No Lock for This:

Concentrated Systemic Impact, the Failure of

Individual Response, and the Ultimate Proof

of Interconnection

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Abstract

Background: The companion studies in this series have demonstrated that human lives are systemically interconnected, that prevention outperforms defence, and that these principles apply at every scale and income level. Each prior study examined consequences from which individuals or nations could, in principle, partially insulate themselves—through locks, insurance, military alliances, or gated communities. This paper examines the one systemic consequence for which no insulation is possible: the degradation of the planetary environment through concentrated industrial emissions, planned obsolescence, and structural waste.

Methods: We compiled data from the Carbon Majors Database (Climate Accountability Institute/InfluenceMap), the PERI Greenhouse 100 Suppliers Index, the UN Global E-Waste Monitor 2024, and related sources to quantify: (1) the concentration of greenhouse gas emissions among a small number of entities; (2) the scale of waste produced by planned obsolescence; and (3) the inefficacy of individual-level responses (recycling) relative to the systemic scale of the problem.

Results: 71% of all industrial fossil fuel and cement greenhouse gas emissions from 1988 to 2015 can be traced to just 100 entities. The top 4 U.S. fossil fuel suppliers alone account for over 26% of U.S. greenhouse gas emissions from supplies. Globally, 62 million tonnes of electronic waste were generated in 2022, rising 82% from 2010, with only 22.3% properly recycled. E-waste generation is growing five times faster than documented recycling. Planned obsolescence—the deliberate design of products to fail—is identified as a primary driver.

Conclusions: Environmental degradation represents the ultimate proof of systemic interconnection: a consequence produced by concentrated actors, distributed across all 8 billion people, from which no individual, corporation, or nation can opt out. There is no lock for an uninhabitable atmosphere. There is no insurance policy for a collapsed ecosystem. There is no gated community on a dead planet. The failure of individual-level responses (recycling, consumer choice) to address systemic-level causes (concentrated industrial emissions, designed obsolescence) demonstrates that the prevention-vs-defence framework requires systemic, not individual, intervention.

Keywords: carbon majors; greenhouse gas emissions; planned obsolescence; e-waste; systemic interconnection; environmental degradation; recycling; collective action

Key Points

- 100 fossil fuel and cement producers are linked to 71% of industrial greenhouse gas emissions since 1988
- The top 4 U.S. fossil fuel suppliers account for over 26% of U.S. greenhouse gas emissions from supplies
- 62 million tonnes of e-waste were generated globally in 2022; only 22.3% was properly recycled
- E-waste generation is rising 5x faster than recycling capacity
- Planned obsolescence—designing products to fail—is a primary driver of waste and resource depletion
- Individual responses (recycling, consumer choice) are structurally inadequate to address systemic-scale causes
- Environmental degradation is the one systemic consequence from which no lock, insurance policy, or border can provide protection

1 Introduction

1.1 The Series So Far

The companion studies in this series have established a framework:

1. Environment determines behaviour (OMXUS, 2026a: Language Study)
2. All human lives are systemically interconnected (OMXUS, 2026b: Security Study)
3. Prevention outperforms defence at every scale (OMXUS, 2026c: Europe Study)

4. These principles apply at every income level (OMXUS, 2026d: Deprivation Study)

Each prior study examined a domain in which the interconnection, while real, could be partially managed through individual or national action. You can buy a lock. You can purchase insurance. You can join a military alliance. You can build a gated community. These are expensive and inefficient responses—the series has demonstrated that prevention is cheaper—but they are *available*. A person can, in principle, reduce their personal exposure to the consequences of others' actions.

This paper examines the domain where that is no longer true.

1.2 The Final Proof

The degradation of the planetary environment—climate change, resource depletion, ecosystem collapse—is the consequence from which no individual action can provide protection. You cannot buy a lock for the atmosphere. You cannot insure against the loss of a habitable planet. You cannot build a gated community that excludes rising sea levels, collapsing food systems, or toxic air.

This makes environmental degradation the ultimate proof of systemic interconnection: a consequence produced by a concentrated number of actors, distributed across all 8 billion people, from which no one—regardless of wealth, status, or geography—can opt out.

2 The Concentration of Cause

2.1 The Carbon Majors

The Carbon Majors Database, originally constructed by Richard Heede of the Climate Accountability Institute and updated by InfluenceMap, traces greenhouse gas emissions upstream to the entities that produced the fossil fuels. The findings are stark:

- 71% of all industrial fossil fuel and cement greenhouse gas emissions from 1988 to 2015 can be traced to just 100 entities (CDP/CAI, 2017)
- 63% of all carbon dioxide and methane emitted between 1751 and 2010 can be traced to just 90 entities (Heede, 2014)
- The top 20 carbon major entities from 2016–2022 alone account for over 65% of global CO_2 emissions, with China's coal production contributing 25.8% (InfluenceMap, 2024)

It is important to note, as several analyses have clarified, that these figures refer specifically to industrial fossil fuel and cement emissions, not to total global emissions (which also include agriculture, deforestation, and other sources). Nevertheless, fossil fuel combustion remains the dominant source of anthropogenic greenhouse gases, and the concentration of production among a small number of entities is beyond dispute.

2.2 U.S. Greenhouse 100 Suppliers

The PERI Greenhouse 100 Suppliers Index provides granular data on U.S. emissions by corporate entity. Table 1 presents the top 10 suppliers.

Four corporations account for more than a quarter of all U.S. greenhouse gas emissions from supplies. Ten account for nearly half. This is not a distributed problem. It is a concentrated one.

2.3 The Shift Toward State Actors

The updated Carbon Majors data reveals a critical trend: the bulk of emissions are increasingly coming from nation-states and state-owned entities rather than investor-owned companies. From 2016 to 2022, nation-state producers accounted for 38% of

Table 1: Top 10 U.S. Greenhouse Gas Suppliers, 2023

Rank	Corporation	Emissions (Mt CO_2)	% of U.S. Total
1	Marathon Petroleum	401.2	8.2%
2	Phillips 66	301.5	6.2%
3	Exxon Mobil	297.4	6.1%
4	Valero Energy	273.3	5.6%
5	Core Natural Resources	191.0	3.9%
6	Peabody Energy	183.6	3.8%
7	Chevron	144.0	2.9%
8	Enterprise Products	128.0	2.6%
9	PDVSA	111.5	2.3%
10	PBF Energy	106.5	2.2%
Top 4		**1,273.5**	**26.1%**
Top 10		**2,138.1**	**43.8%**

Source: PERI Greenhouse 100 Suppliers Index, 2023 emissions data. Emissions include fossil fuel supplies (production-linked).

database emissions, state-owned entities for 37%, and investor-owned companies for only 25% (InfluenceMap, 2024).

This means that the locus of systemic impact is shifting toward actors that are even less responsive to market pressure or consumer choice than private corporations—further undermining the efficacy of individual-level responses.

3 The Amplification of Waste: Planned Obsolescence

3.1 Designing for Disposal

Planned obsolescence is the deliberate design of products to have a limited lifespan, ensuring that consumers must replace them at regular intervals. This practice is driven by a straightforward incentive: a product that lasts indefinitely generates one sale; a product that fails after the warranty period generates repeated sales.

The consequence is an accelerating cycle of extraction, manufacture, consumption, and

waste. The product that *could* last 30 years is designed to last 5, tripling the demand for raw materials, energy, manufacturing capacity, and waste disposal—not because the technology doesn't exist to build durable goods, but because the incentive structure rewards disposal over durability.

3.2 The E-Waste Crisis

The UN Global E-Waste Monitor 2024 documents the consequences:

- 62 million tonnes of e-waste were generated globally in 2022—an 82% increase from 34 million tonnes in 2010
- This is equivalent to 1.55 million 40-tonne trucks, enough to form a bumper-to-bumper line encircling the equator
- Only 22.3% was documented as properly collected and recycled
- E-waste generation is rising by 2.6 million tonnes annually and is projected to reach 82 million tonnes by 2030
- USD $62 billion worth of recoverable materials was unaccounted for in 2022
- E-waste generation is growing **five times faster** than documented recycling

The primary drivers are identified as shortened product lifecycles due to planned obsolescence and perceived obsolescence (discarding functioning products in favour of newer models), increased consumer demand, and rising global incomes enabling wider access to electronic goods (UNITAR/ITU, 2024).

3.3 The Recycling Illusion

Individual recycling is frequently presented as a meaningful response to waste and environmental degradation. The data suggest otherwise.

Even at maximum documented recycling rates (42.8% in Europe, the global leader), the majority of e-waste is not properly processed. Globally, the recycling rate is 22.3% and *declining relative to generation*. The gap between waste production and recycling capacity is widening, not closing.

More fundamentally, recycling addresses the *symptom* (waste that has already been produced) rather than the *cause* (an incentive structure that rewards producing waste). It is the equivalent of bailing water from a boat while someone continues drilling holes in the hull. The bailing is not meaningless—it slows the sinking—but it cannot solve the problem because it does not address the source.

This is the lock-vs-prevention argument in environmental form. Recycling is the lock. Changing the incentive structure—eliminating planned obsolescence, mandating durable design, pricing externalities into production—is the prevention. And as with every other domain in this series, prevention is cheaper.

4 The Ultimate Proof of Interconnection

4.1 No Opt-Out

In every prior paper in this series, the consequence of interconnection could, in principle, be partially managed at the individual level:

- Crime affects you → buy a lock
- Others' health affects your costs → buy insurance
- War threatens your nation → build an alliance

Environmental degradation breaks this pattern. There is no individual action that insulates you from a degraded atmosphere. The CO_2 emitted by Marathon Petroleum does

not respect property lines, national borders, or socioeconomic status. The e-waste leaching mercury into groundwater does not check the postcode of the aquifer. The collapsing ecosystem does not distinguish between the person who recycled and the person who did not.

This is the final, irrefutable proof of the proposition established in the Security Study: *there is no "outside."* You are in the system. The system's consequences reach you. The only question is whether you acknowledge it.

4.2 The Incentive Structure

The environmental crisis is, at its core, an incentive structure problem. The entities producing the majority of emissions are operating rationally within their incentive environment: fossil fuel extraction is profitable, planned obsolescence generates repeat sales, and the costs of environmental degradation are externalised to the global commons.

This is identical to the dynamic described in the Security Study: the structural incentive (profit from extraction) overpowers the declared intention (sustainability goals, net-zero pledges). The road is wide and smooth; the sign says "speed limit." The road wins.

Solving the problem therefore requires changing the incentive structure, not appealing to individual virtue. Just as European integration changed the incentive structure for interstate war (making cooperation more profitable than conflict), environmental policy must change the incentive structure for extraction and waste (making durability more profitable than obsolescence, making clean energy more profitable than fossil fuels).

4.3 The Timeline

Unlike the other domains in this series, environmental degradation operates on a timeline that does not allow indefinite delay. Climate scientists have identified thresholds

beyond which certain effects become irreversible. The IPCC has estimated that limiting warming to 1.5°C above pre-industrial levels requires global emissions to reach net zero by approximately 2050.

The current trajectory—with emissions from state-owned producers increasing, e-waste growing five times faster than recycling, and planned obsolescence remaining the dominant product design philosophy—does not converge with this timeline.

This means that the prevention-vs-defence argument, in the environmental domain, has a deadline. In every other domain, the argument is that prevention is *cheaper*. In this domain, prevention is *necessary*—because the alternative is not merely expensive but terminal.

5 Discussion

5.1 The Complete Series

This paper completes the arc of the companion studies:

1. **Language** (2026a): Environment determines behaviour. *Proof*: 1.8 billion people across 8 nations.

2. **Security** (2026b): All lives are connected; prevention beats defence. *Proof*: USD $10+ trillion in annual security spending; Perry Preschool returns $12.90/$1.

3. **Europe** (2026c): This scales to nations. *Proof*: 9 wars in 244 years $\rightarrow$ 0 wars in 80 years.

4. **Deprivation** (2026d): This applies at every income level. *Proof*: U-shaped distribution of dysfunction; affluent youth at 2–3x national average for substance abuse and delinquency.

5. **This Study** (2026e): There is no opt-out. *Proof*: 100 entities linked to 71% of industrial emissions; 62 million tonnes of e-waste annually; no lock, insurance policy, or border protects against atmospheric degradation.

Each paper addresses the next objection in sequence. "Environment doesn't determine behaviour" → yes it does (language). "But people aren't really connected" → yes they are (lock). "But this can't work at scale" → yes it can (Europe). "But this doesn't apply to the rich" → yes it does (deprivation). "But I can insulate myself from the consequences" → no you can't (this paper).

5.2 The Question That Remains

The series has established the facts. What it has not done—and what no academic paper can do—is compel action. The data show that we are connected, that prevention works, that the current approach is the most expensive possible response to interconnection, and that the environmental dimension of this problem has a deadline.

The question that remains is not empirical. It is not "are we connected?" or "does prevention work?" or "is the planet degrading?" The data have answered all of these.

The question is: *knowing all of this, what do we do?*

The lock on your door already answered that question for you, without your permission. It said: you are in the system. You know it. You paid for it.

The atmosphere is now asking the same question, at a scale where the answer cannot be a purchase. It must be a choice.

6 Limitations

1. The "71% of emissions" figure refers specifically to industrial fossil fuel and cement emissions, not total global emissions. The distinction matters and is noted in the text. The concentration of production-linked emissions remains significant regardless.

2. Attribution of emissions to producers (Scope 3) is methodologically distinct from attribution to consumers. Both perspectives are valid; this paper adopts the producer perspective because it illustrates the concentration of systemic impact.

3. The planned obsolescence section relies on general evidence and industry-wide patterns rather than company-specific data on design decisions. Direct evidence of intentional lifespan limitation is difficult to obtain.

4. The paper does not address all sources of environmental degradation (e.g., deforestation, agriculture, land use change), which are significant but fall outside the fossil fuel and waste focus of this study.

5. Climate timelines and tipping points carry inherent uncertainty. The urgency argued here is based on mainstream scientific consensus but is not immune to revision.

7 Conclusions

Your friend the environmental scientist was right. Recycling doesn't solve the problem because the problem isn't that you aren't recycling. The problem is that a small number of entities produce the majority of emissions, that products are designed to become waste, and that the incentive structure rewards all of this.

You can recycle every bottle, sort every bin, and carry a reusable bag to every shop. It will not matter if 100 entities continue to produce 71% of industrial emissions. It will not matter if 62 million tonnes of electronics are designed to fail and replaced every few

years. It will not matter if the incentive structure continues to reward extraction over durability, disposal over repair, and externalisation over accountability.

For every other consequence of interconnection documented in this series, there was a lock available—expensive, inefficient, and inferior to prevention, but available. For this one, there is no lock.

There is no gated community on a dead planet. There is no insurance policy for a collapsed atmosphere. There is no border that keeps out rising seas.

The system is connected. The consequences are shared. The timeline is finite.

The only remaining question is the one that every locked door has already answered: will we invest in the conditions, or will we keep buying locks until there are no doors left to put them on?

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