CLIMATE PHYSICAL RISK REPORT

SEGRO EUROPEAN PORTFOLIO

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WRITTEN BY: SAVILLS SUSTAINABILITY

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EXECUTIVE SUMMARY PORTFOLIO EXPOSURE RISK

Savills carried out a climate change physical risk assessment at the portfolio level for SEGRO to help inform their climate-related risks management and Taskforce on Climate-related Financial Disclosures (TCFD) report. The assessment modelled 197 SEGRO assets across Europe for climate change physical risks. Using the Munich Re NATHAN and climate change datasets, the physical hazards were assessed under three different IPCC AR5 RCP scenarios (2.6, 4.5 and 8.5) and four time periods (current, 2030, 2050 and 2100). **Given the geographical spread of the portfolio across Europe, the physical hazard risks modelled and analysed vary considerably under any given RCP scenario and time period, and across the portfolio.**

Using the Munich Re datasets, the assets were modelled for their exposure risk to the seven physical hazards. These were acute hazards such as River Flood and Tropical Cyclone, and chronic hazards such as Sea Level Rise, Drought Stress, Precipitation Stress, Heat Stress and Fire Weather Stress.

For the country and portfolio calculations, all assets were included as equal binary units. At this stage, no specific asset vulnerability modeling was undertaken nor any financial impact assessment modelling for acute or chronic risks.

		RCP 8.5 2050				
Hazard	**Examples of potential impacts**	**No or very Low**	**Low**	**Medium**	**High**	**Very High**
Sea Level Rise (2100 Time period)	Stranded assets / high insurance costs	191	0	0	1	5
River Flood (undefended)	Significant damage and repair costs	173	-	4	-	20
Tropical Cyclone	Extreme damage to buildings and wider in infrastructure	197	0	0	0	0
Drought Stress	Soil subsidence affecting asset stability	0	44	145	4	4
Precipitation Stress	Significant damage and repair costs	0	154	33	7	3
Heat Stress	Opportunity for structural deformation; energy costs due to cooling	0	82	107	8	0
Fire Weather Stress	Damage to infrastructure, damage and repair costs	0	159	30	8	0

Table 1: Portfolio risk summary for RCP 8.5, 2050

Table 1 shows a summary of the model outputs under RCP 8.5 (high concentration scenario) in 2050. The table groups the number of assets across the SEGRO portfolio in a particular risk category for each climate change physical hazard assessed. It shows that under RCP 8.5 in 2050, the exposure risk to Drought Stress is the physical hazard affecting the SEGRO European portfolio most severely, with 153 assets experiencing between Medium and Very High exposure risk to Drought Stress.

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The SEGRO portfolio average exposure risk to Heat Stress is the highest from the current baseline, with a 91% increase from current baseline to RCP 8.5 by 2100. This could mean that Heat Stress may potentially need adaptive measures within the portfolio. However, no assessment of asset vulnerability was currently modelled, so current or future asset vulnerability to the exposure risk was not assessed.

The identification of High to Very High asset exposure to Heat Stress for the SEGRO portfolio provides an indication of the potential for Heat Stress impacts to be experienced, but asset vulnerability assessment would help identify the most appropriate adaptation and resilience measures. This would allow adaptation investment to be targeted at the asset components that are most sensitive to Heat Stress and provide the most cost-effective resilience improvements.

SEGRO's European assets are geographically located away from the Atlantic Ocean with the portfolio's most western assets located in Central and Southeast UK and Central and Eastern Spain, so Tropical Cyclones remain a Very Low risk for all assets within the portfolio (Table 1).

A small number of assets are in coastal areas, with six assets experiencing High to Very High exposure risk of Sea Level Rise by 2100 under RCP 8.5 (Table 1). Table 2 shows the SEGRO portfolio average exposure risk to Sea Level Rise and River Flood as Very Low, however, Table 20 shows Sea Level Rise in the Netherlands is High under all RCP scenarios (data only available for 2100). Under RCP 2.6 scenario by 2100 the Netherlands experiences a High-risk average score of 6.67, this grows to 7.83 under both RCP 4.5 and 8.5 (Table 4). Germany also faces a slightly increased risk to Sea Level Rise change compared to the rest of the portfolio albeit this is for one asset (Table 19).

For Sea Level Rise – where the only data from the Munich Re model is from 2100 – assets at Very High exposure risk under RCP 8.5 in 2100 need careful and balanced consideration. Whilst these assets are Very High exposure risk, this is not until 2100 so face a less imminent potential impact from Sea Level Rise than some of the other assets experiencing shorter term (2030 and 2050) exposure risks from other physical hazards. This is a difficult balance. Long-term Very High exposure risks with non-quantified impacts and less understood asset vulnerability between the current time period and 2100, against medium time period (2050) exposure risk from other hazards at lower risk levels. This highlights the interpretation challenges associated with hazard exposure risk data, and the requirements for integrating medium and high-resolution hazard exposure risk data with quantitative and qualitative intelligence on asset sensitivity and vulnerability.

It is critical that medium time period and Medium exposure risks from physical hazards and long-term Very High exposure risks from the same or different hazards are further investigated through deeper asset specific vulnerability assessments. This is to better understand the potential and different impacts on the individual assets, through which appropriate, tailored and cost-effective resilience and adaptation measures can be implemented.

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River Flood is also in the High to Very High-risk exposure categories in Table 5, with at least 12 assets consistently in the Very High category from current baselines up to RCP 8.5 in 2100. No other physical hazard has as many assets in the Very High Exposure risk category across all time frames and RCP scenarios (Table 5). For River Flood data – especially in Very High exposure risk areas – it would be recommended that this is investigated further at the asset level using higher resolution (5–30m) Flood Risk data and Standard of Protection GIS maps and datasets. This is to understand and assess whether asset specific flood resilience and adaptation measures should be installed to provide current and future asset resilience to River Flood.

River Flood hazard modelling uses the concept of return periods – a term used to show the occurrence and extent of a River Flood event. In the Munich Re system, 100-year return periods are classified as Very High risk and 500-year return periods are classified as Medium risk. If the return period is greater than 500 years, then the River Flood risk is classed as No or Very Low risk. It would be expected that as the climate changes, these low probability but potentially high impact River Flood events might contribute towards an asset having value at risk.

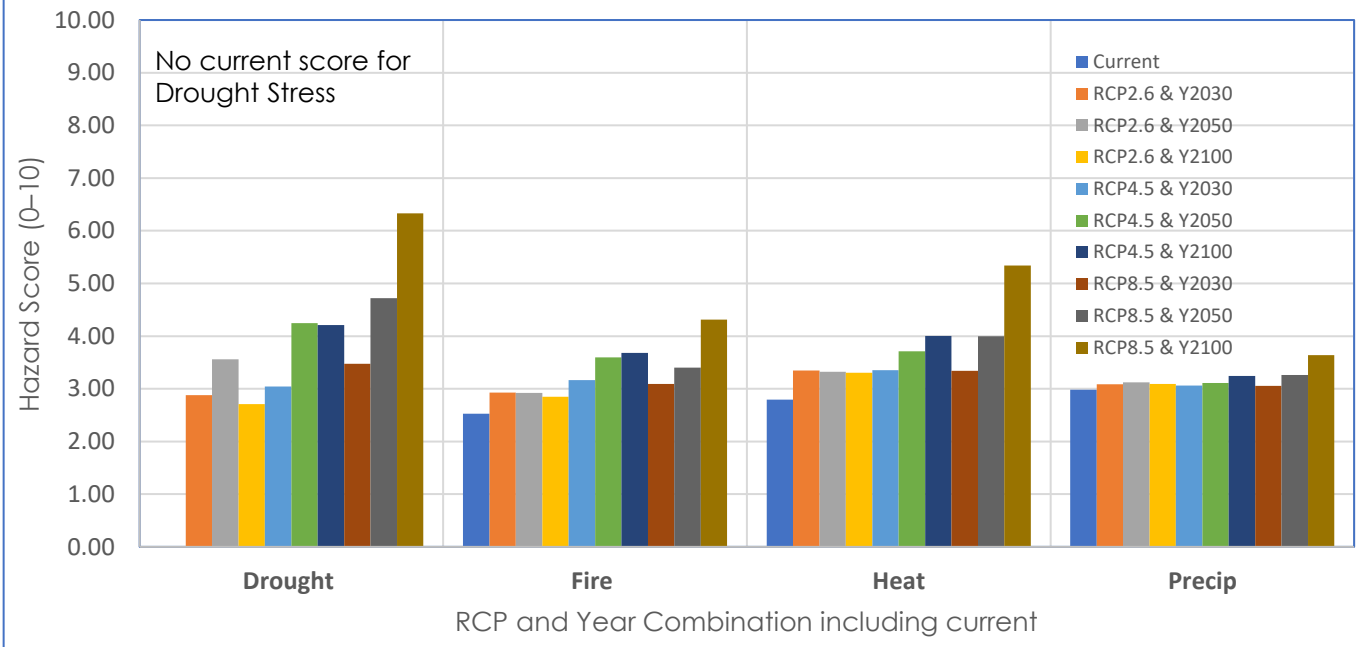
It is important to note that return periods are based on a specific year baseline and that return periods themselves do not provide explicit information about the location specific flood depths associated with these return period River Flood events. It is recommended to incorporate climate change Flood Depth data and Annual Exceedance Probability data, especially as these change under different climate change RCP scenarios (4.5 and 8.5) and across future time periods (2030, 2050 and 2100).

Table 5 provides an in-depth overview of the SEGRO portfolio's exposure risk across RCPs and time periods (including current, where data exists). In 2030, Undefended River Flood is the hazard with the most assets at Very High Exposure risk. By 2050, exposure risk to Drought Stress increases considerably across the portfolio, with 153 assets facing Medium, High or Very High exposure to the hazard. In 2100, the number of properties at risk in all hazards increases substantially, with Sea Level Rise on a par with River Flood (Undefended), and Drought Stress being the highest value exposure risk (6.33) with 25 assets at Very High Exposure. Additionally, changes from current baseline (Graph 2, where data is available) show Heat Stress faces the highest increase from current baseline.

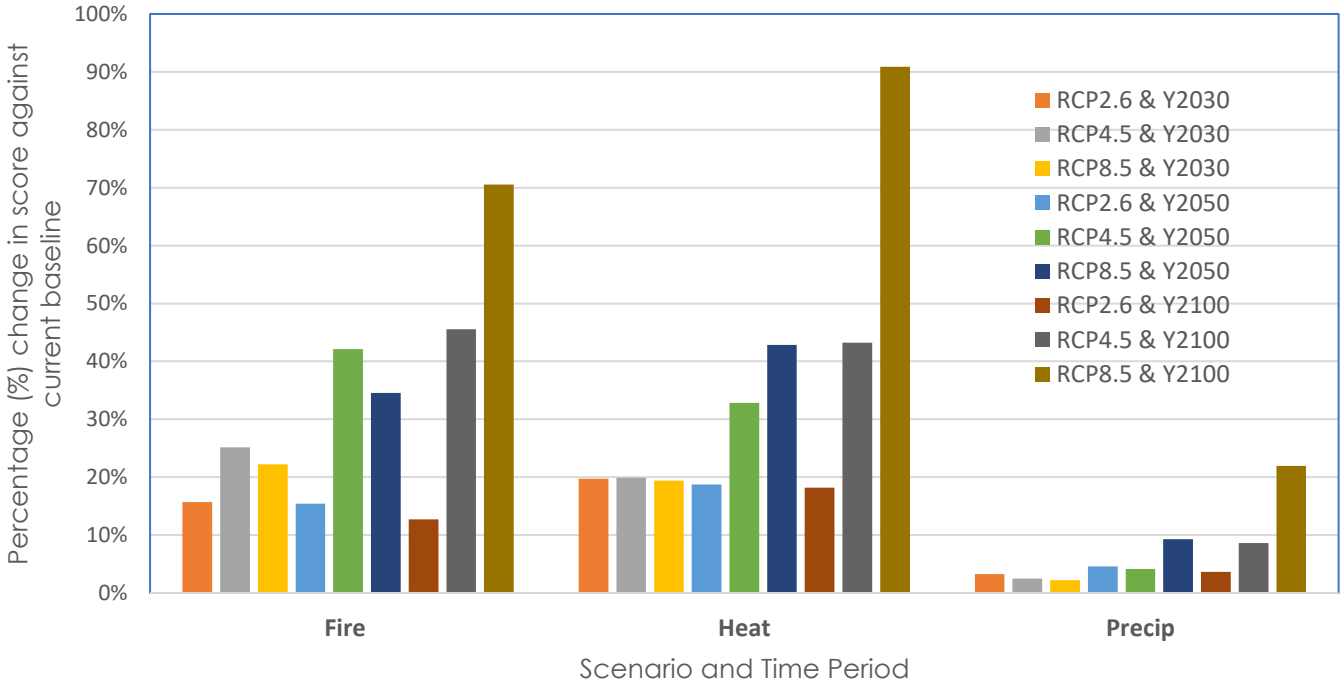
Overall, the SEGRO portfolio is exposed to a variety of physical hazards regardless of how the data is presented (i.e., averages, number of assets, change from baselines, risk scores). Drought Stress (in terms of asset numbers) and Heat Stress (in terms of change from baseline) are physical hazards to which the SEGRO portfolio is particularly highly exposed. The next steps could include considering the financial impacts of acute hazards like River Flood using agreed standardized methodologies. This would provide asset and portfolio level financial impacts data. It will also be important to consider measures to quantify the potential impacts of the chronic physical hazards such as Heat, Drought, Precipitation and Fire Weather Stress indices, to allow for targeted adaptation and resilience investment measures.

EXECUTIVE SUMMARY
PORTFOLIO EXPOSURE RISK

Graph 1: SEGRO average portfolio score (197 properties). Stress Variables: Drought, Fire, Heat and Precipitation. Grouped by physical hazard.



Graph 2: Percentage (%) change in score for portfolio against current baseline. Stress Indices – Fire Weather, Heat and Precipitation.



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INTRODUCTION

INTRODUCTION

Climate change generates material risks and opportunities, which can affect buildings' performance now and in the future. Assessing the climate change physical risks can help inform adaptation and mitigation measures and improve building resilience.

For this assessment, Savills has used the modelled physical hazard data under three different climate scenarios (RCP 2.6, 4.5 and 8.5) and four time periods (current, 2030, 2050 and 2100) provided in Munich Re's Location Risk Intelligence Platform. Munich Re has been a pioneer in the global assessment of natural hazard risks and has been systematically recording the global hazard data over the past decades.

At this stage, no specific asset vulnerability modeling was undertaken nor any financial impact assessment modelling for acute or chronic risks.

For the country and portfolio calculations, all assets were included as equal binary units. No data on asset areas or rental values data was incorporated in these calculations.

No data was verified by Savills as part of this assessment.

PORTFOLIO INFORMATION

This assessment looked at 197 assets, with locations across eight countries: United Kingdom, Germany, The Netherlands, Poland, Czechia, France, Italy and Spain. Given Czechia has just one asset it has been grouped with Poland (Map 1; Table 3).

For the purposes of this study, an "asset" refers to an estate or building or, where there are several buildings or estates in close proximity, to a cluster of estates or buildings.

All physical hazards covered within the report are modelled up to **2100** (except for supplementary NATHAN hazards). For most hazards intermediate time periods of **2030** and **2050** are also modelled.

The number of RCP scenarios covered varies between hazards due to the lack of granularity and difference between scenarios for certain hazards. All risk categories cover **RCP 8.5 and RCP 4.5.** All hazards, apart from River Flood and Tropical Cyclone, are modelled under **RCP 2.6** scenario.

Map 1: SEGRO Portfolio

Table 3: Portfolio Information

	UK	Germany	The Netherlands	Poland and Czechia	France	Italy	Spain
No. Sites:	64	34	6	16+1	49	18	9

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CLIMATE RISK ASSESSMENT

PORTFOLIO EXPOSURE RISK

Table 4 identifies France, Italy and Spain as the countries most at exposure risk to Drought Stress. Under RCP 2.6 scenario by 2100 France still experiences significant Drought Stress, but across RCP 4.5 and RCP 8.5 scenarios, Italy and Spain overtake France in exposure risk to Drought Stress. A similar pattern exists for Fire Weather and Heat Stress, with France, Italy and Spain remaining most exposed. At current baselines, Italy and Spain are facing Medium exposure risk to Heat Stress. Italy faces the highest exposure risk to Precipitation Stress, both currently and across years and RCP scenarios, with a Medium exposure risk already being faced.

The geographical distribution of assets within Italy means those assets experiencing Drought Stress, Fire Weather Stress and Heat Stress are in different regions of Italy than those facing Precipitation Risk. Heat Stress Maps 17–20 show assets in the Alpine region of Italy are at a lower risk than those in Southern and Eastern Italy across all scenarios in 2030 and 2050. These North-Western assets face higher precipitation risk, both currently (Graph 7) and across all RCP scenarios and years (Maps 13–16).

SEGRO's European assets are geographically located away from the Atlantic Ocean with the portfolio's most western assets located in Central and Southeast UK and Central and Eastern Spain so Tropical Cyclones remain a very Low risk for all assets within the portfolio (Table 1). A number of assets are in coastal areas, with six assets experiencing High to Very High risk of Sea Level Rise by 2050 under RCP 8.5 (Table 1). Table 2 shows the SEGRO portfolio exposure risk to Sea Level Rise and River Flood as Very Low, however, Table 20 shows Sea Level Rise in the Netherlands is High under all RCP scenarios (data only available for 2100). Under RCP 2.6 scenario by 2100 the Netherlands experiences a High-risk score of 6.67, this grows to 7.83 under both RCP 4.5 and 8.5 (Table 4). Germany also faces a slightly increased risk to Sea Level Rise change compared to the rest of the portfolio albeit this is for one asset (Table 19).

River Flood is also in the High to Very High-risk exposure categories in Table 5, with at least 12 assets consistently in the Very High category from current baselines up to RCP 8.5 in 2100. No other physical hazard has as many assets in the Very High Exposure risk category across all time frames and RCP scenarios (Table 5). However, the portfolio risk score remains lower than for other hazards (Table 2). This provides an excellent example of the issues created by looking at portfolio scores (especially for large number of assets) where (mean) averages for geographically distributed hazards exposed to varying physical hazards can mask High to Very High exposure risks for single assets or geographically co-located groups of assets.

Table 5 provides an in-depth overview of the SEGRO portfolio's exposure risk across RCPs and time periods (including current, where data exists). The second column outlines the average absolute value of exposure risk for each hazard across the portfolio, and the subsequent five columns show how many assets fall into each level of exposure risk. Taking the business-as-usual scenario of RCP 8.5 as an example, risk exposure can be explored. In 2030, Undefended River Flood is the hazard with the most assets at Very High Exposure risk. By 2050, Drought Stress Exposure risk increases considerably across the portfolio, with 153 assets facing Medium, High or Very High exposure to the hazard. In 2100, the number of properties at risk in all hazards increases substantially, with Sea Level Rise on a par with River Flood (Undefended), and Drought Stress being the highest value exposure risk (6.33) with 25 assets at Very High Exposure. Additionally, taking into consideration changes from current baseline (Graph 2, where data is available), Heat Stress faces the highest increase in risk from current baseline.

COUNTRY AVERAGE SCORES ALL HAZARDS, RCP AND TIME PERIODS

Drought Stress	Portfolio	UK	Germany	The Netherlands	Czechia and Poland	France	Italy	Spain
RCP 2.6 2030	2.88	2.31	3.13	1.67	2.97	3.20	3.06	4.50
RCP 2.6 2050	3.56	3.45	2.71	2.08	1.97	4.67	3.44	5.78
RCP 2.6 2100	2.71	2.42	3.46	2.50	1.38	3.47	1.78	2.28
RCP 4.5 2030	3.04	2.82	2.21	0.67	2.15	3.45	4.36	6.22
RCP 4.5 2050	4.25	3.95	3.49	2.00	1.85	5.20	5.53	7.50
RCP 4.5 2100	4.21	4.13	3.21	2.33	2.06	4.95	5.28	7.72
RCP 8.5 2030	3.47	3.47	2.12	1.67	2.41	4.26	4.47	5.61
RCP 8.5 2050	4.72	4.89	3.60	2.33	3.50	5.02	5.69	8.00
RCP 8.5 2100	6.33	5.83	4.76	4.25	3.82	7.59	9.03	9.67
Fire Weather Stress	**Portfolio**	**UK**	**Germany**	**The Netherlands**	**Czechia and Poland**	**France**	**Italy**	**Spain**
Current	2.53	2.12	2.31	1.60	2.38	2.82	3.01	4.62
RCP 2.6 2030	2.93	2.75	2.48	2.03	3.12	2.83	3.71	5.03
RCP 2.6 2050	2.92	2.65	2.34	1.93	2.55	3.23	3.71	5.14
RCP 2.6 2100	2.85	2.66	2.57	2.07	2.54	2.94	3.22	5.17
RCP 4.5 2030	3.17	2.78	2.65	2.07	2.89	3.56	3.92	5.44
RCP 4.5 2050	3.59	3.19	3.31	2.73	3.13	4.04	4.06	5.64
RCP 4.5 2100	3.68	3.30	3.37	2.73	3.32	4.12	4.06	5.71
RCP 8.5 2030	3.09	2.77	2.53	2.07	2.84	3.47	3.78	5.21
RCP 8.5 2050	3.40	2.90	3.04	2.38	3.12	3.89	4.06	5.61
RCP 8.5 2100	4.31	3.82	3.87	3.17	3.68	4.94	5.19	6.33
Heat Stress	**Portfolio**	**UK**	**Germany**	**The Netherlands**	**Czechia and Poland**	**France**	**Italy**	**Spain**
Current	2.80	1.74	2.75	2.13	2.62	3.31	4.54	5.02
RCP 2.6 2030	3.35	2.00	3.32	2.33	3.41	4.07	5.34	5.67
RCP 2.6 2050	3.32	2.00	3.17	2.30	3.26	4.11	5.37	5.67
RCP 2.6 2100	3.31	2.17	3.18	2.33	3.20	3.89	5.23	5.67
RCP 4.5 2030	3.35	2.03	3.22	2.33	3.24	4.22	5.27	5.67
RCP 4.5 2050	3.71	2.47	3.49	2.93	3.51	4.60	5.54	5.87
RCP 4.5 2100	4.01	2.60	4.12	3.27	3.86	4.84	5.73	6.32
RCP 8.5 2030	3.34	2.07	3.17	2.33	3.19	4.14	5.31	5.67
RCP 8.5 2050	4.00	2.69	3.95	3.08	3.97	4.80	5.69	6.32
RCP 8.5 2100	5.34	4.04	5.26	4.60	5.49	6.15	7.02	7.27
Precipitation Stress	**Portfolio**	**UK**	**Germany**	**The Netherlands**	**Czechia and Poland**	**France**	**Italy**	**Spain**
Current	2.99	2.30	2.56	2.30	2.44	3.16	6.30	3.41
RCP 2.6 2030	3.08	2.30	2.77	2.57	2.61	3.19	6.58	3.49
RCP 2.6 2050	3.12	2.31	2.79	2.57	2.79	3.21	6.73	3.54
RCP 2.6 2100	3.10	2.31	2.68	2.57	2.80	3.14	6.78	3.54
RCP 4.5 2030	3.06	2.31	2.81	2.57	2.52	3.18	6.39	3.41
RCP 4.5 2050	3.11	2.31	2.80	2.57	2.75	3.19	6.64	3.58
RCP 4.5 2100	3.24	2.31	2.98	2.77	2.91	3.43	6.91	3.54
RCP 8.5 2030	3.05	2.31	2.69	2.57	2.50	3.19	6.46	3.54
RCP 8.5 2050	3.26	2.36	3.05	2.77	3.01	3.41	6.76	3.54
RCP 8.5 2100	3.64	2.81	3.49	3.47	3.30	3.77	6.88	3.74
River Flood	**Portfolio**	**UK**	**Germany**	**The Netherlands**	**Czechia and Poland**	**France**	**Italy**	**Spain**
Current Undefended	1.48	1.61	1.50	2.17	2.00	1.27	1.22	0.75
Current Defended	1.44	1.61	1.50	0.75	2.00	1.27	1.22	0.75
RCP 4.5 2030 Undefended	1.66	1.81	1.63	2.17	2.00	1.27	2.17	0.75
RCP 4.5 2030 Defended	1.61	1.81	1.63	0.75	2.00	1.27	2.17	0.75
RCP 8.5 2030 Undefended	1.66	1.75	1.63	2.17	2.00	1.27	2.17	1.22
RCP 8.5 2030 Defended	1.61	1.75	1.63	0.75	2.00	1.27	2.17	1.22
RCP 4.5 2050 Undefended	1.68	1.81	1.63	2.17	2.00	1.27	2.17	1.22
RCP 4.5 2050 Defended	1.63	1.81	1.63	0.75	2.00	1.27	2.17	1.22
RCP 8.5 2050 Undefended	1.68	1.75	1.63	2.17	2.25	1.27	2.17	1.22
RCP 8.5 2050 Defended	1.63	1.75	1.63	0.75	2.25	1.27	2.17	1.22
RCP 4.5 2100 Undefended	1.70	1.81	1.63	2.17	2.25	1.27	2.17	1.22
RCP 4.5 2100 Defended	1.66	1.81	1.63	0.75	2.25	1.27	2.17	1.22
RCP 8.5 2100 Undefended	1.66	1.81	1.63	2.17	2.00	1.27	2.17	0.75
RCP 8.5 2100 Defended	1.61	1.81	1.63	0.75	2.00	1.27	2.17	0.75
Sea Level Rise	**Portfolio**	**UK**	**Germany**	**The Netherlands**	**Czechia and Poland**	**France**	**Italy**	**Spain**
RCP 2.6 2100	0.96	0.75	0.95	6.67	0.75	0.75	0.75	0.75
RCP 4.5 2100	1.00	0.75	0.95	7.83	0.75	0.75	0.75	0.75
RCP 8.5 2100	1.00	0.75	0.95	7.83	0.75	0.75	0.75	0.75
Tropical Cyclone	**Portfolio**	**UK**	**Germany**	**The Netherlands**	**Czechia and Poland**	**France**	**Italy**	**Spain**
Current	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
RCP 4.5 2030	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
RCP 4.5 2050	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
RCP 4.5 2100	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
RCP 8.5 2030	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
RCP 8.5 2050	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
RCP 8.5 2100	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75

Table 4: Country Scores – all Hazards, RCP and Time Periods

DISTRIBUTION OF ASSETS ACROSS EXPOSURE RISK CATEGORIES

Climate Change Hazard, RCP and Time Period	Average	No/Very Low Exposure (1) Dark Green	Low Exposure (2) Light Green	Medium Exposure (3) Orange	High Exposure (4) Red	Very High Exposure (5) Dark Red	Total
Drought Stress		0 - 1.50	1.51 - 3.50	3.51 - 6.50	6.51 - 8.50	8.51 - 10.0	
RCP 2.6 2030	2.88	17	158	22	0	0	197
RCP 2.6 2050	3.56	12	130	52	3	0	197
RCP 2.6 2100	2.71	29	150	18	0	0	197
RCP 4.5 2030	3.04	19	144	31	3	0	197
RCP 4.5 2050	4.25	10	42	139	6	0	197
RCP 4.5 2100	4.21	5	61	125	3	3	197
RCP 8.5 2030	3.47	17	120	57	3	0	197
RCP 8.5 2050	4.72	0	44	145	4	4	197
RCP 8.5 2100	6.33	0	13	110	49	25	197
Fire Weather Stress		0 - 1.50	1.51 - 3.50	3.51 - 6.50	6.51 - 8.50	8.51 - 10.0	
Current	2.53	7	177	6	7	0	197
RCP 2.6 2030	2.93	0	179	11	7	0	197
RCP 2.6 2050	2.92	2	178	10	7	0	197
RCP 2.6 2100	2.85	0	183	7	7	0	197
RCP 4.5 2030	3.17	0	173	16	8	0	197
RCP 4.5 2050	3.59	0	142	47	8	0	197
RCP 4.5 2100	3.68	0	142	47	8	0	197
RCP 8.5 2030	3.09	0	180	10	7	0	197
RCP 8.5 2050	3.40	0	159	30	8	0	197
RCP 8.5 2100	4.31	0	26	163	8	0	197
Heat Stress		0 - 1.50	1.51 - 3.50	3.51 - 6.50	6.51 - 8.50	8.51 - 10.0	
Current	2.80	12	145	40	0	0	197
RCP 2.6 2030	3.35	0	127	66	4	0	197
RCP 2.6 2050	3.32	0	129	62	6	0	197
RCP 2.6 2100	3.31	0	155	39	3	0	197
RCP 4.5 2030	3.35	0	125	68	4	0	197
RCP 4.5 2050	3.71	0	115	75	7	0	197
RCP 4.5 2100	4.01	0	78	111	8	0	197
RCP 8.5 2030	3.34	0	129	64	4	0	197
RCP 8.5 2050	4.00	0	82	107	8	0	197
RCP 8.5 2100	5.34	0	3	161	33	0	197
Precipitation Stress		0 - 1.50	1.51 - 3.50	3.51 - 6.50	6.51 - 8.50	8.51 - 10.0	
Current	2.99	0	158	32	5	2	197
RCP 2.6 2030	3.08	0	158	31	5	3	197
RCP 2.6 2050	3.12	0	156	31	7	3	197
RCP 2.6 2100	3.10	0	156	31	7	3	197
RCP 4.5 2030	3.06	0	158	31	6	2	197
RCP 4.5 2050	3.11	0	157	31	7	2	197
RCP 4.5 2100	3.24	0	156	29	9	3	197
RCP 8.5 2030	3.05	0	158	32	5	2	197
RCP 8.5 2050	3.26	0	154	33	7	3	197
RCP 8.5 2100	3.64	0	140	47	7	3	197
River Flood		0		500		100	
Current Undefended	1.48	176		8		13	197
Current Defended	1.44	177		8		12	197
RCP 4.5 2030 Undefended	1.66	174		4		19	197
RCP 4.5 2030 Defended	1.61	175		4		18	197
RCP 4.5 2050 Undefended	1.66	173		6		18	197
RCP 4.5 2050 Defended	1.61	174		6		17	197
RCP 4.5 2100 Undefended	1.68	173		5		19	197
RCP 4.5 2100 Defended	1.63	174		5		18	197
RCP 8.5 2030 Undefended	1.68	173		5		19	197
RCP 8.5 2030 Defended	1.63	174		5		18	197
RCP 8.5 2050 Undefended	1.70	173		4		20	197
RCP 8.5 2050 Defended	1.66	174		4		19	197
RCP 8.5 2100 Undefended	1.66	174		4		19	197
RCP 8.5 2100 Defended	1.61	175		4		18	197
Sea Level Rise		-1	1	2	3	4	
RCP 2.6 2100	0.96	191	0	0	5	1	197
RCP 4.5 2100	1.00	191	0	0	1	5	197
RCP 8.5 2100	1.00	191	0	0	1	5	197
Tropical Cyclone		-1, 0	1	2, 3	4	5	
Current	0.75	197	0	0	0	0	197
RCP 4.5 2030	0.75	197	0	0	0	0	197
RCP 4.5 2050	0.75	197	0	0	0	0	197
RCP 4.5 2100	0.75	197	0	0	0	0	197
RCP 8.5 2030	0.75	197	0	0	0	0	197
RCP 8.5 2050	0.75	197	0	0	0	0	197
RCP 8.5 2100	0.75	197	0	0	0	0	197

Table 5: Distribution of SEGRO Assets Across Exposure Risk Categories Grouped by RCP (2.6, 4.5 and 8.5) and then by Time Period (2030, 2050 and 2100)

SEA LEVEL RISE

BACKGROUND

The global mean sea level has risen more than 20 centimetres since 1880 and the trend is continuing at an unprecedented speed (IPCC, 5AR).

Sea level rise is primarily caused by processes linked to global warming, such as the melting of glaciers and ice sheets, and the thermal expansion of water. Furthermore, rising sea levels have knock on impacts on the rate or intensity of coastal erosion, inundations, storm floods, tidal waters encroachment into estuaries and river systems, as well as contamination of freshwater reserves.

Sea level rise can affect coastal regions worldwide and regions will experience varying impacts based on their topography and mitigation measures.

Munich Re provides hazard information on a 30m resolution for flooding hazard by sea level rise globally. The extents of potentially flooded areas are given by storm surge events with a 100-year return period. Sea level rise zones were modelled on the basis of high-resolution elevation data from the ALOS elevation model and sea level rise projections from climate models. This enables the identification of five different hazard classes describing the potential hazard level by sea level rise, from no hazard to extreme hazard.

The sea level rise hazard information is available for the three RCP scenarios (RCP2.6, RCP4.5 and RCP8.5) and the projection year 2100).*

Table 6: Portfolio Scores – Sea Level

Timescale	RCP Scenario	No of sites by risk category				
		No or Very Low	Low	Medium	High	Very High
2100	2.6	191	0	0	5	1
	4.5	191	0	0	1	5
	8.5	191	0	0	1	5

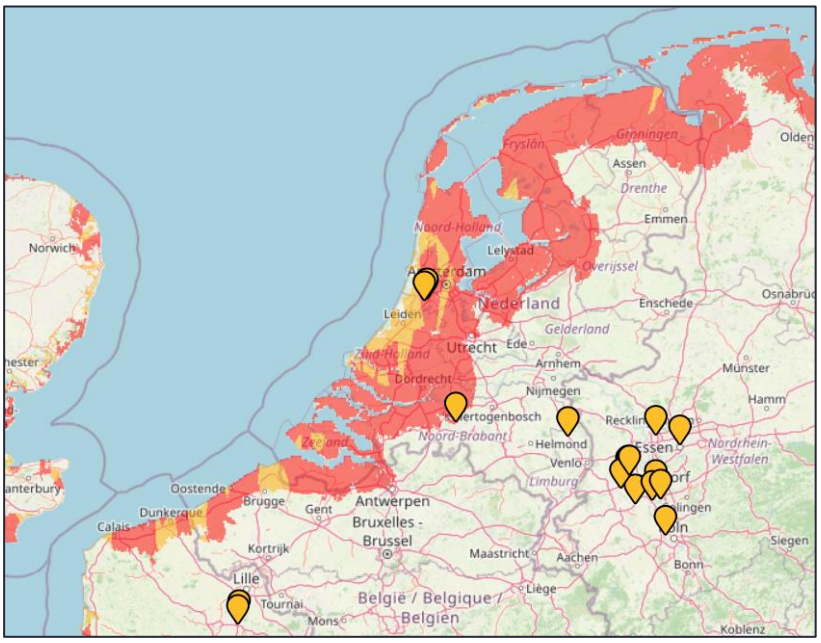
* Munich RE Climate Change Edition Fact Sheet v. 2020/04

SEA LEVEL RISE

As shown previously in Table 6, the portfolio faces little exposure risk to Sea Level Rise, with the majority of assets being inland.

However, Map 2 (right) highlights the assets in Amsterdam that are facing significant Sea Level Rise exposure risk in 2100 (RCP 8.5). Even under a 2.6 and 4.6 RCP scenario, the Netherlands exposure risk to Sea Level Rise is high (Table 4). These assets are listed below in Table 7, as well as one of the assets in Hamburg.

The remaining countries with assets in the portfolio all have an average hazard rating score of less than 1 and therefore are No to Very Low exposure risk of Sea Level Rise.



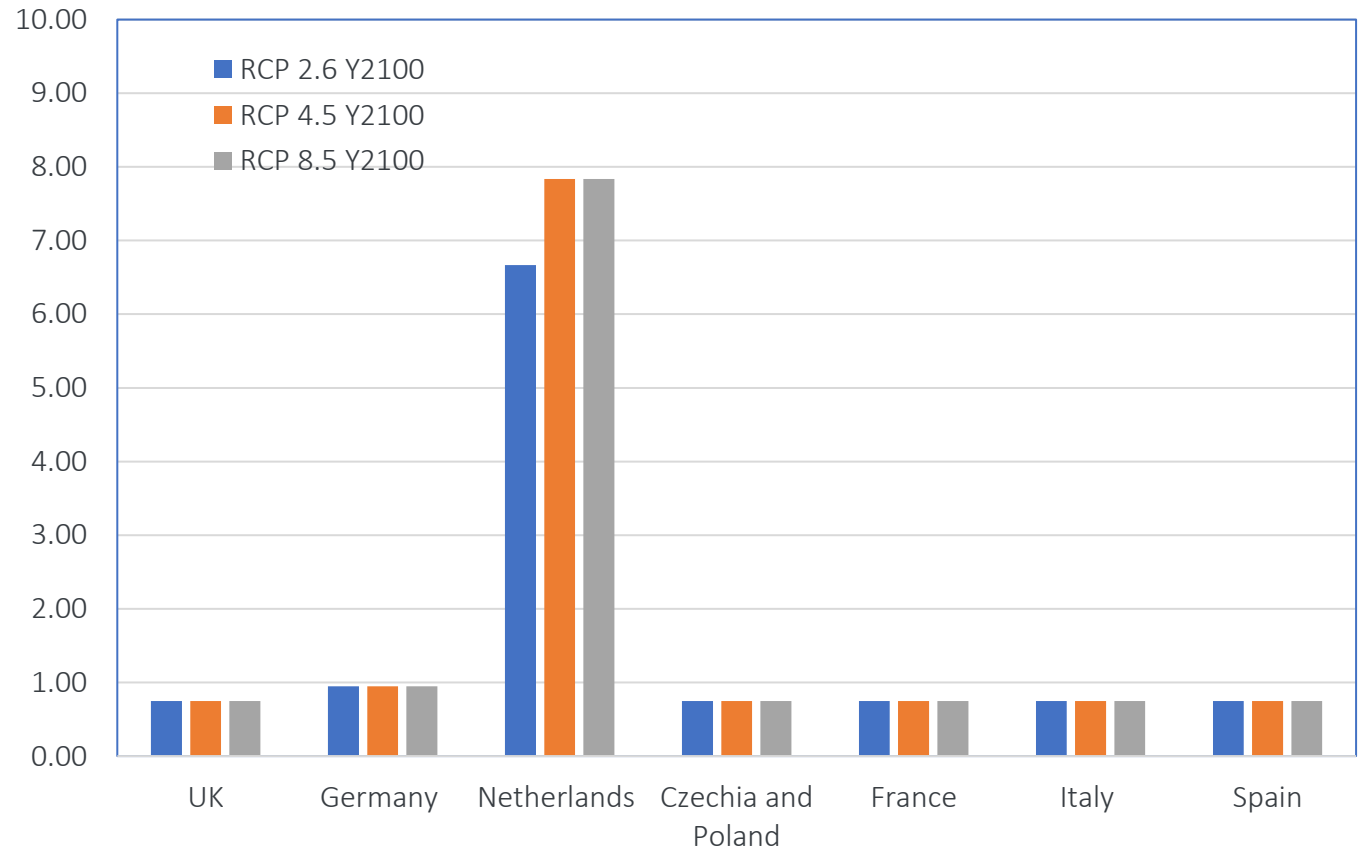
Map 2: Regional sea level risk, RCP 8.5 2100

Table 7: Sites, Location, Distance To Sea and Elevation of Most at Risk Sites

Site Address	Type of location	Distance to sea	Elevation (m)
Asset ID99	Coastal	12,395	8
Asset ID100	Coastal	12,550	3
Asset ID101	Coastal	12,016	-8
Asset ID102	Coastal	14,133	-8
Asset ID103	Coastal	14,662	4
Asset ID68	Coastal	5,349	9

SEA LEVEL RISE
ALL RCP AND TIME PERIODS, BY COUNTRY

Graph 3: Sea Level Rise. Average Score - All RCP and Time Periods, By Country



Sea Level Rise	UK	Germany	The Netherlands	Czechia and Poland	France	Italy	Spain
RCP 2.6 2100	0.75	0.95	6.67	0.75	0.75	0.75	0.75
RCP 4.5 2100	0.75	0.95	7.83	0.75	0.75	0.75	0.75
RCP 8.5 2100	0.75	0.95	7.83	0.75	0.75	0.75	0.75

RIVER FLOOD

BACKGROUND

Munich Re's current river flood hazard data (provided by JBA risk management) offer River Flood hazard information with a 30m horizontal resolution.

The global flood maps are constantly improved and are based on bare-earth digital terrain data and a consistent worldwide digital surface model.

The River Flood hazard is represented by three return period zones (representing River Flood probability), ranging from zone 0 (areas of low to minimal flood risk) to zone 100 (100-year return period of river flood).

A 100-year return period indicates in any one year a 1/100 chance of an event, i.e., an annual risk of 1%.

Flood protection systems are defence structures to reduce the flooding to areas and properties. Globally, the quality of defence information and the structures themselves is highly variable. Hence, there is value in considering the undefended river flood hazard in order to keep global consistency. Munich Re provides both defended and undefended river flood hazard information.

The flood projections follow a hybrid method using the output from the latest high-resolution CMIP5 global climate model runs and global land surface models to estimate changes in peak water runoff at hydrological basin resolution. These changes in peak runoff are then used to scale current river flood maps, using flood depth data from JBA Risk Management.*

Table 8: Portfolio Scores – River Flood Undefended

Timescale	RCP Scenario	No. of sites by risk category		
		Zone 0 minimal flood risk 0 – No or Very Low	Zone 500 year return period 500 – Medium	Zone 100 year return period 100 – Very High
Current	Undefended	176	8	13
	Defended	177	8	12
2030	4.5 U	174	4	19
	4.5 D	175	4	18
	8.5 U	173	5	19
	8.5 D	174	5	18
2050	4.5 U	173	6	18
	4.5 D	174	6	17
	8.5 U	173	4	20
	8.5 D	174	4	19
2100	4.5 U	173	5	19
	4.5 D	174	5	18
	8.5 U	174	4	19
	8.5 D	175	4	18

*Munich RE Climate Change Edition Fact Sheet v. 2020/04

RIVER FLOOD

River Flood Risk is closely related to Precipitation Stress and Extratropical Storms, increasing the levels of water in river catchment areas in short periods of time to exceed the current capacity and spilling out to the surrounding areas.

The Netherlands as a country has a high degree of exposure risk for (Undefended) River Flood. Maps 3–6 indicate River Flood exposure risk in the Netherlands is significant under all RCPs and across all time periods. The maps only show Undefended River Flood exposure risk data without taking into consideration the regional River Flood defense systems (Dykes) with a very high Standard of Protection.

As previously shown in Table 8, River Flood is in the High to Very High-risk exposure categories, with at least 12 assets consistently in the Very High category from current baselines up to RCP 8.5 in 2100.

Map 3: Current River Flood Risk

Map 4: River Flood Risk 2030, RCP 4.5

Map 5: River Flood Risk 2050, RCP 4.5

Map 6: River Flood Risk 2100, RCP 4.5

RIVER FLOOD

NOTE ON RIVER FLOOD

River Flood hazard modelling uses the concept of return periods – a term used to show the occurrence and extent of a River Flood event. In the Munich Re system, 100-year return periods (or 1% annual exceedance probability) are classified as Very High risk and 500-year return periods (or 0.2% annual exceedance probability) are classified as Medium risk. If the return period is greater than 500 years, then the River Flood risk is classed as No or Very Low risk. This does not mean that there is no River Flood risk, but the likelihood of such an event is lower than 0.2% annual exceedance probability. It would be expected that as the climate changes, these low probability but potentially high impact River Flood events might contribute towards an asset having value at risk. To enable this to be better understood, a financial impact assessment may be undertaken to understand the hazard exposure, flood depth and vulnerability to River Flood for a range of RCP scenarios and time periods.

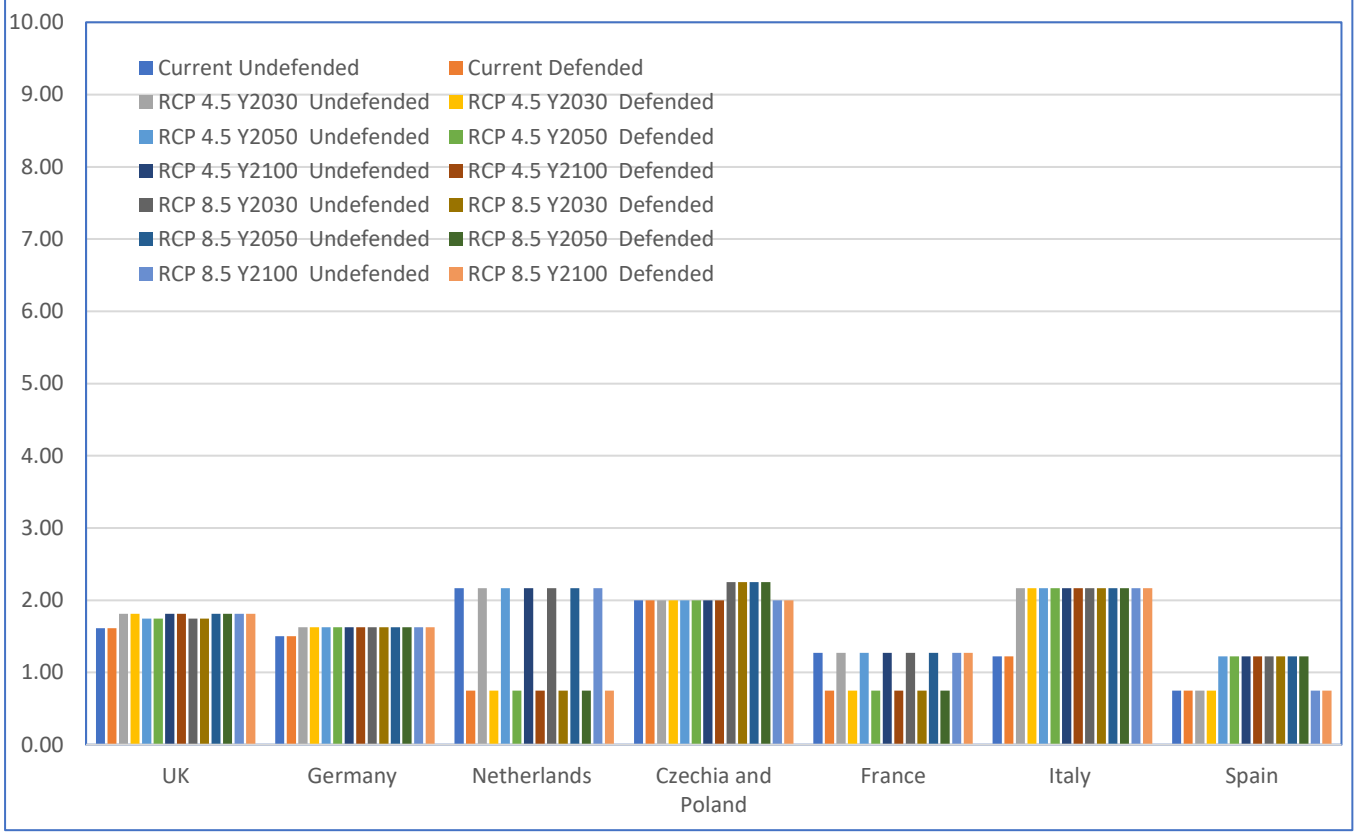
It is important to note that return periods are based on a specific year baseline and that return periods themselves do not provide explicit information about the location specific flood depths associated with these return period River Flood events. They do provide probabilities that in any given year such a flood depth would be exceeded (i.e., annual exceedance probabilities). Every location will have different flood depths associated with a 100- or 500-year return period. It is recommended to incorporate climate change Flood Depth data and Annual Exceedance Probability data, especially as these change under different climate change RCP scenarios and across future time periods.

For River Flood data – especially in Very High exposure risk areas – it is important to look at both the defended and undefended data. If assets are all Very High exposure risk for Undefended and Defended assessments this could indicate that the Standard of Protection (SoP) against the River Flood exposure risk may not be sufficient for either current baseline climate or future climate under any scenario or time period. It would be recommended that this is investigated further at the asset level using higher resolution (5–30m) Flood Risk data and Standard of Protection GIS maps and datasets to understood and assess whether asset specific flood resilience and adaptation measures should be installed.

The modelling was undertaken using single Lat/Long locations (i.e., non-finite size of asset). For River Flood data (where the resolution of data from JBA Flood Risk used within the Munich Re model is 30m), the hazard exposure risk to River Flood could vary across the spatial extent of single (large) assets within the portfolio. It is recommended to consider more detailed flood risk assessments at the asset extents, including polygons or shape files to represent the differential fluvial and pluvial flood exposure risk across the asset boundaries.

RIVER FLOOD
ALL RCP AND TIME PERIODS, BY COUNTRY

Graph 4: River Flood. Average Score - All RCP and Time Periods , By Country



River Flood	UK	Germany	The Netherlands	Czechia and Poland	France	Italy	Spain
Current – Undefended	1.61	1.50	2.17	2.00	1.27	1.22	0.75
Current – Defended	1.61	1.50	0.75	2.00	0.75	1.22	0.75
RCP 4.5 2030 – Undefended	1.81	1.63	2.17	2.00	1.27	2.17	0.75
RCP 4.5 2030 – Defended	1.81	1.63	0.75	2.00	0.75	2.17	0.75
RCP 4.5 2050 – Undefended	1.75	1.63	2.17	2.00	1.27	2.17	1.22
RCP 4.5 2050 – Defended	1.75	1.63	0.75	2.00	0.75	2.17	1.22
RCP 4.5 2100 – Undefended	1.81	1.63	2.17	2.00	1.27	2.17	1.22
RCP 4.5 2100 – Defended	1.81	1.63	0.75	2.00	0.75	2.17	1.22
RCP 8.5 2030 – Undefended	1.75	1.63	2.17	2.25	1.27	2.17	1.22
RCP 8.5 2030 – Defended	1.75	1.63	0.75	2.25	0.75	2.17	1.22
RCP 8.5 2050 – Undefended	1.81	1.63	2.17	2.25	1.27	2.17	1.22
RCP 8.5 2050 – Defended	1.81	1.63	0.75	2.25	0.75	2.17	1.22
RCP 8.5 2100 – Undefended	1.81	1.63	2.17	2.00	1.27	2.17	0.75

TROPICAL CYCLONE

BACKGROUND

Tropical cyclones are formed in the +/- 5 to 30 degrees of latitude from the equator, when sea temperatures are 27°C or more and there are converging winds with low wind shear. They are among the more destructive weather phenomena.

Coastal regions and islands are particularly exposed both by the direct impacts of the resulting storm and by secondary hazards, such as storm surges and pounding waves.

The present day hazard analysis is based on Munich Re's Tropical Cyclone zoning in NATHAN, which uses forward wind, maximum wind speed, minimum central pressure, radius of maximum wind speeds and track of the centre ("eye") in three to six hourly intervals as main variables for modelling.

By means of frequency analysis for each grid coordinate, the peak wind speed to be expected was modelled for 100-year return period at the global scale.

The Tropical Cyclone projections are based on published model run results of the High-Resolution Forecast-Oriented Low Ocean Resolution (HiFLOR) model at the NOAA Geophysical Fluid Dynamics Laboratory (GFDL). The HiFLOR model allows the user to assess how climate change will alter the frequency and intensity of tropical cyclones.

The results are used for remodelling the Nathan hazard zones, represented by the five-level scale for the probable maximum intensity with an exceedance probability of 10% in 10 years (equivalent to return period of 100 years).*

Table 9: Portfolio Scores – Tropical Cyclone

Timescale	RCP Scenario	No. Of Sites By Risk Category				
		No/Low	Low/Medium	Medium	Medium/High	High
Current		197	0	0	0	0
2030	4.5	197	0	0	0	0
	8.5	197	0	0	0	0
2050	4.5	197	0	0	0	0
	8.5	197	0	0	0	0
2100	4.5	197	0	0	0	0
	8.5	197	0	0	0	0

*Munich RE Climate Change Edition Fact Sheet v. 2020/04

TROPICAL CYCLONE

Table 9 shows the SEGRO portfolio has No to Very Low exposure risk to Tropical Cyclones. All 197 SEGRO asset locations are located at distance from the Atlantic Ocean.

Maps 7–8 highlight that Ireland and the East coast of the UK are at a more pronounced exposure risk of Tropical Cyclones. It is recommended to consider this exposure risk to Tropical Cyclones if looking to expand their portfolio into these regions.

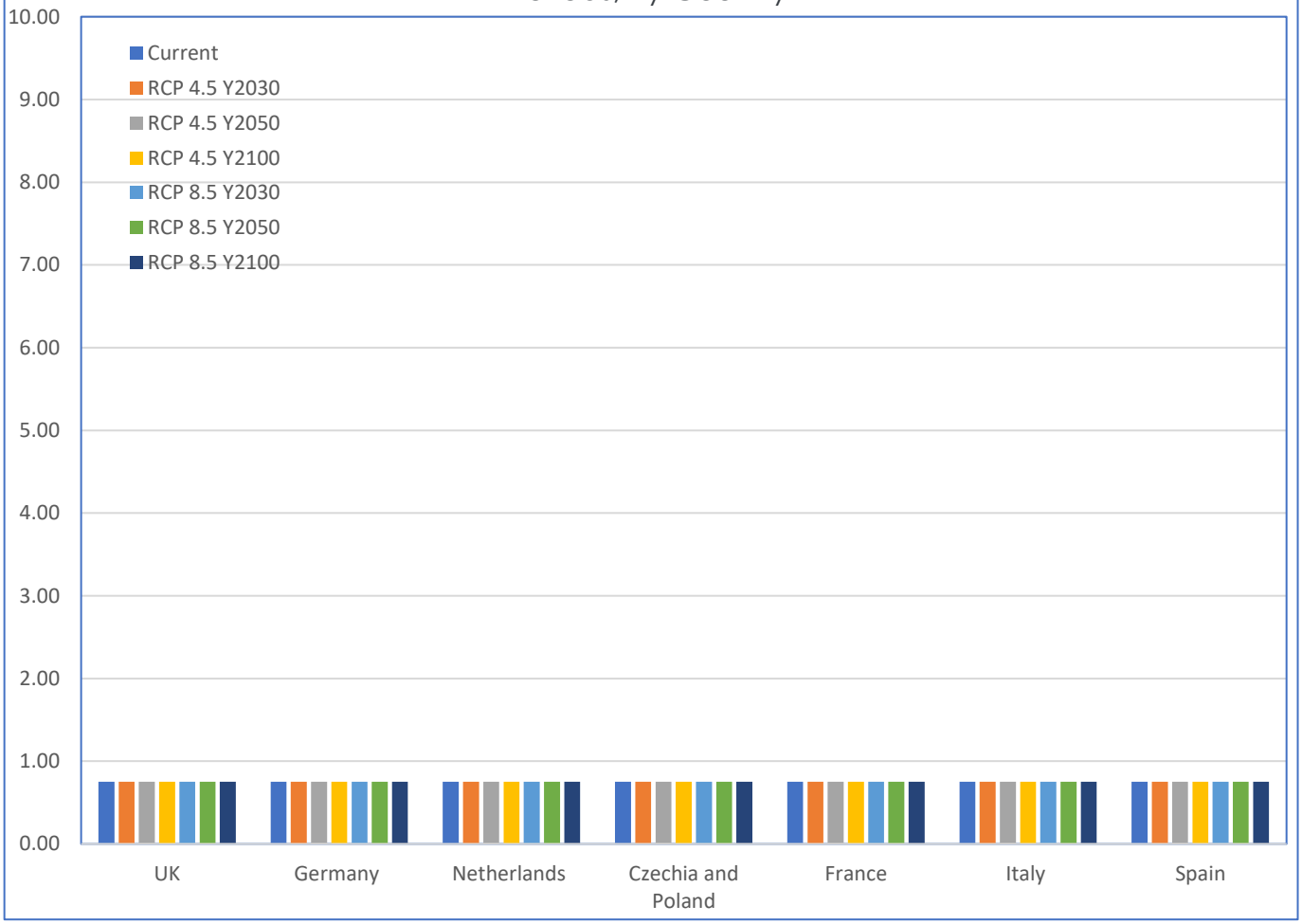
Map 7: Current Tropical Cyclone Risk

Zone 0: 76 - 141 km/h	
Zone 1: 142 - 184 km/h	
Zone 2: 185 - 212 km/h	
Zone 3: 213 - 251 km/h	
Zone 4: 252 - 299 km/h	
Zone 5: ≥ 300 km/h	

Map 8: Tropical Cyclone Risk 2100, RCP 8.5

TROPICAL CYCLONE
ALL RCP AND TIME PERIODS, BY COUNTRY

Graph 5: Tropical Cyclone. Average Score - All RCP and Time Periods, By Country



Tropical Cyclone	UK	Germany	The Netherlands	Czechia and Poland	France	Italy	Spain
Current	0.75	0.75	0.75	0.75	0.75	0.75	0.75
RCP 4.5 2030	0.75	0.75	0.75	0.75	0.75	0.75	0.75
RCP 4.5 2050	0.75	0.75	0.75	0.75	0.75	0.75	0.75
RCP 4.5 2100	0.75	0.75	0.75	0.75	0.75	0.75	0.75
RCP 8.5 2030	0.75	0.75	0.75	0.75	0.75	0.75	0.75
RCP 8.5 2050	0.75	0.75	0.75	0.75	0.75	0.75	0.75
RCP 8.5 2100	0.75	0.75	0.75	0.75	0.75	0.75	0.75

DROUGHT STRESS

BACKGROUND

Increasing temperature in addition to changes in precipitation patterns can cause drier weather conditions leading to intense and frequent drought events, which can have severe economic, environmental and social impacts. Munich Re provides an integrated Drought Stress Index to identify the impact of climate change on current drought conditions globally.

The Drought Stress Index describes the change in the water balance, characterised by the change in precipitation and potential evapotranspiration. It is derived from the Standardized Precipitation Evapotranspiration Index (SPEI), which is the state-of-the-art index for describing drought conditions.

As a multi-scalar drought index, the SPEI is based on climatic data, used to determine duration, intensity and severity of drought conditions with respect to normal conditions in the reference period. The SPEI is modelled on the basis of daily information about temperature, precipitation and humidity,

Using data from latest high-resolution local (CORDEX) and global (CMIP5) climate models to assess drought conditions for the projection periods, information about projected drought durations and severities are combined to the Drought Stress Index, ranging from 0 (very low) to 10 (very high).*

Table 10: Portfolio Scores – Drought Stress

Timescale	RCP Scenario	No. of sites by risk category				
		No or Very Low	Low	Medium	High	Very High
Current						
2030	2.6	17	158	22	0	0
	4.5	19	144	31	3	0
	8.5	17	120	57	3	0
2050	2.6	12	130	52	3	0
	4.5	10	42	139	6	0
	8.5	0	44	145	4	4
2100	2.6	29	150	18	0	0
	4.5	5	61	125	3	3
	8.5	0	13	110	49	25

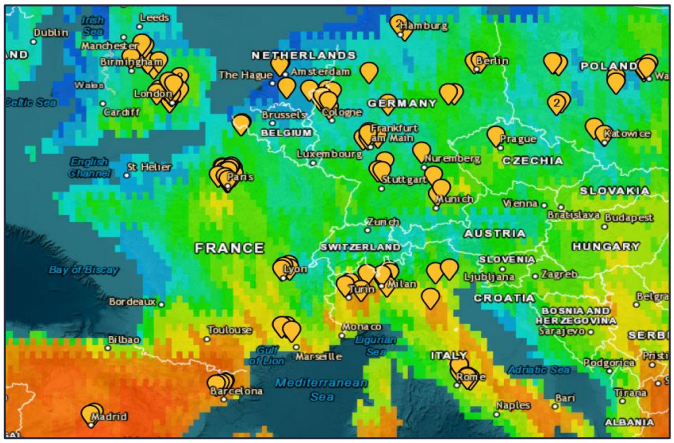
*Munich RE Climate Change Edition Fact Sheet v. 2020/04

DROUGHT STRESS

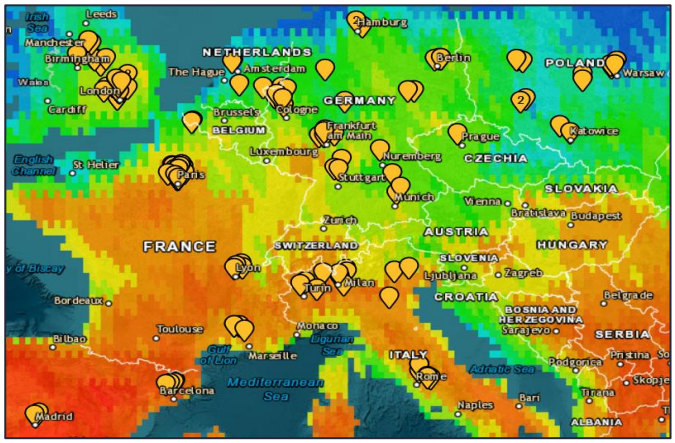
Drought Stress is one of the most significant hazards experienced by the SEGRO portfolio under all RCP scenarios and across all time period. No current Drought Stress data is available in the Munich Re dataset but increase in exposure risk to Drought Stress under different RCP and in different time periods can be seen below in Maps 9–12.

These maps show how Drought Stress increasingly encroaches on southern and central Europe as time progresses, across both RCP 4.5 and RCP 8.5. The assets in Italy and Spain have the highest exposure risk to Drought Stress following a geographical gradient (more stress further south) – as shown in Graph 6. Those assets in the North European Plain have the lowest exposure risk to Drought Stress, with the Netherlands and Poland and Czechia at lowest overall exposure risk.

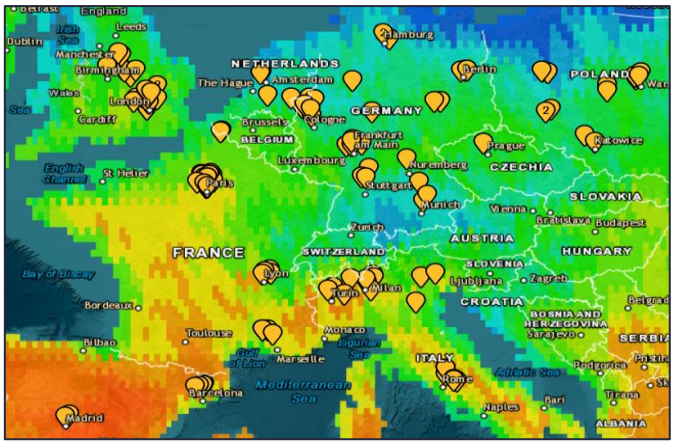
Across the SEGRO portfolio of 197 assets, Drought Stress is a significant exposure risk to the portfolio by 2050, even under the ambitious lower concentration RCP 2.6 scenario (Graph 6). There is never less than 11% of the portfolio facing Medium exposure risk to Drought Stress, as shown previously in Table 10. Drought Stress is related to Heat Stress and Fire Weather Stress and the three physical hazards have similar exposure risk intensities and geographical distribution across the SEGRO portfolio (Graph 1).



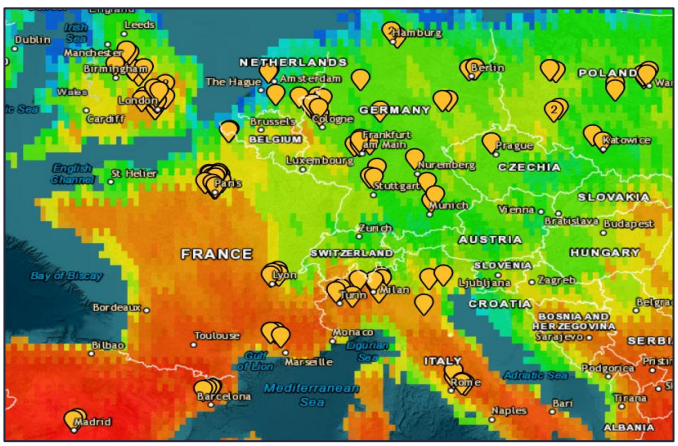
Map 9: Drought Stress 2030, RCP 4.5



Map 10: Drought Stress 2050, RCP 4.5



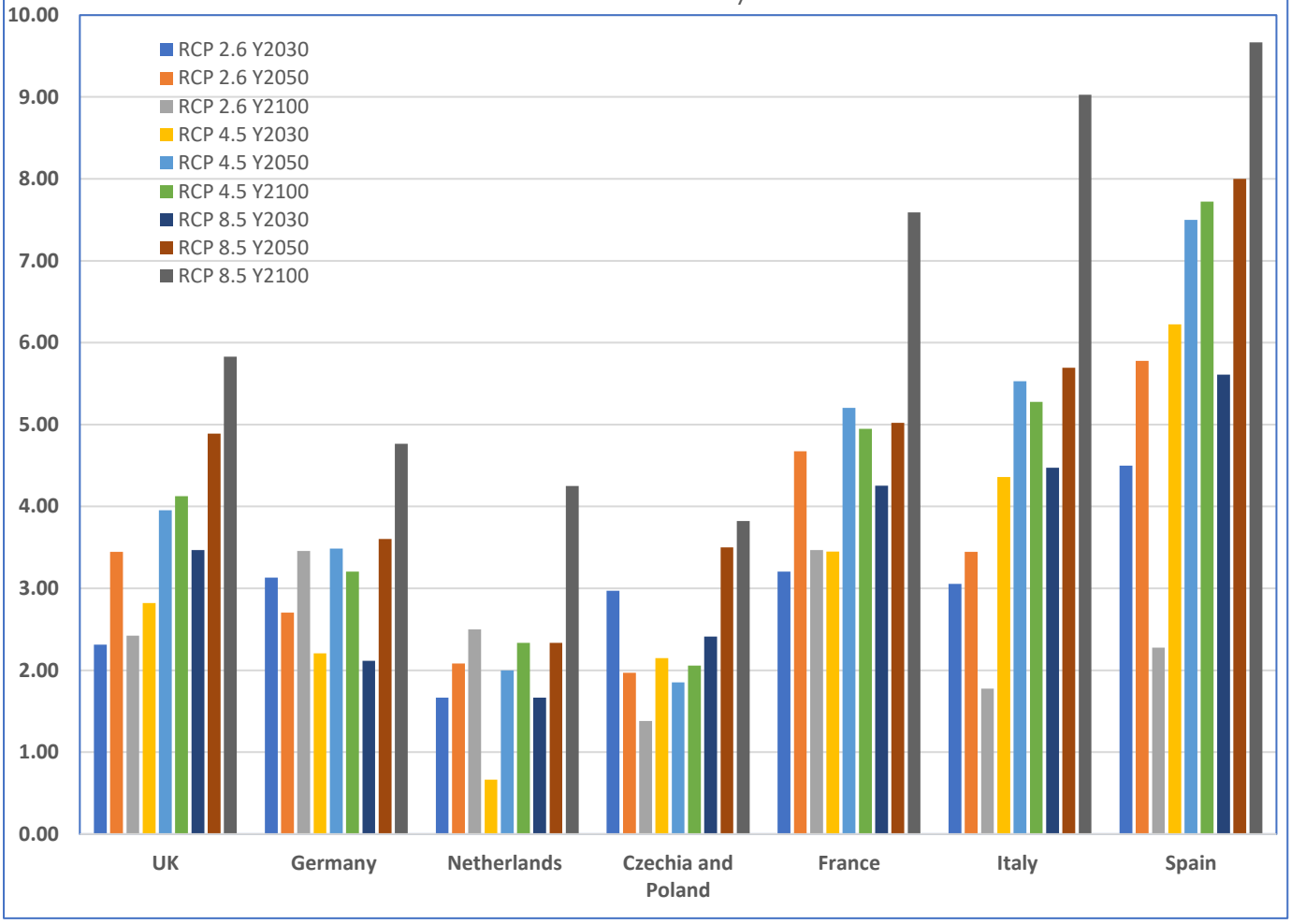
Map 11: Drought Stress 2030, RCP 8.5



Map 12: Drought Stress 2050, RCP 8.5

DROUGHT STRESS
ALL RCP AND TIME PERIODS BY COUNTRY

Graph 6: Drought Stress. Average Score - All RCP and Time Periods, By Country



Drought Stress	UK	Germany	The Netherlands	Czechia and Poland	France	Italy	Spain
RCP 2.6 2030	2.31	3.13	1.67	2.97	3.20	3.06	4.50
RCP 2.6 2050	3.45	2.71	2.08	1.97	4.67	3.44	5.78
RCP 2.6 2100	2.42	3.46	2.50	1.38	3.47	1.78	2.28
RCP 4.5 2030	2.82	2.21	0.67	2.15	3.45	4.36	6.22
RCP 4.5 2050	3.95	3.49	2.00	1.85	5.20	5.53	7.50
RCP 4.5 2100	4.13	3.21	2.33	2.06	4.95	5.28	7.72
RCP 8.5 2030	3.47	2.12	1.67	2.41	4.26	4.47	5.61
RCP 8.5 2050	4.89	3.60	2.33	3.50	5.02	5.69	8.00
RCP 8.5 2100	5.83	4.76	4.25	3.82	7.59	9.03	9.67

PRECIPITATION STRESS

BACKGROUND

Due to global warming and particularly to warmer oceans, air contains more moisture. This might lead to an intensification of high-precipitation events and an alteration of the frequency of such events.

The impact of climate change on precipitation is very heterogenous globally, which is caused by its fine-scale features. This makes it essential to use high-resolution climate models to capture the climate change impacts, which might lead to soil erosion and increased flood risk.

Munich Re provides information on the threat by heavy precipitation in the form of detailed precipitation information as well as an integrated Precipitation Stress Index. Underlying heat stress parameters include Maximum Daily Precipitation p.a. (> 30mm precipitation per day).

The Precipitation Stress Index combines relevant information from the parameters characterising heavy precipitation and classifies the precipitation stress situation on a scale ranging from 0 (very low) to 10 (very high). The parameters were chosen in accordance with scientific studies and climate extremes indices defined by the CCI/WCRP/JCOMM ETCCDI, with the aim of depicting heavy-precipitation stress consistently, locally and globally.*

Table 11: Portfolio Scores – Precipitation Stress

		No of sites by risk category				
Timescale	**RCP Scenario**	**No or Very Low**	**Low**	**Medium**	**High**	**Very High**
Current		0	158	32	5	2
2030	**2.6**	0	158	31	5	3
	4.5	0	158	31	6	2
	8.5	0	158	32	5	2
2050	**2.6**	0	156	31	7	3
	4.5	0	157	31	7	2
	8.5	0	154	33	7	3
2100	**2.6**	0	156	31	7	3
	4.5	0	156	29	9	3
	8.5	0	140	47	7	3

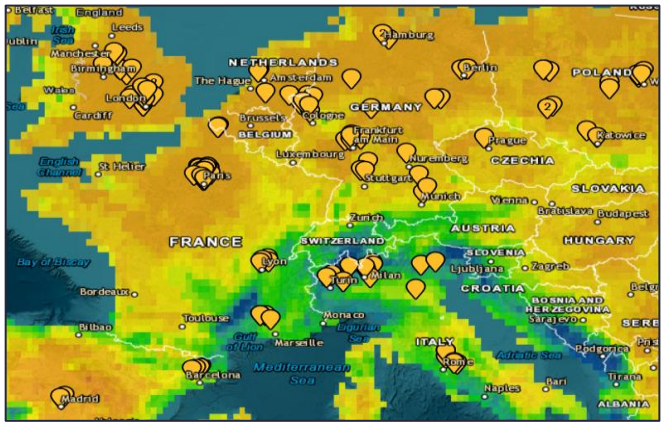
*Munich RE Climate Change Edition Fact Sheet v. 2020/04

PRECIPITATION STRESS

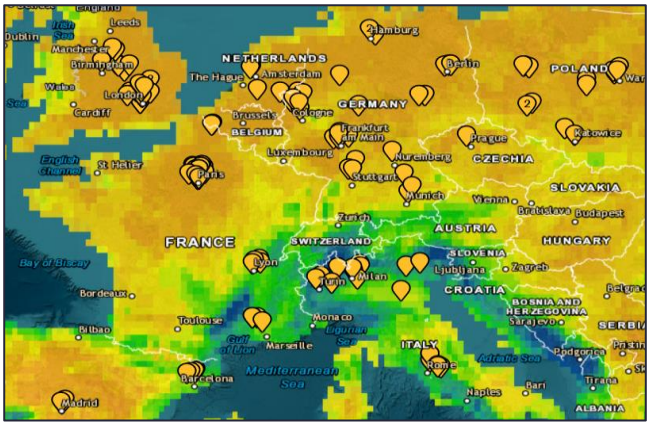
Precipitation Stress exposure risk across the portfolio is a key consideration for assets in the Alpine region. This relates to those assets in Northern Italy (Graph 7) and the assets in East to Southern France and North-East Spain (nearing the Pyrenees). Due to the current exposure risk to Precipitation Stress being significant (Table 11), the progression of Precipitation Stress is less prominent (see Maps 13–16). Under the high scenario (RCP 8.5 or BAU) in 2100, there is an increase in the exposure risk to Precipitation Stress. The number of assets in an exposure risk category higher than No to Very Low exposure risk increases from 20% (all previous RCP and time scenarios) up to 29% (Table 11).

Asset level assessments will show individual assets that have a High or Very Precipitation Stress exposure risk, and the potential impact of Precipitation (and River Flood) at an asset level. A highly vulnerable asset in a Medium exposure risk area may experience a great impact from Precipitation Stress than a less vulnerable asset in a High or Very exposure risk area. Vulnerability is a largely independent variable from exposure risk – although current baseline exposure risk levels may have influenced local/regional/country building regulations to adapt and be resilient to existing natural hazards.

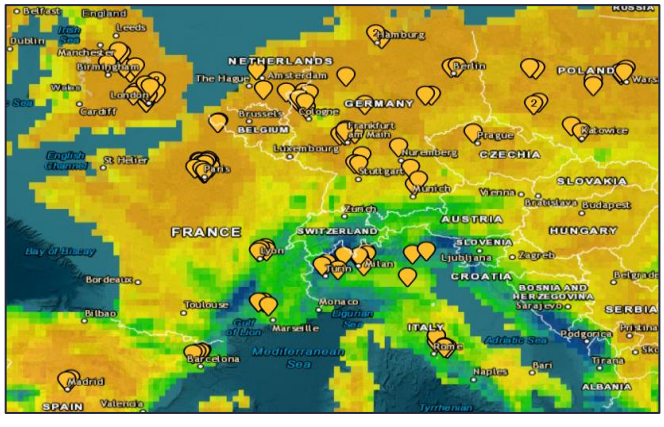
Future analysis could investigate combinations of physical hazards such as Precipitation Stress and River Flood to understand an asset vulnerability to combinations of hazards. For non-urban sites the combination of Precipitation Stress and Heat Stress may have an impact on soil stability after recurring Heat waves.



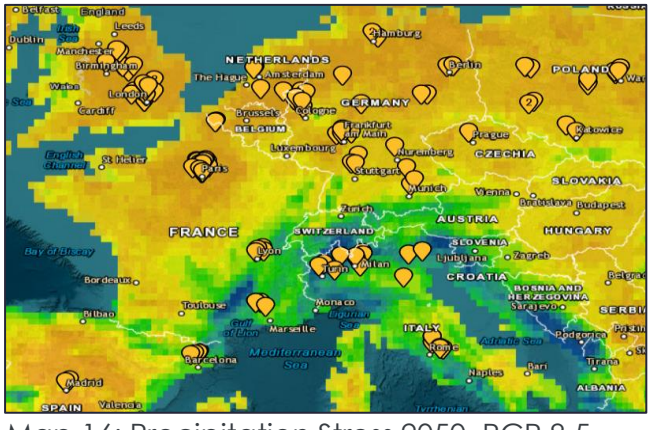
Map 13: Precipitation Stress 2030, RCP 4.5



Map 14: Precipitation Stress 2050, RCP 4.5



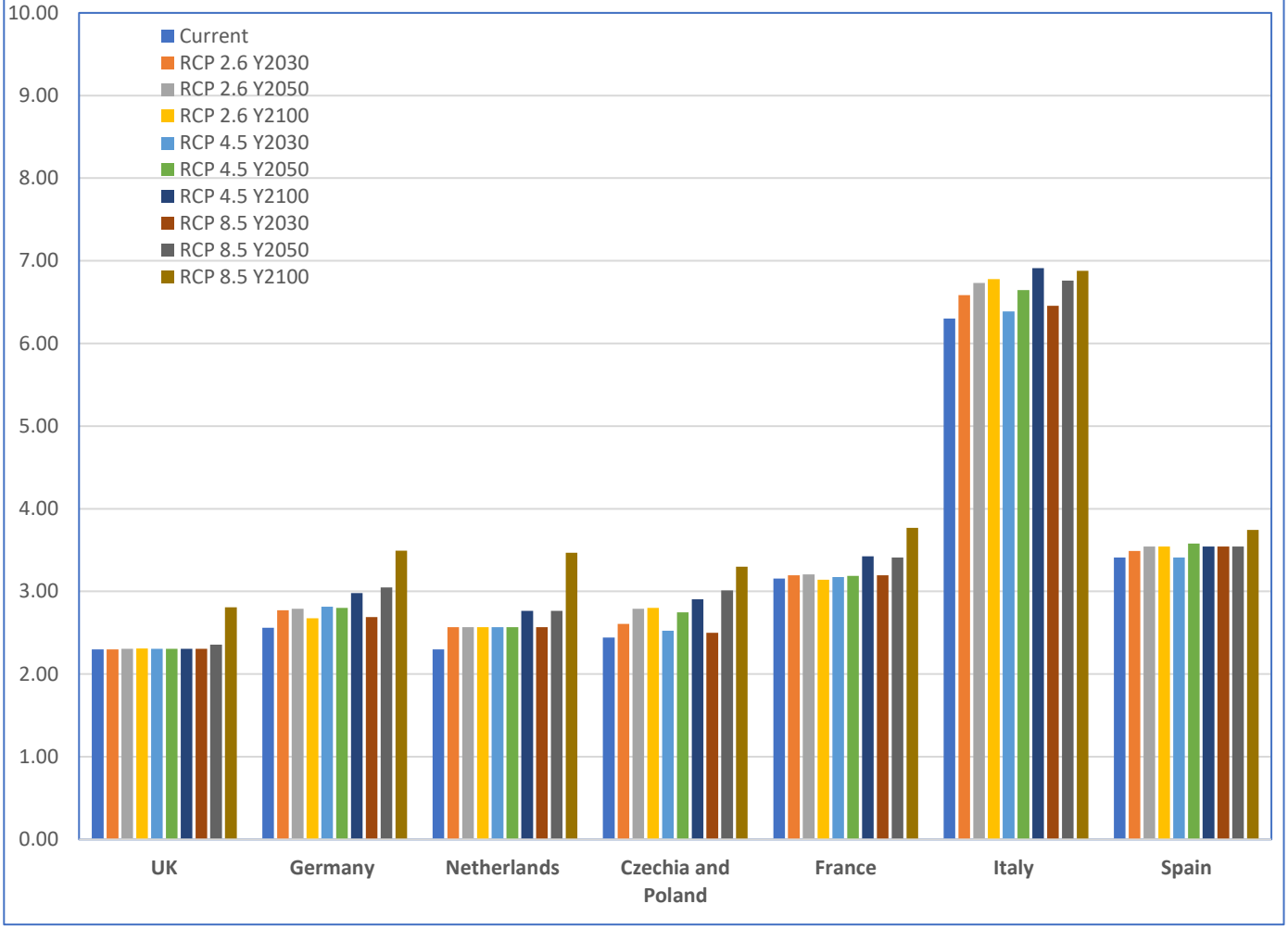
Map 15: Precipitation Stress 2030, RCP 8.5



Map 16: Precipitation Stress 2050, RCP 8.5

PRECIPITATION STRESS
ALL RCP AND TIME PERIODS, BY COUNTRY

Graph 7: Precipitation Stress. All RCP and Time Periods, By Country



Precipitation Stress	UK	Germany	The Netherlands	Czechia and Poland	France	Italy	Spain
Current	2.30	2.56	2.30	2.44	3.16	6.30	3.41
RCP 2.6 2030	2.30	2.77	2.57	2.61	3.19	6.58	3.49
RCP 2.6 2050	2.31	2.79	2.57	2.79	3.21	6.73	3.54
RCP 2.6 2100	2.31	2.68	2.57	2.80	3.14	6.78	3.54
RCP 4.5 2030	2.31	2.81	2.57	2.52	3.18	6.39	3.41
RCP 4.5 2050	2.31	2.80	2.57	2.75	3.19	6.64	3.58
RCP 4.5 2100	2.31	2.98	2.77	2.91	3.43	6.91	3.54
RCP 8.5 2030	2.31	2.69	2.57	2.50	3.19	6.46	3.54
RCP 8.5 2050	2.36	3.05	2.77	3.01	3.41	6.76	3.54
RCP 8.5 2100	2.81	3.49	3.47	3.30	3.77	6.88	3.74

HEAT STRESS

BACKGROUND

Global warming is increasing the risk of heat stress which affects humans, infrastructure, as well as ecosystems. Temperatures are rising and the intensity and frequency of heat waves are increasing.

Munich Re provides detailed information on the meteorological threat by heat stress and an integrated Heat Stress Index. Underlying heat stress parameters include Annual Maximum Temperature (Annual No. of Days above 30°C), Mean Daily Maximum Temperature (Annual No. of Days above 40°C) and Annual No. of Days in Heatwave (Annual No. of Tropical Nights).

The Heat Stress Index combines relevant information from the parameters and classifies the climatological heat stress situation on a scale ranging from 0 (very low) to 10 (very high). The parameters were chosen in accordance with scientific studies and climate extremes indices defined by the CCI/WCRP/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI), with the aim of depicting heat stress consistently, locally and globally.*

Thermal comfort within the building is not assessed as part of this analysis.

Table 12: Portfolio Scores – Heat Stress

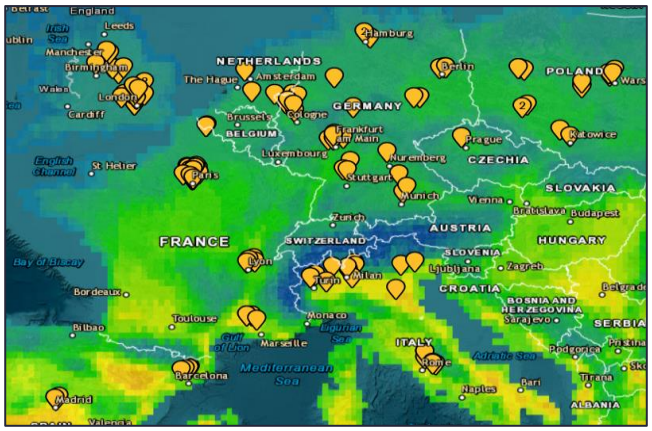
Timescale	RCP Scenario	No of sites by risk category				
		No or very Low	Low	Medium	High	Very High
Current		12	145	40	0	0
2030	2.6	0	127	66	4	0
	4.5	0	125	68	4	0
	8.5	0	129	64	4	0
2050	2.6	0	129	62	6	0
	4.5	0	115	75	7	0
	8.5	0	82	107	8	0
2100	2.6	0	155	39	3	0
	4.5	0	78	111	8	0
	8.5	0	3	161	33	0

*Munich RE Climate Change Edition Fact Sheet v. 2020/04

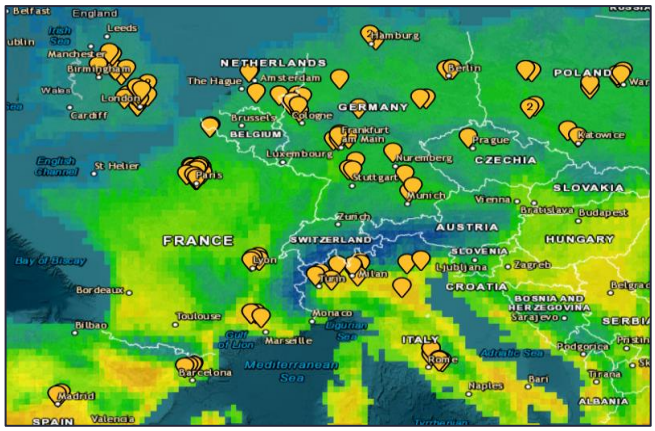
HEAT STRESS

Under all RCP scenarios and across all time periods there is a clear pattern of exposure risk to Heat Stress for the SEGRO portfolio. The more southern European assets have the highest exposure risk (Graph 8). Similarly, to Drought Stress and Fire Stress, there is higher exposure risk in Italy, France and Spain where there is more of a continental warming effect. It is worth noting that the data for Heat Stress is based on mean annual change and does not show seasonal variations or peaks such as consecutive heat wave days, which are expected to increase with climate change.

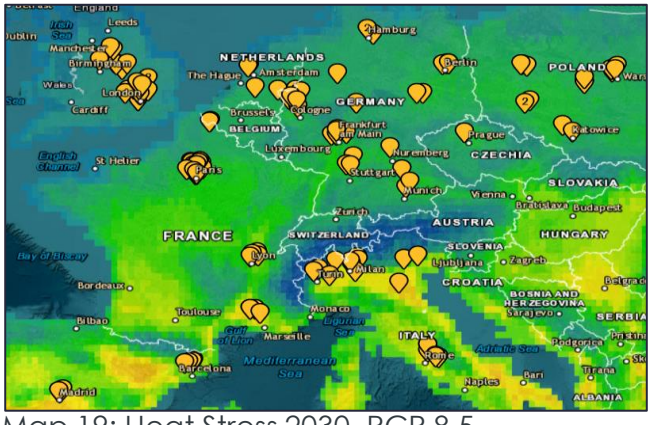
Looking at Maps 17–20, the Alpine region stands out as consistently having a lower exposure risk to Heat Stress than the rest of the modelled area, this being in line with the Precipitation Stress exposure risk in the region. However, in contrast to Precipitation Stress, Heat Stress has a very large increase from current baseline under all RCP scenarios and across all time periods. A large increase in exposure for a physical hazard like Heat Stress from current baseline may indicate some challenges in adapting to these changes – but as for other physical hazards, the adaptation investments required are not solely based on the higher exposure risk from a single physical hazard (or multiple physical hazards), but the vulnerability of the asset and its ability to cope with these changes. A vulnerability assessment to the exposure risk would allow SEGRO to understand where the most significant impacts from climate changes across their portfolio may occur – and what type, when and how much adaptation investment is required to build resilience to climate changes.



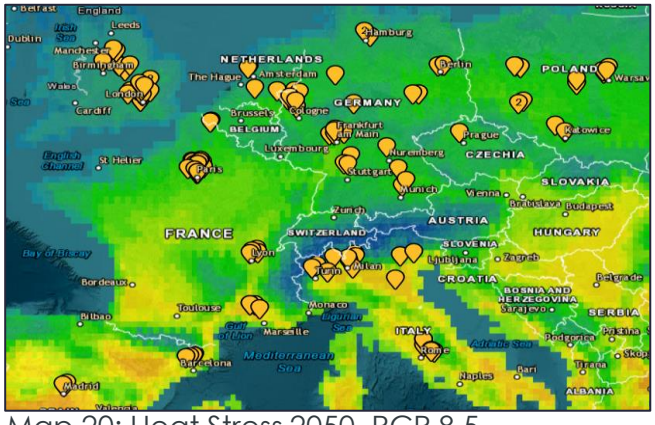
Map 17: Heat Stress 2030, RCP 4.5



Map 18: Heat Stress 2050, RCP 4.5



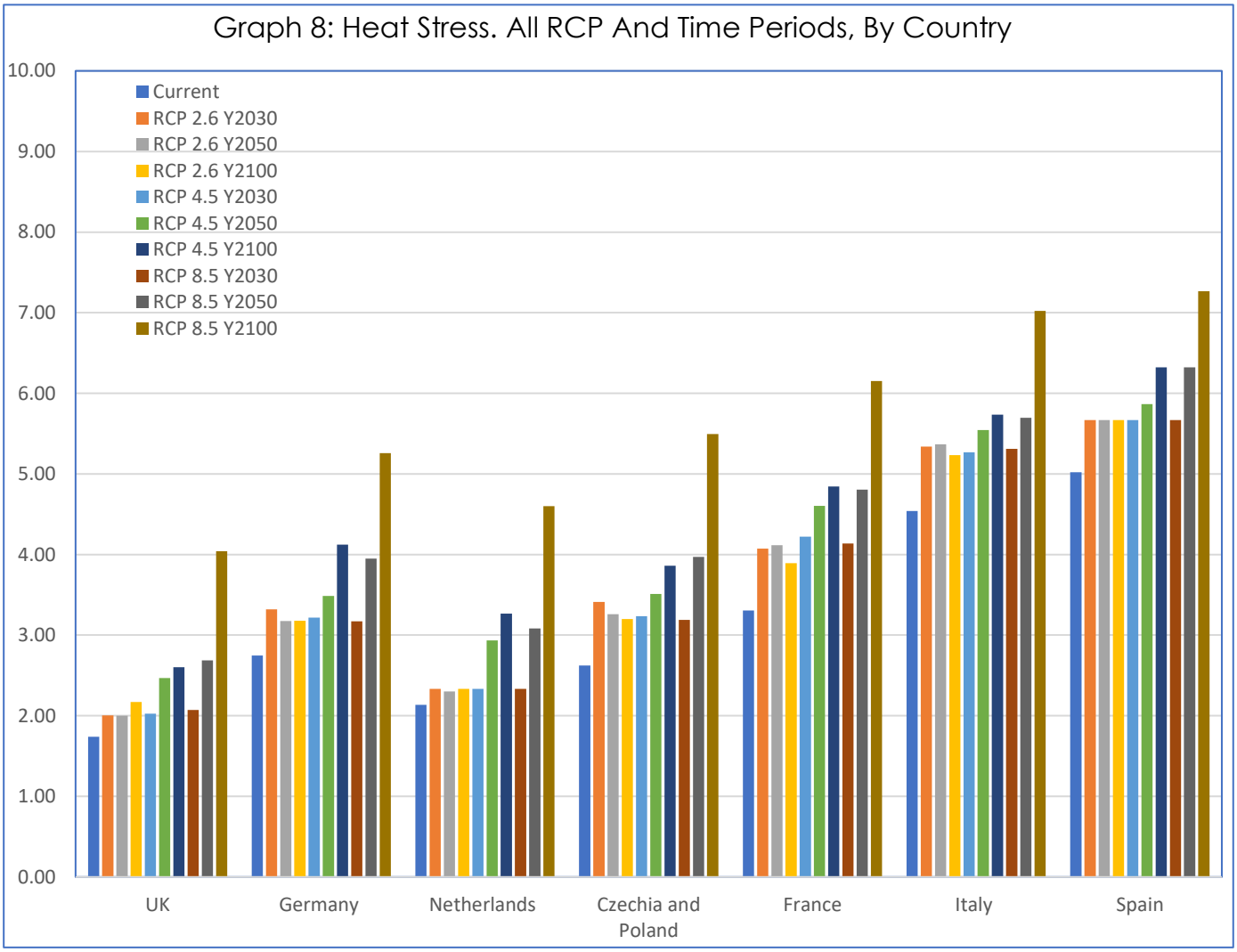
Map 19: Heat Stress 2030, RCP 8.5



Map 20: Heat Stress 2050, RCP 8.5

HEAT STRESS
ALL RCP AND TIME PERIODS, BY COUNTRY

Graph 8: Heat Stress. All RCP And Time Periods, By Country



Heat Stress	UK	Germany	The Netherlands	Czechia and Poland	France	Italy	Spain
Current	1.74	2.75	2.13	2.62	3.31	4.54	5.02
RCP 2.6 2030	2.00	3.32	2.33	3.41	4.07	5.34	5.67
RCP 2.6 2050	2.00	3.17	2.30	3.26	4.11	5.37	5.67
RCP 2.6 2100	2.17	3.18	2.33	3.20	3.89	5.23	5.67
RCP 4.5 2030	2.03	3.22	2.33	3.24	4.22	5.27	5.67
RCP 4.5 2050	2.47	3.49	2.93	3.51	4.60	5.54	5.87
RCP 4.5 2100	2.60	4.12	3.27	3.86	4.84	5.73	6.32
RCP 8.5 2030	2.07	3.17	2.33	3.19	4.14	5.31	5.67
RCP 8.5 2050	2.69	3.95	3.08	3.97	4.80	5.69	6.32
RCP 8.5 2100	4.04	5.26	4.60	5.49	6.15	7.02	7.27

FIRE WEATHER STRESS

BACKGROUND

Wildfires are a destructive hazard, which can occur naturally and be caused by humans. Fire events are often accompanied by secondary effects including erosion, landslides, impaired water quality and smoke damage.

According to the European Commission's Joint Research Centre (JRC), climate change alters the relevant meteorological conditions impacting the ignition and spread of wildfires. Munich Re provides data on the basis of fire danger, modelling detailed information on wildfire conditions as well as an integrated Fire Weather Stress Index. The Fire Weather Stress Index is based on the Fire Weather Index (FWI), which describes the climatological conditions for wildfire.

The FWI is a widely used numeric rating, combining the probability of ignition, the speed and likelihood of fire spread and the availability of fuel. The FWI is modelled on the basis of daily information about temperature, precipitation, humidity and wind. The changes for the projection periods are derived on the respective data from latest high-resolution local (CORDEX) and global (CMIP5) climate models.

The Fire Weather Stress Index combines relevant information derived from the FWI time series and classifies the fire weather stress situation on a scale ranging from 0 (very low) to 10 (very high).*

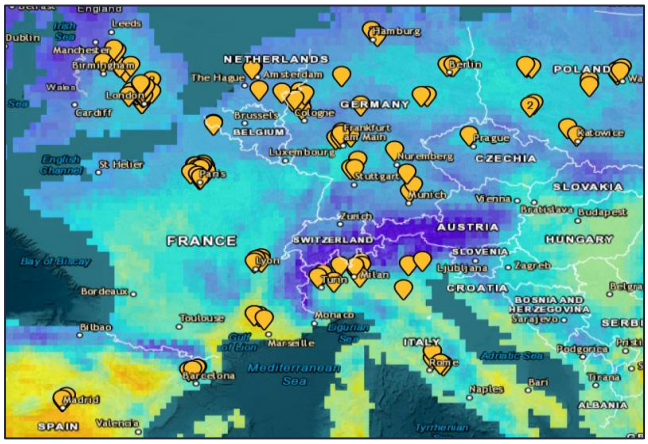
Table 13: Portfolio Scores – Fire Weather Stress

Timescale	RCP Scenario	No of sites by risk category				
		No or Very Low	Low	Medium	High	Very High
Current		7	177	6	7	0
2030	2.6	0	179	11	7	0
	4.5	0	173	16	8	0
	8.5	0	180	10	7	0
2050	2.6	2	178	10	7	0
	4.5	0	142	47	8	0
	8.5	0	159	30	8	0
2100	2.6	0	183	7	7	0
	4.5	0	142	47	8	0
	8.5	0	26	163	8	0

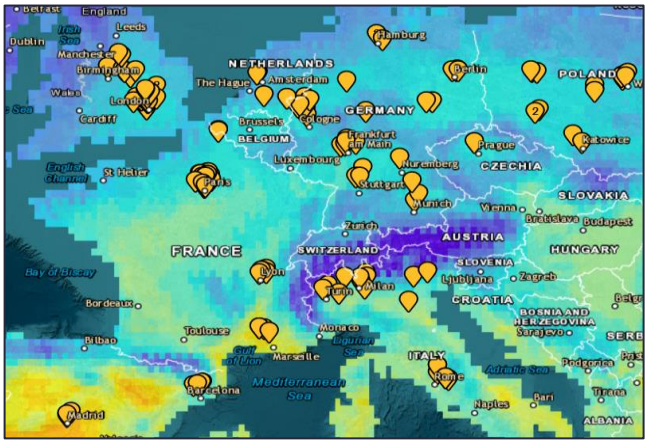
*Munich RE Climate Change Edition Fact Sheet v. 2020/04

FIRE WEATHER STRESS

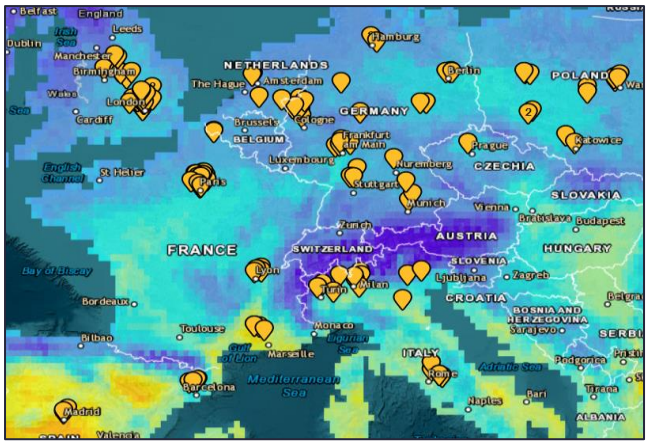
Fire Weather Stress is closely related to Drought Stress and Heat Stress, so similar geographical patterns appear on the maps. Spain, France and Italy face increasing exposure risk, with the assets in Madrid experiencing the highest exposure risk to Fire Weather Stress (Maps 21–24). The exposure risk is lower in the UK than continental Europe, mostly as a result of the higher humidity associated with being an island. Similar is true for the Netherlands, due to the large coastline and exposure to the North Sea. Germany and Czechia and Poland also face lower exposure risk due to their geographical location in Northern Europe (Graph 9). Although these countries face lower exposure risk than the more southern assets, the risk is still real as seen by the wildfires that swept the UK, Germany and Czechia in the summer of 2022. Overall, by 2050 under RCP 4.5, the portfolio's exposure risk to Fire Weather Stress increases in exposure risk average score by 42% from the current baseline, showing that the progression of the exposure risk to this hazard could be significant for the portfolio (Graph 2).



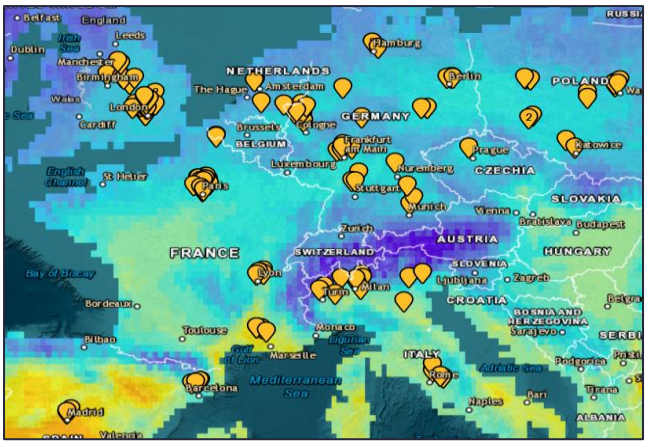
Map 21: Fire Weather Stress 2030, RCP 4.5



Map 22: Fire Weather Stress 2050, RCP 4.5



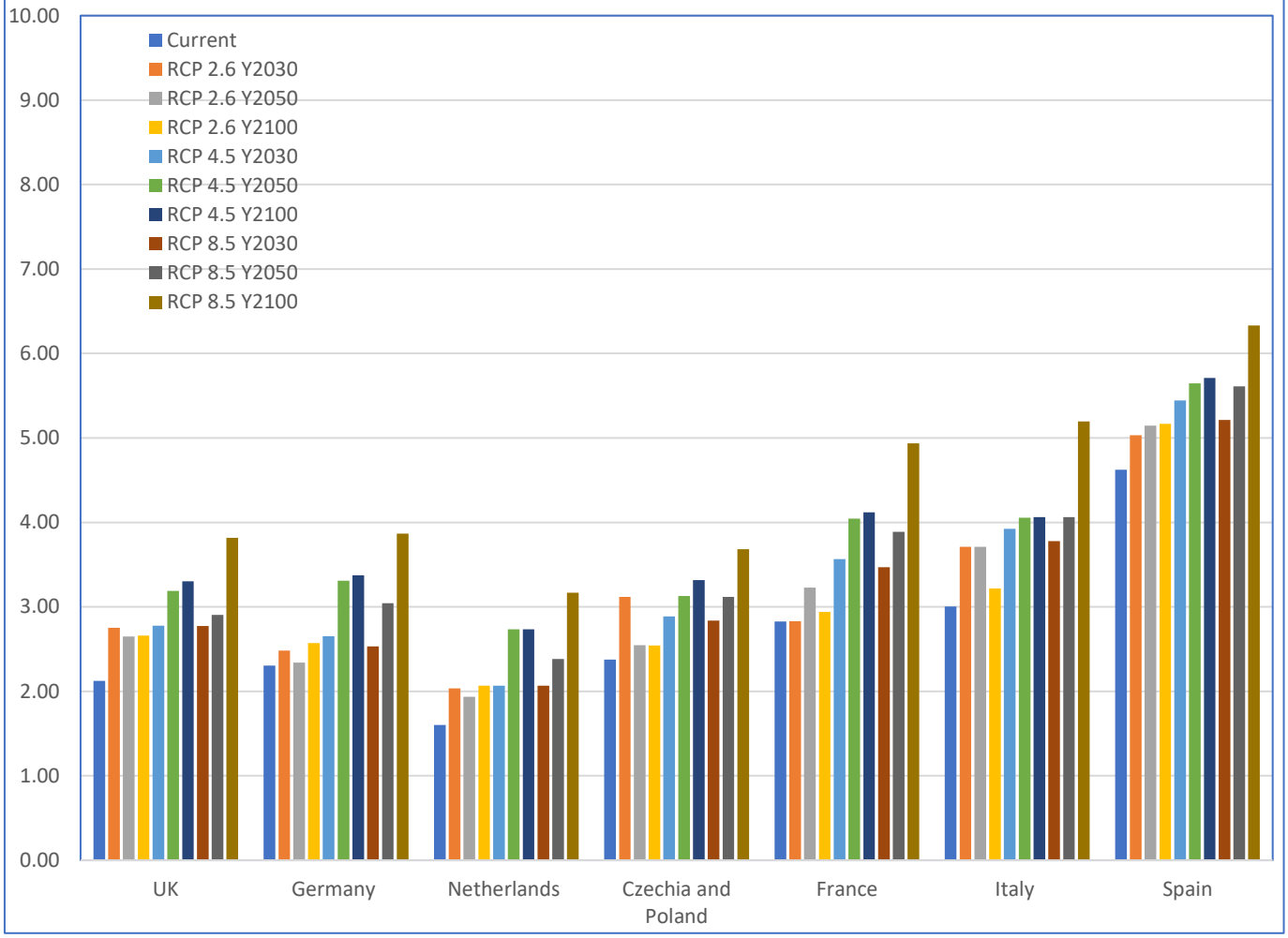
Map 23: Fire Weather Stress 2030, RCP 8.5



Map 24: Fire Weather Stress 2050, RCP 8.5

FIRE WEATHER STRESS
ALL RCP AND TIME PERIODS, BY COUNTRY

Graph 9: Fire Weather Stress. All RCP and Time Periods, By Country



Fire Weather Stress	UK	Germany	The Netherlands	Czechia and Poland	France	Italy	Spain
Current	2.12	2.31	1.60	2.38	2.82	3.01	4.62
RCP 2.6 2030	2.75	2.48	2.03	3.12	2.83	3.71	5.03
RCP 2.6 2050	2.65	2.34	1.93	2.55	3.23	3.71	5.14
RCP 2.6 2100	2.66	2.57	2.07	2.54	2.94	3.22	5.17
RCP 4.5 2030	2.78	2.65	2.07	2.89	3.56	3.92	5.44
RCP 4.5 2050	3.19	3.31	2.73	3.13	4.04	4.06	5.64
RCP 4.5 2100	3.30	3.37	2.73	3.32	4.12	4.06	5.71
RCP 8.5 2030	2.77	2.53	2.07	2.84	3.47	3.78	5.21
RCP 8.5 2050	2.90	3.04	2.38	3.12	3.89	4.06	5.61
RCP 8.5 2100	3.82	3.87	3.17	3.68	4.94	5.19	6.33

NATHAN PHYSICAL HAZARDS

ABOUT NATHAN PHYSICAL HAZARDS

NATHAN refers to the Natural Hazards Assessment Network. Munich RE dataset is based on 40 years of natural hazards experience and systematic recording of global hazard data over the past decades, to assess current weather risk associated with physical hazards.

The hazards covered in the NATHAN dataset are: Earthquake, Extratropical Storm, Flash Flood, Hail Storm Surge, Tornado, Tsunami, Tropical Cyclone, River Flood, Volcano, Lightning, Wildfire, and Soil and Shaking

Table 14: NATHAN Natural Hazards – Data Legend And Key

Natural Hazard	Resolution	Timeframes and Relevant RCP	Scale	None (0)	No/Very Low Exposure (1)	Low Exposure (2)	Medium Exposure (3)	High Exposure (4)	Very High Exposure (5)
Earthquake	10 [km]	current	Zone 0 (Mercalli scale V and below) to Zone 4 (Mercalli scale IX and above)		0	1	2	3	4
Extratropical Storm	1 [km]	current	(5 zones) un-named		-1, 0	1	2	3	4
Flash Flood	250 [m]	current	Zone 1 (low hazard) to Zone 6 (high hazard)	-999	1	2	3, 4	5	6
Hail	10 [km]	current	1 (low hazard) to 6 (high hazard)	-999	1	2	3,4	5	6
Storm Surge	30 [m]	current	Zone 100 : 100 year return period of storm surge = 1% annual flood chance, Zone 500 = 0.2% annual flood chance, Zone 1000 = 0.1% annual flood chance		-1	1000	500		100
Tornado	10 [km]	current	1 (low hazard) to 4 (high hazard)	-999	1	2		3	4
Tsunami	90 [m]	current	Zone 0 (minimal risk) to Zone 100 (year return period)		-1,0	1000	500		100
Tropical Cyclone	5 [km]	current	Zone 0 (no risk) to Zone 5 (extreme risk)		-1, 0	1	2,3	4	5
River Flood	30 [m]	current	Zone 0 (areas of minimal flood risk) Zone 500 (500 year return period) and Zone 100 (100 year return period)		0		500		100
Volcano	30 [m]	current	Zone 0: Unclassified to Zone 3: High hazard ≤ 200 years return period)		-1, 0		1, 2		3
Lightning	~800 [m]	current			1.2	3	4	5	6
Wildfire	1 [km]	current	1 (low hazard) to 4 (high hazard)		-1.1	2		3	4
Soil and shaking hazard	1 [km]	current	1 (low risk) to 6 (high risk)		1	2	3,4	5	6

NATHAN PHYSICAL HAZARDS

The majority (85%) of assets are at Medium exposure risk to Extratropical Storms, with the remaining assets in the Low exposure risk category (Table 15).

Similarly for Hail, the majority of assets (116) are in the Medium exposure risk category. However there are also 14 assets in the High exposure risk category. These are all in Italy, which corroborates the Precipitation Stress the country faces.

Flash floods pose a relatively low current risk to the portfolio, with 153 assets being in the No/Very Low to Low risk category. Those in the Medium exposure risk category are predominately in Italy and Spain, this accompanies the Heat Stress these regions face resulting in less permeable ground.

Storm Surges are predominantly not an exposure risk for the portfolio, apart from nine assets in the Very High category. These assets are split across northern Europe with three in the UK, two in Germany, and four in the Netherlands.

Table 15: NATHAN Natural Hazards – Portfolio Summary

	Portfolio Average Score (0–10 Blended Scale)	No/Very Low Exposure (1)	Low Exposure (2)	Medium Exposure (3)	High Exposure (4)	Very High Exposure (5)	Total Assets
Earthquake	1.02	178	11	8	0	0	197
Extratropical Storm	4.62	0	30	167	0	0	197
Flash Flood	3.04	2	151	44	0	0	197
Hail	4.33	0	67	116	14	0	197
Lightning	1.04	170	23	4	0	0	197
River Flood	1.48	176		8		13	197
Soil And Shaking	4.92	0	6	191	0	0	197
Storm Surge	1.15	187	1	0		9	197
Tornado	5.37	0	84		113	0	197
Tropical Cyclone	0.75	197	0	0	0	0	197
Tsunami	0.75	197	0	0		0	197
Volcanoes	0.77	196		1		0	197
Wildfire	0.95	174	23		0	0	197

04

COUNTRY SUMMARIES

UNITED KINGDOM: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

The United Kingdom is home to 64 of SEGRO's assets, accounting for 63% of the portfolio by value (as at 31 December 2022), with 53 of these assets in London, and the remaining assets spread across the rest of England with no assets in Scotland, Ireland or Wales.

The UK assets face relatively low exposure risk across the hazards compared to some of the other countries. As Table 17 shows, on average, the assets face No/Very Low exposure to Sea Level Rise across any of the RCP scenarios or timeframes. However, as this only covers exposure risk based upon geographical location to a physical hazard, with no insights into the asset vulnerability, this does not provide any indication as to whether the assets within the UK portfolio are better (or worse) adapted to current and future climate.

Table 16: UK Hazard Rating Average Scores

Physical Hazard	Examples of Potential Impact	Climate Scenario	Time Period			
			Current	2030	2050	2100
Sea Level Rise	Stranded assets / high insurance costs	2.6				0.75
		4.5				0.75
		8.5				0.75
River Flood	Significant damage and repair costs	4.5 U	1.61	1.81	1.75	1.81
		4.5 D	1.61	1.81	1.75	1.81
		8.5 U	1.61	1.75	1.81	1.81
		8.5 D	1.61	1.75	1.81	1.81
Tropical Cyclone	Extreme damage to buildings and wider in infrastructure	4.5	0.75	0.75	0.75	0.75
		8.5	0.75	0.75	0.75	0.75
Drought Stress	Soil subsidence affecting asset stability	2.6		2.31	3.45	2.42
		4.5		2.82	3.95	4.13
		8.5		3.47	4.89	5.83
Precipitation Stress	Significant damage and repair costs	2.6	2.30	2.30	2.31	2.31
		4.5		2.31	2.31	2.31
		8.5		2.31	2.36	2.81
Heat stress	Opportunity for structural deformation; energy costs due to cooling	2.6	1.74	2.00	2.00	2.17
		4.5		2.03	2.47	2.60
		8.5		2.07	2.69	4.04
Fire Weather Stress	Damage to infrastructure, damage and repair costs	2.6	2.12	2.75	2.65	2.66
		4.5		2.78	3.19	3.30
		8.5		2.77	2.90	3.82

Traffic Scores	
0–1.50	No Or Very Low
1.51–3.50	Low
3.51–6.50	Medium
6.51–8.50	High
8.51–10.00	Very High

The average scores provided in this table should be viewed in conjunction with Table 17 and the distribution of hazard scores. This enables to identify cases where individual asset risks deviate significantly from the average hazard rating.

TRAFFIC LIGHT DISTRIBUTION OF EXPOSURE RISK SCORES – UK

United Kingdom	Average	No/Very Low Exposure (1) Dark Green	Low Exposure (2) Light Green	Medium Exposure (3) Orange	High Exposure (4) Red	Very High Exposure (5) Dark Red	Total Assets
Drought Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
RCP 2.6 2030	2.31	6	58	0	0	0	64
RCP 2.6 2050	3.45	0	64	0	0	0	64
RCP 2.6 2100	2.42	4	60	0	0	0	64
RCP 4.5 2030	2.82	1	63	0	0	0	64
RCP 4.5 2050	3.95	0	3	61	0	0	64
RCP 4.5 2100	4.13	0	8	56	0	0	64
RCP 8.5 2030	3.47	0	64	0	0	0	64
RCP 8.5 2050	4.89	0	1	63	0	0	64
RCP 8.5 2100	5.83	0	0	64	0	0	64
Fire Weather Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	2.12	0	64	0	0	0	64
RCP 2.6 2030	2.75	0	64	0	0	0	64
RCP 2.6 2050	2.65	0	64	0	0	0	64
RCP 2.6 2100	2.66	0	64	0	0	0	64
RCP 4.5 2030	2.78	0	64	0	0	0	64
RCP 4.5 2050	3.19	0	64	0	0	0	64
RCP 4.5 2100	3.30	0	64	0	0	0	64
RCP 8.5 2030	2.77	0	64	0	0	0	64
RCP 8.5 2050	2.90	0	64	0	0	0	64
RCP 8.5 2100	3.82	0	6	58	0	0	64
Heat Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	1.74	12	52	0	0	0	64
RCP 2.6 2030	2.00	0	64	0	0	0	64
RCP 2.6 2050	2.00	0	64	0	0	0	64
RCP 2.6 2100	2.17	0	64	0	0	0	64
RCP 4.5 2030	2.03	0	64	0	0	0	64
RCP 4.5 2050	2.47	0	64	0	0	0	64
RCP 4.5 2100	2.60	0	64	0	0	0	64
RCP 8.5 2030	2.07	0	64	0	0	0	64
RCP 8.5 2050	2.69	0	64	0	0	0	64
RCP 8.5 2100	4.04	0	3	61	0	0	64
Precipitation Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	2.30	0	64	0	0	0	64
RCP 2.6 2030	2.30	0	64	0	0	0	64
RCP 2.6 2050	2.31	0	64	0	0	0	64
RCP 2.6 2100	2.31	0	64	0	0	0	64
RCP 4.5 2030	2.31	0	64	0	0	0	64
RCP 4.5 2050	2.31	0	64	0	0	0	64
RCP 4.5 2100	2.31	0	64	0	0	0	64
RCP 8.5 2030	2.31	0	64	0	0	0	64
RCP 8.5 2050	2.36	0	64	0	0	0	64
RCP 8.5 2100	2.81	0	63	1	0	0	64
River Flood		0		500		100	
Current Undefended	1.61	55		5		4	64
Current Defended	1.61	55		5		4	64
RCP 4.5 2030 Undefended	1.81	55		2		7	64
RCP 4.5 2030 Defended	1.81	55		2		7	64
RCP 4.5 2050 Undefended	1.75	55		3		6	64
RCP 4.5 2050 Defended	1.75	55		3		6	64
RCP 4.5 2100 Undefended	1.81	55		2		7	64
RCP 4.5 2100 Defended	1.81	55		2		7	64
RCP 8.5 2030 Undefended	1.75	55		3		6	64
RCP 8.5 2030 Defended	1.75	55		3		6	64
RCP 8.5 2050 Undefended	1.81	55		2		7	64
RCP 8.5 2050 Defended	1.81	55		2		7	64
RCP 8.5 2100 Undefended	1.81	55		2		7	64
RCP 8.5 2100 Defended	1.81	55		2		7	64
Sea Level Rise		-1.00	1.00	2.00	3.00	4.00	
RCP 2.6 2100	0.75	64	0	0	0	0	64
RCP 4.5 2100	0.75	64	0	0	0	0	64
RCP 8.5 2100	0.75	64	0	0	0	0	64
Tropical Cyclone		-1.0	1.00	2,3	4.00	5.00	
Current	0.75	64	0	0	0	0	64
RCP 4.5 2030	0.75	64	0	0	0	0	64
RCP 4.5 2050	0.75	64	0	0	0	0	64
RCP 4.5 2100	0.75	64	0	0	0	0	64
RCP 8.5 2030	0.75	64	0	0	0	0	64
RCP 8.5 2050	0.75	64	0	0	0	0	64
RCP 8.5 2100	0.75	64	0	0	0	0	64

Table 17: UK Assets – Traffic Light Distribution Of Exposure Risk Scores

UNITED KINGDOM: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

Different assets within the SEGRO portfolio, based upon their specific asset vulnerability, will be differentially impacted by the same exposure risk.

The most significant risk facing UK assets is River Flood. Of the 64 UK SEGRO assets, 55 assets remain in a No to Very Low exposure risk category under all scenarios and time periods, whilst the remaining nine are between Medium and Very High exposure risk throughout the scenarios and time frames (Table 17). Of the nine UK assets experiencing these Medium to Very High exposure risk to River Flood, eight of these assets are in London. The outcomes are the same for these assets regardless of defended / undefended.

Drought Stress, Fire Weather Stress and Heat Stress are all Low risk for SEGRO UK assets. Drought Stress only becomes a concern in 2050 when, under an RCP 4.5 scenario, 61 assets experience Medium exposure risk to Drought Stress increasing to 63 assets under an RCP 8.5 (Table 17). Fire Risk deviates from the Low exposure risk under the high concentration scenario (RCP 8.5) in 2100. At this point, 58 of the 64 assets are in the Medium exposure risk category. Heat Stress follows this trend too, with 61 assets moving to Medium exposure risk under RCP 8.5 in 2100 (Table 17). Similarly, Precipitation Stress is a Low risk for all assets under all scenarios, even in RCP 8.5 2100 only one asset moves from a Low to Medium exposure risk (Asset ID50).

It is recommended that these nine UK assets – with elevated exposure risk to Undefended/Defended River Flood exposure risk – should be focused on, with further detailed single asset studies focused on current and future River Flood exposure risk. The remaining 55 assets experience very little exposure risk to climate change physical hazards assessed, under any of the fours time periods or RCP scenarios.

GERMANY: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

Germany is home to 34 of SEGRO's assets accounting for 11% of the portfolio by value (as at 31 December 2022). These assets are spread across the entirety of Germany, including key cities of Munich, Berlin, Cologne, Frankfurt and Hamburg.

The climate change physical hazard exposure risk experienced by the German assets are, on average, Low to Medium compared to the other countries, with Germany facing slightly more exposure risk than the UK but not as much as the southern Europe countries.

Table 18: Germany Hazard Rating Average Scores

Physical Hazard	Examples of Potential Impact	Climate Scenario	Time Period			
			Current	2030	2050	2100
Sea Level Rise	Stranded assets / high insurance costs	2.6				0.95
		4.5				0.95
		8.5				0.95
River Flood	Significant damage and repair costs	4.5 U	1.50	1.63	1.63	1.63
		4.5 D	1.50	1.63	1.63	1.63
		8.5 U	1.50	1.63	1.63	1.63
		8.5 D	1.50	1.63	1.63	1.63
Tropical Cyclone	Extreme damage to buildings and wider in infrastructure	4.5	0.75	0.75	0.75	0.75
		8.5	0.75	0.75	0.75	0.75
Drought Stress	Soil subsidence affecting asset stability	2.6		3.13	2.71	3.46
		4.5		2.21	3.49	3.21
		8.5		2.12	3.60	4.76
Precipitation Stress	Significant damage and repair costs	2.6	2.56	2.77	2.79	2.68
		4.5		2.81	2.80	2.98
		8.5		2.69	3.05	3.49
Heat stress	Opportunity for structural deformation; energy costs due to cooling	2.6	2.75	3.32	3.17	3.18
		4.5		3.22	3.49	4.12
		8.5		3.17	3.95	5.26
Fire Weather Stress	Damage to infrastructure, damage and repair costs	2.6	2.31	2.48	2.34	2.57
		4.5		2.65	3.31	3.37
		8.5		2.53	3.04	3.87

Traffic Scores	
0–1.50	No Or Very Low
1.51–3.50	Low
3.51–6.50	Medium
6.51–8.50	High
8.51–10.00	Very High

The average scores provided in this table should be viewed in conjunction with Table 19 and the distribution of hazard scores. This enables to identify cases where individual asset risks deviate significantly from the average hazard rating.

TRAFFIC LIGHT DISTRIBUTION OF EXPOSURE RISK SCORES – GERMANY

Germany	Average	No/Very Low Exposure (1) Dark Green	Low Exposure (2) Light Green	Medium Exposure (3) Orange	High Exposure (4) Red	Very High Exposure (5) Dark Red	Total Assets
Drought Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
RCP 2.6 2030	3.13	4	27	3	0	0	34
RCP 2.6 2050	2.71	5	26	3	0	0	34
RCP 2.6 2100	3.46	0	26	8	0	0	34
RCP 4.5 2030	2.21	8	26	0	0	0	34
RCP 4.5 2050	3.49	0	24	10	0	0	34
RCP 4.5 2100	3.21	0	33	1	0	0	34
RCP 8.5 2030	2.12	10	24	0	0	0	34
RCP 8.5 2050	3.60	0	23	11	0	0	34
RCP 8.5 2100	4.76	0	4	30	0	0	34
Fire Weather Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	2.31	0	34	0	0	0	34
RCP 2.6 2030	2.48	0	34	0	0	0	34
RCP 2.6 2050	2.34	2	32	0	0	0	34
RCP 2.6 2100	2.57	0	34	0	0	0	34
RCP 4.5 2030	2.65	0	34	0	0	0	34
RCP 4.5 2050	3.31	0	34	0	0	0	34
RCP 4.5 2100	3.37	0	33	1	0	0	34
RCP 8.5 2030	2.53	0	34	0	0	0	34
RCP 8.5 2050	3.04	0	34	0	0	0	34
RCP 8.5 2100	3.87	0	6	28	0	0	34
Heat Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	2.75	0	34	0	0	0	34
RCP 2.6 2030	3.32	0	32	2	0	0	34
RCP 2.6 2050	3.17	0	31	3	0	0	34
RCP 2.6 2100	3.18	0	33	1	0	0	34
RCP 4.5 2030	3.22	0	34	0	0	0	34
RCP 4.5 2050	3.49	0	26	8	0	0	34
RCP 4.5 2100	4.12	0	4	30	0	0	34
RCP 8.5 2030	3.17	0	34	0	0	0	34
RCP 8.5 2050	3.95	0	9	25	0	0	34
RCP 8.5 2100	5.26	0	0	34	0	0	34
Precipitation Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	2.56	0	32	2	0	0	34
RCP 2.6 2030	2.77	0	32	2	0	0	34
RCP 2.6 2050	2.79	0	32	2	0	0	34
RCP 2.6 2100	2.68	0	32	2	0	0	34
RCP 4.5 2030	2.81	0	32	2	0	0	34
RCP 4.5 2050	2.80	0	32	2	0	0	34
RCP 4.5 2100	2.98	0	32	2	0	0	34
RCP 8.5 2030	2.69	0	32	2	0	0	34
RCP 8.5 2050	3.05	0	30	4	0	0	34
RCP 8.5 2100	3.49	0	22	12	0	0	34
River Flood		0		500		100	
Current Undefended	1.50	30		2		2	34
Current Defended	1.50	30		2		2	34
RCP 4.5 2030 Undefended	1.63	30		1		3	34
RCP 4.5 2030 Defended	1.63	30		1		3	34
RCP 4.5 2050 Undefended	1.63	30		1		3	34
RCP 4.5 2050 Defended	1.63	30		1		3	34
RCP 4.5 2100 Undefended	1.63	30		1		3	34
RCP 4.5 2100 Defended	1.63	30		1		3	34
RCP 8.5 2030 Undefended	1.63	30		1		3	34
RCP 8.5 2030 Defended	1.63	30		1		3	34
RCP 8.5 2050 Undefended	1.63	30		1		3	34
RCP 8.5 2050 Defended	1.63	30		1		3	34
RCP 8.5 2100 Undefended	1.63	30		1		3	34
RCP 8.5 2100 Defended	1.63	30		1		3	34
Sea Level Rise		-1.00	1.00	2.00	3.00	4.00	
RCP 2.6 2100	0.95	33	0	0	1	0	34
RCP 4.5 2100	0.95	33	0	0	1	0	34
RCP 8.5 2100	0.95	33	0	0	1	0	34
Tropical Cyclone		-1,0	1.00	2,3	4.00	5.00	
Current	0.75	34	0	0	0	0	34
RCP 4.5 2030	0.75	34	0	0	0	0	34
RCP 4.5 2050	0.75	34	0	0	0	0	34
RCP 4.5 2100	0.75	34	0	0	0	0	34
RCP 8.5 2030	0.75	34	0	0	0	0	34
RCP 8.5 2050	0.75	34	0	0	0	0	34
RCP 8.5 2100	0.75	34	0	0	0	0	34

Table 19: Germany Assets – Traffic Light Distribution Of Exposure Risk Scores

GERMANY: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

Sea Level Rise is a High exposure risk for one of the assets in Hamburg (Asset ID68). The Sea Level Rise data is only available for the 2100 time period – so understanding the exposure risk between current baseline and 2100 is difficult to predict – as is the impact on the asset due to its specific vulnerability or resilience.

For River Flood, there are four assets in Germany that are between Medium and High exposure risk under all scenarios and time periods, including current time period. These are Asset ID72 (High), Asset ID81 (Medium), Asset ID92 (High) and Asset ID85 (which moves from Medium exposure risk to Very High from 4.5 2030). Attention should be given to the named assets above where the hazard risk is likely to affect them in 2030 and 2050. Specifically, River Flood is the highest exposure risk to SEGRO assets in Germany, and detailed vulnerability assessments are therefore recommended to understand how this exposure risk might be translated into asset impact.

For Drought Stress, the average score remains in a Low category until RCP 8.5 in 2050 and 2100. There are several assets in the Medium exposure risk category (Table 19). This starts with three assets under RCP 2.6 in 2030, increasing slowly to 11 under RCP 8.5 in 2050, before jumping to 30 assets under RCP 8.5 in 2100.

Precipitation Stress is a Low average exposure risk for SEGRO assets in Germany across all RCP scenarios and time periods assessed, with two assets in the Medium risk category: Asset ID85 and Asset ID89. Further assessment at the specific asset level to establish the detailed Precipitation Stress exposure risk is recommended.

Heat Stress is also a Low exposure risk physical hazard. **There are three scenarios where the average heat stress exposure risk score is in the Medium exposure risk category: RCP 4.5 in 2100, RCP 8.5 in 2050 and RCP 8.5 in 2100.** In 2030 there are two assets with an elevated exposure risk – Asset ID90 and Asset ID92 – which are in the Medium exposure risk category under RCP 2.6 (Table 19). Further studies should be undertaken to understand the asset vulnerability to the Heat Stress exposure risk at these two sites, to better understand the impact that Heat Stress will have on the individual assets – two assets with different asset vulnerability to Heat Stress will be impacted differently and therefore experience different Heat Stress impacts. Single asset assessments can identify appropriate adaptation measures to reduce asset vulnerability to Heat Stress and build asset resilience to Heat Stress. The identification of High to Very High asset exposure to Heat Stress provides an indication of the potential for Heat Stress impacts to be experienced by the asset – but specific asset vulnerability assessment would identify the most appropriate adaptation and resilience measures.

Fire Weather Stress remains a Low exposure risk to the SEGRO assets in Germany until RCP 8.5 in 2100, apart from one asset (Asset ID86), which is a Medium exposure risk under RCP 4.5 in 2100 (Table 19). Short to medium term Fire Weather Stress risks across the German asset portfolio are generally low.

THE NETHERLANDS: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

The Netherlands is home to six of SEGRO's assets, accounting for 1% of the portfolio value (as at 31 December 2022). These assets are primarily located in Amsterdam, with one asset near the German border.

Sea Level Rise is a High exposure risk for the Netherlands portfolio. Under RCP 2.6 in 2100, four assets in the Netherlands are in the High exposure risk category and one in the Very High exposure risk category. Under RCPs 4.5 and 8.5 in 2100, five assets are in the Very High exposure category. These assets are outlined in Table 7, with Asset ID104 the only asset at No to Very Low exposure risk.

Table 20: The Netherlands Hazard Rating Average Scores

Physical Hazard	Examples of Potential Impact	Climate Scenario	Time Period			
			Current	2030	2050	2100
Sea Level Rise	Stranded assets / high insurance costs	2.6				6.67
		4.5				7.83
		8.5				7.83
River Flood	Significant damage and repair costs	4.5 U	2.17	2.17	2.17	2.17
		4.5 D	0.75	0.75	0.75	0.75
		8.5 U	2.17	2.17	2.17	2.17
		8.5 D	0.75	0.75	0.75	0.75
Tropical Cyclone	Extreme damage to buildings and wider in infrastructure	4.5	0.75	0.75	0.75	0.75
		8.5	0.75	0.75	0.75	0.75
Drought Stress	Soil subsidence affecting asset stability	2.6		1.67	2.08	2.50
		4.5		0.67	2.00	2.33
		8.5		1.67	2.33	4.25
Precipitation Stress	Significant damage and repair costs	2.6	2.30	2.57	2.57	2.57
		4.5		2.57	2.57	2.77
		8.5		2.57	2.77	3.47
Heat stress	Opportunity for structural deformation; energy costs due to cooling	2.6	2.13	2.33	2.30	2.33
		4.5		2.33	2.93	3.27
		8.5		2.33	3.08	4.60
Fire Weather Stress	Damage to infrastructure, damage and repair costs	2.6	1.60	2.03	1.93	2.07
		4.5		2.07	2.73	2.73
		8.5		2.07	2.38	3.17

Traffic Scores	
0–1.50	No Or Very Low
1.51–3.50	Low
3.51–6.50	Medium
6.51–8.50	High
8.51–10.00	Very High

The average scores provided in this table should be viewed in conjunction with Table 21 and the distribution of hazard scores. This enables to identify cases where individual asset risks deviate significantly from the average hazard rating.

TRAFFIC LIGHT DISTRIBUTION OF EXPOSURE RISK SCORES – THE NETHERLANDS

The Netherlands	Average	No/Very Low Exposure (1) Dark Green	Low Exposure (2) Light Green	Medium Exposure (3) Orange	High Exposure (4) Red	Very High Exposure (5) Dark Red	Total Assets
Drought Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
RCP 2.6 2030	1.67	5	1	0	0	0	6
RCP 2.6 2050	2.08	4	2	0	0	0	6
RCP 2.6 2100	2.50	0	6	0	0	0	6
RCP 4.5 2030	0.67	6	0	0	0	0	6
RCP 4.5 2050	2.00	4	2	0	0	0	6
RCP 4.5 2100	2.33	0	6	0	0	0	6
RCP 8.5 2030	1.67	4	2	0	0	0	6
RCP 8.5 2050	2.33	0	6	0	0	0	6
RCP 8.5 2100	4.25	0	0	6	0	0	6
Fire Weather Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	1.60	4	2	0	0	0	6
RCP 2.6 2030	2.03	0	6	0	0	0	6
RCP 2.6 2050	1.93	0	6	0	0	0	6
RCP 2.6 2100	2.07	0	6	0	0	0	6
RCP 4.5 2030	2.07	0	6	0	0	0	6
RCP 4.5 2050	2.73	0	6	0	0	0	6
RCP 4.5 2100	2.73	0	6	0	0	0	6
RCP 8.5 2030	2.07	0	6	0	0	0	6
RCP 8.5 2050	2.38	0	6	0	0	0	6
RCP 8.5 2100	3.17	0	6	0	0	0	6
Heat Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	2.13	0	6	0	0	0	6
RCP 2.6 2030	2.33	0	6	0	0	0	6
RCP 2.6 2050	2.30	0	6	0	0	0	6
RCP 2.6 2100	2.33	0	6	0	0	0	6
RCP 4.5 2030	2.33	0	6	0	0	0	6
RCP 4.5 2050	2.93	0	6	0	0	0	6
RCP 4.5 2100	3.27	0	4	2	0	0	6
RCP 8.5 2030	2.33	0	6	0	0	0	6
RCP 8.5 2050	3.08	0	5	1	0	0	6
RCP 8.5 2100	4.60	0	0	6	0	0	6
Precipitation Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	2.30	0	6	0	0	0	6
RCP 2.6 2030	2.57	0	6	0	0	0	6
RCP 2.6 2050	2.57	0	6	0	0	0	6
RCP 2.6 2100	2.57	0	6	0	0	0	6
RCP 4.5 2030	2.57	0	6	0	0	0	6
RCP 4.5 2050	2.57	0	6	0	0	0	6
RCP 4.5 2100	2.77	0	6	0	0	0	6
RCP 8.5 2030	2.57	0	6	0	0	0	6
RCP 8.5 2050	2.77	0	6	0	0	0	6
RCP 8.5 2100	3.47	0	2	4	0	0	6
River Flood		0		500		100	
Current Undefended	2.17	5		0		1	6
Current Defended	0.75	6		0		0	6
RCP 4.5 2030 Undefended	2.17	5		0		1	6
RCP 4.5 2030 Defended	0.75	6		0		0	6
RCP 4.5 2050 Undefended	2.17	5		0		1	6
RCP 4.5 2050 Defended	0.75	6		0		0	6
RCP 4.5 2100 Undefended	2.17	5		0		1	6
RCP 4.5 2100 Defended	0.75	6		0		0	6
RCP 8.5 2030 Undefended	2.17	5		0		1	6
RCP 8.5 2030 Defended	0.75	6		0		0	6
RCP 8.5 2050 Undefended	2.17	5		0		1	6
RCP 8.5 2050 Defended	0.75	6		0		0	6
RCP 8.5 2100 Undefended	2.17	5		0		1	6
RCP 8.5 2100 Defended	0.75	6		0		0	6
Sea Level Rise		-1.00	1.00	2.00	3.00	4.00	
RCP 2.6 2100	6.67	1	0	0	4	1	6
RCP 4.5 2100	7.83	1	0	0	0	5	6
RCP 8.5 2100	7.83	1	0	0	0	5	6
Tropical Cyclone		-1,0	1.00	2,3	4.00	5.00	
Current	0.75	6	0	0	0	0	6
RCP 4.5 2030	0.75	6	0	0	0	0	6
RCP 4.5 2050	0.75	6	0	0	0	0	6
RCP 4.5 2100	0.75	6	0	0	0	0	6
RCP 8.5 2030	0.75	6	0	0	0	0	6
RCP 8.5 2050	0.75	6	0	0	0	0	6
RCP 8.5 2100	0.75	6	0	0	0	0	6

Table 21: The Netherlands Assets – Traffic Light Distribution Of Exposure Risk Scores

THE NETHERLANDS: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

Other physical hazard exposure risks faced by the Netherlands are generally Low, especially when compared to the southern European countries.

Despite the evidence of an increase of River Flood average exposure risk in the maps (3–6), River Flood remains a Low exposure risk under all RCP scenarios and time periods. **One asset in an Undefended scenario remains at Very High exposure risk – Asset ID102.** The Defended River Flood risk is Low but attention should be given to ensure River Flood Defence measures are in place and effective over time.

For Drought Stress, the average score remains at a Low category until RCP 8.5 in 2100, when all six assets move from Low exposure risk to Medium (Table 21). Fire Weather Stress remains Low under all scenarios (Table 21). Heat Stress is a Low exposure risk until RCP 8.5 in 2100, but there are two assets in the Medium exposure risk category under RCP 4.5 in 2100 (Asset ID103 and Asset ID104), and one under RCP 8.5 in 2050 (Asset ID104).

The overall Low exposure risk of Drought Stress, Fire Weather Stress and Heat Stress can be explained by the location of these assets being predominately (five of the six) in Amsterdam, which is on a natural, low-lying peninsular in the North Sea. The one non-coastal/inland asset (Asset ID104) has the highest exposure risk to these stresses out of the six assets, yet this is still a low risk.

Precipitation Stress remains a Low exposure risk for SEGRO assets in the Netherlands under all scenarios and time periods (Table 21). There are four assets in the Medium exposure risk category under RCP 8.5 in 2100: Asset ID99, Asset ID100, Asset ID101 and Asset ID102.

Overall, the most significant risk facing SEGRO's assets in the Netherlands is Sea Level Rise, given the low-lying coastal nature of these assets this is unsurprising. The Undefended River Flood exposure risk is known to be High to Very High – but high-quality Standard of Protection (SoP) River Flood Defences reduces the High to Very High Undefended exposure risk to No or Very Low Defended exposure risk scores. This is a well-known example of adaptation to current baseline River Flood exposure risk, with the SoP Defences sufficient to cope with any increase in Undefended River Flood exposure into future time periods and under different RCP concentration scenarios.

CZECHIA AND POLAND: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

The assets in Czechia and Poland, account for 5% of the portfolio value (as at 31 December 2022). There are 16 in Poland, and one in Czechia, located in Prague.

SEGRO assets in Czechia (1) and Poland (16) experience relatively low average exposure risks across the seven physical hazards compared to some of the other countries.

Table 22: Czechia And Poland Hazard Rating Average Scores

Physical Hazard	Examples of Potential Impact	Climate Scenario	Time Period			
			Current	2030	2050	2100
Sea Level Rise	Stranded assets / high insurance costs	2.6				0.75
		4.5				0.75
		8.5				0.75
River Flood	Significant damage and repair costs	4.5 U	2.00	2.00	2.00	2.00
		4.5 D	2.00	2.00	2.00	2.00
		8.5 U	2.00	2.25	2.25	2.00
		8.5 D	2.00	2.25	2.25	2.00
Tropical Cyclone	Extreme damage to buildings and wider in infrastructure	4.5	0.75	0.75	0.75	0.75
		8.5	0.75	0.75	0.75	0.75
Drought Stress	Soil subsidence affecting asset stability	2.6		2.97	1.97	1.38
		4.5		2.15	1.85	2.06
		8.5		2.41	3.50	3.82
Precipitation Stress	Significant damage and repair costs	2.6	2.44	2.61	2.79	2.80
		4.5		2.52	2.75	2.91
		8.5		2.50	3.01	3.30
Heat stress	Opportunity for structural deformation; energy costs due to cooling	2.6	2.62	3.41	3.26	3.20
		4.5		3.24	3.51	3.86
		8.5		3.19	3.97	5.49
Fire Weather Stress	Damage to infrastructure, damage and repair costs	2.6	2.38	3.12	2.55	2.54
		4.5		2.89	3.13	3.32
		8.5		2.84	3.12	3.68

Traffic Scores	
0–1.50	No Or Very Low
1.51–3.50	Low
3.51–6.50	Medium
6.51–8.50	High
8.51–10.00	Very High

The average scores provided in this table should be viewed in conjunction with Table 23 and the distribution of hazard scores. This enables to identify cases where individual asset risks deviate significantly from the average hazard rating.

TRAFFIC LIGHT DISTRIBUTION OF EXPOSURE RISK SCORES – CZECHIA AND POLAND

Czechia and Poland	Average	No/Very Low Exposure (1) Dark Green	Low Exposure (2) Light Green	Medium Exposure (3) Orange	High Exposure (4) Red	Very High Exposure (5) Dark Red	Total Assets
Drought Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
RCP 2.6 2030	2.97	0	16	1	0	0	17
RCP 2.6 2050	1.97	3	14	0	0	0	17
RCP 2.6 2100	1.38	12	5	0	0	0	17
RCP 4.5 2030	2.15	4	12	1	0	0	17
RCP 4.5 2050	1.85	6	11	0	0	0	17
RCP 4.5 2100	2.06	5	12	0	0	0	17
RCP 8.5 2030	2.41	3	14	0	0	0	17
RCP 8.5 2050	3.50	0	12	5	0	0	17
RCP 8.5 2100	3.82	0	9	8	0	0	17
Fire Weather Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	2.38	0	17	0	0	0	17
RCP 2.6 2030	3.12	0	17	0	0	0	17
RCP 2.6 2050	2.55	0	17	0	0	0	17
RCP 2.6 2100	2.54	0	17	0	0	0	17
RCP 4.5 2030	2.89	0	17	0	0	0	17
RCP 4.5 2050	3.13	0	17	0	0	0	17
RCP 4.5 2100	3.32	0	17	0	0	0	17
RCP 8.5 2030	2.84	0	17	0	0	0	17
RCP 8.5 2050	3.12	0	17	0	0	0	17
RCP 8.5 2100	3.68	0	8	9	0	0	17
Heat Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	2.62	0	17	0	0	0	17
RCP 2.6 2030	3.41	0	17	0	0	0	17
RCP 2.6 2050	3.26	0	17	0	0	0	17
RCP 2.6 2100	3.20	0	17	0	0	0	17
RCP 4.5 2030	3.24	0	17	0	0	0	17
RCP 4.5 2050	3.51	0	16	1	0	0	17
RCP 4.5 2100	3.86	0	6	11	0	0	17
RCP 8.5 2030	3.19	0	17	0	0	0	17
RCP 8.5 2050	3.97	0	1	16	0	0	17
RCP 8.5 2100	5.49	0	0	17	0	0	17
Precipitation Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	2.44	0	17	0	0	0	17
RCP 2.6 2030	2.61	0	17	0	0	0	17
RCP 2.6 2050	2.79	0	15	2	0	0	17
RCP 2.6 2100	2.80	0	15	2	0	0	17
RCP 4.5 2030	2.52	0	17	0	0	0	17
RCP 4.5 2050	2.75	0	16	1	0	0	17
RCP 4.5 2100	2.91	0	15	2	0	0	17
RCP 8.5 2030	2.50	0	17	0	0	0	17
RCP 8.5 2050	3.01	0	15	2	0	0	17
RCP 8.5 2100	3.30	0	14	3	0	0	17
River Flood		0		500		100	
Current Undefended	2.00	14		1		2	17
Current Defended	2.00	14		1		2	17
RCP 4.5 2030 Undefended	2.00	14		1		2	17
RCP 4.5 2030 Defended	2.00	14		1		2	17
RCP 4.5 2050 Undefended	2.00	14		1		2	17
RCP 4.5 2050 Defended	2.00	14		1		2	17
RCP 4.5 2100 Undefended	2.00	14		1		2	17
RCP 4.5 2100 Defended	2.00	14		1		2	17
RCP 8.5 2030 Undefended	2.25	14		0		3	17
RCP 8.5 2030 Defended	2.25	14		0		3	17
RCP 8.5 2050 Undefended	2.25	14		0		3	17
RCP 8.5 2050 Defended	2.25	14		0		3	17
RCP 8.5 2100 Undefended	2.00	14		1		2	17
RCP 8.5 2100 Defended	2.00	14		1		2	17
Sea Level Rise		-1.00	1.00	2.00	3.00	4.00	
RCP 2.6 2100	0.75	17	0	0	0	0	17
RCP 4.5 2100	0.75	17	0	0	0	0	17
RCP 8.5 2100	0.75	17	0	0	0	0	17
Tropical Cyclone		-1,0	1.00	2,3	4.00	5.00	
Current	0.75	17	0	0	0	0	17
RCP 4.5 2030	0.75	17	0	0	0	0	17
RCP 4.5 2050	0.75	17	0	0	0	0	17
RCP 4.5 2100	0.75	17	0	0	0	0	17
RCP 8.5 2030	0.75	17	0	0	0	0	17
RCP 8.5 2050	0.75	17	0	0	0	0	17
RCP 8.5 2100	0.75	17	0	0	0	0	17

Table 23: Czechia And Poland Assets – Traffic Light Distribution Of Exposure Risk Scores

CZECHIA AND POLAND: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

The assets show No or Very Low exposure risk to Sea Level Rise across any of the RCP scenarios or time periods assessed. This is due to the inland position of the assets in this region.

Precipitation Stress and River Flood remain a Low average exposure risk across all RCPs and time period scenarios. **There are two assets frequently in the Medium exposure risk category from 2050 and 2100 scenarios (Asset ID106 and Asset ID113)**, apart from in RCP 4.5 2050 when this is just Asset ID106. Asset ID108 is also Medium exposure risk for Precipitation Stress exposure risk under RCP 8.5 in 2100. The overall Precipitation Stress exposure risk remains Low for the 17 assets in this region.

River Flood risk remains an overall Low exposure risk throughout all scenarios with one asset (Asset ID120) in the Medium exposure under all scenarios, other than RCP 8.5 2030 and 2050. **There are also two assets which have High exposure flood risk throughout all scenarios, Asset ID116 and Asset ID117.**

Drought and Fire Weather Stress are both Low exposure risk for the Czechia and Poland assets. Drought only becomes a Medium exposure risk under RCP 8.5 in 2100, when eight assets move from Low to Medium exposure risk (Table 23). There is one asset facing Medium exposure risk under RCP 2.6 in 2030 (Asset ID112) and one under RCP 4.5 in 2030 (Asset ID105). Five assets in this region increase to Medium exposure risk under RCP 8.5 2050. Fire Weather Stress remains a Low exposure risk for all assets until under RCP 8.5 in 2100, where nine assets move from Low to Medium exposure risk.

Heat Stress is a slightly higher exposure risk than Drought Stress and Fire Weather Stress. Under RCP 4.5 in 2050, one asset is in Medium exposure risk (Asset ID115), under RCP 4.5 in 2100 11 assets are in the Medium exposure risk, RCP 8.5 2050 there are 16 and under RCP 8.5 in 2100 all assets are in the Medium exposure risk category (Table 23).

FRANCE: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

There are 49 assets in France from SEGRO's European portfolio, this accounting for 12% of the portfolio value (as at 31 December 2022). These are split across Paris, Lyon and Marseille. The assets in Paris are exposed to quite different hazards than those in Lyon and Marseille. The Lyon assets are more comparable with the Italian alpine (Turin) assets.

France faces more elevated average exposure risk across multiple physical hazards than some other countries. **Drought Stress, Fire Weather Stress and Heat Stress are the physical hazards to which the SEGRO assets in France have the highest exposure risk.** Precipitation Stress, River Flood and Sea Level Rise are all Low exposure risk for SEGRO assets in France.

Table 24: France Hazard Rating Average Scores

Physical Hazard	Examples of Potential Impact	Climate Scenario	Time Period			
			Current	2030	2050	2100
Sea Level Rise	Stranded assets / high insurance costs	2.6				0.75
		4.5				0.75
		8.5				0.75
River Flood	Significant damage and repair costs	4.5 U	1.27	1.27	1.27	1.27
		4.5 D	1.27	1.27	1.27	1.27
		8.5 U	1.27	1.27	1.27	1.27
		8.5 D	1.27	1.27	1.27	1.27
Tropical Cyclone	Extreme damage to buildings and wider in infrastructure	4.5	0.75	0.75	0.75	0.75
		8.5	0.75	0.75	0.75	0.75
Drought Stress	Soil subsidence affecting asset stability	2.6		3.20	4.67	3.47
		4.5		3.45	5.20	4.95
		8.5		4.26	5.02	7.59
Precipitation Stress	Significant damage and repair costs	2.6	3.16	3.19	3.21	3.14
		4.5		3.18	3.19	3.43
		8.5		3.19	3.41	3.77
Heat stress	Opportunity for structural deformation; energy costs due to cooling	2.6	3.31	4.07	4.11	3.89
		4.5		4.22	4.60	4.84
		8.5		4.14	4.80	6.15
Fire Weather Stress	Damage to infrastructure, damage and repair costs	2.6	2.82	2.83	3.23	2.94
		4.5		3.56	4.04	4.12
		8.5		3.47	3.89	4.94

Traffic Scores	
0–1.50	No Or Very Low
1.51–3.50	Low
3.51–6.50	Medium
6.51–8.50	High
8.51–10.00	Very High

The average scores provided in this table should be viewed in conjunction with Table 25 and the distribution of hazard scores. This enables to identify cases where individual asset risks deviate significantly from the average hazard rating.

TRAFFIC LIGHT DISTRIBUTION OF EXPOSURE RISK SCORES – FRANCE

France	Average	No/Very Low Exposure (1) Dark Green	Low Exposure (2) Light Green	Medium Exposure (3) Orange	High Exposure (4) Red	Very High Exposure (5) Dark Red	Total Assets
Drought Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
RCP 2.6 2030	3.20	2	39	8	0	0	49
RCP 2.6 2050	4.67	0	12	37	0	0	49
RCP 2.6 2100	3.47	1	38	10	0	0	49
RCP 4.5 2030	3.45	0	42	7	0	0	49
RCP 4.5 2050	5.20	0	2	47	0	0	49
RCP 4.5 2100	4.95	0	2	47	0	0	49
RCP 8.5 2030	4.26	0	11	38	0	0	49
RCP 8.5 2050	5.02	0	2	47	0	0	49
RCP 8.5 2100	7.59	0	0	2	43	4	49
Fire Weather Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	2.82	2	43	1	3	0	49
RCP 2.6 2030	2.83	0	45	1	3	0	49
RCP 2.6 2050	3.23	0	45	1	3	0	49
RCP 2.6 2100	2.94	0	45	1	3	0	49
RCP 4.5 2030	3.56	0	44	1	4	0	49
RCP 4.5 2050	4.04	0	17	28	4	0	49
RCP 4.5 2100	4.12	0	18	27	4	0	49
RCP 8.5 2030	3.47	0	45	1	3	0	49
RCP 8.5 2050	3.89	0	31	14	4	0	49
RCP 8.5 2100	4.94	0	0	45	4	0	49
Heat Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	3.31	0	35	14	0	0	49
RCP 2.6 2030	4.07	0	7	42	0	0	49
RCP 2.6 2050	4.11	0	10	37	2	0	49
RCP 2.6 2100	3.89	0	34	15	0	0	49
RCP 4.5 2030	4.22	0	3	46	0	0	49
RCP 4.5 2050	4.60	0	2	45	2	0	49
RCP 4.5 2100	4.84	0	0	46	3	0	49
RCP 8.5 2030	4.14	0	7	42	0	0	49
RCP 8.5 2050	4.80	0	2	44	3	0	49
RCP 8.5 2100	6.15	0	0	36	13	0	49
Precipitation Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	3.16	0	35	14	0	0	49
RCP 2.6 2030	3.19	0	35	14	0	0	49
RCP 2.6 2050	3.21	0	35	14	0	0	49
RCP 2.6 2100	3.14	0	35	14	0	0	49
RCP 4.5 2030	3.18	0	35	14	0	0	49
RCP 4.5 2050	3.19	0	35	14	0	0	49
RCP 4.5 2100	3.43	0	35	12	2	0	49
RCP 8.5 2030	3.19	0	35	14	0	0	49
RCP 8.5 2050	3.41	0	35	14	0	0	49
RCP 8.5 2100	3.77	0	35	14	0	0	49
River Flood		0		500		100	
Current Undefended	1.27	46		0		3	49
Current Defended	1.27	46		0		3	49
RCP 4.5 2030 Undefended	1.27	46		0		3	49
RCP 4.5 2030 Defended	1.27	46		0		3	49
RCP 4.5 2050 Undefended	1.27	46		0		3	49
RCP 4.5 2050 Defended	1.27	46		0		3	49
RCP 4.5 2100 Undefended	1.27	46		0		3	49
RCP 4.5 2100 Defended	1.27	46		0		3	49
RCP 8.5 2030 Undefended	1.27	46		0		3	49
RCP 8.5 2030 Defended	1.27	46		0		3	49
RCP 8.5 2050 Undefended	1.27	46		0		3	49
RCP 8.5 2050 Defended	1.27	46		0		3	49
RCP 8.5 2100 Undefended	1.27	46		0		3	49
RCP 8.5 2100 Defended	1.27	46		0		3	49
Sea Level Rise		-1.00	1.00	2.00	3.00	4.00	
RCP 2.6 2100	0.75	49	0	0	0	0	49
RCP 4.5 2100	0.75	49	0	0	0	0	49
RCP 8.5 2100	0.75	49	0	0	0	0	49
Tropical Cyclone		-1,0	1.00	2,3	4.00	5.00	
Current	0.75	49	0	0	0	0	49
RCP 4.5 2030	0.75	49	0	0	0	0	49
RCP 4.5 2050	0.75	49	0	0	0	0	49
RCP 4.5 2100	0.75	49	0	0	0	0	49
RCP 8.5 2030	0.75	49	0	0	0	0	49
RCP 8.5 2050	0.75	49	0	0	0	0	49
RCP 8.5 2100	0.75	49	0	0	0	0	49

Table 25: France Assets – Traffic Light Distribution Of Exposure Risk Scores

FRANCE: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

River Flood and Sea Level Rise are both Very Low average exposure risk across the SEGRO assets in France. River Flood exposure risk consistently has 46 assets in No to Very Low category **whilst three are in Very High exposure risk; Asset ID145, Asset ID148, Asset ID151.** These are all in Paris (La Seine river). These assets are all Very High exposure risk for Undefended and Defended assessments – indicating that the Standard of Protection (SoP) may not be sufficient. It is recommended that this is investigated further at the asset level and the SoP data understood to assess whether asset specific flood resilience and adaptation measures should be installed to provide current and future asset resilience to River Flood.

Drought stress is a Medium average exposure risk under RCP 2.6 in 2050, RCP 4.5 in 2050, 2100 and RCP 8.5 in 2030 and 2050, and a High exposure risk under RCP 8.5 in 2100. Assets at Medium exposure risk under RCP 2.6 2050 (37 assets) and under RCP 4.5 in 2050 (Table 25) should have further assessment to understand their specific asset vulnerability and quantify the climate change impact. There are four assets at Very High exposure risk under RCP 8.5 in 2100. These are: Asset ID150, Asset ID162, Asset ID170, and Asset ID128. Whilst these are Very High exposure risk, this is not until 2100 so face a less imminent potential impact than some of the other assets experiencing shorter term (2030 and 2050) exposure risks from other physical hazards.

Precipitation Stress is predominantly a Low exposure risk for SEGRO assets in France. It is only under RCP 8.5 in 2100 that a Medium exposure risk is recorded. Under RCP 4.5 in 2100, two assets are in the High exposure risk category – Asset ID150 and Asset ID162.

Heat Stress is the most significant hazard experienced by SEGRO assets in France. It is a Medium average exposure risk under all scenarios and time periods (apart from current). The key assets at risk here are Asset ID150 and Asset ID162, which are both in the High exposure risk category for the following scenarios: RCP 2.6, 2030; RCP 4.5, 2050; RCP 4.5, 2100; RCP 8.5, 2050 and 2100. Asset ID128 is in High exposure risk in RCP 4.5, 2100; RCP 8.5, 2050 and 2100. There are 13 assets in the High exposure category by RCP 8.5, 2100.

Fire Weather stress is also a significant exposure risk to the SEGRO asset portfolio in France. The overall exposure risk is Medium under RCP 4.5, 2030, 2050 and 2100, and under RCP 8.5, 2050 and 2100. There are three assets that are in High exposure risk under all scenarios: Asset ID128, Asset ID150, and Asset ID162, which are also the ones exposed to Very High Drought exposure risk under RCP 8.5 in 2100. There is also an additional asset at High exposure risk under RCP 4.5 in 2030, 2050, 2100 and RCP 8.5 in 2050 and 2100, which is Asset ID163.

In addition to the three assets at Very High exposure to River Flood, there are also three key assets at exposure risk to Drought Stress, Fire Weather Stress, Heat stress and Precipitation Stress. These are Asset ID150, Asset ID162 and Asset ID128.

ITALY: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

There are 18 assets in Italy, this accounting for 6% of the portfolio value (as at 31 December 2022). These are split across Turin, Milan, Bologna, Venice (Airport) and Rome.

Drought Stress, Fire Weather Stress, Heat stress and Precipitation Stress are significant hazards to which the SEGRO portfolio in Italy has exposure risk. Assets in and around Rome, Bologna, and Milan (Asset ID174) have Medium to Very High exposure to these physical hazards.

Table 26: Italy Hazard Rating Average Scores

Physical Hazard	Examples of Potential Impact	Climate Scenario	Time Period			
			Current	2030	2050	2100
Sea Level Rise	Stranded assets / high insurance costs	2.6				0.75
		4.5				0.75
		8.5				0.75
River Flood	Significant damage and repair costs	4.5 U	1.22	2.17	2.17	2.17
		4.5 D	1.22	2.17	2.17	2.17
		8.5 U	1.22	2.17	2.17	2.17
		8.5 D	1.22	2.17	2.17	2.17
Tropical Cyclone	Extreme damage to buildings and wider in infrastructure	4.5	0.75	0.75	0.75	0.75
		8.5	0.75	0.75	0.75	0.75
Drought Stress	Soil subsidence affecting asset stability	2.6		3.06	3.44	1.78
		4.5		4.36	5.53	5.28
		8.5		4.47	5.69	9.03
Precipitation Stress	Significant damage and repair costs	2.6	6.30	6.58	6.73	6.78
		4.5		6.39	6.64	6.91
		8.5		6.46	6.76	6.88
Heat stress	Opportunity for structural deformation; energy costs due to cooling	2.6	4.54	5.34	5.37	5.23
		4.5		5.27	5.54	5.73
		8.5		5.31	5.69	7.02
Fire Weather Stress	Damage to infrastructure, damage and repair costs	2.6	3.01	3.71	3.71	3.22
		4.5		3.92	4.06	4.06
		8.5		3.78	4.06	5.19

Traffic Scores	
0–1.50	No Or Very Low
1.51–3.50	Low
3.51–6.50	Medium
6.51–8.50	High
8.51–10.00	Very High

The average scores provided in this table should be viewed in conjunction with Table 27 and the distribution of hazard scores. This enables to identify cases where individual asset risks deviate significantly from the average hazard rating.

TRAFFIC LIGHT DISTRIBUTION OF EXPOSURE RISK SCORES – ITALY

Italy	Average	No/Very Low Exposure (1) Dark Green	Low Exposure (2) Light Green	Medium Exposure (3) Orange	High Exposure (4) Red	Very High Exposure (5) Dark Red	Total Assets
Drought Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
RCP 2.6 2030	3.06	0	14	4	0	0	18
RCP 2.6 2050	3.44	0	12	6	0	0	18
RCP 2.6 2100	1.78	8	10	0	0	0	18
RCP 4.5 2030	4.36	0	1	17	0	0	18
RCP 4.5 2050	5.53	0	0	18	0	0	18
RCP 4.5 2100	5.28	0	0	18	0	0	18
RCP 8.5 2030	4.47	0	2	16	0	0	18
RCP 8.5 2050	5.69	0	0	16	2	0	18
RCP 8.5 2100	9.03	0	0	0	6	12	18
Fire Weather Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	3.01	1	12	5	0	0	18
RCP 2.6 2030	3.71	0	8	10	0	0	18
RCP 2.6 2050	3.71	0	9	9	0	0	18
RCP 2.6 2100	3.22	0	12	6	0	0	18
RCP 4.5 2030	3.92	0	5	13	0	0	18
RCP 4.5 2050	4.06	0	4	14	0	0	18
RCP 4.5 2100	4.06	0	4	14	0	0	18
RCP 8.5 2030	3.78	0	9	9	0	0	18
RCP 8.5 2050	4.06	0	4	14	0	0	18
RCP 8.5 2100	5.19	0	0	18	0	0	18
Heat Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	4.54	0	1	17	0	0	18
RCP 2.6 2030	5.34	0	1	16	1	0	18
RCP 2.6 2050	5.37	0	1	16	1	0	18
RCP 2.6 2100	5.23	0	1	17	0	0	18
RCP 4.5 2030	5.27	0	1	16	1	0	18
RCP 4.5 2050	5.54	0	1	15	2	0	18
RCP 4.5 2100	5.73	0	0	16	2	0	18
RCP 8.5 2030	5.31	0	1	16	1	0	18
RCP 8.5 2050	5.69	0	1	15	2	0	18
RCP 8.5 2100	7.02	0	0	4	14	0	18
Precipitation Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	6.30	0	0	11	5	2	18
RCP 2.6 2030	6.58	0	0	10	5	3	18
RCP 2.6 2050	6.73	0	0	8	7	3	18
RCP 2.6 2100	6.78	0	0	8	7	3	18
RCP 4.5 2030	6.39	0	0	10	6	2	18
RCP 4.5 2050	6.64	0	0	9	7	2	18
RCP 4.5 2100	6.91	0	0	8	7	3	18
RCP 8.5 2030	6.46	0	0	11	5	2	18
RCP 8.5 2050	6.76	0	0	8	7	3	18
RCP 8.5 2100	6.88	0	0	8	7	3	18
River Flood		0		500		100	
Current Undefended	1.22	17		0		1	18
Current Defended	1.22	17		0		1	18
RCP 4.5 2030 Undefended	2.17	15		0		3	18
RCP 4.5 2030 Defended	2.17	15		0		3	18
RCP 4.5 2050 Undefended	2.17	15		0		3	18
RCP 4.5 2050 Defended	2.17	15		0		3	18
RCP 4.5 2100 Undefended	2.17	15		0		3	18
RCP 4.5 2100 Defended	2.17	15		0		3	18
RCP 8.5 2030 Undefended	2.17	15		0		3	18
RCP 8.5 2030 Defended	2.17	15		0		3	18
RCP 8.5 2050 Undefended	2.17	15		0		3	18
RCP 8.5 2050 Defended	2.17	15		0		3	18
RCP 8.5 2100 Undefended	2.17	15		0		3	18
RCP 8.5 2100 Defended	2.17	15		0		3	18
Sea Level Rise		-1.00	1.00	2.00	3.00	4.00	
RCP 2.6 2100	0.75	18	0	0	0	0	18
RCP 4.5 2100	0.75	18	0	0	0	0	18
RCP 8.5 2100	0.75	18	0	0	0	0	18
Tropical Cyclone		-1,0	1.00	2,3	4.00	5.00	
Current	0.75	18	0	0	0	0	18
RCP 4.5 2030	0.75	18	0	0	0	0	18
RCP 4.5 2050	0.75	18	0	0	0	0	18
RCP 4.5 2100	0.75	18	0	0	0	0	18
RCP 8.5 2030	0.75	18	0	0	0	0	18
RCP 8.5 2050	0.75	18	0	0	0	0	18
RCP 8.5 2100	0.75	18	0	0	0	0	18

Table 27: Italy Assets – Traffic Light Distribution Of Exposure Risk Scores

ITALY: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

Sea Level Rise is a hazard that the SEGRO asset portfolio in Italy has No to Very Low exposure. Asset ID188 in Venice is located close to the airport rather than the city and coast. Venice is at Very High exposure risk to Sea Level Rise. It is recommended that this asset is assessed in more detail, using high resolution River Flood, Surface Water and Sea Level Rise data combined with understand the specific asset vulnerability to assess the potential current baseline and future climate change impact from these acute hazards.

River flood is a Low exposure risk for assets in Italy, with one asset in the Very High exposure risk category currently; **Asset ID179, Asset ID184 and Asset ID188 are Very High for all future scenarios.** This is for defended and undefended assessments – evidence of a potential lower SoP than required – it is recommended that this is further assessed using higher resolution (5–30m) Flood Risk data and Standard of Protection GIS maps and datasets to corroborate these findings and assess the asset vulnerability to these Very High River Flood exposure risks.

Drought Stress has an average Low exposure risk under RCP 2.6 scenario across all time periods. **This increases to a Medium exposure risk from RCP 4.5 2030 until RCP 8.5 2100 when it becomes Very High risk (Table 27).** Asset ID181 and Asset ID185 are the first assets to enter the High exposure risk category under RCP 8.5 in 2050. Under RCP 8.5 in 2100, there are six assets in the High exposure risk category, and 12 assets in the Very High exposure category.

Precipitation Stress is a significant hazard for the SEGRO asset portfolio in Italy. The average for the SEGRO assets in Italy is a Medium exposure risk under current baseline with five assets in the High exposure risk category and two in Very High exposure risk: Asset ID176 and Asset ID180. Asset ID183 is in the Very High exposure category under all RCP 2.6 scenarios, plus RCP 4.5 in 2100, and RCP 8.5 in 2050, 2100 (Table 27). Given the location of these three assets being at the foot of the Alps, Precipitation Stress is expected. This is a different set of assets than those experiencing High to Very exposure risk to Drought Stress, Fire Weather Stress and Heat Stress.

Heat Stress as a hazard is a significant exposure risk for assets in Italy, with the average being a Medium exposure risk until RCP 8.5 in 2100 where it becomes High exposure risk. The key assets are: Asset ID175, which is in the High exposure risk category for all scenarios other than current and RCP 2.6, 2100 (where it is Medium); and Asset ID174 which is in the High exposure risk category under RCP 4.5 in 2050 and 2100 and under RCP 8.5 in 2050 and 2100.

Fire Weather Stress is also a significant physical hazard affecting the SEGRO asset portfolio in Italy. It is an average Medium exposure risk under all scenarios and time periods other than current and RCP 2.6 in 2100. No SEGRO assets in Italy are in the High or Very High exposure risk categories for Fire Weather Stress. Five assets are already (current baseline) experiencing Medium exposure risk to Fire Weather Stress: Asset ID174, Asset ID175, Asset ID177, Asset ID181 and Asset ID185.

SPAIN: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

There are nine assets in Spain, accounting for 2% of the portfolio value (as at 31 December 2022). These assets are based in Madrid and Barcelona.

Assets in Spain have High to Very High average exposure risk from Drought Stress, Fire Stress and Heat Stress. The assets in Spain have a No to Very Low exposure risk from Sea Level Rise.

Table 28: Spain Hazard Rating Average Scores

Physical Hazard	Examples of Potential Impact	Climate Scenario	Time Period			
			Current	2030	2050	2100
Sea Level Rise	Stranded assets / high insurance costs	2.6				0.75
		4.5				0.75
		8.5				0.75
River Flood	Significant damage and repair costs	4.5 U	0.75	0.75	1.22	1.22
		4.5 D	0.75	0.75	1.22	1.22
		8.5 U	0.75	1.22	1.22	0.75
		8.5 D	0.75	1.22	1.22	0.75
Tropical Cyclone	Extreme damage to buildings and wider in infrastructure	4.5	0.75	0.75	0.75	0.75
		8.5	0.75	0.75	0.75	0.75
Drought Stress	Soil subsidence affecting asset stability	2.6		4.50	5.78	2.28
		4.5		6.22	7.50	7.72
		8.5		5.61	8.00	9.67
Precipitation Stress	Significant damage and repair costs	2.6	3.41	3.49	3.54	3.54
		4.5		3.41	3.58	3.54
		8.5		3.54	3.54	3.74
Heat stress	Opportunity for structural deformation; energy costs due to cooling	2.6	5.02	5.67	5.67	5.67
		4.5		5.67	5.87	6.32
		8.5		5.67	6.32	7.27
Fire Weather Stress	Damage to infrastructure, damage and repair costs	2.6	4.62	5.03	5.14	5.17
		4.5		5.44	5.64	5.71
		8.5		5.21	5.61	6.33

Traffic Scores	
0–1.50	No Or Very Low
1.51–3.50	Low
3.51–6.50	Medium
6.51–8.50	High
8.51–10.00	Very High

The average scores provided in this table should be viewed in conjunction with Table 29 and the distribution of hazard scores. This enables to identify cases where individual asset risks deviate significantly from the average hazard rating.

TRAFFIC LIGHT DISTRIBUTION OF EXPOSURE RISK SCORES – SPAIN

Spain	Average	No/Very Low Exposure (1) Dark Green	Low Exposure (2) Light Green	Medium Exposure (3) Orange	High Exposure (4) Red	Very High Exposure (5) Dark Red	Total Assets
Drought Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
RCP 2.6 2030	4.50	0	3	6	0	0	9
RCP 2.6 2050	5.78	0	0	6	3	0	9
RCP 2.6 2100	2.28	4	5	0	0	0	9
RCP 4.5 2030	6.22	0	0	6	3	0	9
RCP 4.5 2050	7.50	0	0	3	6	0	9
RCP 4.5 2100	7.72	0	0	3	3	3	9
RCP 8.5 2030	5.61	0	3	3	3	0	9
RCP 8.5 2050	8.00	0	0	3	2	4	9
RCP 8.5 2100	9.67	0	0	0	0	9	9
Fire Weather Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	4.62	0	5	0	4	0	9
RCP 2.6 2030	5.03	0	5	0	4	0	9
RCP 2.6 2050	5.14	0	5	0	4	0	9
RCP 2.6 2100	5.17	0	5	0	4	0	9
RCP 4.5 2030	5.44	0	3	2	4	0	9
RCP 4.5 2050	5.64	0	0	5	4	0	9
RCP 4.5 2100	5.71	0	0	5	4	0	9
RCP 8.5 2030	5.21	0	5	0	4	0	9
RCP 8.5 2050	5.61	0	3	2	4	0	9
RCP 8.5 2100	6.33	0	0	5	4	0	9
Heat Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	5.02	0	0	9	0	0	9
RCP 2.6 2030	5.67	0	0	6	3	0	9
RCP 2.6 2050	5.67	0	0	6	3	0	9
RCP 2.6 2100	5.67	0	0	6	3	0	9
RCP 4.5 2030	5.67	0	0	6	3	0	9
RCP 4.5 2050	5.87	0	0	6	3	0	9
RCP 4.5 2100	6.32	0	0	6	3	0	9
RCP 8.5 2030	5.67	0	0	6	3	0	9
RCP 8.5 2050	6.32	0	0	6	3	0	9
RCP 8.5 2100	7.27	0	0	3	6	0	9
Precipitation Stress		0 – 1.50	1.51 – 3.50	3.51 – 6.50	6.51 – 8.50	8.51 – 10.0	
Current	3.41	0	4	5	0	0	9
RCP 2.6 2030	3.49	0	4	5	0	0	9
RCP 2.6 2050	3.54	0	4	5	0	0	9
RCP 2.6 2100	3.54	0	4	5	0	0	9
RCP 4.5 2030	3.41	0	4	5	0	0	9
RCP 4.5 2050	3.58	0	4	5	0	0	9
RCP 4.5 2100	3.54	0	4	5	0	0	9
RCP 8.5 2030	3.54	0	4	5	0	0	9
RCP 8.5 2050	3.54	0	4	5	0	0	9
RCP 8.5 2100	3.74	0	4	5	0	0	9
River Flood		0		500		100	
Current Undefended	0.75	9		0		0	9
Current Defended	0.75	9		0		0	9
RCP 4.5 2030 Undefended	0.75	9		0		0	9
RCP 4.5 2030 Defended	0.75	9		0		0	9
RCP 4.5 2050 Undefended	1.22	8		1		0	9
RCP 4.5 2050 Defended	1.22	8		1		0	9
RCP 4.5 2100 Undefended	1.22	8		1		0	9
RCP 4.5 2100 Defended	1.22	8		1		0	9
RCP 8.5 2030 Undefended	1.22	8		1		0	9
RCP 8.5 2030 Defended	1.22	8		1		0	9
RCP 8.5 2050 Undefended	1.22	8		1		0	9
RCP 8.5 2050 Defended	1.22	8		1		0	9
RCP 8.5 2100 Undefended	0.75	9		0		0	9
RCP 8.5 2100 Defended	0.75	9		0		0	9
Sea Level Rise		-1.00	1.00	2.00	3.00	4.00	
RCP 2.6 2100	0.75	9	0	0	0	0	9
RCP 4.5 2100	0.75	9	0	0	0	0	9
RCP 8.5 2100	0.75	9	0	0	0	0	9
Tropical Cyclone		-1,0	1.00	2,3	4.00	5.00	
Current	0.75	9	0	0	0	0	9
RCP 4.5 2030	0.75	9	0	0	0	0	9
RCP 4.5 2050	0.75	9	0	0	0	0	9
RCP 4.5 2100	0.75	9	0	0	0	0	9
RCP 8.5 2030	0.75	9	0	0	0	0	9
RCP 8.5 2050	0.75	9	0	0	0	0	9
RCP 8.5 2100	0.75	9	0	0	0	0	9

Table 29: Spain Assets – Traffic Light Distribution Of Exposure Risk Scores

SPAIN: SUMMARY OF CLIMATE CHANGE PHYSICAL RISK

The SEGRO assets in Spain have a No to Very Low average exposure risk throughout all scenarios and time periods to River Flood. One asset has Medium exposure (Undefended and Defended) under some scenarios: Asset ID197. This should be further explored to understand the Standard of Protection currently implemented, the specific vulnerability and if additional asset resilience investment is required to reduce to potential impact from the current and future exposure risk even under Defended scenarios to River Flood.

Drought stress is particularly important in Spain, with the average score being Medium exposure risk under RCP 2.6 in 2030 and 2050, by RCP 4.5 2050 this has increased to a High risk (for RCP 4.5 2100, and 8.5 2050 too), before increasing to Very High risk in RCP 8.5 2100 (Table 29). Specific assets to focus on are: Asset ID190, Asset ID196 and Asset ID197, all of which are in Madrid. They are all in the High exposure risk category under RCP 2.6 2050. They are also the first three assets to enter the Very High exposure risk category in RCP 4.5 2100. They are then closely followed by Asset ID191, which is located on the outskirts of Madrid. The Barcelona located assets have lower exposure risk to Drought Stress.

For Precipitation Stress, the Madrid assets remain in Low exposure risk category under all RCP scenarios and time periods, whilst the five assets in Barcelona are in the Medium exposure risk category throughout all scenarios. The small fluctuations within each asset's risk do not change their exposure risk category, however, cumulatively it affects the average exposure risk score, with the different scenarios sitting on the border between Low and Medium exposure risk. Under RCP 2.6 and RCP 4.5 the 2050 and 2100 scenarios are Medium exposure risk. Under all RCP 8.5 scenarios the asset average score is Medium exposure risk. (Table 29).

Fire Weather Stress remains an average of Medium risk in all timeframes and scenarios. There are four assets in the High exposure risk category for Fire Weather Stress, which are the four Madrid assets referenced above. Similar is true for Heat Stress, which remains an average of Medium exposure risk throughout all scenarios until RCP 8.5, 2100. Again, the three assets in the High exposure risk category are Asset ID190, Asset ID196 and Asset ID197 in Madrid.

The four assets in Madrid should be looked at asset-level to assess the vulnerability to the increasing exposure risk to Drought Stress, Fire Stress and Heat Stress. The four assets have a lower exposure risk to the same chronic physical hazards, but as a country wide set of assets it would be worth understanding the asset vulnerability to assess the potential impacts across the nine assets and if investment into additional resilience and adaptation measures could reduce the impacts from the High exposure risk to these physical hazards.

05
ASSESSMENT METHODOLOGY

ASSESSMENT METHODOLOGY

SCENARIO ANALYSIS

Scenario analysis allows the user to understand risks and uncertainties under different hypothetical futures. Scenario analysis provides insights on site exposure and vulnerability to climate hazards and the implications of climate change.

The Munich Re physical climate hazard assessment services are based on the IPCC AR5 framework and use RCP scenarios for atmospheric greenhouse gas concentrations from IPCC Assessment Report 5 (IPCC AR5, 2014).

IPCC AR6 (IPCC, AR6, WG1, Summary for Policy Makers, 2021) indicates that "with further global warming, every region is projected to increasingly experience concurrent and multiple changes in climatic impact-drivers. Changes in several climatic impact-drivers would be more widespread at 2°C compared to 1.5°C global warming and even more widespread and/or pronounced for higher warming levels".

IPCC AR5 SCENARIOS

The Munich Re Risk Suite uses three of the IPCC AR5 RCP scenarios to assess the impacts of climate change:

- **RCP2.6 – 2 Degree**
  Moderate scenario leading to a warming at the end of the 21st century of probably less than 2°C relative to the pre-industrial period.
- **RCP4.5 – Partial mitigation**
  Intermediate scenario leading to a warming at the end of the 21st century of more than 2°C relative to the pre-industrial period.
- **RCP8.5 – Business as usual**
  Most severe scenario leading to a warming at the end of the 21st century of *probably* more than 4°C relative to the pre-industrial period.

RCP	Global Mean Surface Temperature Change (°C)		Global Mean Sea Level Rise (m)	
	2046–2065	2081–2100	2046–2065	2081–2100
2.6	1	1	0.24	0.40
4.5	1.4	1.8	0.26	0.47
8.5	2	3.7	0.30	0.63

Table 30: Projected change in global mean surface air temperature and global mean sea level rise for the mid and late 21st century, relative to the reference period of 1986–2005. (Ar5, wg1, spm, table spm.2, 2013)

CLIMATE CHANGE PHYSICAL HAZARDS

MODELLED PHYSICAL HAZARDS

The table below outlines the physical hazards that are modelled into the future.

Acute hazards are modelled based on the established models for (re)insurance purposes.

Data for the reference period are based on NATHAN model (for Tropical Cyclone, River Flood) and on ERA5 ECMWF atmospheric reanalysis data (for Heat Stress, Precipitation Stress, Fire Weather Stress).

Hazard	Risk Type	Examples of Potential Impact on Buildings
Sea Level Rise	Chronic	Stranded assets; high insurance costs
River flood (undefended and defended)	Acute	Significant damage and repair costs
Tropical Cyclone	Acute	Extreme damage to buildings and wider in infrastructure
Drought Stress	Chronic	Soil subsidence affecting asset stability
Precipitation Stress	Chronic	Significant damage and repair costs
Heat Stress	Chronic	Opportunity for structural deformation; energy costs due to cooling
Fire Weather Stress	Chronic	Damage to infrastructure; damage and repair costs

Table 31: Modelled Physical Hazards

OTHER CURRENT PHYSICAL HAZARDS

The table below outlines the physical hazards for the reference period only, which are presented in this analysis in addition to the modelled hazards.

Hazard	Risk Type	Examples of Potential Impact on Buildings
Extratropical storm (winter storm)	Acute	Significant damage and repair costs
Hail	Acute	Significant damage and repair costs
Flash flood	Acute	Significant damage and repair costs
Storm surge	Acute	Increased wear and tear to infrastructure; remedial costs; life protection costs.

Table 32: Other Current Physical Hazards

TRAFFIC LIGHT SCORING METHODOLOGY

MODELLED PHYSICAL HAZARDS

The tables below outline the scoring categories, time periods and RCP Scenarios available for each assessed hazard in the Munich Re model. There are different scoring methodologies for each climate hazard, with each hazard being modelled across specific scenarios and time periods.

For example, Sea Level Rise is modelled for year 2100 only. There is also limited variation in risk between some scenarios and time periods for specific hazards.

Table 33: Sea Level Rise

Categories	Time Periods covered	Scenarios covered
-1 (No or Very Low)	2100	• RCP2.6 • RCP4.5 • RCP8.5
1 (Low)		
2 (Medium)		
3 (High)		
4 (Very High)		

Table 34: River Flood Undefended and Defended

Categories	**Time Periods covered**	**Scenarios covered**
Zone 0 minimal flood risk 0 – No or very Low	• Current • 2030 • 2050 • 2100	• RCP4.5 • RCP8.5
Zone 500 year return period 500 – Medium		
Zone 100 year return period 100 – Very High		

Table 35: Tropical Cyclone

Categories	Time Periods covered	Scenarios covered
0.0 – 1.50 (No or very Low)	• Current • 2030 • 2050 • 2100	• RCP4.5 • RCP8.5
1.51 – 3.50 (Low)		
3.51 – 6.50 (Medium)		
6.51 – 8.50 (High)		
8.51 – 10.0 (Very High)		

Table 36: Drought and Precipitation Stress Indexes (Scoring 0–10)

Categories	Time Periods covered	Scenarios covered
0.0 – 1.51 (No or very Low)	• Current (Precip only) • 2030 • 2050 • 2100	• RCP2.6 • RCP4.5 • RCP8.5
1.51 – 3.50 (Low)		
3.51 – 6.50 (Medium)		
6.51 – 8.50 (High)		
8.51 – 10.0 (Very High)		

Table 37: Heat Stress Index (Scoring 0–10)

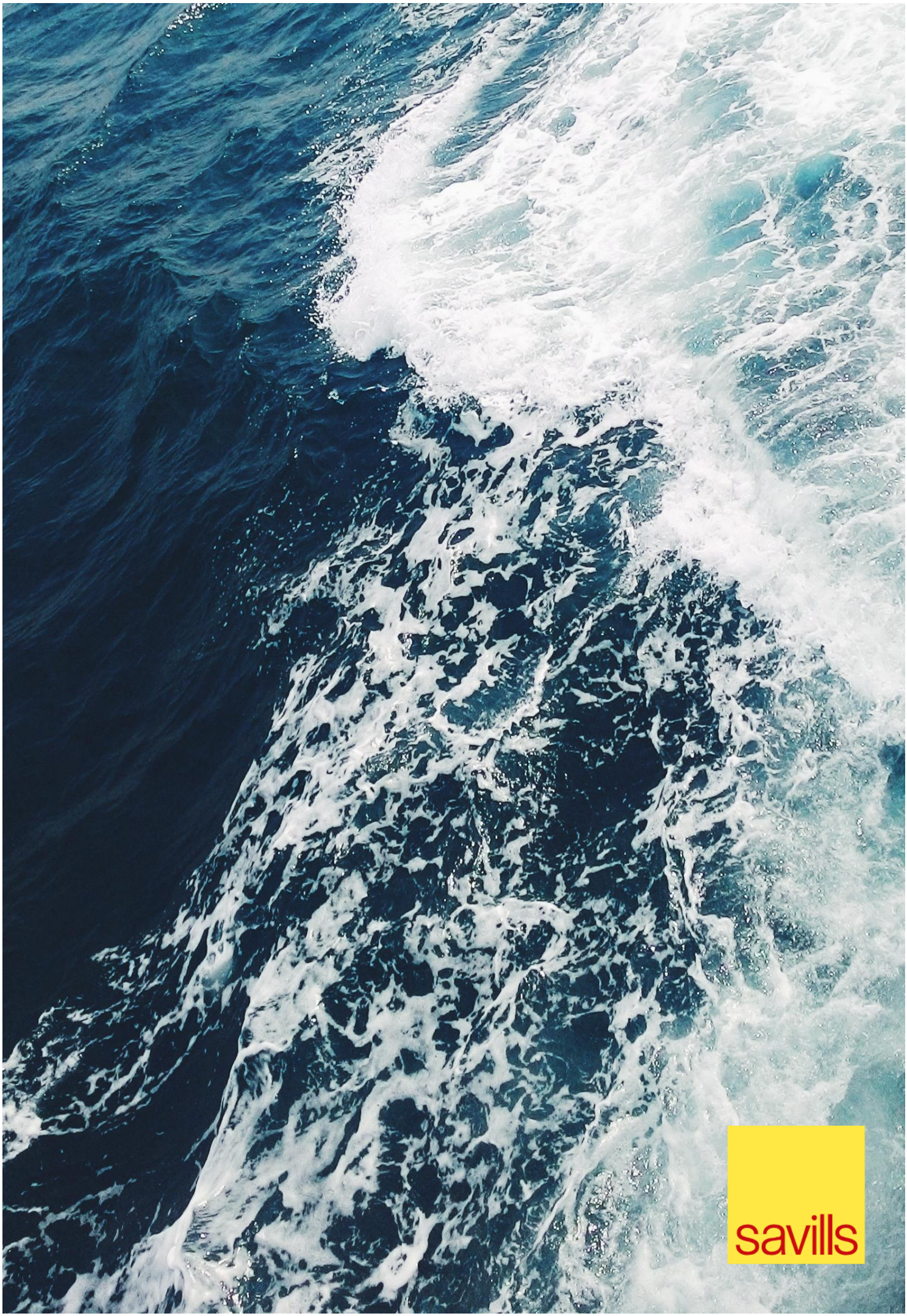
Categories	Time Periods covered	Scenarios covered
0.0 – 1.50 (No or very Low)	• Current • 2030 • 2050 • 2100	• RCP2.6 • RCP4.5 • RCP8.5
1.51 – 3.50 (Low)		
3.51 – 6.50 (Medium)		
6.51 – 8.50 (High)		
8.51 – 10.0 (Very High)		

Table 38: Fire Weather Index (Scoring 0–10)

Categories	Time Periods covered	Scenarios covered
0.0 – 1.50 (No or very Low)	• Current • 2030 • 2050 • 2100	• RCP2.6 • RCP4.5 • RCP8.5
1.51 – 3.50 (Low)		
3.51 – 6.50 (Medium)		
6.51 – 8.50 (High)		
8.51 – 10.0 (Very High)		

GLOSSARY

Term	Acronym	Definition
Business as usual (baseline scenario)	BAU	In the context of transformation pathways, the term baseline scenarios refers to scenarios that are based on the assumption that no mitigation policies or measures will be implemented beyond those that are already in force and/or are legislated or planned to be adopted.
Global mean surface temperature	GMST	Area-weighted global average of land surface air temperature over land and sea surface temperatures, unless otherwise specified, normally expressed relative to a specified reference period.
Hazard		The potential occurrence of a natural or human-induced physical event that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, and environmental resource.
Representative Concentration Pathway	RCP	Scenarios that include time series of emissions and concentrations of the full suite of greenhouse gases (GHGs) and aerosols and chemically active gases, as well as land use/land cover (Moss et al., 2008). The word representative signifies that each RCP provides only one of many possible scenarios that would lead to the specific radiative forcing characteristics. The term pathway emphasises that not only the long-term concentration levels are of interest, but also the trajectory taken over time to reach that outcome (Moss et al., 2010).
RCP2.6	RCP2.6	One pathway where radiative forcing peaks at approximately 3 W m-2 before 2100 and then declines (the corresponding ECP [Extended Concentration Pathway] assuming constant emissions after 2100).
RCP4.5 and RCP6.0	RCP4.5 RCP6.0	Two intermediate stabilisation pathways in which radiative forcing is stabilised at approximately 4.5 W m-2 and 6.0 W m-2 after 2100 (the corresponding ECPs [Extended Concentration Pathways] assuming constant concentrations after 2150).
RCP8.5	RCP8.5	One high pathway for which radiative forcing reaches greater than 8.5 W m-2 by 2100 and continues to rise for some amount of time (the corresponding ECP [Extended Concentration Pathway] assuming constant emissions after 2100 and constant concentrations after 2250).


savills