

Version: 28 October 2022

AXA Climate x IPSEN

Assessment of climate change physical impacts

Final presentation



x



Agenda



- 01 Executive Summary
- 02 Portfolio description & Methodology
- 03 Portfolio screening results
- 04 Focus on main perils
- 05 Focus on specific sites
 - Zoom on most-at-risk sites*
 - Zoom on 4 IPSEN strategic sites*
- 06 Adaptation to climate change
- 07 Appendices

01



Executive summary



Scope of work & objectives

AXA Climate is engaged in helping industries in climate adaptation to **reduce the physical impacts of climate change**, as they can align investments and innovation strategies with climate change effects. Indeed, this presentation provides IPSEN the main conclusions from the **physical climate risk assessment**, creating a strong database and providing recommendations related to climate physical risks in the analyzed portfolio. The scope of this analysis is briefly described:



Obtain **future climate risk data** for each site of the scope (Baseline, 2030 and 2050), under SSP2-4.5 and SSP5-8.5 global warming scenario



Analyze the **impact** on the 178 sites **per strategic axis**:

- Asset Centric Model
- Country
- Type of site



Identify the **most critical sites** and the most impacting climate indicators by SSP5-8.5 global warming scenario projected in 2030*



Obtain high-level **recommendations** regarding an actionable and climate-adapted prevention plan

** **Note:** A projection to 2030 using global warming scenario SSP5-8.5 is recommended to industrial actors, as it gives a mid-term perspective in a business-as-usual global economic model*

AXA Climate assessed the **physical vulnerability to climate change of 178*** sites split between 40 countries, 7 types of occupancy, owned and third-party



■ Low ■ Medium ■ High ■ Extreme [Risk categories for Climate risk scoring by 2030 under SSP5 - 8.5]

IMPORTANT DISCLAIMER: Please note that the scope of work includes the sites associated with Consumer HealthCare (CHC) activities – which have been sold by IPSEN in 2022

Key findings

Whether at full portfolio level or for IPSEN' sites, only a few sites are exposed to a high or extreme risk

Under SSP5-8.5, in 2030, 16 of sites (9%) are considered at **Extreme** risk (3 IPSEN and 3 third parties) or **High** risk (1 IPSEN, 1 CHC and 8 third parties)
vs. 17 sites in the baseline (-1)

By 2050, the dynamics of climate change should have little impact on the portfolio ...

Only 4 sites (incl. 2 CHC sites and 1 IPSEN' site) will upgrade to the **Extreme** or **High** category

... however in details, some sites will see their risk profile change significantly

No risk category change, but variation per peril

The USA, Taiwan, Switzerland and China are the most at risk countries in your portfolio

25% of the **Extreme** or **High** risk sites are in the USA, 25% in Taiwan (67% of **Extreme** sites), 19% in Switzerland and 19% in China

Major acute perils for most-at-risk sites are:

- Geophysical (Earthquake and Landslide) → **stable**
- Wind (Tropical Cyclone and Winterstorm) → **stable**
- Cold (Consecutive Frost Days) → **decreasing risk**

While main chronic perils are:

- Combined Heat index → **increasing risk**
- Cooling Degree Days → **increasing risk**

Our guidelines for a climate resilience and adaption plan

CLIMATE RESILIENCE & ADAPTATION

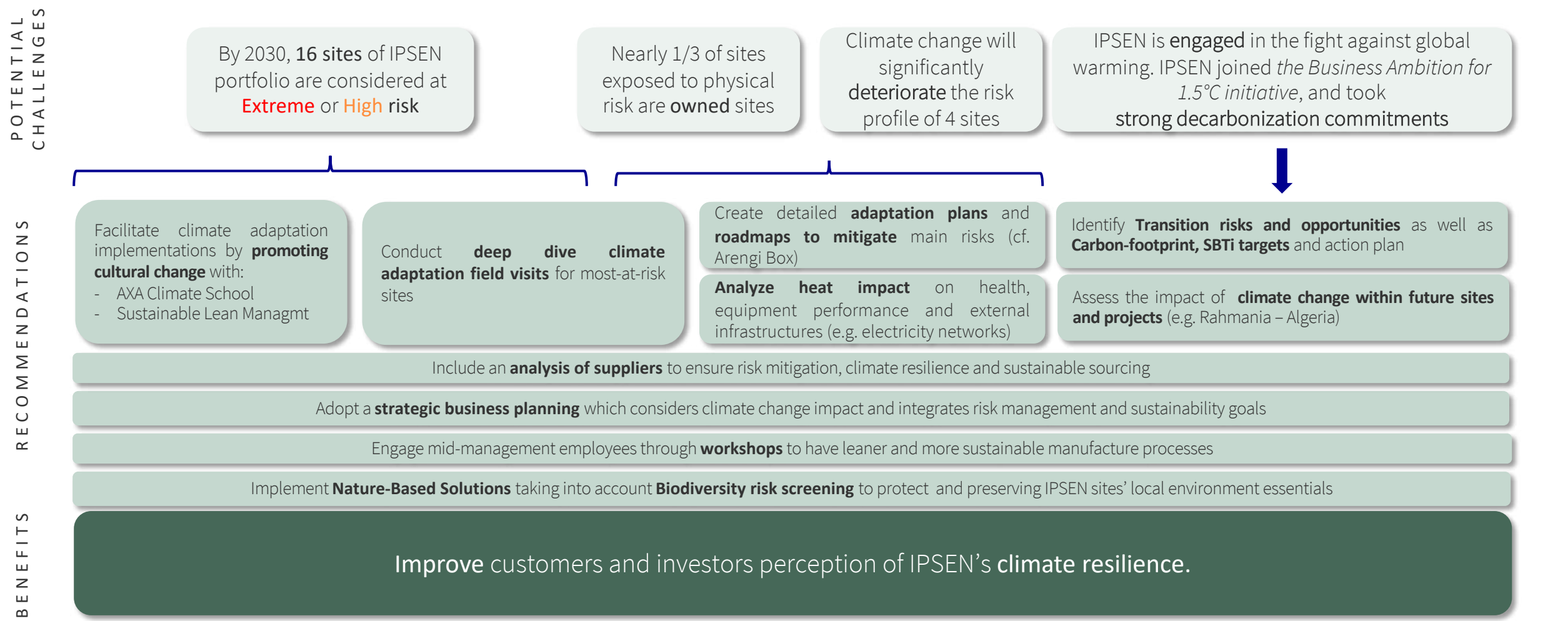
- 1st step: Assess exposure and vulnerability of all sites ✓
- 2nd step: Identify most impacting perils and decide priority climate resilience and adaptation improvement axes ✓
- 3rd step: Build an adaptation and resilience action plan (workshops, climate adaptation field visits, sustainable lean, ISO 14090 etc.)
- 4th step: Assess costs & benefits of each priority action with local teams on priority sites
- 5th step: Assess carbon footprint / GHG emissions attached to each priority action

IMPLEMENTATION GUIDELINES

- #1 Develop a prospective 2030 vision (and strategy) articulated with scenario-based analysis
- #2 Build a multi-disciplinary governance of the implementation plan , with milestones and KPIs
- #3 Strengthen crisis management plans and improve resilience plans according to new findings from vulnerability to climate change, either acute or chronic
- #4 Always mix both attenuation and adaptation efforts in order to maintain organizational momentum

✓ *as part of this mission*

How to go further on the climate journey?



02



Portfolio description & Methodology



Portfolio description

Scope of analysis

178 sites

16 classes of asset

(According to the Asset Centric Model (ACM))

7 types of site

(Including supply-chain information)

40 countries



Notes & Assumptions

- ACM class of asset are not available for each site
- Financial exposure has been graded from 1 to 5 (cf. appendix)

Note: Earthquakes are not impacted by climate change but it was agreed to include this peril in the scope of analysis

Portfolio breakdown (with available data)

70 IPSEN own sites

Internal Distribution site	6
Internal Factory	9
Internal Laboratory	5
Offices	50

- Internal Factories and Internal Laboratories are considered are more critical than Internal Distribution sites and Offices
- 1 Internal Factory is a project (Rahmania – Algeria)

108 third-party sites

External Distribution site	56
External Partner	47
Materials Provider	5

- External Partners and Material Providers are considered are more critical than External Distribution sites
- 11 External Partners are part of the Emerald Project (i.e. acquisition of Epizyme (Tazverik))

4 strategic axis of analysis have been identified for IPSEN

The analysis has been done using 4 axis to determine the most exposed sites related to the portfolio characteristics



ACM

- 61 sites analysed
(sites with “No ACM” or “Other” have been excluded)
- 16 classes of asset (ACM)
(detailed in appendix)



COUNTRIES

- All 178 sites analysed
- 40 countries
(detailed in appendix)



IPSEN KEY SITES

- 20 sites analysed

Internal Distribution site	6
Internal Factory	9
Internal Laboratory	5

(Offices have been excluded because less critical for operations)



SUPPLY-CHAIN

- 108 third party sites

External Distribution site	56
External Partner	47
Materials Provider	5

- 70 IPSEN' sites

Internal Distribution site	6
Internal Factory	9
Internal Laboratory	5
Offices	50

AXA Climate methodology: Climate

Climate hazards

Acute climate hazard

refer to hazards that are event-driven, including extreme weather events, such as cyclones, droughts, earthquakes or floods.

and

Chronic climate hazards

refer to long-term shifts in climate patterns that may cause the continuous evolution in climate variable like sea level rise, water stress etc...

Scenarios

Base case : SSP2-4.5 – Middle of the Road Scenario

This scenario is projected to lead to a mid-century warming of 1.6 to 2.5°C and end of the century warming of 2.1 to 3.5°C.

Pessimistic case : SSP5-8.5 – High-reference Scenario (Fossil-fueled Development)

This scenario, which is the most pessimistic one, is projected to lead to a mid-century warming of 1.9 to 3°C and end of the century warming of 3.3 to 5.7°C.

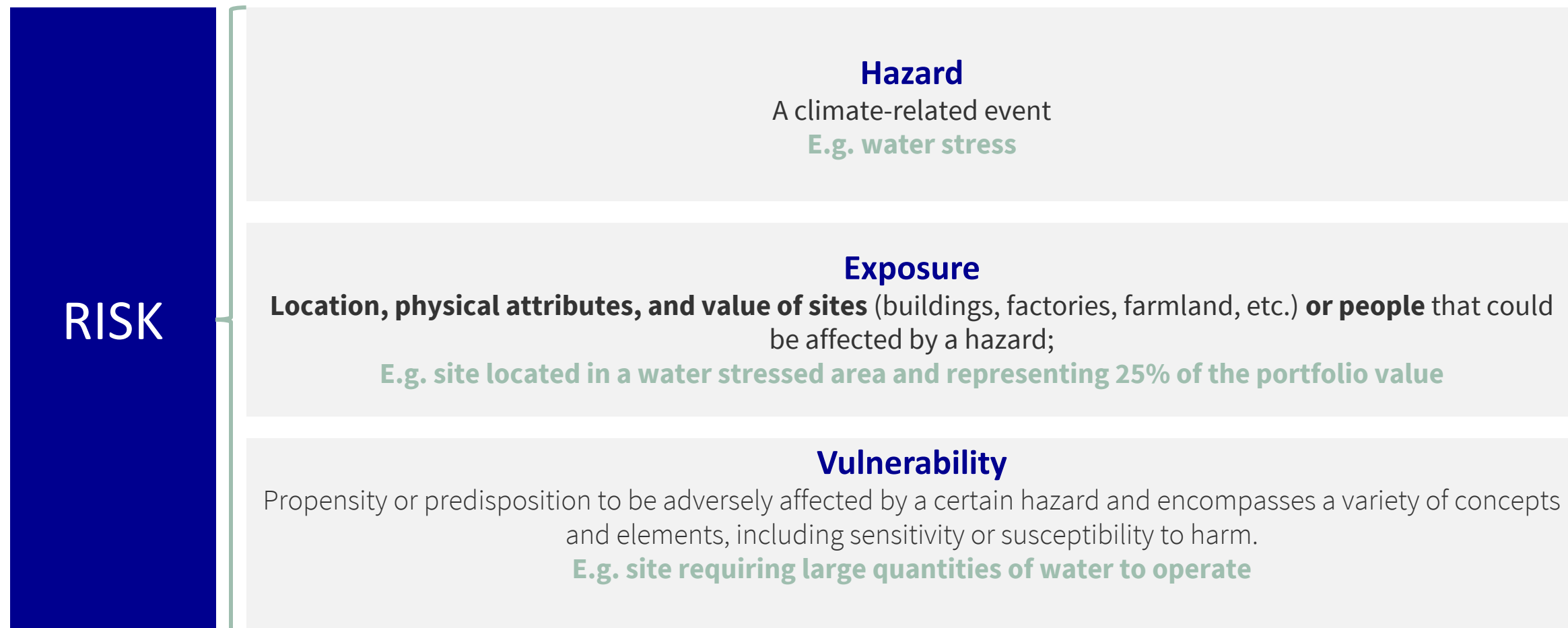
Timeframes

Three timeframes are considered, consistently with the indicative expected lifetime of the sites and the indications of the EU Taxonomy:

- **Baseline:** average 1981 and 2010;
- **2030:** average between 2015 and 2044 values;
- **2050:** average between 2035 and 2064 values.

AXA Climate methodology: Physical climate risks

Climate risk is a function of hazard, vulnerability and exposure



AXA Climate methodology: Risk categorisation and calculation

Multi-peril risk score calculation

Score calculated based only on a site **exposition** to perils (relatively to the portfolio studied) and on the vulnerability depending on the type of building and industry.

Hazard

x

Exposure

x

Vulnerability

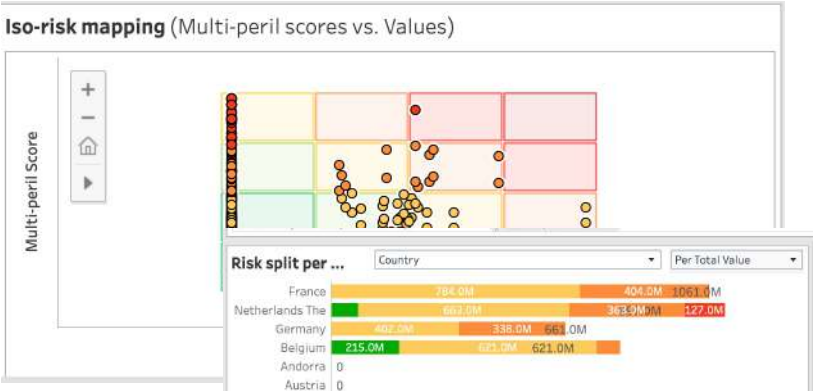
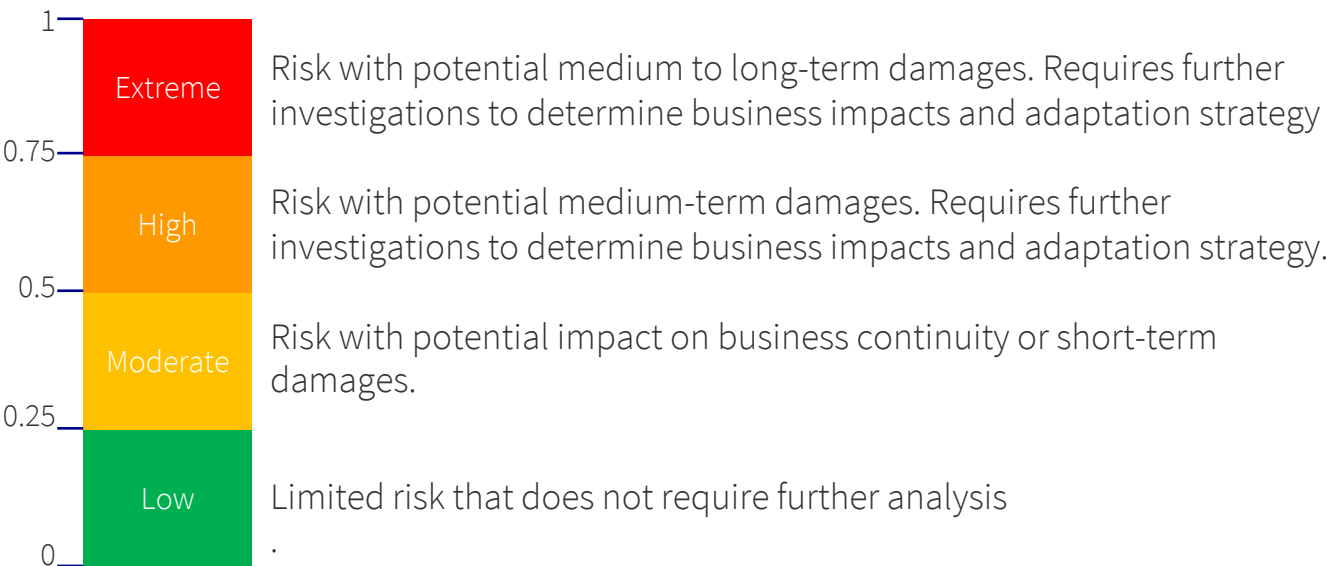
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Normalisation
Risk Score

=

Multi-peril
Score

The multi-peril risk score calculated for each site has different categories



Iso-risk score calculation

absolute risk scoring of a site multiplied by its financial exposure. This indicator allows to include the financial value of to their level of risk. **The number obtained is then normalized between 0 and 1.**

Multi-peril
Score

x

Financial
Value *

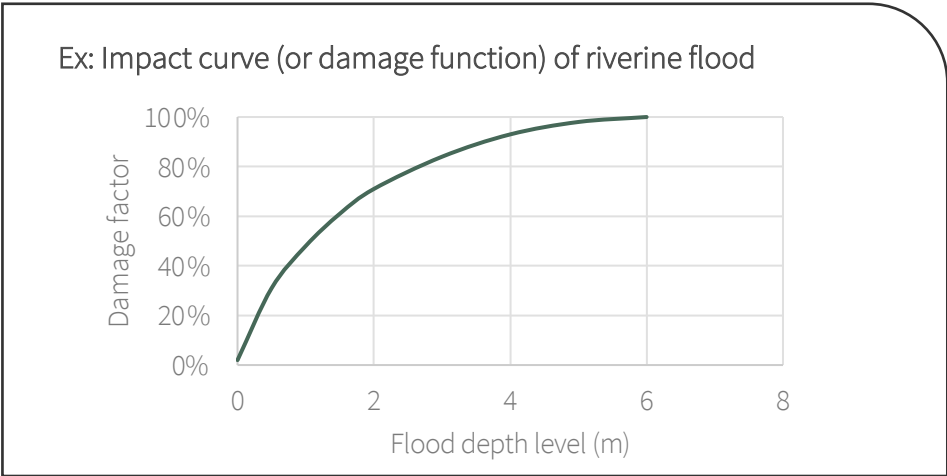
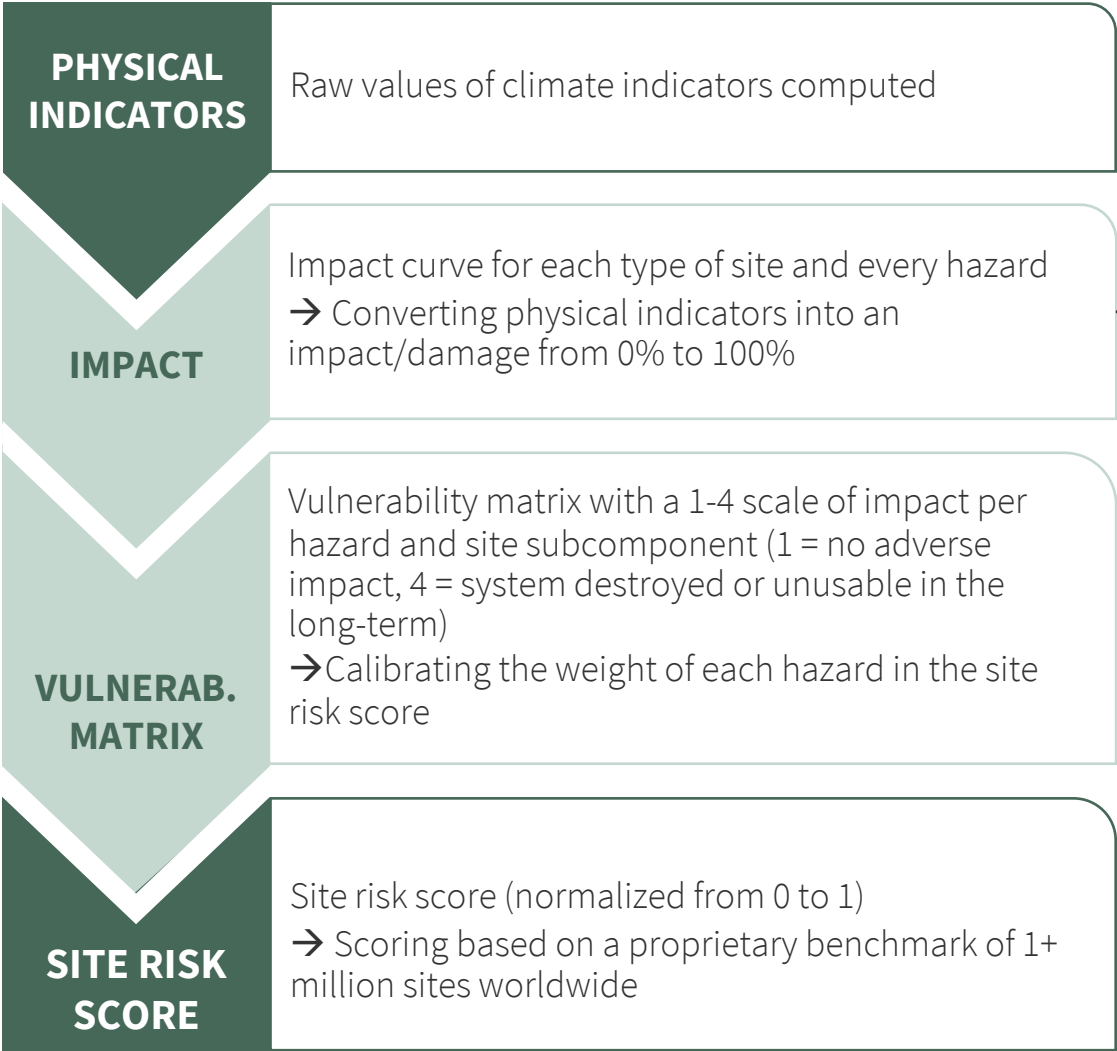
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Iso-Risk

* In this mission indicators include TIV, Gross Margin and Nb. Of Accommodations

AXA Climate methodology: From physical indicators to a risk score

Our risk scoring method accounts for the site vulnerability to each peril



Ex: Extract of a vulnerability matrix for an infrastructure

		Average Temperature	Wildfires	Earthquake	Water availability	Heavy rain falls
Infrastructures	Accesses	1	4	2	1	3
	Car parks	1	3	1	1	2
	Runways	1	3	4	2	3
	Taxiways	1	3	4	2	3
	Apron	1	4	4	2	3
Buildings	Terminals	1	3	3	2	
	Liaisons between terminals	1	3	3	1	
	Offices and other buildings	1	2	2	2	
	Any bridges	1	2	2	1	
	Tower	1	3	4	2	
Exploitation	Fuel deposit	1	4	4	2	3
	Deicing	1	2	2	1	2
	ARFF	1	2	2	1	2
	Trucks	1	3	1	1	
	Navigation and equipment	1	2	1	1	
	Human resources	1	3	2	1	

An aerial, high-angle photograph of a city at night. The image shows a dense urban environment with various buildings, streets, and parking lots. The lighting is a mix of warm yellow and orange from streetlights and cooler blue and white from building lights. The perspective is looking down from a high vantage point, showing the layout of the city blocks.

03



Portfolio screening results

5 IPSEN' sites are considered at High or Extreme risk (multi-peril risk scoring)

PORTFOLIO ANALYSIS – MOST EXPOSED IPSEN' SITES by SSP5-8.5 2030

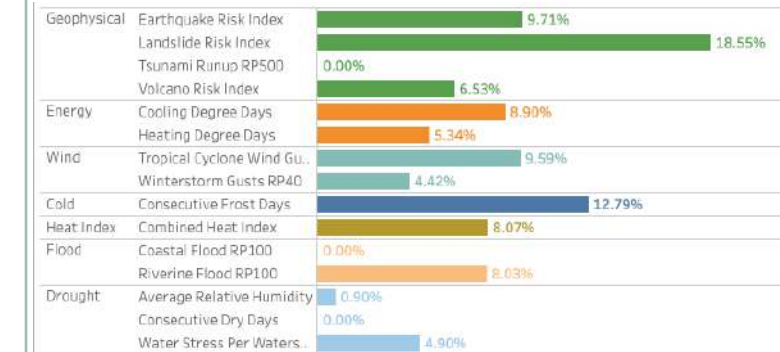
- **3 sites** are considered at **Extreme** risk, representing **less than 5% of IPSEN' sites**, and **2 sites** at **High** risk (incl. 1 CHC)
- 80% of these sites are based in **Taiwan** (2 sites) and **Switzerland** (2 sites)
- The multi-peril scoring value is **driven by geophysical perils**
- When considering the financial exposure, **5 internal factories** appear to be at risk (incl. 2 CHC sites)

Geographical distribution*



*Of the sites at High or Extreme risk

Breakdown per peril*



*For the sites at High or Extreme risk

Top 5 IPSEN' sites ranked Multi-Peril Score

#	Asset Name	Country	Occupancy	Selected Val..	Iso-Risk	Score
IPSEN_182	IPSEN PHARMA TAIWAN - Taipei	Taiwan	Offices	5,0M	0,07	1,00
IPSEN_77	IPSEN PHARMA TAIWAN Tapei - Ta..	Taiwan	Offices	5,0M	0,06	0,89
IPSEN_181	LINNEA SA - Riazzino - Internal Fac..	Switzerland	Internal Fac..	50,0M	0,54	0,77
IPSEN_113	Beaufour Ipsen Tianjin Pharmaceu..	China	Internal Fac..	50,0M	0,52	0,74
IPSEN_180	LINNEA SA - Riazzino - Internal Dis..	Switzerland	Internal Dis..	25,0M	0,22	0,64

Top 5 IPSEN' sites ranked by Iso-Risk Score [weighted by financial exposure]

#	Asset Name	Country	Occupancy	Selected Val..	Iso-Risk	Score
IPSEN_223	Ipsen Algérie (projet) - Rahmania	Algeria	Internal Fac..	150,0M	1,00	0,48
IPSEN_208	IPSEN BIOSCIENCE - Cambridge	United States	Internal Fac..	150,0M	0,91	0,44
IPSEN_126	BEAUFOUR IPSEN INDUSTRIE - Dre..	France	Internal Fac..	150,0M	0,61	0,29
IPSEN_181	LINNEA SA - Riazzino - Internal Fac..	Switzerland	Internal Fac..	50,0M	0,54	0,77
IPSEN_113	Beaufour Ipsen Tianjin Pharmaceu..	China	Internal Fac..	50,0M	0,52	0,74

CHC site

16 sites are considered at High or Extreme risk (multi-peril risk scoring)

PORTFOLIO ANALYSIS – MOST EXPOSED SITES by SSP5-8.5 2030

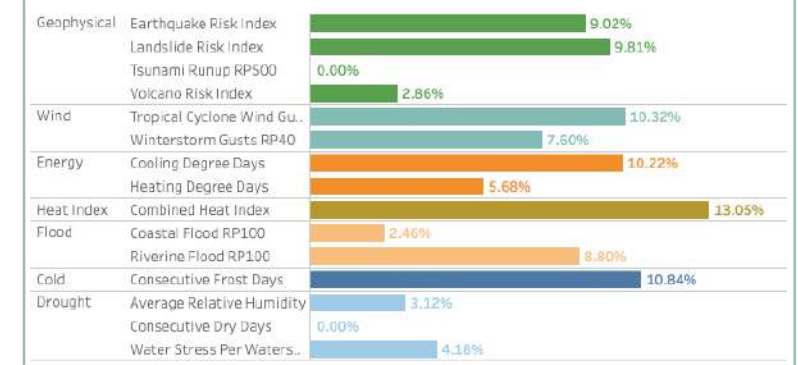
- **6 sites** are considered at **Extreme** risk and **10 sites** at **High** risk, representing **less than 10% of the portfolio**
- 4 sites of these sites are in **Taiwan**, 4 in the **USA**, 3 in **China**, 3 in **Switzerland**, 1 in **Singapore**, and 1 in the **Netherlands**
- Vulnerability of **High** and **Extreme** risk sites are mainly linked to **Geophysical perils** (destructive peril) and **Heat Index** (chronic peril)
- When considering the financial exposure, **the USA** appears to be the country most at risk (total financial exposure of 500m€)

Geographical distribution*



*Of the sites at High or Extreme risk

Breakdown per peril*



*For the sites at High or Extreme risk

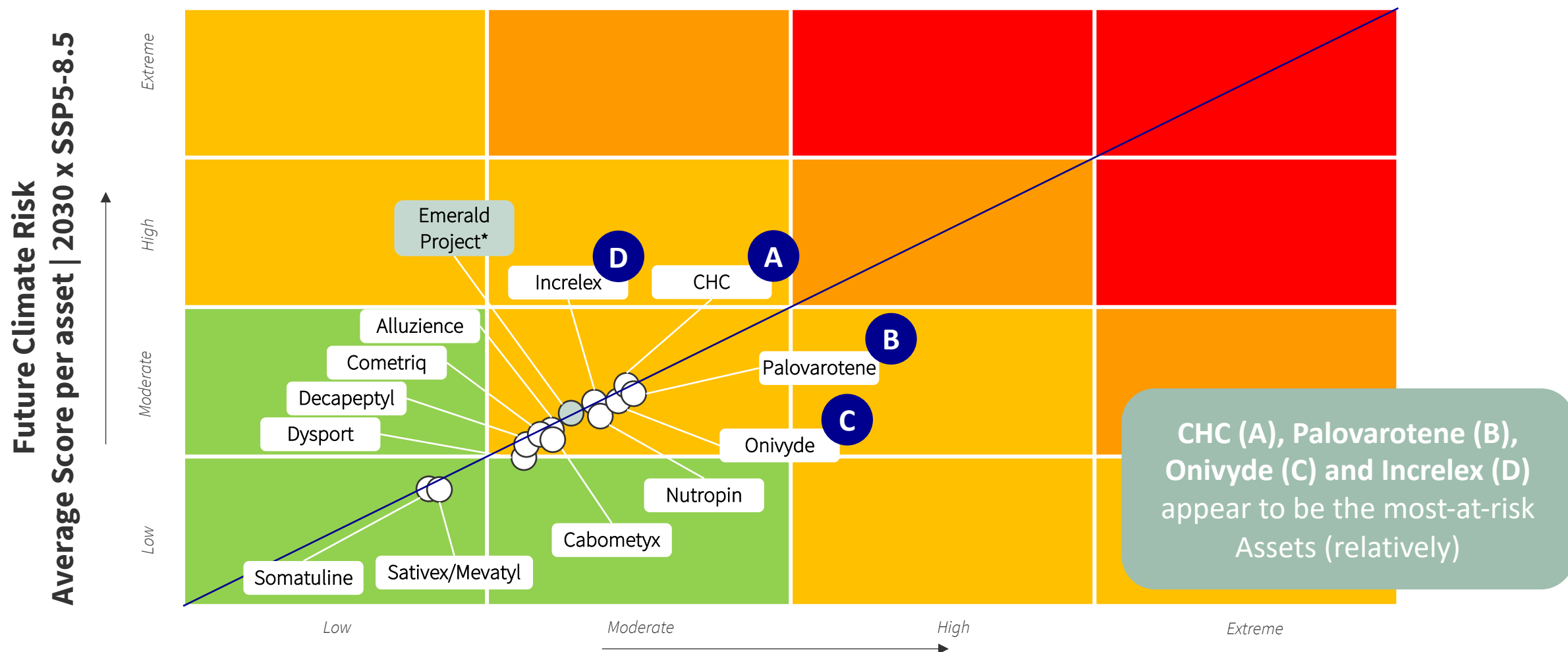
List of the 16 sites ranked by Multi-Peril Score

#	Asset Name	Country	Occupancy	Selected Val..	Iso-Risk	Score
IPSEN_27	ScinoPharm - Taiwan City	Taiwan	External Pa..	150,0M	1,00	1,00
IPSEN_182	IPSEN PHARMA TAIWAN - Taipei	Taiwan	Offices	5,0M	0,03	1,00
IPSEN_77	IPSEN PHARMA TAIWAN Tapei - Ta..	Taiwan	Offices	5,0M	0,03	0,89
IPSEN_183	IPSEN PHARMA TAIWAN - Taoyuan	Taiwan	External Dis..	5,0M	0,03	0,84
IPSEN_45	Clementia Pharmaceuticals Inc (A..	United States	External Pa..	150,0M	0,78	0,78
IPSEN_181	LINNEA SA - Riazzino - Internal Fac..	Switzerland	Internal Fac..	50,0M	0,26	0,77
IPSEN_113	Beaufour Ipsen Tianjin Pharmaceu..	China	Internal Fac..	50,0M	0,25	0,74
IPSEN_22	Lonza - Visp	Switzerland	External Pa..	150,0M	0,71	0,71
IPSEN_110	Beaufour Ipsen Tianjin Pharmaceu..	China	External Dis..	5,0M	0,02	0,66
IPSEN_180	LINNEA SA - Riazzino - Internal Dis..	Switzerland	Internal Dis..	25,0M	0,11	0,64
IPSEN_60	Alcami Corporation - Wilmington	United States	External Pa..	150,0M	0,64	0,64
IPSEN_62	Genentech, Inc. - South San Franci..	United States	External Pa..	50,0M	0,20	0,60
IPSEN_5	Piramal Pharma Solutions - Mitichi..	United States	External Pa..	150,0M	0,56	0,56
IPSEN_107	Beaufour Ipsen Tianjin Pharmaceu..	China	External Dis..	5,0M	0,02	0,55
IPSEN_221	Catalent Pharma Solutions - Singa..	Singapore	External Pa..	150,0M	0,54	0,54
IPSEN_58	Pall (Single source supplier single..	Netherlands ..	External Pa..	150,0M	0,52	0,52

CHC site

On average, no Asset shows a high or extreme exposure to climate risk

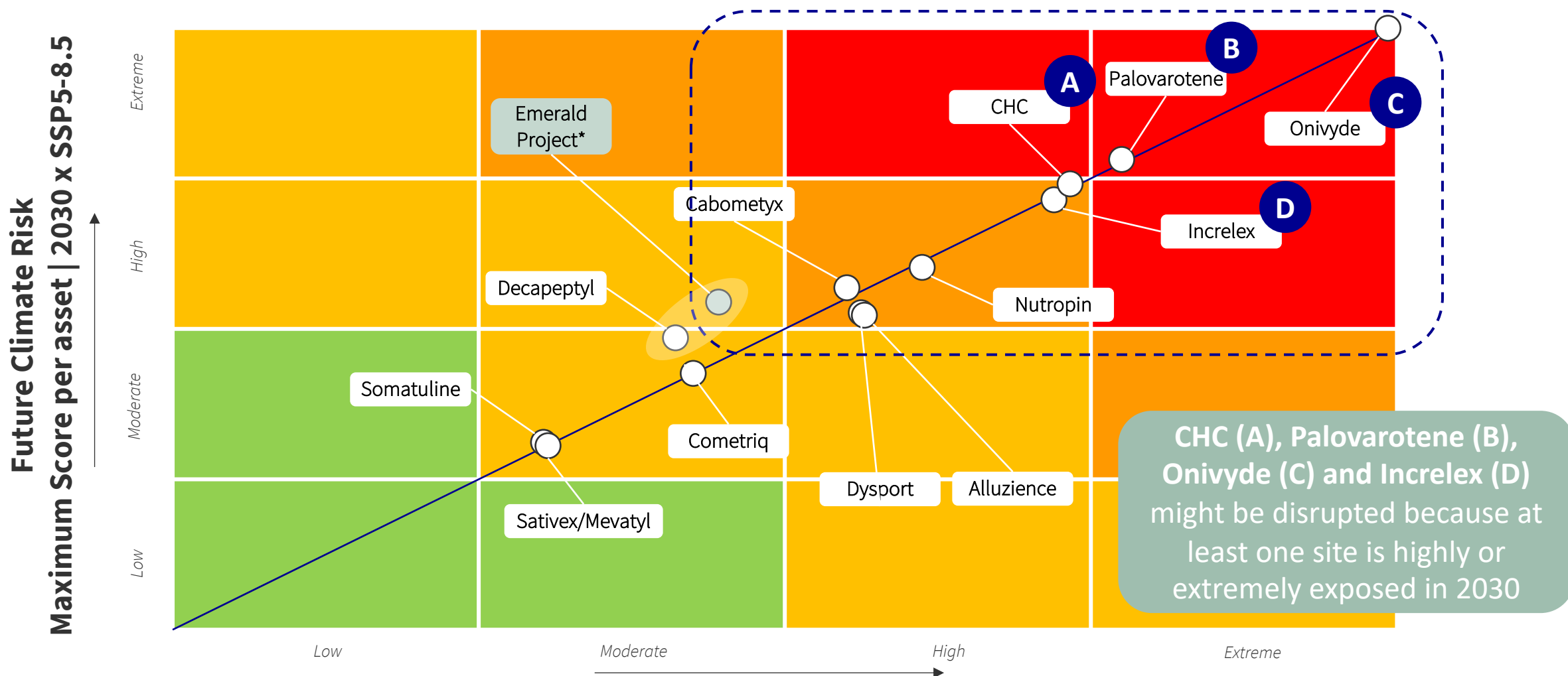
Portfolio analysis | ACM perspective – Average Multi-Peril Score per Asset



* acquisition of Epizyme (Tazverik)

However, 9 Assets might have at least one site at high or extreme climate risk in 2030

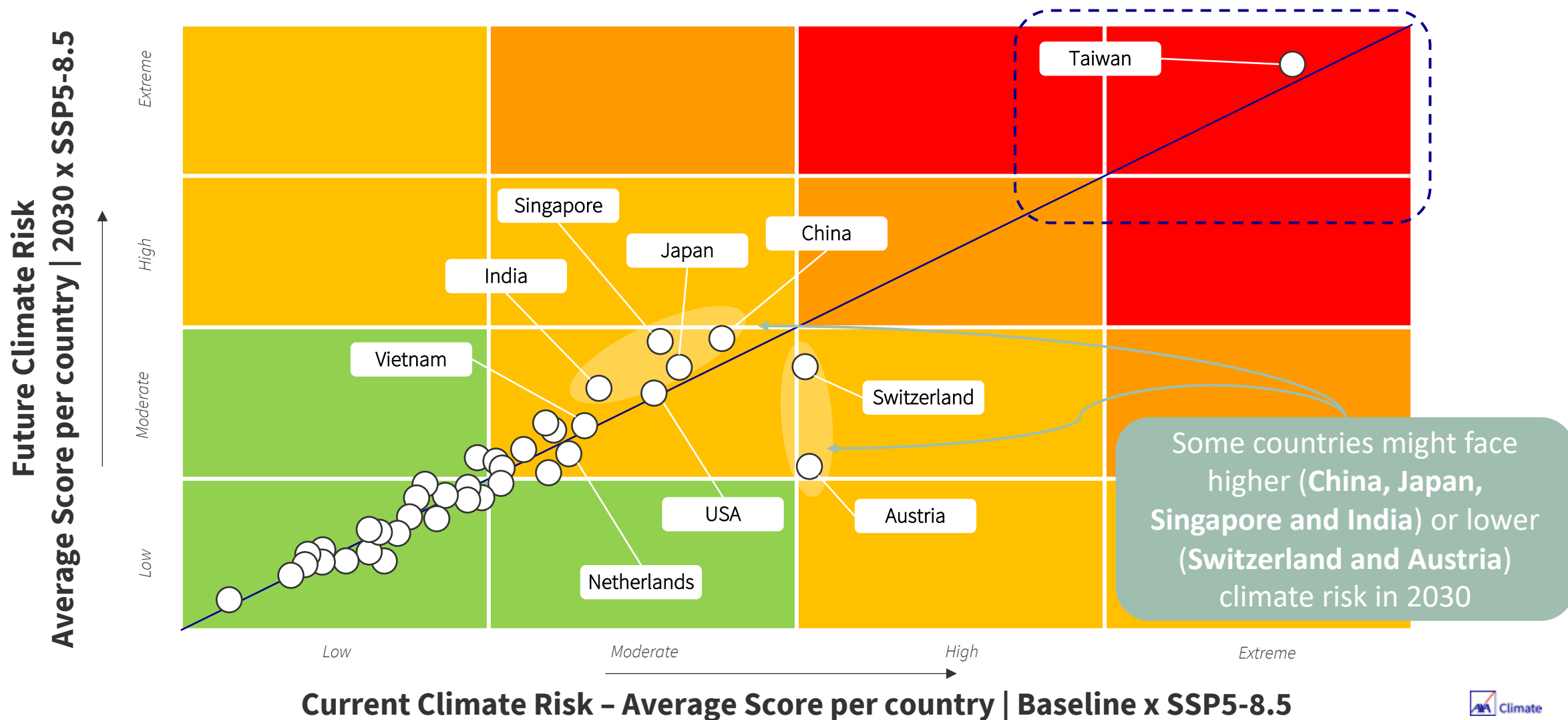
Portfolio analysis | ACM perspective – Maximum Multi-Peril Score per Asset



* acquisition of Epizyme (Tazverik)

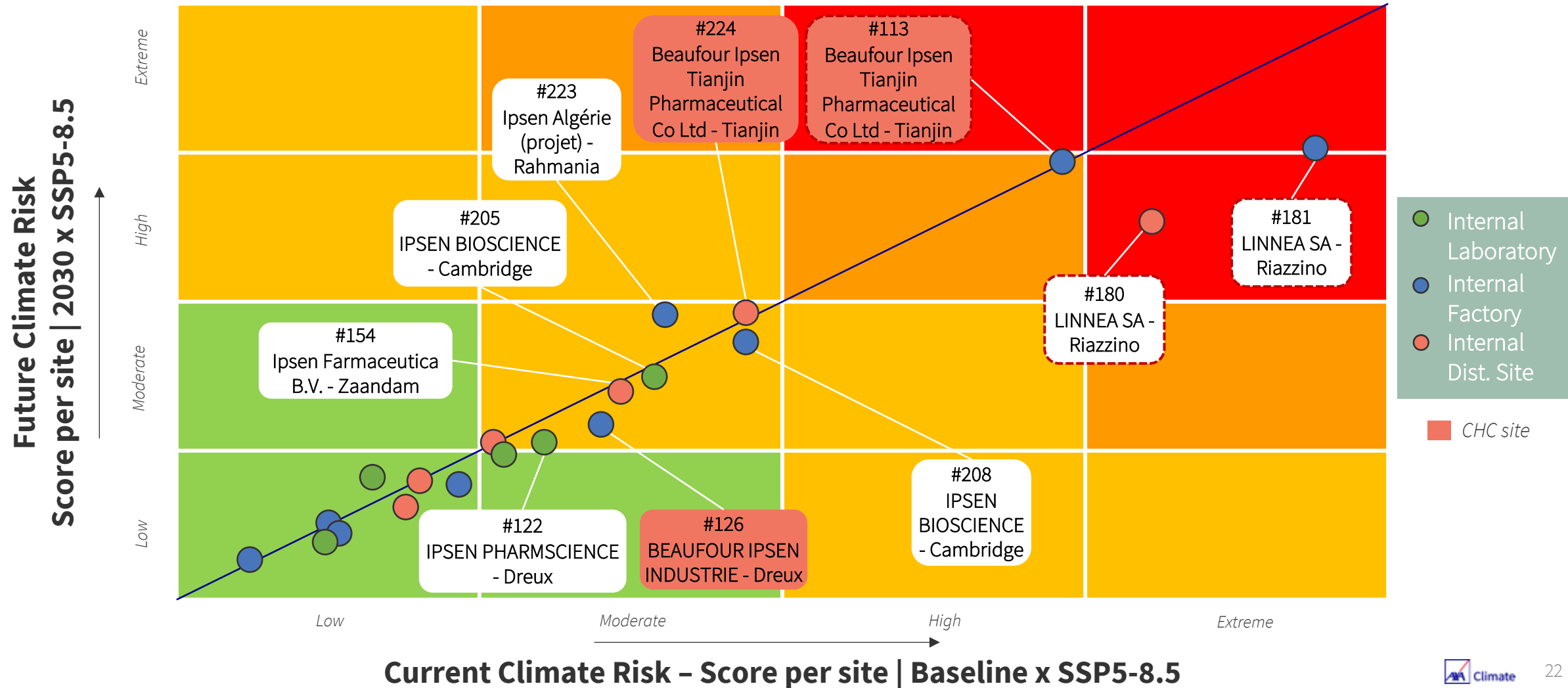
As measured by the average score of each site, Taiwan appears to be the country most at risk

Portfolio analysis | Country perspective – Average Score per Country



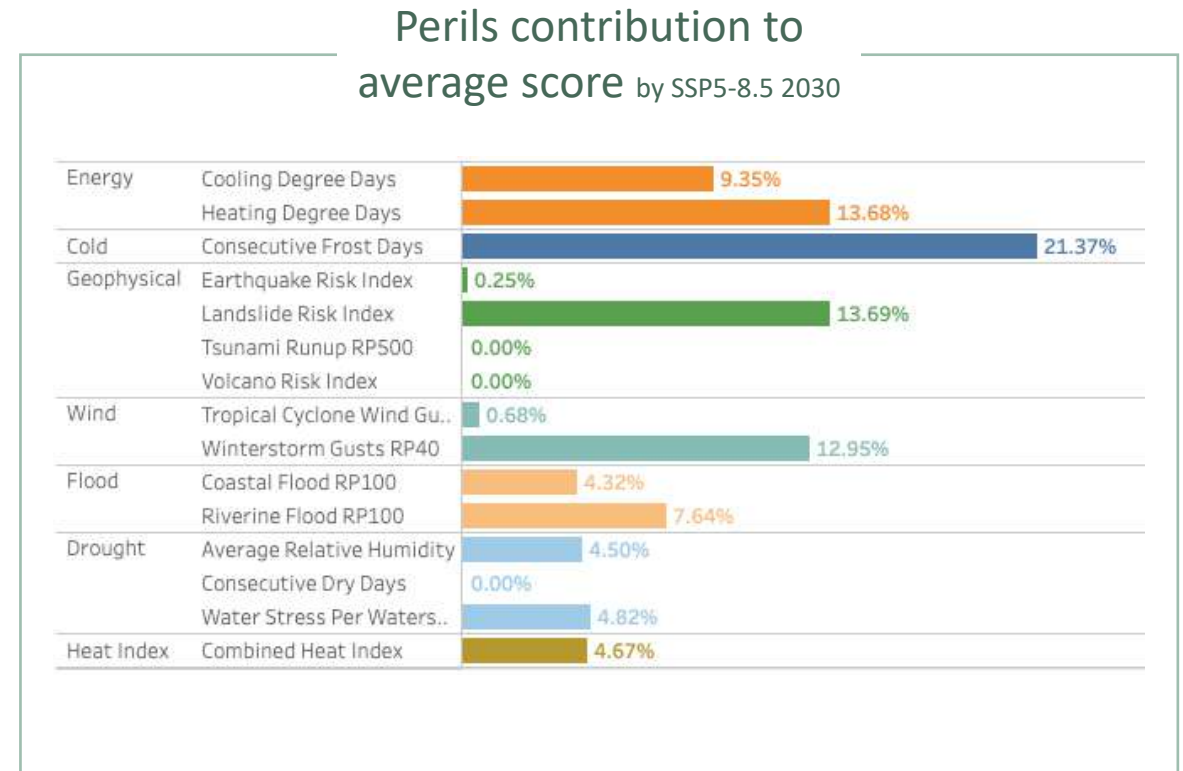
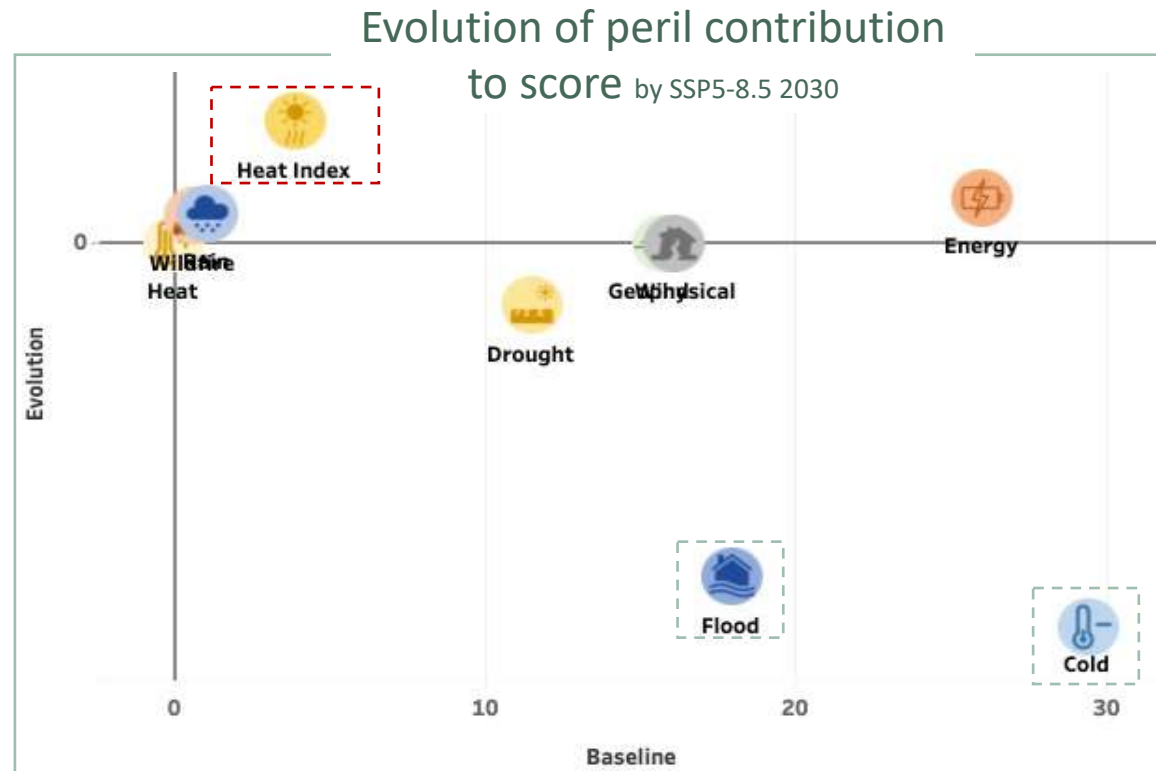
3 IPSEN key sites (2 factories – incl. 1 CHC) appear to be at high or extreme risk

Portfolio analysis | IPSEN key sites (*i.e. excl. offices*)



IPSEN key sites should be mainly affected by the deterioration of the Heat Index¹

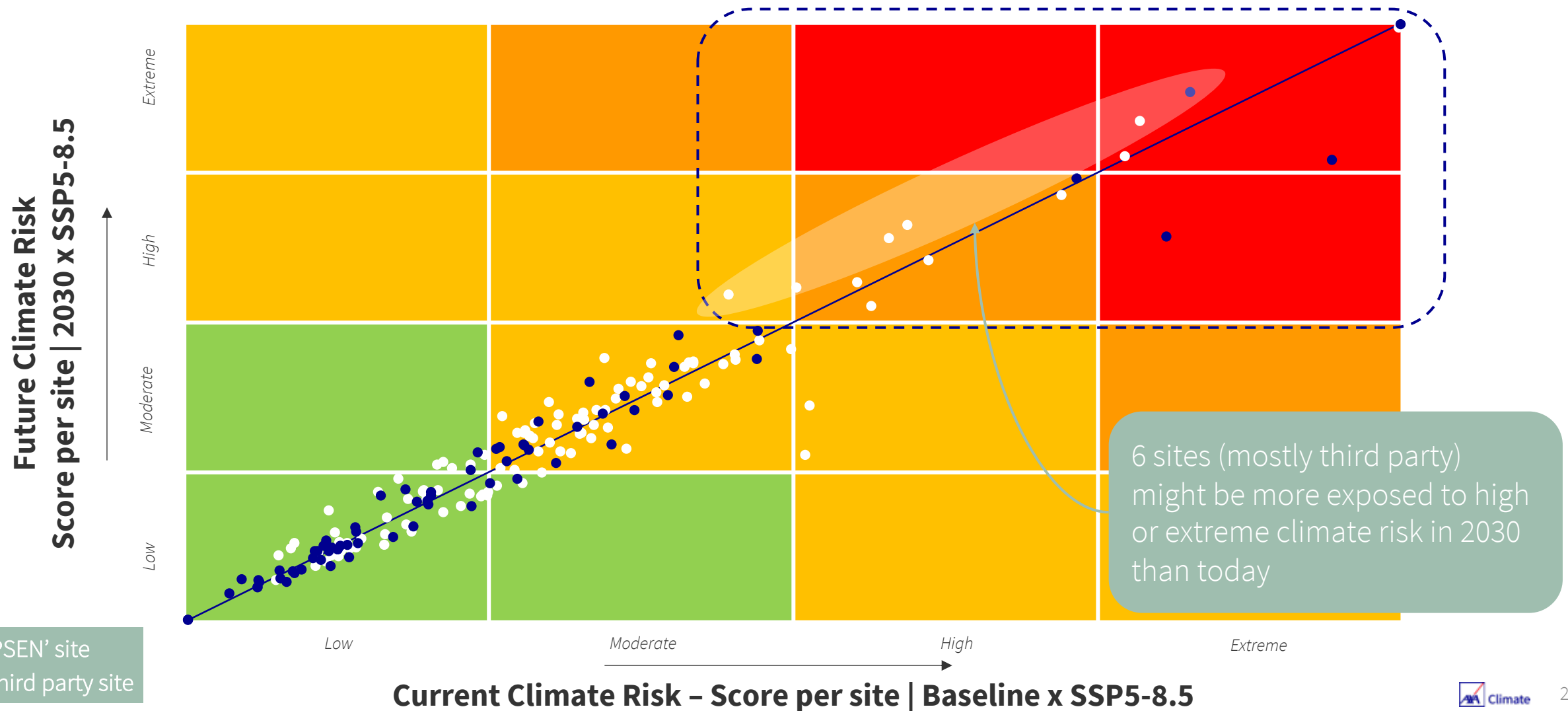
Portfolio analysis | Variation of key perils for IPSEN key sites (*i.e. excl. offices*)

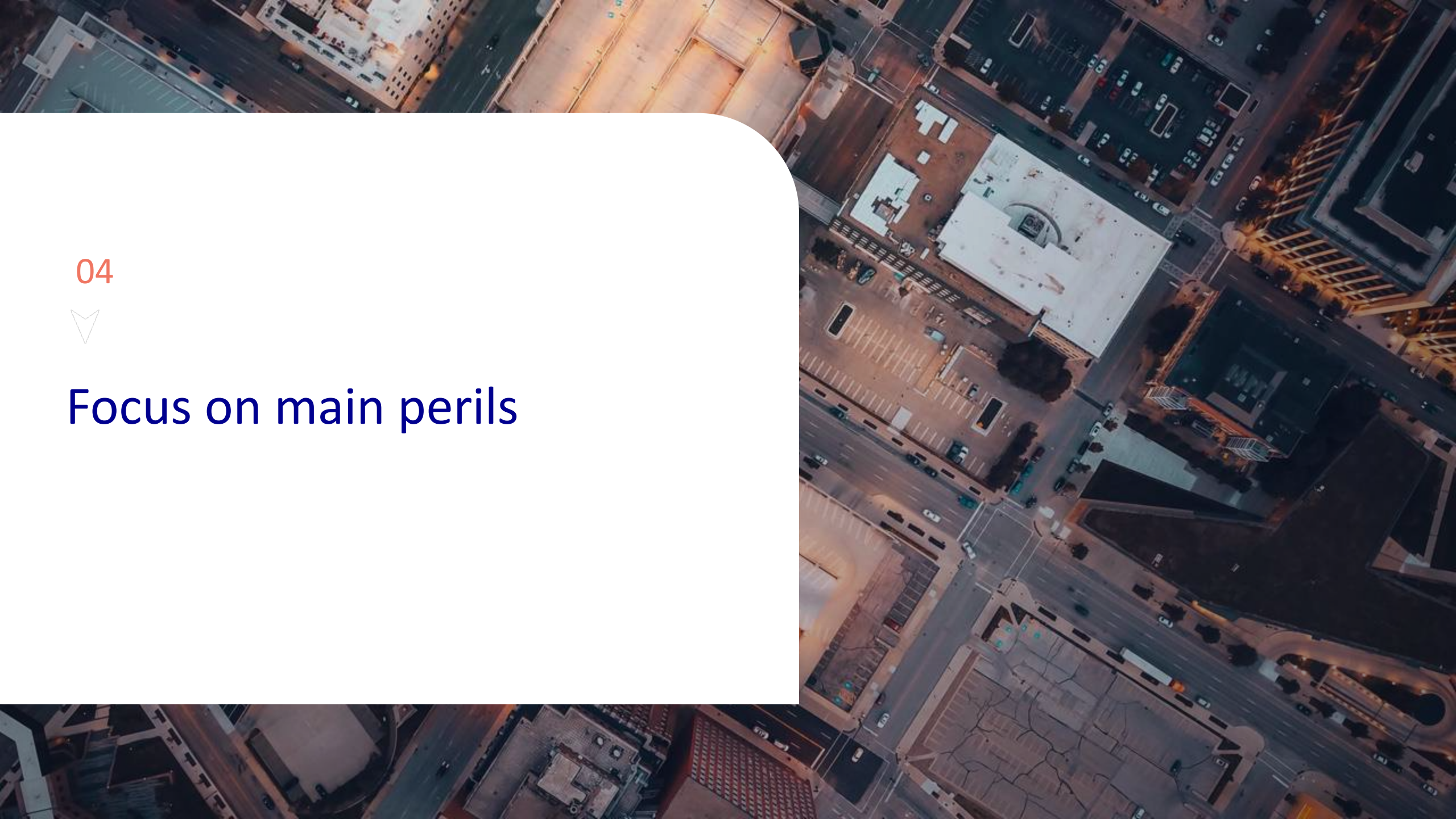


¹ The focus is given to variation as it is assumed that most sites are already adapted to the perils to which they are currently exposed

5 IPSEN' sites might be at high or extreme risk in 2030 vs 11 third-party sites

Portfolio analysis | Supply-chain



An aerial, high-angle photograph of a city street at night. The street is illuminated by streetlights, and several cars are visible. The surrounding buildings are also lit up, and the overall scene is a dense urban environment.

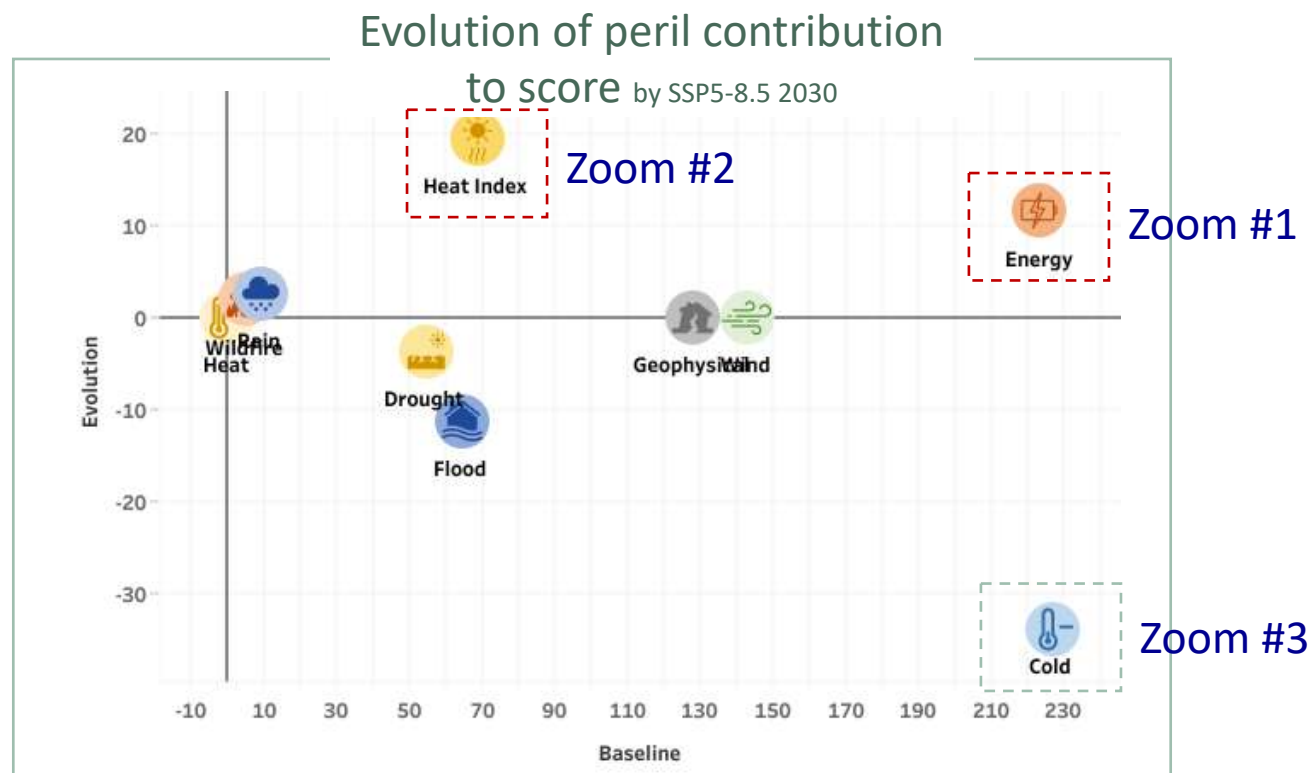
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Focus on main perils

The main deterioration¹ will concern Heat Index and Cooling Degree Days

Portfolio analysis | Variation of perils for the full portfolio

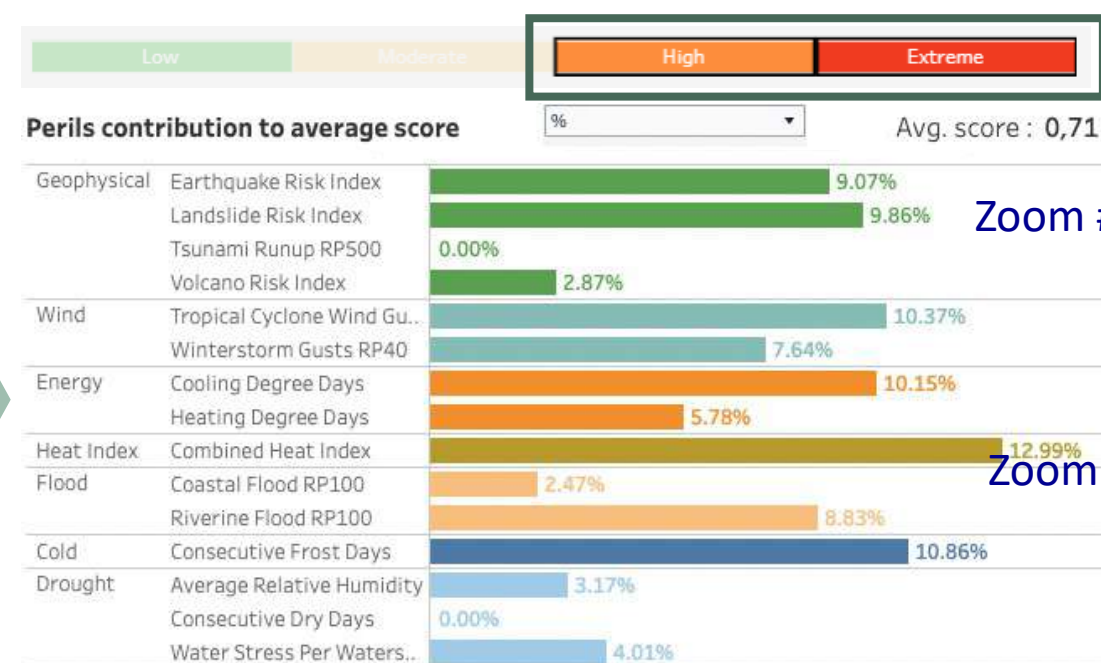
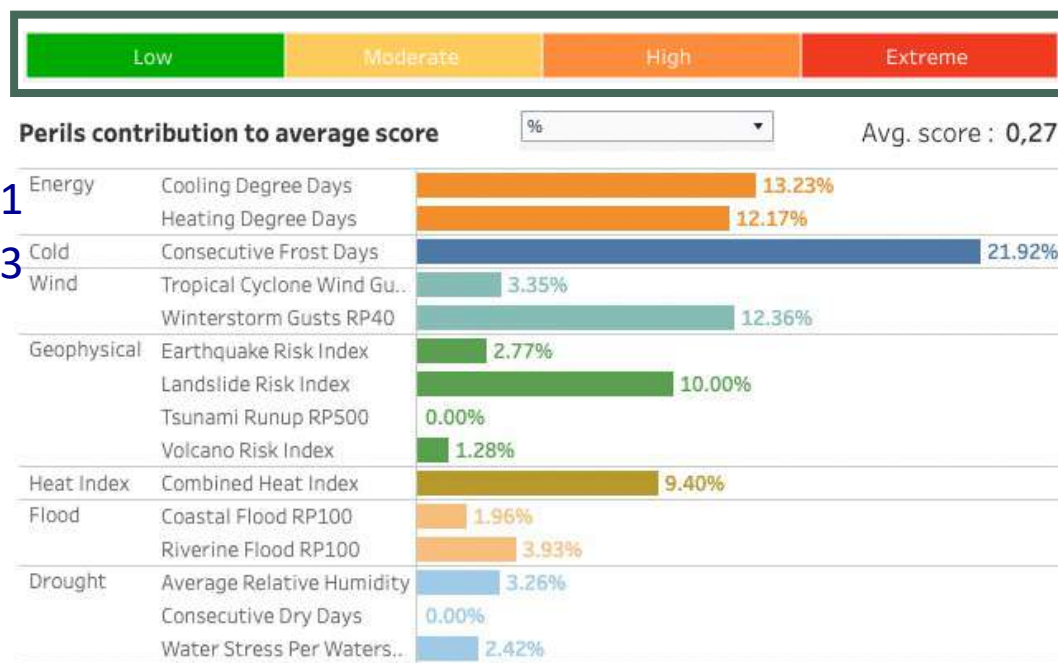


¹ The focus is given to variation as it is assumed that most sites are already adapted to the perils to which they are currently exposed

Vs the portfolio average, sites at High and Extreme risk are characterized by their exposure to geophysical and wind-related perils

Zoom #1

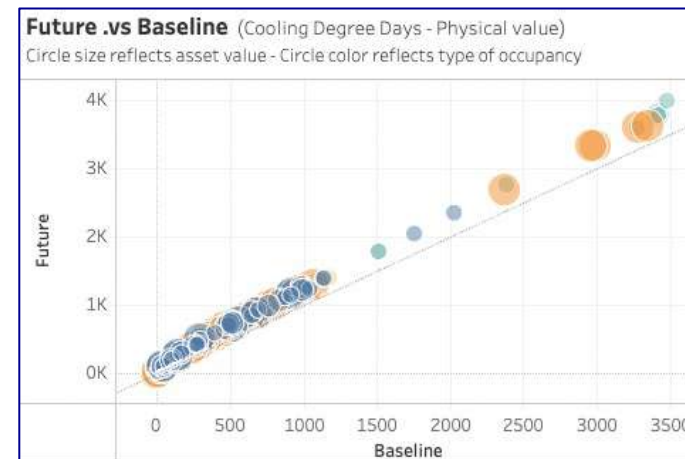
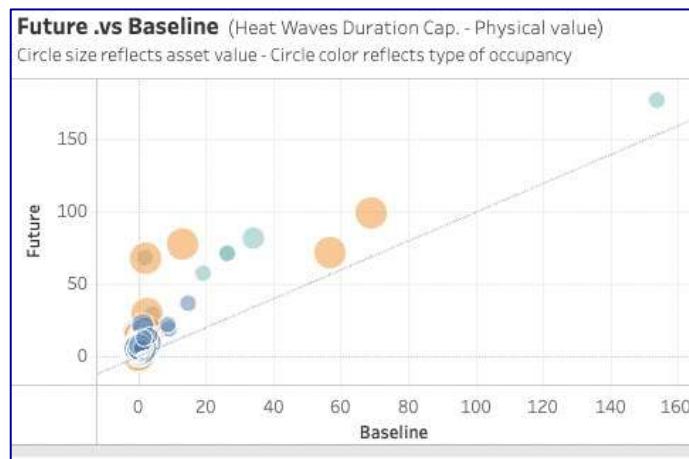
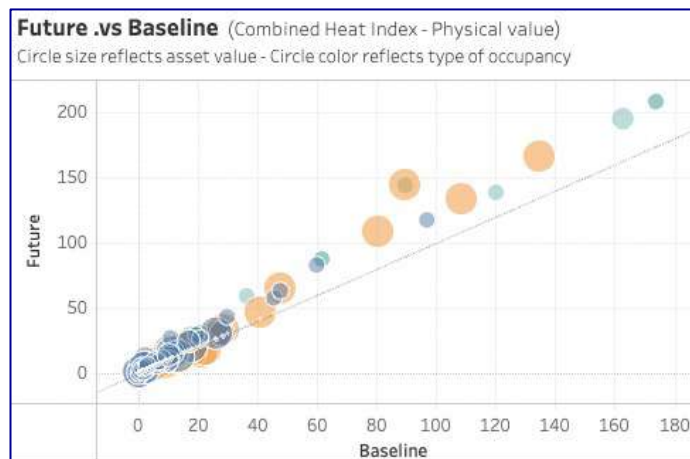
Zoom #3



Zoom #4

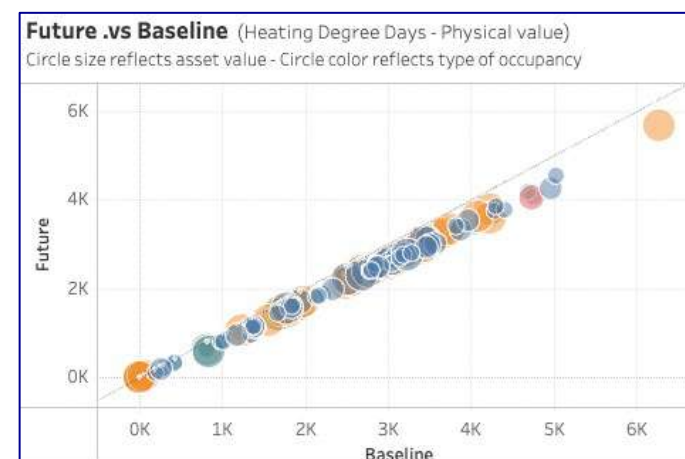
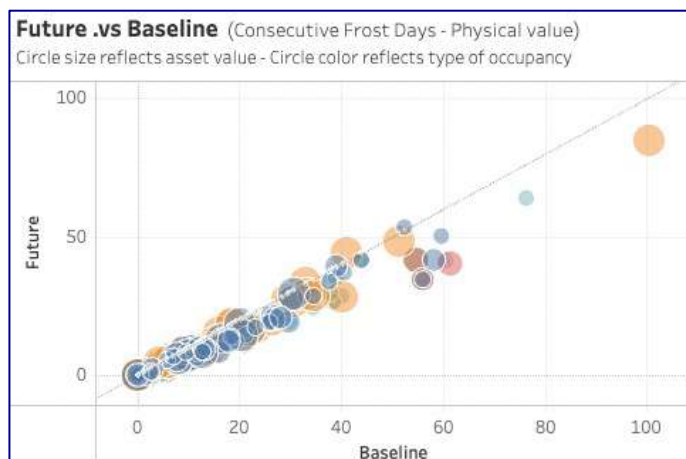
Zoom #2

Among the main contributing perils, significant variations will be observed for those related to the increase in temperature



Perceived temperature and Heat Waves Duration
vs Consecutive Frost Days

Energy-related indicators



ZOOM #1 – COOLING DEGREE DAYS

Already highly exposed sites will see their exposure to the Cooling Degree Days peril increase significantly by 2030

- 9 sites are considered highly exposed to the Cooling Degree Days peril by 2030
- The top 15 sites exposed are all located in the Middle East and South East Asia regions.
- 4 of the highly exposed sites are External Partners (in India and Singapore), highlighting a potential supply-chain vulnerability to energy consumption (for cooling systems and temperature monitoring in their processes)

➤ Cooling Degree Days is a weather-based technical index designed to describe the need for the cooling energy requirements of buildings (reference threshold = 18°C)

Top 15 of the most exposed assets to CDD (°C) - 2030 SSP5-8.5

#	Asset Name	Country	Asset City	Occupancy	Selected Va..	
IPSEN_193	IPSEN PHARMA SAS UAE ..	United Arab ..	Dubai	Offices	5,0M	3977
IPSEN_211	9322 IPSEN CONSUMER ..	Vietnam	Thuan An	Offices	25,0M	3787
IPSEN_81	9322 IPSEN CONSUMER ..	Vietnam	Ho Chi Minh City	Offices	5,0M	3780
IPSEN_210	9222 IPSEN PHARMA SA..	Vietnam	Ho Chi Minh City	Offices	5,0M	3780
IPSEN_213	Laurus Labs Ltd - Visakha..	India	Visakhapatnam	External Partner	150,0M	3612
IPSEN_221	Catalent Pharma Solutio..	Singapore	Singapore	External Partner	150,0M	3598
IPSEN_164	IPSEN PHARMA SINGAPO..	Singapore	Singapore	Offices	5,0M	3598
IPSEN_24	Dr. Reddy's Laboratories ..	India	Ida Bollaran	External Partner	150,0M	3329
IPSEN_212	Aarti Industries Ltd - Vapi	India	Vapi	External Partner	150,0M	3322
IPSEN_209	9222 IPSEN PHARMA SA..	Vietnam	Hanoi	Offices	5,0M	2754
IPSEN_27	ScinoPharm - Taiwan City	Taiwan	Taiwan City	External Partner	150,0M	2693
IPSEN_110	Beaufour Ipsen Tianjin P..	China	Guangzhou	External Distribution site	5,0M	2348
IPSEN_183	IPSEN PHARMA TAIWAN ..	Taiwan	Taoyuan	External Distribution site	5,0M	2042
IPSEN_77	IPSEN PHARMA TAIWAN ..	Taiwan	Taipei	Offices	5,0M	1786
IPSEN_182	IPSEN PHARMA TAIWAN ..	Taiwan	Taipei	Offices	5,0M	1786

 Assets with significant increase of CDD value

CHC site

ZOOM #2 – COMBINED HEAT INDEX

Already highly exposed sites will see their exposure to the Combined Heat Index peril increase significantly by 2030

➤ Heat Index is combination of hot temperatures and high relative humidity

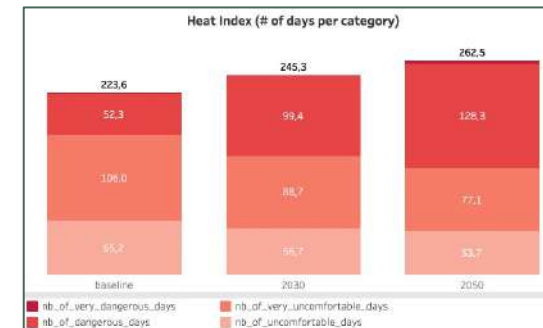
Top 15 of the most exposed assets to CHI - 2030 SSP5-8.5

#	Asset Name	Country	Asset City	Occupancy	Selected Va..	
IPSEN_81	9322 IPSEN CONSUMER ..	Vietnam	Ho Chi Minh City	Offices	5,0M	207,5
IPSEN_210	9222 IPSEN PHARMA SA..	Vietnam	Ho Chi Minh City	Offices	5,0M	207,5
IPSEN_211	9322 IPSEN CONSUMER ..	Vietnam	Thuan An	Offices	25,0M	194,8
IPSEN_213	Laurus Labs Ltd - Visakha..	India	Visakhapatnam	External Partner	150,0M	165,7
IPSEN_221	Catalent Pharma Solutio..	Singapore	Singapore	External Partner	150,0M	144,4
IPSEN_164	IPSEN PHARMA SINGAPO..	Singapore	Singapore	Offices	5,0M	144,4
IPSEN_209	9222 IPSEN PHARMA SA..	Vietnam	Hanoi	Offices	5,0M	138,4
IPSEN_27	ScinoPharm - Taiwan City	Taiwan	Taiwan City	External Partner	150,0M	133,5
IPSEN_110	Beaufour Ipsen Tianjin P..	China	Guangzhou	External Distribution site	5,0M	117,3
IPSEN_212	Aarti Industries Ltd - Vapi	India	Vapi	External Partner	150,0M	108,3
IPSEN_77	IPSEN PHARMA TAIWAN ..	Taiwan	Taipei	Offices	5,0M	87,3
IPSEN_182	IPSEN PHARMA TAIWAN ..	Taiwan	Taipei	Offices	5,0M	87,3
IPSEN_183	IPSEN PHARMA TAIWAN ..	Taiwan	Taoyuan	External Distribution site	5,0M	82,7
IPSEN_24	Dr. Reddy's Laboratories ..	India	Ida Bollaran	External Partner	150,0M	64,9
IPSEN_107	Beaufour Ipsen Tianjin P..	China	Shanghai	External Distribution site	5,0M	63,2

CHC site

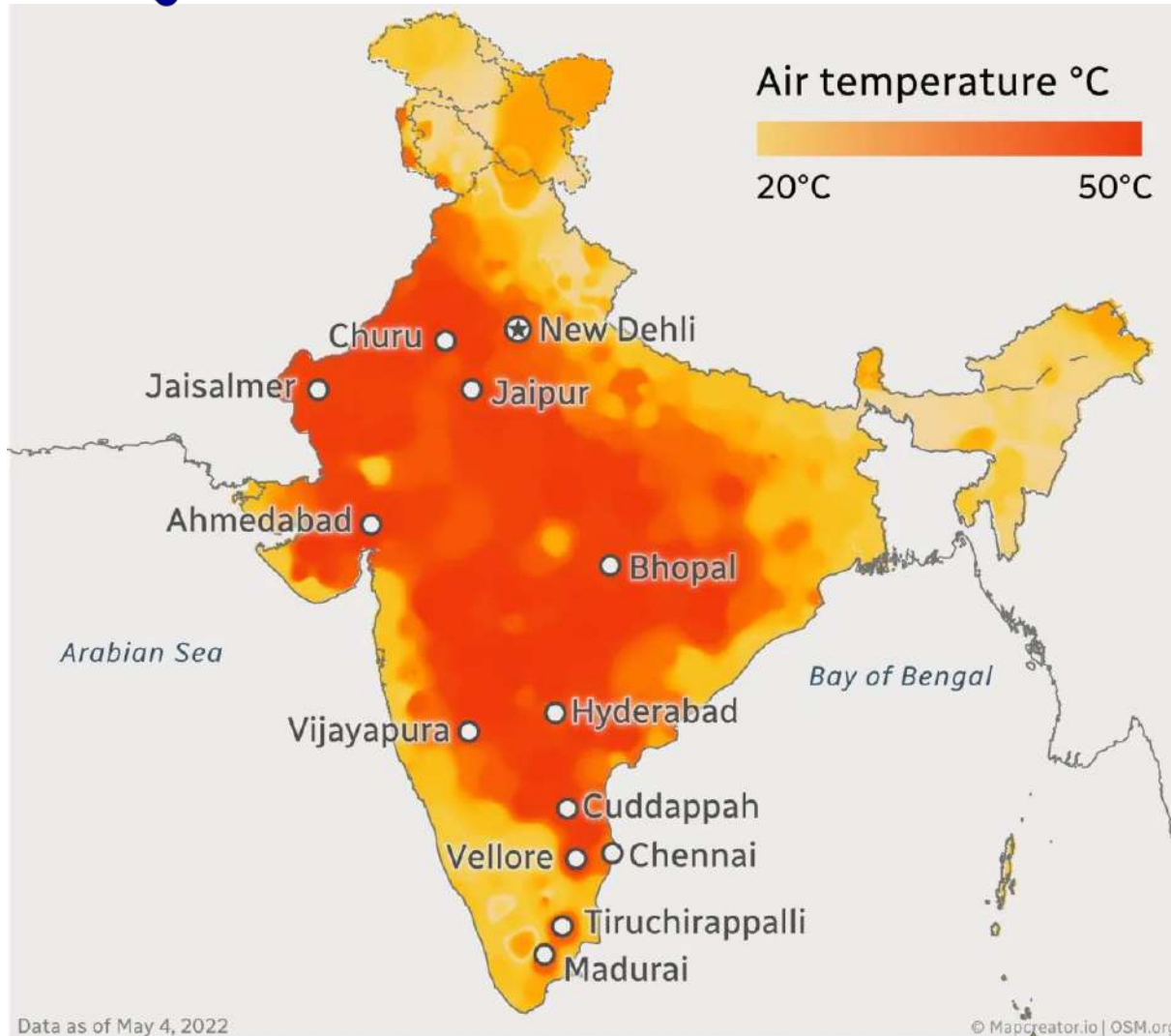
Perceived temperature will hit at least a 40°C much more frequently in Taiwan

Conditions can trigger problems in health issues for employees and therefore affect operations





The Science behind — Heat Wave in India (April May 2022)



Source: India Meteorological Department

CBC News

- Hottest March in record in India in 122 years!
- Fourth-hottest April in record in India
- Multiple stations in New Delhi recorded their all-time high temperature topping 49°C on May 15, 2022.

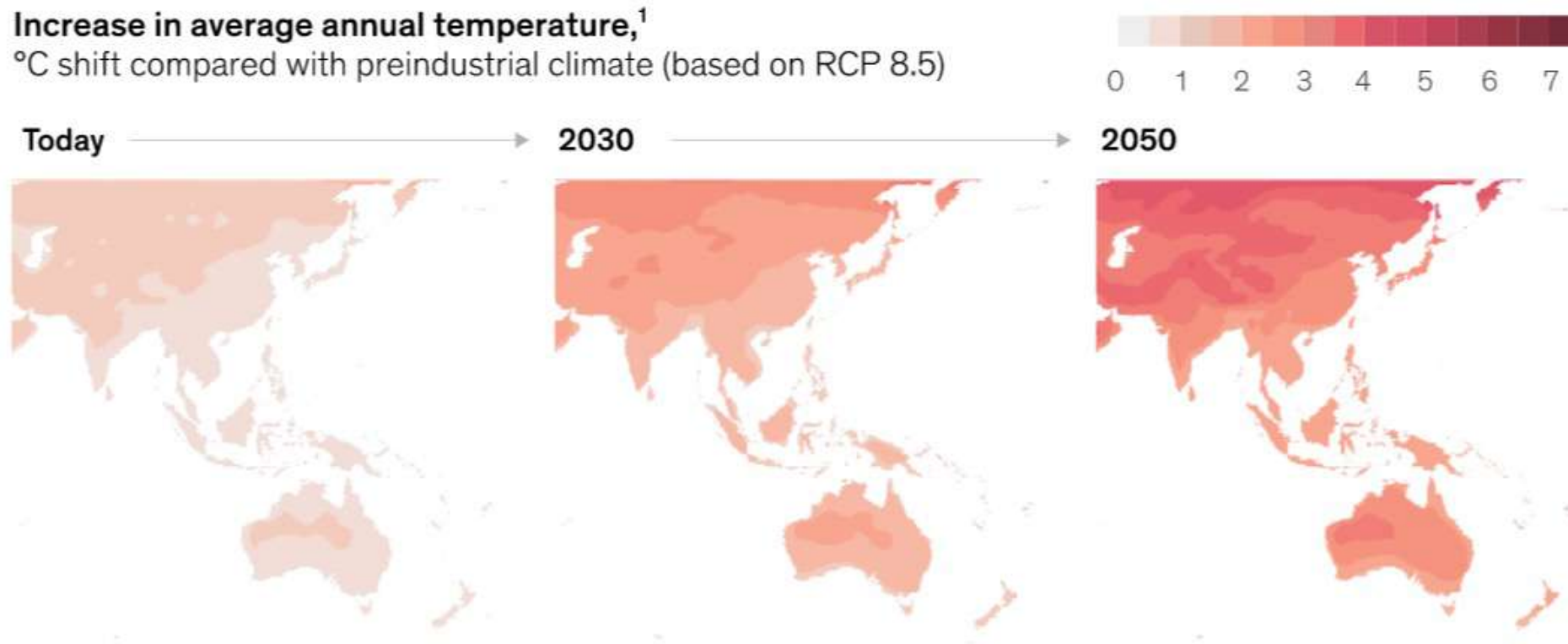
Heat stress acceleration thru the number of past heatwave days* in India:

- **413 in 1981-90**
- **575 in 2001-10**
- **600 in 2011-20**



The Science behind — What's coming soon?

Asia stands out as being more exposed to physical climate risk than other parts of the world in the absence of adaptation and mitigation



Major reasons being:

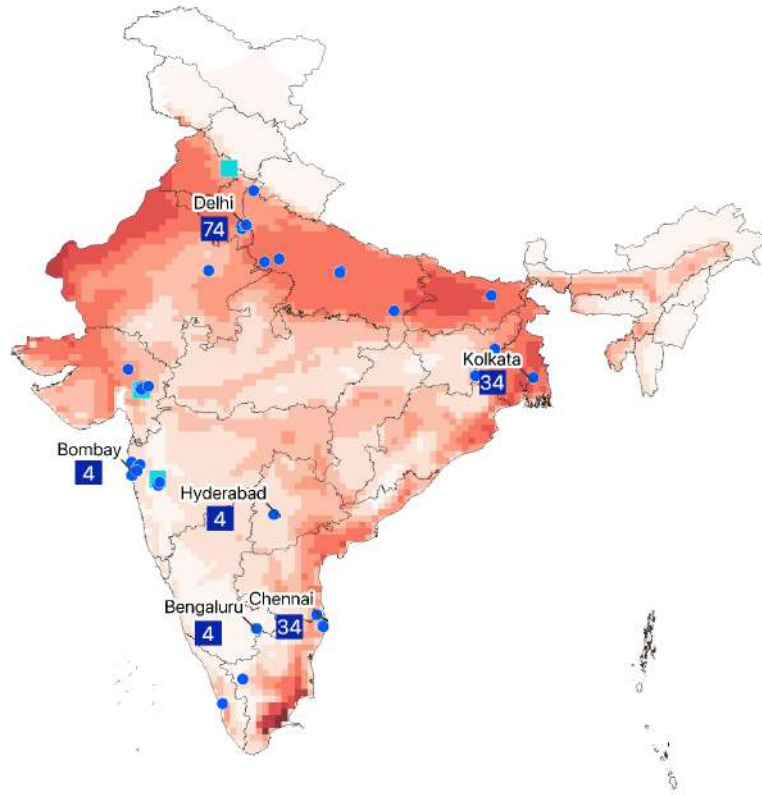
- GHG emissions
- Deforestation
- Changes in land use (Urbanization)

Sources: AXA Climate Science team, McKinsey 2020, <https://www.mckinsey.com/business-functions/sustainability/our-insights/climate-risk-and-response-in-asia>



The Science behind — What lies ahead for India ?

Baseline:

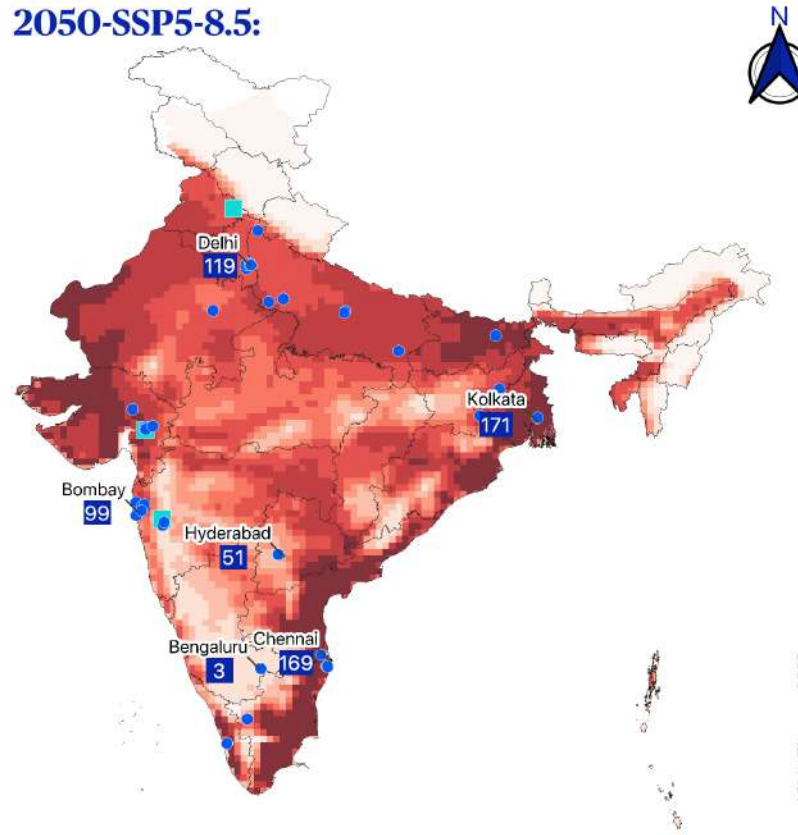


Number of dangerous days and worse:



0 250 500 km

2050-SSP5-8.5:



Sources: M. Le Cam, AXA Climate, 2022



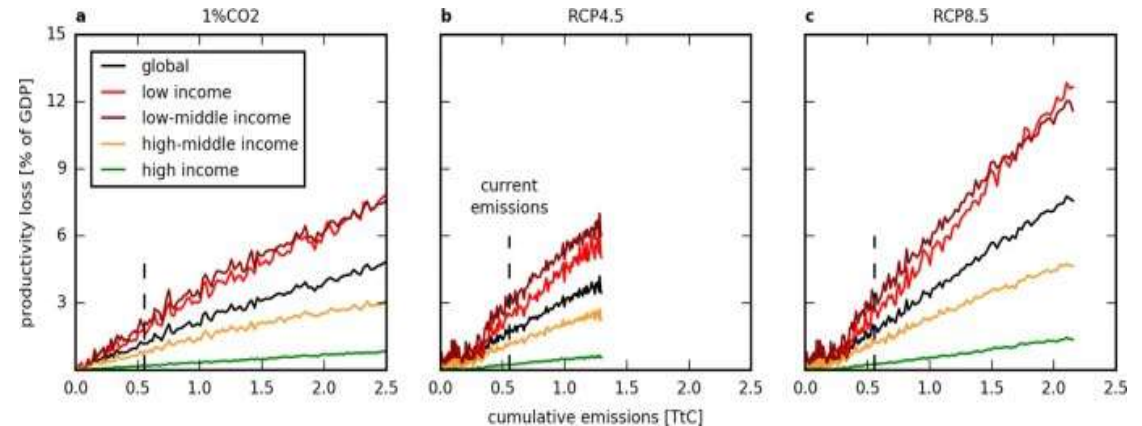
In its latest reports, the IPCC already pointed out that heat waves of longer duration and higher frequency are projected in India and Pakistan

Short term impact will cause operational disruption and long term will drive investment strategy

Risks and Impacts of heat-stress on businesses 1/2

Loss in labour productivity

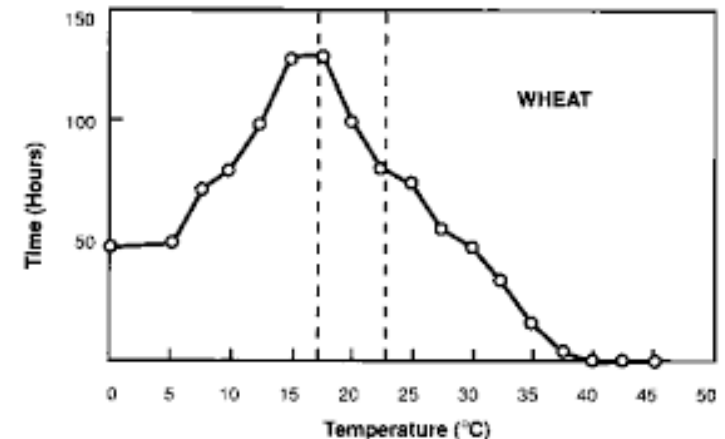
- As per International Labour Organization report, 2019, India lost around 4.3% of working hours due to heat stress in 1995.
- Going forward, for each 1 unit of CO₂ emitted, the annual productivity loss will globally increase by 1.84% of global GDP



Annual labour productivity loss due to the increase in heat exposure classified by income class based on GDP per capita

Agriculture in danger and impact on workers

- Yields fall sharply when thermostats rise further than 29-32 C
- Many farmers in several states of India have reported 20-60% losses due to current heat wave which had affected the wheat.
- Disruption to raw material supply chain/costs



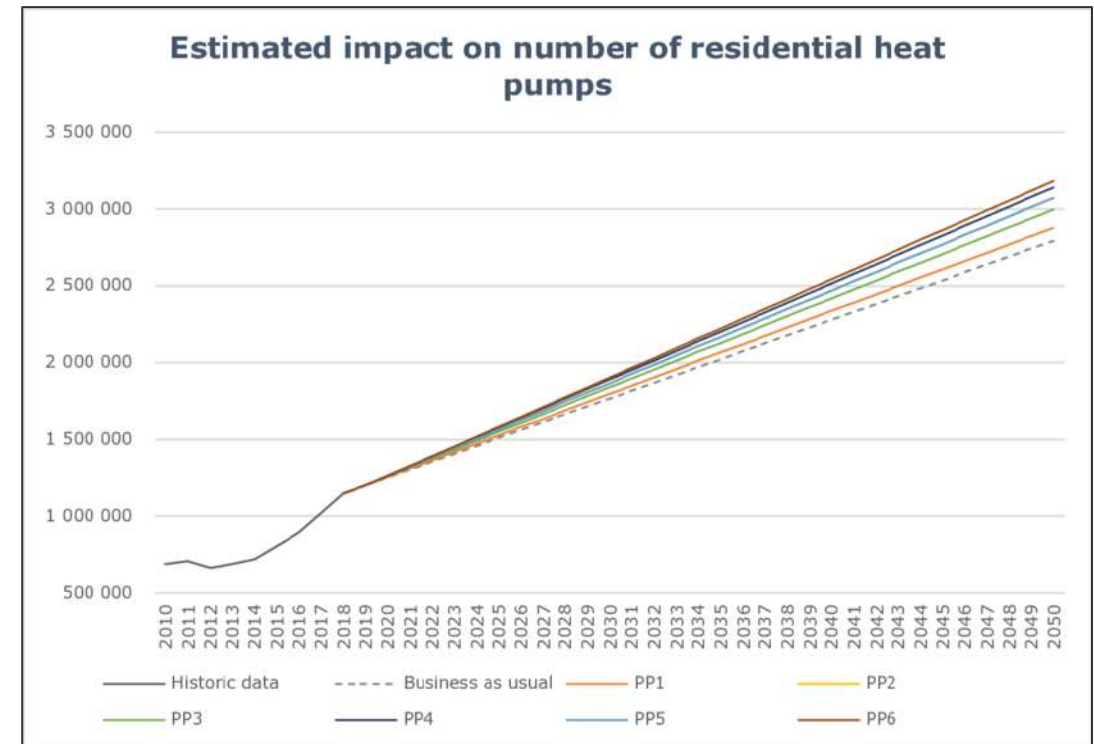
Risks and Impacts of heat-stress on businesses 2/2

Energy use soars

- Increase in electricity use on hot days stresses electric grids causing blackouts which can disrupt supply chain
- Increase in energy demand is boosting coal production leading to **more emissions**.
- Energy costs to increase drastically

Disruption of business operations

- Self-ignition of flammable or combustible materials leading to **economic losses** and **safety concerns**
- May alter process or **product chemistry**
- Equipment **inefficiencies**
- Project **delays** and **overruns**



ZOOM #3 – CONSECUTIVE FROST DAYS

Climate change will result in a significant reduction of the risk of frost for the exposed sites

➤ The “consecutive frost days” indicator measures the largest number of consecutive days, with daily min temperatures lower than 0°C (average value over the 30 years around considered timeframe)

- 13 sites are considered highly or extremely exposed to Consecutive Frost Days in the Baseline, vs only 6 in 2030

Top 10 of the most exposed assets to CFD - Baseline

#	Asset Name	Country	Asset City	Occupancy	Selected Va..	
IPSEN_22	Lonza - Visp	Switzerland	Visp	External Partner	150,0M	100,5
IPSEN_148	IPSEN PHARMA KAZAKHS..	Kazakhstan	Almaty	Offices	5,0M	76,3
IPSEN_163	IPSEN LLC - Moscow - Int..	Russia	Moscow	Internal Distribution site	50,0M	61,4
IPSEN_162	IPSEN LLC - Moscow - Offi..	Russia	Moscow	Offices	5,0M	60,6
IPSEN_109	Beaufour Ipsen Tianjin P..	China	Beijing	External Distribution site	5,0M	59,7
IPSEN_117	Ipsen AB - Tampere	Finland	Tampere	External Distribution site	25,0M	58,2
IPSEN_181	LINNEA SA - Riazzino - Int..	Switzerland	Riazzino	Internal Factory	50,0M	56,0
IPSEN_180	LINNEA SA - Riazzino - Int..	Switzerland	Riazzino	Internal Distribution site	25,0M	56,0
IPSEN_179	LINNEA SA - Cadenazzo	Switzerland	Cadenazzo	External Distribution site	5,0M	56,0
IPSEN_224	Beaufour Ipsen Tianjin P..	China	Tianjin	Internal Distribution site	50,0M	54,7

Top 10 of the most exposed assets to CFD - 2030

#	Asset Name	Country	Asset City	Occupancy	Selected Va..	
IPSEN_22	Lonza - Visp	Switzerland	Visp	External Partner	150,0M	84,50
IPSEN_148	IPSEN PHARMA KAZAKHS..	Kazakhstan	Almaty	Offices	5,0M	64,00
IPSEN_101	IPSEN BIOPHARMACEUTI..	Canada	Calgary	External Distribution site	5,0M	53,40
IPSEN_109	Beaufour Ipsen Tianjin P..	China	Beijing	External Distribution site	5,0M	50,20
IPSEN_222	Padagis LLC - Minneapolis	United States	Minneapolis	External Partner	150,0M	48,30
IPSEN_1	Piramal / Healthcare Can..	Canada	Aurora	External Partner	150,0M	44,10
IPSEN_117	Ipsen AB - Tampere	Finland	Tampere	External Distribution site	25,0M	41,60
IPSEN_224	Beaufour Ipsen Tianjin P..	China	Tianjin	Internal Distribution site	50,0M	41,60
IPSEN_113	Beaufour Ipsen Tianjin P..	China	Tianjin	Internal Factory	50,0M	41,60
IPSEN_66	Clementia Pharma Inc Mo..	Canada	Montréal	Offices	5,0M	41,50

CHC site

CONFIDENTIAL

ZOOM #4 – LANDSLIDE SUSCEPTIBILITY INDEX

5 sites appear to be highly exposed to landslide. Rainfall pattern evolution might increase the risk of landslide trigger event

➤ Landslide Susceptibility categorized from 1 to 5, 5 being the worst case (1 : Very Low | 2 : Low | 3 : Moderate | 4 : High | 5 : Very High)

- 5 sites are considered highly exposed to the **landslide risk** (no change between the baseline and 2030)
- Deep-dive analysis shows that no site is at high risk. Yet **continuous monitoring of signs of rupture is recommended**
- The exposed sites in Switzerland are **not critical sites** for IPSEN (LINNEA is a joint venture)

Top 15 of the most exposed assets to Landslide Susceptibility Index

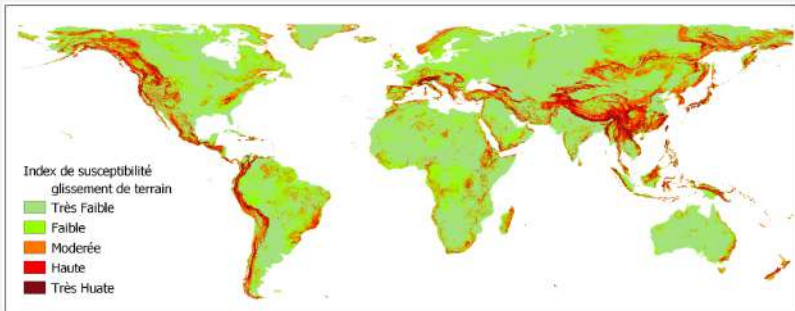
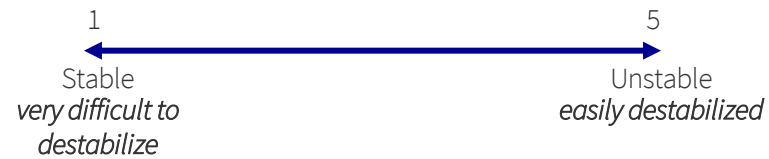
#	Asset Name	Country	Asset City	Occupancy	Selected Va..	
IPSEN_182	IPSEN PHARMA TAIWAN ..	Taiwan	Taipei	Offices	5,0M	5,000
IPSEN_181	LINNEA SA - Riazzino - Int..	Switzerland	Riazzino	Internal Factory	50,0M	5,000
IPSEN_180	LINNEA SA - Riazzino - Int..	Switzerland	Riazzino	Internal Distribution site	25,0M	5,000
IPSEN_201	IPSEN BIOSCIENCE - San ..	United States	San Diego	External Distribution site	150,0M	4,000
IPSEN_152	Ipsen Mexico S de RL de C..	Mexico	Tlalnepantla Edo. d..	External Distribution site	5,0M	4,000
IPSEN_9	Carlo Erba (Heptan) - Pey..	France	Peypin	External Partner	150,0M	3,000
IPSEN_8	Catalent - Schorndorf	Germany	Schorndorf	External Partner	150,0M	3,000
IPSEN_64	Ypsomed AG - Burgdorf	Switzerland	Burgdorf	External Partner	50,0M	3,000
IPSEN_56	Adelphi/Schott - 55122 ..	Germany	MULHEIM	External Partner	150,0M	3,000
IPSEN_52	Nemera - La Verpillère	France	La Verpillère	External Partner	150,0M	3,000
IPSEN_45	Clementia Pharmaceutic..	United States	Rensselaer	External Partner	150,0M	3,000
IPSEN_219	Catalent Pharma Solutio..	United King..	Bathgate	External Partner	150,0M	3,000
IPSEN_19	West Pharma - Eschweiler	Germany	Eschweiler	Materials Provider	150,0M	3,000
IPSEN_164	IPSEN PHARMA SINGAPO..	Singapore	Singapore	Offices	5,0M	3,000
IPSEN_158	Ipsen Portugal - Produto..	Portugal	Lisboa	Offices	5,0M	3,000

Extra-mile focus in appendices

AXA Climate methodology: Landslide assessment components

1 Prioritisation of assets via Landslide Susceptibility Index

Indicator developed by Kirschbaum et al. (2017) with a resolution of 1 km.
Precision level: medium-low
 The index scale goes from :



Historical events Geological parameters Seismic hazard Topography Land cover

Figure. Input factors considered in the landslide susceptibility index

2 Further assessment adding the contribution of rainfall using the Landslide Risk Index

Extra mile by AXA Climate

The Landslide Risk Index has a resolution of 1km and estimates Landslide Rainfall Triggered hazard from landslide susceptibility and rainfall data from ERA 5.
Precision level: medium-high

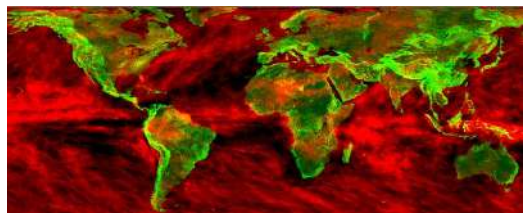


Figure. Landslide Rainfall Triggered Risk map

3 Deep dive on landslide, qualitative analysis

Extra mile by AXA Climate

AXA Climate analysed at a local level how landslide can be triggered by contextual specifications in a zone. This characterisation is a qualitative analysis which allows to assess the most impacted assets and adapt.

Precision level: high

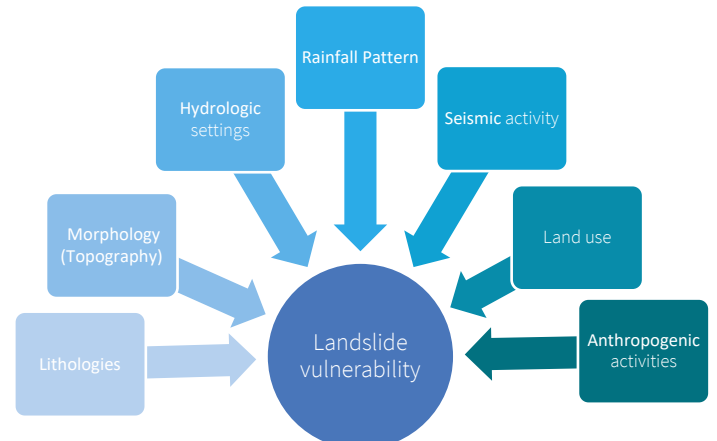


Figure. Factors included in the local vulnerability landslide analysis

FOCUS ON LANDSLIDE – MOST CRITICAL SITES

IPSEN_201 | IPSEN BIOSCIENCE - San Diego

Instability in the zone

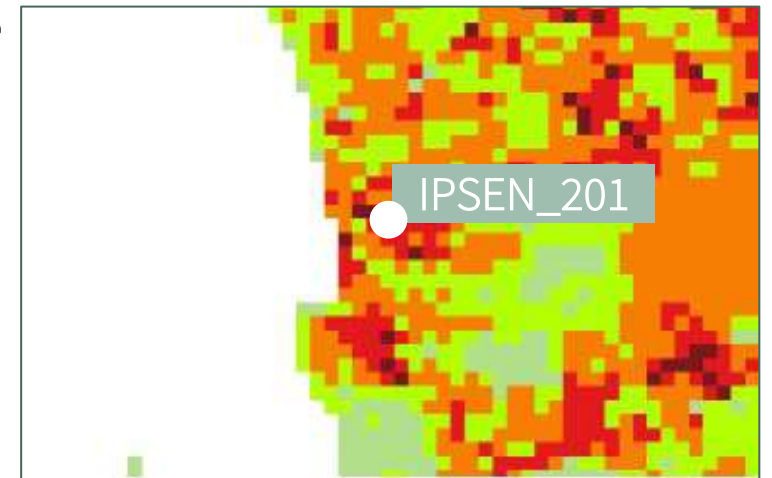
- The site presents a high gravity risk because it is surrounded by very eroded and altered reliefs. Several morphological markers indicate that the stability of these slopes is relative.
- The occurrence of phenomena such as intense or **continuous rainy episodes, earthquakes could trigger landslides in the direct vicinity of the site**. In view of the type of apparent materials, landslides, debris flows and mudslides are to be considered.
- The landslide trigger (type) induces a risk of binary impact of the site depending on the location of the failure and the quantity of materials involved. As the industrial zone has an evacuation route in the event of flooding, the risk of mudslides integrating the site into its impact surface must be considered.



Google Earth Pro View of the site

Particular vigilance and adaptation

- Ensure the **maintenance of drainage networks** in the direct vicinity of the site and in the surrounding hills (state of water saturation of the soil is a destabilizing factor involved in 56% of landslide triggers).
- **Monitoring the appearance of signs of slope failure** such as cracks, fractures, scree in the area even from a distance, appearance of wetlands (the occurrence of earthquakes, intense or continuous rainfall events could trigger these events).
- Adaptation: Carrying out geotechnical studies preliminary to the installation of protective structures / stabilization works on the slopes closest to buildings and strategic access points.



Landslide susceptibility map

An aerial, high-angle photograph of a city at night. The image shows a dense urban environment with various buildings, streets, and parking lots. The lighting is a mix of warm yellow and orange from streetlights and cooler blue and white from building lights. The perspective is looking down from a high altitude, showing the layout of the city blocks and the flow of traffic on the roads.

05



Focus on specific sites

- *Zoom on most-at-risk sites*
 - *Variation caused by climate change*
 - *Absolute risk*
- *Zoom on 4 strategic sites selected by IPSEN*

By 2050 4 sites increase their risk, becoming at High or Extreme risk assets, while 1 site reduces its exposition

➤ Increase to red (Extreme risk) or orange (High risk) in 2050*

#	Asset Name	Country	Occupancy	Selected Value	Rank 20..	Rank 2..	SSP5-8.5
IPSEN_221	Catalent Pharma Solutions ..	Singapore	External Part..	150,0M	0,54	0,54	0,45 0,54 0,54
IPSEN_223	Ipsen Algérie (projet) - Rah..	Algeria	Internal Facto..	150,0M	0,48	0,65	0,40 0,48 0,65
IPSEN_224	Beaufour Ipsen Tianjin Pha..	China	Internal Distr..	50,0M	0,48	0,52	0,47 0,48 0,52
IPSEN_113	Beaufour Ipsen Tianjin Pha..	China	Internal	50,0M	0,74	0,78	0,73 0,74 0,78
							baseline 2030 2050

By 2050, the significant increase of **heat-related index** in Singapore could explain the variation

By 2050, the significant increase of **Water Stress** in Algeria could explain the variation

By 2050, the increase of **heat and energy-related index** in Tianjin could explain the variation

➤ Decrease from red to orange (High risk) in 2030

#	Asset Name	Country	Occupancy	Selected Value	Rank 20..	Rank 2..	SSP5-8.5
IPSEN_180	LINNEA SA - Riazzino - Inter..	Switzerland	Internal Distr..	25,0M	0,64	0,64	0,81 0,64 0,64
							baseline 2030 2050

By 2030 : significant decrease of the **Riverine Flood index** could explain the variation

*Except for IPSEN_221 and IPSEN_180, no risk category variation is observed before 2050

The 4 sites in Taiwan are inherently exposed to geophysical and cyclonic risks, but climate change might also increase the number of dangerous days

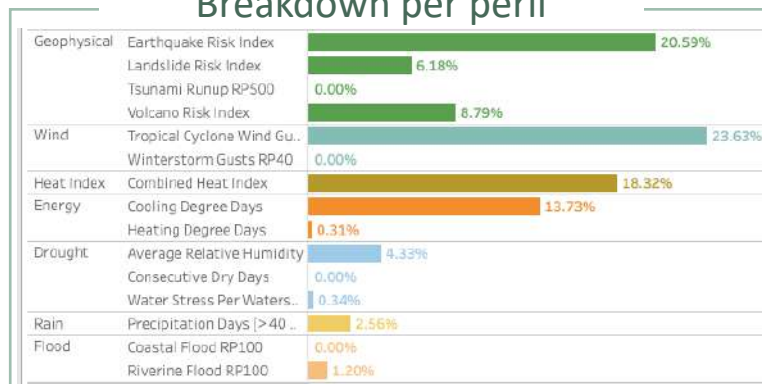


- **ScinoPharm – Taiwan City** appears to be an External Partner potentially highly exposed to physical risks
- Every site based in Taiwan will be affected by the **increase of dangerous days and very dangerous days**
- Taiwanese sites are **inherently exposed to geophysical perils**, notably earthquake, landslides and volcano risks

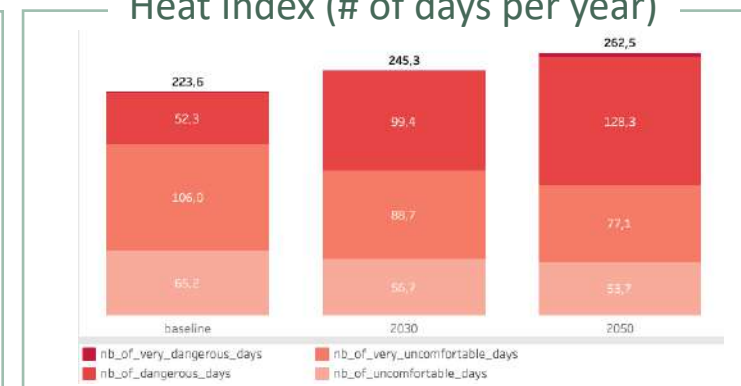
Details on the 4 sites based in Taiwan

#	Asset Name	Country	Occupancy	Selected Val..	Iso-Risk	Score
IPSEN_27	ScinoPharm - Taiwan City	Taiwan	External Pa..	150,0M	1,00	1,00
IPSEN_182	IPSEN PHARMA TAIWAN - Taipei	Taiwan	Offices	5,0M	0,03	1,00
IPSEN_77	IPSEN PHARMA TAIWAN Tapei - Ta..	Taiwan	Offices	5,0M	0,03	0,89
IPSEN_183	IPSEN PHARMA TAIWAN - Taoyuan	Taiwan	External Dis..	5,0M	0,03	0,84

Breakdown per peril



Heat Index (# of days per year)



The 4 US sites at high or extreme risk will not see their physical climate risk profile change significantly

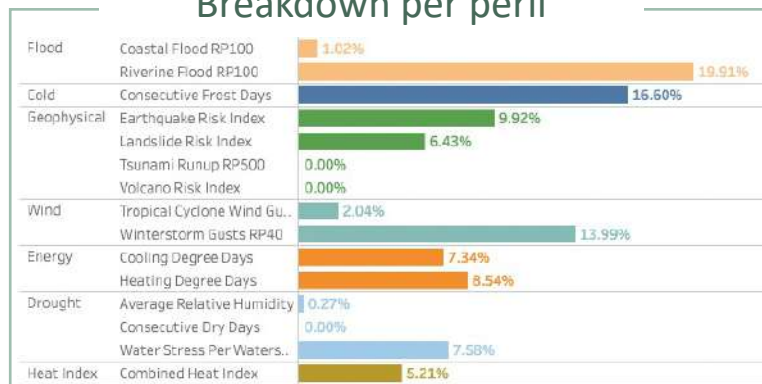
- The exposed assets in the US – 4 external partners – may reveal a **potential vulnerability in IPSEN's supply-chain**
- 3 sites out of 4 have a **high financial value**
- However, no significant variation is observed: we can assume that **the sites are already adapted to the perils to which they are exposed** (e.g. riverine flood and frost)



Details on the 4 sites based in the US

#	Asset Name	Country	Occupancy	Selected Val..	Iso-Risk	Score
IPSEN_45	Clementia Pharmaceuticals Inc (A...	United States	External Pa..	150,0M	1,00	0,78
IPSEN_60	Alcami Corporation - Wilmington	United States	External Pa..	150,0M	0,82	0,64
IPSEN_5	Piramal Pharma Solutions - Mitichi..	United States	External Pa..	150,0M	0,72	0,56
IPSEN_62	Genentech, Inc. - South San Franci..	United States	External Pa..	50,0M	0,26	0,60

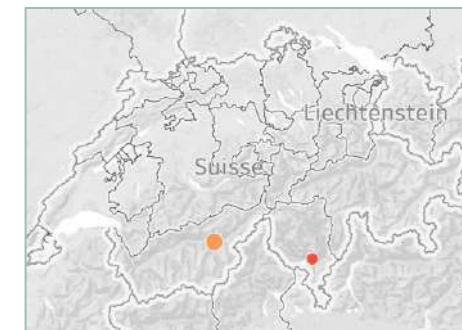
Breakdown per peril



Iso-risk mapping



Climate change should marginally improve the multi-peril score of the 3 most exposed sites in Switzerland (reduction of cold-related perils)



- The exposed sites in Switzerland are **not critical sites** for IPSEN (LINNEA is a joint venture)
- However, no significant variation is observed: we can assume that **the sites are already adapted to the perils to which they are exposed**

Details on the 3 sites based in Switzerland

#	Asset Name	Country	Occupancy	Selected Val..	Iso-Risk	Score
IPSEN_22	Lonza - Visp	Switzerland	External Pa..	150,0M	1,00	0,71
IPSEN_181	LINNEA SA - Riazzino - Internal Fac..	Switzerland	Internal Fac..	50,0M	0,36	0,77
IPSEN_180	LINNEA SA - Riazzino - Internal Dis..	Switzerland	Internal Dis..	25,0M	0,15	0,64

Breakdown per peril

Geophysical	Earthquake Risk Index	0.34%
	Landslide Risk Index	26.59%
	Tsunami Runup RP500	0.00%
	Volcano Risk Index	0.00%
Cold	Consecutive Frost Days	24.26%
	Winterstorm Gusts RP40	19.48%
Flood	Coastal Flood RP100	0.00%
	Riverine Flood RP100	13.63%
Energy	Cooling Degree Days	0.43%
	Heating Degree Days	12.88%
Rain	Precipitation Days [> 40...	2.13%
Wildfire	Wildfire Risk Index	0.14%
Heat Index	Combined Heat Index	0.02%
Drought	Average Relative Humidity	0.00%

Focus on landslide for LINNEA SA



- Direct risk of falling boulders
- Secondary risk of landslide (unlikely considering the 1977 precedent)

In China, IPSEN's direct vulnerability is limited, yet 3 sites will be significantly affected by the increase of temperatures and its consequences



- Following the **cession of CHC activities** in 2022, the most exposed site (IPSEN_113) will no longer be part of IPSEN's scope
- The 2 other sites are less critical (External Distribution Sites)
- The main perils are related to the **increase of temperatures** (Combined Heat Index and Cooling Degree Days) and to water stress (especially IPSEN_113). **South-Eastern China is notably exposed to Heat Index deterioration**

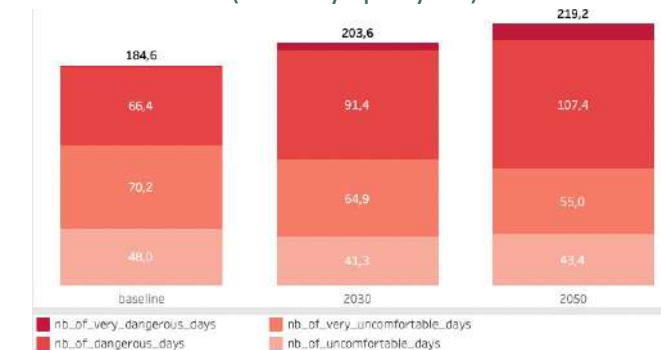
Details on the 3 sites based in China

#	Asset Name	Country	Occupancy	Selected Val..	Iso-Risk	Score
IPSEN_113	Beaufour Ipsen Tianjin Pharmaceu..	China	Internal Fac..	50,0M	1,00	0,74
IPSEN_110	Beaufour Ipsen Tianjin Pharmaceu..	China	External Dis..	5,0M	0,09	0,66
IPSEN_107	Beaufour Ipsen Tianjin Pharmaceu..	China	External Dis..	5,0M	0,07	0,55

Breakdown per peril

Heat Index	Combined Heat Index	21.52%
Energy	Cooling Degree Days	15.64%
	Heating Degree Days	4.30%
Drought	Average Relative Humidity	0.44%
	Consecutive Dry Days	0.00%
	Water Stress Per Waters..	13.62%
Wind	Tropical Cyclone Wind Gu..	12.78%
	Winterstorm Gusts RP40	1.31%
Cold	Consecutive Frost Days	12.03%
Flood	Coastal Flood RP100	0.00%
	Riverine Flood RP100	8.31%
Geophysical	Earthquake Risk Index	0.16%
	Landslide Risk Index	5.88%
	Tsunami Runup RP500	0.00%
	Volcano Risk Index	0.00%

Heat Index in Guangzhou (South East) (# of days per year)



In Singapore, 1 site of high value (External Partner) will be affected by the deterioration of the Combined Heat Index

- In Singapore, 1 External Partner site (Catalent Pharma Solutions) appears to **become at high risk in 2030**
- Singapore is inherently exposed to high relative humidity. With the increase of temperatures, **the Combined Heat Index will deteriorate** – which is reflected in the multi-peril score

Details on the site based in Singapore

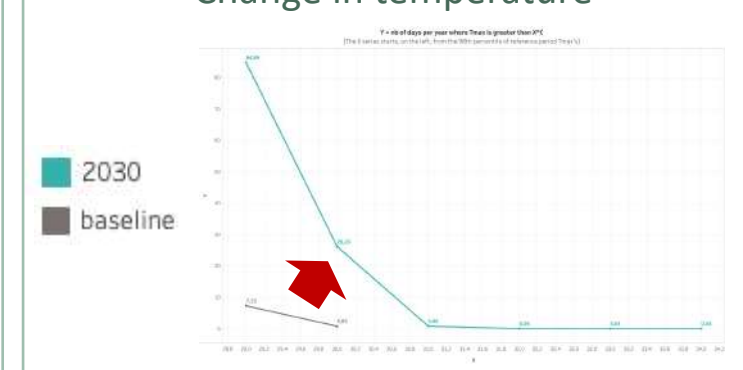
Customer Ref	IPSEN_221
Name	Catalent Pharma Solutions - Singapore
Subportfolio	Emerald Project*
Occupancy	External Partner
Country	Singapore
City	Singapore
Postal Code	
Address	1 Jln Kilang, #03-01, Singapore 159402
Coordinates (Long, Lat)	103.81015359268294,
Geocoding confidence	
Altitude (m)	30.0
Asset Value	1.5E8
Asset Outcomes	



Breakdown per peril

Heat Index	Combined Heat Index	46.01%
Energy	Cooling Degree Days	23.01%
	Heating Degree Days	0.00%
Drought	Average Relative Humidity	20.58%
	Consecutive Dry Days	0.00%
	Water Stress Per Waters...	0.00%
Geophysical	Earthquake Risk Index	0.18%
	Landslide Risk Index	9.20%
	Tsunami Runup RP500	0.00%
	Volcano Risk Index	0.00%
Rein	Precipitation Days [> 40 ...	0.82%
Wildfire	Wildfire Risk Index	0.19%
Cold	Consecutive Frost Days	0.00%
Flood	Coastal Flood RP100	0.00%
	Riverine Flood RP100	0.00%

Change in temperature



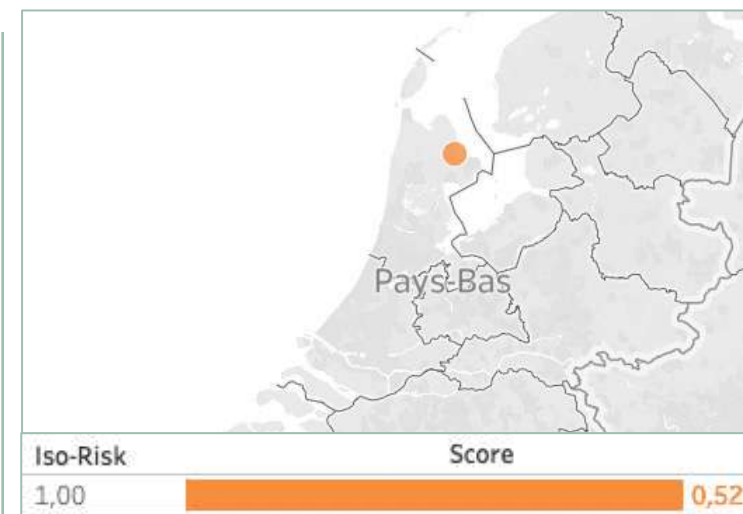
*Emerald project = Episyme (Tazverik)

In the Netherlands, 1 site of high value (External Partner) might be affected by sea level rise and increasing flood risk

- With sea level rise, the flood depth due to storm surges occurring along coastlines – with a return period of 100 years – will **increase by 10%, from 5,5m to 6m** putting pressure on existing flood defences
- The vulnerability of this External Partner to physical climate risks **might jeopardize IPSEN's supply-chain robustness**

Details on the site based in the Netherlands

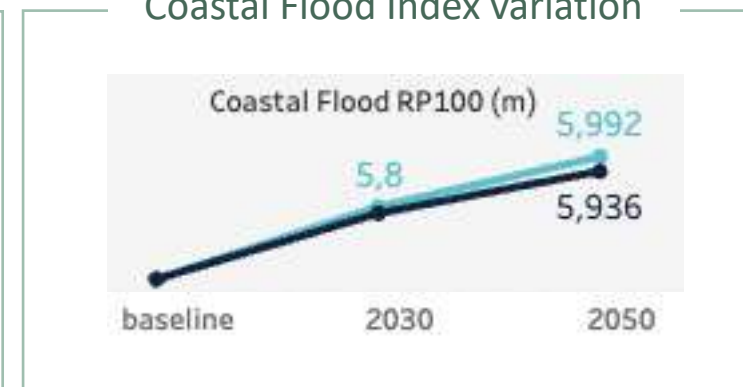
Customer Ref	IPSEN_58
Name	Pall (Single source supplier single use kit
Subportfolio	Onivyde and Dysport and Alluzience
Occupancy	External Partner
Country	Netherlands The
City	Medemblik
Postal Code	
Address	Nijverheidsweg 1, 1671 GC Medemblik,
Coordinates (Long, Lat)	5.0973019785908456,
Geocoding confidence	
Altitude (m)	1.0
Asset Value	1.5E8
Asset Outcomes	



Breakdown per peril

Flood	Coastal Flood RP100	47.52%
	Riverine Flood RP100	0.00%
Wind	Tropical Cyclone Wind Gu..	0.00%
	Winterstorm Gusts RP40	13.75%
Energy	Cooling Degree Days	1.53%
	Heating Degree Days	11.82%
Cold	Consecutive Frost Days	12.64%
Drought	Average Relative Humidity	12.31%
	Consecutive Dry Days	0.00%
	Water Stress Per Waters..	0.00%
Heat Index	Combined Heat Index	0.40%
Rain	Precipitation Days [> 40 ..	0.02%
Geophysical	Earthquake Risk Index	0.00%
	Landslide Risk Index	0.00%
	Tsunami Runup RP500	0.00%

Coastal Flood Index variation



Key findings for Wrexham

- 1 The climatic risk profile of the site is **not at all alarming**
The asset multi-peril score decreases over time (from 0,23 in baseline, to 0,19 in 2030 and even 0,17 in 2050 under SSP5-8.5)
- 2 Climate change might even **reduce energy consumption** for heating buildings
- 3 Although the site is not exposed to riverine and coastal flooding, **surface flooding caused by heavy rains cannot be ruled out**

Outcomes of the workshop

- No surprise in the findings
- **Regarding flooding, the risk is already addressed by the site**
- Further analysis should be carried out to **check** whether **nominal operating range of equipment** (HVAC, compressor, chilling units) are adapted to future climatic conditions
- On energy aspects, further analysis should be conducted to **assess the impact and associated costs**

Key findings for Dublin

- 1 The climatic risk profile of the site is **not at all alarming**
The site multi-peril score is very low and decreases over time (from 0,13 in baseline, to 0,10 in 2030 and even 0,09 in 2050 under SSP5-8.5)
- 2 Climate change might even **reduce energy consumption** for heating buildings
- 3 **Winterstorm remains a prominent peril (vs full portfolio)**

Outcomes of the workshop

- No surprise in the findings – somewhat reassuring
- **Winterstorm risk is already well addressed by the site**
- While the site itself is not concerning, **dependencies vis-à-vis supply-chain should be further assessed** to stress-test cascading effects
- **Other indirect impacts of climate change** could affect the site (e.g. Irish electric infrastructures might be affected by temperature above 30°C)

Key findings for Dreux PharmDev

- 1 The overall climatic risk profile of the site remains **almost stable**
The asset multi-peril score is slightly decreases over time (from 0,30 in baseline, to 0,26 in 2030 and even 0,25 in 2050 under SSP5-8.5)
- 2 **Riverine flood** is a key peril, yet the impact of climate change should be limited
- 3 Rising temperatures will significantly **reduce the risk of frost**, while heat should not pose a major challenge

Outcomes of the workshop

- No surprise in the findings – *“the location of the site was well chosen several decades ago”*
- **Flood risk is well flagged and managed by the site**
- Beyond direct physical impact on site (e.g. electricity shut-down), business interruption can also be caused by the **lack of accessibility**

Key findings for Signes

- 1 The climatic risk profile of the site is **not alarming**
The site multi-peril score is very low and remains almost stable (from 0,06 in baseline, to 0,07 in 2030 and even 0,08 in 2050 under SSP5-8.5)
- 2 The main changes are related to **heat**, which can have an impact on working conditions and equipment
- 3 **Second order perils** (drought, flood, wind and wildfire) should be assessed according to the **site's vulnerability**

Outcomes of the workshop

- No surprise in the findings
- **Wildfire** is a risk as it can cut **site accessibility** and therefore cause business interruption
- Though water is critical for the process, the demand is not excessive compared to the supply
- Further analysis should be carried out to **check** whether **nominal operating range of equipment** (HVAC, compressor, chilling units) are adapted to future climatic conditions (heat)

06



Adaptation to climate change

High-level climate adaptation considerations

High-level generic climate adaptation considerations

Supply-chain analysis

Supply chain vulnerabilities

Some External Partners and Providers of IPSEN already are and will be significantly be affected by climate change. Supply-chain disruption can severely affect IPSEN operations by shortages on specific materials, and potentially generating a **decrease or an interruption of manufacturing activity**.

Implementing adaptation measures can help **mitigate supply-chain impact**:

- Pursue the mapping of supply chain dependencies for every site (in priority manufacturing sites) as initiated through the Asset Centric Model approach
- Stress-test the disruption caused by the failure of one or several suppliers (scenario analysis)
- Challenge IPSEN External Partners and Providers climate resilience and risk mitigation measure
- Identify alternative suppliers



Operational insight (from site focus workshops)

- Screen supply-chain interdependencies for maintaining manufacturing operations (e.g. dependency on solvent import from outside Europe)
- Consider future climate condition in strategic planning and investment decision

High-level generic climate adaptation considerations

By type of peril (acute)

Flood & Landslide

Flood and landslide are both **destructive perils**, depending on the **location** of a site and its **exposure** to the risk.

Both can severely affect IPSEN sites by disrupting transportations, interrupting utilities such as power, water and waste as well as damaging buildings and infrastructures potentially generating a **decrease or an interruption of activity**.

Implementing adaptation measures can help **mitigate flood and landslide impact**:

- Enable access to early warning system
- Coastal management plans and set back requirements
- Building design standards (flood prone areas, building code, setbacks, etc)
- Drainage/watershed management to reduce flooding and erosion risks (incl. nature-based solutions)
- Adjustable insurance premiums and improved insurance coverage
- Extreme event risk exposure coverage



Operational insight (from site focus workshops)

- Maintain prevention and emergency plans up to date through Arengi Box
- Maintain the high level of operational preparedness to deal with these risks (drills, staff training, regular check of protective equipment, of drainage network)

High-level generic climate adaptation considerations

By type of peril (chronic)

Heat

Heat perils can have various impacts on infrastructures, processes as well as working conditions and all of them can result in a decrease of productivity (short-term to long-term). Temperature increase can lead to a rise of cooling needs and costs as well as deteriorate working conditions.

In order to prevent heat impact on IPSEN business, various solutions can be implemented :

- **Assess** and **upgrade** if needed thermal insulation and roof color, as well as adapted **cooling** systems
- Consider **nature-based solutions** (such as green roofs and green cool islands) if relevant
- Reinforce **prevention** of heat stress for workers. Employers should provide training to workers so they understand what heat stress is, how it affects their health and safety, and how it can be prevented
- Consider alternative suppliers and **areas for production** assets which are less impacted by extreme heat
- Use **renewable energies** to compensate increasing cooling needs



Operational insight (from site focus workshops)

- For the most exposed sites, list the “nominal operating ranges” of critical equipment and assess the cost of the impact of equipment failure to enable cost trade-off
- Set up guidelines to consider future climate conditions when renewing equipment (HVAC system, compressors, chilling units)

Thank you for your
attention!

Before finishing



What did you like?

**What is the most
useful?**

**What did you
learn?**



**Is there any need of
clarification?**



**From 1 to 10, how
insightful is this
preliminary analysis?**

07



Appendices

Disclaimers

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List of types of site used for the analysis

Name	Description	IPSEN / Third party
External Distribution site	Third party providing downstream logistics and distribution services	Third party
External Partner	Third party providing upstream supplying or manufacturing services	Third party
Internal Distribution site	IPSEN owned or rented site used for downstream logistics and distribution services	IPSEN
Internal Factory	IPSEN owned or rented site used for manufacturing	IPSEN
Internal Laboratory	IPSEN owned or rented site used for research & development	IPSEN
Materials Provider	Third party providing materials (upstream supply-chain)	Third party
Offices	IPSEN owned or rented asset used for administrative purpose	IPSEN

List of classes of asset used for the analysis

According to IPSEN's Asset Centric Model (ACM)

Name	Description	Source	Storage
All	Related to every asset		Non applicable
No ACM	Not related to any asset		Non applicable
Other	No asset indication		Non applicable
Alluzience	Alluzience (liquid botulinum toxin type A – often shorten Botox) designates a ready-to-use BoNT-A liquid neuromodulator formulation.	HPRA	2°C - 8°C - Do not freeze
Cabometyx	Cabometyx is a cancer medicine used to treat adults with kidney cancer or liver cancer.	EMA	Does not require any special storage conditions.
CHC	Consumer HealthCare – activities being sold (completion of the transaction in Q3 2022).	IPSEN	Not found
Cometriq	Cometriq is a cancer medicine that contains the active substance cabozantinib. It is used to treat adults with medullary thyroid cancer.	EMA	Do not store above 25 °C
Decapeptyl	Decapeptyl is a cancer medicine that contains the active substance troptorelin. It is used to treat adults with prostate cancer, endometriosis, central precocious puberty and breast cancer.	EMC	Do not store above 25 °C
Dysport	Dysport is indicated for symptomatic treatment of focal spasticity or specific symptomatic treatments.	EMC	2°C - 8°C - Do not freeze
Increlex	Increlex is a solution for injection that contains the active substance mecasermin used for the long-term treatment of 'severe primary insulin-like-growth-factor-1 deficiency'.	EMA	2°C - 8°C - Do not freeze
Nutropin	NutropinAq is a solution for injection in a cartridge, which contains the active substance somatropin.	EMA	2°C - 8°C - Do not freeze
Onivyde	Onivyde pegylated liposomal is a cancer medicine that is used to treat a form of pancreatic cancer called metastatic adenocarcinoma of the pancreas.	EMA	2°C - 8°C - Do not freeze
Palovarotene	Palovarotene is an active substance used for the treatment of fibrodysplasia ossificans progressive.	EMA	Not found
Sativex/Mevatyl	Metavyl is produced by GW Pharma Limited and distributed in Brazil by Beaufour Ipsen Pharmaceuticals.	IPSEN	Not found
Somatuline	Somatuline is a solution for injection that contains the active substance lanreotide (acetate) used for oncological treatments.	EMA	Not found
Emerald Project	Is not part of ACM. Specific label which designates an internal project.		Non applicable

Financial exposure ranking

Ranking*	Description*	Value used in Tableau
1	Below 5m€	5,000,000 €
2		25,000,000 €
3		50,000,000 €
4		75,000,000 €
5	Above 100m€	150,000,000 €

*Provided by IPSEN

AXA Climate methodology: Glossary of physical climate indicators

Shared Socio-economic Pathways (SSPs) warming scenarios are :

SSP2-4.5 - approx. 2.4°C warming by end of century, relative to pre-industrial,

SSP5-8.5 - approx. 4.3°C warming by end of century, relative to pre-industrial.

The indexes used are defined as:

Consecutive frost days (days): Largest number of consecutive days, with daily min temperatures lower than 0°C (average value over the 30 years around considered timeframe)

Water Stress per Watershed measures the ratio of total water withdrawals to available renewable surface and groundwater supplies. Water withdrawals include domestic, industrial, irrigation, and livestock consumptive and non consumptive uses. Available renewable water supplies include the impact of upstream consumptive water users and large dams on downstream water availability. Higher values indicate more competition among users.

Average Relative Humidity: Average percentage of relative humidity

Heating/Cooling degree days (< 18°C): weather based technical index designed to describe the need for the heating/cooling energy requirements of buildings.

Coastal flood (m) hazard represents flooding from storm surges and occurs along coastlines around the world. (Return period T =100 years).

Riverine Flood (m) hazard represents flooding from river overflow and occurs in river basins with an area of at least 10,000 km² (Return period T =100 years).

Earthquake Risk Index: Earthquake Risk categorized from 0 to 8, on a logarithmic scale (0 : No Hazard | 8 : Extreme Hazard)

Landslide Susceptibility Index: Landslide Susceptibility categorized from 1 to 5, 5 being the worst case (1 : Very Low | 2 : Low | 3 : Moderate | 4 : High | 5 : Very High)

Tsunami Runup: Tsunami max coastal runup value for a return period of 500 years in a circle of 1km around assets (NaN : No risk or distance to coast > 1km | 0 : 0 to 1 m | 1 : 1 to 3 m | 3 : 3 to 5 m | 5 : 5 to 7 m | 7 : 7 to 10 m | 10 : > 10 m).

Volcano Risk Index: Volcano Risk Index, ranking from 0 to 1 (0 : Very Low | 1 : Very High) according to the type of Volcano (explosive or effusive) and distance to Volcano

Heat Waves Duration Cap. (days): Total number of days belonging to waves of at least 5 consecutive days where daily min and max temperatures are greater than min and max thresholds. Those thresholds are defined as the [98th] percentiles of ERAS reference period min and max temperatures, capped between [16°C - 24°C] for Tmin and [24°C – 34°C] for Tmax.

Combined Heat Index (days): This combined index is built making a weighted average between the number of uncomfortable, very uncomfortable, dangerous, and very dangerous days. These categories are defined as high humidity and hot temperature days.

Uncomfortable Days (days): Number of days where the heat index (combination of hot temperatures and high relative humidity) is between 27 and 32°C

Very Uncomfortable Days (days): Number of days where the heat index (combination of hot temperatures and high relative humidity) is between 33 and 39°C

Dangerous Days (days): Number of days where the heat index (combination of hot temperatures and high relative humidity) is between 40 and 52°C

Very Dangerous Days (days): Number of days where the heat index (combination of hot temperatures and high relative humidity) is above 53°C

Weather Fire Index: The Fire Weather Index (FWI) is a meteorologically based index used worldwide to estimate fire danger. It consists of different components that account for the effects of fuel moisture and wind on fire behaviour and spread.

Wildfire Risk Index: equals Weather Fire Index if the tree cover % at 1km radius is > 15%, 0 if not.

Tropical Cyclone Wind Gust: Tropical cyclones max wind speeds for a return period of 100 years (Return period T =100 years).

Winterstorm Gusts: Maximum winterstorm wind speed (only calculated in extra-tropical regions, 0 if not)

Combined Heat Index – Humidity and Temperature Weighting

Indice de chaleur en degrés Celsius

		température (°C)																
		27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Humidité relative (%)	40	27	28	29	30	31	32	34	35	37	39	41	43	46	48	51	54	57
	45	27	28	29	30	32	33	35	37	39	41	43	46	49	51	54	57	
	50	27	28	30	31	33	34	36	38	41	43	46	49	52	55	58		
	55	28	29	30	32	34	36	38	40	43	46	48	52	55	59			
	60	28	29	31	33	35	37	40	42	45	48	51	55	59				
	65	28	30	32	34	36	39	41	44	48	51	55	59					
	70	29	31	33	35	38	40	43	47	50	54	58						
	75	29	31	34	36	39	42	46	49	53	58							
	80	30	32	35	38	41	44	48	52	57								
	85	30	33	36	39	43	47	51	55									
	90	31	34	37	41	45	49	54										
	95	31	35	38	42	47	51	57										
	100	32	36	40	44	49	54											

Heat Index will compute values of perceived temperature to find the risk associated with this conditions.

The most critical parts of this interval, are the Number of dangerous days and number of very dangerous days

The combined heat index weights the different number of days where the temperature range is between the intervals thresholds.

$$\text{Combined Heat Index} = \frac{\begin{aligned} &\text{Nb. Uncomfortable days} \times \mathbf{0.25} \\ &\text{Nb. Very Uncomfortable days} \times \mathbf{0.5} \\ &\text{Nb. Dangerous days} \times \mathbf{0.75} \\ &\text{Nb. Very Dangerous} \times \mathbf{1} \end{aligned}}{\text{Nb. of days}}$$

Intervals of combination of hot temperatures and high relative humidity

- Uncomfortable days: 29 – 32 °C
- Very Uncomfortable days: 33 – 39 °C
- Dangerous days: 40 – 52 °C
- Very Dangerous days : ≥53 °C

The weighting method allows to give higher value to days where temperature is critical for human health.

NB. This indicator uses relative humidity instead of the dewpoint, since humidity is easier to assess in future climate than dewpoint.

AXA Climate methodology: Landslide assessment components

1 Prioritisation of assets via Landslide Susceptibility Index

Indicator developed by Kirschbaum et al. (2017) with a resolution of 1 km.

Precision level: medium-low

The index scale goes from :

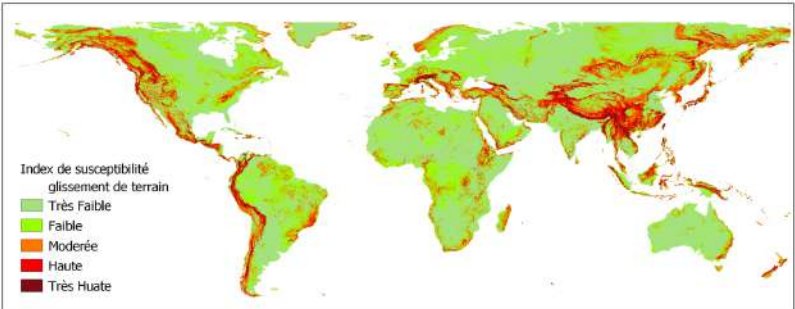


Figure. Input factors considered in the landslide susceptibility index

2 Further assessment adding the contribution of rainfall using the Landslide Risk Index

Extra mile by AXA Climate

The Landslide Risk Index has a resolution of 1km and estimates Landslide Rainfall Triggered hazard from landslide susceptibility and rainfall data from ERA 5.

Precision level: medium-high

The index scale goes from :

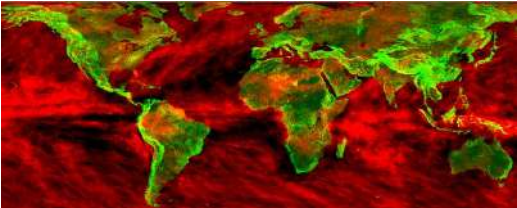


Figure. Landslide Rainfall Triggered Risk map

3 Deep dive on landslide, qualitative analysis

Extra mile by AXA Climate

AXA Climate analysed at a local level how landslide can be triggered by contextual specifications in a zone. This characterisation is a qualitative analysis which allows to assess the most impacted assets and adapt.

Precision level: high

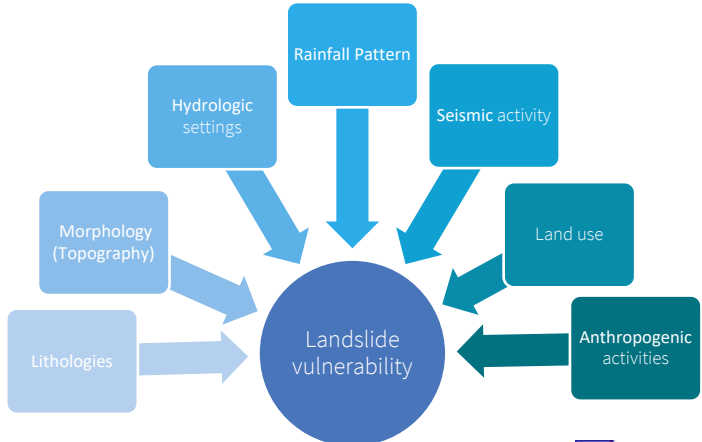


Figure. Factors included in the local vulnerability landslide analysis

FOCUS ON LANDSLIDE – MOST CRITICAL ASSETS

IPSEN_182 | IPSEN PHARMA TAIWAN - Taipei

Instability in the zone

- The site is located on flat land in an urban area surrounded by buildings and at a distance of between 500m and 1km from the first reliefs.
- The scientific literature on the triggering of landslides on the territory of the city is rich. These events are mainly linked to the passage of typhoons on the island or to earthquakes.



Google Earth Pro View
of the site

Particular vigilance and adaptation

- The location of the building indicates that **the building does not present any identifiable risk of landslide impact.**

Note: Taiwan is one of the most landslide-prone countries on earth due to the combination of steep terrain, high rates of uplift, extraordinary rainfall events and regular seismicity.



Landslide susceptibility map

FOCUS ON LANDSLIDE – MOST CRITICAL SITES

IPSEN_201 | IPSEN BIOSCIENCE - San Diego

Instability in the zone

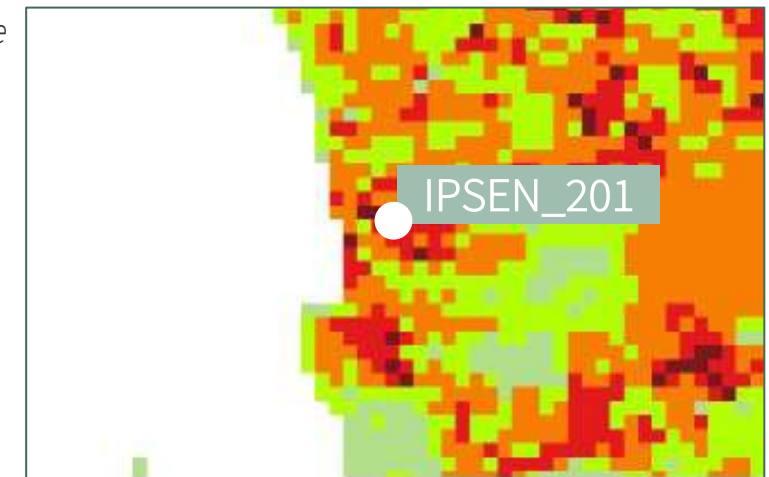
- The site presents a high gravity risk because it is surrounded by very eroded and altered reliefs. Several morphological markers indicate that the stability of these slopes is relative.
- The occurrence of phenomena such as intense or **continuous rainy episodes, earthquakes could trigger landslides in the direct vicinity of the site**. In view of the type of apparent materials, landslides, debris flows and mudslides are to be considered.
- The landslide trigger (type) induces a risk of binary impact of the site depending on the location of the failure and the quantity of materials involved. As the industrial zone has an evacuation route in the event of flooding, the risk of mudslides integrating the site into its impact surface must be considered.



Google Earth Pro View of the site

Particular vigilance and adaptation

- Ensure the **maintenance of drainage networks** in the direct vicinity of the site and in the surrounding hills (state of water saturation of the soil is a destabilizing factor involved in 56% of landslide triggers).
- **Monitoring the appearance of signs of slope failure** such as cracks, fractures, scree in the area even from a distance, appearance of wetlands (the occurrence of earthquakes, intense or continuous rainfall events could trigger these events).
- Adaptation: Carrying out geotechnical studies preliminary to the installation of protective structures / stabilization works on the slopes closest to buildings and strategic access points.



Landslide susceptibility map

FOCUS ON LANDSLIDE – MOST CRITICAL ASSETS

IPSEN_152 | IPSEN Mexico

Instability in the zone

- The hill affected by gravitational processes is located about a hundred meters west of the building on the site. Two areas could be the source of landslides near the site noted “Landslide scar” and “Main scar of a past Landslide” on the photo annotated.
- The 80m long cliff facing the east side of the building (115m away) (Landslide scar) seems to be the result of a previous slide of the hillside. It raises fears that the slipped part will collapse on the parking lot and the road serving the site.
- In addition, this cliff is extended to the north by a large tear-out niche (Main scar of a past Landslide) located at the rear of the building facing the site. Given that this niche shows signs of activity (upstream propagation of gravity instability), the worst-case scenario would be an upstream propagation of the cliff instability with a massive landslide that could reach the access road, and the building.



Geomorphological analysis map

Particular vigilance and adaptation

- The occurrence of earthquakes, intense or continuous rainfall events could trigger these events. [However, some landslides activate without trigger factors belonging to them. This is why **increased monitoring, instrumentation and site monitoring is recommended**]
- Monitoring of signs of slope failure** above the cliff such as cracks, fractures, leaning trees, above the cliff above the parking lot.
- Monitoring of signs of sliding activation** near the crown such as small falls of material, widening of head crevices, localized sinking/subsidence, etc.
- The appearance of signs in other parts of the massif should be followed by a site visit as soon as possible by a geologist who will be able to consider the reinforcement work necessary to stem or limit the impact of a landslide.



The boundaries shown on this diagram illustrate the scenarios *directly* or *indirectly* impacting the site and do not represent the actual extent of a future landslide event.

FOCUS ON LANDSLIDE – MOST CRITICAL ASSETS

IPSEN_180 and IPSEN_181 | LINNEA SA - Riazzino

Instability in the zone

- The sites are located downstream of a mainly rocky promontory, overhung by a development in soil terraces located upstream of the site. The metric rock blocks covering these terraces indicate an activity of the massif subject to scree and falling blocks (isolated).
- The **fall of isolated blocks** (landslide of boulders) from heights presents a risk of direct impact for the site.
- The second gravity process that could affect the slope in the future is a landslide in the terraced part upstream of the site. Prolonged or intense precipitation could contribute to destabilizing the ground which would slip.
- A **direct impact remains unlikely** in view of historical aerial photos of the site from the past 50 years.



Google Earth Pro View of the sites



Ground view of the rocky promontory above the sites



The aerial photo of 1977 shows a landslide a hundred meters from the buildings.

Particular vigilance and adaptation

- **Monitoring the appearance of signs of rupture of the terraced plot or of the rocky cliff** such as cracks, fractures.
- In the event of the appearance of these signs of ruptures upstream of the site, a site visit as soon as possible by a geologist is strongly recommended. The location of these warning signs will make it possible to simulate the fall trajectory and the nature of potential emergency measures to be taken.



Landslide susceptibility map

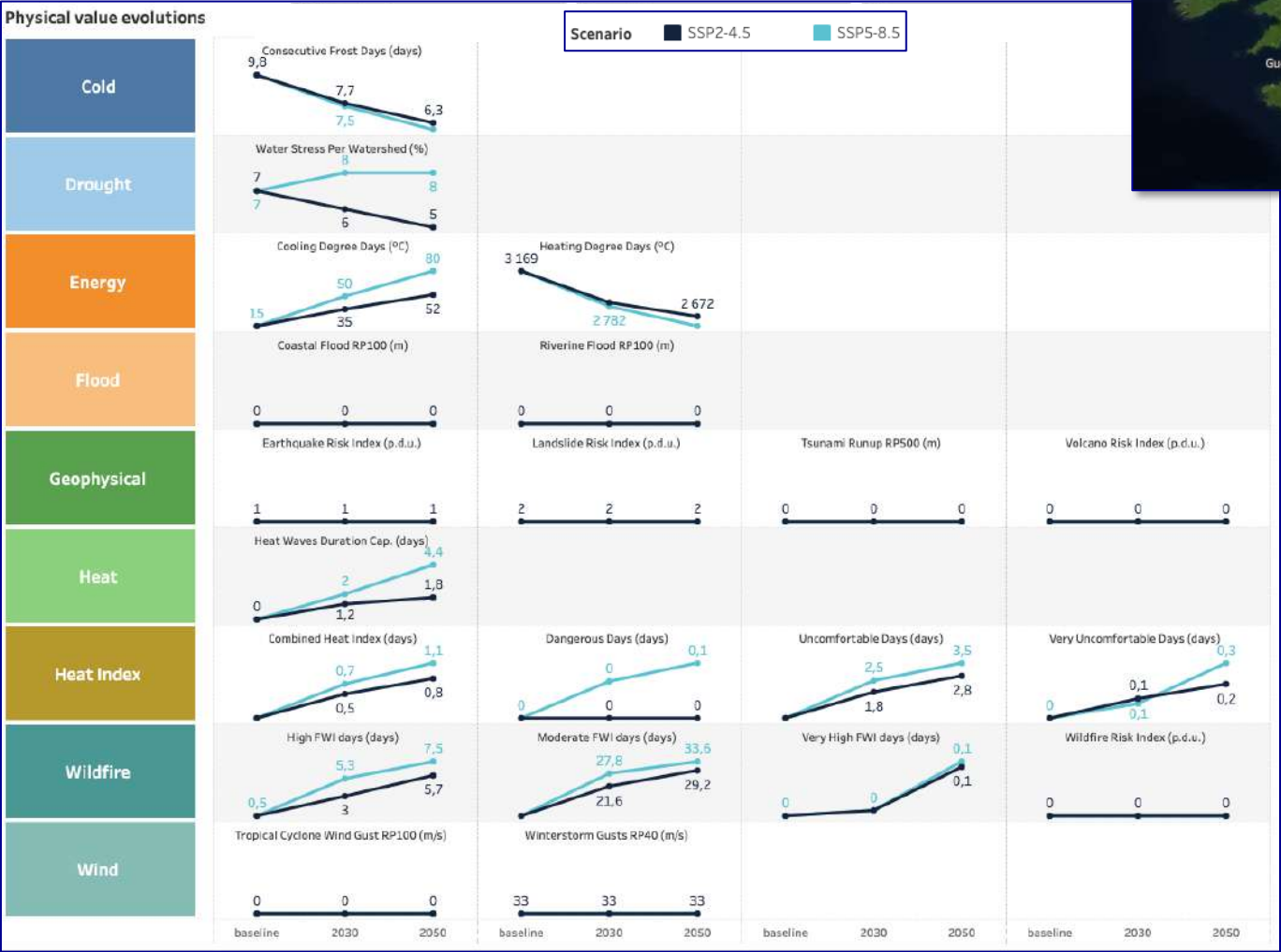
Wrexham site climate risk profile overview



IPSEN_87 Asset Details	
Customer Ref	IPSEN_87
Name	IPSEN BIOPHARM Limited - Wrexham
Subportfolio	Dysport
Occupancy	Internal Factory
Country	United Kingdom
City	Wrexham
Postal Code	
Address	Ash Rd N, Wrexham LL13 9UF, United
Coordinates (Long, Lat)	-2.933737234889669,
Geocoding confidence	
Altitude (m)	41.0

Asset multi-peril score :		0,19 *
Energy	29.63%	
Cold	28.43%	
Geophysical	20.32%	
Drought	18.26%	
Wind	2.78%	
Heat Index	0.54%	
Rain	0.04%	
Flood	0.00%	
Heat	0.00%	
Wildfire	0.00%	

*Under SSP5-8.5 by 2030



Perils evolution matrix

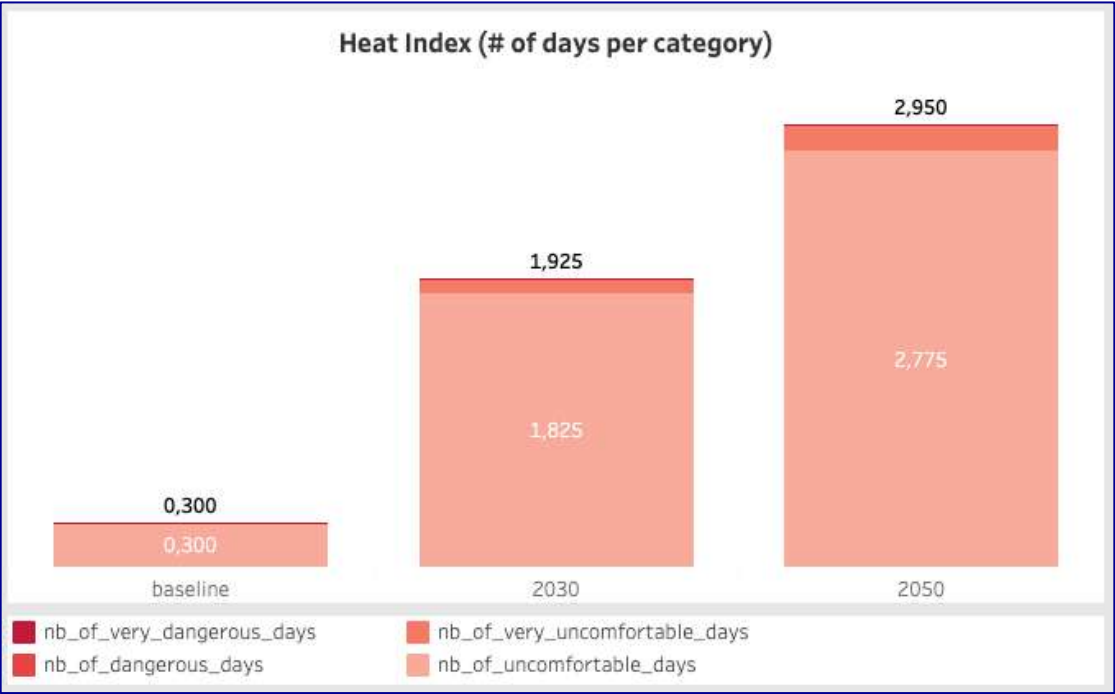


Under SSP5-8.5 by 2030

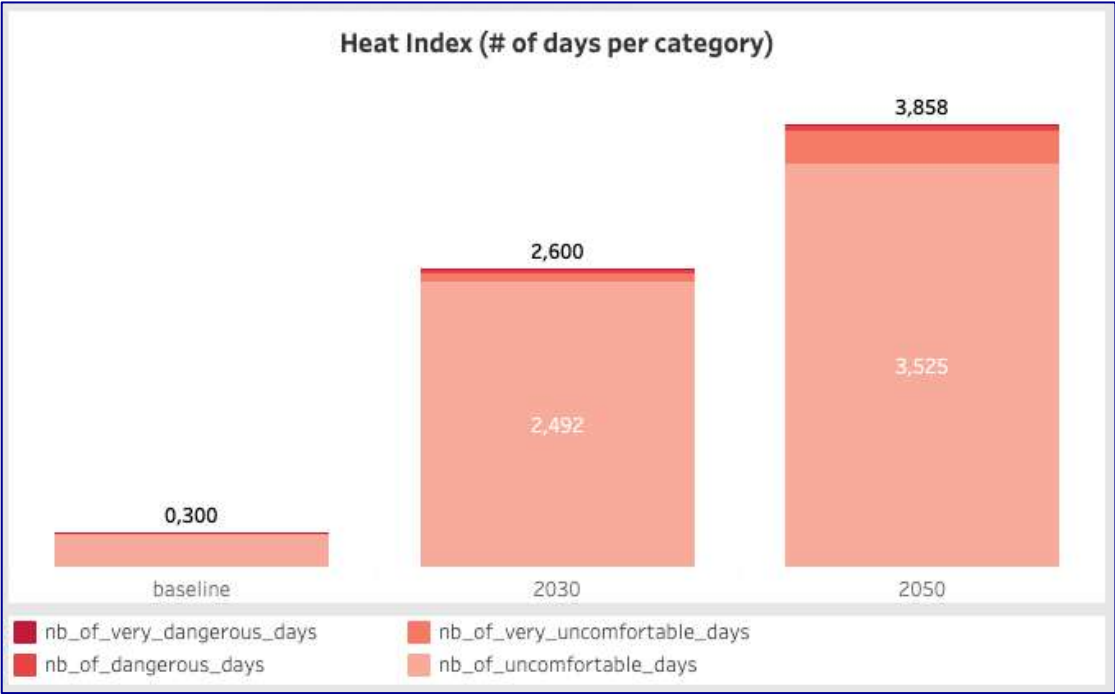
The decrease in frost days (cold) and the increase of the heat index are correlated with energy indicators, with a **possible overall reduction in energy consumption**

Only the heat index will deteriorate slightly, but with no impact (see focus)

Zoom on Heat Index



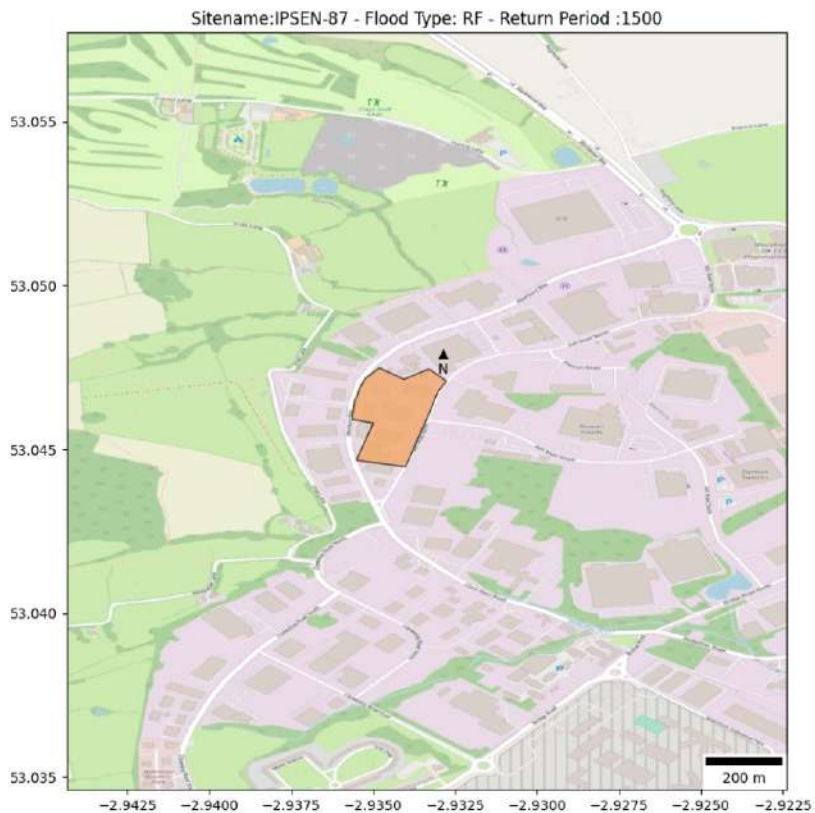
Under SSP2-4.5



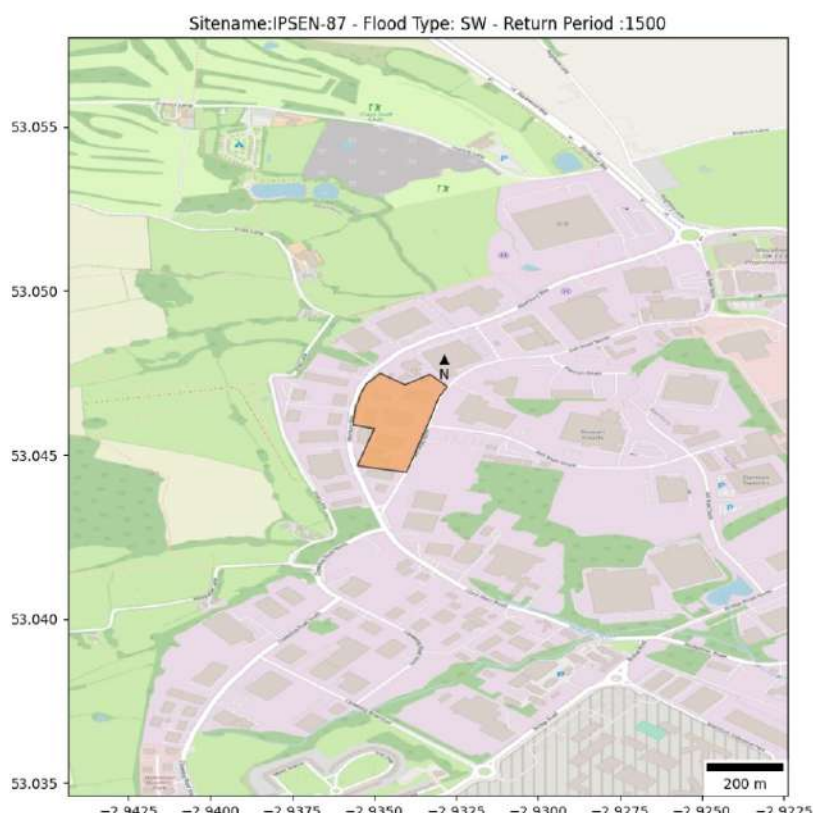
Under SSP5-8.5

Whatever the scenario, in absolute value, the increase of uncomfortable days remains anecdotal and should not affect significantly the site operations

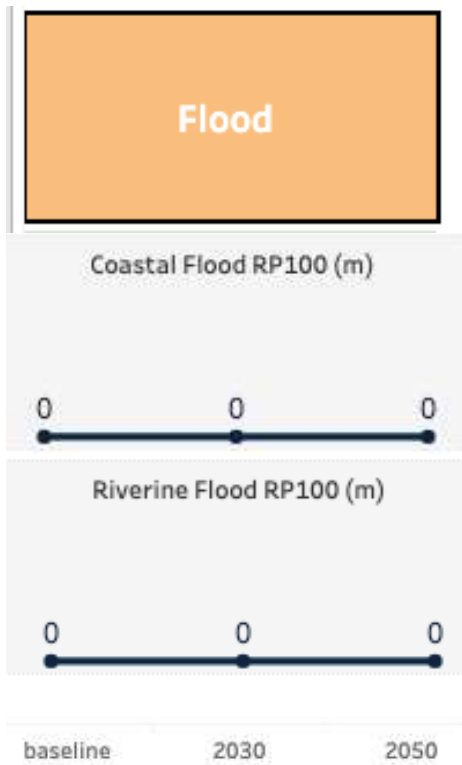
Zoom on Flooding (1/2) – Models



Riverine flooding map for a return period of 1500y



Surface flooding map for a return period of 1500y



Peril evolution under SSP5-8.5

Flooding does not appear as a peril for Wrexham site,
and climate change does not seem to change the risk profile

NB. Results consistent with the [“check your flood risk”](#) service provided by the UK government

Zoom on Flooding (2/2) – Ground observation

Wrexham Covid vaccine factory protected from flooding by emergency crews during Storm Christoph

Teams have been working through the night to protect the site on Wrexham Industrial Estate



<https://www.business-live.co.uk/economic-development/wrexham-covid-vaccine-factory-protected-19669535>

Storm Christoph: Wrexham's readiness for flooding questioned



<https://www.bbc.com/news/uk-wales-60074335>



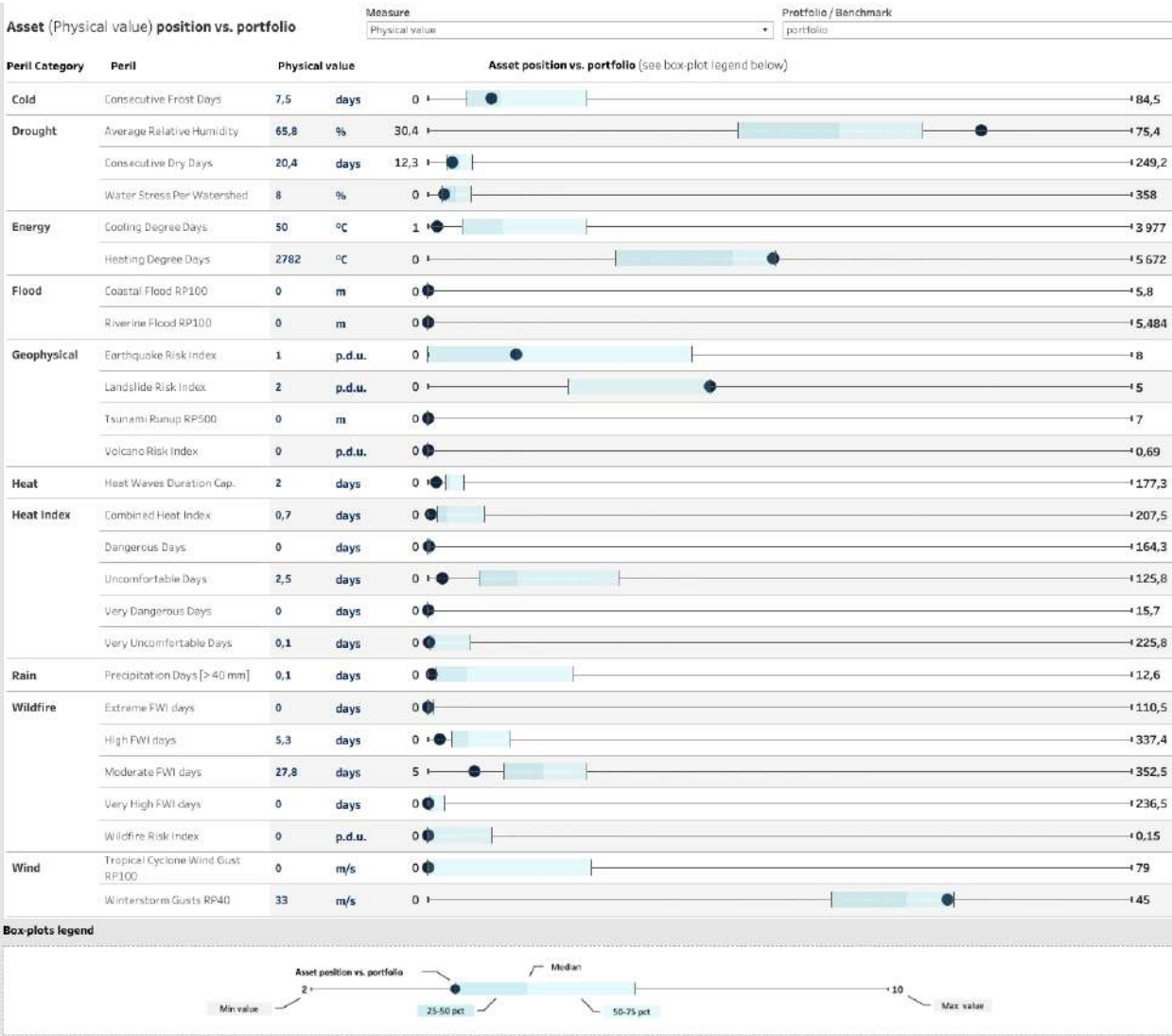
Site	Type	Level	Month	Date	Time	Country
IPSEN BIOPH. Thunderstor	1 - Yellow	2 - February	28/02/2022	10:10:00	United Kingdom	
IPSEN BIOPH. Storm	2 - Orange	2 - February	20/02/2022	09:28:00	United Kingdom	
IPSEN BIOPH. Storm	1 - Yellow	2 - February	20/02/2022	08:32:00	United Kingdom	
IPSEN BIOPH. Storm	5 - Grey	2 - February	18/02/2022	21:27:00	United Kingdom	
IPSEN BIOPH. Storm	2 - Orange	2 - February	18/02/2022	09:48:00	United Kingdom	
IPSEN BIOPH. Storm	1 - Yellow	2 - February	17/02/2022	10:25:00	United Kingdom	
IPSEN BIOPH. Storm	2 - Orange	2 - February	16/02/2022	15:32:00	United Kingdom	
IPSEN BIOPH. Storm	1 - Yellow	2 - February	15/02/2022	14:31:00	United Kingdom	
IPSEN BIOPH. Flood	1 - Yellow	2 - February	12/02/2022	21:22:00	United Kingdom	

Reminder CYMO Alerts for Wrexham in February 2022

However, a recent event (Storm Christoph, January 2021) caused flooding in the area and very close to the site: flood risk cannot be completely ruled out

Wrexham site position vs full portfolio

Under SSP5-8.5, by 2030



Dublin site climate risk profile overview

Changing patterns should not significantly affect the site operations



IPSEN_138 Asset Details	
Customer Ref	IPSEN_138
Name	IPSEN MANUFACTURING IRELAND Ltd -
Subportfolio	Other
Occupancy	Internal Factory
Country	Ireland
City	Dublin
Postal Code	
Address	Blanchardstown Industrial Park,
Coordinates (Long, Lat)	-6.358441440243904,
Geocoding confidence	
Altitude (m)	68.0

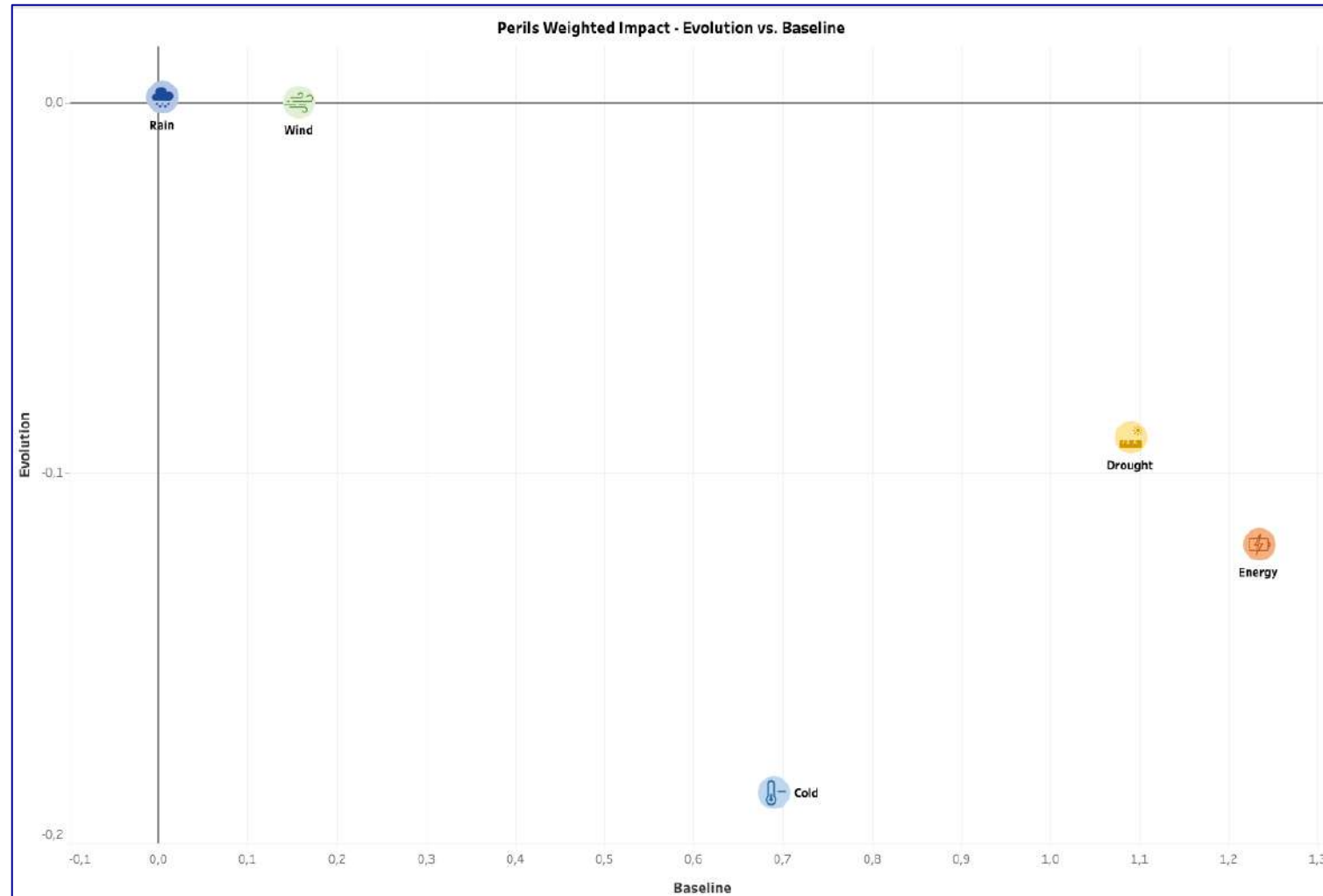
Asset multi-peril score :		0,10*
Energy	40.04%	
Drought	35.93%	
Cold	18.09%	
Wind	5.68%	
Rain	0.23%	
Heat Index	0.04%	
Flood	0.00%	
Geophysical	0.00%	
Heat	0.00%	
Wildfire	0.00%	

*Under SSP5-8.5 by 2030



Perils evolution matrix

Dublin site to “benefit” from climate change?

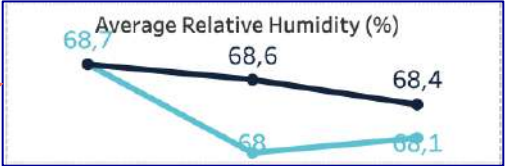
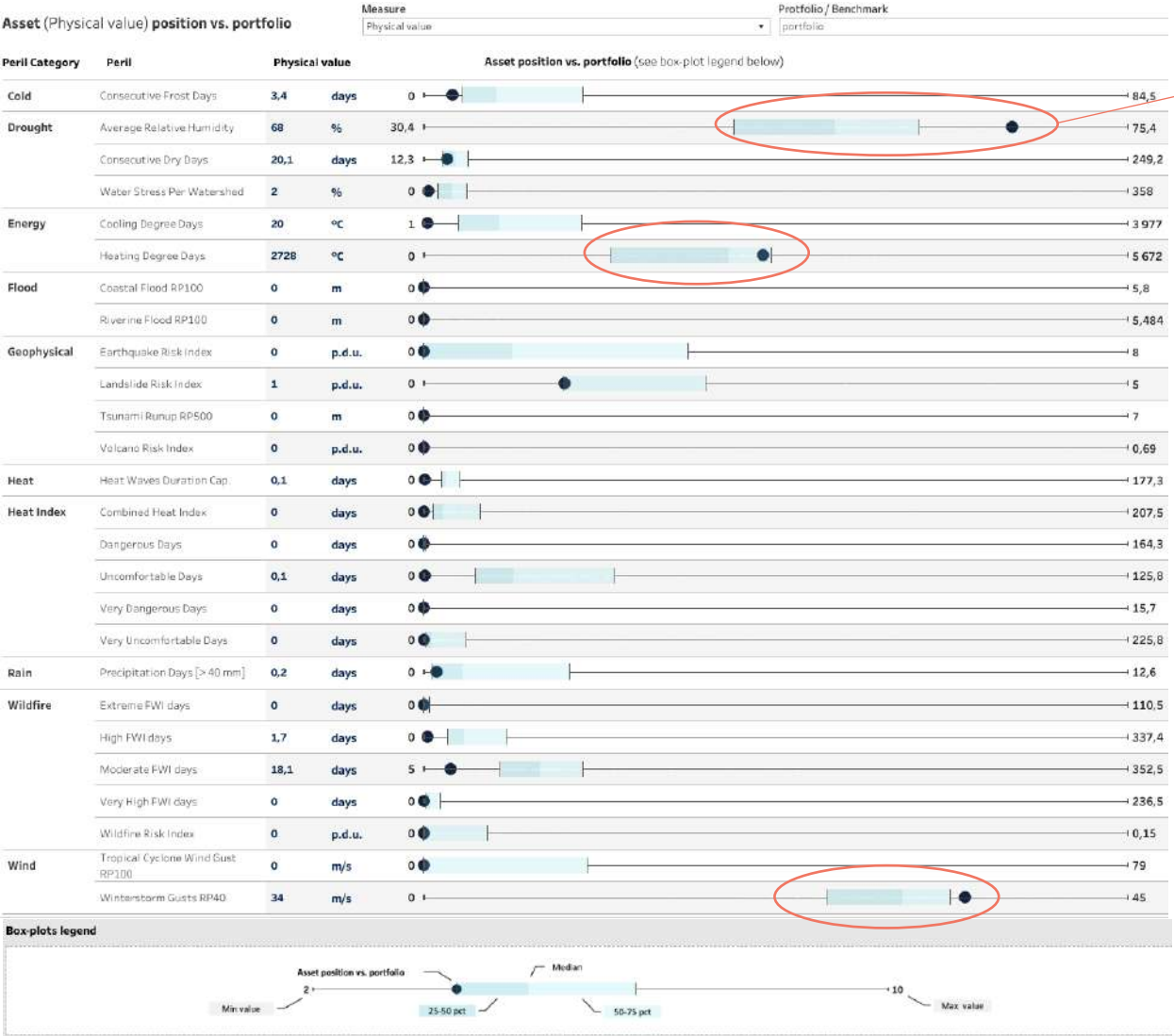


Under SSP5-8.5 by 2030

- Improvement of 3 indicators:
 - cold
 - drought
 - energy
- No change for rain and wind indicators
- [NB. Cold and Energy (heating degree days) indicators are correlated]

Dublin site position vs full portfolio

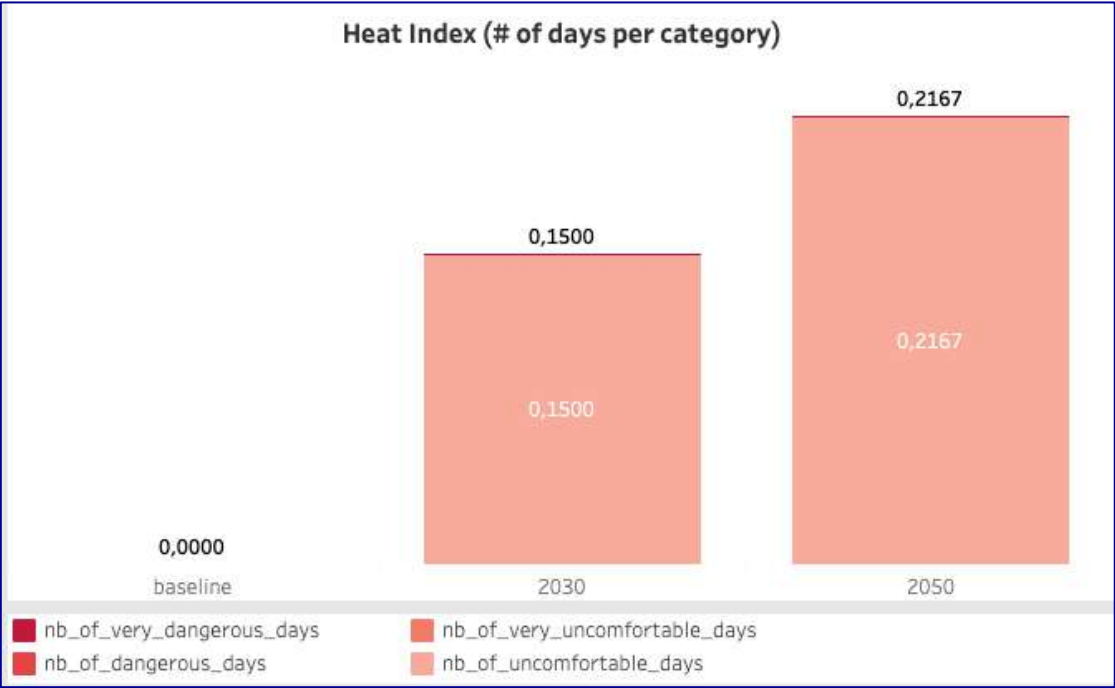
Under SSP5-8.5, by 2030



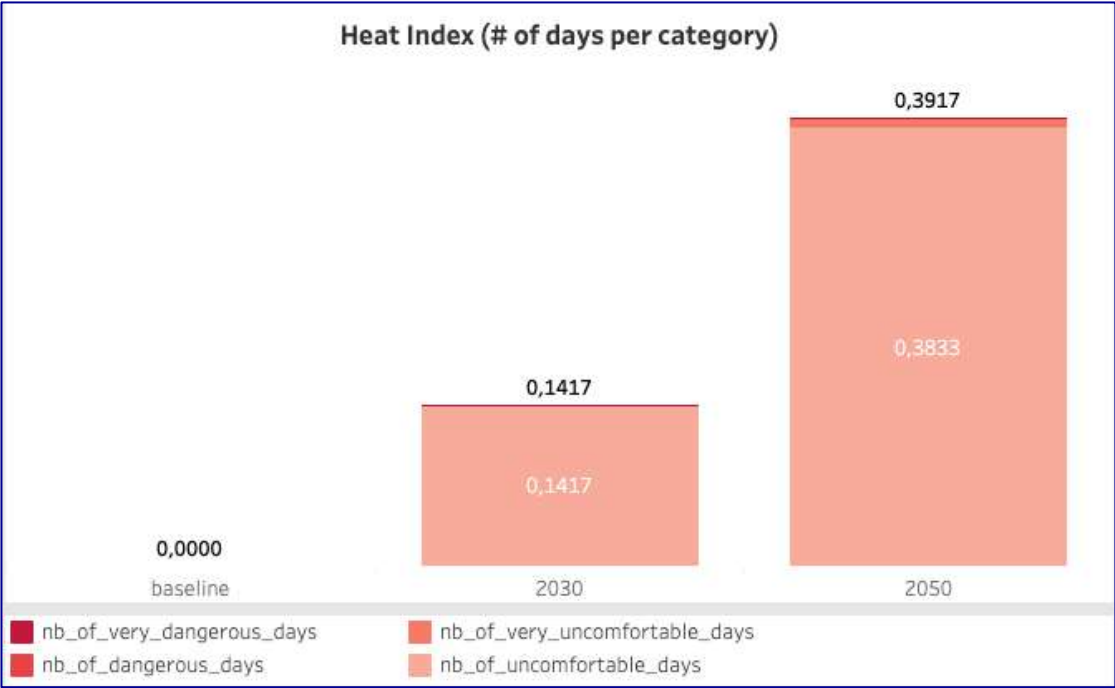
>60%

Is humidity a challenge for production processes or not?

Zoom on Heat Index



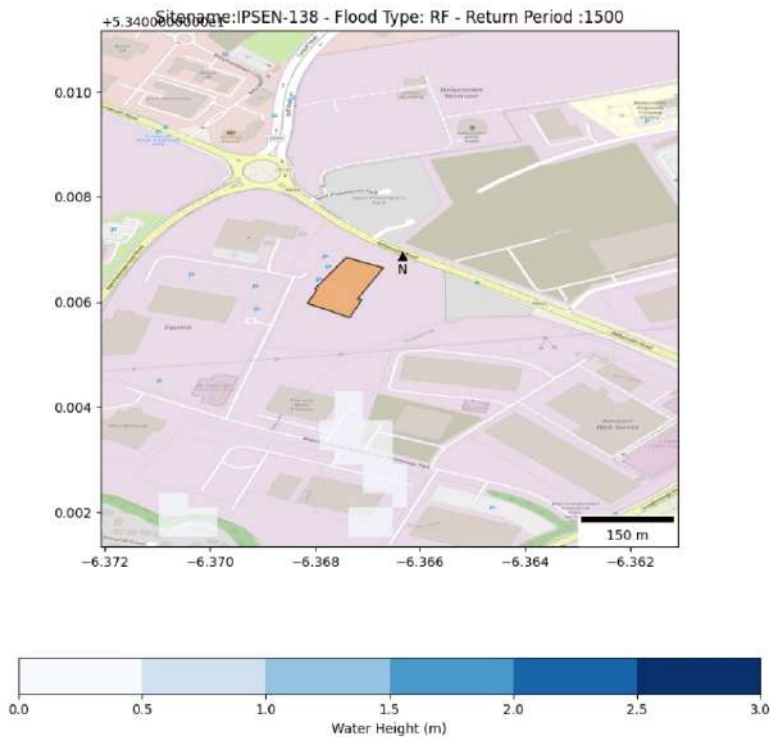
Under SSP2-4.5



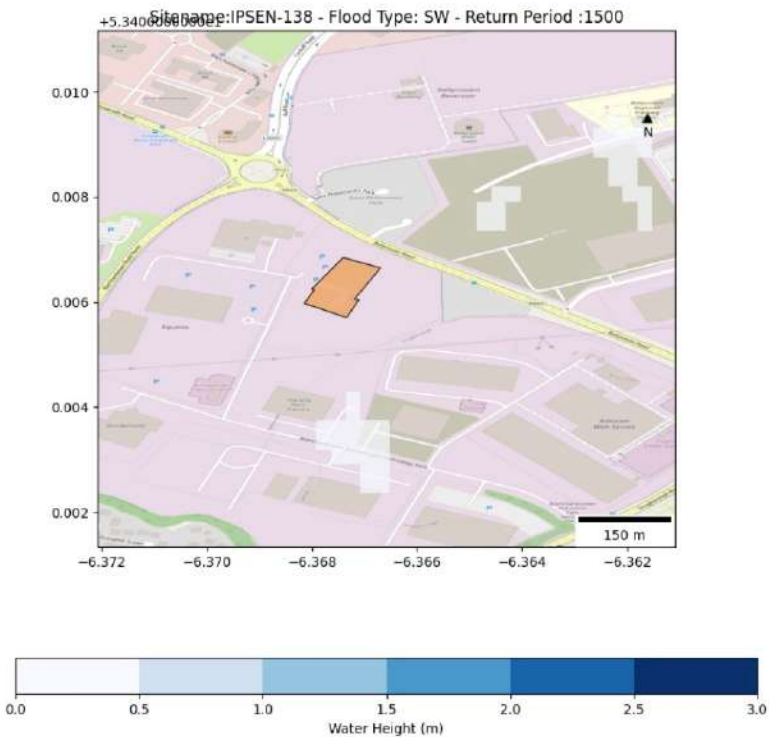
Under SSP5-8.5

Whatever the scenario, in absolute value, the increase of uncomfortable days remains almost insignificant and should not affect significantly the site operations

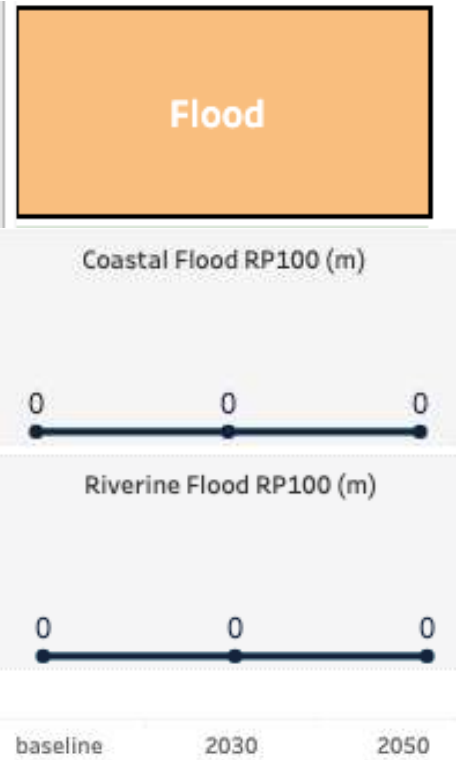
Zoom on Flooding



Riverine flooding map for a return period of 1500y



Surface flooding map for a return period of 1500y



Peril evolution under SSP5-8.5

Even with very long return periods (1500y), flooding does not appear as a major peril for Dublin site, and climate change does not seem to change the risk profile

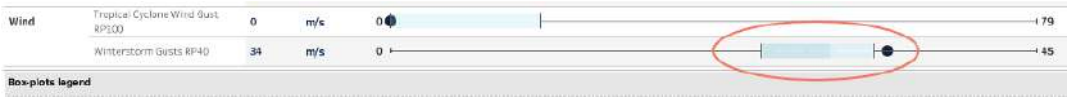
Zoom on Winterstorm



<https://www.dublinlive.ie/news/dublin-news/storm-eunice-orange-weather-warning-23126106>

Site	Type	Level	Month	Date	Time	Country
IPSEN MANU Storm		2 - Orange	2 - February	20/02/2022	18:40:00	Ireland
IPSEN MANU Storm		1 - Yellow	2 - February	20/02/2022	08:32:00	Ireland
IPSEN MANU Storm		1 - Yellow	2 - February	18/02/2022	14:58:00	Ireland
IPSEN MANU Storm		1 - Yellow	2 - February	17/02/2022	10:25:00	Ireland
IPSEN MANU Storm		1 - Yellow	2 - February	15/02/2022	14:07:00	Ireland
IPSEN MANU Flood		1 - Yellow	2 - February	12/02/2022	21:22:00	Ireland
IPSEN MANU Storm		1 - Yellow	3 - March	11/03/2022	13:40:00	Ireland

Reminder CYMO Alerts for Dublin in February 2022

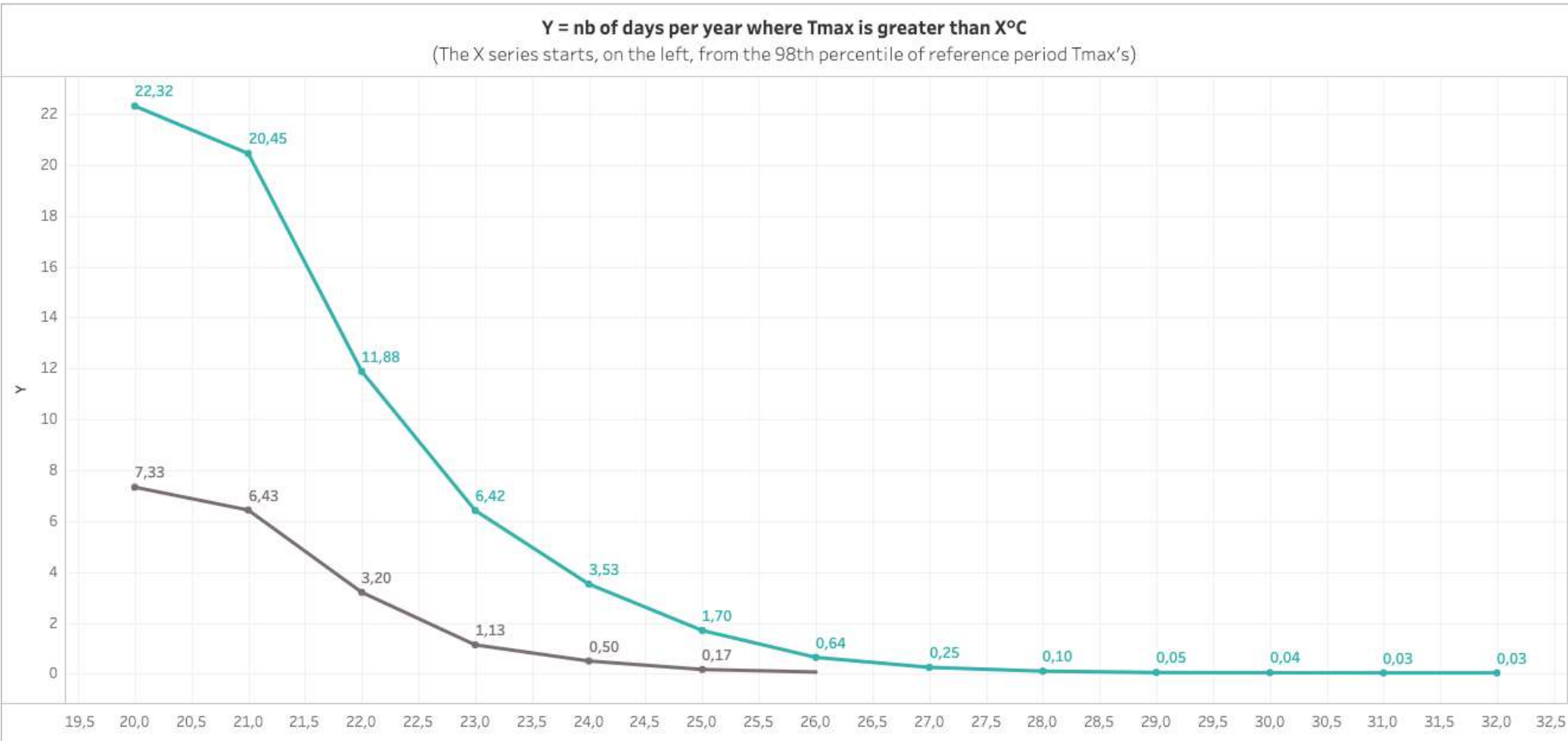


Dublin site position vs full portfolio

No pattern change regarding winterstorm.
However, this peril is more prominent for Dublin than for the rest of the portfolio.

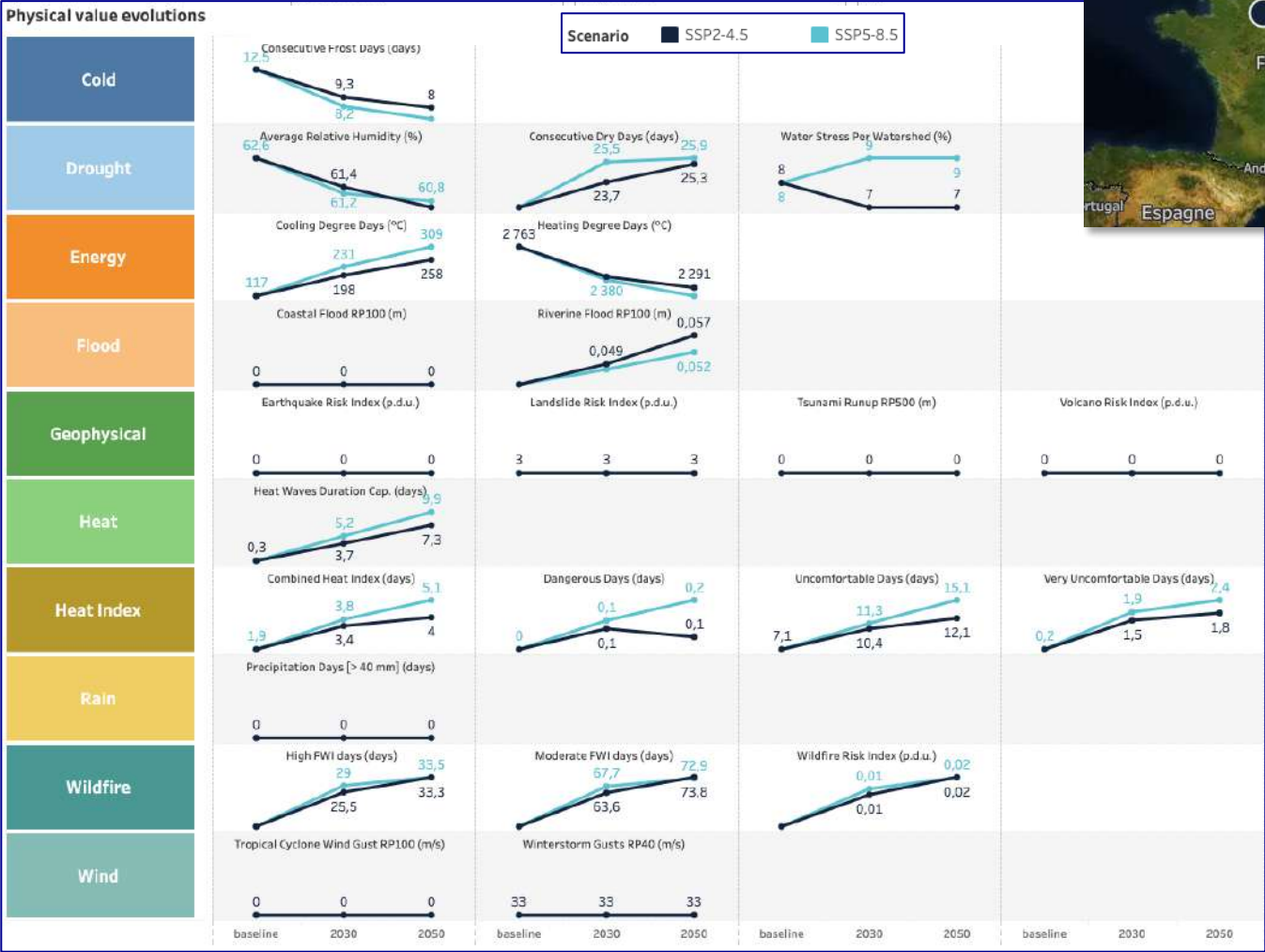
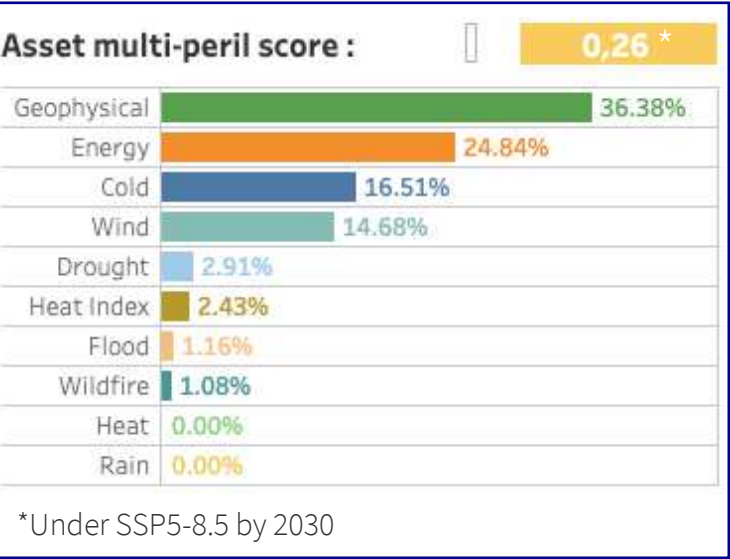
Focus on high temperature

Dublin site [IPSEN_138]



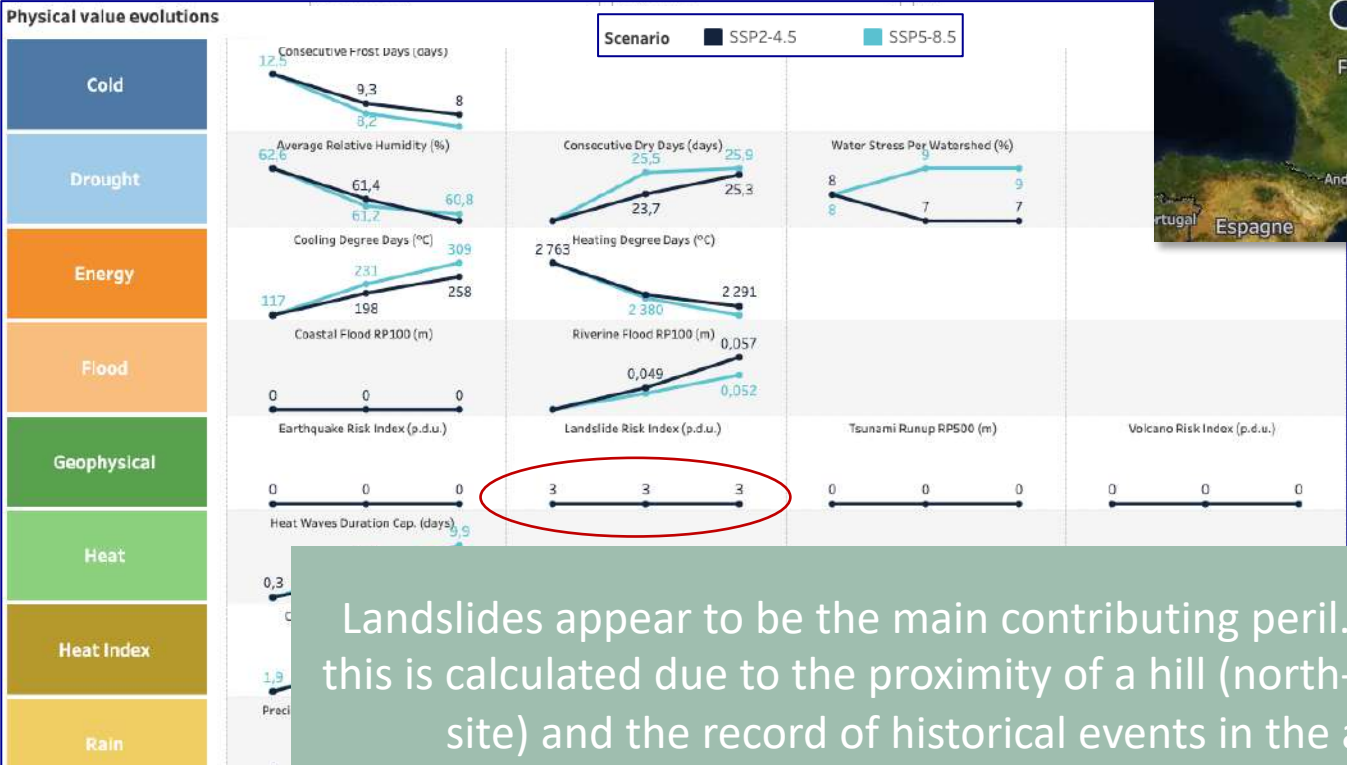
Dreux PharmDev climate risk profile overview

IPSEN_122 Asset Details	
Customer Ref	IPSEN_122
Name	IPSEN PHARMSCIENCE - Dreux
Subportfolio	All
Occupancy	Internal Laboratory
Country	France
City	Dreux
Postal Code	
Address	20 Rue Ethe Virton, 28100 Dreux, France
Coordinates (Long, Lat)	1.3823971283950618,
Geocoding confidence	
Altitude (m)	86.0



Dreux PharmDev climate risk profile overview

IPSEN_122 Asset Details	
Customer Ref	IPSEN_122
Name	IPSEN PHARMSCIENCE - Dreux
Subportfolio	All
Occupancy	Internal Laboratory
Country	France
City	Dreux
Postal Code	
Address	20 Rue Ethe Virton, 28100 Dreux, France
Coordinates (Long, Lat)	1.3823971283950618,
Geocoding confidence	
Altitude (m)	86.0



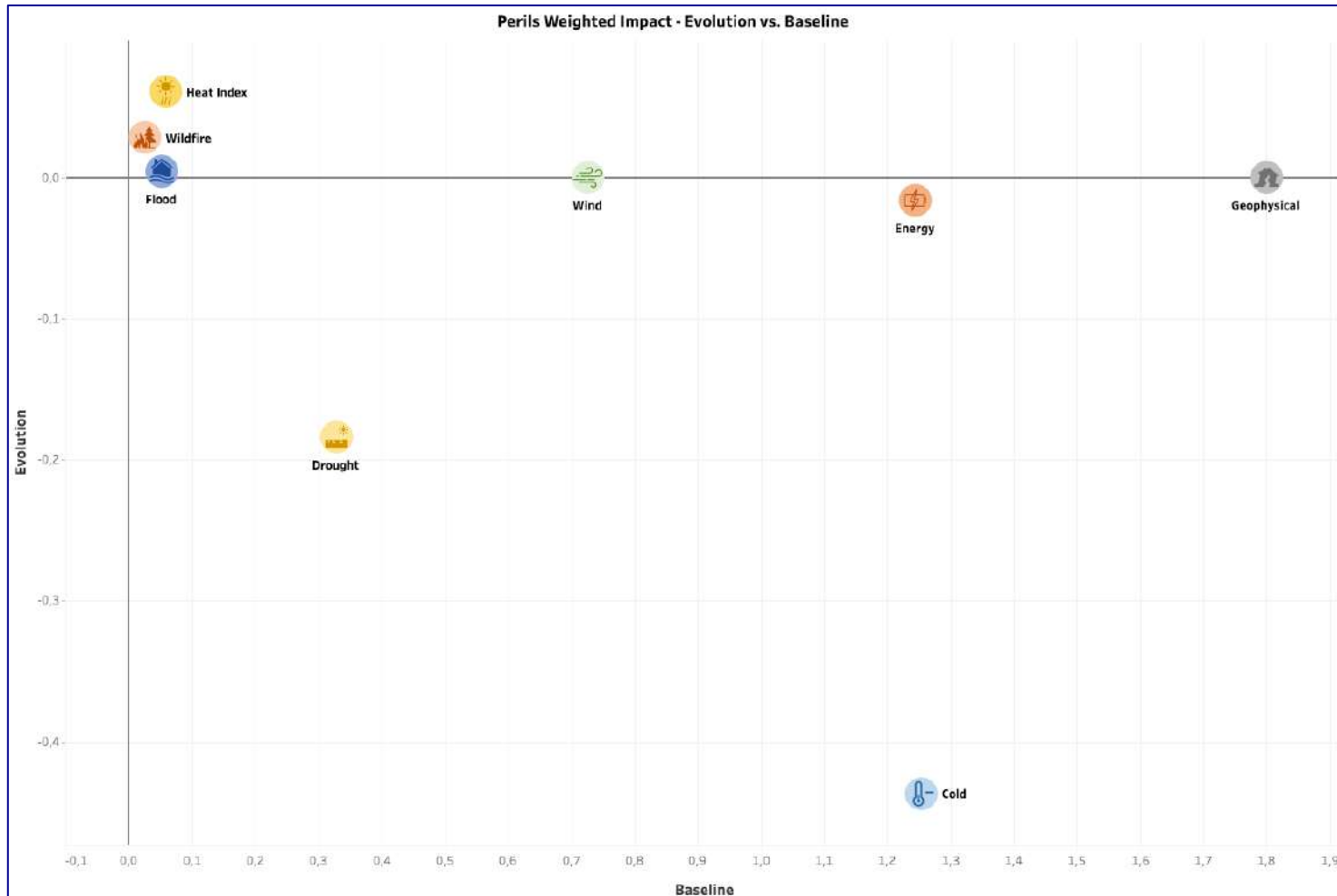
Landslides appear to be the main contributing peril. However, this is calculated due to the proximity of a hill (north-east of the site) and the record of historical events in the area.

The site analysis shows that there is no landslide risk directly on the site.



Topographical section north-west/south-east

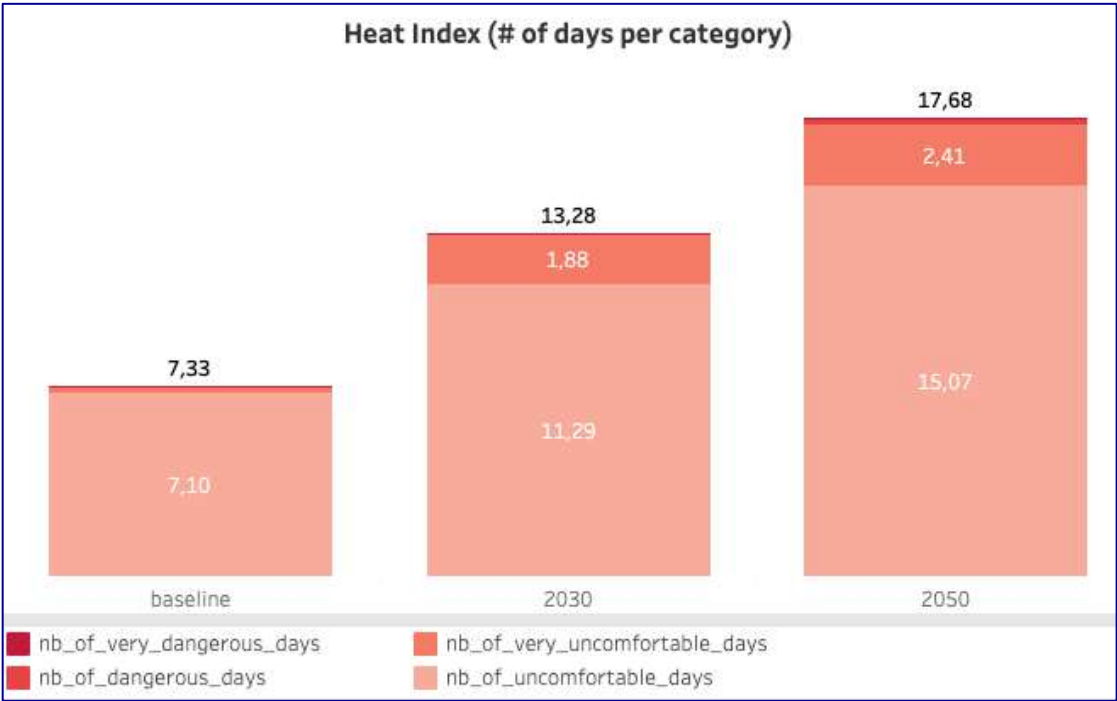
Perils evolution matrix



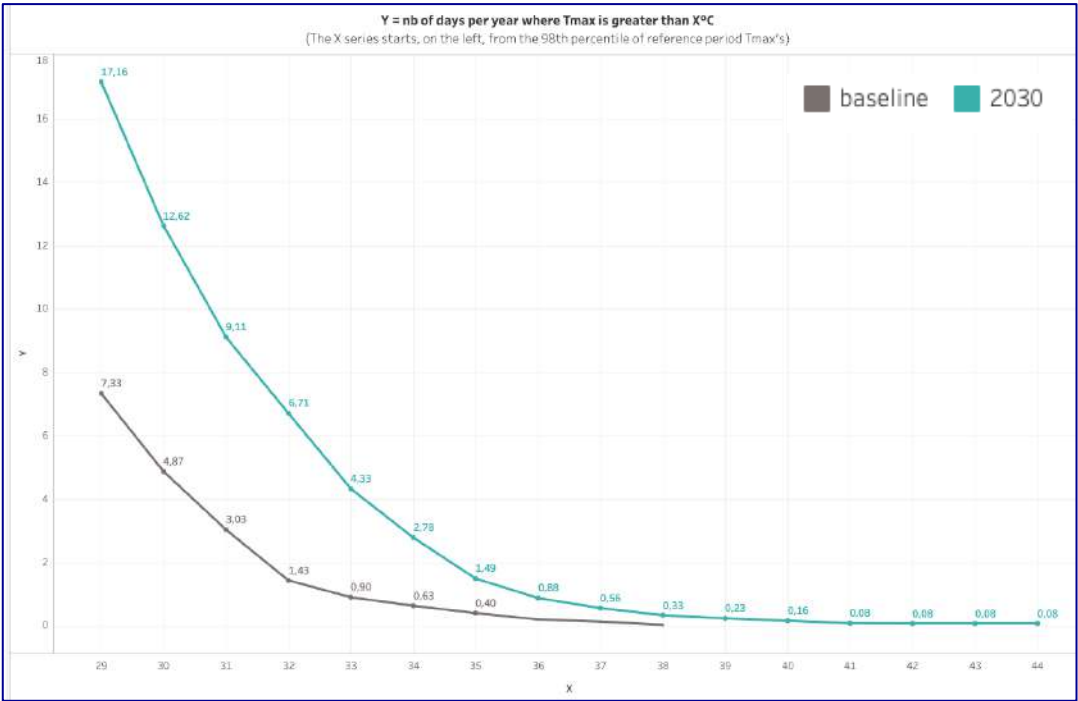
Under SSP5-8.5 by 2030

- No significant deterioration
- By 2030, a 25% reduction in the number of consecutive dry days results in an improvement of the cold-related perils

Zoom on Heat Index and High Temperatures



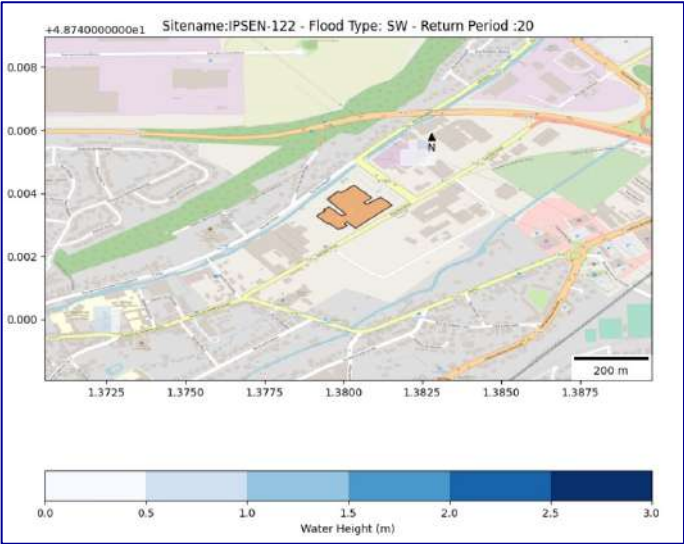
Under SSP5-8.5



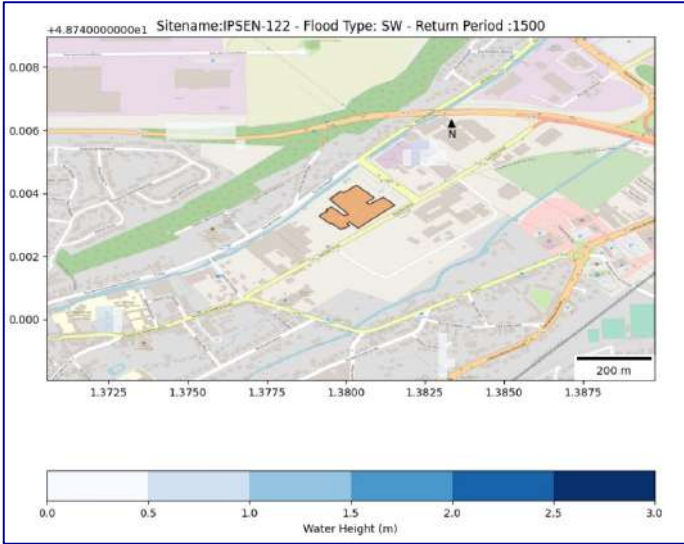
Under SSP5-8.5

Climate change will result in an increase of the number of days >27°C and longer heat waves, yet temperature should not reach extreme thresholds (>40°C)

Zoom on Surface Flood | Exposure



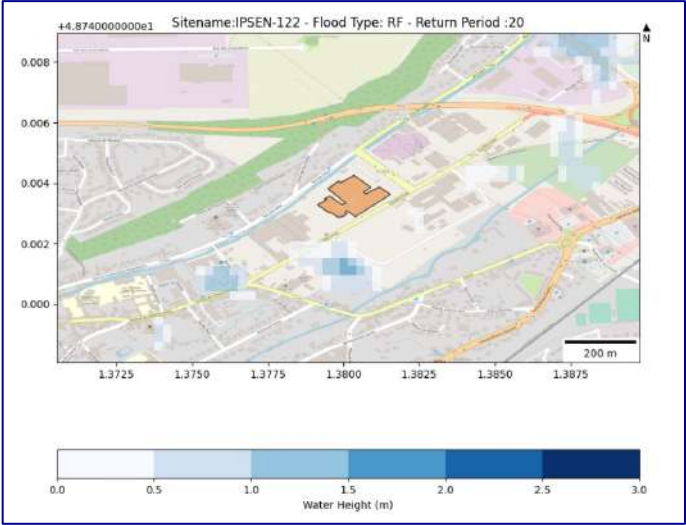
RP20y



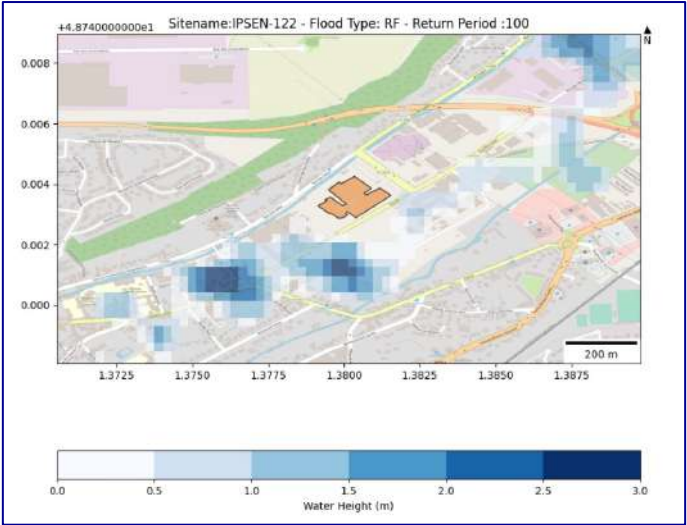
RP1500y

The site does not appear to be at risk of surface flooding

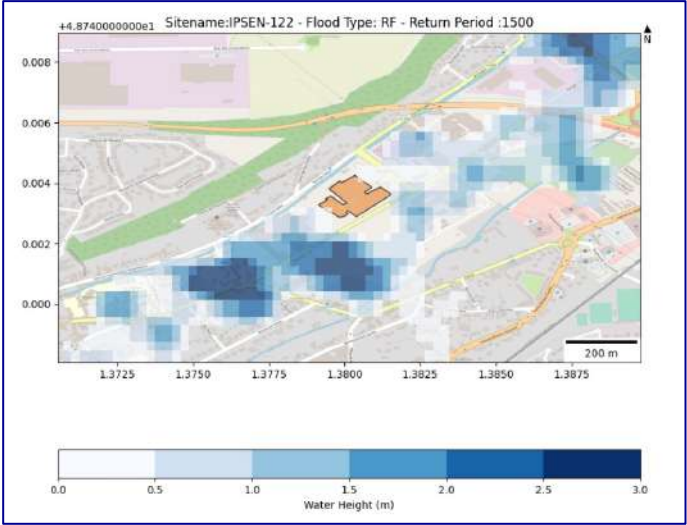
Zoom on Riverine Flood | Exposure



RP20y



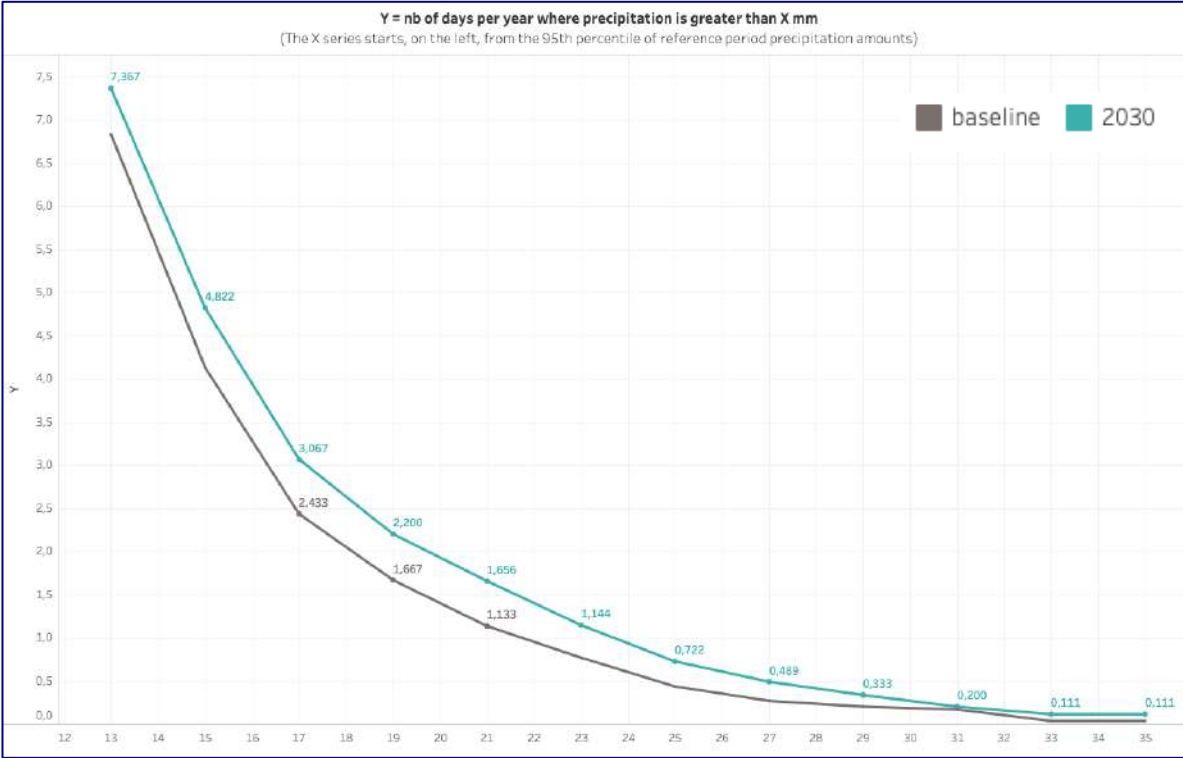
RP100y



RP1500y

The site appears to be inherently exposed to riverine flooding

Zoom on Riverine Flood | Impact of climate change

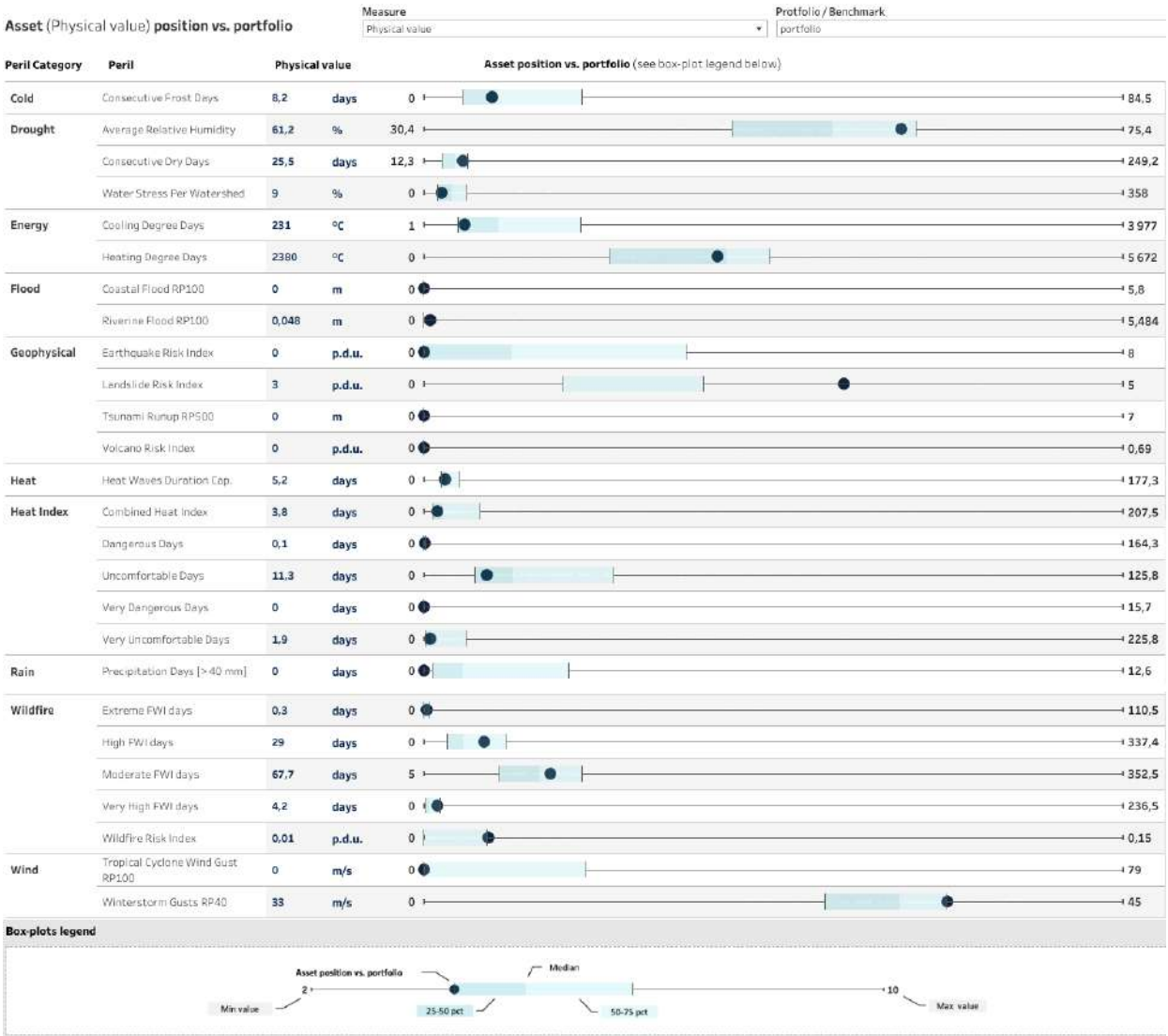


Under SSP5-8.5

Climate change will result in a slight increase of the precipitation, which could potentially cause riverine flooding

Dreux PharmDev site position vs full portfolio

Under SSP5-8.5, by 2030



Signes site climate risk profile overview

Changing patterns should not significantly affect the site operations

IPSEN_85 | Asset Details

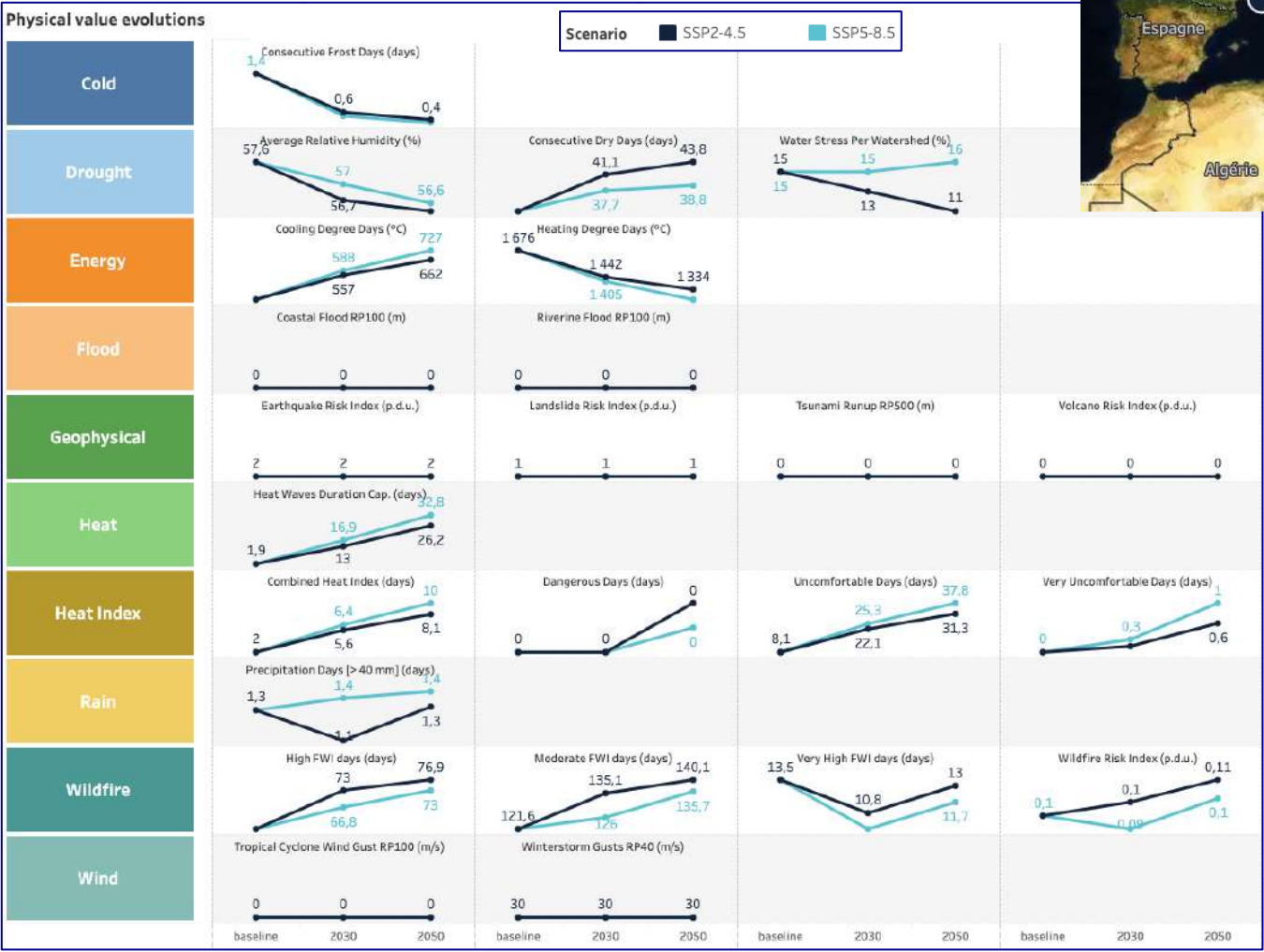
Customer Ref	IPSEN_85
Name	IPSEN PHARMA BIOTECH - Signes
Subportfolio	All
Occupancy	Internal Factory
Country	France
City	Signes
Postal Code	
Address	Parc Activités, 83870 Signes, France
Coordinates (Long, Lat)	5.804252018734399,
Geocoding confidence	
Altitude (m)	454.0

Asset multi-peril score :

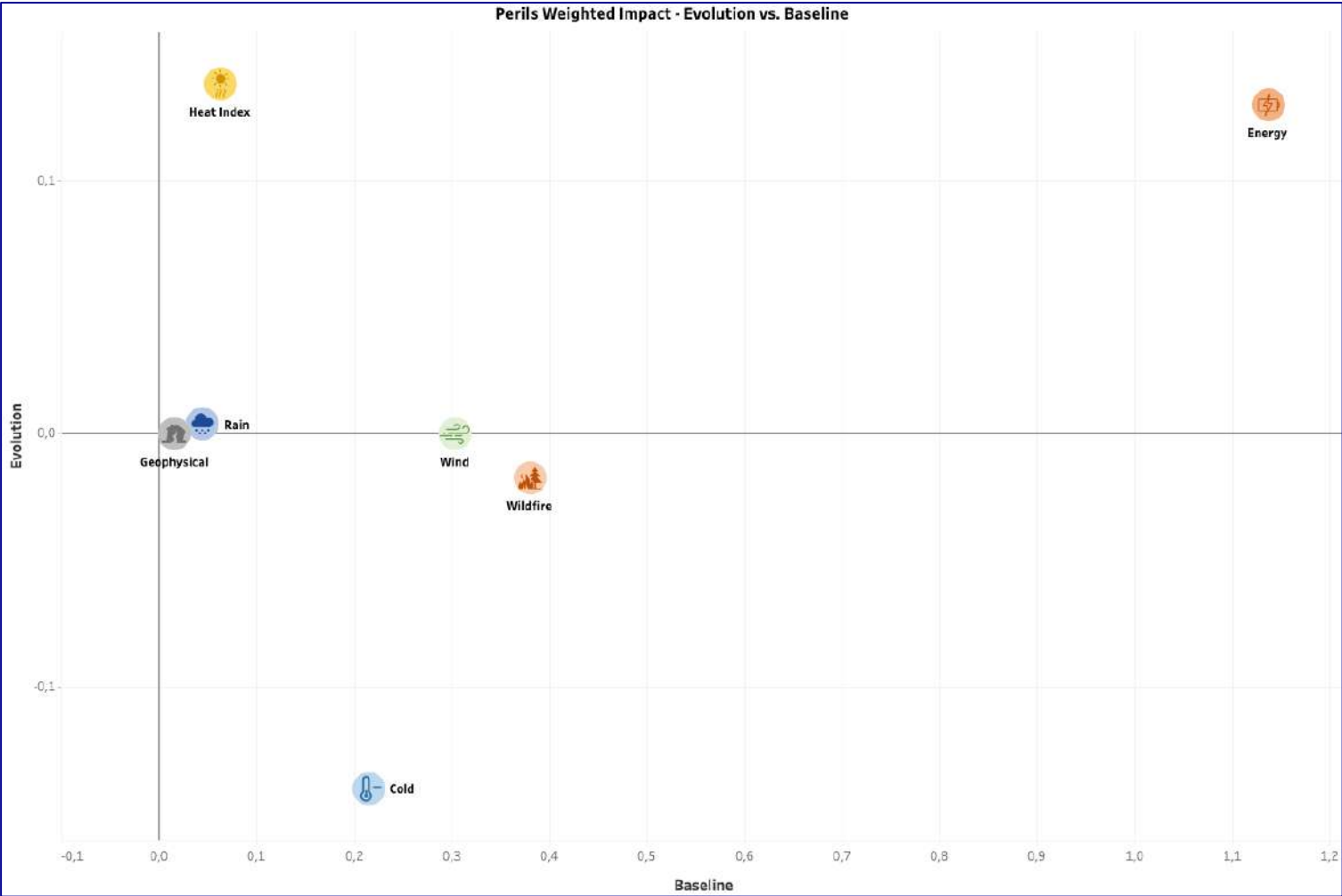
0,07*

Energy	55.69%
Wildfire	15.94%
Wind	13.37%
Heat Index	8.85%
Cold	3.30%
Rain	2.15%
Geophysical	0.70%
Drought	0.00%
Flood	0.00%
Heat	0.00%

*Under SSP5-8.5 by 2030



Perils evolution matrix

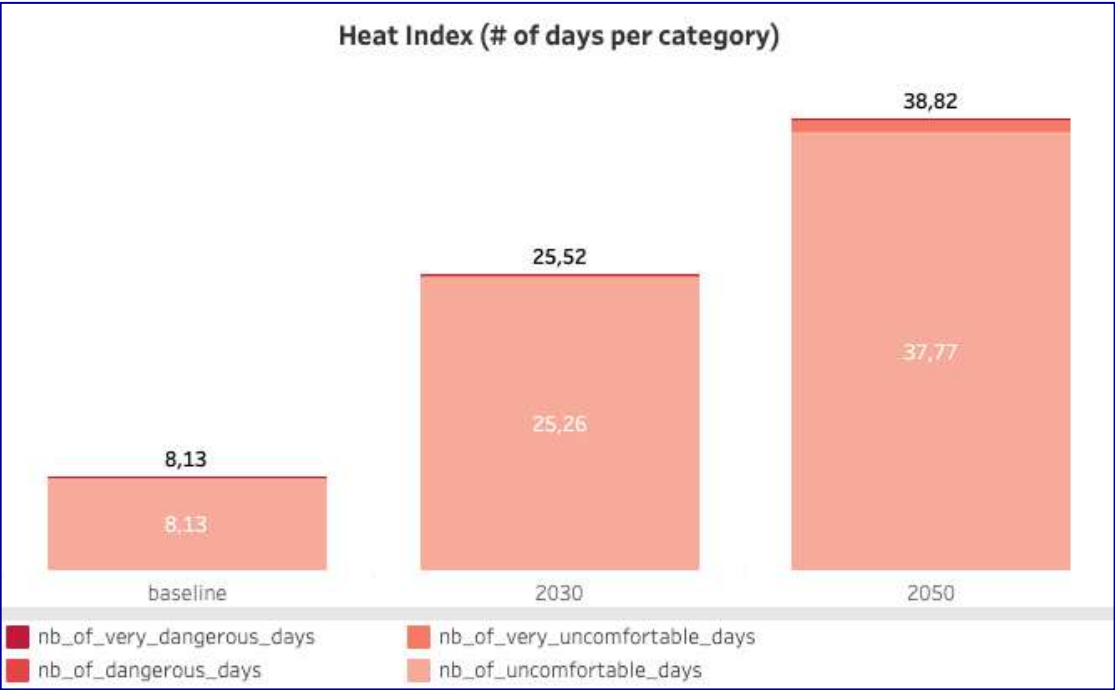


Under SSP5-8.5 by 2030

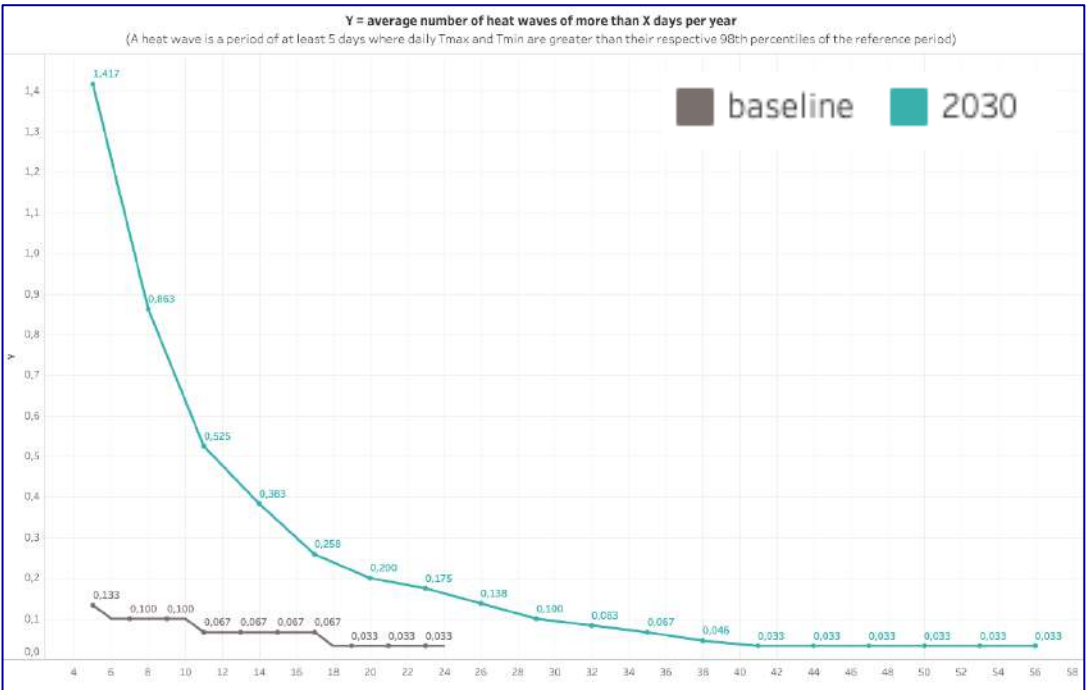
The main deterioration is related to heat which impact both:

- working conditions (heat index) and
- energy consumption (energy indicators)

Zoom on Heat



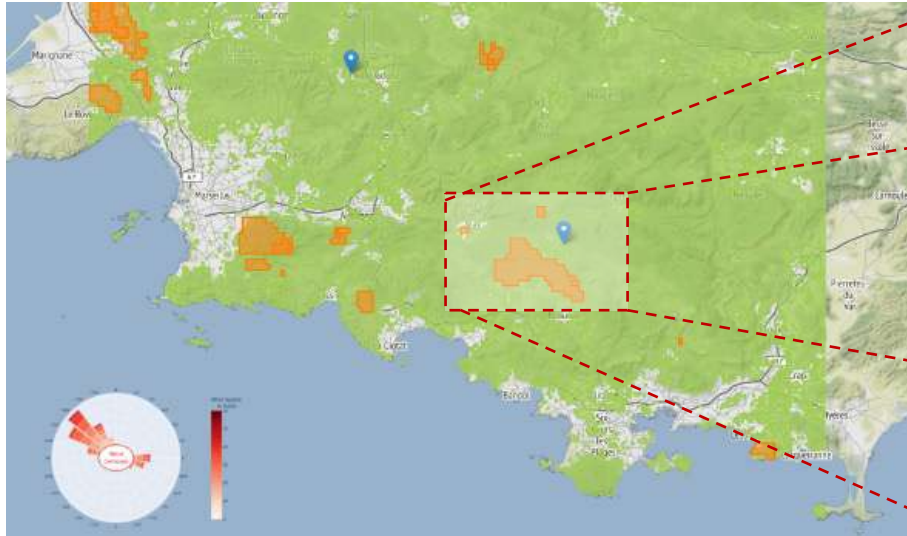
Under SSP5-8.5



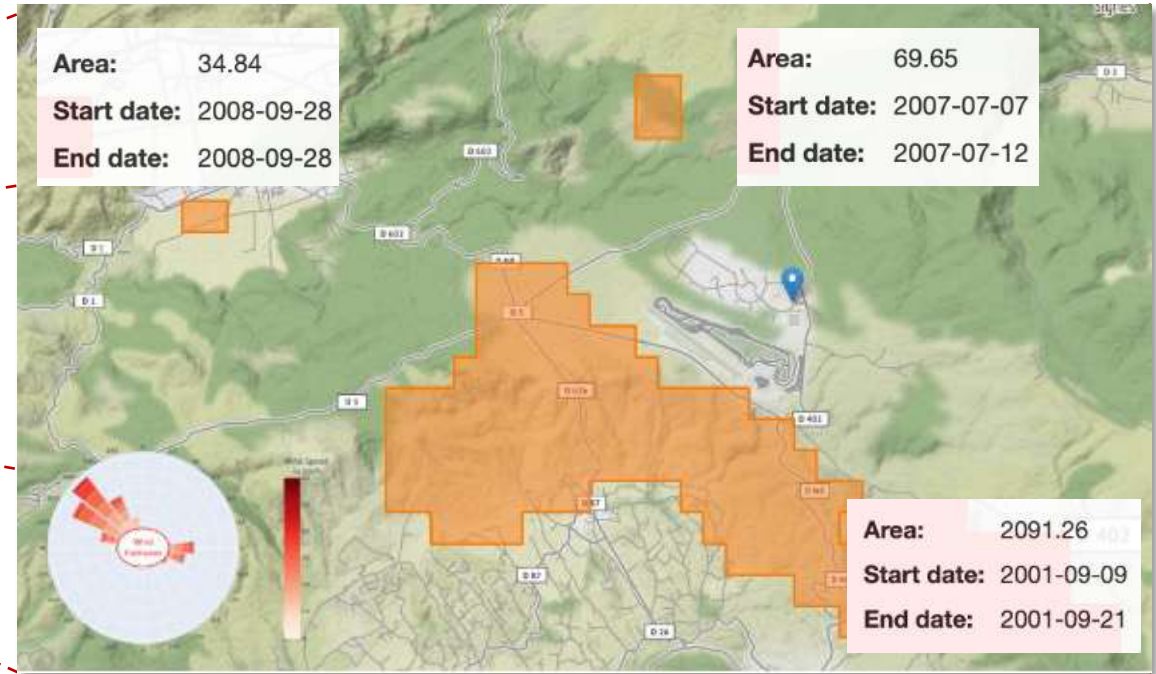
Under SSP5-8.5

Climate change will result in a significant increase of the number of days >27°C and in longer heat waves
which might put the HVAC systems under tension (?)

Zoom on Wildfire | History outlook

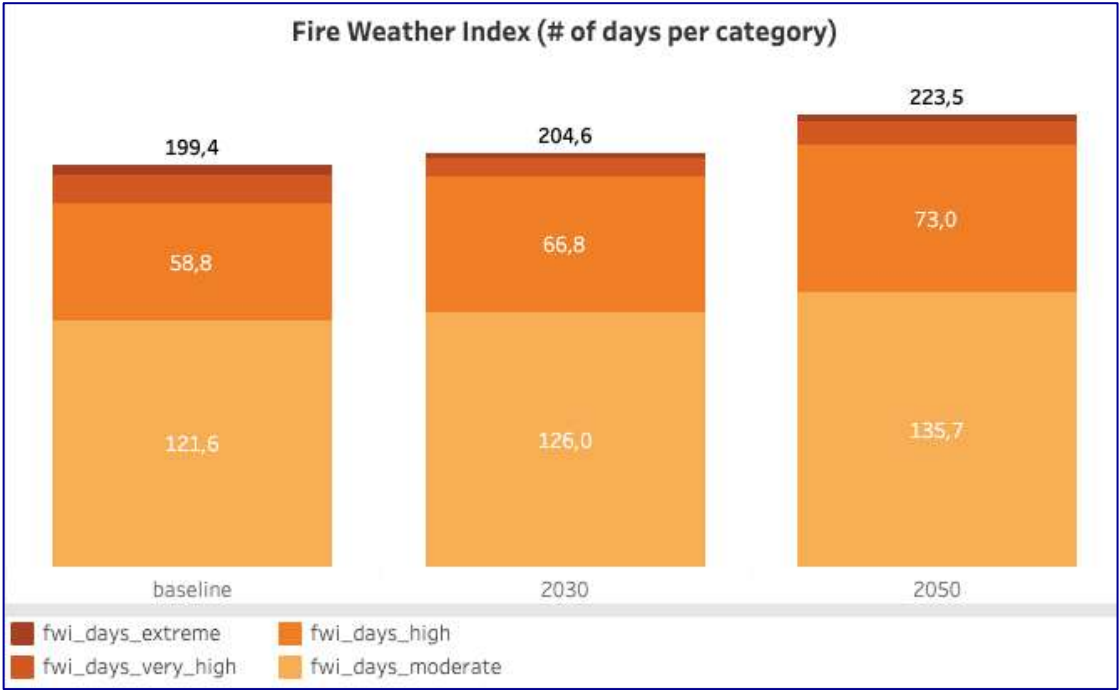


Map displaying vegetation continuity, type of vegetation and historical wildfires from MODIS



Even though the site seems to be protected from direct wildfire impact (+ Sapeurs Forestiers very close),
do air quality and wildfire smokes affect operations and HVAC systems?

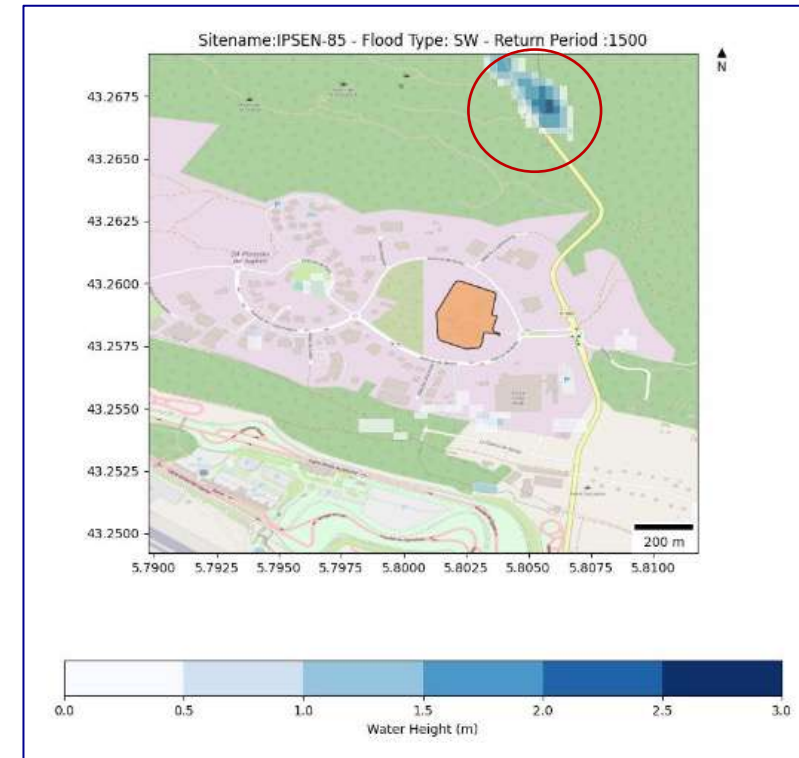
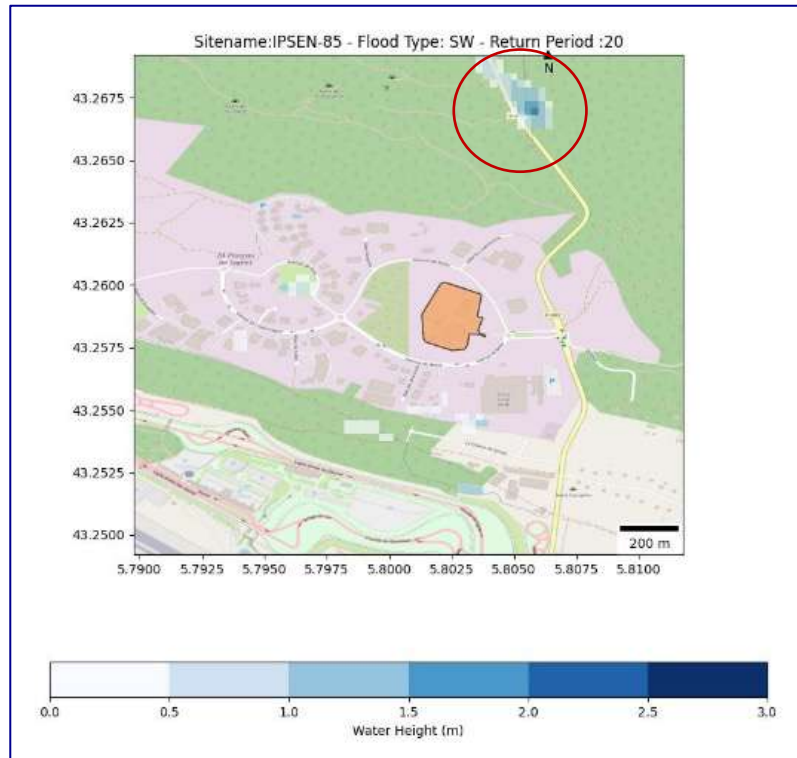
Zoom on Wildfire | Impact of climate change



Under SSP5-8.5

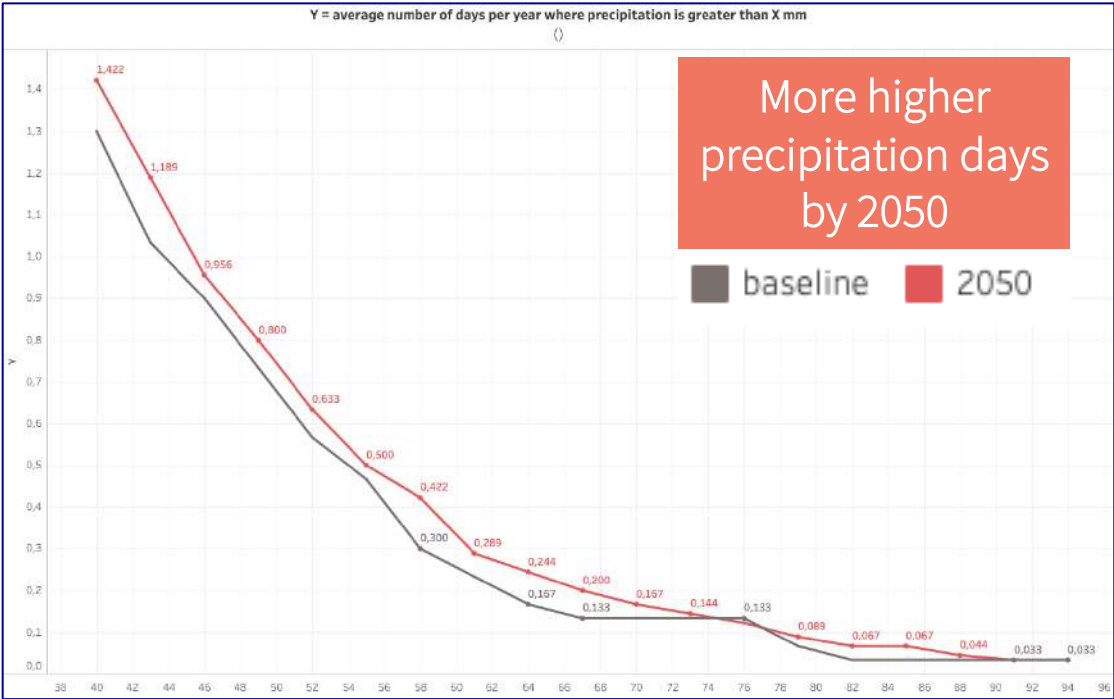
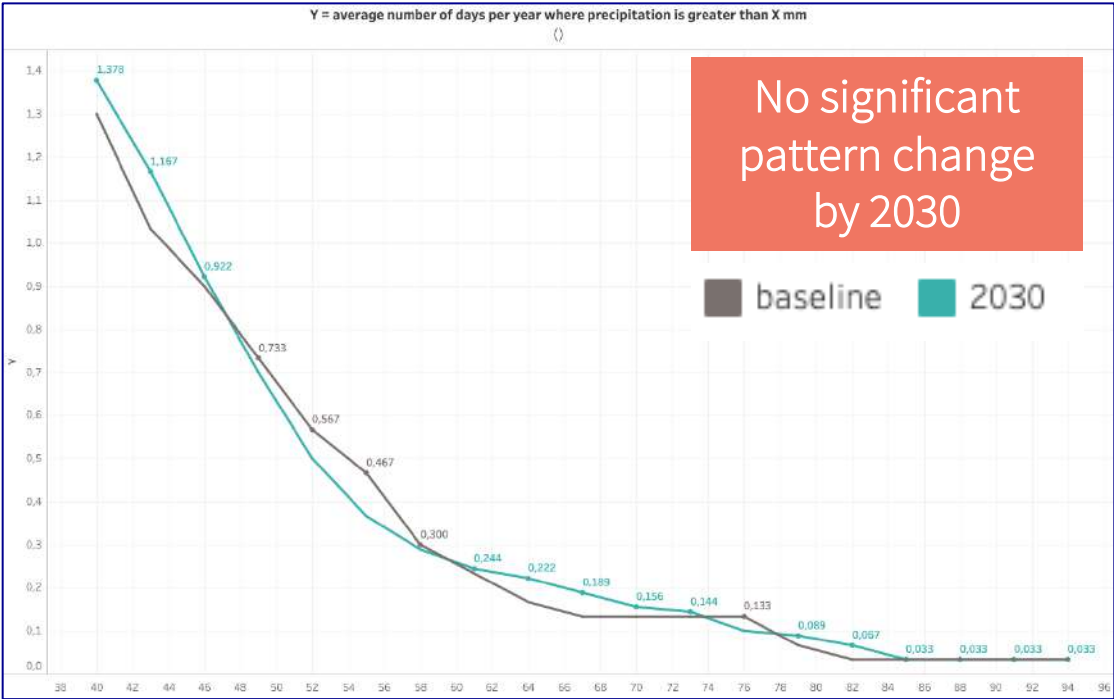
Climate change will increase the number of days with a higher Fire Weather Index (+10% by 2050)

Zoom on Flood | Exposure to surface flooding



The site is not exposed to riverine nor coastal flooding. Even with a long Return Period (RP1500y), surface flooding does not appear to be a key peril. Yet it could block the northern road (D402) frequently (RP20y)

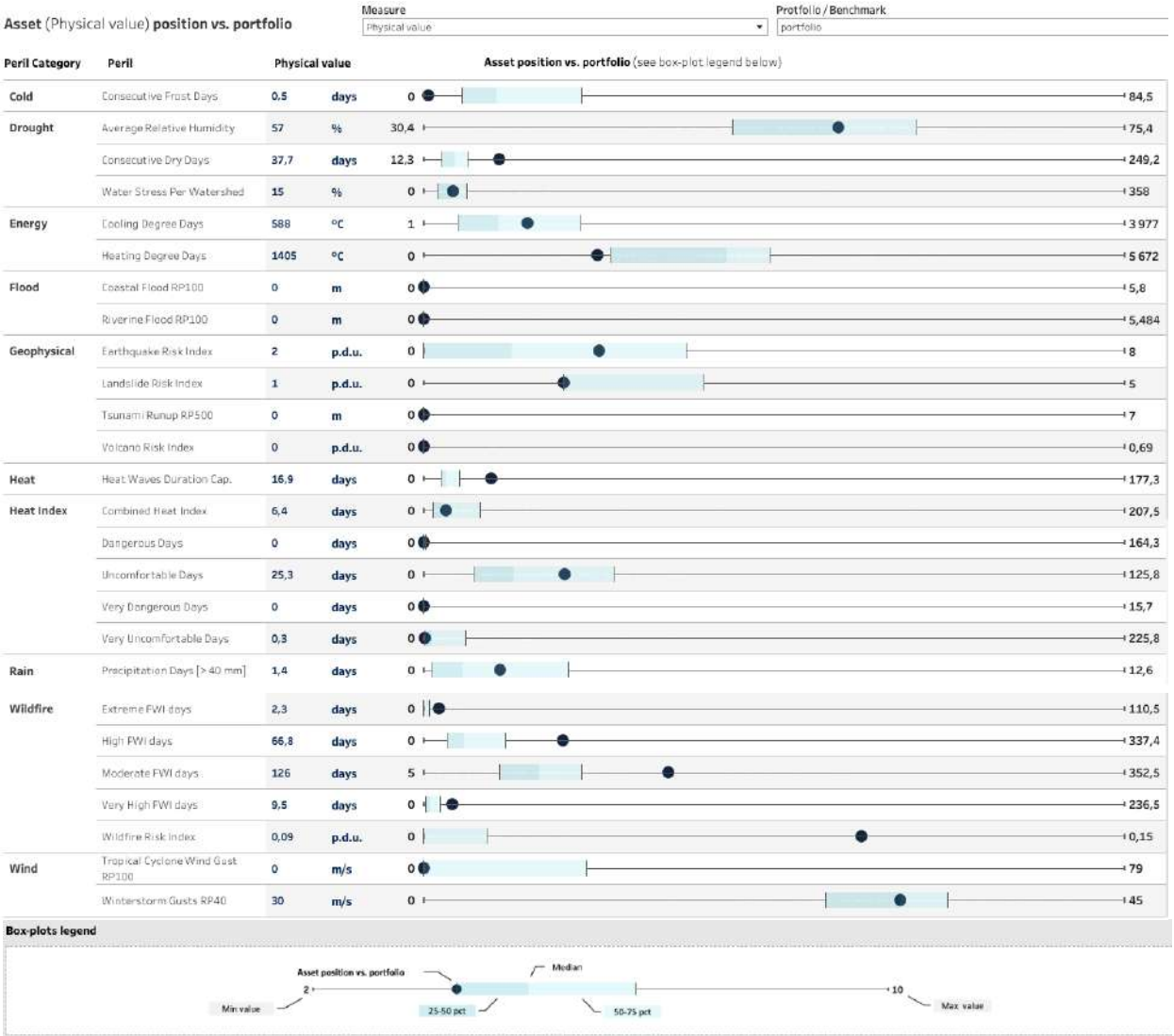
Zoom on Flood | Impact of climate change on high precipitation



Is surface flooding a challenge for operations?

Signes site position vs full portfolio

Under SSP5-8.5, by 2030



Focus on high temperature

Signes site [IPSEN_85]

