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Climate Risk and Insurance
When Risks Move Together: From Flooded Homes to
Soaring Energy Bills
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Introduction

Let me introduce you to two families who have never met, live 200 miles apart, and work in completely different industries. Yet they share something important: both have been caught up in the same underlying problem - a problem that affects millions of households across Britain and, increasingly, around the world.

The Hendersons bought their cottage on the Norfolk coast in 2008. Sea views, a short walk to the beach, everything they had dreamed of for retirement. Their home insurance cost about £400 a year - not cheap, but perfectly manageable. Fast forward to last year. Their renewal letter arrived: £2,400. They shopped around. One quote came back at £3,100. Three insurers simply said no.

The Hendersons have not made a single claim. Their house has not flooded. But their postcode has become toxic. The cliffs are eroding faster than anyone predicted, and after two bad winters of coastal flooding up and down the East coast, insurers have decided that Happisburgh is not a place they want to be. The Hendersons are not unlucky individuals. They are caught in a system that is breaking down.

Now meet the Patels, 200 miles away in Preston. In September 2021, their energy supplier - a company called Avro Energy - sent them a cheerful email about their fixed tariff. Three weeks later, Avro did not exist anymore. It had gone bust, along with 28 other UK energy suppliers that year. The Patels were moved to a 'supplier of last resort.' Their monthly bill went from £85 to £190 - not because they used more energy, but because the wholesale price of gas had quadrupled in a matter of months. Putin had not even invaded Ukraine yet. That would make things worse.

The Patels did nothing wrong. They picked a supplier, signed up for a fixed deal, and expected the system to work. It did not.

Here is what I want us to understand tonight: How can a family losing their home insurance on the Norfolk coast and a family watching their energy supplier collapse in Lancashire be experiencing the same underlying problem? One is about weather and buildings. The other is about gas markets and geopolitics. Yet both markets are failing in remarkably similar ways - and the failures are landing on ordinary households. The answer has to do with what happens when risks stop being independent and start moving together. And once you see the pattern, you will spot it everywhere.

Part I: The Beauty of Pooling

Let me show you something with ten coins. Each coin represents a house in a village. Heads means a fire this year; tails means no fire. If I flip them one at a time, we might get two heads—two houses burned down. Next year, maybe one head. The year after, three.

This is the magic of pooling. Fires are essentially random. They do not know about each other. So in any given year, some houses burn and most do not. An insurer can collect premiums from everyone, pay out claims to the unlucky few, and keep a modest reserve for years when the coins come up heads a bit more often than average.

This is why insurance exists. It is not gambling - it is mathematics. The Law of Large Numbers says that with enough independent flips, the average outcome becomes predictable. An insurer does not know which houses will burn but can estimate how many with reasonable confidence.

Energy retail works on a similar principle, though it looks different. Gas prices wobble. Some months they are up, some months down. An energy supplier buys wholesale gas in advance—called hedging—and sells it to you at a fixed price. If they have hedged well, the wobbles cancel out over time. They make a thin margin, you get predictable bills, everyone is happy.

Think of each month's gas price as a coin flip. Sometimes it is a bit higher than expected, sometimes lower. Over a year or two, these fluctuations average out. The supplier can set a retail price that covers their average costs plus a small profit.

Both systems - insurance and energy retail - depend on the same beautiful idea: random variations cancel each other out when you put enough of them together.

But notice what both systems assume: the coins are being flipped independently. Your house fire does not cause my house fire. This month's gas price does not have to predict next month's. The risks are scattered in time and space.

What happens when that assumption breaks?

Part II: When the Coins Flip Together

Forget the coins. Imagine dominoes instead. Suppose I set up a hundred dominoes in a scattered pattern across a table. If one falls over randomly - maybe a small earthquake, maybe a clumsy cat - it might knock over one or two neighbours. Most stay standing. This is like independent risk.

Now imagine I arrange them in a line. One push, and they all go down together. Same dominoes, same probability of that first push, but completely different outcome. This is correlated risk. The bad thing does not happen more often—it happens to everyone at once.

In February 2020, Storms Ciara, Dennis, and Jorge hit the UK in quick succession. Flooding affected properties from South Wales to Yorkshire. Insurers did not face a few scattered claims - they faced thousands of claims, all at once, all from the same cause. The industry paid out over £500 million in three weeks. But here is the key point: it was not £500 million worth of bad luck spread across the year. It was £500 million of bad luck concentrated into a single month. The reserves that would comfortably handle normal years got hammered in weeks.

In autumn 2021, European gas prices did not just rise - they rose *everywhere*, all at once, to levels nobody had hedged against. A UK energy supplier typically hedges 12-18 months ahead. But hedging is expensive, and margins in energy retail are razor-thin. Many smaller suppliers had hedged only partially, betting that prices would stay within historical ranges. When prices quadrupled, every supplier faced the same problem simultaneously. There was no diversification. You could not offset losses in one region with profits in another, because every region was losing money. The dominoes fell together.

Both industries operate on thin capital buffers. This is not greed or stupidity - it is a rational response to competitive markets. If your risks really are independent, you do not need massive reserves. Holding excess capital is expensive; it drags down returns. But thin buffers plus correlated losses equals insolvency.

Think of it this way: if I am an insurer expecting 100 claims per year at £10,000 each, I need about £1 million to cover expected losses, plus maybe a 30% buffer for bad years. Call it £1.3 million in reserves. Now suppose 400 claims arrive in one month because of flooding. I need £4 million immediately, and I only have £1.3 million. Even if I will make the money back over the next three years of normal claims, I do not have three years. I have three weeks before I am insolvent.

Energy suppliers faced the same arithmetic. Avro Energy had about £3 million in assets. When wholesale prices spiked, their obligations to customers exceeded their ability to pay by orders of magnitude. They were not a badly run company caught by gradually declining fortunes—they were a thinly capitalized company hit by a wall of correlated losses.

Part III: The Multipliers — Climate and Geopolitics

Climate change is not just making weather worse. It is making weather more synchronized.

Here is what I mean. Traditionally, a flood in Somerset and a flood in Yorkshire were largely independent events. Different weather systems, different river basins, different timing. Now consider what happens when climate change shifts the jet stream, creates persistent weather patterns, and loads the atmosphere with more moisture. You get what meteorologists call blocking patterns - weather systems that sit in one place for weeks. When those systems dump rain, they dump it everywhere the pattern covers.

The result: floods that hit multiple regions simultaneously, heatwaves that span continents, or droughts that affect crop-growing regions on opposite sides of the globe at the same time. Look at 2022. Europe experienced its worst drought in 500 years.

China had its worst heatwave on record. The American West was parched. These were not three separate events - they were connected through global atmospheric patterns.

For insurers, this is devastating. The whole point of geographic diversification is that a hurricane in Florida does not correlate with flooding in Germany. But climate change is creating correlations that did not exist before.

British insurers used to rely on something called 'return periods.' A one-in-100-year flood was supposed to happen, on average, once per century. You could price insurance around that. But what happens when the one-in-100-year flood starts happening every 20 years? Or when it happens three years in a row, as it did in parts of Yorkshire between 2015 and 2020? The historical data that insurers relied on is not just incomplete - it is misleading. The climate that generated the data no longer exists.

Energy markets have a different multiplier: geopolitical risk. Europe gets – got - about 40% of its natural gas from Russia. That is not 40% of risk nicely spread across hundreds of suppliers. That is 40% of supply concentrated in one actor who can turn off the tap. When Russia invaded Ukraine and Europe sanctioned Russian energy, the price spike was not local. It was not gradual. It hit every European country, every energy supplier, every household at the same time. This is correlation at the speed of news. One phone call between Putin and his energy minister causes dominoes fall from Lisbon to Helsinki.

Let me step back from the specific example of Russian gas and look at the bigger picture. Over the past decade, three overlapping trends have fundamentally reshaped the global order. First, the rise of emerging powers: China, India, Brazil, and others are no longer peripheral players. They are competing for resources, building new supply chains, and asserting influence in ways that create friction with established powers. Second, increasing military conflicts: Ukraine is the most obvious, but look at the Middle East, tensions in the South China Sea, instability across the Sahel. Each conflict does not just cause local suffering - it disrupts energy supplies, food exports, and shipping routes that the global economy depends on. Third, growing trade tensions: Tariffs, sanctions, export controls on technology, reshoring of manufacturing. The integrated global trading system that we built over 30 years is fragmenting.

These are not three separate stories. They feed each other. And they all connect to energy and insurance markets in ways that matter for our argument tonight.

Why does this matter? Climate and geopolitics do not just coexist. They amplify each other. Start with climate driving geopolitics. Water stress is already fueling tensions in river basins shared by multiple countries - the Nile, the Tigris-Euphrates, the Indus. Crop failures drive migration, which destabilises politics. As the Arctic melts, we see a new great-power competition for resources and shipping routes. Extreme weather events strain military and humanitarian budgets everywhere.

Now flip it around. Geopolitics worsens climate outcomes. When major powers are in conflict, climate negotiations stall - look at how difficult it has been to make progress at COP summits when the US, China, and Russia are at odds. Trade wars slow the transfer of clean technology. Sanctions disrupt supply chains for the critical minerals we need for batteries and solar panels. Military spending crowds out investment in climate adaptation.

This is a feedback loop. A warming world creates geopolitical stress. Geopolitical stress makes it harder to address warming.

And both of them create the kind of correlated shocks we have been talking about - shocks that hit energy markets, supply chains, and insurance systems all at once. The Russian gas crisis was not an isolated event. It was one manifestation of a deeper structural problem that is only going to intensify.

Part IV: Tipping Points and Geoengineering Wild Cards

Now I want to introduce a concept that takes us from what is already happening to what could happen - and I will be careful here, because there is genuine scientific uncertainty involved.

Climate scientists have identified what they call tipping points. These are thresholds in the climate system beyond which change becomes self-reinforcing. You push past the threshold, and the system does not gradually return - it shifts to a new state.

Let me give you some examples, with the caveat that scientists disagree about timing and probability. Ice sheet collapse in Greenland or West Antarctica could cause sea levels to rise not gradually, but in sudden jumps. The Amazon rainforest, if it crosses a certain threshold of deforestation and drought, could flip from absorbing carbon to releasing it - and that would disrupt weather patterns across South America and beyond. Permafrost in Siberia and Canada contains vast amounts of methane; if it thaws rapidly, that methane accelerates warming further. The Atlantic circulation that keeps Western Europe relatively mild could slow dramatically. Coral reefs, already under stress, could die off across the tropics, collapsing fisheries that feed hundreds of millions of people.

I am not predicting that all of these will happen, or even happen soon. The science is contested and evolving. But here is why it matters for our argument tonight. Tipping points are, by their nature, correlation accelerators. They do not cause damage gradually and locally. They cause sudden, widespread, correlated impacts - exactly the kind of shocks that break the systems we have been discussing.

If the Greenland ice sheet destabilises faster than expected, it does not flood one coastal city. It threatens coastal property values, insurance markets, and mortgage systems across every continent simultaneously. If the Amazon flips, it does not affect one season's harvest. It disrupts agricultural production, commodity prices, and food supply chains globally.

We have been talking about how existing climate change is creating correlations that did not exist before. Tipping points could amplify that problem by orders of magnitude - taking us from a world of increasing correlation to a world of cascading, interconnected shocks.

Here is something that most people do not realise: we have already been geoengineering the climate - by accident - for decades.

When we burn coal or heavy ship fuel, we release sulphur dioxide into the atmosphere. Those sulphur particles are terrible for human health - they cause respiratory disease and premature death. But they also reflect sunlight back into space. They act as a kind of accidental sunshade. Climate scientists have known for years that air pollution was partially masking the full effect of greenhouse gas warming. We were, in effect, running two experiments at once: warming the planet with carbon dioxide while cooling it slightly with sulphur.

Then we started cleaning up. In 2020, the International Maritime Organization imposed strict new limits on sulphur in ship fuel. Overnight, shipping emissions of sulphur dropped by about

80%. China's clean air policies have dramatically reduced coal pollution over the past decade. These were public health victories - tens of thousands of lives saved from respiratory disease.

But they also removed the accidental sunshade. In 2023 and 2024, ocean temperatures spiked to levels that surprised even climate scientists. The Atlantic was far warmer than models predicted. There is now active debate about how much of that spike was due to removing sulphur pollution. We may have solved one problem - dirty air - and accidentally accelerated another - ocean warming.

I am not saying we should have kept polluting. The health benefits of clean air are real and important. But this is a preview of what intentional geoengineering might look like: complex systems, unexpected interactions, and fixes that create new problems.

Now let me raise an uncomfortable truth that rarely gets discussed in polite climate conversations: not everyone loses from global warming. Russia, for example, may be a net beneficiary - at least in the short term. Warming opens up new farmland in Siberia. It makes Arctic shipping routes viable. It makes oil and gas reserves more accessible. Canada gains longer growing seasons. Parts of Scandinavia become more agriculturally productive.

I am not saying these benefits outweigh the global costs - they do not. But they create misaligned incentives. Why would Russia push aggressively for emissions cuts when warming might benefit its economy? This is one reason why international climate negotiations are so difficult.

Now imagine we add intentional geoengineering to this picture. The most discussed form is solar radiation management - injecting particles into the stratosphere to reflect sunlight, essentially doing deliberately what sulphur pollution did accidentally. In theory, this could cool the planet quickly. In practice, the effects would not be uniform. Models suggest that solar geoengineering could reduce temperatures in some regions while disrupting monsoon patterns in others. One nation's solution might be another nation's agricultural catastrophe. The country that benefits from cooling might be inflicting drought on its neighbour.

And here is the really troubling part: there is no global governance framework for geoengineering. Nothing stops a country—or even a wealthy individual—from acting unilaterally. The technology is not particularly expensive. A nation facing climate catastrophe might decide to act alone, whatever the consequences for others.

This brings us back to our theme. Geoengineering is not just an environmental issue. It is a potential source of correlated risk. If a major geoengineering intervention goes wrong—or triggers international conflict—the effects would not be local or gradual. They would be sudden, global, and simultaneous. Ungoverned geoengineering could add a whole new layer of correlation—human interventions that affect everyone, everywhere, all at once.

Part V: When the System Fails — Who Pays?

Here is what keeps energy economists up at night: climate and geopolitics can amplify each other. A drought in Europe reduces hydroelectric power, increasing demand for gas. A heatwave increases air conditioning demand, spiking electricity prices. If those happen during a geopolitical crisis that has already pushed gas prices up, the effects multiply.

Summer 2022 gave us a preview. Europe was trying to wean itself off Russian gas while simultaneously experiencing a record heatwave and drought. Nuclear plants in France had to reduce output because rivers were too warm to cool them. The Rhine fell so low that barges

could not transport coal to German power plants. Every shock reinforced every other shock. The risks did not just move together—they pushed each other along.

When insurers face correlated losses they cannot handle, they have three options: raise prices, restrict coverage, or exit entirely. All three are happening right now. In flood-prone areas of the UK, premiums have increased 50-100% in the past five years. Some postcodes are seeing 300% increases. Insurers are imposing higher excesses—the portion you pay before insurance kicks in—of £5,000 or even £10,000 for flood damage. And in the highest-risk areas, insurers are simply leaving. They do not change the price, they do not change the terms – they just say ‘no.’

This creates a doom loop. Without insurance, mortgages become impossible. Without mortgages, properties become unsellable. Without buyers, property values collapse. The Hendersons' retirement nest egg evaporates not because their house was damaged, but because the market for insuring houses like theirs has vanished.

If you are watching from California or Australia, you have seen this movie already. Entire towns in fire-prone areas have become uninsurable. In California, the state-run FAIR Plan—the insurer of last resort—saw its exposure grow by 60% in three years. In Australia, some postcodes face premiums that cost more than the average annual income. This is not a British problem; it is a global pattern.

The UK energy crisis created a real-time experiment in correlated failure. Before autumn 2021, about 70 suppliers competed in the UK retail market. By February 2022, 30 had gone bust. We went from a competitive market to an oligopoly in six months. But the costs did not disappear.

When a supplier fails, customers are transferred to another company. That company has to buy energy at current market prices—not the prices the failed supplier had locked in. Someone has to cover the gap. That someone turned out to be all of us. Ofgem, the regulator, spread the costs of supplier failures across all energy bills. Every household in Britain is paying about £100 extra per year to cover the collapse of suppliers they never used.

Add the direct impact of higher wholesale prices, and UK energy bills went from an average of £1,100 per year in early 2021 to £2,500 by late 2022. The government stepped in with a price cap, costing taxpayers tens of billions.

Notice what happened in both markets: First, correlated losses overwhelmed thin capital buffers. Then, private companies failed or retreated. Then, costs transferred to households and taxpayers—through higher prices, reduced service, or direct bailouts. The profits from operating in normal times went to shareholders. The losses from correlated shocks went to the public.

This is not a conspiracy. It is a structural feature of how these markets work. When risks are independent, private markets handle them efficiently. When risks correlate, the losses exceed what private capital can absorb, and they land on households and governments by default.

Part VI: What Actually Helps

The first line of defence is having less to lose.

For flooding, this means: stop building houses in floodplains. It sounds obvious, but the UK approved 5,000 new homes in high-risk areas last year. Every one of those homes is a future insurance crisis. For existing properties, better defences help. The Flood Re scheme—we will come back to this—has funded £10,000 grants for household flood resilience: flood doors, air

brick covers, non-return valves in drains. Properties with these measures face dramatically lower damage when floods do occur.

For energy, reducing exposure means using less of it. Insulation, heat pumps, better building standards. The UK has some of the oldest, leakiest housing stock in Europe. Every house we retrofit is a house less exposed to the next gas price spike. Reducing exposure does not make the risk go away, but it shrinks the losses when risks materialize.

We need risk-sharing tools designed for correlation, not independence. Parametric insurance is one example. Traditional insurance pays based on assessed damage - you flood, an adjuster visits, they write a cheque. This is slow and expensive when thousands of claims arrive together. Parametric insurance pays based on a trigger - river level exceeds X, or wind speed exceeds Y. If the trigger is met, you get a predetermined payout immediately. There are no adjusters, no disputes, and no waiting. Several Caribbean countries now use parametric insurance for hurricane damage. Payments arrive within days, not months.

Catastrophe bonds are another tool. These are bonds sold to investors where the principal can be wiped out if a specified disaster occurs. They transfer correlated risk to capital markets, which can absorb it better than insurance company balance sheets.

Public backstops matter too. The UK's Flood Re scheme is not perfect, but it is instructive. It pools flood risk across all home insurers, subsidized by a levy on all household policies. High-risk properties can get affordable insurance because the risk is spread across the entire market, not concentrated with individual insurers. Flood Re has problems - it does not cover commercial properties or new builds, and it is scheduled to end in 2039. But it shows that markets plus government can handle correlation that markets alone cannot.

In energy, we need better mechanisms too. Strategic gas reserves, like strategic oil reserves, can buffer price spikes. Long-term contracts with diverse suppliers reduce dependence on any single source. Better interconnection with neighbours means one country's shortage can be offset by another's surplus. The EU's collective gas purchasing initiative is an attempt at this: buying gas together so individual countries are not picked off by sellers.

Here is a hard truth: if we price risk too cheaply, we encourage too much exposure. If flood insurance is artificially cheap, people build in floodplains. If energy is artificially cheap, we do not invest in efficiency. But if we price risk accurately, the costs fall hardest on people who can least afford them. The Hendersons did not choose to live in a riskier climate - climate change found them.

The answer is not fake prices. It is real prices plus targeted support. Pay risk-based premiums, but give low-income households grants to improve flood resilience - or help them relocate. Charge cost-reflective energy tariffs, but provide means-tested support for heating bills. Blunt price caps, as we saw in the energy crisis, protect everyone equally - including people who do not need protection - while failing to encourage efficiency or support new supply. Targeted support costs less and works better.

Finally, we need better data. Flood risk maps based on historical data are useless when the climate is changing. We need forward-looking models, regularly updated, publicly available. Energy market monitoring needs to catch building stress earlier. Ofgem should have seen the supplier crisis coming - the signs were there months before the first collapse. Early warning systems buy time. They cannot prevent shocks, but they can trigger preparation before the dominoes start falling.

Final Reflections — The Choice Ahead

Let me leave you with this.

The Hendersons and the Patels are not victims of random misfortune. They are experiencing a predictable consequence of how we have structured markets for risks that are becoming more correlated.

We have choices. We can pretend the old world still exists - independent risks, thin buffers, private markets handling everything - and watch more households lose insurance, more suppliers collapse, more costs land on taxpayers. Or we can acknowledge that correlated risks need different tools: more capital, different structures, public backstops, honest pricing with targeted support.

The comfortable middle ground - cheap insurance, cheap energy, no government involvement - never really existed. It was an illusion sustained by a period of relatively mild shocks. Climate and geopolitics have ended that period.

The question is not whether we will pay for correlated risk. We are already paying. The question is whether we will pay through chaotic failures and bailouts, or through deliberate, designed systems that spread the costs fairly and encourage adaptation.

The Hendersons cannot rebuild the Norfolk coast. The Patels cannot stabilize global gas markets. But collectively, through better policy, we can build systems that do not break when risks move together.

That is the challenge.

References and Further Reading

Risky Business: The Economic Risks of Climate Change in the United States — Risky Business Project

A comprehensive assessment of how climate change poses economic risks to American industries and regions, with particular attention to insurance and property markets.

The Uninhabitable Earth — David Wallace-Wells

A sobering account of worst-case climate scenarios and their cascading effects on human systems, including finance and insurance.

The New Climate Economy Report — Global Commission on the Economy and Climate

Analysis of the economic opportunities and risks of climate action and inaction, with attention to systemic risks.

Climate Casino: Risk, Uncertainty, and Economics for a Warming World — William Nordhaus

Nobel laureate Nordhaus explains the economics of climate change, including how to think about risk, uncertainty, and policy responses.

The Price of Oil — Roberto F. Aguilera and Marian Radetzki

An accessible guide to understanding energy markets, price formation, and the geopolitical factors that drive volatility.

Tipping Point: How Little Things Can Make a Big Difference — Malcolm Gladwell

While not about climate, Gladwell's exploration of how small changes can trigger large-scale shifts provides useful intuition for understanding climate tipping points.

Against the Gods: The Remarkable Story of Risk — Peter L. Bernstein

A history of how humans have learned to understand and manage risk, from probability theory to modern finance. Essential background for understanding insurance and risk pooling.

The Quest: Energy, Security, and the Remaking of the Modern World — Daniel Yergin

A comprehensive history of global energy markets and geopolitics by the Pulitzer Prize-winning author. Essential for understanding the Russia-Europe gas relationship.

Termination Shock — Neal Stephenson

A rogue Texas billionaire launches an unsanctioned solar-geoengineering scheme, firing sulfur into the stratosphere to cool a climate-ravaged Earth, creating clear winners and losers. The novel follows the political, military, and personal fallout—centered on the Dutch queen, a Texan hog hunter, and a Sikh soldier—as states covertly battle over who controls the planetary thermostat.