and Washington.

In a potential maritime blockade scenario, export disruptions are bound to severely impact various spheres, including telecommunications, AI and data centres, security and defence, and, last but not least, energy and mobility. In conclusion, while efficient, data-driven energy systems are vital for reducing energy dependencies, the pursuit of rapid "smartification" does bear risks of its own.

Beyond hardware supply bottlenecks, digitalized grids introduce severe cybersecurity vulnerabilities. As millions of internet-connected edge devices, smart inverters, and EV charging networks link to central distribution management platforms, the attack surface for hostile threat actors expands exponentially. A coordinated cyber breach targeting SCADA systems or smart meter communications software could maliciously manipulate demand profiles, trigger widespread voltage instability, or permanently damage physical substation hardware, paralyzing civil infrastructure without firing a single missile. Establishing sovereign encryption standards, robust firewall protections, and air-gapped emergency operating protocols is therefore as vital to European energy security as physical grid fortification. In addition, real-time data governance frameworks must ensure sensitive energy consumption data remains protected from hostile foreign intelligence oversight.

No storage – no security

Energy reserves provide a critical buffer when conventional production or supply is disrupted. However, the development of battery storage facilities requires a number of critical raw materials, particularly lithium, nickel, and cobalt. Although the continent is increasing its mining and manufacturing volumes, the processing capacities – converting the mined materials into high-purity chemical components – remain largely outsourced.

For instance, the EU extracts a fraction of its lithium "domestically" – primarily in Spain, Portugal, Germany and Finland; however, the mined concentrates are still exported for processing purposes. Hence, value creation, pricing power, and operational control remain outside European borders.

The leading market for chemical conversion is China, primarily through giants such as Ganfeng Lithium and Tianqi Lithium. Moreover, apart from processing, Beijing also dominates lithium and cobalt refining, as well as cathode and anode manufacturing.

In the case of nickel, domestic production is also insufficient. Around 400,000 tonnes annually enter Europe from abroad – primarily in the form of nickel sulphate, battery-grade intermediates, and Class 1 nickel. A significant share of these volumes originates from Indonesian mines and Asian refineries.

Likewise, cobalt dependency is evident across multiple stages of the value chain, with mining concentrated in Africa, above all DRC, and processing located primarily in Asia. Beyond these metals, synthetic and natural graphite represents another acute supply bottleneck, where Chinese export controls severely constrain European gigafactories from scaling domestic battery cell manufacturing independently.

Such reliance on exports, coupled with the widespread use of long-term offtake agreements and the dependence on external pricing benchmarks, does put a European consumer at a disadvantage. Given how crucial energy storage is for national security, geopolitical turbulences bear significant risks already at the rollout stage. Furthermore, financial market volatility surrounding battery metals complicates long-term capital allocation for European battery startup companies, who must compete against heavily subsidized foreign competitors operating under lower environmental and labor compliance costs. To bridge this competitive gap, European financial institutions must expand de-risking mechanisms, such as state-backed loan guarantees and long-term price floor contracts for critical battery chemistry inputs.

Bigger grids, lower risks

Finally, connecting new districts, renewable power generation sources, virtual power plants and storage facilities is impossible without the expansion and modernisation of the current electricity network. Expansion does not only entail the increase of the physical grid, but the installation of new transformers, solar inverters and other equipment. The urgency of such measures is widely recognised and demonstrated by the emergence of the EU's Grid Action Plan, which aims to double cross-border transmission capacity. Europe is also a leading investor in domestic power transmission.

First and foremost, similar to the build-up of storage centres, the physical grid expansion requires large quantities of raw materials, primarily copper and aluminium. Copper imports especially highlight the scope of European dependency: the continent demands around 4 million tonnes yearly, whereas only around 1 million is mined domestically. Despite the relatively strong refining capacity of 1.2 – 1.5 million tonnes, as well as rapid growth and modernisation of the recycling infrastructure, the system demands a large-scale, continuous supply from external sources, with the demand covered primarily by Latin American countries. Although the domestic aluminium value chain exhibits a higher level of completion, Europe continues to rely on imports of 8 – 12 million tonnes of alumina and aluminium products each year.

Beyond raw materials, grid expansion requires power transformers – devices used to convert voltage levels and thus connect different segments of the power system. Although Italy leads European sales, China dominates the global transformer trade.

Furthermore, the demand for HDVC equipment is rising, given the rapid expansion of European offshore wind projects. High-Voltage Direct Current (HVDC) technology is indispensable for transmitting massive quantities of power across vast distances with minimal line losses, linking isolated offshore wind farms in the Baltic and North Seas directly to heavy industrial hubs inland.

The good news for Europe is that a big chunk of the energy transition technology is produced internally – primarily due to the operation of giants such as Hitachi Energy and Siemens. Nonetheless, some crucial components are still highly sourced "from the outside". And, given the complexity of modern energy systems and interconnectedness of global supply chains, complete self-sufficiency may never be possible.

In addition to material bottlenecks, European transmission system operators (TSOs) face severe administrative, legal, and permitting hurdles that delay major cross-border infrastructure projects by up to a decade. Complex environmental impact assessments, legal challenges from local communities, and bureaucratic fragmentation across jurisdictions frequently stall overhead high-voltage transmission lines. This structural mismatch creates chronic internal grid congestion, where clean energy produced on northern coastlines cannot reach manufacturing regions in the south, forcing operators to pay exorbitant redispatch fees to curtail renewable power and activate fossil-fuel backup generators. Streamlining national permitting timelines through overarching EU statutory exemptions for critical energy infrastructure represents an essential prerequisite for unlocking grid expansion at scale.

Strategic pathways, policy trade-offs, and legislative responses

To mitigate these compounding risks and prevent structural vulnerabilities from derailing the energy transition, European policymakers have enacted robust legislative initiatives aimed at building systemic resilience. At the forefront is the Critical Raw Materials Act (CRMA), which establishes clear statutory benchmarks for 2030: extracting at least 10%, processing at least 40%, and recycling at least 25% of the Union's annual

consumption of strategic raw materials domestically. Crucially, the legislation mandates that no more than 65% of any single strategic material's annual supply should originate from a single third country, compelling European industries to aggressively diversify their international supply contracts.

Achieving these ambitious goals demands a multi-tiered strategy that balances domestic industrial expansion with strategic foreign diplomacy. Domestically, European states must streamline permitting protocols for critical mining, refining, and recycling projects while maintaining strict environmental, social, and governance (ESG) standards. Public opposition can be addressed by offering local communities direct equity stakes or regional infrastructure benefits, transforming public perception of mining from an environmental nuisance into a localized economic asset.

Internationally, Europe must deploy proactive economic statecraft by forming Strategic Raw Material Partnerships with resource-rich nations in Latin America, Africa, Australia, and Central Asia. Rather than repeating historical models of pure raw material extraction, European investments should focus on building local processing capacities within partner nations, creating mutually beneficial economic ties that offer sustainable development for exporters while securing reliable intermediate inputs for European industries.

Simultaneously, scaling up circular economy infrastructure represents the most sustainable long-term hedge against primary resource scarcity. Advanced recycling technologies capable of recovering high-purity lithium, nickel, cobalt, copper, and rare earth elements from spent batteries, industrial scrap, and obsolete electronic devices can create a closed-loop domestic supply buffer. By combining public risk-sharing instruments—such as European sovereign funds, strategic stockpiling guarantees, and joint procurement platforms—with private sector capital, the EU can systematically reduce its import exposure and safeguard its energy transition against foreign geopolitical leverage.

Geopolitical statecraft, workforce scaling, and market integration

Beyond domestic industrial initiatives and raw material diversification, Europe must align its broader energy strategy with coherent geopolitical statecraft and structural labor reforms. The transition toward clean, decentralized energy networks requires active international diplomacy to ensure that external energy dependencies are managed through balanced, multi-vector coalitions rather than bilateral vulnerabilities. Establishing strategic energy corridors with neighboring regions, including North Africa and the Western Balkans, can facilitate reciprocal energy trade and expand clean hydrogen transport networks, bolstering regional stability while securing diversified power imports for European industrial centers.

Simultaneously, a critical yet frequently overlooked bottleneck in scaling European energy infrastructure is the acute shortage of specialized industrial labor. Deploying high-voltage transmission networks, installing advanced battery energy storage systems, and operating gigafactories requires hundreds of thousands of qualified electrical engineers, grid technicians, and chemical processing

specialists. Without dedicated public vocational training programs, cross-border professional qualification recognition, and targeted labor migration policies, technical workforce shortages risk delaying project execution timelines as severely as material scarcity or permitting delays.

At the same time, internal market reform within the European Union must keep pace with technological expansion. Regulators must continuously modernize market rules to reward grid flexibility, dynamic demand-side management, and localized battery storage deployment. Eliminating regulatory barriers that restrict virtual power plants from participating in capacity markets can unlock substantial latent flexibility within existing industrial and residential loads, easing pressure on high-voltage transmission networks. By pairing market-based flexibility incentives and labor force expansion with targeted infrastructure investments, Europe can foster an agile energy ecosystem capable of accommodating higher shares of variable renewable generation without compromising economic competitiveness, social cohesion, or grid stability.

Conclusion – no "safe" approach

Despite the many merits of flexible energy systems, the path toward greater energy independence will create new vulnerabilities. The key to a successful energy transition requires companies to continuously explore supply security measures – such as acquiring equity stakes in key producers, forming strategic partnerships, and entering joint ventures across critical segments of the value chain. Additionally, further build-up of recycling capacities will result in more efficient, sustainable material use.

After all, there is no risk-free solution to a complex problem of adapting the energy system to meet the demands of the future. Still, the persistent will of European policymakers to diversify supply and secure critical materials already steers the process in the right direction.

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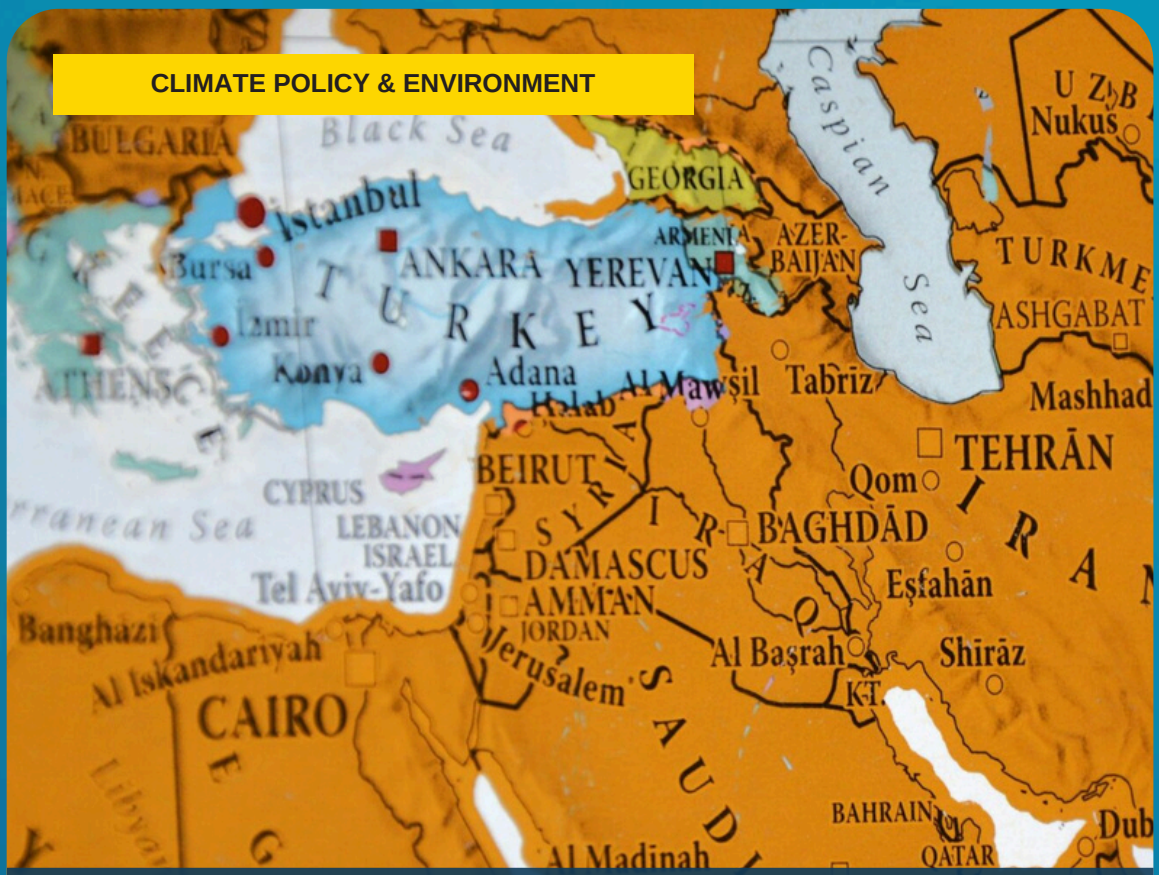

The South Caucasus: Europe's Energy Security amid Middle East Crisis

Strategic Diversification, Transit Corridors, and Regional Vulnerabilities in Supply Resilience

Ani Iaralishvili

About the Article

For Europe, the simultaneous loss of Middle Eastern maritime supply routes and the ongoing phase-out of Russian pipeline gas left the continent vulnerable to severe supply shocks. In this landscape, structural energy redundancy is no longer a theoretical preference; it is an urgent strategic necessity.

About the Author

Ani Iaralishvili holds a BA in International Relations from London South Bank University and an MA in International Peace and Security from King's College London. Ani's research focuses on energy politics and the ties between the Gulf, the South Caucasus and Europe. Ani recently published the article "Competing in the Gulf, converging in Europe: The Saudi–UAE bet on the Black Sea Cable" and works for the benefit of Georgia.

1. Introduction: The Post-Hormuz Energy Landscape

The closure of the Strait of Hormuz has created an unprecedented structural shock in global energy markets. For decades, maritime choke points in the Middle East were evaluated primarily in risk-assessment models; however, recent military engagements in the Persian Gulf converted theoretical vulnerabilities into systemic market disruptions. The sudden removal of Gulf crude and LNG flows from global trade routes exposed structural vulnerabilities in European energy architecture.

the Strait of Hormuz – the most vital bottleneck in global energy trade, since the Hormuz handles the 20% of the global oil supply, along with liquified natural gas (LNG)

Following the 2022 invasion of Ukraine, European Union member states executed a rapid diversification strategy designed to phase out reliance on Russian Gazprom pipeline deliveries. That transition relied heavily on spot-market purchases of sea-borne LNG from Gulf producers like Qatar, alongside increased pipeline imports from Norway and North Africa. The subsequent closure of Hormuz effectively neutralized Europe's primary replacement mechanism (LNG), leaving the continent facing severe physical gas shortages, extreme price volatility, and power grid instability.

Consequently, European energy policy has shifted from standard diversification to a search for structural redundancy: energy transit routes that bypass both Russian territorial control and volatile Middle Eastern maritime choke points. The South Caucasus—comprising Azerbaijan, Georgia, and Armenia—stands as the primary geographical bridge capable of fulfilling these stringent strategic requirements.

By connecting the hydrocarbon-rich Caspian Basin and Central Asia directly to Southern Europe via Anatolia, the South Caucasus offers an inland, overland, and subsea transit vector. This paper evaluates how the South Caucasus is evolving from a set of isolated transit pipelines into a multi-modal energy hub spanning natural gas, high-voltage green electricity transmission, and regional rail-grid interconnections.

2. Azerbaijan: The Anchor of Hydrocarbon Supply and Clean Power Generation

Azerbaijan occupies the central position in the South Caucasus energy equation. As the sole primary producer of natural gas in the immediate region, holding the world's twelfth-largest proven natural gas reserves, Baku serves as the foundation for physical hydrocarbon deliveries to Southern and Central Europe.

The Southern Gas Corridor (SGC) Architecture

The operational backbone of energy transit from the Caspian Sea to Europe is the Southern Gas Corridor (SGC), a $40 billion infrastructure complex consisting of three interlinked pipeline systems:

Trans-Adriatic Pipeline (TAP): Traverses Greece, Albania, and the Adriatic Sea to landfall in Southern Italy, providing direct integration into the European gas grid.

South Caucasus Pipeline (SCP): Expands across Azerbaijan and Georgia, running parallel to the Baku-Tbilisi-Ceyhan (BTC) oil pipeline, carrying gas from the Shah Deniz offshore field to the Turkish border.

Trans-Anatolian Natural Gas Pipeline (TANAP): Spans the entirety of Turkey from its eastern border with Georgia to its western border with Greece, serving as the central high-capacity conduit.

Since becoming fully operational at the end of 2020, the SGC has delivered over 50 billion cubic meters (bcm) of natural gas to European buyers. Today, Azerbaijani gas reaches 16 European nations, including 10 EU member states.

Upstream Expansion Projects (2026–2029)

To alleviate current European supply constraints created by the Hormuz blockage, Azerbaijan is accelerating its upstream field development. Baku plans to bring four major upstream gas projects online between 2026 and 2029:

- Azeri-Chirag-Gunashli (ACG) Deep Gas: Extracting non-associated gas reserves underlying the primary ACG oil field structure.

- Absheron Field Expansion: Full-field development following successful early production phases.

- Umid Phase 2: Expanding extraction from the Umid-Babek offshore structure.

- Shah Deniz Stage 3/Deep: Targeting deeper geological horizons within the core Shah Deniz field area.

"The South Caucasus offers a viable non-Russian, non-Gulf overland and subsea energy corridor."

Combined, these projects are projected to add 10 to 15 bcm of annual gas output. Realizing this export potential requires expanding the physical throughput capacities of TANAP and TAP via additional compressor station investments. Provided capital allocation and infrastructure expansion proceed on schedule, Azerbaijan can offer Europe a durable, long-term hedge against Middle Eastern transit vulnerabilities.

The Renewable Transition and the Green Energy Corridor

Beyond fossil fuels, Azerbaijan is positioning itself to become an exporter of zero-carbon electrical power. Aligned with its national commitment to reduce greenhouse gas emissions by 40% by 2035, Baku has launched a dual-track strategy integrating domestic renewables with international export interconnectors.

By 2027, Azerbaijan plans to complete 10 utility-scale solar and wind projects, adding 2 GW of generation capacity backed by over $2.5 billion in cross-border capital, alongside 250 MW of battery energy storage systems (BESS) to preserve grid stability.

By 2030, total deployed clean energy capacity is projected to exceed 6 GW. Crucially, 4 GW of this green capacity is dedicated specifically for export via high-voltage direct current (HVDC) interconnectors as part of the flagship Caspian-Black Sea-Europe Green Energy Corridor. This aligns Baku's export trajectory with the EU's 2050 climate neutrality mandates.

Geopolitical Vulnerabilities: The Iran-Israel Axis

Azerbaijan's strategic positioning is not without geopolitical risk. Baku maintains a strategic partnership with Israel, supplying crude oil via the BTC pipeline to the Mediterranean terminal at Ceyhan, while acquiring advanced defense systems from Israeli defense contractors.

This relationship remains a source of diplomatic tension with neighboring Iran. Following the recent US-Israeli air strikes on Iranian military and nuclear infrastructure and Tehran's retaliatory strikes in the Gulf, Iran's posture toward Baku remains volatile.

Cross-border military posturing or asymmetric cyber threats originating from Tehran could jeopardize Caspian energy infrastructure. Maintaining physical security around critical energy assets like Shah Deniz and the Sangachal Terminal requires continuous defense coordination and security cooperation with regional partners.

3. Georgia: The Critical Transit Bridge and Black Sea Interconnector

If Azerbaijan acts as the region's energy engine, Georgia serves as its essential geographical bridge. Lacking substantial domestic oil or natural gas reserves, Tbilisi has converted its geography into a strategic asset, providing the terrestrial corridor through which major Caspian oil and gas pipelines reach western markets.

Institutional Alignment and Regulatory Integration

Georgia's role as an energy transit state is reinforced by institutional alignment with European standards. In 2016, Georgia formally signed the Energy Community Treaty, committing to integrate its domestic energy market with EU regulatory frameworks, unbundle state monopolies, and enforce transparent third-party access rules.

This legal alignment reduces regulatory risk for Western institutional investors funding trans-regional pipeline and power grid projects through Georgian territory.

Furthermore, Georgia possesses rich domestic renewable energy potential. Approximately 80% of its domestic electricity generation is derived from run-of-river and reservoir-backed hydropower plants (HPPs). This existing clean power foundation positions Georgia not merely as a passive hydrocarbon conduit, but as an active participant in regional electricity balancing and clean power transmission.

The Black Sea Submarine Cable (BSSC) Megaproject

The centerpiece of Georgia's future energy contribution is the Black Sea Submarine Cable (BSSC), designated as a flagship project under the European Union's Global Gateway infrastructure initiative.

Spanning roughly 1,195 kilometers along the seabed of the Black Sea from Anaklia in Georgia to Constanța in Romania, the BSSC is designed as the world's longest underwater power cable. It will enable the direct transmission of 4 GW of green electricity generated in the Caspian and South Caucasus directly into the East-Central European power grid.

By bypassing land routes south of the Black Sea, the cable creates a direct physical link between the Caucasus and the EU internal energy market. Feasibility assessments conducted by engineering consulting firms confirm the technical viability of the underwater cable system.

Once completed, the cable will allow European grid operators to draw clean power from Caucasus wind and hydro assets, balancing intermittent European solar and wind generation while replacing lost thermal and natural gas generation.

4. Armenia: Infrastructure Reform, Renewable Growth, and the TRIPP Initiative

Historically isolated from regional East-West transit networks due to long-standing border closures with Azerbaijan and Turkey, Armenia is working to integrate itself into the broader South Caucasus energy and transport architecture. Yerevan is pursuing institutional reforms, solar energy expansion, and multi-lateral infrastructure initiatives.

Domestic Energy Diversification and Solar Deployment

Armenia has historically relied on imported Russian natural gas and aging nuclear power from the Metsamor plant for its domestic needs. To reduce supply vulnerabilities, Yerevan has updated its national energy strategy to prioritize rapid renewable energy integration.

Supported by international climate financing, utility-scale solar photovoltaic (PV) developments across the high-altitude plateau are expanding rapidly. Renewable energy is projected to account for roughly 30% of Armenia's domestic generation mix, with official policies aiming to double that share by 2040.

By developing domestic solar power, Armenia reduces its gas demand for power generation, freeing up regional gas infrastructure for cross-border transit while creating surplus clean power for regional grid exchanges.

The TRIPP Initiative and Regional Transport-Energy Integration

The geopolitical landscape of the South Caucasus is undergoing a shift toward regional integration. A key driver of this transition is the United States-backed Trump Route for International Peace and Security (TRIPP) initiative.

TRIPP provides a diplomatic and infrastructure framework designed to unlock un-demarcated transit corridors between Azerbaijan, Armenia,

and Nakhchivan, establishing an unbroken transport line through Turkey to Western markets.

The primary physical focus of TRIPP centers on constructing and restoring a 43-kilometer rail section through southern Armenia (the Syunik region). This link connects Azerbaijan proper with its Nakhchivan exclave and interfaces directly with Turkey's Dilucı–Kars railway line.

Beyond rail logistics, TRIPP establishes a physical pathway for co-located energy infrastructure:

- Cross-Border High-Voltage Power Lines: Constructing unified electricity interconnectors running parallel to the rail line, enabling power sharing between Azerbaijan, Armenia, Nakhchivan, and Turkey.

- Gas Interconnections: Providing redundant pipeline routing option across southern West Asia.

- Middle Corridor Optimization: Expanding the carrying capacity of the Middle Corridor, reducing transit times between Central Asia, the Caspian, and Europe.

For TRIPP to reach its operational potential, sustainable political normalization between Baku and Yerevan is essential. Institutionalizing the initiative through broader diplomatic frameworks —such as integrating TRIPP objectives into the C5+1 platform or EU-backed regional coordination mechanisms—can help ensure project continuity despite ongoing geopolitical tensions.

5. European Union Strategy and Policy Recommendations

The strategic necessity of securing non-Gulf, non-Russian energy corridors requires proactive, direct engagement by European Union institutions and international finance organizations. The EU cannot treat the South Caucasus merely as a commercial supplier; it must approach the region as a core component of its strategic energy architecture.

To secure long-term energy resilience, European policymakers should focus on four primary strategic interventions:

1. Capital Guarantees for Upstream and Midstream Pipeline Expansion

Expanding TANAP and TAP to handle an additional 10 to 15 bcm of Azerbaijani gas annually requires substantial capital investment in compressor station upgrades along the pipeline route. The European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) should extend long-term loan guarantees and concessional financing structures to private pipeline operators to accelerate throughput capacity expansion.

2. Full Capitalization of the Black Sea Submarine Cable

The EU should prioritize funding for the Black Sea Submarine Cable through its Global Gateway budget. Co-financing the underwater cable installation and modernizing landing substations in Anaklia and Constanța reduces project implementation timelines and ensures direct integration into the European power grid.

3. Diplomatic Mobilization and Risk Mitigation for TRIPP

The EU should work closely with Washington to provide technical assistance, border management technology, and institutional backing for the TRIPP corridor. Depoliticizing cross-border infrastructure development in southern Armenia helps convert historical points of friction into shared economic assets.

4. Grid Modernization Across the Caucasus Triad

To handle fluctuating renewable power outputs from Caspian wind and Armenian solar facilities, the EU should co-fund smart-grid modernizations, high-voltage transformers, and battery storage installations across Azerbaijan, Georgia, and Armenia. Unified technical standards ensure seamless power trading across borders and facilitate reliable export transmission to Europe.

6. Conclusion

The energy crisis triggered by the closure of the Strait of Hormuz has reshaped global energy geography. For Europe, the simultaneous loss of Middle Eastern maritime supply routes and the ongoing phase-out of Russian pipeline gas left the continent vulnerable to severe supply shocks. In this landscape, structural energy redundancy is no longer a theoretical preference; it is an urgent strategic necessity.

The South Caucasus offers a viable non-Russian, non-Gulf overland and subsea energy corridor. Through the upstream expansion of the Southern Gas Corridor, the realization of the Caspian-Black Sea Green Energy Corridor, the construction of the Black Sea Submarine Cable, and the deployment of multi-modal transit links under the TRIPP initiative, Azerbaijan, Georgia, and Armenia are establishing a resilient, integrated regional energy hub.

By backing these regional initiatives with targeted capital investments, risk guarantees, and diplomatic support, the European Union can secure long-term energy supply diversification. Integrating the South Caucasus into the broader European energy market strengthens regional stability while providing Europe with the physical infrastructure necessary to withstand future international energy shocks.



Map 1: The Southern Gas Corridor (SGC) Network



Map 2: Black Sea Submarine Cable & Green Energy Corridor

October 2026

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Fellow of the Month



Our FASP Leader **Dmytro Sochnyev** is your Fellow of the Month in September! Dmytro he keeps our schedule organised and ensures smooth FASP operations, and thereby ultimately helps your publications shine. Thank you for your work Dmytro, we are looking forward to the next hills we will climb!

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We are currently expanding our ILCJ branch. A warm welcome to **Cem Sunay** as Thematic Working Groups Leader, **Carmen Ghetu** as ILCJ Blog leader, all leaders of the individual thematic report and working groups, and all new ILCJ fellows!

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Viola von Cramon-Taubadel is a German politician from Alliance 90/The Greens. She served in the Bundestag and European Parliament, working on foreign affairs, EU-Russia relations, and EU-Ukraine relations.

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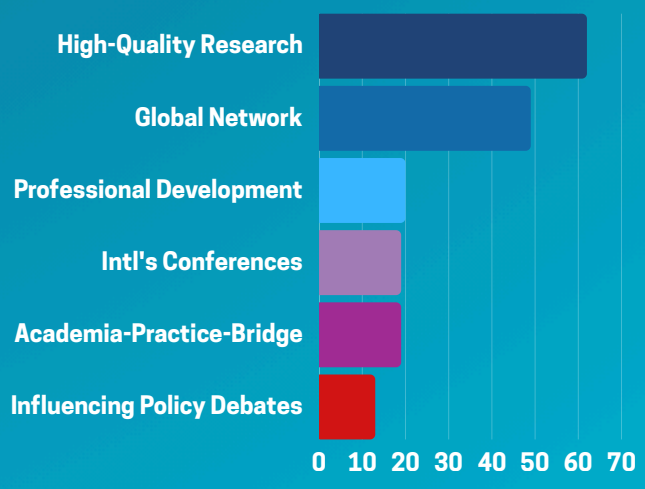

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1. https://datawrapper.dwcdn.net/af1Cm/6/

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The South Caucasus offers a viable non-Russian, non-Gulf overland and subsea energy corridor.

— Ani Iaralishvili, The South Caucasus

CLIMATE POLICY & ENVIRONMENT



The COVID ‘Anthropause’ and Planetary Health: Lessons for the Future

How did this affect planetary health and The European Green Deal?

Kate Whitelock

About the Article

The sudden economic halt exposed how heavily greenhouse gas emissions remain coupled to GDP, revealing that claims of "green growth" and economic decoupling by world leaders were overly optimistic.

About the Author

Kate Whitelock is a graduate of Northeastern University London with an MSc in Digital Politics and Sustainable Development. Her dissertation explored environmental policy, with a particular focus on how neoliberalism has become intertwined with environmentalism. During her time at Northeastern, she worked as a research assistant. Prior to this, Kate earned a BA (Hons) in Philosophy from the University of Sussex. Kate is passionate about shaping environmental policy and aspire to work for a think tank or within government to advance sustainable solutions.

1. Introduction: The Anthropause as an Unintended Environmental Experiment

The emergence of SARS-CoV-2 (COVID-19) in late 2019 rapidly escalated into a global health crisis, prompting international curfews, travel bans, and industrial halts. While public health measures were enacted to mitigate virus transmission, the resulting reduction in human mobility and industrial throughput produced an unprecedented ecological baseline shift, scientifically termed the anthropause (Chuan Loh, 2021, p. 4430).

Unlike previous localized or regional disruptions, the pandemic lockdowns were globally synchronized. This sudden deceleration of human activity provided an empirical opportunity to observe how natural systems respond when anthropogenic pressures are abruptly lifted.

For decades, environmental economics and international policy frameworks have been guided by the concept of "green growth"—the idea that economic expansion can be fully decoupled from environmental degradation through technological innovation and efficiency gains. However, the environmental changes observed during the anthropause challenge this assumption. The rapid drop in pollutants during lockdowns, followed by a swift rebound as industries reopened, indicates that carbon emissions remain bound to economic activity.

This paper examines the environmental dimensions of the COVID-19 pandemic and its policy implications. It begins by auditing the empirical environmental impacts of the anthropause across air quality, marine health, and waste management.

It then evaluates the structural lessons of the pandemic, arguing that the anthropause exposed the limitations of green growth narratives while highlighting the risks of climate-induced tipping points, such as permafrost thaw.

Finally, the paper analyzes the policy response of the European Union, demonstrating how the European Green Deal (EGD) was leveraged as a central framework for post-pandemic recovery, driving policy integration across member states.

Anthropause: The temporary, global reduction in human activity during COVID-19 lockdowns, offering key insights into how lower transport and industry impact the environment and climate.

2. Environmental Dynamics of the Anthropause

The economic shutdown during the height of the COVID-19 pandemic altered global pollution baselines. The forced contraction of industrial output, aviation, maritime transport, and commercial traffic led to observable changes in urban air sheds and aquatic ecosystems.

However, these short-term ecological improvements were accompanied by negative environmental trade-offs, particularly in waste

management and residential resource consumption.

2.1 Air Pollution Dynamics and Atmospheric Realignment

Air pollution remains one of the world's leading environmental health risks. According to the World Health Organization (WHO), ambient air pollution accounts for roughly 4.6 million premature deaths annually due to cardiovascular, cerebrovascular, and respiratory diseases (Chuan Loh, 2021, p. 4427). Other global estimates place the death toll closer to 4.9 million annually, with low- and middle-income nations bearing a disproportionate share of the disease burden (Hassan Shakil, 2020, p. 4).

Beyond human health, atmospheric pollutants such as sulfur dioxide (SO2), nitrogen oxides (NOx), and fine particulate matter (PM2.5) drive environmental degradation, including the acidification of freshwater bodies, soil nutrient depletion, and damage to agricultural crop yields.

During the anthropause, the suspension of commercial transport and industrial operations drove reductions in major atmospheric pollutants:

1. Nitrogen Dioxide (NO2) and Carbon Emissions

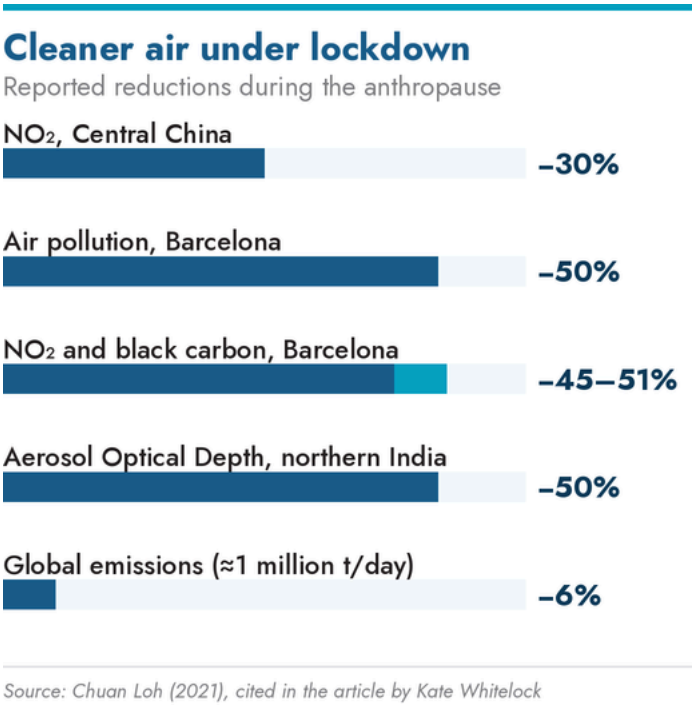
Because NO2 is primarily a byproduct of fossil fuel combustion in internal combustion engines and thermal power generation, travel restrictions led to rapid declines in its concentration. Tropospheric satellite imagery captured reductions of up to 30% over Central China during the early 2020 lockdown phase (Chuan Loh, 2021, p. 4428).

Similar trends occurred in European urban centers: Barcelona experienced a 50% overall drop in air pollution levels, driven by a 45–51% decline in NO2 and black carbon rates (Chuan Loh, 2021, p. 4428). Globally, atmospheric carbon emissions dropped by roughly 1 million metric tons per day during peak lockdown periods, representing a temporary 6% decline in global emissions (Chuan Loh, 2021, p. 4428).

2. Particulate Matter (PM2.5) and Aerosol Optical Depth (AOD)

Data gathered by Moderate Resolution Imaging Spectroradiometer (MODIS) sensors aboard NASA satellites showed a 50% reduction in Aerosol Optical Depth (AOD) across northern India compared to pre-pandemic baselines (Chuan Loh, 2021, p. 4428).

"The sudden economic halt exposed how heavily greenhouse gas emissions remain coupled to GDP, revealing that claims of "green growth" and economic decoupling by world leaders were overly optimistic."



Source: Chuan Loh (2021), cited in the article by Kate Whitelock

At the global scale, atmospheric emissions were reduced by approximately 0.6 million metric tons (Mt) of PM2.5 and 5.1 Mt of combined SO2 and NO2 (Chuan Loh, 2021, p. 4428).

This sudden shift highlighted a critical policy dynamic: in the more than three-decade history of formal international climate negotiations, no treaty, regulatory intervention, or technological deployment had achieved such a rapid reduction in global air pollution (Chuan Loh, 2021, p. 4428).

These drastic, short-term air quality gains demonstrated that aggressive emissions reductions are immediately achievable when society coordinates large-scale behavioral and operational changes. Moreover, the rapid clearing of urban atmospheric haze served as a vivid public demonstration of human ecological impacts. This unique empirical window provided unprecedented momentum for environmental health advocates seeking to reframe clean air standards as an essential, non-negotiable component of post-pandemic public healthcare infrastructure.

2.2 Aquatic Ecosystems and Marine Life Dynamics

The reduction in human activity also produced observable, short-term changes in marine and freshwater environments. The temporary halt of commercial fisheries, reduced cruise line operations, and decreases in industrial wastewater discharge relieved pressure on coastal ecosystems.

1. Reduction of Maritime Disruptions

The slowdown in marine traffic and coastal tourism led to a drop in underwater noise pollution, marine littering, and urban runoff. In urban aquatic systems such as the canals of Venice, Italy, reduced boat traffic allowed suspended sediment to settle, resulting in improved water clarity and visible returns of local fish populations within two months of lockdown enforcement (Chuan Loh, 2021, p. 4429).

Similarly, environmental monitoring along coastal zones, such as the Salinas and Manta beaches in South America, indicated that temporary reductions in tourism brought water quality metrics close to those observed in formal Marine Protected Areas (MPAs).

2. Commercial Fishing Halts and Marine Fauna Recovery

Fears of virus outbreaks among migratory fishing crews led to partial or complete closures of commercial fishing ports worldwide. This temporary fishing pause served as an involuntary stock-recovery period.

Decreased industrial chemical runoff and lower rates of acid precipitation supported localized marine biodiversity. Coastal monitoring documented increases in sightings of marine mammals—including cetaceans and pinnipeds—in areas where commercial vessel traffic had historically displaced them, while endangered sea turtle species recorded higher nesting success on uncrowded beaches (Chuan Loh, 2021, p. 4429).

2.3 Environmental Trade-offs: Medical Litter and Domestic Shift

The anthropause was not a period of unmixed ecological improvement. The public health crisis introduced new environmental challenges, particularly regarding solid waste management, medical waste disposal, and shifts in domestic energy consumption.

1. Medical Waste Generation

The global demand for personal protective equipment (PPE)—including single-use surgical masks, nitrile gloves, face shields, and testing kits—generated a large spike in biomedical waste. In Wuhan, China, hospital facilities produced over 240 metric tons of medical waste per day at the peak of the outbreak, compared to roughly 50 metric tons per day prior to the pandemic (Hassan Shakil, 2020, p. 2).

Concerns over viral transmission hampered recycling initiatives, leading municipal authorities to rely on high-temperature incineration or direct landfill disposal, which raised local secondary emissions risks.

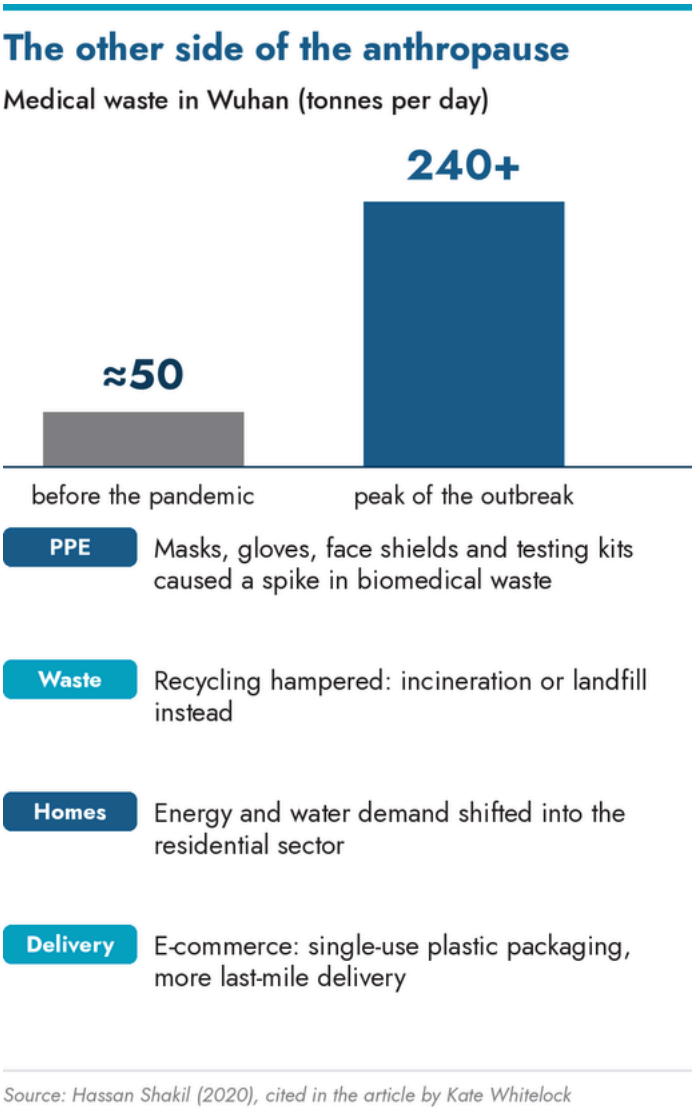
2. Residential Energy Shift and E-Commerce Footprint

While commercial, industrial, and transportation energy use plummeted, energy and water demand shifted into the residential sector. Lockdowns drove increased reliance on household utilities, personal electronic devices, digital entertainment, and climate control.

Simultaneously, the expansion of e-commerce and home food delivery generated large volumes of single-use plastic packaging and expanded last-mile delivery routes. While these residential increases did not fully offset the drops in heavy industrial emissions, they highlighted the environmental trade-offs of a digitally reliant, home-centered economy.

3. Structural Lessons: Challenging Green Growth and Decoupling Paradigms

The environmental changes brought by the pandemic offer broader insights into the relationship between economic output and environmental health. The anthropause served as a empirical stress-test for theories of sustainable development, particularly the concepts of green growth and the absolute decoupling of GDP from greenhouse gas emissions.



3.1 The Decoupling Myth and the Limits of Green Growth

In the years leading up to the COVID-19 pandemic, policymakers frequently asserted that economic expansion had been successfully decoupled from carbon emissions. In its 2017 America's Pledge Phase 1 Report, the United States highlighted that between 2005 and 2015, the US economy grew by 15% while net greenhouse gas emissions fell by 11.5% (America's Pledge, 2017, p. 15).

Similarly, in 2019, former British Prime Minister Theresa May publicly celebrated the UK's climate record, stating, "We have made huge progress in growing our economy and the jobs market while slashing emissions" (GOV.UK, 2019).

While these statistics reflected domestic reductions in territorial production emissions, they obscured broader structural realities:

- Consumption-Based Emissions Accounting: Much of the reported emissions declines in advanced economies resulted from offshoring carbon-intensive manufacturing to developing nations. When evaluated through consumption-based accounting—incorporating imported goods and international transport—emissions reductions appear far more modest.

- Insufficiency of Relative Decoupling: While some economies achieved relative decoupling (where emissions grow at a slower rate than GDP) or localized absolute decoupling, the global pace of technological efficiency gains remained far too slow to meet the temperature targets set by the Paris Agreement (Helm, 2020, p. 24).

The anthropause revealed this structural reality: the only intervention that produced a rapid decline in atmospheric emissions was a direct, physical halt in production and consumption.

The fact that global emissions rebounded swiftly as economies reopened demonstrates that global GDP remains bound to carbon consumption (Helm, 2020, p. 24). Relying on incremental technological progress under a traditional green growth paradigm is unlikely to deliver decarbonization at the speed required to prevent critical climate impacts.

3.2 Climate Feedback Loops and Cascading Risks

The necessity for rapid emissions reductions is underlined by the risk of self-reinforcing climate feedback loops. Climate models project that under continued global warming, the Arctic Ocean could become largely free of sea ice during summer months by mid-century.

This warming triggers permafrost thaw across sub-Arctic regions, creating both biogeochemical and biological risks:

1. Biogeochemical Feedback

Permafrost soils store vast quantities of organic carbon—roughly double the amount currently present in the atmosphere. As these soils thaw, microbial decomposition releases methane and carbon dioxide, accelerating warming independently of direct human emissions.

2. Biological Pathogen Exposure

Permafrost thaw risks exposing ancient animal remains and microbial layers, potentially releasing viable long-dormant pathogens, including ancient viral and bacterial strains (Chuan Loh, 2021, p. 4426). The release of such biological agents poses public health risks that could spark future infectious disease outbreaks, potentially triggering further socio-economic disruptions.

Preemptive mitigation is therefore critical. Relying on slow, market-driven efficiency gains under traditional green growth models exposes human society to systemic risks. Instead, climate policy must incorporate the lessons of the anthropause, prioritizing structural economic realignments over minor efficiency improvements.

4. Institutional Policy Response: The European Green Deal as a Recovery Anchor

The economic shock of COVID-19 required intervention from international institutions. Historically, major macroeconomic shocks—such as the 2008–2009 global financial crisis and the subsequent Eurozone debt crisis—led policymakers to sideline environmental objectives in favor of short-term industrial stabilization and fiscal austerity.

However, the European Union's response to the pandemic diverged from this historical pattern. Rather than delaying its climate agenda, the EU integrated environmental targets directly into its macroeconomic recovery architecture.

4.1 The European Green Deal Framework

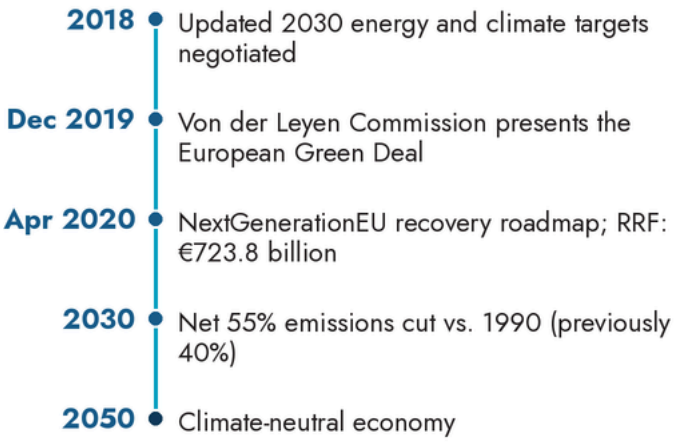
In December 2019, just prior to the global outbreak of COVID-19, the incoming von der Leyen Commission presented the European Green Deal (EGD) as its flagship political priority and new growth strategy (Crnčec, 2020, p. 1116). The EGD represented a comprehensive policy effort to transform the European Union into a resource-efficient, competitive, climate-neutral economy by 2050.

1. Legislative Ambition and the European Climate Law

Building on the updated 2030 energy and climate targets negotiated between the European Council and European Parliament in 2018, the EGD sought to codify the EU's 2050 net-zero ambition through a legally binding European Climate Law (Crnčec, 2020, p. 1116).

This legislation established legal requirements for both the Union and individual member states to track toward climate neutrality, upgrading the intermediate 2030 emissions reduction target from an earlier 40% threshold to a net 55% reduction compared to 1990 levels.

The European Green Deal at a glance



Source: Crnčec (2020); Penca (2023), cited in the article by Kate Whitelock

2. The "Do No Significant Harm" (DNSH) Guiding Principle

A cornerstone of the EGD policy framework is the Do No Significant Harm (DNSH) principle, derived from the EU Taxonomy Regulation. Under this mandate, no public expenditure, economic policy, or developmental project supported by EU funds may actively undermine any of the Union's six designated environmental objectives:

The DNSH principle prevented public recovery funds from being funneled into traditional, high-carbon fossil fuel infrastructure, ensuring alignment across all post-pandemic spending plans.

4.2 NextGenerationEU and the Recovery and Resilience Facility (RRF)

When the pandemic triggered economic downturns across member states in early 2020, European institutions designed a structural response. In April 2020, the European Commission introduced a recovery roadmap modeled on a large-scale investment framework, establishing a centerpiece fund named NextGenerationEU (NGEU), financed through direct joint EU debt issuance (Crnčec, 2020, p. 1111).

The core financial instrument within NextGenerationEU was the Recovery and Resilience Facility (RRF), supplying €723.8 billion in combined grants and loans to member states. Rather than disbursing these funds through unconditional fiscal transfers, the Commission made access contingent on national Recovery and Resilience Plans (RRPs).

Crucially, each member state was required to allocate a minimum of 37% of its total RRF budget directly to climate and green transition initiatives (Penca, 2023, p. 2).

The RRF framework prioritized three primary green transition pillars (Penca, 2023, p. 6):

- "Power Up": Accelerating the deployment of clean technologies, expanding renewable generation capacity (solar, onshore/offshore wind), and developing green hydrogen infrastructure.

- "Renovate": Improving the energy efficiency of public and private building stocks to reduce operational carbon footprints and address energy poverty.

- "Recharge and Refuel": Supporting sustainable transport through clean vehicle incentives, mass transit expansion, and electric vehicle charging infrastructure.

4.3 Fiscal Integration and Regional Convergence

The deployment of the RRF addressed long-standing disparities in climate ambition among EU member states. Historically, Central and Eastern European member states—as well as highly indebted Southern European economies—expressed reservations regarding high decarbonization targets, citing fiscal constraints and ongoing reliance on carbon-intensive energy networks.

The RRF provided substantial financial support for these transition plans. By directing significant grant funding toward nations lagging in renewable infrastructure—such as Poland,

Romania, Italy, and Estonia—the EU helped build alignment around its green transition goals (Penca, 2023, p. 6).

For instance, national plans in Eastern and Southern Europe directed large capital allocations toward hydrogen development, grid modernization, and clean transit networks.

By linking pandemic recovery financing to binding climate targets, the EU turned an economic crisis into an opportunity to advance its climate objectives, establishing the EGD as an anchor for long-term regional economic alignment.

5. Comparative Policy Analysis: Post-Crisis Decarbonization Pathways

To evaluate the significance of the post-COVID-19 European Green Deal framework, it is useful to compare it against previous economic crisis responses and alternative decarbonization approaches.

5.1 Comparing the 2008 and 2020 Response Models

The contrasting approaches between the 2008 financial crisis and the 2020 pandemic highlight a shift in European economic planning:

• The 2008 Capital Injection Model: Following the 2008 financial collapse, Western governments deployed liquidity injections and industrial bailouts with few environmental conditions. Consequently, as economic growth returned, global emissions rebounded by 5.9% in 2010, erasing the minor reductions recorded during the economic downturn.

• The 2020 Conditional Investment Model: By contrast, the NextGenerationEU framework combined capital distribution with environmental requirements. The mandatory 37% climate expenditure threshold and the DNSH principle prevented public funds from propping up fossil fuel infrastructure without transition commitments, reducing the risk of a high-carbon rebound.

5.2 Degrowth and Post-Growth Paradigms

The findings of the anthropause have fueled discussions around degrowth and post-growth economic models. Proponents argue that because market-driven efficiency gains have failed to deliver absolute decoupling at the required speed, deliberate reductions in material throughput and non-essential production are necessary to remain within planetary boundaries.

While the anthropause achieved rapid emissions reductions through involuntary restrictions, a planned post-growth transition would aim to reduce resource use through deliberate policy choices:

• Targeted Reduction of Resource-Intensive Sectors: Scaling down non-essential, highly polluting industries while expanding public infrastructure, healthcare, and ecological restoration.

• Shortened Workweeks and Redistribution: Managing employment through reduced working hours and expanded social protections, avoiding the unemployment crises associated with forced lockdowns.

• Replacing GDP Metrics: Shifting national planning away from aggregate GDP growth toward direct indicators of human wellbeing and ecological stability.

While full degrowth strategies face political hurdles, incorporating post-growth insights—such as accepting that certain polluting economic sectors must shrink directly—can strengthen existing climate policies like the European Green Deal.

6. Conclusion: Synthesizing Lessons for Future Environmental Governance

The COVID-19 anthropause was a complex, involuntary experiment in global environmental management. While the pandemic brought widespread human and economic hardship, the temporary pause in human activity delivered valuable insights into the dynamics between human society and natural systems.

The empirical evidence gathered during the anthropause demonstrates that natural systems can recover quickly when human pressures are reduced. The rapid drops in tropospheric, fine particulate matter, and coastal water turbidity confirmed that atmospheric and aquatic systems respond quickly to reductions in anthropogenic emissions.

However, the rapid rebound of global emissions following the easing of lockdown measures exposed the limits of pre-pandemic green growth narratives. Incremental technological efficiency gains under traditional market frameworks have not produced absolute decoupling at the speed required to meet global climate goals.

The European Union's institutional response through the European Green Deal and NextGenerationEU offers a useful model for crisis management. By making post-pandemic economic recovery contingent on green transition targets, enforcing the "Do No Significant Harm" principle, and directing capital toward clean technology, energy efficiency, and sustainable transport, the EU deepened regional integration and anchored decarbonization within its economic architecture.

Moving forward, international climate policy must build on these insights. Policymakers should recognize that meeting long-term ecological goals requires going beyond reliance on market-driven efficiency gains. Addressing climate change effectively demands structural economic realignments that prioritize long-term ecological stability, public health, and genuine sustainability.

Two crisis responses compared

2008 Capital injection model	2020 Conditional investment model
• Liquidity injections and industrial bailouts • Few environmental conditions • Minor emission reductions of the downturn erased	• NextGenerationEU tied capital to environmental requirements • RRF: €723.8 billion in grants and loans • "Do No Significant Harm" principle
+5.9% global emissions rebound in 2010	**37%** minimum climate share of each RRF budget

Source: Kate Whitelock, based on the article text

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> The sudden economic halt exposed how heavily greenhouse gas emissions remain coupled to GDP, revealing that claims of "green growth" and economic decoupling by world leaders were overly optimistic.

— Kate Whitelock, The COVID 'Anthropause' and Planetary Health

CLIMATE POLICY & ENVIRONMENT



Fish Wars: Climate and Fisheries Conflict in the South China Sea

How climate-driven fisheries disputes are reshaping maritime security in the South China Sea

Nicoline Petersen

About the Article

Climate change does not create maritime disputes in the South China Sea, but it intensifies the conditions under which they unfold.

About the Author

Nicoline Petersen is a Governance and Stakeholder Management intern at eu-LISA. She holds a Master's degree in Political Science (European Politics and External Relations) from the University of Amsterdam. Her interests lie in EU foreign policy and security, particularly how Europe positions itself in a multipolar world. She aims to engage with contemporary policy debates and contribute to a clearer understanding of Europe's evolving global role.

The Climate-Security Nexus in Contested Waters

Climate change is no longer exclusively an environmental crisis or an ecological concern confined to scientific policy circles; it has evolved into a profound, multi-dimensional security challenge that is fundamentally reshaping global geopolitical affairs (Mendenhall et al., 2020; World Meteorological Organization [WMO], 2026). The thermal expansion of oceans, shifts in global precipitation regimes, rapid ocean acidification, and the escalating frequency of catastrophic, extreme weather events are increasingly recognized by defense strategists and international legal scholars as critical mechanisms that exacerbate pre-existing political vulnerabilities, erode institutional stability, and intensify competition over finite natural resources (WMO, 2026).

Within international security literature, climate change is frequently conceptualized as a "threat multiplier"—a systemic phenomenon that amplifies socio-economic stress, destabilizes fragile governance structures, and lowers the threshold for militarized interstate friction (Mendenhall et al., 2020). Nowhere is this threat multiplier effect more visible or dangerous than in the semi-enclosed basin of the South China Sea. In this maritime region, rapidly warming sea surface temperatures, catastrophic coral reef degradation, and declining wild fish stocks are intersecting directly with deep-seated sovereign territorial disputes, transforming ecological degradation into a core driver of regional naval militarization and strategic instability.

The South China Sea supports the foundational food security, coastal employment, and nutritional livelihoods of hundreds of millions of people across Southeast Asia and southern China, ranking among the planet's most bio-diverse and productive marine ecosystems (Pomeroy et al., 2016, as cited in Mendenhall et al., 2020). However, this crucial biological engine is facing unprecedented, simultaneous pressure from ecological collapse and geopolitical confrontation. The convergence of climate-driven shifts in fish stock distributions and decades of unsustainable, subsidized industrial overfishing has created a highly volatile environment. In this space, the competition over access to dwindling marine resources is intensifying, and the probability of militarized fisheries conflicts is rising exponentially (Mendenhall et al., 2020).

Threat multiplier: A factor that exacerbates existing social, economic, and political vulnerabilities, increasing the likelihood of instability or conflict rather than directly causing it.

The South China Sea therefore provides a primary global case study of how rapid environmental change strains existing international law, tests the limits of sovereign maritime boundary regimes under the United Nations Convention on the Law of the Sea (UNCLOS), and reshapes regional security dynamics in a warming world.

Climate Change, Oceanographic Transformation, and the Race for Fish

The physical impacts of global anthropogenic climate change—including thermal ocean warming, marine heatwaves, sea-level rise, and ocean acidification—are altering marine ecosystems on a planetary scale (Mendenhall et al., 2020; Pecl et al., 2017). Ocean warming, driven by global atmospheric heat absorption, is inducing a massive, systemic redistribution of marine biodiversity (Pecl et al., 2017). As sea surface temperatures exceed the thermal tolerance thresholds of key pelagic and demersal species, marine organisms are undergoing poleward pole-ward shifts or moving deeper into cooler water columns to maintain physiological homeostasis (Pecl et al., 2017).

These thermal migration patterns alter the spatial availability of commercially vital fish stocks. Tropical enclosed basins, such as the South China Sea, are particularly vulnerable to these ecological shifts. Marine species are forced to migrate out of historical exclusive economic zones (EEZs) and artisanal fishing grounds, crossing international boundaries and entering contested waters where sovereignty remains aggressively disputed (Mendenhall et al., 2020; Pecl et al., 2017).

In the South China Sea, these climate-driven ecological dislocations intersect with longstanding, multi-party territorial disputes. Overlapping, irreconcilable maritime claims involving China, the Philippines, Vietnam, Malaysia, Brunei, and Taiwan create a fragile political landscape where the movement of pelagic fish populations quickly translates into interstate friction (Mendenhall et al., 2020).

Climate change does not create these underlying territorial claims, but it significantly alters the resource environment in which they play out.

These environmental stresses are further compounded by Illegal, Unreported, and Unregulated (IUU) fishing activities. According to the Stimson Center's regional risk assessments, the South China Sea remains one of the world's most high-risk environments for IUU fishing, driven by weak regional governance, massive state-backed fuel subsidies, market demand, and severe enforcement gaps (Stimson Center, 2025).

"Climate change does not create maritime disputes in the South China Sea, but it intensifies the conditions under which they unfold."

As nearshore fisheries collapse due to decades of over-extraction, artisanal fishers and commercial industrial trawlers are forced to venture hundreds of nautical miles from their home coasts. Equipped with larger vessels and navigational technology, these fleets routinely cross contested Exclusive Economic Zones (EEZs) and approach disputed maritime features—such as Scarborough Shoal, the Spratly Islands, and the Paracel Islands—to maintain commercially viable catch rates (Mendenhall et al., 2020; Spijkers et al., 2019).

This dynamic creates a dangerous "race-for-fish." Spijkers et al. (2019) emphasize that maritime resource conflicts are rarely triggered by a single environmental shock. Instead, they arise from the continuous,

compounding interaction of ecological change, political friction, economic necessity, and sovereign competition over dwindling stocks. In regions where coastal communities rely on marine protein for basic nutrition and employment, ecological degradation directly degrades national security and international stability.

The Securitization of Fisheries and Gray-Zone Tactics

In a warming world characterized by resource scarcity, fishing grounds are increasingly evaluated through a strategic geopolitical lens rather than purely as economic or ecological domains (Mendenhall et al., 2020). Across the Indo-Pacific, fisheries disputes have undergone rapid securitization—a process wherein state actors reframe resource access and fishing activity from routine economic and regulatory matters into existential security concerns requiring state enforcement, paramilitary deployment, and military power (Mendenhall et al., 2020; Spijkers et al., 2019).

Coastal states across the South China Sea increasingly deploy state power to assert exclusive rights over marine living resources. This includes sending expanded coast guard fleets, maritime law enforcement agencies, and naval assets to escort domestic fishing fleets, forcibly expel foreign fishers, arrest rival crews, and assert sovereign rights over disputed waters (Mendenhall et al., 2020).

The People's Republic of China (PRC) has operationalized this strategy at scale, pioneering a three-tiered maritime architecture that blends civilian, paramilitary, and naval power to project sovereignty across its sweeping "nine-dash line" claims (PCA, 2016). This architecture integrates:

- The Commercial Civilian Fishing Fleet: Acts as a frontline presence to establish historical operational footprint and capture marine resources.

- The People's Armed Forces Maritime Militia (PAFMM): Uses state-subsidized, heavy-hulled commercial fishing vessels equipped with military-grade communications to swarming maritime features, block rival state access, and execute gray-zone operations below the threshold of open armed conflict.

- The China Coast Guard (CCG) and People's Liberation Army Navy (PLAN): Operates as a heavily armed backstop, employing water cannons, long-range acoustic devices, ramming maneuvers, and military surveillance to intimidate rival claimants and protect Chinese vessels.

This gray-zone strategy intentionally blurs the legal line between civilian economic enterprise and state-directed military force, posing severe challenges to international law (PCA, 2016; Spijkers et al., 2019). By using civilian fishing fleets as proxy instruments of territorial expansion, state actors create severe operational ambiguity.

When a nation's coast guard responds to an illegal fishing incursion within its recognized exclusive economic zone, it risks encountering heavily armed maritime militia or coast guard vessels operating under broad engagement rules. This integration of fisheries and naval power dramatically increases the risk of

operational miscalculation, where a routine fisheries enforcement action can escalate into a diplomatic standoff or armed military confrontation (Spijkers et al., 2019). Fishing vessels are no longer merely economic units; they have been converted into physical assertions of sovereignty and instruments of state power.

Scarborough Shoal: Flashpoint of Fisheries, Sovereignty, and Power Projection

Scarborough Shoal (known as Bajo de Masinloc in the Philippines and Huangyan Dao in China) represents one of the most volatile flashpoints in the South China Sea. Situated approximately 120 nautical miles west of the Philippine island of Luzon—well within the Philippines' 200-nautical-mile Exclusive Economic Zone—and over 470 nautical miles from China's nearest coastline on Hainan Island, Scarborough Shoal is a high-value geographic feature (PCA, 2016; Dang & Trang, 2025).

The shoal consists of a triangular chain of reefs and rocks surrounding a rich, sheltered lagoon. It provides critical spawning grounds and nursery habitats for commercially vital pelagic and reef fish species across the broader regional ecosystem (PCA, 2016; Dang & Trang, 2025). For generations, artisanal fishers from the Philippines, Vietnam, and China utilized the lagoon as both a safe refuge from high-seas storms and an abundant traditional fishing ground (PCA, 2016).

However, in April 2012, Scarborough Shoal became the site of a tense standoff when Philippine Navy assets attempted to arrest Chinese fishers who had harvested endangered giant clams, corals, and sharks inside the lagoon. In response, China dispatched coast guard and maritime surveillance vessels to block Philippine law enforcement, leading to a prolonged confrontation.

Following a negotiated withdrawal brokered by international third parties, Chinese maritime forces maintained effective physical control around the shoal (PCA, 2016). Since 2012, Beijing has maintained a continuous presence of China Coast Guard and maritime militia ships around Scarborough Shoal, restricting access to the lagoon and periodically driving away Filipino fishers using water cannons, acoustic devices, and physical vessel blockades (PCA, 2016; Dang & Trang, 2025).

The dispute over Scarborough Shoal was a primary driver behind the Philippines' decision to initiate historic legal proceedings against China under Annex VII of UNCLOS in January 2013 (PCA, 2016). In its unanimous landmark award issued on July 12, 2016, the Arbitral Tribunal at the Permanent Court of Arbitration reached several critical legal conclusions regarding Scarborough Shoal and maritime resource management:

- Invalidation of Historic Rights: The Tribunal ruled that China's claims to historic rights or sovereign resources within the "nine-dash line" were legally invalid to the extent they exceeded the explicit geographic limits of maritime entitlements established under UNCLOS (PCA, 2016).

- Traditional Fishing Rights: The Tribunal determined that Scarborough Shoal constitutes a

high-tide feature entitled only to a 12-nautical-mile territorial sea, and that artisanal fishers from both the Philippines and China possessed long-standing, traditional fishing rights within the shoal's lagoon (PCA, 2016).

• Interference with Sovereign Rights: The Tribunal found that China had unlawfully interfered with the traditional fishing rights of Filipino fishers by physically blocking their access to the shoal after May 2012 (PCA, 2016).

• Failure to Prevent Ecological Damage: The Tribunal held that China had breached its international legal obligations under Article 192 and Article 194 of UNCLOS to protect and preserve the marine environment by tolerating and actively escorting Chinese fishing fleets engaged in the destructive harvesting of endangered giant clams, sea turtles, and coral reef ecosystems around Scarborough Shoal and the Spratly Islands (PCA, 2016).

Despite the legally binding nature of the 2016 Arbitral Award under international law, China explicitly rejected the tribunal's jurisdiction and declared the decision "null and void." Over the subsequent decade, confrontation around Scarborough Shoal has continued to escalate.

In late April 2026, the People's Liberation Army Southern Theater Command conducted combat readiness air and naval patrols around Scarborough Shoal (Reuters, 2026a). These exercises were executed in direct response to large-scale joint military and maritime maneuvers conducted by Philippine and United States armed forces in surrounding waters under the framework of the bilateral Visiting Forces Agreement (Reuters, 2026a).

More recently, in mid-2026, diplomatic protests erupted after the Philippine Coast Guard identified and documented a long, floating barrier deployed by Chinese vessels across the mouth of Scarborough Shoal lagoon, designed to physically deny entry to Philippine small-scale fishers (Reuters, 2026b). While Chinese foreign ministry officials defended these installations as legitimate marine spatial management and "comprehensive scientific research" assets, Manila condemned the barriers as illegal sovereign overreach that threatened coastal livelihoods (Reuters, 2026b).

These developments demonstrate how fisheries access, legal arbitration, non-lethal gray-zone tactics, and major-power geopolitical balancing are tightly intertwined around a single, ecologically fragile maritime feature.

Environmental Degradation: Island Building and Ecological Destruction

The environmental costs of militarized maritime disputes in the South China Sea extend far beyond the over-extraction of wild fish stocks; they include severe physical destruction of fragile marine ecosystems. The 2016 Arbitral Tribunal evaluated detailed oceanographic, satellite, and ecological evidence, concluding that China's large-scale land reclamation, island-building operations, and artificial construction projects across the Spratly Islands caused irreversible damage to critical coral reef ecosystems (PCA, 2016).

Between 2013 and 2016, state-owned Chinese dredging fleets deployed cutter-suction vessels across major features in the Spratlys—including Mischief Reef, Subi Reef, Fiery Cross Reef, Hughes Reef, Johnson South Reef, Cuarteron

Reef, and Gaven Reef—creating over 3,000 acres of artificial land to support military runways, deep-water harbors, radar installations, and missile emplacements (PCA, 2016). The physical process of dredging involved grinding up live, high-biodiversity coral reef crests and pumping millions of metric tons of sand, silt, and crushed limestone over living lagoons (PCA, 2016).

This dredging process generated massive, persistent sediment plumes that drifted across surrounding reef systems, smothering benthic habitats, blocking sunlight essential for coral photosynthesis, and killing marine life across vast areas of the ocean floor (PCA, 2016). Marine biologists estimate that these land reclamation activities permanently destroyed thousands of hectares of living coral reefs that had functioned for millennia as primary spawning and larval dispersal centers for pelagic species across the South China Sea.

Furthermore, the 2016 Arbitral Tribunal documented severe, deliberate environmental damage caused by specialized Chinese harvesting methods in the Spratlys and around Scarborough Shoal (PCA, 2016). To harvest rare giant clam (Tridacna gigas) shells, which are highly valued as luxury commodities and carving materials in mainland China, fishing crews used customized boat propellers mounted on long shafts to cut up coral reef flats (PCA, 2016).

These propeller-harvesting operations shredded entire reef ecosystems, destroying hundreds of square kilometers of healthy coral reefs (PCA, 2016). The Tribunal found that Chinese law enforcement vessels were aware of these practices and actively protected domestic fleets engaged in these illegal operations within contested waters (PCA, 2016).

The destruction of these coral reef systems undermines the long-term ecological foundation of regional fisheries. Coral reefs occupy less than 0.1% of the global ocean floor, yet they support over 25% of all marine life, acting as critical feeding, breeding, and nursery grounds for pelagic species that sustain coastal populations across Southeast Asia. Destroying these habitat engines while climate change accelerates ocean warming severely impairs the marine ecosystem's ability to recover, pushing regional fisheries toward systemic collapse.

From Competition to Cooperation: Institutional Governance Realities

Despite escalating security risks and habitat destruction, current international legal regimes, regional institutions, and multilateral governance structures remain ill-equipped to address the complex interplay of climate change, fisheries depletion, and maritime boundary disputes (Mendenhall et al., 2020; Spijkers et al., 2019). The primary structural limitation stems from the territorial focus of UNCLOS itself. UNCLOS operates under a territorial state framework that grants coastal nations sovereign rights over living resources within a 200-nautical-mile Exclusive Economic Zone (Article 56) and obligates states to cooperate in managing straddling and highly migratory fish stocks (Articles 63 and 64).

However, climate change disrupts this legal model by driving fish stocks across state lines and un-demarcated maritime boundaries (Mendenhall et al., 2020; Pecl et al., 2017). Existing Regional Fisheries Management

Organizations (RFMOs) often lack real-time stock assessment capabilities, dynamic spatial management tools, and binding enforcement mechanisms needed to manage climate-induced stock shifts (Mendenhall et al., 2020).

In the South China Sea, establishing an effective RFMO is blocked by unresolved sovereignty disputes. States are reluctant to enter binding multilateral management agreements or share fisheries catch data out of fear that doing so could compromise their underlying territorial claims or signal tacit recognition of rival claims.

Despite these structural hurdles, legal scholars, oceanographers, and security analysts have proposed several pathways to transition from confrontation to sustainable resource management:

1. Joint Scientific Research and Marine Environmental Benchmarking

Scientific collaboration provides a politically neutral platform for interstate engagement. Developing joint marine scientific research initiatives—focused on tracking sea surface temperatures, assessing regional larval flows, mapping coral bleaching, and measuring fish biomass—allows claimant states to build common empirical baselines without directly addressing sovereign boundaries (Spijkers et al., 2019). Initiatives modeled after the historic Joint Oceanographic Marine Scientific Research Expeditions (JOMSRE) conducted by the Philippines and Vietnam demonstrate that scientific cooperation can build trust and generate valuable data for managing regional ecosystems.

2. Provisional Measures and Coordinated Fisheries Agreements

Under Article 74(3) and Article 83(3) of UNCLOS, states with overlapping maritime boundary claims are legally obligated to make every effort to enter into practical, provisional arrangements during transition periods. These provisional measures must not jeopardize or hamper reaching a final boundary agreement.

Claimant states could establish joint management zones, seasonal fishing moratoriums based on shared ecological data, and standardized cross-border vessel monitoring systems (VMS) across disputed areas (Mendenhall et al., 2020). By setting aside sovereign claims to establish shared resource management protocols, states can halt over-extraction while keeping legal options open.

3. The Scarborough Peace Park Framework

An innovative proposal involves converting highly contested features into transboundary Marine Protected Areas (MPAs). Dang and Trang (2025) argue that establishing a "Scarborough Peace Park" could de-escalate tensions surrounding Scarborough Shoal.

Under this model, claimant states would pause unilateral military deployments and maritime militia presence around the shoal, delegating environmental stewardship to a joint management commission composed of regional scientists, conservationists, and coast guard representatives (Dang & Trang, 2025).

The peace park model would freeze all commercial extraction inside the shallow lagoon, turning the shoal into a no-take biological

sanctuary to replenish fish stocks throughout the regional ecosystem (Dang & Trang, 2025). This approach draws inspiration from successful international precedent, such as the Antarctic Treaty System and the Red Sea Peace Park, demonstrating that shared environmental preservation can build trust in contested spaces.

Conclusion: Reframing Maritime Governance for a Warming Century

The South China Sea demonstrates how anthropogenic climate change alters geopolitical relationships without acting as a direct, singular cause of armed conflict. By warming ocean waters, shifting marine ecosystems, damaging fragile habitats, and intensifying competition over declining fish stocks, climate change strains traditional maritime governance frameworks and raises the strategic stakes of territorial disputes (Mendenhall et al., 2020; Pecl et al., 2017).

The traditional model of maritime sovereignty—built on fixed geographic zones, exclusive resource extraction rights, and militarized coastal enforcement—is ill-suited for a warming world. When living marine resources shift across legal lines and fragile coral ecosystems face severe environmental stress, relying on unilateral power projection and gray-zone coercion accelerates ecological degradation and increases the risk of regional militarized conflict.

For national policymakers, legal scholars, and defense strategists, the policy mandate is clear: maritime security and ecological sustainability are inextricably linked. Managing marine resources through a climate-security framework is essential for environmental survival and regional peace.

The future stability of the South China Sea—and the food security of the millions who depend on it—will ultimately depend on whether claimant states choose joint stewardship over unilateral confrontation. By establishing flexible, climate-resilient regional institutions capable of managing shared ecological systems, states can build a stable, sustainable maritime order for the twenty-first century.

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CLIMATE POLICY & ENVIRONMENT



Australia's Border Security Dilemma: Climate Migration and Operation Sovereign Borders

Evaluating the Effectiveness and Morality of Operation Sovereign Borders

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About the Article

Australia's rigorous border security suggests that the emerging flows of environmental refugees could face similar deterrence measures rather than access to asylum.

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Climate Change and Human Mobility: The Securitisation Paradigm

The phenomenon of climate change symbolises one of the most pressing multi-dimensional challenges of the 21st century (Tavares Da Costa et al., 2023). Accelerating global environmental degradation manifests through both rapid-onset climate shocks—such as intense tropical cyclones, severe flash flooding, and catastrophic wildfires—and slow-onset environmental disruptions, including sea-level rise, ocean acidification, coastal erosion, desertification, and protracted droughts (Chesler, 2024; Tavares Da Costa et al., 2023). These environmental transformations do not occur in a socio-political vacuum; rather, they interact directly with pre-existing political vulnerabilities, socio-economic inequalities, weak governance structures, and resource dependencies across developing regions. The resulting conditions of acute food and water scarcity, physical unsafety, widespread destruction of critical infrastructure, livelihood collapse, and economic repression have contributed to growing patterns of human displacement and regional migration flows (Chesler, 2024; Tavares Da Costa et al., 2023).

As global environmental shifts severely disrupt agrarian economies and urban settlement viability across the Global South, traditional analytical distinctions between voluntary economic migrants and involuntary asylum seekers have grown increasingly blurred and insufficient. Consequently, these alarming changes in the global sociopolitical landscape have compelled national governments around the world to integrate climate change, environmental stress, and human mobility directly into their national security agendas, systematically expanding military roles into border control operations (Chesler, 2024; McDonald, 2025).

This paradigm shift represents a fundamental conceptual transition in global governance: the re-framing of environmental displacement from a humanitarian crisis requiring international solidarity into an existential national security threat demanding military enforcement and sovereign deterrence (McDonald, 2025; Parker, 2022). Military involvement is particularly evident in the strategic operational frameworks adopted by national security institutions to respond to the projected upsurge of climate-induced human displacement and manage maritime border control operations (McDonald, 2025; Parker, 2022). By operationalising border enforcement through a military lens, sovereign states prioritise territorial integrity, national sovereignty, and physical defense above universal human rights protections, systematically framing asylum seekers and displaced populations as existential security threats to domestic stability, public order, and social cohesion (Hodge, 2015).

This security-focused agenda is prominently reflected in Australia's aggressive maritime migration policy, known as "Operation Sovereign Borders" (OSB), which was explicitly established to prevent and deter unauthorized maritime arrivals of asylum seekers (ASRC, 2013). Operation Sovereign Borders was established in September 2013 by Prime Minister Tony Abbott as a military-led, multi-agency border security initiative operating under the administrative and operational control of a three-star ADF lieutenant

general within the Department of Defence and the Australian Border Force (Hodge, 2015; Huynh, 2023). OSB's core operational mechanisms combined forceful boat turnbacks and offshore vessel interception, extraterritorial offshore processing in developing Pacific island jurisdictions such as the Republic of Nauru and Papua New Guinea's Manus Island, and the restrictive granting of temporary protection visas to ensure that incoming asylum seekers were permanently denied settlement rights in Australia (ASRC, 2013; Huynh, 2023).

Climate-driven border securitisation frames the effects of climate change, particularly migration, as national security issues requiring militarised responses to protect territorial sovereignty.

To justify and sustain these extraordinary executive measures, the Australian government deployed a strategic framing agenda that heavily utilized military terminology and the language of warfare, actively depicting asylum seekers not as vulnerable victims of persecution or environmental disaster, but as illegal infiltrators, sovereign threats, and strategic adversaries (Hodge, 2015).

This militarised border security architecture intersects directly with the worsening environmental crisis across the Indo-Pacific region, where escalating frequencies of extreme weather events, thermal ocean expansion, and rising sea levels are threatening the territorial integrity, freshwater security, and long-term habitability of low-lying island nations (Parker, 2020; Parker, 2022). As environmental degradation forces vulnerable island populations from their homelands, growing numbers of displaced people are seeking refuge and resettlement in regional centers such as Australia.

However, Australia's rigid border security posture suggests that emerging flows of environmental refugees could face similar punitive deterrence measures, sovereign maritime interception, and administrative rejection rather than legal recognition or humanitarian asylum (McDonald, 2025; Parker, 2020).

"Australia's rigorous border security suggests that the emerging flows of environmental refugees could face similar deterrence measures rather than access to asylum."

Theoretical Foundations: Securitisation Theory and Environmental Displacement

To fully comprehend the operational logic, political durability, and societal acceptance of militarised border responses like Operation Sovereign Borders, it is necessary to examine the theoretical frameworks governing state responses to human mobility. According to the Copenhagen School of security studies, securitisation occurs when a political actor uses a discursive "speech act" to frame a specific issue, social phenomenon, or group of people as an existential threat to a designated referent object —typically the sovereign state, physical territory, or dominant cultural identity (Hodge, 2015; McDonald, 2025). By successfully persuading the public and political elites that an issue poses an imminent existential danger,

political leadership gains the moral and legal authority to bypass standard democratic deliberation, suspend conventional civil liberties, and deploy extraordinary emergency measures, such as military border deployment, maritime blockades, and indefinite administrative detention (Hodge, 2015).

In the context of climate-induced human displacement, securitisation operates by converting ecological vulnerabilities into external strategic hazards (McDonald, 2025; Parker, 2022). Rather than framing environmental displacement as a systemic failure of global carbon mitigation or a collective international governance responsibility requiring climate justice and development aid, states adopt an isolationist "fortress" mentality. Under this model, state border infrastructure is conceptualised as a defensive shield designed to protect domestic resources, welfare systems, public infrastructure, and social harmony from external destabilisation (Chesler, 2024; Huynh, 2023). Displaced persons are stripped of their human agency, individual narratives, and socio-historical context; instead, they are discursively transformed into statistical abstractions, "waves," or demographic pressures capable of overwhelming state capacity and social order (Hodge, 2015).

This securitised narrative relies heavily on the criminalisation of mobility modes. By conflating irregular maritime entry with criminal acts, sovereign incursions, and transnational security risks, governments justify the total militarisation of civil maritime borders (ASRC, 2013; Hodge, 2015). In the case of Australia, this discursive strategy allowed the state to frame boat turnbacks not as a violation of international humanitarian norms, but as a lawful defense of maritime sovereignty and national self-determination (Hodge, 2015; Huynh, 2023). Consequently, human security—defined as individual protection from physical violence, environmental harm, economic starvation, and state persecution—is systematically subordinated to traditional state-centric security, laying the groundwork for severe legal, ethical, and geopolitical contradictions.

Competing Perspectives on Operation Sovereign Borders

Strategic and Operational Arguments: Deterrence, Efficiency, and Equity

Proponents of Operation Sovereign Borders argue that the policy achieved unprecedented strategic effectiveness and demonstrated the utility of decisive state power in managing irregular maritime boundaries (Huynh, 2023; Wood, 2026). Advocates emphasize that a military-led command structure was necessary to systematically dismantle the established business model of transnational human-smuggling syndicates that operated with virtual impunity across Southeast Asia (Huynh, 2023). Following a dramatic surge in unauthorised maritime arrivals between 2008 and 2012—during which over 50,000 individuals arrived via irregular sea routes on hundreds of unseaworthy vessels—the implementation of OSB's uncompromising deterrence posture brought irregular vessel crossings to a near-total halt (Huynh, 2023; Wood, 2026). Official government records indicate that while hundreds of boats attempted the crossing in peak years, only a single unauthorised maritime vessel reached the Australian mainland in 2014, with

zero successful vessel arrivals reported for nearly a decade thereafter (Wood, 2026).

From an operational and financial standpoint, supporters maintain that this total reduction in irregular maritime traffic allowed the Australian Defence Force (ADF) and Australian Border Force (ABF) to optimize resource allocation (Huynh, 2023). By ending the requirement for continuous, emergency maritime search-and-rescue and interception operations across thousands of square nautical miles of the Indian Ocean, naval assets and coastal patrol units could be redeployed toward core national security priorities, regional stability missions, and strategic maritime domain awareness (Huynh, 2023; Parker, 2020). Proponents argue that despite the high initial capital outlay for offshore processing facilities on Nauru and Manus Island, the elimination of ongoing maritime rescue missions and domestic processing bottlenecks produced significant long-term operational savings for the national defense and border protection budgets (Huynh, 2023).

Furthermore, defenders of OSB frame the policy as a humanitarian imperative centered on life-saving deterrence (Huynh, 2023; Wood, 2026). Between 2008 and 2013, when maritime turnback policies were inactive, an estimated 1,200 asylum seekers drowned at sea in hazardous, unseaworthy vessels managed by predatory people smugglers (Wood, 2026). By establishing a strict, predictable policy of zero maritime admittance, OSB removed the financial and practical incentive for vulnerable individuals to undertake life-threatening ocean voyages, resulting in zero recorded maritime drownings in Australian waters in the years following its implementation (Huynh, 2023; Wood, 2026).

In addition to safety arguments, proponents contend that military border enforcement restores procedural equity and fairness to the national immigration framework (Huynh, 2023). Uncontrolled maritime entry allows wealthier asylum seekers who possess the financial capital to pay transnational human smugglers to circumvent official humanitarian channels, effectively jumping ahead of millions of destitute, vulnerable refugees residing in overseas UNHCR camps who lack the financial means for illegal transit (Huynh, 2023). By closing the irregular maritime pathway, Australia restored integrity to its structured offshore humanitarian intake program.

Finally, supporters argue that rigid border enforcement preserves domestic social cohesion, political stability, and public confidence in legal immigration channels (Huynh, 2023; Wood, 2026). By demonstrating total state control over national borders, the policy neutralised populist anti-immigrant sentiment and prevented the political radicalisation and social polarization observed in European nations struggling with unregulated migration crises (Huynh, 2023). This restored confidence is reflected in longitudinal public opinion data. While 78 percent of Australians expressed extreme anxiety regarding unauthorised boat arrivals in 2010, the proportion of voters viewing asylum seekers as a critical election issue dropped by more than half by 2022 (Wood, 2026). Survey data from Ipsos indicates that domestic sentiment softened so significantly under secure border settings that 57 percent of Australians now believe refugees make a positive social and economic contribution, three in four support a universal right to asylum, and Australia successfully accepted three times as

many legal humanitarian claims in 2023 than it did in 2013 (Wood, 2026).

Legal, Human Rights, and Diplomatic Criticisms: The Costs of Securitisation

Conversely, legal scholars, human rights organisations, and diplomatic observers vigorously contest the claims of effectiveness and condemn the ethical premises of Operation Sovereign Borders (Amnesty International, 2021; Huynh, 2023). Opponents contend that state sovereignty cannot be exercised in a legal vacuum and that valid national security objectives must remain strictly constrained by international treaty obligations, customary international law, and fundamental human rights norms (Huynh, 2023). Under Article 31 of the 1951 Refugee Convention—to which Australia is a signatory state—governments are explicitly prohibited from imposing penal sanctions on refugees on account of their illegal entry or presence, recognizing that victims of persecution and disaster are frequently forced to cross borders without formal documentation or prior authorization (Amnesty International, 2021; Hodge, 2015). OSB fundamentally breached this legal principle by institutionalising a blanket criminalisation strategy that treated asylum seekers as guilty lawbreakers subject to mandatory offshore detention and administrative banishment (Hodge, 2015).

A critical legal condemnation of OSB centers on Australia's violation of the customary international law principle of non-refoulement, codified under Article 33 of the Refugee Convention and international human rights law (Amnesty International, 2021). Non-refoulement strictly forbids states from expelling, returning ("refouling"), or transferring any individual to a territory where they would face torture, cruel treatment, or threats to their life and freedom (Amnesty International, 2021). By conducting swift high-seas turnbacks and orange-lifeboat transfers without conducting individualized refugee status determinations, legal representation, or vulnerability assessments, Australian maritime forces risked returning asylum seekers directly to persecution or indirect chain-refoulement through third countries (Amnesty International, 2021; Huynh, 2023).

Furthermore, human rights monitoring bodies, including Amnesty International (2021), documented extensive breaches of the UN Protocol Against the Smuggling of Migrants by Sea. Australian authorities subjected intercepted asylum seekers to arbitrary at-sea detention, denied access to legal counsel and independent medical assessments, and subjected detainees to inhumane and degrading treatment (Amnesty International, 2021). In offshore processing centers on Nauru and Manus Island, conditions were described by international observers as amounting to systemic institutional abuse and psychological torture (Amnesty International, 2021; Huynh, 2023). Between 2012 and 2021, the average duration an individual spent in Australian immigration detention reached an unprecedented global record of 627 days, culminating in severe psychiatric trauma, widespread self-harm, and multiple preventable deaths (Huynh, 2023).

Diplomatically, critics argue that OSB's isolationist framework severely damaged Australia's international standing and eroded regional cooperation across the Indo-Pacific (ASRC, 2013; Huynh, 2023). Rather than contributing to regional burden-sharing or

resolving the root causes of forced migration, Australia unilaterally shifted its humanitarian obligations onto economically vulnerable neighboring states (Wood, 2026). Maritime turnback operations provoked recurring diplomatic friction with Indonesia, whose government repeatedly condemned Australian naval incursions into its territorial waters as overt violations of national sovereignty (ASRC, 2013; Huynh, 2023). Moreover, by establishing a precedent of militarised rejection, Australia undermined international norms governing refugee protection, providing autocratic regimes worldwide with a legal and operational pretext to justify their own border closures, pushbacks, and forced returns (Huynh, 2023).

Climate Securitisation and Regional Realities in the Indo-Pacific

The intersection of climate change, human mobility, and militarised border architecture presents a severe governance challenge for the Indo-Pacific region (McDonald, 2025; Parker, 2020). The Pacific region contains several low-lying atoll nations—most notably Tuvalu, Kiribati, and the Marshall Islands—where the maximum land elevation rarely exceeds two to three meters above sea level (Parker, 2020; Parker, 2022). Comprehensive climate projections indicate that accelerating sea-level rise, combined with saltwater intrusion into freshwater lens aquifers, coastal erosion, and agricultural soil salinisation, will render significant portions of these island territories physically uninhabitable decades before complete submersion occurs (Parker, 2020).

Under current international legal definitions, individuals displaced primarily by environmental degradation or climate disasters do not meet the criteria for "refugee" status under the 1951 Refugee Convention, which strictly requires a well-founded fear of persecution based on race, religion, nationality, membership of a particular social group, or political opinion (McDonald, 2025). This institutional gap creates a legal normative vacuum: climate-displaced individuals face existential threats to their survival, yet possess no legally binding right to cross international borders, claim asylum, or demand protection in neighboring developed states (McDonald, 2025; Parker, 2022).

If regional middle powers like Australia continue to rely exclusively on militarised deterrence frameworks modeled after Operation Sovereign Borders, climate-induced displacement in the Pacific will inevitably trigger humanitarian crises and regional instability (McDonald, 2025; Parker, 2020). Applying naval turnbacks, offshore interception, and administrative detention to populations whose homelands are rendered uninhabitable by global greenhouse gas emissions represents a profound moral contradiction (McDonald, 2025). Australia's high per capita carbon footprint and historical resource extraction position it as a major contributor to regional environmental change, while small island developing states contribute minimally to global emissions yet endure its most immediate consequences (Parker, 2022). Refusing entry to climate-displaced Pacific neighbors through military deterrence risks damaging Australia's strategic partnerships in the region, creating geopolitical openings for competing major powers—such as China—to expand their diplomatic, economic, and security influence across the Pacific by offering climate adaptation assistance and development finance (Parker, 2020; Parker, 2022).

Rethinking Governance: Beyond Securitisation Toward Cooperative Mobility

Addressing the crisis of climate-induced displacement requires moving beyond pure militarisation toward comprehensive, regional mobility frameworks based on human security, international solidarity, and proactive adaptation (McDonald, 2025; Wood, 2026). Military border operations treat the symptoms of human mobility while ignoring its underlying environmental, economic, and structural drivers (Chesler, 2024; McDonald, 2025). To establish a sustainable, long-term policy response, middle powers must replace punitive deterrence architectures with legal pathways, managed labor mobility schemes, and international burden-sharing mechanisms (McDonald, 2025; Wood, 2026).

An exemplary step toward progressive climate mobility governance is reflected in bilateral initiatives such as the Australia-Tuvalu Falepili Union treaty (Wood, 2026). Signed in late 2023, this historic agreement establishes a dedicated visa pathway allowing Tuvaluan citizens to live, study, and work in Australia, providing a dignified adaptation pathway for islanders facing environmental displacement without requiring them to rely on irregular maritime routes or apply for traditional refugee status (Wood, 2026). Expanding similar bilateral and multilateral mobility agreements across the Pacific represents a constructive alternative to the securitisation framework, converting forced migration into managed, dignified mobility (McDonald, 2025; Wood, 2026).

Furthermore, regional security strategies must integrate environmental protection and climate resilience directly into defense planning (McDonald, 2025; Parker, 2022). Rather than framing military forces primarily as border enforcement agents tasked with repelling displaced populations, defense capabilities should be oriented toward disaster relief, humanitarian assistance, climate resilience building, and maritime domain awareness across the Indo-Pacific (McDonald, 2025; Parker, 2022). Investing in climate adaptation infrastructure, renewable energy systems, and coastal defense mechanisms within vulnerable Pacific nations helps build local resilience, allowing communities to remain in their ancestral homelands for as long as possible (Parker, 2020; Parker, 2022).

Conclusion

Australia's Operation Sovereign Borders demonstrates clear contradictions regarding the morality, strategic sustainability, and long-term effectiveness of climate securitisation (Hodge, 2015; Huynh, 2023). While the military-led operation successfully prevented the arrival of irregular vessels and asylum seekers, thereby virtually eliminating maritime mortalities in Australian waters, it achieved these operational metrics by compromising international law, human rights, and regional diplomatic cooperation (Amnesty International, 2021; Huynh, 2023; Wood, 2026).

As climate change continues to degrade environmental stability, destroy agrarian livelihoods, and threaten territorial habitability across the Indo-Pacific, the volume of vulnerable displaced populations will inevitably expand (Chesler, 2024; McDonald, 2025). Replicating punitive military deterrence operations against environmental refugees represents a shortsighted, financially burdensome, and

ethically tenuous strategy that undermines multilateral diplomatic trust and regional stability (McDonald, 2025; Parker, 2020). Ultimately, the fundamental question facing national policymakers is whether isolationist border enforcement can remain viable in an increasingly volatile world, or whether enduring regional security requires replacing militarised border architectures with targeted climate adaptation funding, cooperative regional governance, dignified legal migration pathways, and international climate justice (McDonald, 2025; Wood, 2026).Australia's Operation Sovereign Borders demonstrates clear contradictions regarding the morality, strategic sustainability, and long-term effectiveness of climate securitisation (Hodge, 2015; Huynh, 2023). While the military-led operation successfully prevented the arrival of irregular vessels and asylum seekers, thereby virtually eliminating maritime mortalities in Australian waters, it achieved these operational metrics by compromising international law, human rights, and regional diplomatic cooperation (Amnesty International, 2021; Huynh, 2023; Wood, 2026).

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