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Our blueprint for addressing climate change

Global direct real estate approach to assessing transition and physical risks

December 2022

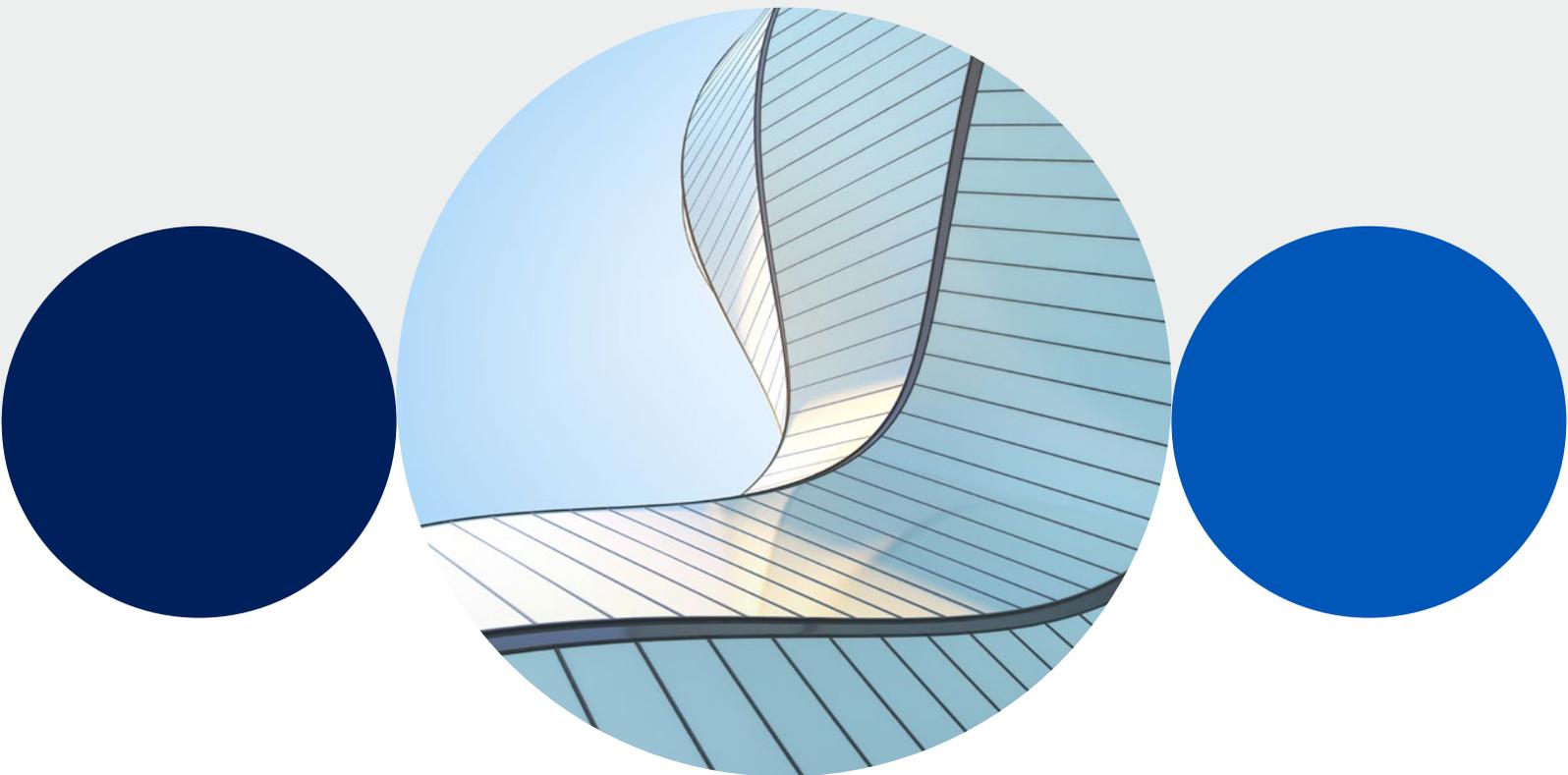
abrdn.com

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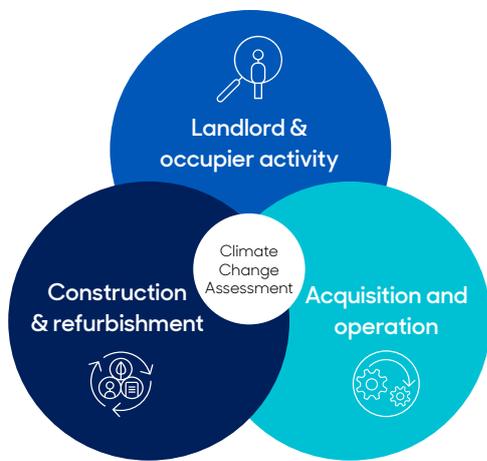
"The importance of rapid decarbonization in the real estate sector is only increasing as we start to see the real-life impacts of climate change today. The only way to future proof our portfolios and achieve a low carbon world is to work together. As signatories of the Better Buildings Partnership's Climate Commitment, along with the British Property Federation's net zero pledge, we are committed to collaboration and progress across the industry."

Neil Slater
Head of Real Assets



Executive Summary

Our approach: Our real estate environmental, social and governance (ESG) approach actively assesses risks and opportunities as an integral part of our investment process. This includes understanding the risks and opportunities related to climate change. It is fundamental to recognise that every fund, geography and investor is different and that much work is still required at an industry level to agree what a successful climate risk and resilience strategy looks like. However, we have a good understanding of where we can have most impact as an asset manager; our global blueprint for addressing climate risks acts as a framework for each property portfolio to be able to develop its own strategy towards the assessment, management, mitigation and disclosure of climate risk.

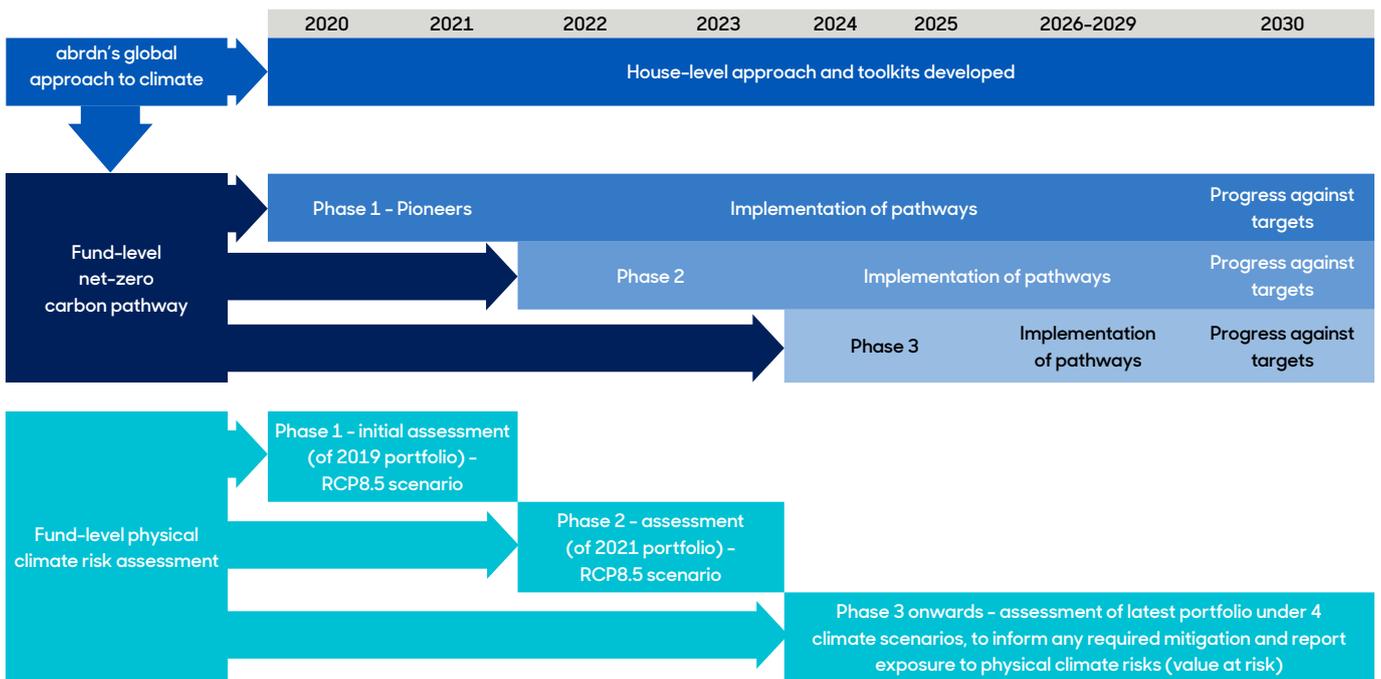


Transition risks: We have targeted net-zero carbon by 2050 for our global direct real estate investments. Some of our funds have and will set targets in advance of this date, following their own detailed pathway work. We will also contribute to the wider abrdn investments target to improve the Scope 1 and 2 emissions intensity of the assets we manage by 50% by 2030, relative to our 2019 baseline.

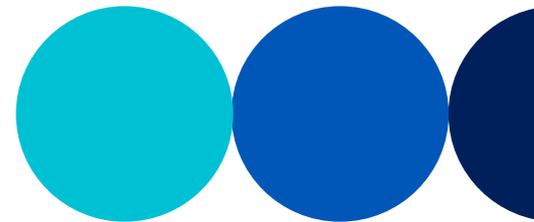
Our net-zero carbon framework follows the principles of the energy hierarchy and considers funds' specific investment objectives, time horizons and the priorities of their investors. At the time of writing, we have either completed or are in the final stages of detailed net-zero studies for funds representing nearly 51% of direct real estate AUM as at December 2022.

Physical risks: Our approach to considering physical risks assesses the materiality of both 'acute' (e.g. single events such as flooding and wildfires) and 'chronic' (e.g. ongoing sea-level rise and water scarcity) risks over different time horizons and global warming scenarios. Our work to date has centered around examining the costs and implications that these risks pose, as well as the opportunities for improving our assets, in order to mitigate these risks and make them resilient to the rapidly changing environment. At the time of writing, approximately 60% of direct real estate AUM has been subject to climate scenario analysis.

Direct real estate climate framework



Introduction



In 2021, COP26 served to reinforce the need for the rapid decarbonisation of the global economy. Conversely, the outcomes of COP27 in November 2022 centered more around the important issues of climate justice and climate adaptation. Notably, some progress was made with respect to a 'loss and damage fund' aiming to direct compensation towards those countries disproportionately vulnerable to the impacts of climate change, along with the launch of the Sharm-el-Sheikh Adaptation Agenda which demonstrated progress towards the provision of adaptation solutions in equally vulnerable regions. Despite this progress, the lack of credible climate ambition and resultant Nationally Determined Contributions (NDCs) towards reducing emissions at COP27 means that the world remains on trajectory towards 2.4 degrees of warming.

Resultantly, there is now an even greater need for meaningful action to keep global temperature increases below 1.5 degrees to mitigate the worst effects of climate change. Achieving net-zero emissions globally by 2050 is seen as consistent with keeping the global temperature increase below 1.5 degrees, thus avoiding the most dangerous effects of climate change. abrdn is committed to playing a constructive role in the decarbonisation of the global economy and to serving the long-term interests of our clients. Following COP26 and COP27, much more needs to be done by policymakers to ensure we follow through on to meet the goals of the Paris Agreement. We are acutely aware of our responsibility to support the decarbonisation of existing assets and to finance climate solutions. You can read more about our company approach to climate change – both at the corporate level and across our investments – [here](#). We are also acutely aware of the increasing link between climate issues and investment performance, and the impact that inaction could have on valuations, returns and investment activity at the direct real estate level.

The built environment remains a major contributor of greenhouse gas emissions. The sector has made some progress to date but the rate of decarbonisation must accelerate from here. We have a responsibility to all our clients to consider how climate change will affect the value and risk profile of their investments. Our real estate environmental, social and governance (ESG) approach actively assesses risks and opportunities as an integral part of our investment process. This includes understanding the risks and opportunities related to climate change. According to the Taskforce for Climate-related Financial Disclosures (TCFD), the risks are categorised as follows.

- **Transition risks** are those that relate to an asset's ability to decarbonise. An asset can be exposed to risks as a result of carbon pricing, regulation, shifts in technology, and demand related to the transition.
- **Physical risks** are those that relate to an asset's vulnerability to factors such as increasing temperatures and extreme weather events as a result of climate change. Exposure to physical risks may result in, for example, direct damage to assets, rising insurance costs or supply chain disruption. We must also consider the costs of adaptation (i.e. the infrastructure required to protect from physical damage).

Understanding and managing these risks is one component of abrdn's wider ESG strategy. It accounts for several of the 21 material ESG indicators that we track across our funds. You can read about our wider approach to ESG in real estate [here](#).

Our Investment Process

Our overall ESG approach groups 21 material sustainability indicators into four main categories: (i) Environment & Climate, (ii) Demographics; (iii) Governance & Engagement; and (iv) Technology & Infrastructure. This approach allows the identification and promotion of appropriate material ESG risks and opportunities relevant to a fund’s investment strategy, sector and geography. Climate change represents one of the most material ESG risks and opportunities that we consider as part of our investment process.

ESG integration

The 21 material ESG indicators act as a reference point for investment decisions. The consideration of these ESG and climate-related factors is factored into the investment process leveraging existing touch points, detailed in the chart below:

Acquisition approach

- **Pre-Bid ESG Due Diligence Screen** – this high-level screen undertaken internally at pre-bid stage supports ‘go/ no-go’ investment decisions; informs decarbonisation CAPEX to be included in bid offers and informs the Investment Committee (IC) paper. This step assesses (1) physical climate risks (2) risks and opportunities relating to decarbonisation/net-zero; and (3) any other material ESG issues that fall under our 21 defined ESG indicators.
- **Post-Bid Detailed ESG Due Diligence** – this is completed post-IC approval and includes further detailed assessment of ESG and climate related topics.

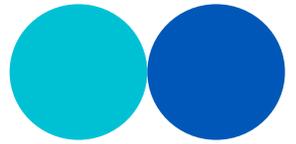
Standing assets

- **Fund-Level** – ESG is considered in the **Fund strategic plan**, which includes two sections (1) Risk and performance, and (2) ESG goals and aspirations for the following year.
- **Asset-Level:**
 - ESG action – asset management plans are updated to include ESG actions on at least an annual basis, which includes factoring in decarbonisation CAPEX.
 - Development/Refurbishment – abrdn has established a set of minimum ESG standards that apply to all new construction, major renovations and forward funded developments.

Real estate house view	Product strategy and fund raising	Fund Level	Assets level		
Environment and climate	Client outcome Forces for change form the basis for client engagement on ESG	Fund strategic plan Fund-specific ESG objectives established and tracked	Acquisitions ESG risks and opportunities assessed as part of due diligence and included in underwriting as appropriate	Asset Management Tools and procedures to support ESG integration into all asset management activity including leasing and landlord works	Development/ refurb Robust standards and procedures for development major refurbishment and fundings
Governance and engagement					
Demographics					
Technology and infrastructure					
Real Estate ESG Team with Research and Strategy Team monitors trends and materiality	Product specialists and investment strategy team engaging with clients	Real Estate ESG Team provides supporting input into Fund Strategic Plan. Signed off by Investment Strategy Committee.	ESG criteria assessed by Fund and Transactions Team with ESG Team input throughout DD process. ESG Team support required for Investment Committee Paper. Signed off by Investment Committee	ESG data management system captures performance data and hosts ESG asset action plans owned by Asset and Property Managers. ESG risks and opportunities integrated into landlord works in line with fund strategy and approved by Fund Manager	ESG Standards for Development and Refurbishment integrated from concept design and into design and construction contracts. ESG Team provides supporting input. Major development works and fundings approved by Investment Committee

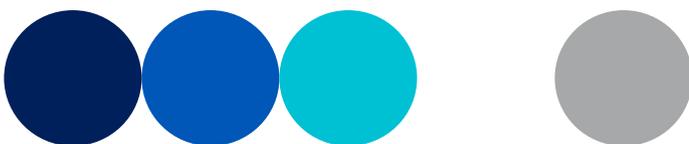
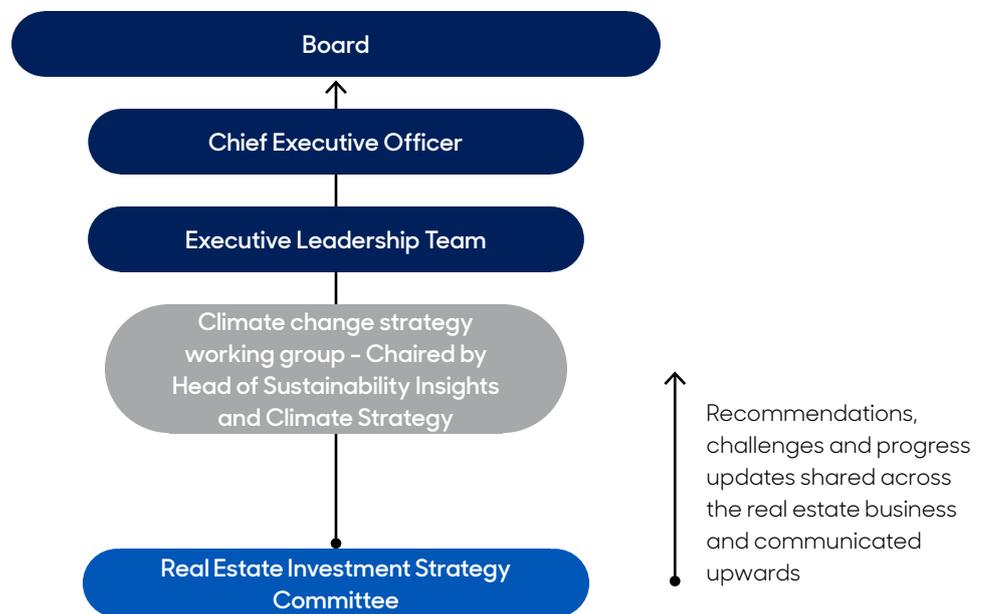
Source: abrdn.

Governance



We have a strong governance framework to ensure that climate change risk and opportunities are embedded in our investment process and decision-making. This allows for effective communication and accountability at all levels and makes sure that knowledge and best practice are shared with the real estate business and other asset classes.

Our Climate Change Strategy Group (CCSG) is the management decision-making forum for climate-related risks and opportunities in the investments vector. The group is responsible for setting strategy and escalating material issues through our wider governance framework. The group meets quarterly and is chaired by our Head of Sustainability Insights & Climate Strategy.



Transition risks

Transition risks are those that relate to an asset's ability to decarbonise. This section therefore focuses on our approach for achieving net-zero carbon for our real estate portfolio.

What is net-zero carbon?

The Intergovernmental Panel on Climate Change's (IPCC) definition of net zero is when anthropogenic emissions of greenhouse gases are balanced by anthropogenic removals over a specified period, which is set at 2050 by the Paris Agreement. At a real estate asset or portfolio level, this is when greenhouse gases emitted – as a result of all activities associated with the development, ownership and servicing of a building – are zero or negative for a given period of time.

Our commitment

This document outlines the framework we are using to address transition risk across our global portfolio. As signatories, our approach aligns with the Better Buildings Partnership (BBP) Climate Change Commitment. This requires us to set out our house-level approach for achieving net-zero carbon and provide an annual update on progress. Within the real estate business, the commitment to achieving net zero by 2050 applies to our direct real estate funds, including new funds. We have excluded indirect investments at this stage. There are activities underway to decarbonise indirect investments but data collection and influence remain challenging. We will regularly review whether to bring these into the scope of the 2050 commitment alongside direct investments. This commitment applies to real estate investment assets only and not to other asset types managed by abrdn or the corporate estate, which are subject to independent decarbonisation strategies.

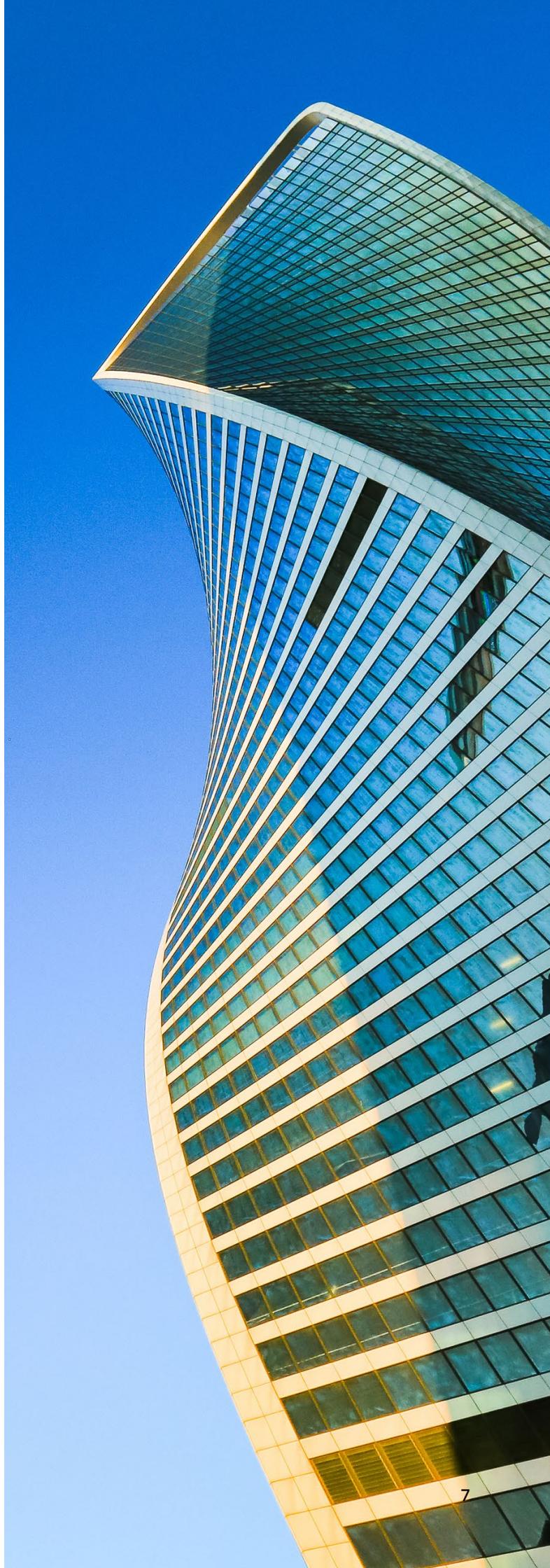
abrdn's real estate business AUM

Direct	Indirect
Direct real estate 93%	Multi-manager 4%
	Real estate equities 3%

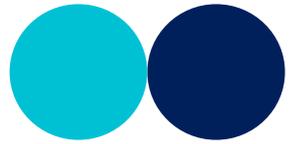
Real estate assets under management (AUM) as at 31 December 2022. abrdn.

"We have a responsibility to all our clients to consider how climate change will affect the value of their investments."

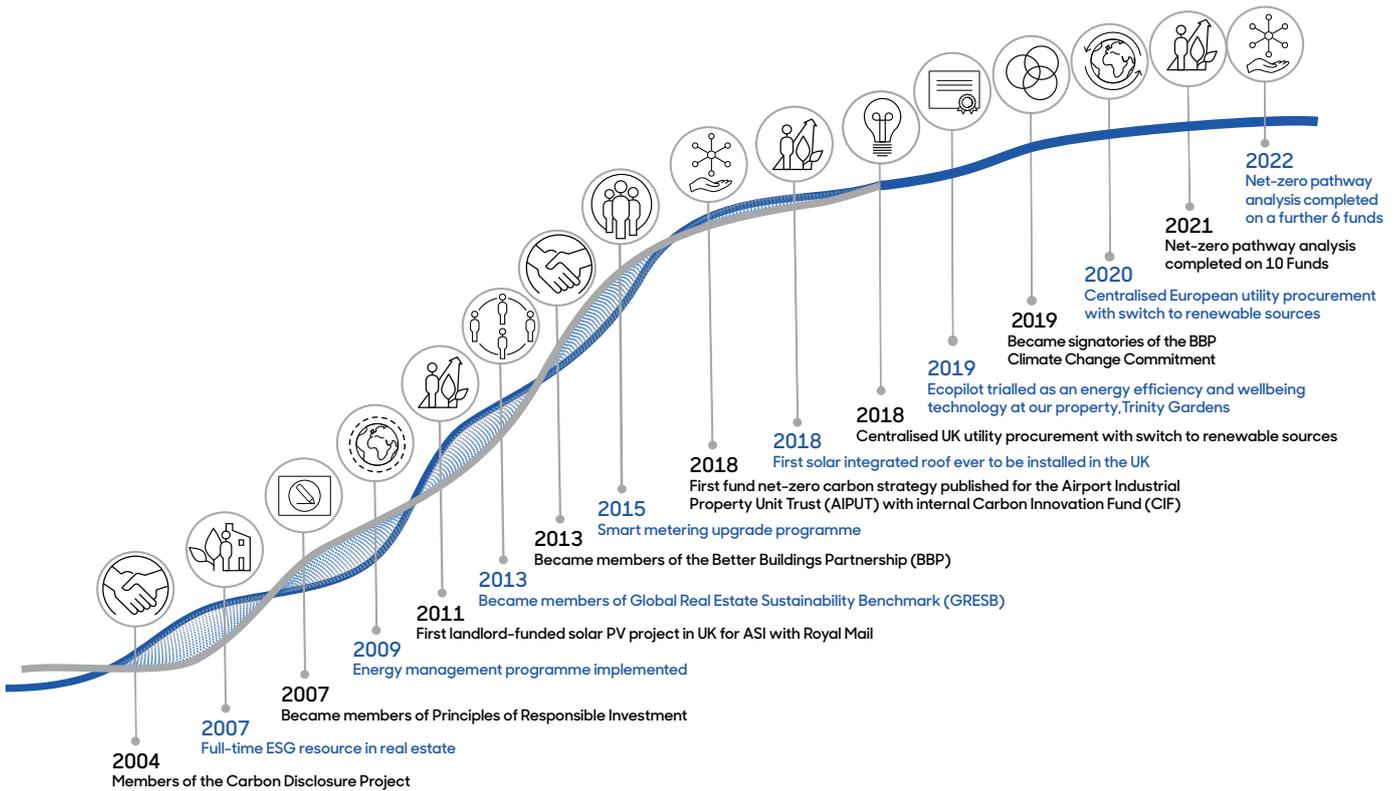
Eva Cairns
Head of Sustainability Insights and Climate Strategy



Transition risks



This topic is not new; we've had a long-standing focus on energy efficiency and emissions reduction. As landlords, we have the potential to influence the carbon intensity of the assets we manage through a number of our activities. This includes undertaking high-quality development and refurbishment projects, implementing energy-management programmes where we have operation control, and installing on-site renewables for the benefit of our occupiers.



<p>2021: Project ICON C (Seoul, Korea)</p>	<p>2022: Solar PV installation (Veghel, Netherlands)</p>	<p>2022: Completed residential development (Roselawn, Dublin)</p>
<p>We undertook a detailed bottom-up study of costs and benefits of net-zero for this large newly-constructed office asset in Seoul, providing the template for how we define asset-level pathways in the future. The building also is targeting a LEED Platinum rating, and received an award from the Ministry of Environment Korea for its green building credentials.</p>	<p>In collaboration with Eneco and Goossens, 6,228 Solar PV panels have been installed on one of our EPC A-rated logistics investments, to deliver around 2.3GWh of energy annually, meeting over 100% of the energy consumption demands of the occupier, with the remainder exported to the grid to support The Netherlands' mix of renewable energy.</p>	<p>We funded the development of a high-standard residential development in Dublin, complete with low-carbon in-operation design which included Solar PV with 43kWp capacity.</p>

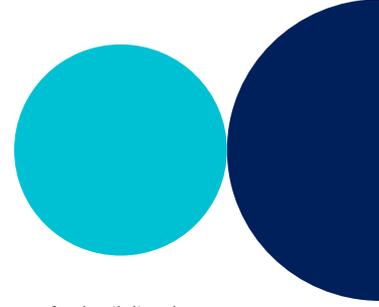
"It is essential for us to have a detailed understanding of transition and physical climate risks at the earliest stage of the investment process. Our acquisition strategy serves to minimize our overall exposure to such risks to maintain long-term investment performance for our clients."

Rob Cass

Head of Transactions, Real Estate

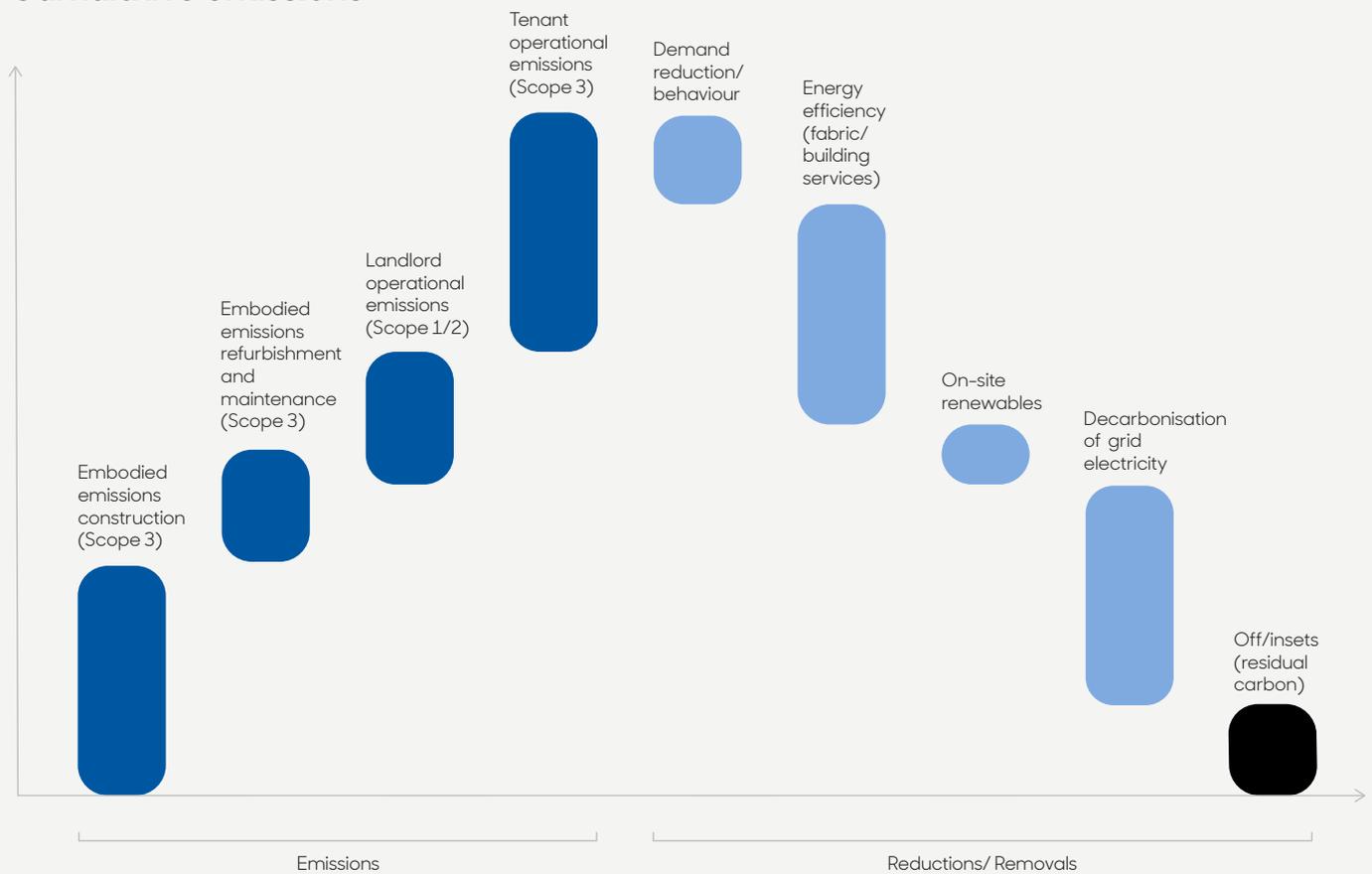


Transition risks



The BBP Climate Change Commitment and its Net-Zero Framework cover emissions from all stages of a building's lifecycle. This includes embodied emissions associated with the construction and refurbishment of buildings, as well as those from its operation and maintenance. The simplified, waterfall chart below shows the main sources of emissions and reduction/removal options.

Cumulative emissions



Source: abrdn.

Note that the waterfall chart here is for illustration purposes only, which highlights the sources of carbon emissions in scope but is not based on actual carbon emissions data of abrdn's direct real estate investments.

Transition risks



Scope 1 and 2 – These are emissions that directly result from the landlord’s activities where there is operational control, either through the purchase and consumption of energy or refrigerant losses.

Scope 3 – These are emissions that occur in our supply chains and downstream leased assets (i.e. tenant spaces) over which we have a degree of influence but limited control.

	Activities that generate GHG emissions for real estate investment	Activities that are controlled and managed by landlords	Activities that are controlled and managed by occupiers
Standing investments	Energy to operate buildings (electricity, fuels and heat networks)	Scope 1 and 2	Scope 3
	Water to operate buildings	Scope 3	n/a
	Waste generated during operation	Scope 3	n/a
	Refrigerants (fugitive emissions)	Scope 1	n/a
	Purchase of goods and services	Scope 3	n/a
Development	New development works	Scope 3	n/a
	Refurbishment works	Scope 3	Scope 3
	Fit-out works	Scope 3	Scope 3

At present, it is not possible for a real estate asset manager to have full and complete visibility of data across all of these categories. Given that occupiers are generally responsible for procuring utilities in single-let assets, it remains a challenge to achieve full data coverage in relation to Scope 3 emissions. However, this is gradually improving through actions we are taking and technological advances.

We have categorised the carbon emissions we can report on now and those that will take time to refine.

- **Data currently collected.** This is where data is currently collected and reported in line with international sustainability standards.
- **Data occasionally collected.** This is data that is occasionally collected where possible, but still remains a challenge for the real estate industry.
- **Data rarely or not collected.** This is where data is rarely or not collected and reported.



"Our house-level ESG development guidelines set the standard for all our direct development and funding activity. We are pushing forwards with the wider industry towards the development of resilient, low-carbon buildings, while working to measure and reduce their whole-life carbon footprint."

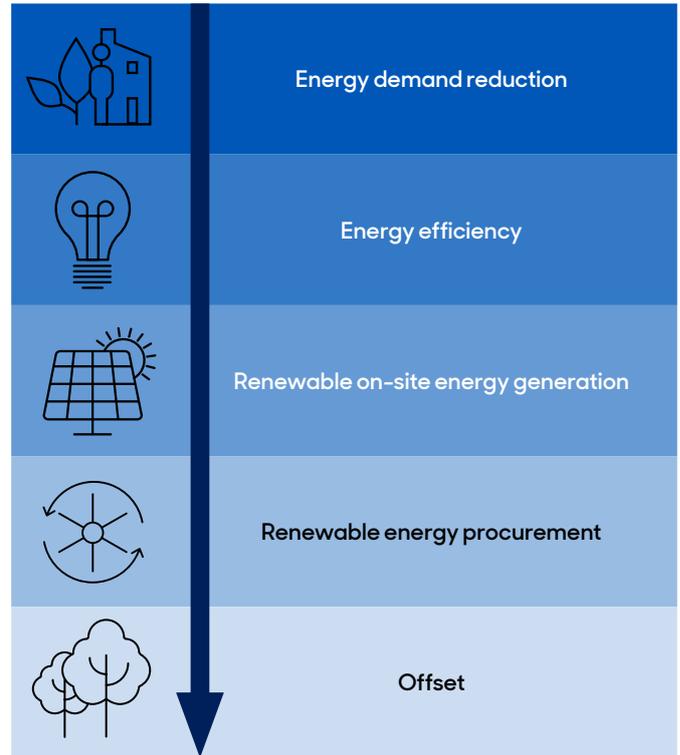
John Brophy
Head of Development & Building Services

Transition risks

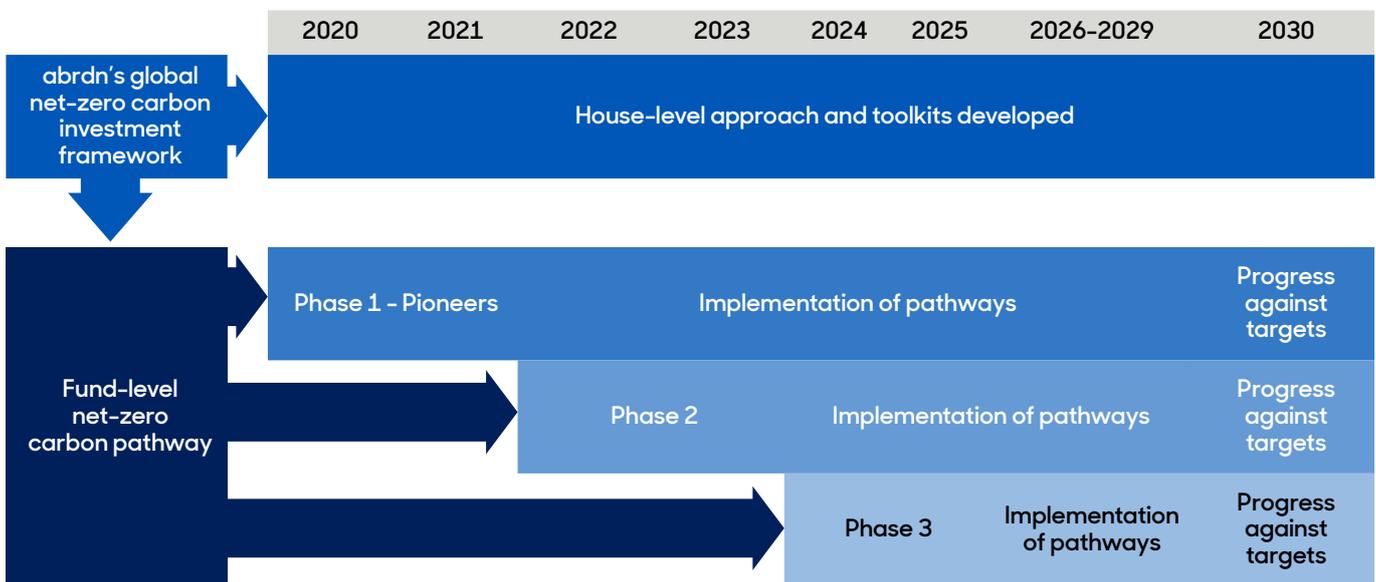
Delivery Framework

abrdn's direct real estate portfolio is global and diverse across multiple funds, with approximately 1,100 assets. In order to deliver net zero at scale and across these varying funds and assets, we have created a delivery framework. This sets out strategic actions at both the abrdn and fund level, following the energy hierarchy as shown here. The framework effectively acts as an instruction manual for each of the funds we manage. It prioritizes actions and provides the process that should be followed to create a pathway and to define practical implementation. However, each fund will need to define its own journey and pathway, taking account of its structure, investment objectives, client objectives, and sector and geographical allocations. We expect that some funds will move faster than others and may want to set an earlier net-zero target. To ensure the necessary focus and momentum, all funds in scope must undertake work to understand their own net-zero carbon pathway by no later than the end of 2025, subject to investor approval. This work will be undertaken in three phases, as illustrated in the timeline below.

Energy hierarchy



Direct real estate net-zero carbon framework



Transition risks

Interim targets

In order to understand whether our buildings are on track with a 2050 net-zero carbon pathway, it is important to compare their carbon intensities with third-party benchmarks. This is a new and evolving area. With the framework and pathway implementation, we will check, challenge and review our use of specific industry benchmarks. As part of the initial fund pathway work, a range of benchmarks and pathways are being used. These include the Carbon Risk Real Estate Monitor (CRREM) and a national framework approach where available, based on work undertaken by local Green Building Councils. The appropriate tool to use will vary by country and sector, and will change over time as the market's approach to measuring alignment matures. For now, CRREM remains the primary tool to understand where our properties are positioned and where they need to be to achieve a net-zero carbon status, using 2030 as a key milestone in delivery.

Since the recent (2022) announcement that CRREM will align with the Science Based Targets Initiative (SBTi)¹, we expect CRREM to remain as the primary tool for supporting the assessment of our portfolio against net-zero pathways. As part of the CRREM/SBTi partnership, revised CRREM targets were released in early January 2023. These pathway changes will influence the outputs of our fund-level net-zero modelling. Based on our preliminary understanding of the newly-released CRREM pathways, it is apparent that the reduction pathways are steeper in the short-term (inciting a need for nearer-term action), but the energy intensity pathways post-2030 are more realistic, due to updated assumptions around future renewable energy grid capacities in various countries across the globe. We know that these changes will significantly change the timing and extent of any resultant required interventions and CAPEX assumptions; and all modelling going forward will use these revised pathways.

Aside from aspiring for alignment with CRREM pathways, we will also contribute to abrdn's target to improve the Scope 1 and 2 emissions intensity of the assets we manage by 50% by 2030, from our 2019 baseline.

"By working collaboratively with our occupiers, we can unlock significant potential in driving the transition towards low carbon buildings that are resilient to the impacts of climate change."

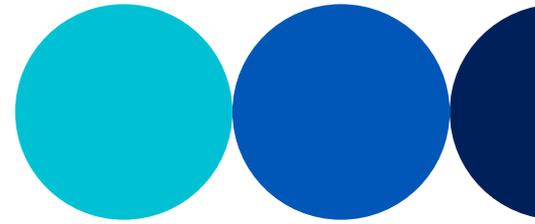
Bernd Bechheim

Head of European Asset Management and ESG

¹ The Science-Based Targets Initiatives (SBTi) is an organization that helps to define and promote best practice in science-based net-zero target setting. The SBTi independently assesses and approves net-zero targets set by corporations and investment vehicles.

Transition risks

Delivery Framework at the abrdn level



The table on next page follows the principles of the energy hierarchy and outlines the actions required at the house level in order to support fund-level delivery of net zero.

Update on 2022 activity

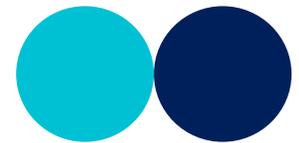
As is clear from the table, we have made significant progress in the past two years. At the time of writing, 16 of our funds have either completed or are in the final stages of detailed net-zero studies representing nearly 51% of our AUM. This has involved;

- data collection and validation
- baselining
- asset benchmarking
- intervention and scenario modelling, including identifying capital expenditure requirements and residual carbon over time.

We have learned a lot from this work so far, especially in relation to the relative contribution of each emissions category, the appropriate methodologies to use for different portfolio types and the extent to which emerging national regulations will support the transition to net zero. As the first 16 funds move from the initial stage to practical delivery, we will reflect this insight in the next phase of funds commencing detailed work in 2023, and in the pathway updates for any Fund completing its annual net-zero progress review.



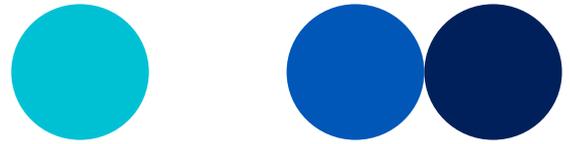
Transition risks



Topic	Outcomes	Delivery strategy	Progress to date
Operational carbon (energy, water, waste)	Understanding of full carbon footprint (both landlord and occupier)	Automation of occupier data collection: develop an abrdn approach and deploy solutions to collect occupier energy data automatically	Installations underway across a number of funds following assessment of technology options
		Other emissions calculations: develop abrdn approach for the data collection of (1) refrigerants (2) purchased goods	Landlord refrigerant data now collected in UK. Progress to be made with European property managers
	Reduction in operational energy, water and waste	Occupier fit-out guide: update abrdn fit-out guides for landlords and occupiers, to further address low-carbon opportunities	Review underway alongside updated license approval process
		Refurbishment checklist: implementation of refurbishment checklist to support integration of net-zero principles into any near-term planned interventions or plant replacement as required	Refurbishment checklist updated in 2022 and is currently being implemented
		Acquisition approach: update abrdn acquisition process to include carbon analysis on purchases and understand improvement potential	Approach updated in 2022 and is currently being implemented
Development and refurbishment standards: Our updated abrdn house standards will drive enhanced operational performance and minimized whole-life carbon footprint.	Approach updated in 2022 and currently being implemented		
Renewable energy procurement and investment	<p>Increase in on-site energy generation and 100% renewable energy procurement globally</p> <p>Successful engagement with occupiers switching to renewable energy procurement</p>	Renewable energy procurement and on-site generation: we already have an approach to procure all landlord electricity supplies from certified renewable energy sources. Procuring any further renewable sources by occupiers or on-site generation is delivered at the fund level	100% landlord procured electricity in the UK. We have centralised European utility supplies and have transitioned all portfolios to 100% renewable electricity as part of the tendering process. Large on-going programme of on-site solar projects with approximately 52MWp in development at the time of writing. In 2021, 10,000MWh of electricity was generated from our solar PV installations globally. In 2022, 2,700MWh of electricity was generated from our UK solar PV installations, and we are in the process of gathering 2022 Solar PV generation data from our wider global portfolio.
Embodied carbon	Measurement and reduction of embodied carbon in developments, refurbishments and fit-outs	Development of an embodied carbon approach in developments, refurbishments and fit-outs	Updated approach to development requires assessment of embodied carbon with reference to best practice benchmarks
Offsetting	Robust offsetting options for residual carbon	Clear position on appropriate use of offsets as a last resort once energy hierarchy has been exhausted	Our approach and guidance on offsets is to prioritise the use of nature based offsets with wider environmental and social benefits which are robustly calculated and verified with third parties to show true and additional carbon savings. These should be focused on removal and reduction offsets where possible

Transition risks

Delivery Framework at the Fund Level

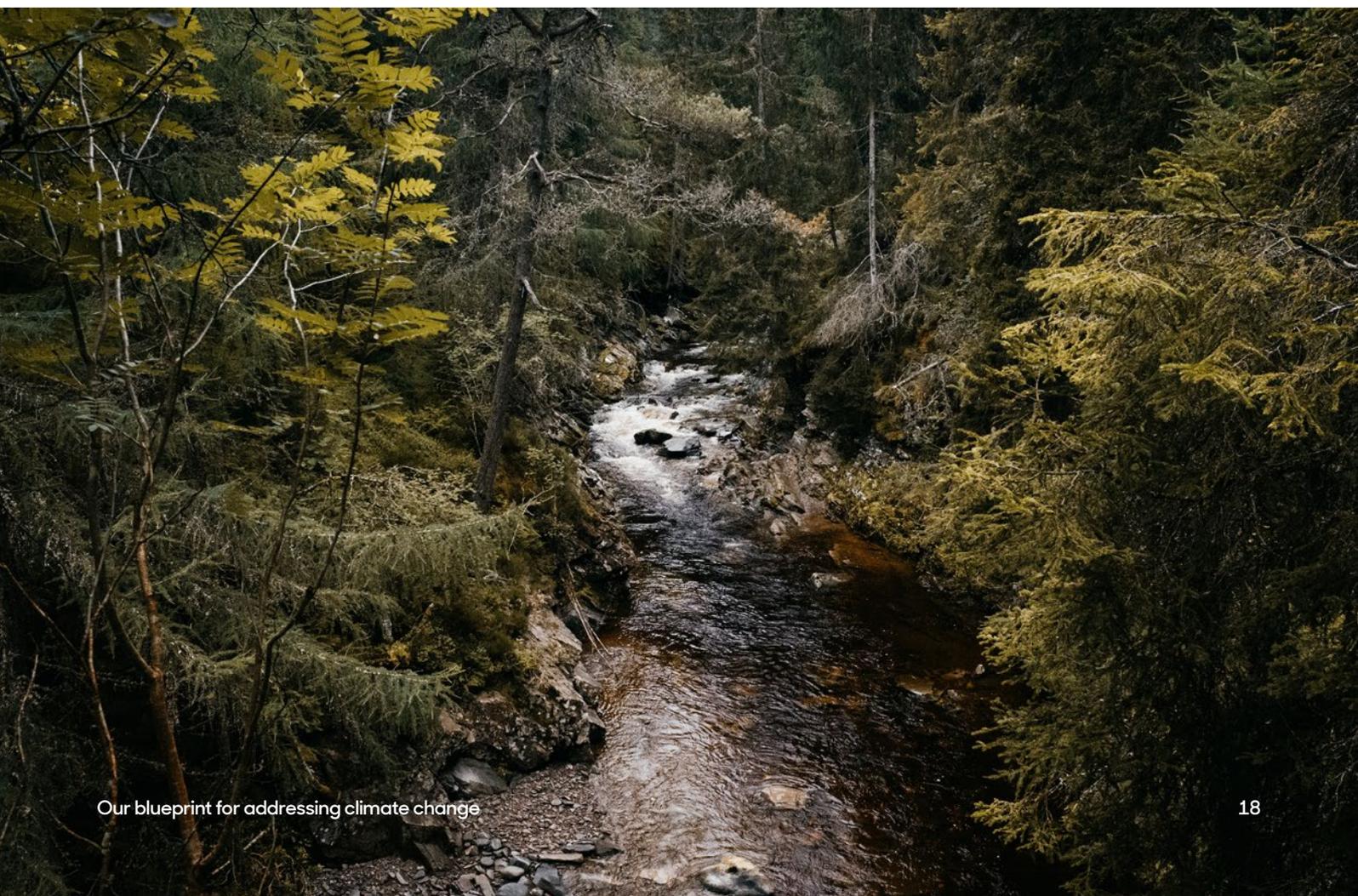


The actions delivered at the abrdn level will facilitate action at the fund level, with the framework enabling each fund to set its specific net-zero carbon pathway. Disclosure of progress will be to the investors of the fund and not publicly available unless a listed entity. All data used for modelling will be subject to robust validation. In addition, where possible, Scope 1 and 2 data will be assured by a third-party.

Topic	Outcomes	Delivery	Reporting metrics
Operational carbon (energy, water, waste)	Understanding of full carbon footprint (both landlord and occupier)	Carbon footprint baseline to include measurement and reporting of all landlord and occupier energy, landlord water and landlord waste	kWh, m ³ , tCO ₂ e (plus intensity metrics by floor area)
		Technological solutions piloted and deployed to collect occupier energy data	Percentage occupier actual versus estimate, tCO ₂ e
		Occupier energy data gaps annually modelled to estimate full carbon footprint	kWh, tCO ₂ e
		Data collection to include over time (1) landlord refrigerants (2) landlord purchased goods and service	tCO ₂ e
	Reduction in operational energy, water and waste	Asset-level energy, water, waste and carbon targets set. Specific carbon pathways for each asset determined	kWh/m ² , tCO ₂ e/m ² , m ³ /m ² , Percentage waste recycled Percentage landfill avoidance
		Carbon, energy, water and waste performance monitoring against target	kWh/m ² , tCO ₂ e/m ² , m ³ /m ² , Percentage waste disposal routes
		ESG action plans across every property, including energy efficiency and carbon reduction actions	Percentage actions completed
		Occupier fit out guides to be re distributed.	Percentage occupiers distributed to
		Acquisitions to incorporate company level carbon analysis	kWh/m ² , Potential kWh/m ² savings
		Development and refurbishment policy to improve operational performance implemented	Status complete

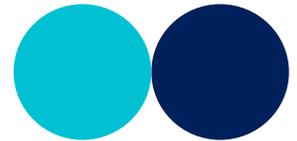
Transition risks

Topic	Outcomes	Delivery	Reporting metrics
Renewable energy procurement and investment	Increase in on-site energy generation	Carry out feasibility studies to explore on-site renewable energy generation	Number of renewable energy opportunities, tCO ₂ e savings potential
		Implementation of opportunities where appropriate	Percentage energy generated, tCO ₂ e saved
	100% renewable energy procurement globally	All landlord electricity contracts to be procured from certified renewable sources	Percentage landlord-procured renewable energy
	Successful engagement with occupiers on procuring energy from renewable sources	Engagement with occupiers for their contracts to be procured from certified renewable sources	Percentage tenant-procured renewable energy
Embodied carbon	Measurement and reduction of embodied carbon in fit-outs, developments and refurbishments	Measurement and reduction of embodied carbon following abrdn recommendations. Examples below of what this is likely to include:	tCO ₂ e
		Every development, refurbishment and fit-out proposal to include embodied carbon calculation and carbon shadow price	£/tCO ₂ e
		Establish embodied carbon intensity targets and performance measured against target	Percentage reduction compared with business as usual (BAU) tCO ₂ e/m ²
Offsetting	Robust offsetting options for residual carbon	As required, emissions to be offset following abrdn guidance	tCO ₂ e offset



Transition risks

Challenges



Industry challenges

While there is a significant effort underway to shift the built environment sector to net zero, much of what we're aiming for – including how we should go about it and how we should measure progress – remains unclear. We have highlighted several of the ongoing challenges below and we are engaging proactively with our sector partners and industry groups to resolve them.

Definitions and data

As highlighted above, net zero requires the emissions from a building (including its construction if applicable and/or operation) to be zero or less for a given time period. But what's the right way to get there? The Better Buildings Partnership Net Zero Carbon Pathway Framework and the UK Green Building Council's (GBC) definition go some way to setting rules around what legitimate net zero looks like by reflecting the energy hierarchy. However, there still remain open questions. For example, exactly how energy efficient must a building or portfolio be before the savings from renewables procurement and/or offsetting can be counted? And how should we account for tenant-procured energy that does not relate to the operation of the building itself and may fall into the carbon budgets of other sectors (e.g. industrial manufacturing processes, healthcare and agricultural activities)? The question of who controls and influences the sources of emissions is also important. For most abrdn diversified portfolios, the landlord's Scope 1 and 2 emissions account for only around 10% of the total emissions. While annual data requests, 'green' leases and improvements in metering technologies can make a difference, there is an ongoing challenge to obtain full and accurate data from tenants to enable the analysis of whole-building emissions. Gap-filling is therefore required to undertake portfolio-wide net-zero work and estimation techniques vary considerably. Whether an assessment is based on actual data or not, there are material differences in the existing emissions and energy intensity benchmarks for real estate. As noted above, we make use of many of these approaches including CRREM and several GBC national-level benchmarks. However, with the exception of offices in the UK and assets in the Netherlands, there are no clear rules as to the energy use intensities that must be achieved by a building before net zero can be claimed.

Whose emissions are they?

At present, most net-zero definitions and approaches don't reflect the nuance of who controls and influences the emissions from a building. As such, the landlord is often assumed to have full control and to take full responsibility for emissions, even though their ability to influence them may be limited. Net-zero frameworks for the built environment must evolve to reflect this. As landlords, there are clear intervention points where we can influence tenant emissions and hence the Scope 3 emissions of a portfolio – for example, acquisition, development, refurbishment and granting licenses for fit-outs and alterations. These are the touch-points we are focusing on to ensure our tenants can occupy our assets at as low a carbon intensity as possible. Ultimately, costs for net-zero are likely to be prohibitive if the onus for decarbonization rests solely on the landlord or occupier, especially where deep retrofit is required. Ultimately, clarity on responsibility for emissions should serve to provide clarity on cost attribution as well.

Science-Policy Gap

Government policies at a global level lag well behind what climate science tells us we have to achieve to keep global temperatures below 1.5C of warming. As a result, the gap has been filled with a proliferation of voluntary standards, such as the Better Building Partnership, the World Resources Institute, and the World Green Building Council. While these are well-intentioned, they are often contradictory. Resultantly, confusion can arise from uncertainty over 'net-zero carbon' means, which only serves to limit the extent to which the market can start to price in net-zero performance. A more supportive policy mix is required in support of net-zero action, to incentivize action.

Transition risks

Cross-border regulatory inconsistency

The current reliance on Energy Performance Certificates (EPCs) across Europe illustrates some of the issues with the existing regulatory regime. EPCs can be helpful in providing information about a property's theoretical energy use, but they tell us nothing about the actual energy used in practice. The key European Union (EU) sustainable finance regulations rely heavily on EPCs. But how these concepts are implemented by each member state renders cross-border comparison nearly impossible. At present, the same building will be efficient or inefficient (under the Sustainable Finance Disclosure Regulations), or it will be sustainable or unsustainable (under the EU taxonomy classification of sustainable activities), based purely on the country in which the building is located.

Valuation uncertainty

Plotting a route to net zero for an asset or fund clearly requires an assessment of the costs required to get there. A clear trend is emerging where real estate assets with a higher sustainability specification can command a premium, while those that don't are vulnerable to a 'brown' discount. However, if the energy use intensity pre-requisites are not clear, it is difficult to price the transition to net zero with any degree of certainty. Will CRREM become a dominant benchmark for valuations, or will we rely on national regulations, or something else entirely?

Challenges for abrdn

Our real estate business is global and diverse. This presents challenges in creating a coherent and consistent net-zero carbon framework that is globally applicable. This framework is a step in that direction. There will be nuances depending on geography and investment types. Our funds are a mixture of discretionary and nondiscretionary. This means that while we can apply our own framework to our products and discretionary mandates, we have to align our approach with our investors' strategy for non-discretionary mandates. We are committed to collaborating with all of our clients to make sure we plot a route to net zero for their investments. We aim to protect against risk and exploit opportunities where we see them.



Our blueprint for addressing climate change



Physical Risks

What are physical climate risks?

Physical risks are those that relate to an asset's vulnerability to factors such as increasing temperatures and extreme weather events as a result of climate change. They can be categorized as "Acute" and "Chronic" risks. Acute risks refer to single events like wildfires, flooding, whether it be inland or coastal, and hurricanes. Chronic risks are those that are continuous and exacerbated as time passes, like sustained increases in temperature, sea level and decreasing availability of clean water. It is important to examine both types of risks to identify the costs and implications they pose. We are also interested in spotting opportunities for improving our assets, in order to mitigate these risks and make our assets more resilient to the rapidly changing environment.

Journey so far

For new acquisitions we use a mapping tool to flag any physical risks, including flooding, heat stress and water scarcity, across different time horizons and climate scenarios. This helps us screen assets and understand ways in which we can improve newly acquired assets to strengthen their resilience against climate physical risks.

For our standing assets, we have, at the time of writing, completed two rounds of analysing physical risks: one in 2019 and one in 2021. The third round of analysis will be finalized in early 2023. So far, we've looked at both acute and chronic risks under the worst-case scenario (RCP 8.5). Based on our analysis, we can understand what current climate value at risk (CVAR) is. This work helps us in three ways:

1. better understanding how our assets will perform in the future and what climate risks are most material
2. ability to plan for adaptation measures
3. confidence that our TCFD-aligned disclosures have robust foundations.

The methodology we use to analyse acute risks is the "Natural Catastrophe Framework" which takes Hazard, Exposure and Vulnerability as inputs. For the analysis of Chronic risks (changes in temperatures and water availability), we use Heating/ Cooling Degree Days (HDD/ CDD) and local precipitation trends. To determine the CVAR we look at differences in insurance premiums and changes in operational costs (e.g. associated with the heating and cooling of our assets).

² CVAR is the estimated expected loss within an asset or portfolio that is due to the effects of climate change. It is usually calculated based on a specific climate scenario and time horizon. Dietz et al. define the CVAR as "the size of loss on a portfolio of assets over a given time horizon, at given probability". [Dietz, Simon, Bowen, Alex, Dixon, Charlie and Gradwell, Philip (2016) 'Climate value at risk' of global financial assets. Nature Climate Change. ISSN 1758-678X. Accessed via: <https://www.nature.com/articles/nclimate2972>.]



Physical Risks



“We’re working hard to understand the impacts of physical climate risks across our real estate portfolios. Through ongoing work to integrate such considerations into our investment process, we can identify key risks and opportunities to maximize investment performance, and continue to support our Clients with their wider TCFD reporting obligations.”

Georgie Nelson
Head of Real Estate ESG

Chart 1: Graph for a typical Western-European positioned fund showing an increase in total costs, driven by water stress, wildfire risk and cooling costs.

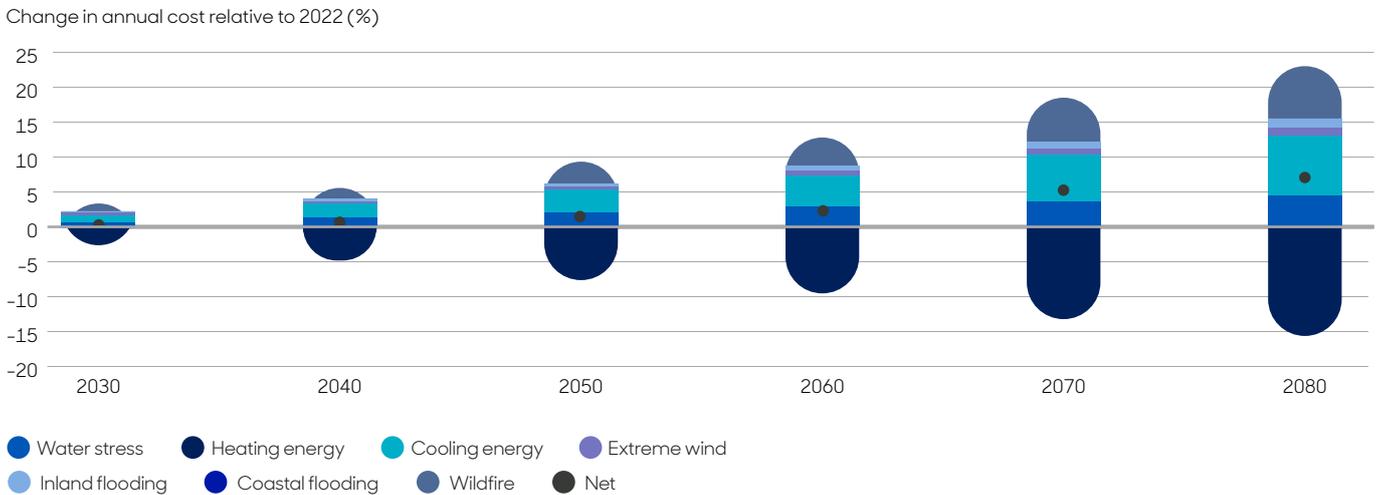
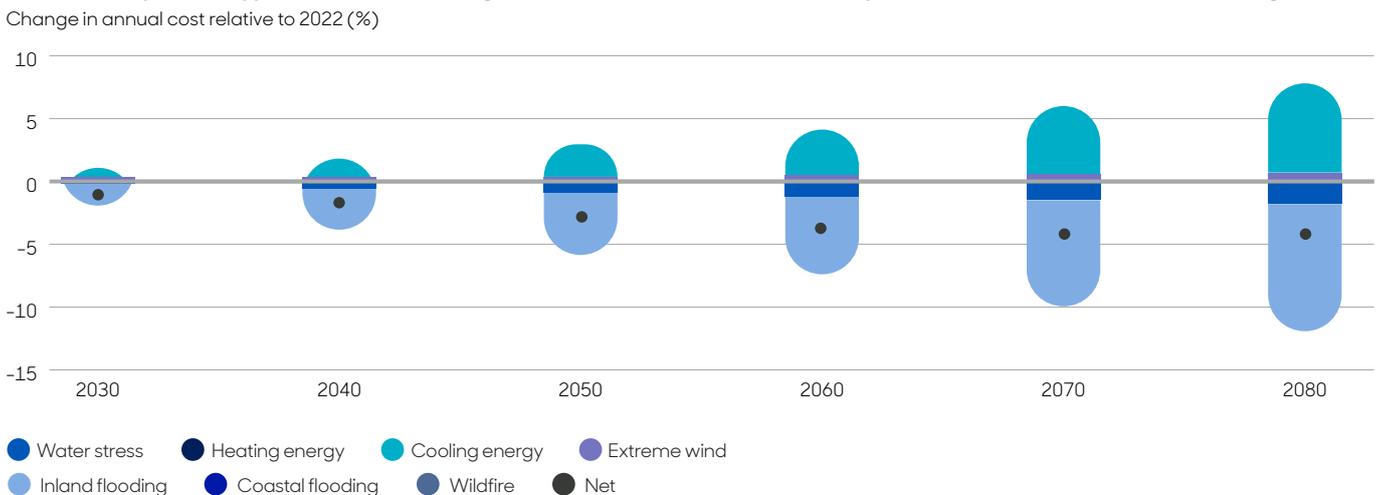


Chart 2: Graph for a typical UK fund showing a decrease in total costs, driven by the decrease in the need for heating



For both the acute and chronic risks, we are looking into the adaptation measures suggested by the Better Buildings Partnership to determine which ones would be most suitable for our assets in order to help us manage the physical risks that have been identified. We have actively looked at nature-based solutions in the UK, to enhance climate mitigation, resilience and biodiversity, all of which are crucial in managing the effects of climate change. See Page 26 for a Case Study on our afforestation and peatland restoration project in the Cairngorms National Park.



Delivery framework

The table below provides the framework of actions required at the house level in order to support fund-level delivery of physical climate risk assessment.

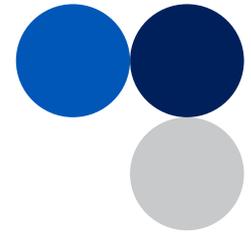
Update on 2022 activity: We have made significant progress in the past two years. At the time of writing, 21 of our funds have been subject to climate scenario analysis, representing approximately 60% of our direct real estate AUM. This has involved:

- Data collection and validation
- Scenario modelling over different time horizons against a selection of acute and chronic climate risks

- Ensuring fund teams understand the implications of the risks identified
- Communicating outcomes and action plan to clients where appropriate.

The work completed to date has provided some key insights including the fact that not all physical risks are relevant to our assets, that different locations give rise to different types of risks and that it is also possible for our operational costs to reduce, as a result of climate change. We will reflect any new insights from the next phase of assessment in 2023.

Outcomes	Delivery strategy	Progress to date
Understanding value at risk from climate hazards	<p>Chronic risks:</p> <p>Utility consumption data, energy performance certifications and HDD/CDD are used to forecast the energy consumption and operating costs of our assets until 2080.</p> <p>Round 3 of our physical risks analysis looking at 4 scenarios, will help us better understand the CVAR for more of our funds and get closer to the realistic figure and not the maximum CVAR that resulted by the RCP 8.5 scenario.</p>	<p>Rounds 1 and 2 identified the chronic risks associated with the assets in 21 of our funds. The main drivers of change in operational costs in all time frames are heating and cooling costs (chronic risks).</p> <p>Regarding progress made for Round 3, all the data has been collated and, at the time of writing, we are working through the modeling process.</p>
	<p>Acute risks:</p> <p>The Natural Catastrophe Framework is used to quantify the risks associated with our assets, based on insurance premia. We are looking at various time frames, until 2080.</p> <p>As stated above, round 3 of this analysis will offer more insight into the risks of our assets.</p>	<p>Acute risks were found to be less relevant to our assets with only a few having elevated extreme wind and wildfire risks, depending on their location. These result in increased risk premia, with the effect only being material by 2080, but not by 2050.</p> <p>Regarding progress made for Round 3, all the data has been collated and, at the time of writing, we are working through the modeling process.</p>
Reducing our exposure to climate hazards	<p>Asset-management approach:</p> <p>To include the development of improvement plans for assets flagged as vulnerable to physical risks to strengthen their resilience</p> <p>To use risk assessment outputs as part of investment decisions for assets; particularly in relation to the divestment of assets at high risk.</p>	Review underway
	<p>Acquisition approach: our revised ESG due diligence scope utilizes a physical climate risk mapping tool to analyze 8 different risks across multiple time horizons (current, 2030, 2050, 2100) under three climate change scenarios (ranging from Representative Concentration Pathway (RCP) 2.6 to 8.5).</p> <p>This tool will be used alongside available in-country flood risk mapping.</p> <p>All potential acquisitions will be subject to detailed analysis of flood risk as a minimum.</p> <p>Approach will better inform "go/no-go" decisions on acquisitions, and lead to a better understand our exposure to such risks going forward.</p>	Approach implemented during 2022 and in place for 2023.
	<p>Development and refurbishment standards: Our updated abrdn house standards will drive the integration of climate resilience related considerations into the design of our assets.</p>	Approach implemented during 2022 and in place for 2023.



Our initial Findings

Acute physical risks, such as flooding, are present in some Asia-Pacific and European locations (e.g. Japan, Austria and Ireland). For other acute risks such as wind, exposure is more prevalent in UK regions. Wildfire risk is also elevated for some European countries. It is important to note that these acute risks are present to only a small number of assets, out of the 500 analysed. This shows that our assets are well-positioned and are not expected to be significantly impaired by extreme natural events.

Chronic physical risks affect all of our assets: as climate change will lead to a rise in average temperatures, the need for heating is expected to decrease and the need for cooling to increase. For most of our assets located in Northern Europe, the implication of this is lower total costs, as the decrease in heating costs is greater than the increase in cooling costs. For most of our assets in Southern European countries and Asia-Pacific (e.g. Japan and Australia), the physical risks associated with climate-change-induced higher temperatures imply higher total costs, due to the extra cooling costs.

Challenges

As with many ESG issues, the biggest challenge we are facing is the availability of meaningful data. In order to manage this and obtain accurate utility consumption data, we are in the process of rolling out smart meters to our assets across Europe (including UK). On top of this, we continue to engage with our tenants to maintain channels for smooth information and data flows, to support them in reducing the energy used in our assets and to ensure that our assets are leading on the energy efficiency front.

Another challenge, which has also been identified by the BBP in the publication "A Guide to Climate Resilience for Commercial Real Estate" (September 2022), is that the value at stake, especially when defined as the CVAR, can be calculated by various methodologies. This means that figures from different landlords/ issuers cannot be meaningfully compared and in the absence of a robust and consistent methodology, it is difficult to determine what the threshold for "material" risk is, based on the CVAR.

Of course, we also understand that having a one-size-fits-all methodology may not be the best solution, due to the different nature of risks associated with different asset types and locations.

Similarly, different data and service providers will come to different results, even for the same asset(s). Therefore, changing providers across time may lead to inconsistent risk estimates, even though it can be argued that looking at the risks from more than one perspectives may offer more insight into the potential CVAR.

With physical risks analysis becoming increasingly important in understanding the climate resilience and potential of assets, it is crucial to understand the assumptions and limitations of each methodology. A **consistent approach** could be helpful for organisations and investors alike.

Next steps

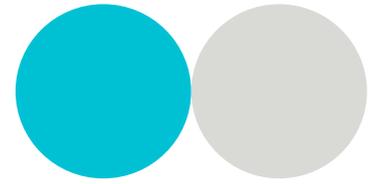
We are currently carrying out the third round of physical risk analysis with a widened scope of 29 funds, compared to the original 21. While in the past we have looked only at the most conservative, "worst case", scenario, we are now expanding the scenarios considered to include the:

- i. Orderly transition to 1.5°C above pre-industrial levels
- ii. Disorderly transition to 1.5°C above pre-industrial levels
- iii. Current policy, leading to an increase of around 4°C above pre-industrial levels
- iv. Probability-weighted scenario of, based on the abrdn Research Institute's findings^{3,4}

³ Climate scenario analysis: a rigorous framework for managing climate financial risks and opportunities.

⁴ abrdn's 2021 climate scenarios: the evolution of investment risk and opportunity since the Covid crisis.

Case Study: Far Ralia Estate



Investing in nature-based solutions

On behalf of one of our abrdn strategies, our natural capital team has acquired a substantial nature-based project situated in the Cairngorms National Park. The land extends to an area of over 1,400 ha and will represent one of the largest afforestation and peatland restoration projects in the UK.

- The aim is to restore more than 150 hectares of degraded peatland and create more than 850 hectares of biodiverse, native woodland with minimal intervention, meaning that the trees will not be cut down for at least 100 years.
- It's estimated the project will deliver up to 150,000 tonnes of claimable carbon to 2060 at a cost of £22 per tonne on a discounted cash flow basis and over 350,000 tonnes in total, over the project's life. The fund will have valuable flexibility to hold the asset beyond 2060, with further carbon offsetting benefits if required.
- Excess credits can be sold on the Voluntary Carbon Market, thus reducing the price of carbon offsetting.
- Biodiversity net gain will be monitored and independently reported to investors over time. This will be done using a leading science-based approach, carried out by a team of ecologists.
- abrdn formed a partnership with EY and the Natural History Museum to pilot museum's science-based Biodiversity Intactness Index. According to this index, the restoration works will improve the site's intactness score from 52% (below the UK average) to 94%, over the long term.
- Focusing on native broad-leaved trees and Scots pine, the woodland creation element of the project will improve amenity, enhance biodiversity, mitigate flooding and improve air quality, while restoring the drained peatlands. The wider environmental net gain will also be measured.
- Local contractors and forestry consultants will, where possible, be employed to deliver the project. Benefits for the local community will be promoted where possible, such as bird-watching huts and the restoration of bothies for hillwalkers.
- On areas of open and unplanted land, nature will be left to recover in a natural way, with minimal intervention management practices to promote further biodiversity net-gain benefits.

Cash flows and project risks were reviewed in detail during an in-depth pre-acquisition due-diligence exercise. Peatland surveys and breeding-bird surveys were carried out prior to completion of the purchase to assess risks and the impact on the potential planting plan and the carbon it could generate. Outputs are modelled using the UK government's Woodland Carbon Code methodology and calculator. Expert advice is provided by leading ecologists and forestry consultants.

Far Ralia Estate represents one of the largest native woodland and degraded peatland restoration projects in the UK. It signifies to our clients that abrdn is committed to taking tangible action to provide innovative solutions on the pathway to net zero, while helping to address biodiversity decline. It's crucial to note that investing in nature-based solutions plays an important role in achieving net zero but this has to be alongside emissions reduction targets.



Summary

abrdn is committed to working towards achieving a resilient, net-zero aligned portfolio of assets, where climate risks are appropriately understood and managed throughout the investment process and disclosed appropriately. abrdn is also committed to working with all of its stakeholders to drive change.

For transition risks, we believe that we have put together a realistic, deliverable plan in order to achieve our ultimate goal of being net-zero by 2050, and look forward to continuing to capitalise on the excellent stakeholder relationships that we maintain in order to achieve better outcomes. We will continue to drive the integration of net-zero assessment and action into our assets and portfolios, in order to maintain long-term value for our investors.

For physical risks, we will continue working towards a robust understanding of our climate value at risk under multiple time horizons and climate scenarios, to manage, mitigate and disclose this going forward. We will follow the evolving approaches from the rest of industry looking forward to a convergence in the definition of "materiality", as well as methodologies to quantify physical risks and CVAR.



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Glossary

GHG

Greenhouse gases

Definition from the Intergovernmental Panel on Climate Change (IPCC)

Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the earth's surface, the atmosphere itself, and by clouds. This property causes the greenhouse effect. Water vapour (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄) and ozone (O₃) are the primary greenhouse gases in the earth's atmosphere. Moreover, there are a number of entirely human-made greenhouse gases in the atmosphere, such as halocarbons and other chlorine- and bromine-containing substances, dealt with under the Montreal Protocol. Beside CO₂, N₂O and CH₄, the Kyoto Protocol deals with the greenhouse gases sulphur hexafluoride (SF₆), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs)

GWh

Gigawatt hour

kWh

Kilowatt hour

m²

Square meters

m³

Cubic meters

MWh

Megawatt hour

tCO₂e

Tonnes of carbon dioxide equivalent

REEB

Real Estate Environmental Benchmark

CRREM

Carbon Risk Real Estate Monitor

AUM

Assets under Management

BBP

Better Buildings Partnership

CDD

Cooling Degree Days

CVAR

Climate Value at Risk

HDD

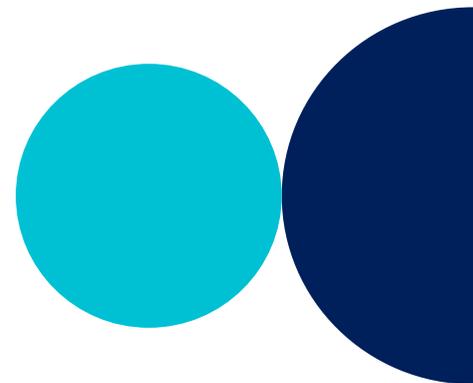
Heating Degree Days

RCP

Representative Concentration Pathways (of greenhouse gas concentration)

TCFD

Task Force on Climate-related Financial Disclosures



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Appendix 1

Detailed Scoping Table & Greenhouse Gas Protocol Alignment

The table below provides an extended version of the greenhouse gas emissions included within abrdn's 2050 net-zero target and aligns with the BBP net-zero carbon framework. In addition to the breakdown of activities, there are references to the carbon scope, as well as how activities align to the GHG protocol reporting categories.

✓ = activities that should be included within signatories' net-zero carbon target.

Business area	Sub-area	GHG protocol reporting category	Emissions scope	Commitment inclusion
Direct real estate holdings (including joint ventures (JV) with management control)	Landlord purchased energy (electricity and fuels)	Purchased electricity, heat and steam	1, 2 and 3	✓
	Tenant purchased energy (electricity and fuels)	Downstream leased assets	3	✓
	Landlord refrigerants	Purchased goods and services	1	✓
	Tenant refrigerants	Tenant Scope 3	3	
	Landlord purchased water	Purchased goods and services	3	✓
	Tenant purchased water	Tenant Scope 3	3	
	Landlord managed operational waste	Waste generated in operations	3	✓
	Tenant managed operational waste	Tenant Scope 3	3	
	Tenant transport emissions	Tenant Scope 3	3	
	Tenant supply chain emissions	Tenant Scope 3	3	
	Landlord purchased capital goods and services (monitoring and evaluation, and property management services)**	Purchased goods and services	3	✓

Business area	Sub-area	GHG protocol reporting category	Emissions scope	Commitment inclusion
Investments (indirect real estate holdings, e.g. where investments are managed by a third party, such as JVs with no management control or investments in other real estate investment vehicles)*	Landlord purchased energy (electricity and fuels)	Investments (proportional to the investment)	3	✓
	Tenant purchased energy (electricity and fuels)	Investments (proportional to the investment)	3	✓
	Landlord refrigerants	Investments (proportional to the investment)	3	✓
	Tenant refrigerants	Tenant Scope 3	3	
	Landlord purchased water	Investments (proportional to the investment)	3	✓
	Tenant purchased water	Tenant Scope 3	3	
	Landlord managed operational waste	Investments (proportional to the investment)	3	✓
	Tenant managed operational waste	Tenant Scope 3	3	
	Visitors transport emissions	Tenant Scope 3	3	
	Tenant supply chain emissions	Tenant Scope 3	3	
	Landlord purchased capital goods and services (monitoring and evaluation, and property management services)**	Purchased goods and services	3	✓
	Development	New development (including those where funding is being provided)	Purchased goods and services	3
Refurbishments		Purchased goods and services	3	✓
Fit-out (landlord controlled)		Purchased goods and services	3	✓
Fit-out (tenant controlled)		Tenant Scope 3	3	✓
End-of-life		End-of-life treatment of sold products	3	***

• Corporate emissions are not included within the scope as the focus of the BBP Climate Change Commitment is on signatories' real estate investments. It is also likely these emissions are not significantly material. However, some signatories may voluntarily elect to include them in their target scope.

* For indirect investments, it is recommended that carbon emissions should be attributed as a percentage ownership of the investment.

** This relates to services procured by the landlord, to service and maintain the space e.g. property management, service charge recoverable items and minor capital expenditure items e.g. minor replacements.

*** End-of-life carbon has not been included within the scope of the BBP Climate Change Commitment due to lack of industry consensus on how it should be accounted for. As industry understanding improves and an agreed approach adopted, this position will be reviewed.

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