Verisk Maplecroft

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Environmental Risk Outlook 2021

Contents

Verisk Maplecroft's Environmental Risk Outlook 2021 covers key and emerging environmental issues that investors and companies cannot afford to ignore if they want to mitigate their exposure to financial, reputational, and regulatory risks.

Foreword

Our pick of the key environmental and climate issues impacting business in 2021

Matt Moshiri
President, Verisk Maplecroft

How well global organisations manage the escalating environmental and climate crisis is now one of the most critical factors determining their long-term resilience. And while a growing proportion of businesses are seeing the issue finally make its way into boardrooms, it's right to question whether companies have put the necessary steps in place to address a crisis that will impact them across a number of fronts.

Alongside the physical risks posed by climate change, harsher regulations will emerge and mounting legal liabilities and reputational damage will become a real prospect for many businesses, due to their association with rises in global heating and the destruction of habitats. Additionally, the secondary and knock-on effects of climate change, from social unrest to economic and political instability, will present a complex landscape to be navigated.

Yet, while these challenges are largely foreseeable, emissions are rapidly returning to pre-shutdown levels, ecosystems continue to decline, and many organisations are simply failing to act. From a strategic perspective, optionality can provide flexibility to traverse a changing risk environment. However, the climate crisis will back some industries into a corner and force reactive decision-making if not appropriately – and collectively – dealt with in the near term.

This year, our Environmental Risk Outlook explores where the key challenges for business will emerge and how governments, investors and corporates can manage this growing body of risks in the face of ever-increasing pressure from shareholders, regulators and customers. With the window closing for actions to minimise climate and environmental impacts, the question is now not only how will organisations respond, but how quickly they will do so.

Spotlight on city risk

For investors and operators, the fact that the world's population is becoming increasingly urban raises a host of issues. Key among them are environmental risks from declining air quality, natural hazards and water availability – all set to be multiplied by climate change. Combining our data on all these threats to build up a picture of risk across almost 600 of the world's largest cities, it is clear that Asia is right on the frontline.

Our data shows that the region is home to the vast majority of cities facing the greatest environmental risks, both man-made and natural. But no region is entirely immune. The different patterns of risks within continents – and even countries – go to show the importance of incorporating granular environmental data in corporate and investment decision-making.

2021 a turning point for carbon policy?

The question of how to tackle the carbon emissions that drive climate change comes sharply into view this year with COP26 on the horizon. Yet the G20 countries, accounting for 80% of global emissions, are not moving quickly enough to meet the Paris Agreement goals. Our analysis shows that despite strong performances from some, countries across the board are facing a disorderly and even abrupt transition to a world of much tougher emissions mitigation regulations.

For investors across all asset classes, time is running out to identify the threats and opportunities facing their portfolios and work to develop hedging strategies. And as for sovereign investors, with debt renegotiations and post-pandemic recovery packages there may never be a better moment to push lawmakers towards a more controlled carbon transition.

Biodiversity a budding ESG risk

While climate change has been a staple of investor concerns for several years, focus is intensifying around biodiversity risk. The potential for damage to corporate reputations is clear as societies become even more environmentally conscious, but lawmakers are also recognising the economic benefits of protecting important ecosystems and habitats.

This 'natural capital' ranges from attracting tourist dollars to pollinating insects, or adapting to climate change. Investor desire for greater information is driving new benchmarks and standards, but will also heap pressure on companies to track and disclose their impacts on nature. Companies and investors must also contend with weak governance and outright corruption muddying the waters around commodities and value chains.

The climate battle heads to court

As the pace picks up on carbon regulations, legal liabilities related to climate are also becoming more mainstream. Hundreds of cases have been lodged since the start of the century, primarily aimed at changing government policy or claiming compensation from fossil fuel companies for their contributions to global heating.

Although concentrated in North America and Europe, our new Climate Litigation Index shows that these types of lawsuits are now spreading into major emerging markets in Asia-Pacific, Latin America and beyond. Transport, mining and agriculture are also being targeted, while new claims around human rights and health are forcing corporates without sound policies and a clear grasp of future risks on the defensive.

The heat is on global cities

If emissions continue to rise on their current trajectory, we can expect soaring temperatures to transform the climate of northern US and European cities to resemble that of their sweltering counterparts hundreds of miles to the south. Londoners might envisage warm days in the park and an Italian café culture, but the reality for most cities is of widespread productivity losses, skyrocketing cooling costs, and a grim toll of heat-related disease.

Agriculture, manufacturing and other outdoor industries will be worst affected, but real estate investors and government officials cannot overlook the dangers lurking just 30 years ahead. Starting today to identify those risks and factor them into decision-making can help mitigate the impacts and even uncover opportunities in a warm-weather world.

Asian cities in eye of environmental storm – global ranking

Will Nichols
Head of Environment and Climate Change Research

India home to seven of world's 10 cities most exposed to environmental risks

  Photo: Getty Images/EyeEm/Hendra Permana

1.4 bn
city dwellers facing high or extreme environmental risk

Companies operating and investing in Asian cities are going to face an increasingly stiff test to their resilience. According to the first instalment of our Cities@Risk series, which ranks the world's 576 largest urban centres on their exposure to a range of environmental and climate-related threats, 99 of the world's 100 riskiest cities are in Asia, including 37 in China and 43 in India.

Our data reveals Jakarta is the riskiest city, but across the globe 414 cities – with over 1.4 billion inhabitants – are deemed to be at high or extreme risk from a combination of pollution, dwindling water supplies, extreme heat stress, natural hazards and vulnerability to climate change. With rising emissions driving weather-related risk and populations growing in many cities across the developing world, the risks to citizens, real assets, and commercial operations are only going to rise.

Of course, companies and investors with a focus on assets such as real estate cannot just pick up and relocate to a 'safer' city. And given our analysis shows no cities are entirely risk free, it is vital that organisations conduct granular assessments of environmental risk so they are best placed to overcome disruption from chronic climate risks and significant natural hazard events.

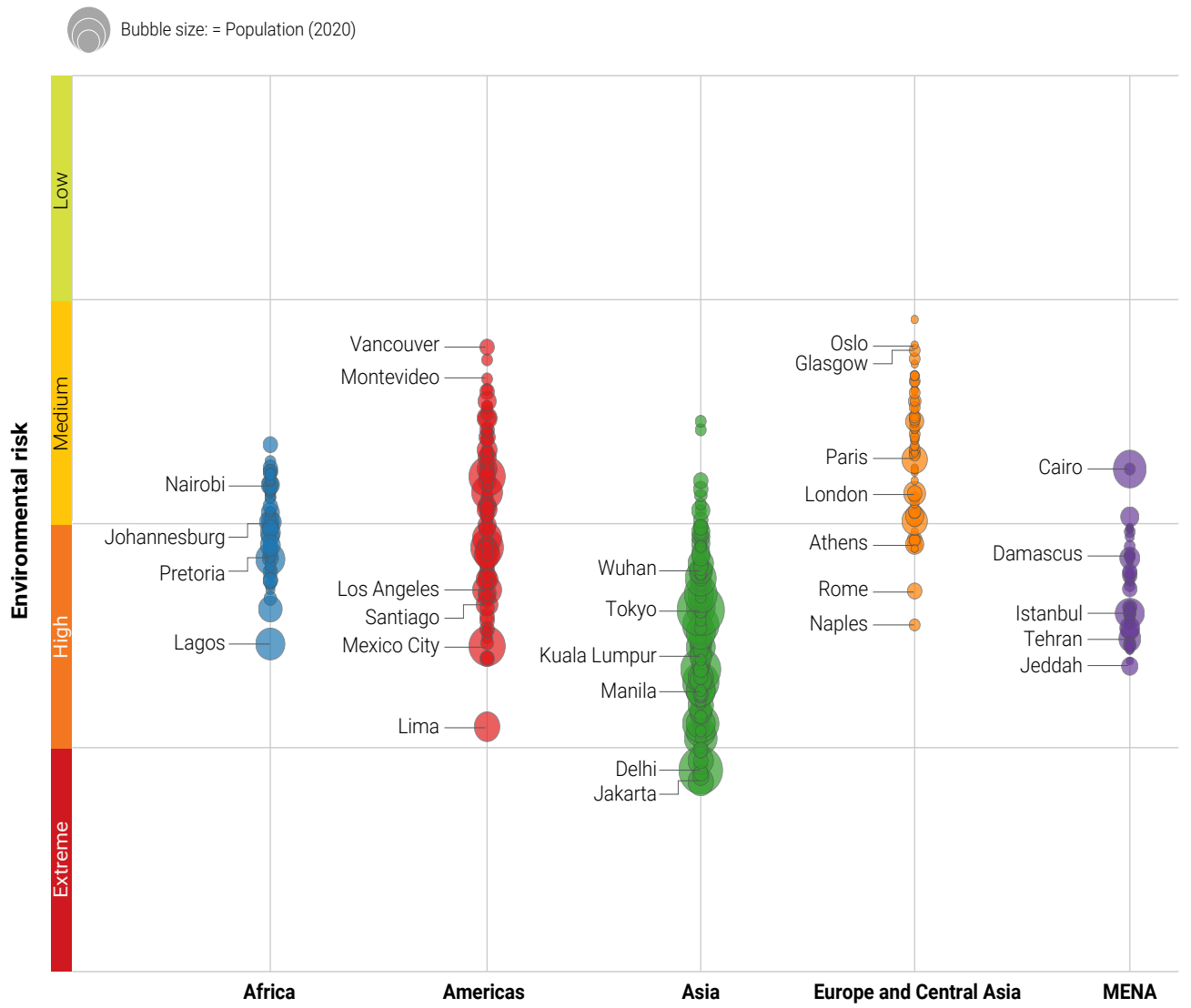
Indian cities on the environmental frontline

The global index, which draws on nine of our risk indices to evaluate the liveability, investment potential and operational risk landscape of cities with a population over 1 million, reveals that India has 13 of the world's 20 highest risk locations. The capital, Delhi, is rated as the second highest risk city globally and is followed by the likes of Chennai (3rd), Agra (6th) and Kanpur (10th). Close behind are Jaipur (22nd), Lucknow (24th), Bengaluru (25th) and Mumbai (27th).

Pollution is the main threat to the health of the country's huge urban populations, with Indian cities making up 19 of the 20 most at risk in our Air Quality Index. Noxious air caused almost one in five deaths in India in 2019, resulting in economic losses of USD36 billion; meanwhile, water pollution is responsible for almost USD9 billion in annual health costs and causes 400,000 deaths each year.

Figure 1: Asian cities are most threatened by environmental risks

Jakarta and Delhi are the most at risk of all cities with a population over 1 million



Source: Verisk Maplecroft Global Risk Analytics Dataset

The worst-performing city in the ranking, Jakarta, is also plagued with dire air pollution, but compounding this are perennial threats from seismic activity and flooding. It is also subsiding at such a rate that Indonesia's president, Joko Widodo, is seeking to relocate the capital. A similar mix puts its Indonesian counterparts Surabaya and Bandung in 4th and 8th place respectively, while also contributing to Pakistan's two most populous cities, Karachi (12th) and Lahore (15th), featuring in the top 20.

Outside Asia, the Middle East and North Africa (MENA) has the largest proportion of cities categorised as high risk. Extreme water stress and the impact of natural hazards, such as earthquakes, means populous Turkish and Iranian cities dominate the region's worst-performing urban areas. And while Lima is the most at-risk city in the Americas – and the only non-Asian city in the top 100 – diverse threats in Mexico City, Santiago and Los Angeles leave them not too far behind. Meanwhile, the most at-risk cities in Europe score at a similar level to those in Africa – but they face a range of very different threats, highlighting the importance of exploring what's driving those risks.

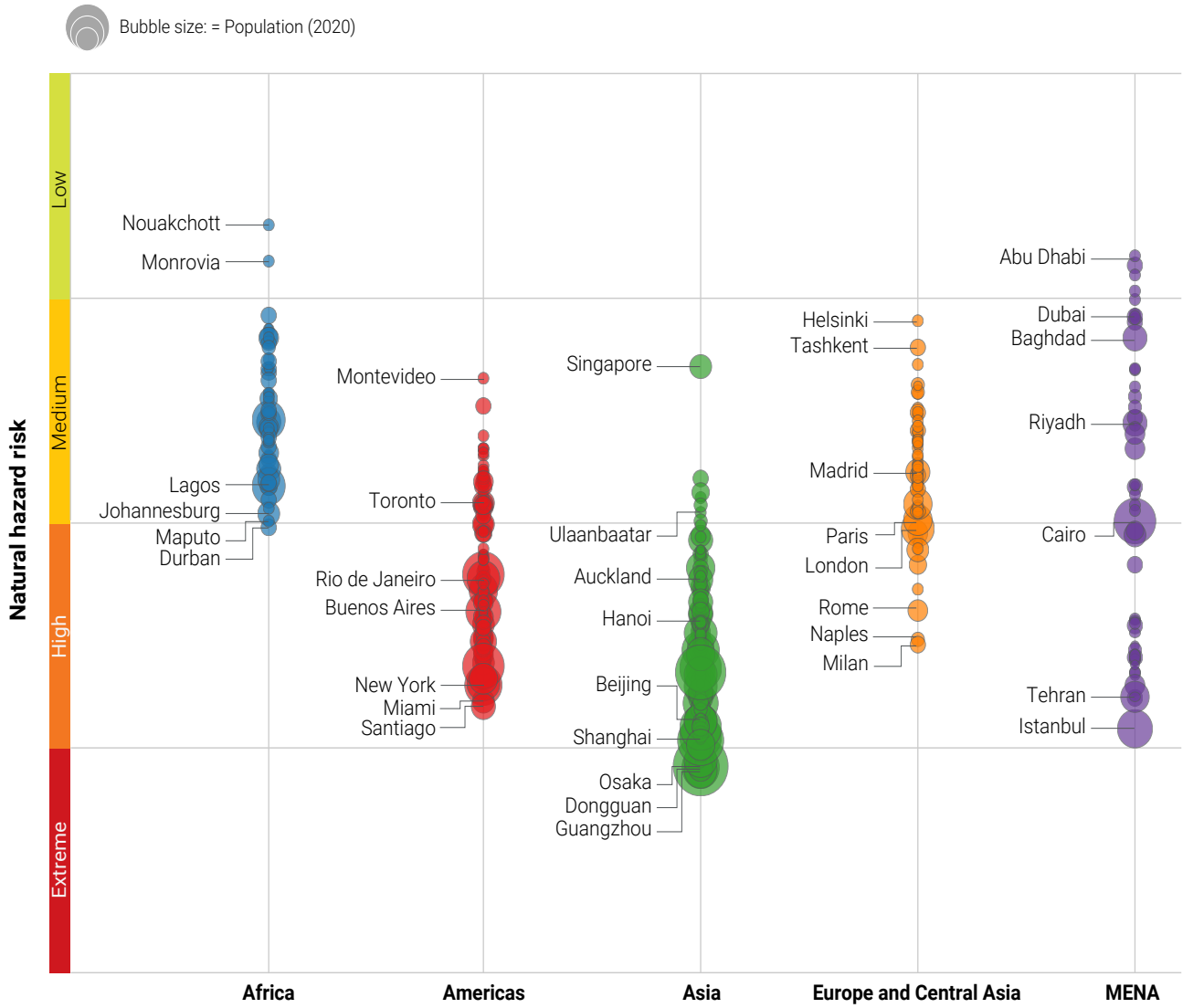
East Asian cities most exposed to natural hazards

The picture changes when looking solely at the impact of natural hazards and the exposure of economies, populations and transport infrastructure. Asia is still most at risk, but the cities are different. Topping the list are flood-prone Guangzhou and Dongguan, followed by Osaka, Tokyo and Shenzhen, which face a host of threats from earthquakes to typhoons.

African cities' low-risk scores stand out in comparison to those of major world cities, such as New York, London or Rio de Janeiro. Some MENA cities have a similarly low level of risk – the Abu Dhabi, Dubai and Sharjah emirates all face lower natural hazards risks than Helsinki, Europe's least exposed city.

Flooding and seismic risks are the key threats to Europe's higher risk cities, which share a concentration of high-value assets and infrastructure, a trait mirrored by major centres in Asia and the Americas. Typically, major cities in North America, Europe, China and Asia Pacific are also better placed to respond to and recover from natural disasters than their counterparts in Africa, MENA, Latin America or much of Asia, according to the data.

Figure 2: Risks from natural hazards are widespread across most regions



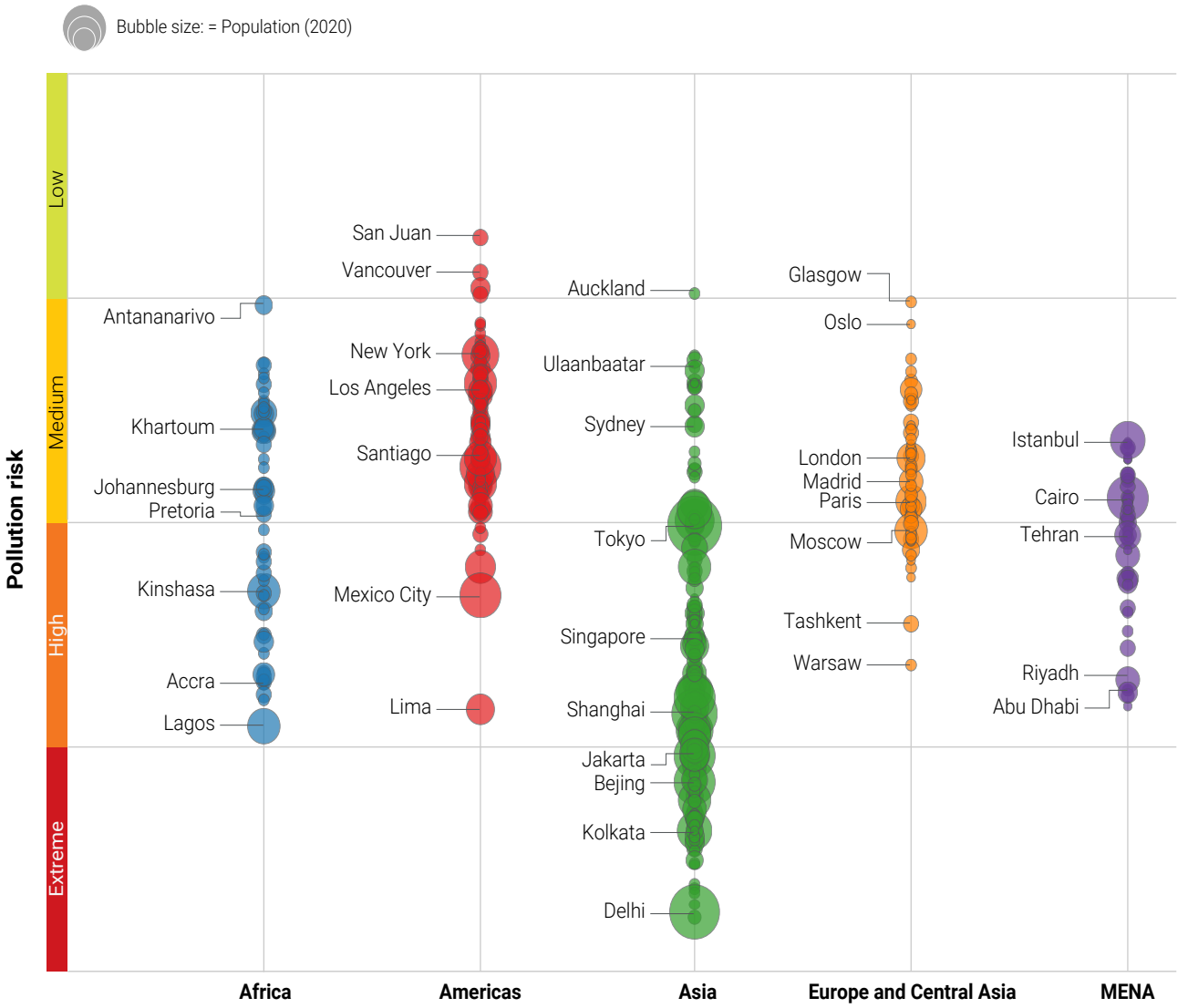
Source: Verisk Maplecroft's Natural Hazard - Impacts Index; Natural Hazards - Economic Exposure (absolute) Index; Natural Hazards - Population Exposure (absolute) Index; Natural Hazards - Transport Infrastructure Exposure (absolute) Index

Pollution clouds health outlook for huge numbers of urban citizens

Focusing on air and water pollution gives a more even spread of risk; at least outside Asia, which again is home to the highest risk cities in the graphic below. The 'airpocalypse' in urban areas across China and India is well documented, but high levels of water pollution go more under the radar. Together, China and India account for 286 million of the 336 million people living in cities at extreme risk for pollution; include high-risk cities and their total rises to 642 million.

The air quality in European cities is relatively benign in comparison, with the possible exceptions of Warsaw and Milan. But again, poor water quality across the continent heightens its cities' risk profiles, leaving Paris and Moscow straddling the high-risk mark. This is the same situation across MENA and the Americas, although most Canadian cities boast reassuringly clean air and water.

Figure 3: Air and water pollution is driving high risk scores in Asia



Source: Verisk Maplecroft Water Pollution Index; Air Quality Index

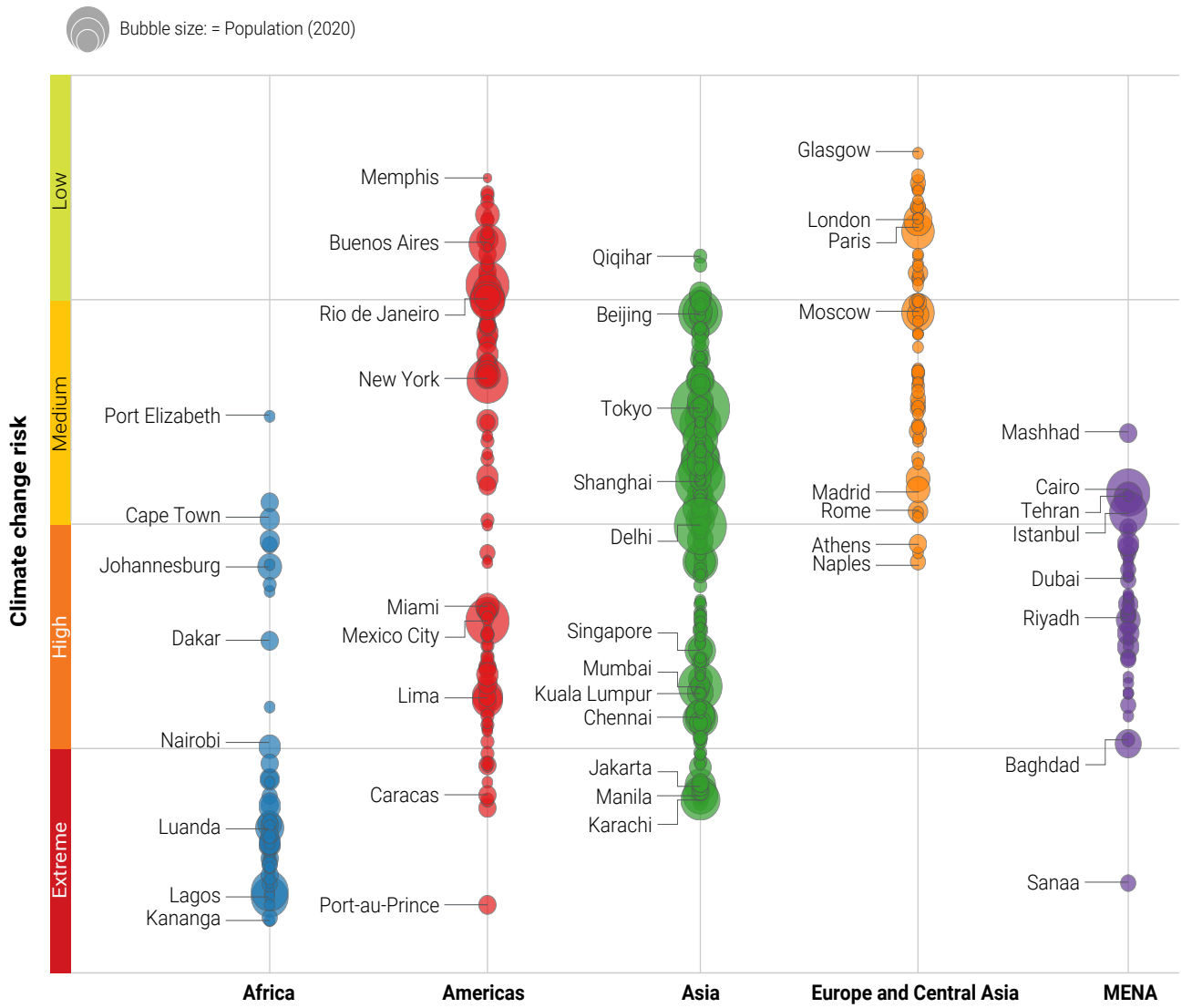
Climate change amplifying environmental risks – Africa most vulnerable

A significant danger for many cities is how climate change will multiply weather-related risks. Higher temperatures and the increasing severity and frequency of extreme events such as storms, droughts and flooding will probably change the quality of living and economic growth prospects of a large number of locations.

As shown in our Climate Change Vulnerability Index, African cities will come off worse given the continent is not only most exposed to climate extremes but is also least able to mitigate their impacts. Africa's two most populous cities, Lagos and Kinshasa, are among those at highest risk, while South Africa's relative wealth and lower exposure cushions its major urban centres. The rest of the world is not immune though. Other major population centres facing extreme risks from climate change include Caracas, Karachi, Manila and Jakarta, alongside Yemen's war-torn Sanaa.

Conversely, COP26 delegates will be pleased to see Glasgow is the city with the least to fear from climate change.

Figure 4: Climate change a significant threat to major Asian and African cities



Source: Verisk Maplecroft Climate Change Vulnerability Index

> Organisations unable to account for the **full spectrum of environmental threats** and impacts will face some difficult conversations.

Europe and Canada offer safe havens from environmental risk

So where should organisations look for less risky cities? In general, Europe is the right answer – the continent is home to 14 of the 20 least risky cities, including Krasnoyarsk in Siberia (576th), Oslo (575th), Glasgow (573rd), Helsinki (569th) and Copenhagen (563rd). Vancouver (574th) and Ottawa (571st) gate-crash Europe's domination.

But companies can't simply move to Europe: they need to consider factors such as the labour market, security, the human rights situation and government support to name just a few (we'll be covering those issues in upcoming instalments of our Cities@Risk series). But operators needing to stay close to regional markets and suppliers do have options.

Cairo looks a good alternative for MENA, with one of the only low-risk water stress scores in the region and comparatively better water and air quality. In South America, Uruguayan capital Montevideo, Paraguayan counterpart Asunción and Argentina's Rosario rank alongside Copenhagen and Montreal in the global list. Even in India, while choices are slim organisations looking to mitigate environmental risk could consider Kolkata, which is towards the lower end of the high-risk bucket. Otherwise, Asia's lowest risk cities are Mongolia's Ulaanbaatar and, perhaps more practically, Shizuoka in Japan.

ESG risks rising up the resilience agenda

Equally, companies need to recognise the costs of remaining in an area of high environment risk from increased power demand for cooling and air filtration or from sourcing reliable, clean water supplies.

What our analysis shows is that environmental risk needs to be a central consideration when it comes to improving the resilience of your business, investments or real estate portfolio. By identifying material risks and stress testing operations and strategies against different future scenarios involving those threats, you'll gain a clearer view of the costs and benefits of investment decisions.

Aligning climate risk assessments with the recommendations of the Task Force for Climate-Related Financial Disclosures (TCFDs) is a great start. But with investors and regulators increasingly concerned about broader ESG issues, organisations unable to account for the full spectrum of environmental threats and impacts will face some difficult conversations.

G20 disorderly transition all but inevitable: even climate-leading UK at risk

Will Nichols
Head of Environment and Climate Change Research

Rory Clisby
Environment and Climate Change Analyst

G20's slow progress on emissions reduction demands investor engagement to push for a faster, less disruptive energy transition

  Photo: Getty Images/Getty Images News/Pool

80%

G20's contribution to global emissions

Out of the G20 economies the UK has made the most progress in tackling climate change, according to our new data. While on the surface this looks good for Downing Street ahead of COP26, the reality shown by our Carbon Policy Index is that the UK still lacks the regulatory framework to deliver on its commitments. This is bad news for markets and business. The G20 accounts for 80% of global emissions: if its best-performing member is struggling to meet its goals, then keeping the 2°C Paris Agreement target in sight will require widespread government intervention over the coming decade.

Major economies like the US, China, the UK, Germany and Japan will need to yank the handbrake on emissions to meet agreed climate goals – at the same time as dangerous rises in extreme weather events play an increasingly disruptive role in the global economy. These conditions will leave businesses in carbon-intense sectors facing the most disorderly of transitions to a low-carbon economy, with measures – such as restrictive emissions limits for factories, mandates for buying clean energy, and high levies on carbon – imposed with little warning.

The ability to identify where and when these changes will occur may help asset owners, managers and corporates offset some of the worst impacts of a poorly managed shift to a low-carbon world. And, with COP26 putting climate change front of mind for global governments, sovereign investors also have an opportunity to ramp up the pressure on laggards, and to influence leaders, in steering an energy transition that will only be more disruptive the longer it is delayed.

UK leading the low-carbon charge – but has more work to do

Figure 1 exposes the root causes of G20 countries' underperformance since 2017 by picking out the three constituent pillars of our Sovereign Carbon Policy Index: the gap between current emissions and 2030 reduction goals; governments' capacity and intent to introduce emissions mitigation policies; and a measure of each economy's carbon intensity.

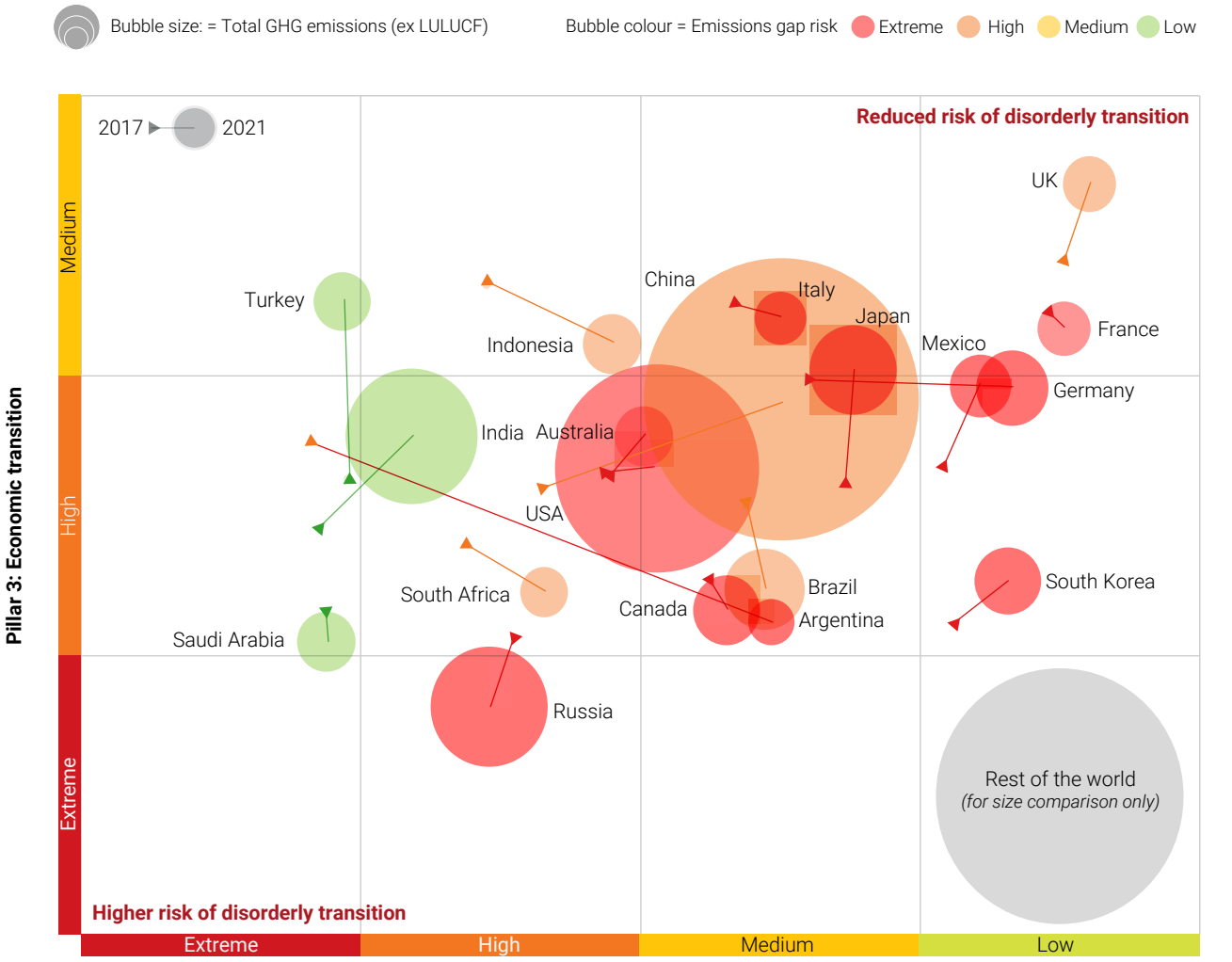
The UK is the standout success among the G20. Already well positioned in terms of policy by 2017 due to its Climate Change Act, the UK has closed the gap between its baseline emissions and its 2030 Paris Agreement target more than any other G20 country. Emissions have almost halved since 1990 due to industrial efficiency improvements and a near-total abandonment of coal that drives down carbon intensity.

> Unless the UK starts to move legislation quickly it will need to rush through regulations later on.

But the UK can't rest on its laurels. The new 78% emissions reduction target for 2035 effectively brings its 2050 goal 15 years forward. Yet, the UK's current policies will not build the zero-carbon electricity, transport and heating infrastructure needed to achieve this goal, much less deliver carbon neutrality by 2050. Unless the UK starts to move legislation quickly it will need to rush through regulations later on, leaving business little time to adapt.

Figure 1: G20 carbon policy performance 2017-2021

Widespread policy progress, shown by movement along the x-axis, has not driven carbon intensity improvements (y-axis).



Emissions gap pillar does not include emissions or mitigations from land use, land use change and forestry (LULUCF).

Source: Verisk Maplecroft

> Neither China nor the US are well placed to avoid a disorderly transition.

US, China – too little too late?

Even if the UK does manage to get back on track, it is the policy direction of the world's carbon heavyweights that matters most to achieving the Paris target. China and the US have taken diverging paths since 2017, but neither is well placed to avoid a disorderly transition.

China has led the world in renewable energy investment, strengthened power plant emissions limits, and transformed a network of regional emissions trading schemes into the world's largest carbon market. As a result, it is one of the few nations to move towards the upper right corner of the graph in Figure 1. This takes it past the US, where President Trump rolled back limits for power plants, battled tailpipe emissions regulations, and gave up any pretence of complying with the Paris Agreement before ditching the accord.

But China continues to cling to high-carbon power sources and announced less ambitious goals in its latest Five Year Plan. The US re-entry into the climate arena under President Biden will put pressure on Beijing to increase its targets – or repeat its record of surpassing underwhelming targets, often achieved through abrupt factory closures that are hostile to investors and operators.

However, significant political roadblocks stand in the way of Biden's new 50% emissions goal for 2030 and plans for huge investments in renewable energy. Unless these barriers can be overcome soon, for the US to meet its targets will require harsh economy-wide interventions later in the decade, which would be near impossible under a future Republican administration.

European carbon agenda is best of the rest

EU emissions rival those of the US and China, but the bloc is trying to smooth the transition pathway by raising its 2030 emissions reduction goal to 55% and pumping out sustainable finance policies. Yet individually, the EU's best G20 performers France and Germany lag behind the UK, and none of the bloc's countries are insulated from a disorderly transition.

Elsewhere, Argentina's framework climate change law, carbon tax and enhanced renewables policies moved it along the graph but have yet to impact its carbon intensity. India is starting to feel the impacts of industrial improvement and large-scale renewables programmes. Japan's post-Fukushima embrace and subsequent rejection of coal has paid dividends, but its updated 46% 2030 target will require stronger policy measures and is not in line with Paris.

45%

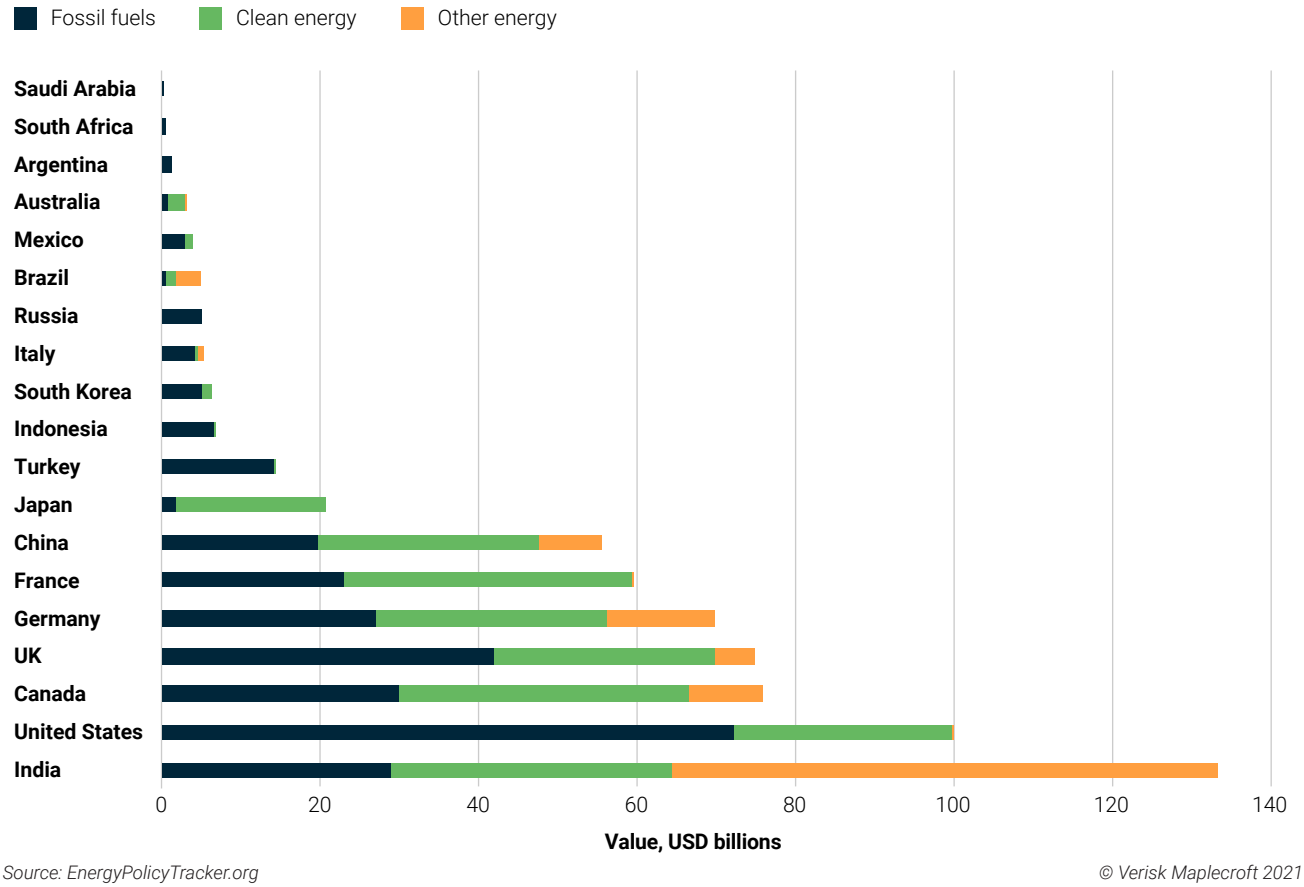
of recovery funding directed to fossil fuels, compared to 38% for clean energy

Sizeable fossil fuel exports, decentralised governance and confused national strategies are why Canada and Australia perform poorly. Oil and gas-dependent Russia and Saudi Arabia have targets so unambitious that achieving them is a near certainty; but this offers no protection from external pressure on exports or access to finance if they fail to improve.

Heavy emitters missing pandemic's clean energy opportunity

Events of the last year have altered the climate dynamic for the worse. G20 countries' COVID relief programmes are doubling down on fossil fuels rather than embracing the opportunity to kickstart low-carbon economies. As of April 2021, the G20 had pledged USD641 billion to energy sector recovery funding: Figure 2 shows 45% of this is directed to fossil fuels, compared to 38% towards clean energy. Continuing to finance high-carbon energy risks a rise in asset stranding as carbon restrictions tighten, creating real uncertainty for sovereign credit and a nation's ability to raise finance for climate mitigation and adaptation measures.

Figure 2: G20 public money commitments to energy in recovery packages



Source: EnergyPolicyTracker.org

> The low-carbon transition is happening whether we like it or not.

Investors and corporates can influence disorderly transition prospects

Our data underscores that it is clear there is no longer any realistic chance of an orderly transition. Companies and investors across all asset classes must prepare for at best a disorderly transition and at worst a whiplash from a succession of rapid shifts in policy across a host of vulnerable sectors. And this doesn't just apply to energy companies – transport, agriculture, logistics and mining operations must all work to identify the threats and opportunities a carbon-restricted future will open up for them. Tracking those countries and sectors most at risk will also enable asset managers to develop longer term climate hedges against what are still effectively unpriced risks.

Armed with this knowledge, sovereign debt investors in particular also have an opportunity to engage with policy-makers with the aim of both accelerating the low-carbon transition and reducing its fallout. Certain countries will be harder to engage with, but the clear case for avoiding political, economic and social upheaval should hit home, even in fossil fuel-reliant nations traditionally impervious to investor pressure. Individual investors are unlikely to have the heft to effect change, so a collective approach, similar to a sovereign-level Climate Action 100+, could be needed to build climate momentum in the short term. Similarly, it will increasingly be in the interests of leading corporates to steer rather than follow regulators through the transition.

What is clear, is that the low-carbon transition is happening whether we like it or not. Governments, investors and corporates have just a few years to determine how smooth that passage is.

Biodiversity risk is the new ESG elephant in the room

Will Nichols
Head of Environment and Climate Change Research

Rory Clisby
Environment and Climate Change Analyst

Natural capital is shaping up to be a key concern for investors, but opaque and weakly governed value chains pose a threat to successful engagement

 Photo: Getty Images/Getty Images News/Mario Tama

US$2.6tn

Estimated figure of loans and underwriting services provided by the world's largest investment banks linked to the 'destruction of nature' in 2019

Just as companies are getting used to the idea of having to report their climate change risks, investors are demanding they now cover a whole new spectrum of issues related to corporate environmental performance. Water, forests and increasingly biodiversity are shooting up the agenda as links between so-called natural capital risks and the impacts of companies become clearer.

This year marks the beginning of the Task Force on Nature-related Financial Disclosures (TNFD), which aims to create a standardised way of measuring threats to wildlife and ecosystems. In time, this will unleash a wave of calls from the investment community for corporates to account for biodiversity risk, especially across assets such as mines, oil operations and pipelines. What's more, if world leaders are able to secure a Paris-style worldwide biodiversity deal in China later this year, it would drive momentum for the introduction of hard regulations addressing biodiversity risk.

In the same way as carbon restrictions threaten emissions-heavy investments, so more stringent biodiversity laws will affect activities impacting nature. One estimate suggests the world's largest investment banks provided around USD2.6 trillion (GBP1.9 trillion) of loans and underwriting services linked to the 'destruction of nature' in 2019. With huge sums under threat and pressure from legislators and civil society growing, investors – and operators – need to find a way to manage this risk.

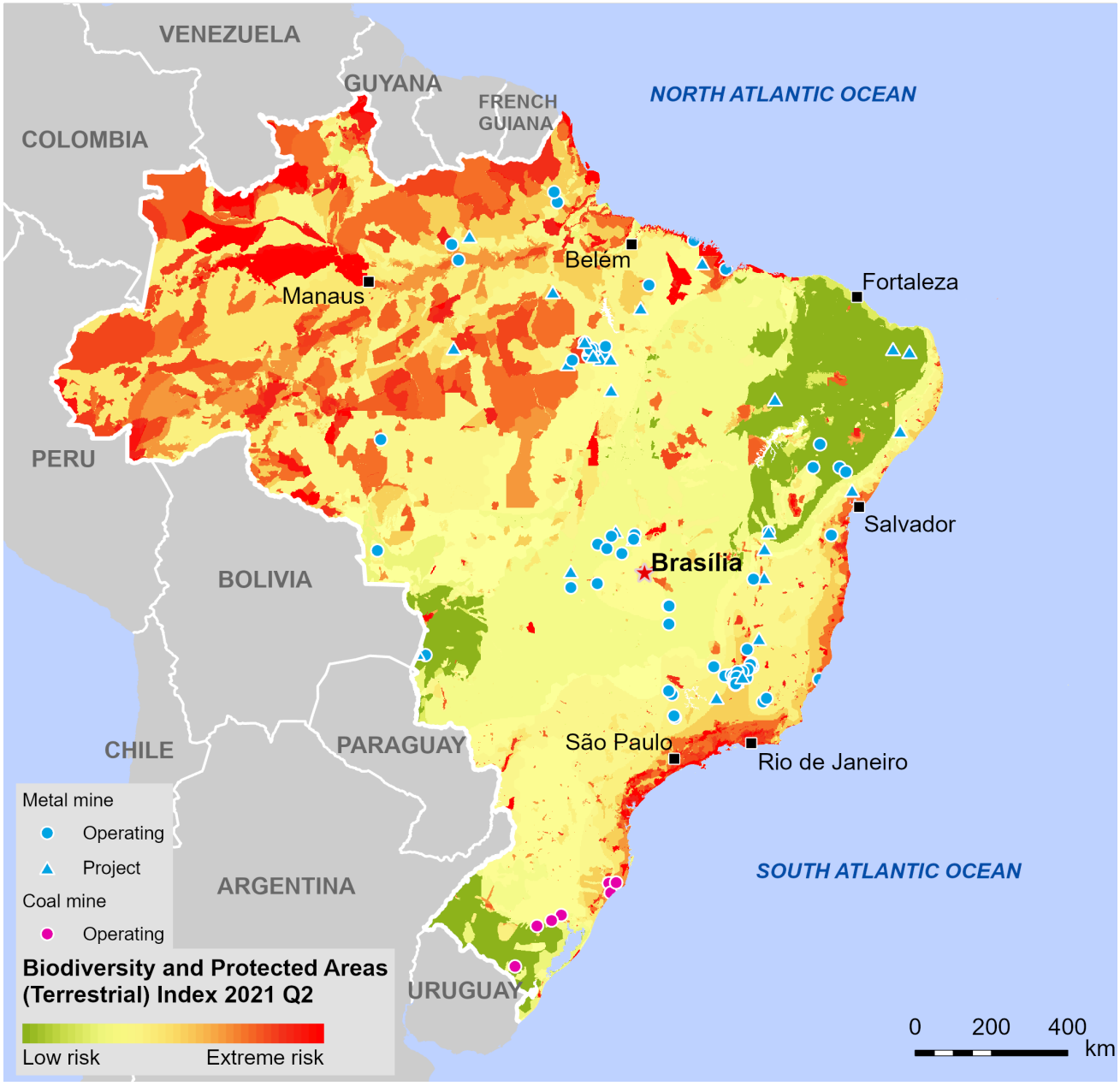
Biodiversity hotspots under attack

Biodiversity risk is a factor of both the presence of valued ecosystems and species, as well as a country's intent and capacity to protect them. One obvious example to focus on is Brazil, where mining operations have faced protests from adjacent communities and NGOs over their impact on biodiversity-rich areas. The map below shows extensive biodiverse areas adjacent to mining operations; Bolsonaro's disregard for Amazon protections further highlights the importance of extensive due diligence for companies operating in or sourcing from the area.

The idea of 'natural capital' – effectively putting a price on nature by factoring ecosystems into measures of financial performance – is not without controversy, but proponents argue that failing to value biodiversity effectively is a key driver in accelerating rates of loss. Without a dollar value to consider, companies can make short-term decisions that fail to account for the harms that large-scale investments in sectors such as agri-business or extractives can reap. And the economic prospects of razing rainforests to expand a mine will look less impressive if the operator's social licence to operate also goes up in smoke.

Figure 1: How mining intersects with biodiversity risk in Brazil

Mine locations compared with our Biodiversity and Protected Areas (Terrestrial) Index



Source: Verisk Maplecroft, Wood Mackenzie, IBAT, Bartlott et al.,ESA @ Verisk Maplecroft

> Finance for Biodiversity suggests that financial institutions become **legally liable** for their impact on ecosystems.

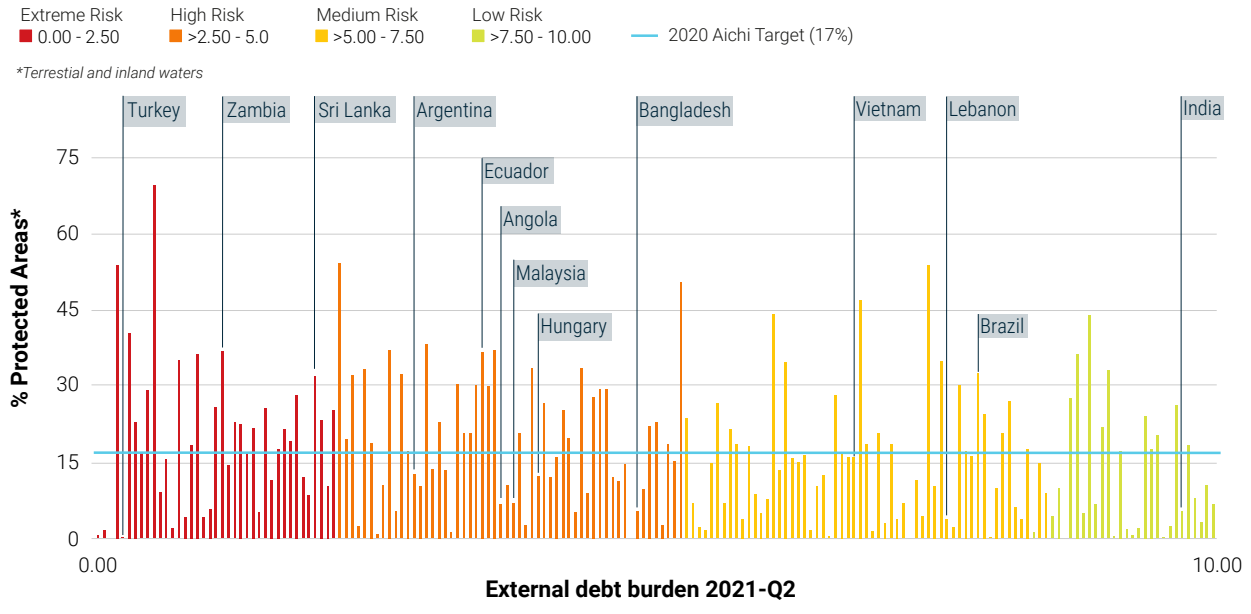
TNFDs among key steps to cultivate a global framework

But measuring these risks requires universal benchmarks. The forthcoming TNFD recommendations will be a key component in standardising measurement of biodiversity risk and encouraging companies to embed natural capital risk into decision-making and strategies. We expect biodiversity disclosures to follow the same pattern as climate risk, where investors are put under pressure to publish information so that, in turn, they demand more granular and material data from their portfolio companies.

Calls to expand the EU Taxonomy for sustainable activities, to include definitions of which projects are beneficial and detrimental to natural capital, will not escape the notice of investors or operators given such a move could make raising finance for those projects much more difficult. Another consideration is the Finance for Biodiversity (F4B) initiative's suggestion that financial institutions become legally liable for their impact on ecosystems.

Regulatory support for TNFDs could come at the Convention on Biological Diversity (CBD) meeting in China in October, postponed from autumn 2020. Parties will discuss a new roadmap and targets to protect biodiversity for the coming decade, aiming to produce a Paris Agreement-style treaty for collaboration on natural capital risk. However, major hurdles to overcome include the US remaining outside the CBD and the fact that the pandemic has pushed economic priorities above natural capital protections for many nations.

Figure 2: Countries with foreign debt burdens offer opportunities for investor engagement on biodiversity



Source: Verisk Maplecroft

17%

Countries furthest away from Aichi biodiversity targets could be prospects for investor engagement

ESG activism branches out

Funds and international creditors have an opportunity to drive conservation improvements by tying finance to ESG milestones. Ongoing debt issues in countries such as Lebanon, Sri Lanka, Angola and Zambia offer potential opportunities for engagement, as well as a number of other countries highlighted in the graphic above.

Those countries furthest away from the 2020 Aichi Biodiversity goal of protecting at least 17% of terrestrial areas and inland waters could find themselves targeted by sovereign ESG investors, while operators in those nations must be aware of the potential for safeguarded areas to expand. Investor attempts to sway Brazil's Bolsonaro administration, which emphasises economic development above environmental protections, have gained access to senior policy-makers, but failed to rein in destruction of the Amazon. However, governments could soften their positions if access to finance were to become a problem.

Corruption intensifies threats to biodiversity

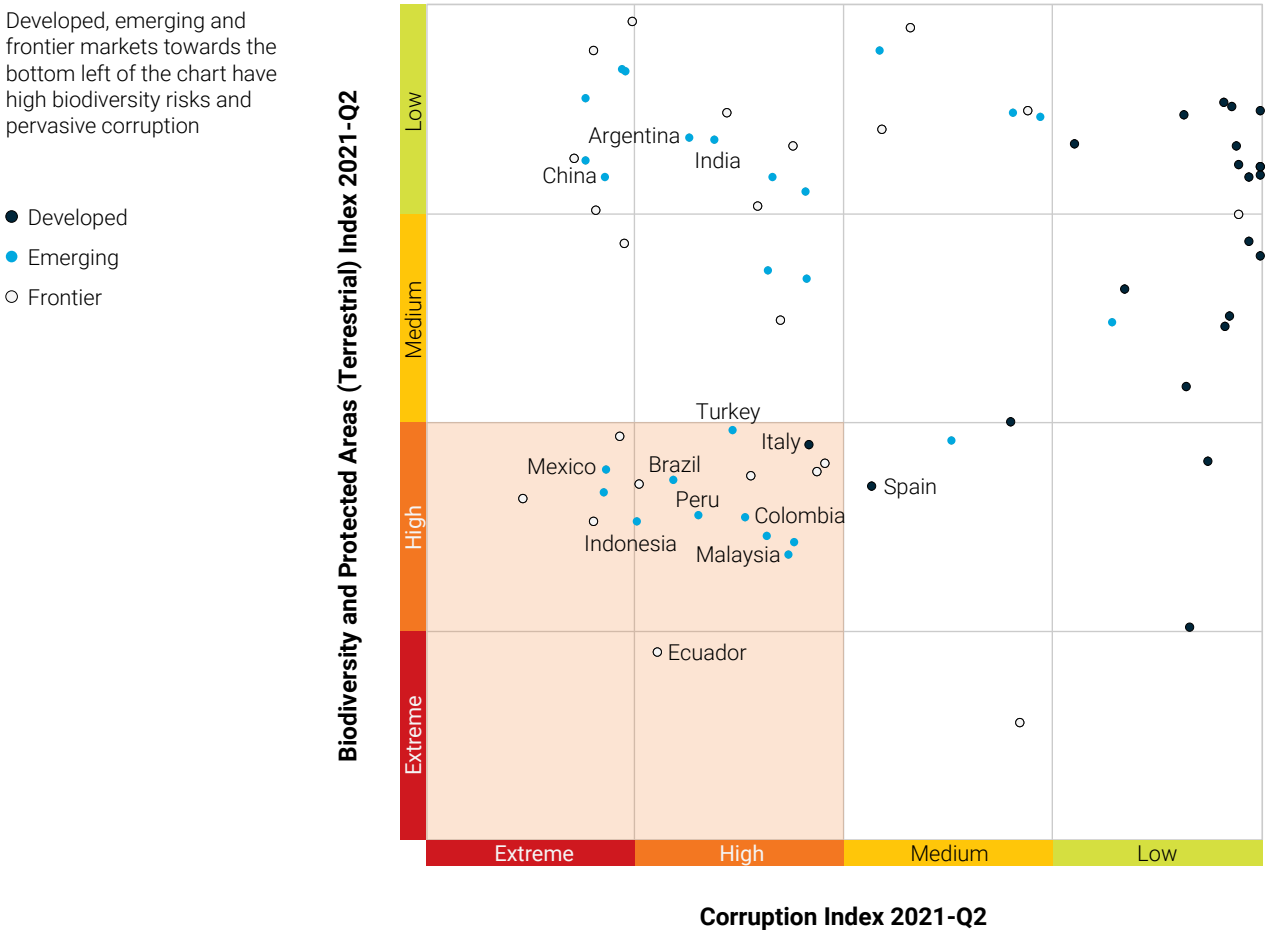
Direct investments in countries will also play a crucial role in addressing natural capital risk. Innovative private funds looking to catalyse investment into the world's stocks of natural assets already attract support from sovereign wealth funds, pension funds and insurers, particularly for investments in emerging markets.

However, the lack of accurate and granular data not only hinders reporting, but masks poor governance. Corruption and misrule provide the cover for natural capital value chains – such as timber or livestock, or crops like soy and palm oil – to destroy nature largely unimpeded and potentially out of sight of certification agencies.

The graphic below highlights emerging and frontier markets where biodiversity is at risk and corruption is widespread. Brazil, Indonesia and Malaysia – all major exporters of agricultural commodities – clearly pose significant risks for investors, alongside Peru, whose economy hinges on mining, and Mexico, where AMLO is stepping up oil and gas expansion. Among developed markets, only Italy can be considered similarly risky.

Figure 3: Corruption compounds biodiversity risk

Developed, emerging and frontier markets towards the bottom left of the chart have high biodiversity risks and pervasive corruption



Source: Verisk Maplecroft

Biodiversity risk blossoms

The financial sector, alongside real asset operators dependent on its capital, need to put resources towards tracking, measuring and managing biodiversity risk. The lesson from climate risk reporting is that certain existing processes can be repeated, but a new way of thinking needs to be embedded from the top down to truly realise the benefits.

And the benefits of getting the process right are substantial: identifying and mitigating biodiversity impacts helps investors and corporates anticipate regulatory shifts and shield themselves from reputational and litigation risks. And, just as with climate risks, there is an opportunity to make smarter investments that tap into the potential of preserving and enhancing ecosystems and natural capital services.

Climate litigation woes rise for energy firms at home, but legal jeopardy set to go global - Index

Liz Hypes
Senior Environment and Climate Change Analyst

Franca Wolf
Europe and Central Asia Analyst

Climate cases in major emerging markets could be next legal battleground for energy firms

 Photo: Getty Images/Getty Images News/Dan Kitwood

90%

Percentage of climate litigation cases filed in EU and US since 2000

The Hague District Court's landmark ruling against Royal Dutch Shell to set more ambitious emission reduction targets is part of a rising tide of legal action that will have global implications for heavy emitting businesses. Hundreds of climate litigation cases have been filed since 2000, but this is only scratching the surface of what we'll see in the future.

Our new Climate Litigation Index, which assesses the likelihood of climate lawsuits being filed and pursued against companies in 198 countries, finds that those operating in developed economies – especially the US, UK, EU and Australia – currently face the highest risk of legal action.

However, the picture could be changing. Limited civil and political rights and a weak rule of law reduce the potential for climate lawsuits in many parts of the developing world: our data points to a shift in major emerging economies, which might not bode well for the carbon-intensive companies operating there. And while lawsuits have so far focused on pressuring governments to increase the regulatory burden on companies, activists are increasingly targeting corporates directly.

Climate litigation risk greatest in developed markets

The Climate Litigation Index pinpoints current hotspots and areas of emerging risk by considering historic climate litigation, public awareness of climate change as a serious issue, climate activism, and the strength of a country's judicial system.

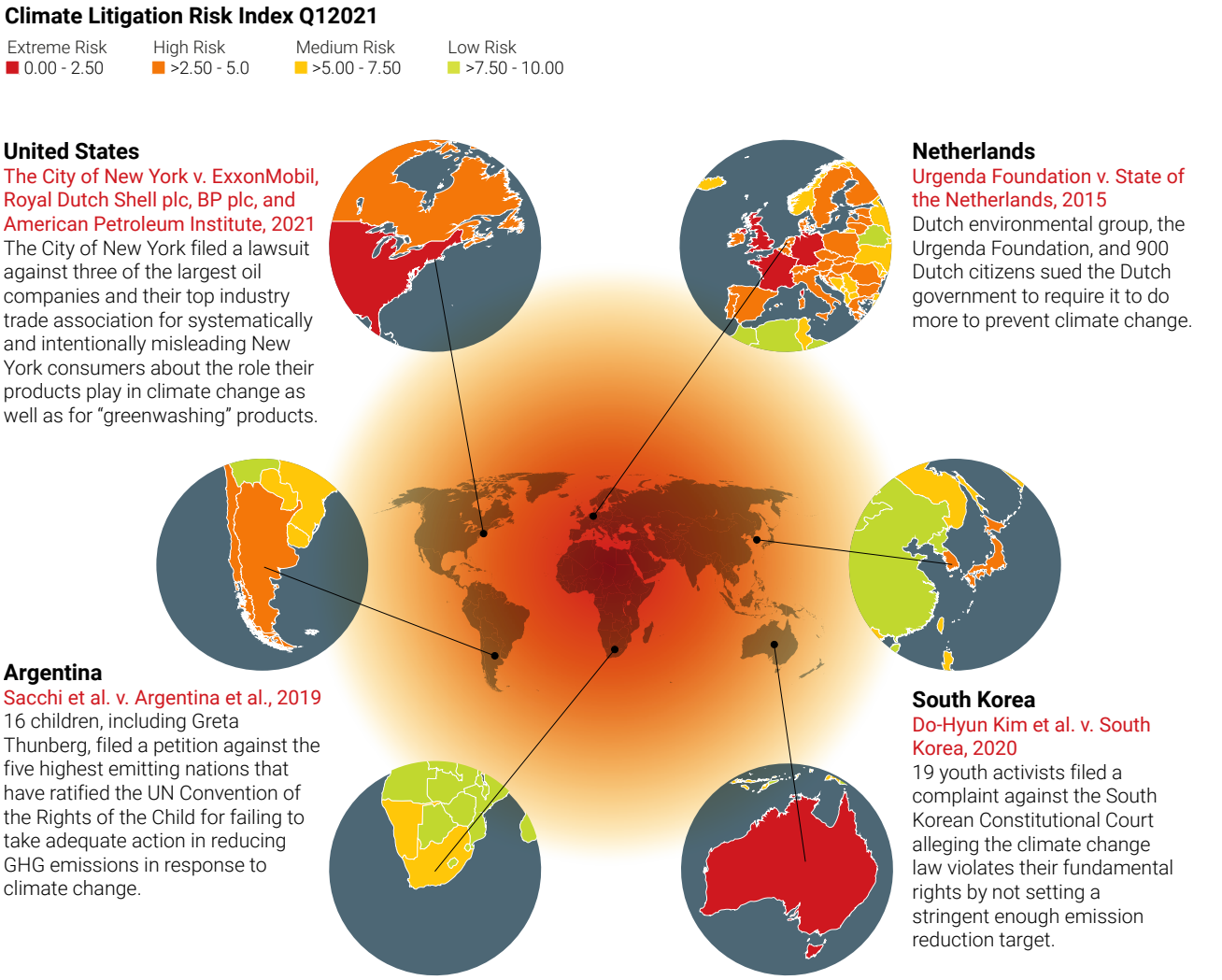
Over the past two decades, climate lawsuits have been filed in 52 countries across North and South America, Europe, Asia Pacific and Africa. There is a stark variation in the number of total cases filed across geographies: the US and EU account for 90% of climate-related lawsuits globally since 2000, but corporates should be aware that cases are starting to move into new territories.

Our data shows that climate activism is more pronounced in developed economies, such as the UK, Japan and the US, where public awareness of the issues tends to be higher. The skilful mobilisation of climate activism, widespread acceptance of climate change as a serious threat, and a strong legal precedent for utilising litigation as a corporate and regulatory motivator underlie these countries' high and extreme risk classifications in our index. An aware and mobilised public can use the courts to push governments to implement stronger climate policies. We saw this happen in the Netherlands in 2015, when the Urgenda Foundation successfully sued the government for stricter 2020 emissions reduction targets, forcing The Hague to introduce additional measures, following a 2019 appeal.

And this is not an isolated incident, as shown by the lawsuits highlighted in Figure 1. Cases like these are opening the door for other activists to pressure governments for more ambitious climate policies – especially ahead of COP26.

Figure 1: Climate litigation case studies

Climate court cases expanding outside of the US and the EU with increasing success.



Source: Verisk Maplecroft

> In emerging markets the drivers behind the rising trend in climate litigation cases are more varied.

Climate lawsuits breaking new ground in emerging markets

Now, we are beginning to see climate litigation shift towards new markets, including major emerging economies such as Argentina, South Africa and India, where climate activism is a less intrusive yet burgeoning issue. Unlike in developed countries, in emerging markets the drivers behind the rising trend in climate litigation are more varied, and there are more human rights-based and governmental 'failure to act' cases.

One of the most recent high-profile human right cases involves six Portuguese children and young adults in September suing 33 European countries for moving too slowly to reduce greenhouse gas emissions, invoking human rights arguments over threats to their "right to life." With the success rate of climate cases in new markets continuing to rise – almost 60% of cases outside the US have had favourable outcomes for the prosecution – we are seeing climate litigation expand into countries where climate activism is lower but the threat of climate change is more significant.

Figure 2: Climate litigation risk across major economies

Climate litigation risk is high among key emerging markets where climate awareness is signficant.

Country	Public awareness of climate change as major issue (%)	Climate Change Litigation Index score 2021-Q2	Climate litigation cases since 2000	Trend in litigation cases	Climate change activism
United States	63%	Extreme	Extreme	Extreme	Extreme
United Kingdom	69%	Extreme	Extreme	Medium	Extreme
France	75%	Extreme	Extreme	Medium	Extreme
Australia	75%	Extreme	Extreme	Low	Extreme
Mexico	63%	High	Medium	Extreme	High
Argentina	71%	High	Medium	Extreme	Extreme
Japan	80%	High	Medium	Extreme	High
Netherlands	57%	High	High	Extreme	Extreme
Canada	74%	High	Medium	High	Extreme
South Korea	80%	High	Medium	Low	High
South Africa	21%	Medium	Medium	Extreme	Medium
Indonesia	33%	Medium	Medium	Extreme	Medium

Source: Verisk Maplecroft

30+

Number of climate lawsuits filed against fossil fuel, steel and cement companies in the US since 2017

For corporates, the growing body of legal precedent for climate lawsuits is translating into a three-fold risk. The most immediate is a changing regulatory environment as governments react to public demand on climate policy, as this can directly constrain the operating environment. However, the damage to brand reputation from high-profile court cases is also not insignificant.

Even if a judgment is favourable, association with highly emotive environmental issues is not going to improve investor and consumer perceptions. A verdict the other way could even lead to divestment and consumer boycotts. Finally, the expanding nature of climate litigation and therefore uncertainty when it comes to financial penalties – which can potentially amount to billions of US dollars – only adds to the financial risks.

From smoking to smokestacks – companies risk fines reminiscent of tobacco trials

While governments have been the prime target of climate litigation to date, corporations whose operations – and increasingly their financial backers – are seen as directly contributing to climate change are being singled out. With 83% of global GHG emissions resulting from fossil fuels in 2018, it is unsurprising that oil and gas, coal and electric utilities are most at risk of climate liability lawsuits.

Since 2017, more than 30 climate litigation lawsuits have been filed against fossil fuel, steel and cement companies in the US. While most of these cases are ongoing or have ruled in favour of the defendants, the outcomes are arguably less important than the information that comes to light – drawing parallels to the tobacco trials of the 1950s-60s; this information not only darkens public perception of firms, it also drives further activism against them, and may trigger new lawsuits or shifts in regulation. It's all about momentum, and the momentum is gaining.

This new era of censure through the courts shows that "not enough action" is no longer just a brand image issue – companies are facing genuine legal risks from which the repercussions may be significant. And it's triggering a real discussion around what is the scope of their responsibility during the climate crisis.

Other energy-intensive sectors should expect to be the objects of climate litigation in the near future – especially metals and mining, agriculture and transport, which are increasingly being targeted by regulators and civil society over their emissions. Financial backers of these industries are also increasingly likely to be targeted like the 2021 ClientEarth v. Belgian National Bank case as more ESG-conscious investors push companies to address environmental risks in their supply chain, including commissioned assets.

> Some in the legal community are calling for a crime of 'ecocide' to be established.

More lawsuits and new defendants

The 2020's are a key decade for climate action. Therefore, sovereigns and corporates should expect more climate lawsuits to come down the line, whether in the form of rights-based cases; the non-fulfilment of green recovery promises; or the failure to protect communities from more frequent extreme weather events.

Corporations also face new arenas of climate litigation risk, as activists expand the legal basis for lawsuits, focusing on fraud and consumer protection, company regulations, or planning and permitting laws to bring companies to court. Other aspects of environmental performance may also be targeted: with natural capital risks coming to the fore, some in the legal community are calling for a crime of 'ecocide' to be established – a distant possibility right now, but one that could encompass a huge range of corporate liabilities.

As the jurisdictional reach of climate lawsuits continues to expand outside of the US and EU, companies in all sectors and countries will need to consider how to mitigate their risk. For energy and mining companies, the very nature of their sectors means they are unlikely to be able to completely negate the risk of being sued. However, any company that can demonstrate comprehensive monitoring and disclosure of climate risks across their supply chain, as well as proactive stakeholder engagement to build social licence to operate in their immediate communities, will be better placed to avoid the courthouse.

London to feel as hot as Milan by 2050, New York like DC

Liz Hypes
Senior Environment and Climate Change Analyst

Urban infrastructure, productivity and health under threat as cities heat up

us$2.8bn

Estimated cost of losses from productivity in London by 2050

In less than 30 years climate change will force us to re-evaluate how we live and work in our urban environments. If emissions remain unchecked, temperatures and humidity will quickly rise, leaving many major cities facing more frequent and severe heatwaves. Forward-thinking major organisations and governments will have to start building these issues into their planning, as heat stress, which can trigger confusion, dizziness, fatigue, nausea and even death, will become an increasingly important factor for highly exposed populations.

By 2050, extreme heat stress is projected to impact 350 million people in the world's megacities. The burden is likely to be significant: healthcare facilities will become stressed, transport and power grids will face disruption, and GDP will reduce as productivity and outputs fall.

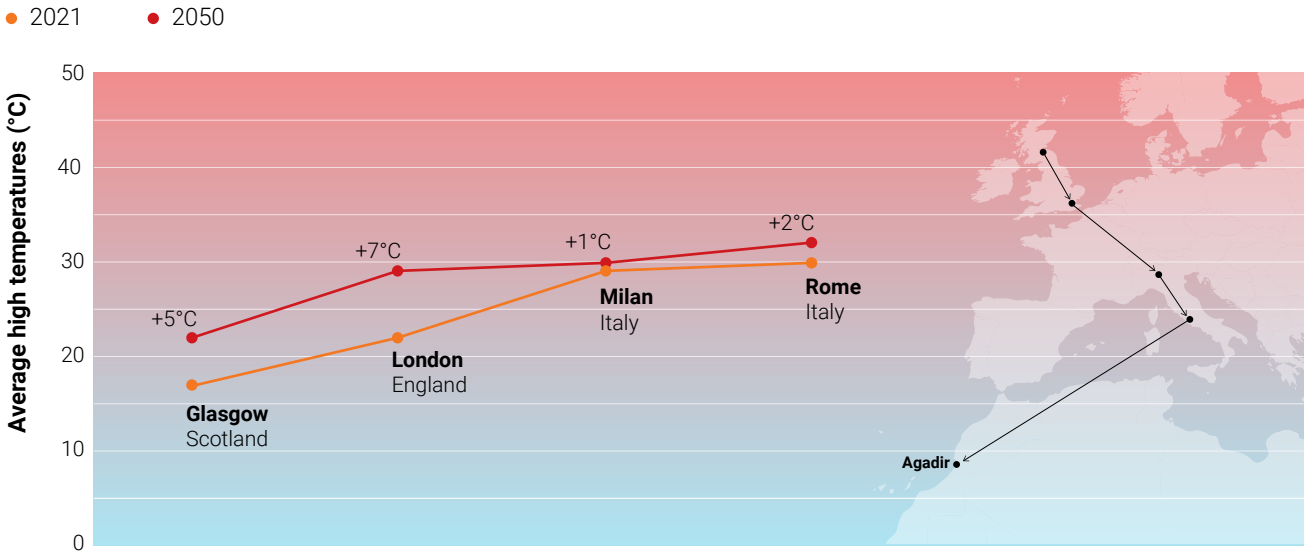
So, what will the future look like? We've handpicked major cities in North America and Europe to show how rising heat stress will change northern urban environments. Tracking two journeys south using our Current and Future Heat Stress indices, we show how major metropolitan areas will transform under future heat stress by revealing the cities that they will most resemble by 2050.

4 degrees of separation

Intensifying levels of heat stress over the next 30 years will make Glasgow as warm as London. While Glaswegians may welcome the change from iron grey skies and rain, those familiar with London's stifling underground system will not relish the thought of heat in the UK capital feeling more like Milan does today.

Milan's July average high temperature comes in around 30°C, 11 degrees warmer than London's current average, elevating the frequency and length of rail delays as more days climb over 24°C. Yet London's transition into a climate like Milan's equates to more than just a sweaty commute. As heatwaves like London's 2019 and 2020 events become the summer norm by 2050, the city could see losses upwards of USD2.8 billion in productivity – from increased labour inefficiency, illness and workplace injuries and delays due to impacts on transport – despite its workforce being largely staffed by people in climate-controlled offices.

Figure 1: Rising heat and humidity creates a journey of 2,000+ miles from Glasgow to Agadir



Source: Verisk Maplecroft

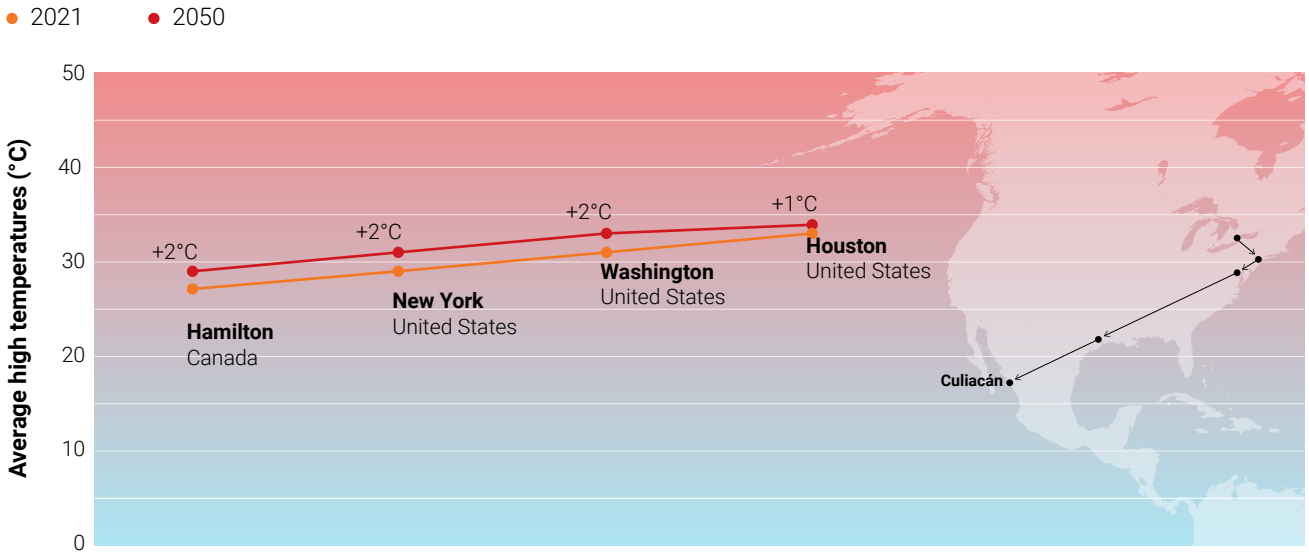
The next city pairing on our journey is Milan to Rome. Milan will be mostly buffered from the severest impacts of heat stress due to its economic focus on financials and services, but Rome's transition will be harsher as it moves into a climate more like that of Agadir, Morocco. Italy's capital is no stranger to the effects of heat stress, but this will be amplified by 2050 when it will experience an additional 41 heat stress days, which occur when temperature and humidity exceed 25˚C on a measure known as the Wet Bulb Globe Temperature (WBGT). The 2017 heatwave saw the Italian capital, renowned for its aqueducts and water fountains, threatening to ration water for over a million residents.

Pressures on power and water supplies, excess mortalities and labour capacity losses are already shared across Southern European cities like Lisbon, Bologna and Athens. But they will, on average, transition into feeling more like Middle Eastern and North African cities over 400 miles to their south, where fatalities related to heat stress are most concentrated. It is going to be an uncomfortable journey and one operators, investors, and city officials need to start preparing for now.

US cities coming in hot by 2050

Across the Atlantic, the situation is similarly worrying. The summer of 2020 saw US cities reaching record monthly temperatures and humidity, but this will feel like the new norm by mid-century. The increase in heat stress will pose particular risks for the US's nearly 8 million construction workers and 13 million manufacturing employees.

Figure 2: NYC most at risk of rising heat in geographical city shift from Canada to Mexico



Source: Verisk Maplecroft

City dwellers will be increasingly familiar with heat stress days. New York City will experience an additional 30 heat stress days by mid-century, leaving the Big Apple feeling more like muggy Washington DC, and presenting the city with a growing set of health and infrastructure challenges.

In a 2018 climate lawsuit against fossil fuel companies, NYC stated that hotter summers even by 2020 could result in an additional 260 heat-related deaths each year and that it is spending over USD100 million on a program to protect vulnerable communities from extreme heat. These expenditures will grow hugely over the coming decades, with the costs of heat resilience strategies and fluctuating energy demands being passed on to real asset owners and businesses.

The journey southward sees DC's heat profile transitioning into today's Houston which, in turn, will feel more like Culiacán, Mexico over 800 miles southwest by 2050. Around 7.4 million barrels of crude oil are produced per day in Texas and the Gulf of Mexico, but Houston faces large labour capacity losses as its heat stress days increase by 50% annually to nearly 150 by mid-century. This could translate into price rises for importers if production costs climb or product availability falls.

> The key word for cities, asset owners, and corporates alike is resilience.

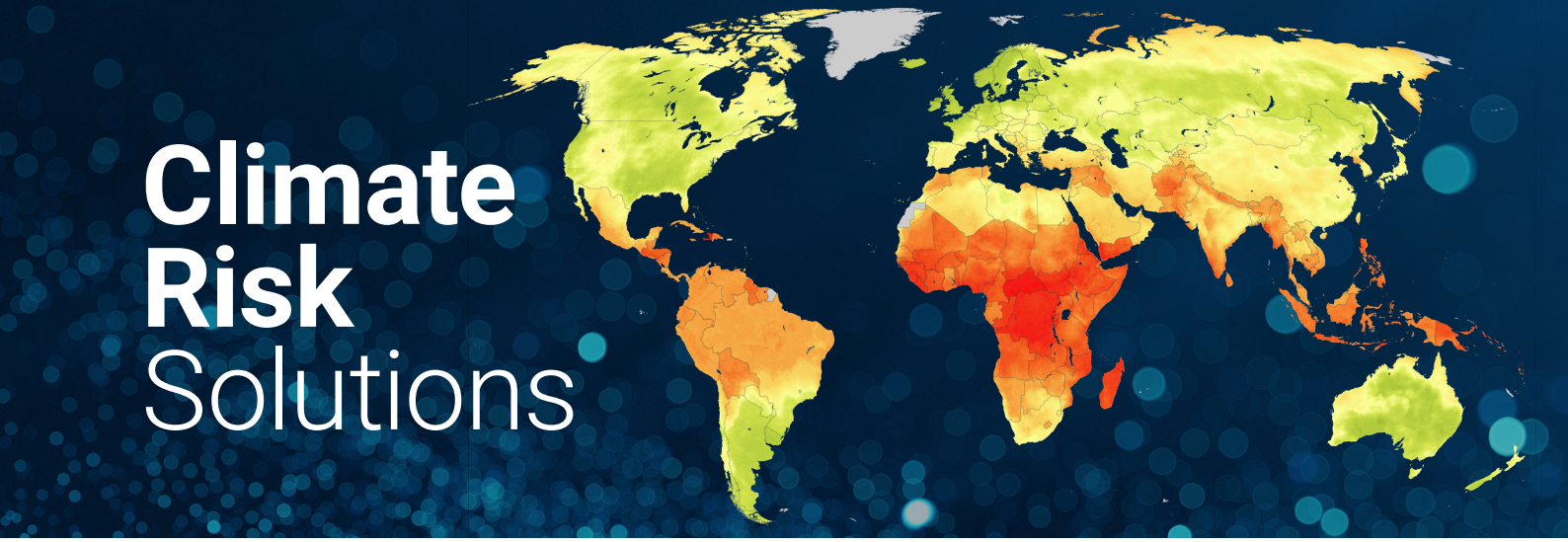
The jumps between major US cities today and those they will resemble in 30 years is consistently large. By 2050, Chicago will be more like Las Vegas; hot and humid Miami will be more reflective of Venezuelan cities; Los Angeles will resemble sweltering New Orleans; and water-stressed Denver will feel like Hollywood, California. The high exposure of cities in the US Sunbelt and the negative impacts on its main economic sectors, such as agriculture, tourism and the growing manufacturing sector, is a significant concern to real asset managers and investors, as well as governments.

Slowing the burn by building climate resilience

Cities like London and NYC will have to face up to rising health crises as heat waves become commonplace. Asset owners, especially those involved in real estate, will see operational and retrofitting costs soar as cooling demands increase and buildings require better heat resilience. And corporate supply chains should expect commodity price increases, falling labour productivity and growing labour risks in warmer months.

The key word for cities, asset owners and corporates alike is resilience. Heat stress will have to be front of mind in their climate strategies and their investment decisions from today. Failing to adapt to heat stress will not only be deadly but also devastating – it will scorch economies, inflate inequalities, drive migration, and amplify natural hazard risks already damaging key urban economies.

Climate Risk Solutions



Physical and transition climate risks pose a major and still largely unpriced threat to markets across all asset classes. Investors should act now to ensure the resilience of their portfolio's assets and client returns. We can help. For 20 years we have enabled leading organisations to effectively identify and manage climate-related risks and opportunities..

Our internationally recognised risk indices pinpoint global corporate exposure to climate change, natural hazards, water issues and regulatory challenges down to the asset level. Our experts have a deep understanding of the growing physical impacts of climate change and shifting stakeholder expectations. Using our proprietary data and bespoke advisory services, we can help you:

Identify and quantify climate risks and opportunities

- Quantitative, comparable current and future climate risk profiles
- Climate change scenario analysis
- Sector-specific and subnational ESG and climate change analysis
- Portfolio, corporate and asset-level risk assessment
- Risk screening / due diligence
- Supply chain mapping, hotspot identification and disruption assessment
- Evaluation of upstream value chain climate-related risks for hard and soft commodities
- Quantification of related social licence and reputational risks

Develop and implement your internal and external climate change strategy

- National and subnational regulatory analysis and horizon scanning
- Corporate climate change policy development and review
- Integration of climate risk into existing management frameworks
- Development of performance metrics and targets

Transparently report on your strategy and performance to key external audiences

- Alignment to international best-practice frameworks including TCFD, CDP, SDGs and UNGC
- Monitor, report and benchmark performance against internal and external standards
- End-to-end sustainability reporting to transparently disclose performance and drive management action

To find out how we can help you with your corporate exposure to climate change contact:

info@maplecroft.com

maplecroft.com

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