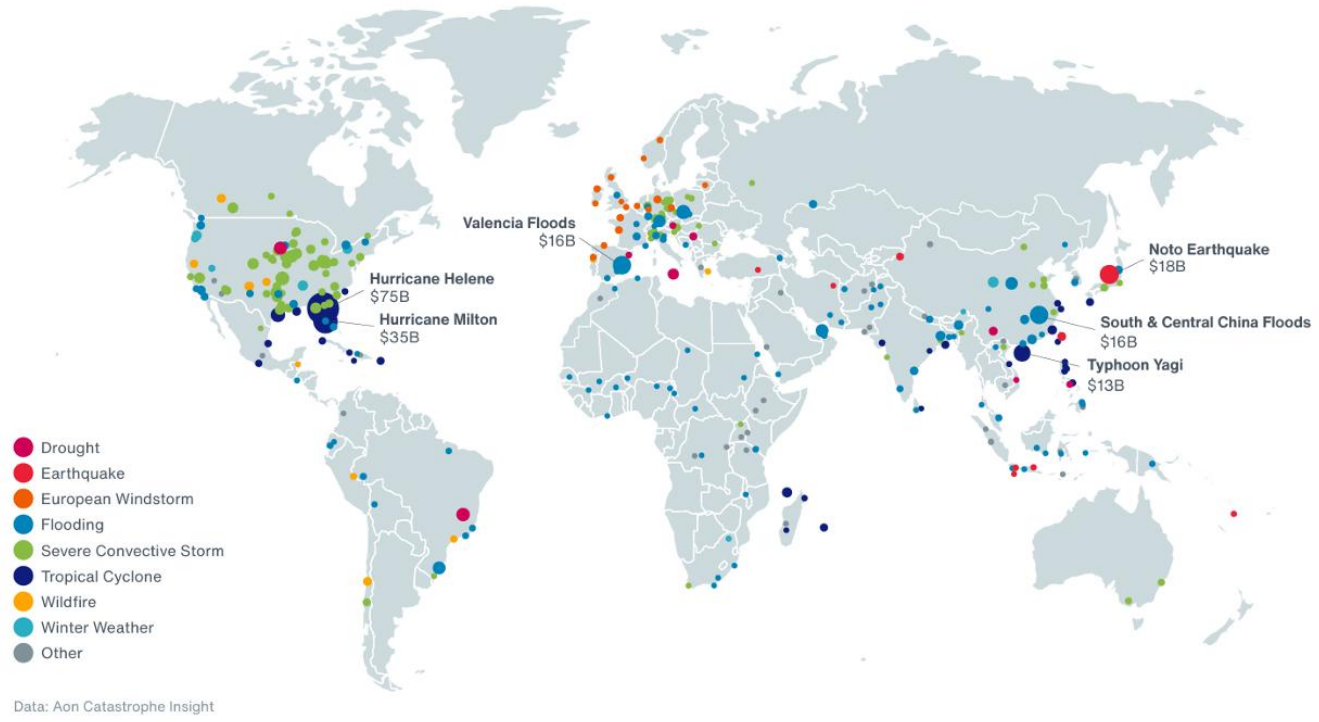

YoujiVest
Building a Climate-Smart Hong Kong:
A Tech-Driven Framework for Climate Risk Mitigation and Resilience

Global Economic Losses

Notable 2024 Economic Loss Events

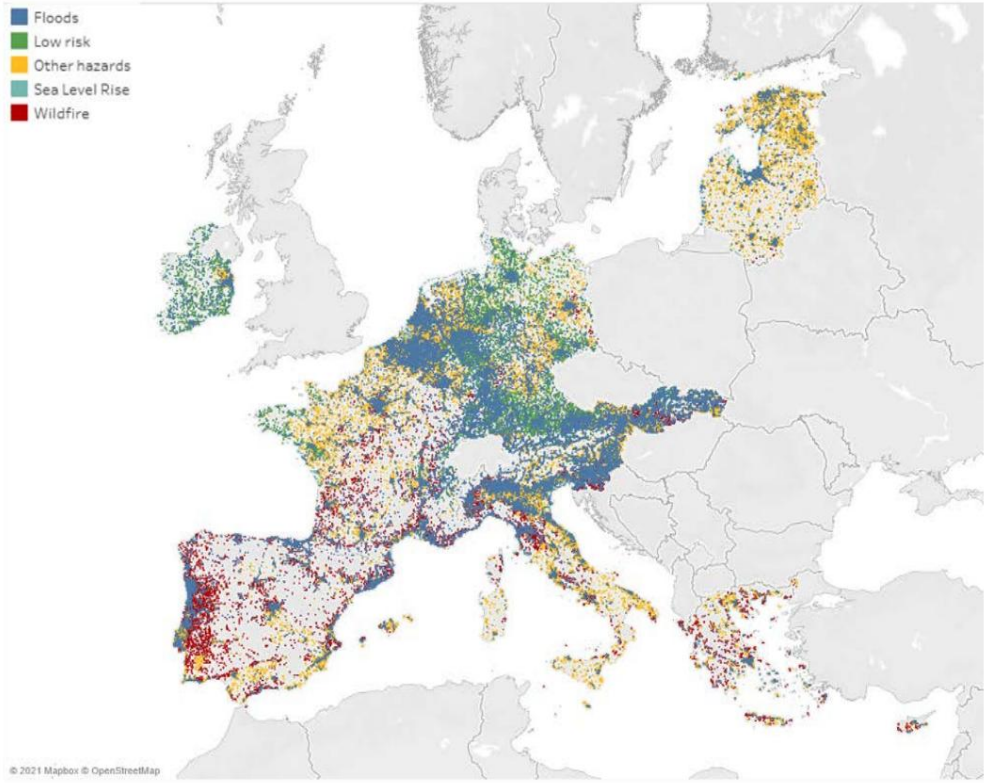


Economic losses from global natural disasters in 2024 are estimated at $368 billion, about 14 percent above the long-term average since 2000.

Losses in emerging markets such as Brazil, India and China are accounting for an increasing portion of the global toll due to the rapid economic growth and urbanization in high-risk areas in recent years.

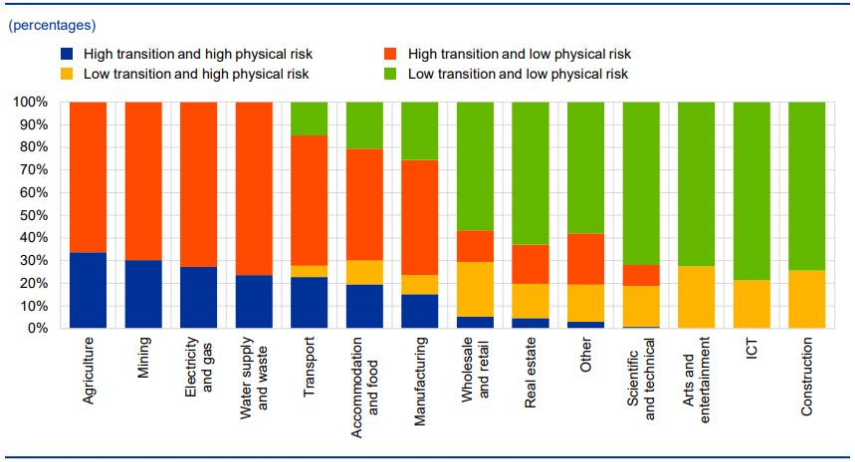
ECB Climate Risk Stress Test Result

Physical risk: intensity and sources across European regions



Source: ECB calculations based on Four Twenty Seven data (2018).

Share of firms subject to climate risk by sector



Source: ECB calculations based on Four Twenty Seven and Urgentem data (2018).
Notes: Firms are categorised as vulnerable to high transition risk if their relative emissions fall into the 70th percentile of Scope 1, 2 and 3 relative emissions for the entire sample. Firms are vulnerable to high physical risk if their probability of suffering from a wildfire or a river or coastal flood in a given year is over 1%. Level 1 NACE sectors are shown.

The probability of default of high-physical risk firms is projected to increase by 2050 by almost 25% under the hot house world scenario, Climate related portfolios with default possibilities five times higher than 2020, subjects to 43 trillion Euro assets. ECB 2021 Sept

The Financial Services Agency (FSA) has already introduced a range of Japan mandatory climate disclosure rules into the nation's corporate governance code since mid-2021. The FSA and the BOJ, in collaboration with three major banks, conducted the second scenario analysis on climate-related risks in 2025.

Climate Risk Pricing Is Crucial For EVERY ASSET!

Current climate risk model Issues

Limited scope

Limited extreme weather events

Uncertainty in climate change

Unable to handle uncertainty in climate change scenario generation

Data availability

Only headquartered location risk

Lack of historical hazard data

Poor local coverage

Low Resolution

Most of the climate models are based on country level

Lack of flexibility

Frameworks inflexible, difficult for organizations requirements adaptation

YoujiVest

- IPCC 7 RCPs and 5 SSPs Pathway scenarios, as well as NGFS scenarios.
- All company subsidiaries, operational locations
- Full coverage in Hong Kong, China, Asia, Global model
- 5x5m resolution, with altitude choice
- Fully customisation (loss curve, assets location, duration, short-term/long term time-interval)

YoujiVest Solutions

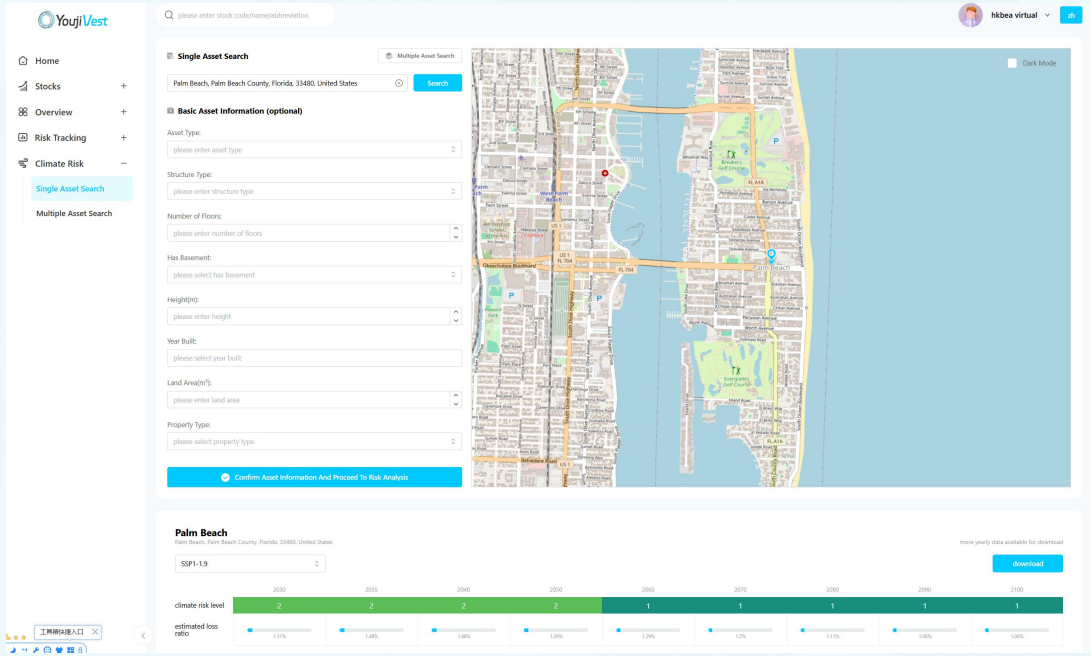
Core Models and Technologies

YoujiVest Climate Risk Model Solutions

-YoujiCRMS

YoujiVest CRM platform provides comprehensive Physical Risk and Transition Risk analysis based on the actual asset locations.

Identify the risks that climate change brings to your business and prepare a risk management plan that deals with climate change



YoujiCRMS Outputs

YoujiCRMS outputs produce scenario analyses that display the Expected Annual Impact. It provides comprehensive climate risk assessments for companies under various scenarios, including physical, policy, and transition risks.

YoujiVest covers all IPCC 7 RCPs and 5 SSPs Pathway scenarios, as well as NGFS scenarios.

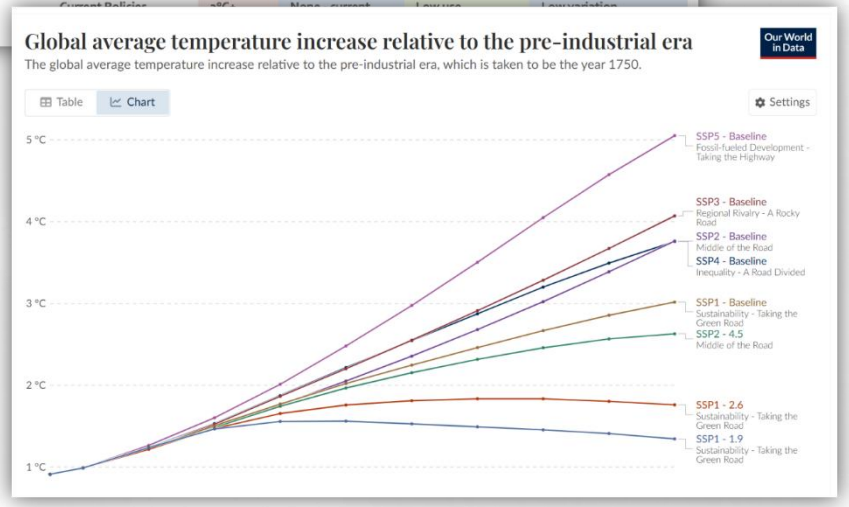
SSP1-1.9, SSP1-2.6, SSP2-4.5, SSP3-7.0, SSP5-8.5

Net Zero 2050, Below 2°, Divergent Net Zero, Delayed Transition, NDCs, Current Policies

A series of hazards can be analysed via CRMS:

Water Stress, Tropical Cyclones, Floods, Extreme high temperatures, Extreme low temperatures, Wildfires, Landslides, Sea Level rise, etc.

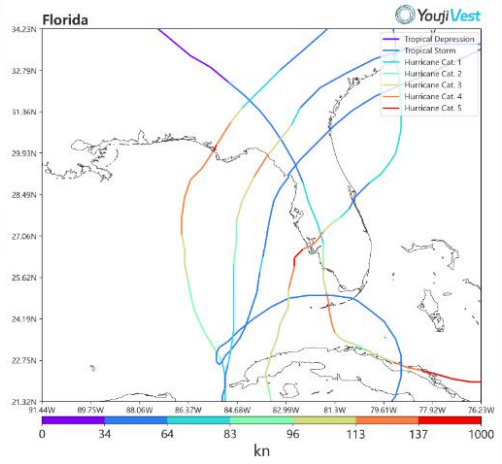
Category	Scenario	Policy ambition	Policy reaction	Carbon dioxide removal	Regional policy variation
Orderly	Net Zero 2050	1.5°C	Immediate and smooth	Medium use	Medium variation
	Below 2°C	1.7°C	Immediate and smooth	Medium use	Low variation
Disorderly	Divergent Net Zero	1.5°C	Immediate but divergent	Low use	Medium variation
	Delayed transition	1.8°C	Delayed	Low use	High variation
Hot House World	Nationally Determined Contributions (NDCs)	~2.5°C	NDCs	Low use	Low variation



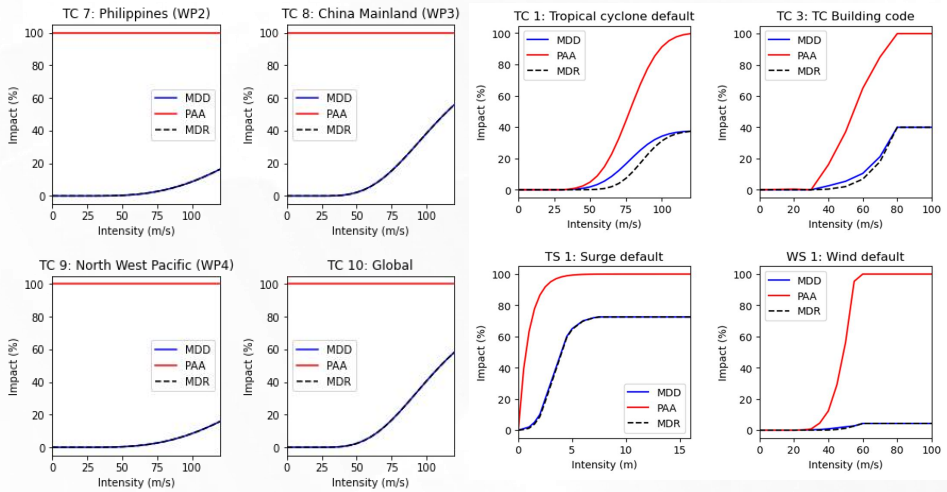
Source: YoujiVest Climate Lab

Comprehensive Coverage of Data

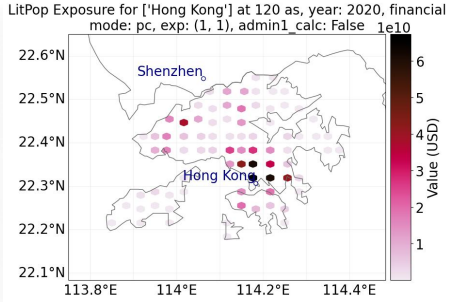
YoujiCRMS is a state-of-the-art climate risk model that integrates a wide array of **meteorological data**, **hazard data**, and **geo-economic data**. It not only incorporates extensive historical data, providing insights into past climate events and trends, but is also adaptable for use in a wide variety of future scenarios.



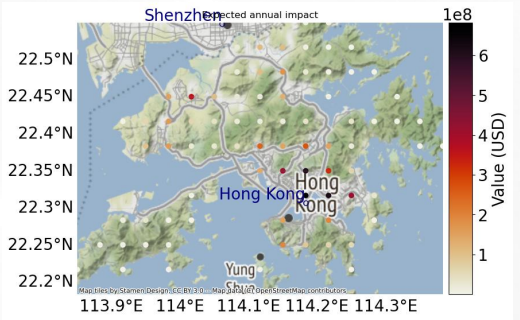
Historical Tropical Cyclone Data of Florida



Worldwide Damage Ratio Curve



Economic Exposure Distribution of Hong Kong



Expected Annual Impact of Hong Kong

Nearly 200 years global historical hazard track data;

More than **9** synthetic trajectories simulated for each historical events;

Monte Carlo simulations influence distribution.

The damage ratio curve covers global locations and different scenarios.

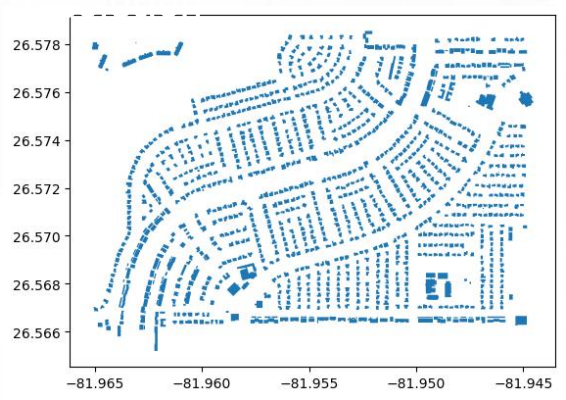
Source: YoujiVest Climate Lab

Hong Kong as an example

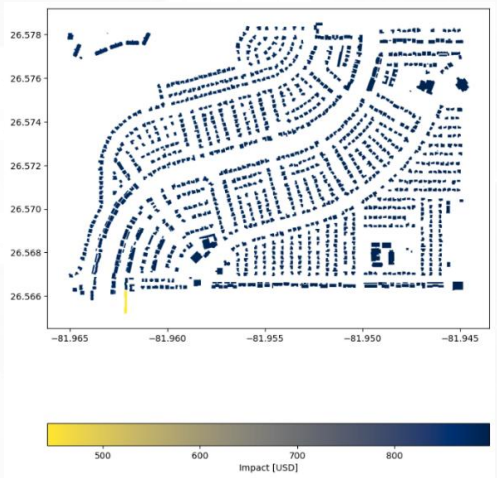
High Resolution for Any Specific Location

YoujiCRMS provides high resolution analysis (**the highest in the market: 5m x 5m**) with satellite imaging and down-scaling techniques.

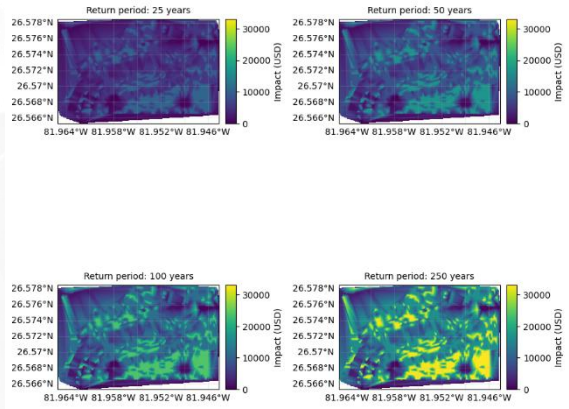
geographical analysis in high



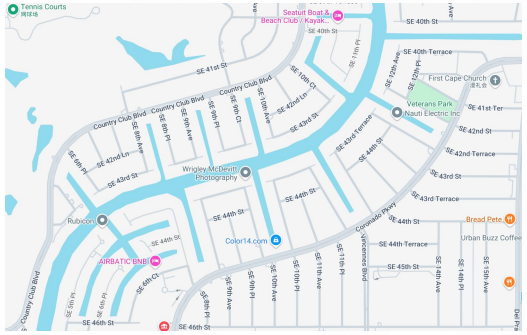
Satellite Auto Detection of Airbatic BNB's Constructions Distribution



Expected Annual Impact Simulation of Airbatic BNB



Expected Annual Impact Simulation of Airbatic BNB in different return periods



Airbatic BNB's Actual Constructions Distribution

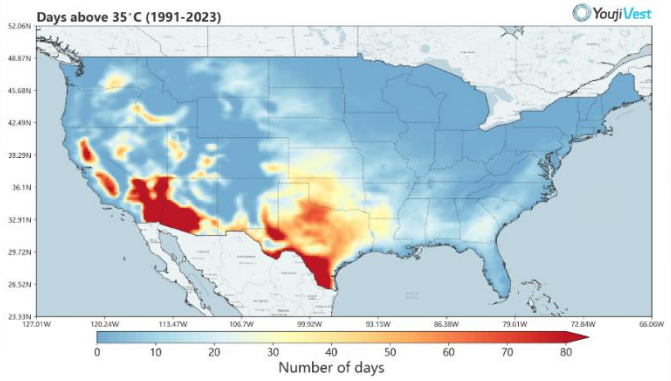
YoujiVest's estimation closely aligns with the real circumstances.

Airbatic BNB is a vacation service provider with a wide array of properties. YoujiCRMS can conduct highly accurate simulations, from modeling its constructions distributions to predicting expected annual impacts, with the analysis of these impacts extendable to different return periods.

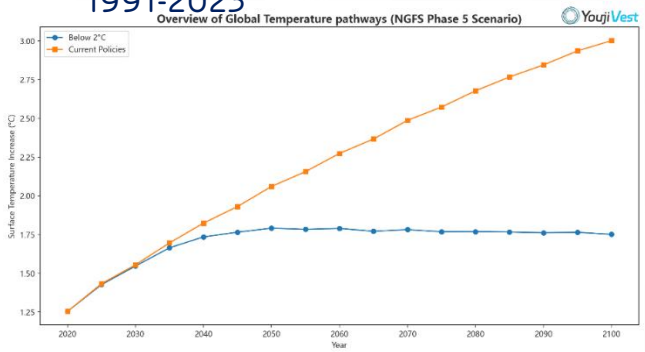
Source: YoujiVest Climate Lab

High-Resolution in Practice: State-Specific Analysis

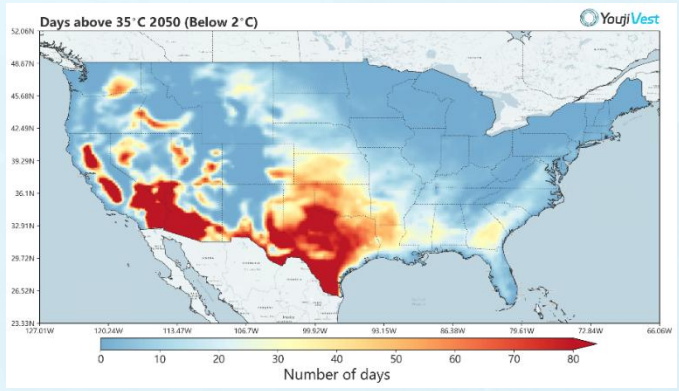
Number of Extreme Heat days in United States

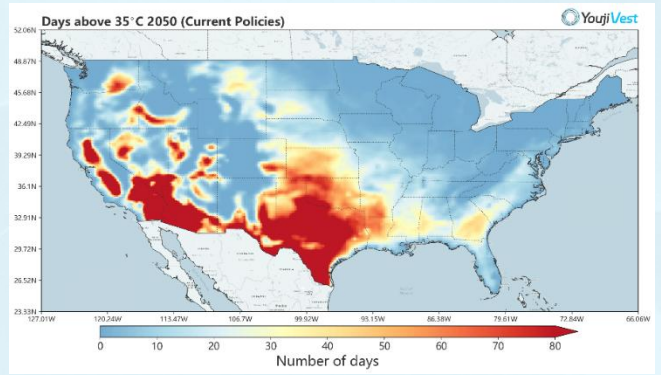


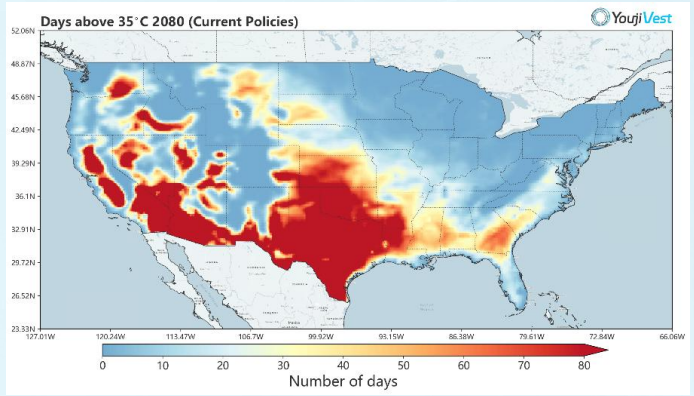
Distribution of Maximum Annual Days Above 35° C Across U.S., 1991-2023

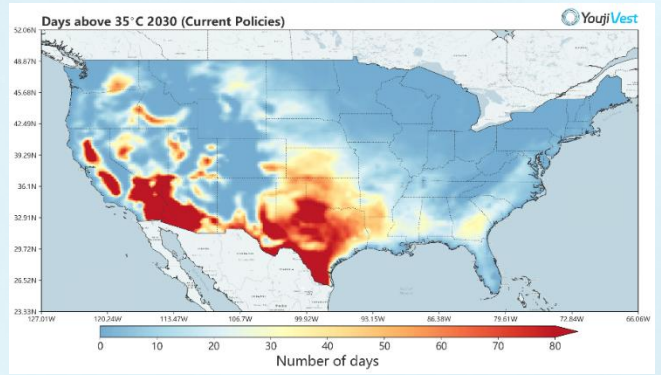


Projected Global Temperature Rise Under Two Scenarios by NGFS









Projected Extreme Heat Days Under different Scenarios by YoujiVest

Source: YoujiVest Climate Lab, ECMWF, NGFS IIASA

Next-Gen Climate Risk Management: Bridging AI Forecasting with Multidimensional Risk Analytics

Industry demands actionable, data-driven solutions

YoujiCRMS bridges traditional and modern approaches

Vision for Climate Resilience

Core Features & Technological Breakthroughs

Hybrid Risk Modeling Framework

Transformer architecture in near-term weather forecasts.

Climate re-analysis model to simulate long-term scenarios.

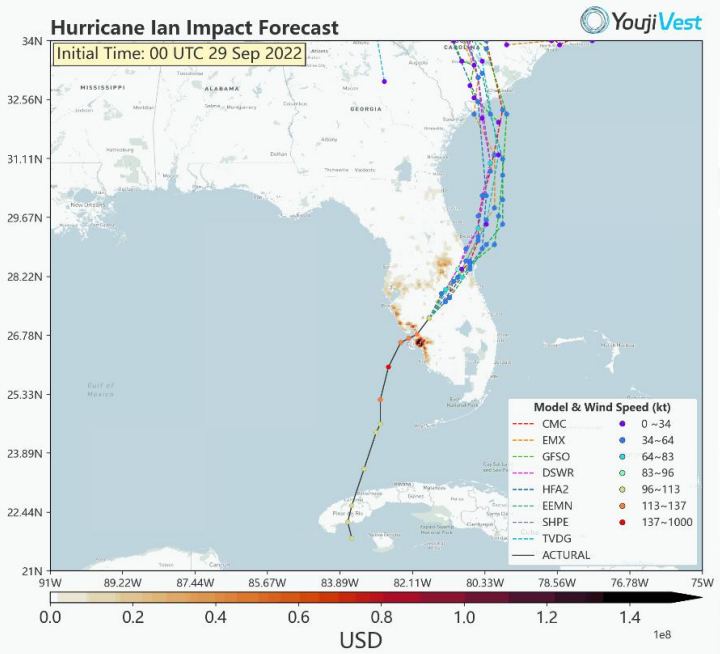
Hazard event database to back-test model results.

Global Data Integration

YoujiCRMS's global data hub employs advanced data integration algorithms to integrate diverse data sources including hazard records, geographics, satellite, IoT, and ground sensor data, seamlessly.

Multi-Sector Use Cases

Product customized to meet various use cases in insurance, banking, construction and property sectors.

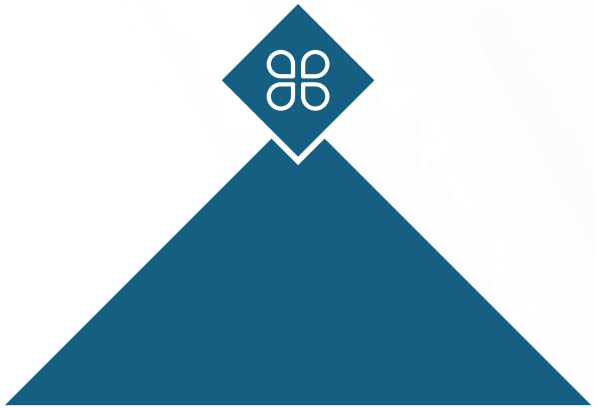


Competitive Advantages

01

Speed & Efficiency

Offers faster forecasts compared to traditional models.
Achieve zero supercomputer dependency with desktop- compatible models.



02

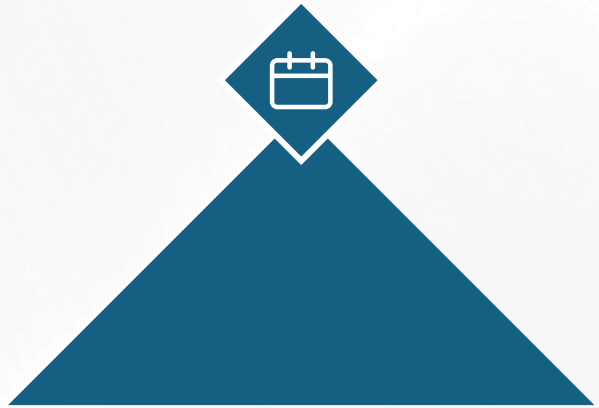
Data Autonomy

Ensures end- to- end data autonomy without reliance on numerical weather prediction (NWP) models.
Maintain complete control over data sources and processing for enhanced accuracy.

03

Customization & Scalability

Provides API- driven customization for sector- specific needs.
Support large- scale deployments with the ability to handle 100k+ asset- level assessments simultaneously.



Application

YoujiVest Climate Risk Solution has been widely applied to leading financial institutions and corporates, across leading construction firms, mining companies, insurance institutions, and asset managements. Including: catastrophe bond (CAT) analysis, catastrophe actuarial model analysis, engineering climate risk modelling, engineering disaster resilience measurement, and climate compliance report.

KeyBank
SOLACTIVE German Index Engineering
TENEX CAPITAL
BEA 東亞銀行
WORLD QUANT
WSP
FOSUN 复星
KERRY PROPERTIES 嘉里建設
中国检验认证集团 CHINA CERTIFICATION & INSPECTION GROUP
中国农业银行 AGRICULTURAL BANK OF CHINA
中国平安 PING AN
CUAM China Universal Asset Management
中信证券 CITIC SECURITIES
太平洋保险 CPIC
五洲(北京)保险经纪有限公司 CONTINENTAL INSURANCE BROKERS LIMITED
中國國際金融香港資產管理有限公司 CHINA INTERNATIONAL CAPITAL CORPORATION HONG KONG ASSET MANAGEMENT LIMITED
CSCEC 中國建築
中国建筑设计研究院有限公司 CHINA ARCHITECTURE DESIGN & RESEARCH GROUP

Application in Real Estate Industry

Case Studies and Innovating Products

Climate Risk Model(CRM): Property Company Case

Quantitative analysis of the risk exposure of corporate property assets to climate and financial losses

- CRM provide companies with scientific tools to quantify the climate vulnerability of property assets. A listed property developer used the YoujiVest CRMS to assess and analyze the financial losses of its property assets. By constructing geographical location-based physical risk scenario analysis (e.g., extreme precipitation, coastal flooding, high temperature heat wave, etc.), the model can assess the asset damage risk, operational interruption probability, and repair cost faced by specific properties under different warming scenarios.
- These financial quantitative risk exposure analyses enable companies to prioritize countermeasures against high-risk assets and hedge losses by adjusting portfolio structures or insurance strategies. Enable companies to reduce the erosion of real estate value from climate change shocks.

Property Asset Climate Risk Report

Climate Risk Model(CRM): Property Company Case

Scientific response recommendations for climate physical risks

- Based on the results of the climate model assessment, the YoujiVest Risk Service Team has put forward targeted suggestions for all target assets of the company to deal with relevant climate and physical risks based on the results of the climate model, taking into account corporate operations, local laws and regulations, property asset classes, etc.


4.2.2. 海平面上升

人力资源

灾前预警系统与风险控制

能源效率与可持续性

与政府和非政府组织的合作

[3] 参考来源：《香港经济政策绿皮书 2025》


YoujiVest

4.2.3. 滑坡

法律与合规管理

建筑设计

灾前预警系统与风险控制

与政府和非政府组织的合作

[4] 参考来源：《香港经济政策绿皮书 2025》

Climate Risk Model (CRM): Construction Company Case

Scientifically assess the impact of climate risks on a company's revenue activities

- A major construction company uses the YoujiVest CRM to connect with TCFD, IFRS S2 and other frameworks to identify and disclose the possible impact of different climate risks on company's revenue activities and main business. It is of great significance to the project risk control of the company.
- The YoujiVest CRM combines international standards such as SASB, TCFD, IFRS, and climate scenario methodologies such as IPCC and RCP. According to the GISC classification, we identify and measure industry-specific climate-specific material risks, helping enterprises scientifically assess and respond to climate-related risks from the perspective of enterprise risk management on the basis of compliance.

氣候相關披露

集團明白氣候變化會帶來一系列挑戰與機遇，對集團將來的業務策略和可持續發展有深遠的影響。2021年12月，集團成為「氣候相關財務披露工作小組」（「TCFD」）的支持機構，是中國建築業的首家機構。集團與國際先進的標準與實踐接軌，正按照TCFD建議的框架探索氣候變化風險因素，圍繞管理、策略、風險管理、指標和目標四個領域，與集團的投資決策及風險管理體系有機融合，提高氣候風險管理能力與信息披露水平。

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

甚麼是TCFD？

2015年底，金融穩定委員會因應巴黎氣候協議，成立由行業主導的TCFD。小組以制定一致的氣候相關財務披露框架為目標，促使信息更加公開透明，以便企業向貸款人、保險公司、投資者和其他持份者提供信息，協助市場了解金融系統對於氣候變化的風險敞口。TCFD在2017年發表建議報告數年之間，廣受國際政府和監管機構支持與採納，並後續公佈更多相關指引。

集團實踐

在氣候風險方面，集團實施由氣候相關財務披露工作小組（「TCFD」）提出的建議，識別實體風險和轉型風險，清晰評估和制定有關緩解和應對氣候變化的策略，以加強氣候韌性。目前，針對香港地區的氣候情景分析已完成。下表概述了集團在TCFD四個核心要素，即管治、策略、風險管理、指標及目標方面所做的工作。

策略

面對全球氣候變化的嚴峻挑戰，集團積極採取前瞻性管理，依據國際財務報告準則（IFRS S2）披露要求、TCFD建議以及香港聯合交易所的《氣候信息披露指引》，採用了四種氣候變化情景進行分析。這些情景結合了聯合國政府間氣候變化專門委員會（IPCC）發佈的共用社會經濟路徑（Shared Socioeconomic Pathways，簡稱「SSP」）和代表性濃度路徑（Representative Concentration Pathway，簡稱「RCP」），以更全面、更科學地了解未來可能的社會經濟發展和溫室氣體排放路徑，從而更好地規劃和管理氣候變化對集團業務和資產的影響。

集團採用的四種氣候情景涵蓋了從嚴格低碳轉型到高排放的不同路徑，具體如下：

路徑	描述
SSP1-2.6（可持續發展路徑）	在嚴格低碳轉型政策干預下，全球溫室氣體排放大幅減少，社會經濟發展呈現可持續和包容性增長。氣候變化受到有效控制，全球升溫幅度控制在低於2°C的目標範圍內。
SSP2-4.5（中間路徑）	在中等低碳轉型政策干預下，全球社會經濟發展相對均衡，氣候變化管控較為溫和。全球升溫幅度較接近3°C。
SSP4-6.0（不均衡發展路徑）	在較少低碳轉型政策干預下，全球經濟發展極不均衡，導致社會和經濟不穩定。氣候變化管控較弱，全球升溫幅度可能超過3°C。
SSP5-8.5（高排放路徑）	在無低碳轉型政策干預下，全球經濟高度依賴化石燃料，氣候變化管控有限，全球升溫幅度可能最高，超過4°C。

E要集中於沿海省份。在2050年高排放路徑%）、廣東（企業影響預期值：3.50%）、江蘇中，對集團整體運營影響最大的三項因素為上升（企業影響預期值：3.24%）。熱帶風暴而海平面上升則可能影響沿海資產的耐久範圍，但集團仍需採取針對性措施以降低潛

勿預防和應對措施，並將建設具備抗災能力面，集團制定了氣候風險項目預算方案，以門的緊密合作，確保能針對突發氣候風險事高對極端氣候事件的應變能力。

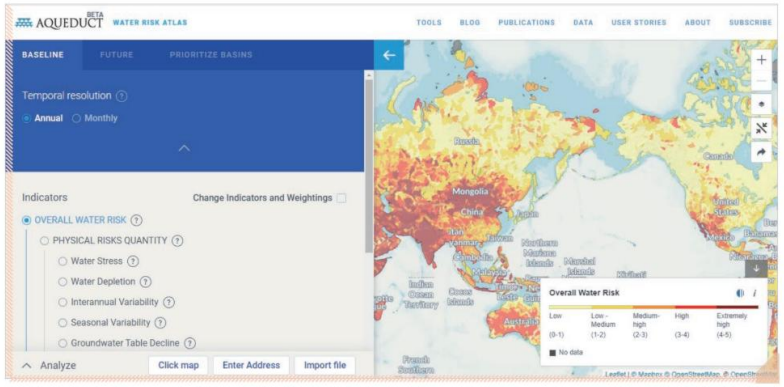
及較為緩和，這反映出集團在應對極端氣候計劃，確保集團業務可針對當地地理及氣業務運營模式的多元化與可持續化，以降低，包括定期更新應對物理風險的策略，以確

Sample Sustainability Report and official website disclosure

Climate Risk Model(CRM): Construction Company Case

Identification and assessment of climate transition risks of the main business of enterprises

- The YoujiVest CRM covers various international climate scenario analysis methodologies such as IEA and IPCC, and identifies and quantitatively assesses the climate transition risks of company's main business.
  During the assessment process, the YoujiVest Climate Risk Service Team obtains information from policy, regulation, law, technology, market, etc., and connects with YoujiVest's internal case data. Finally, the potential climate-related risks and opportunities faced by company in different scenarios and time nodes are identified, and the related issues are quantitatively assessed.



主要風險	風險類型[1]	時間區間[2]	建議措施
極端降水導致業務中斷及資產損失	實體風險（急性）	短至長期	• 考慮潛在強降水事件可能性的增加，加強該方面的建築設計及管理； • 考慮加強較低樓層的長期裝修和材料的防水及抗洪能力；
平均降水量增加影響業務開展	實體風險（慢性）	中至長期	• 進行特定的施工現場洪水風險評估； • 完善洪水發生時的應急管理及緊急疏散方案。
暴風導致業務中斷及資產損失	實體風險（急性）	短至長期	• 完善大風天氣下的應急管理及緊急疏散方案； • 安裝適當的儲存設施以保證材料和設備的安全。
其他氣候因素（如乾旱及高溫）導致的業務中斷	實體風險（急性及慢性）	長期	• 定期評估風險影響，確保其在可控狀態。
碳定價導致合規成本增加	轉型風險（政策及法規）	中至長期	• 訂立目標及具體行動計劃以減少溫室氣體排放； • 完善範圍3排放數據統計。
碳定價導致建築材料採購成本增加	轉型風險（市場）	中至長期	• 增加低碳材料使用比例； • 支持供應商開發綠色工藝及技術。
碳定價導致其他材料採購成本增加	轉型風險（市場）	長期	

過渡風險	描述
監管合規和外部承諾 風險類型：政策及法規 時間跨度：中至長期 可能性：可能 影響的程度：中–高	地方、國家或國際的氣候變化法規可能要求集團限制排放，改變集團的工藝、 產品及服務。集團已經制定了溫室氣體減排目標和相關的可持續發展目標，如果不能實現相關目標或減少業務對環境的影響，或認為集團未能對氣候變化採取負責任的行動，都可能導致負面宣傳，對集團的業務和聲譽 產生不利影響。此外，集團可能因未能遵守或被指控未能遵守包括環境法規在內的各種法律和法規而在未來受到責任處罰、罰款或導致業務暫停。 集團將進一步評估2060年碳中和目標對將全球變暖保持在《巴黎協定》規定的2°C以下承諾的貢獻，以及減輕未來碳價格和法規對業務影響的能力，並會適時調整目標與行動方案。
碳定價 風險類型：市場 時間跨度：中至長期 可能性：可能 影響的程度：中–高	隨著各國政府按照《巴黎協定》採取行動減少溫室氣體排放，與排放交易計劃、碳稅、燃料稅和其他政策相關的碳價格預計在未來會上升。集團利用專業機構的企業碳定價工具來量化風，並了解從現在到2050年的高 、中、低碳價格情況下的潛在未來財務影響。分析發現，在4°C 和2°C的情況下，與範圍3上游排放相關的碳定價風險都是集團整體碳定價風險的最大貢獻者，可能導致採購成本的大幅增加。在高碳價格情景下，未緩解的風險可能會增加運營支出，降低公司的運營利潤率。 集團將通過推廣低碳行為、研發低碳技術，以及在供應鏈中採購綠色材料等方式，減輕這些影響。

實體風險	說明		
業務連續性 風險類型：急性和慢性風險 時間跨度：短至長期 可能性：較可能 影響程度：低	情景	代表性濃度途徑（RCP）	描述
	高排放	RCP 8.5	繼續以目前的速度進行排放，一切照舊。 這種情況下，預計到2100年，升溫將超過4°C。
	中排放	RCP 4.5	採取強而有力的緩解行動，到2080年將排放量減少到目前水平的一半。這種情況更有可能導致到2100年升溫超過2°C。

Application in Financial Institution

Case Studies and Innovating Products

Banking | Asset Management | Insurance

Banking Climate Risk Stress Testing

Mandatory for SDST banks or upon request by global regulators

Overview

- As compared to the pilot exercise, there are several major enhancements in 2023-2024 CRST in respect of climate scenarios, assumptions, assessment approaches and reporting requirements

Scenario Narratives & Specifications

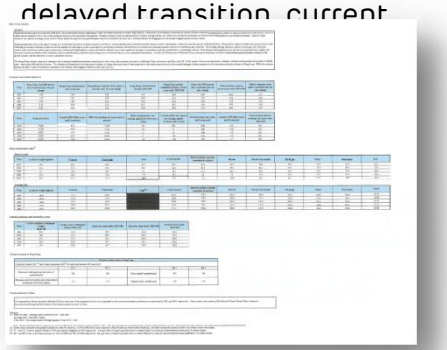
- Sectoral impacts under transition
- Short-term scenario (2023-2027): combining climate risk drivers (more frequent occurrences of extreme climate events, accelerated transition to a low-emission economy) and Macroeconomic risk drivers (global economic downturn, HK in recession, slowdown in ML)
- Long-term scenario (2023-2050):include below 2 ℃, delayed transition, current

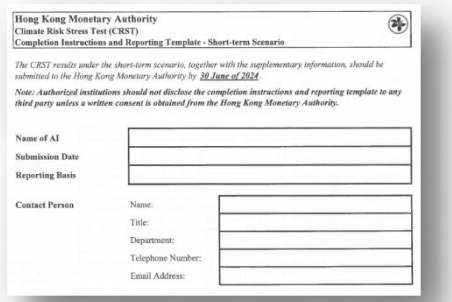
Assessment Requitements

- Full balance sheet covering both on and off balance sheet
- Assessment approaches, include quantitative analyses, qualitative analysis, balance sheet treatment, physical risk assessment, transition risk assessment, key assessment metrics and projection interval, model risk assessment

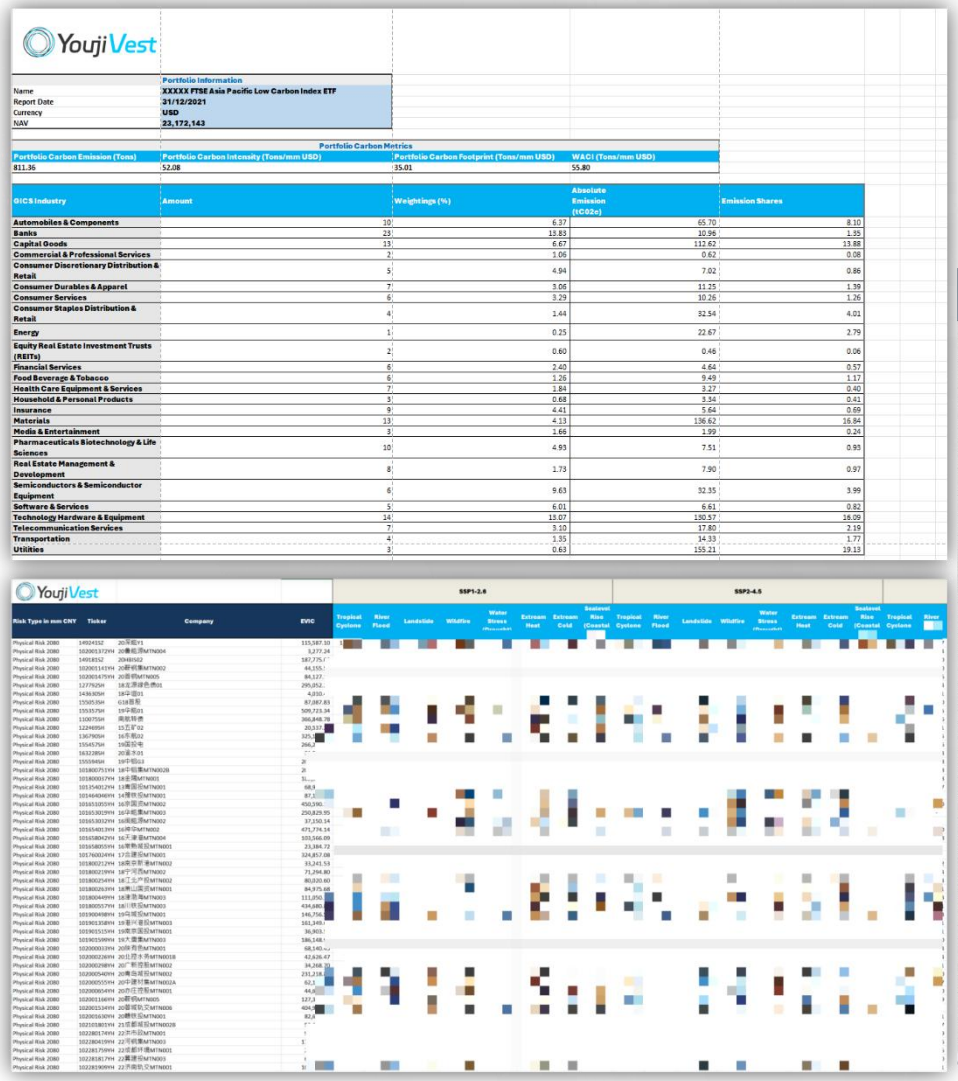
Submission of Results

- Results reporting
- Submission timeline (2023 and 2024 results for short-term scenario should be submitted by 20231231 and 20240630 respectively; results for long-term scenarios should be submitted by 20240630)





Fund Level Analysis: Asset Management



YoujiVest

Portfolio Information	
Name	XXXX FTSE Asia Pacific Low Carbon Index ETF
Report Date	31/12/2021
Currency	USD
NAV	23,172,143

Portfolio Carbon Metrics			
Portfolio Carbon Emission (Tons)	Portfolio Carbon Intensity (Tons/mm USD)	Portfolio Carbon Footprint (Tons/mm USD)	WACI (Tons/mm USD)
811.36	52.08	35.01	55.80

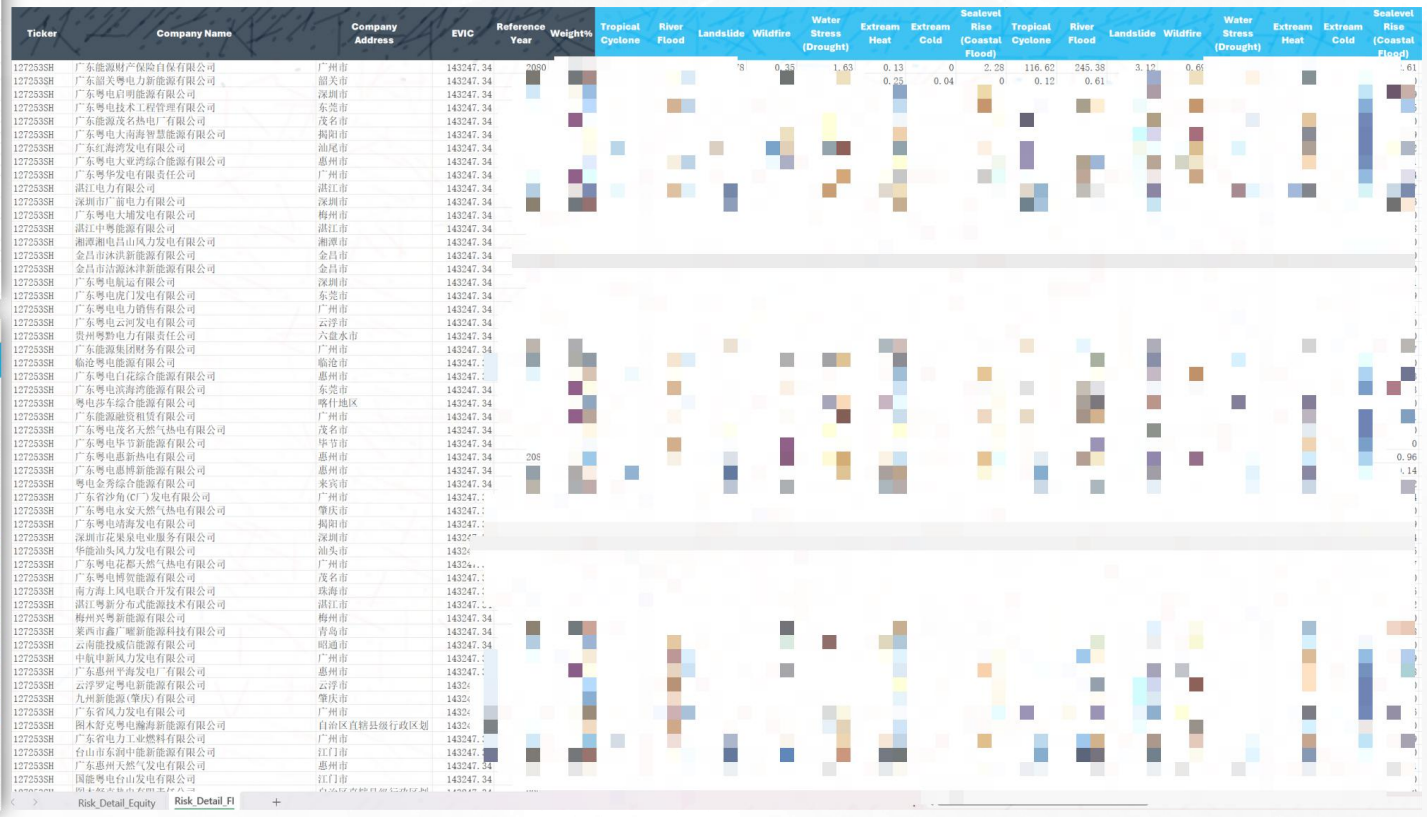
GICS Industry	Amount	Weightings (%)	Absolute Emission (tCO2e)	Emission Shares
Automobiles & Components	10	6.37	65.70	8.10
Banks	23	13.83	10.96	1.35
Capital Goods	13	6.67	112.62	13.88
Commercial & Professional Services	2	1.06	0.62	0.08
Consumer Discretionary Distribution & Retail	5	4.94	7.02	0.86
Consumer Durables & Apparel	7	3.06	11.25	1.39
Consumer Services	6	3.29	10.26	1.26
Consumer Staples Distribution & Retail	4	1.44	32.54	4.01
Energy	1	0.25	22.67	2.79
Equity Real Estate Investment Trusts (REITs)	2	0.60	0.46	0.06
Financial Services	6	2.40	4.64	0.57
Food Beverage & Tobacco	6	1.26	9.49	1.17
Health Care Equipment & Services	7	1.84	3.27	0.40
Household & Personal Products	3	0.68	3.34	0.41
Insurance	9	4.41	5.64	0.69
Materials	13	4.13	136.62	16.84
Media & Entertainment	3	1.66	1.99	0.24
Pharmaceuticals Biotechnology & Life Sciences	10	4.93	7.51	0.93
Real Estate Management & Development	8	1.73	7.90	0.97
Semiconductors & Semiconductor Equipment	6	9.63	32.35	3.99
Software & Services	5	6.01	6.61	0.82
Technology Hardware & Equipment	14	13.07	130.57	16.09
Telecommunication Services	7	3.10	17.80	2.19
Transportation	4	1.35	14.33	1.77
Utilities	3	0.63	155.21	19.13

YoujiVest

SSP1-2.6 | SSP2-4.5

Risk Type in mm CNY	Ticker	Company	EVIC	Tropical Cyclone	River Flood	Landslide	Wildfire	Water Stress (Drought)	Extream Heat	Extream Cold	Sealevel Rise (Coastal Flood)	Tropical Cyclone	River Flood	Landslide	Wildfire	Water Stress (Drought)	Extream Heat	Extream Cold	Sealevel Rise (Coastal Flood)
Physical Risk 2080	14924152	20[illegible]01	115,587.10																
Physical Risk 2080	10200137?H	20[illegible]MTN004	3,277.24																
Physical Risk 2080	14918152	20[illegible]02	587,775.7																
Physical Risk 2080	10200114?H	20[illegible]MTN002	44,155.7																
Physical Risk 2080	10200167?H	20[illegible]MTN005	84,127.																
Physical Risk 2080	1277925H	18[illegible]08	295,052.																
Physical Risk 2080	1436305H	18[illegible]01	4,010.																
Physical Risk 2080	1550535H	01[illegible]	87,087.83																
Physical Risk 2080	1553575H	19[illegible]01	509,723.34																
Physical Risk 2080	1190775H	[illegible]01	360,848.78																
Physical Risk 2080	1224495H	15[illegible]02	20,337.																
Physical Risk 2080	1367905H	16[illegible]02	325,1																
Physical Risk 2080	1554575H	16[illegible]06	266,2																
Physical Risk 2080	1632285H	20[illegible]01																	
Physical Risk 2080	1550565H	19[illegible]01	2																
Physical Risk 2080	1018007?1H	18[illegible]MTN028	2																
Physical Risk 2080	1018000?7H	18[illegible]MTN001	1,...																
Physical Risk 2080	1015401?9H	18[illegible]MTN001	68,5																
Physical Risk 2080	1016404H9H	16[illegible]MTN001	87,1																
Physical Risk 2080	1016510?9H	16[illegible]MTN002	450,390.																
Physical Risk 2080	1016530?9H	16[illegible]MTN002	250,829.95																
Physical Risk 2080	1016540?9H	16[illegible]MTN002	37,150.14																
Physical Risk 2080	1016540?9H	16[illegible]MTN003	471,774.59																
Physical Risk 2080	1016580?9H	16[illegible]MTN004	103,566.09																
Physical Risk 2080	1016580?9H	16[illegible]MTN001	23,184.72																
Physical Risk 2080	1015760?9H	17[illegible]MTN001	224,857.08																
Physical Risk 2080	1018002?9H	18[illegible]MTN002	33,241.53																
Physical Risk 2080	1018002?9H	18[illegible]MTN002	71,294.80																
Physical Risk 2080	1018002?4H	18[illegible]MTN002	80,820.60																
Physical Risk 2080	1018002?9H	18[illegible]MTN001	84,975.66																
Physical Risk 2080	1018004?9H	18[illegible]MTN003	111,050.																
Physical Risk 2080	1018005?7H	18[illegible]MTN003	434,680.																
Physical Risk 2080	1018004?8H	18[illegible]MTN001	146,756.																
Physical Risk 2080	1019013?8H	19[illegible]MTN003	161,349.																
Physical Risk 2080	1019015?5H	19[illegible]MTN001	36,903.																
Physical Risk 2080	1019055?9H	19[illegible]MTN003	186,148.																
Physical Risk 2080	1020000?3H	20[illegible]MTN001	68,140.																
Physical Risk 2080	1020002?6H	20[illegible]MTN001B	42,636.47																
Physical Risk 2080	1020002?8H	20[illegible]MTN002	34,268.																
Physical Risk 2080	1020005?4H	20[illegible]MTN002	231,218.																
Physical Risk 2080	1020005?5H	20[illegible]MTN002A	62,1																
Physical Risk 2080	1020006?4H	20[illegible]MTN001	44,8																
Physical Risk 2080	1020011?4H	20[illegible]MTN003	127,3																
Physical Risk 2080	1020015?4H	20[illegible]MTN006	404,9																
Physical Risk 2080	1020016?0H	20[illegible]MTN001	82,6																
Physical Risk 2080	1021018?1H	21[illegible]MTN003B																	
Physical Risk 2080	1022801?6H	22[illegible]MTN001	1																
Physical Risk 2080	1022804?9H	22[illegible]MTN003	1																
Physical Risk 2080	1022817?9H	22[illegible]MTN001	7																
Physical Risk 2080	1022819?0H	22[illegible]MTN001	1																

For each equity/bond, YoujiVest CRMS calculates all the underlying subsidiaries risk exposure x revenue% of parent company.



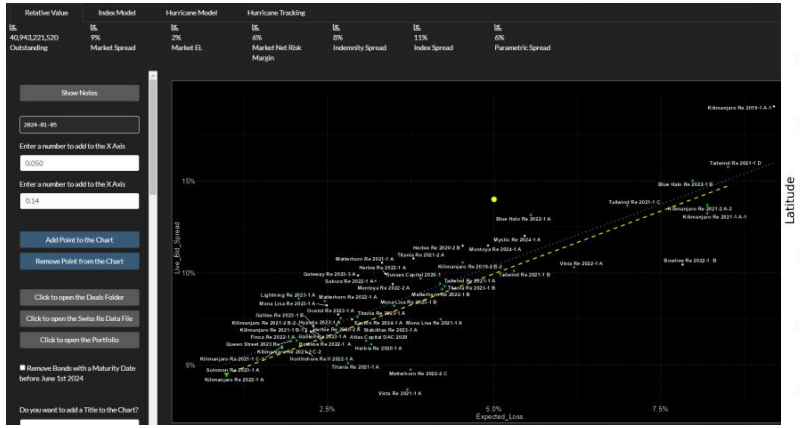
Ticker	Company Name	Company Address	EVIC	Reference Year	Weight%	Tropical Cyclone	River Flood	Landslide	Wildfire	Water Stress (Drought)	Extream Heat	Extream Cold	Sealevel Rise (Coastal Flood)	Tropical Cyclone	River Flood	Landslide	Wildfire	Water Stress (Drought)	Extream Heat	Extream Cold	Sealevel Rise (Coastal Flood)
127253SH	广东能源财产保险自保有限公司	广州市	143247.34	2020				[illegible]8	0.35	1.63	0.13	0	2.28	116.62	245.38	3.12	0.6[illegible]				0.61
127253SH	广东韶关粤电力新能源有限公司	韶关市	143247.34								0.25	0.04	0	0.12	0.61						
127253SH	广东粤电启明能源有限公司	深圳市	143247.34																		
127253SH	广东粤电技术工程管理有限公司	东莞市	143247.34																		
127253SH	广东能源茂名热电厂有限公司	茂名市	143247.34																		
127253SH	广东粤电大南海智慧能源有限公司	揭阳市	143247.34																		
127253SH	广东红海湾发电有限公司	汕尾市	143247.34																		
127253SH	广东粤电大亚湾综合能源有限公司	惠州市	143247.34																		
127253SH	广东粤华发电有限责任公司	广州市	143247.34																		
127253SH	湛江电力有限公司	湛江市	143247.34																		
127253SH	深圳市广前电力有限公司	深圳市	143247.34																		
127253SH	广东粤电大埔发电有限公司	梅州市	143247.34																		
127253SH	湛江中粤能源有限公司	湛江市	143247.34																		
127253SH	湘潭湘电昌山风力发电有限公司	湘潭市	143247.34																		
127253SH	金昌市沐洪新能源有限公司	金昌市	143247.34																		
127253SH	金昌市沽源沐津新能源有限公司	金昌市	143247.34																		
127253SH	广东粤电航运有限公司	深圳市	143247.34																		
127253SH	广东粤电庞门发电有限公司	东莞市	143247.34																		
127253SH	广东粤电电力销售有限公司	广州市	143247.34																		
127253SH	广东粤电云河发电有限公司	云浮市	143247.34																		
127253SH	贵州粤黔电力有限责任公司	六盘水市	143247.34																		
127253SH	广东能源集团财务有限公司	广州市	143247.34																		
127253SH	临沧粤电能源有限公司	临沧市	143247.3[illegible]																		
127253SH	广东粤电白花综合能源有限公司	惠州市	143247.3[illegible]																		
127253SH	广东粤电滨海湾能源有限公司	东莞市	143247.34																		
127253SH	粤电莎车综合能源有限公司	喀什地区	143247.34																		
127253SH	广东能源融资租赁有限公司	广州市	143247.34																		
127253SH	广东粤电茂名天然气热电有限公司	茂名市	143247.34																		
127253SH	广东粤电华节新能源有限公司	华节市	143247.34																		0
127253SH	广东粤电惠新热电有限公司	惠州市	143247.34	20[illegible]																	0.96
127253SH	广东粤电惠博新能源有限公司	惠州市	143247.34																		[illegible].14
127253SH	粤电金秀综合能源有限公司	来宾市	143247.34																		
127253SH	广东省沙角(C厂)发电有限公司	广州市	143247.[illegible]																		
127253SH	广东粤电水安天然气热电有限公司	肇庆市	143247.[illegible]																		
127253SH	广东粤电靖海发电有限公司	揭阳市	143247.[illegible]																		
127253SH	深圳市花果泉电业服务有限公司	深圳市	1432[illegible]																		
127253SH	华能汕头风力发电有限公司	汕头市	1432[illegible]																		
127253SH	广东粤电茂都天然气热电有限公司	广州市	14324[illegible]																		
127253SH	广东粤电博贺能源有限公司	茂名市	143247.[illegible]																		
127253SH	南方海上风电联合开发有限公司	珠海市	143247.[illegible]																		
127253SH	湛江粤新分布式能源技术有限公司	湛江市	143247.[illegible]																		
127253SH	梅州兴粤新能源有限公司	梅州市	143247.34																		
127253SH	莱西市鑫厂曜新能源科技有限公司	青岛市	143247.34																		
127253SH	云南能投威信能源有限公司	昭通市	143247.34																		
127253SH	中航中新风力发电有限公司	广州市	143247.[illegible]																		
127253SH	广东惠州平海发电厂有限公司	惠州市	143247.[illegible]																		
127253SH	云浮罗定粤电新能源有限公司	云浮市	1432[illegible]																		
127253SH	九州新能源(肇庆)有限公司	肇庆市	1432[illegible]																		
127253SH	广东省风力发电有限公司	广州市	1432[illegible]																		
127253SH	阳木舒克粤电梅海新能源有限公司	自治区直辖县级行政区划	1432[illegible]																		
127253SH	广东省电力工业燃料有限公司	广州市	143247.[illegible]																		
127253SH	台山市东洞中能新能源有限公司	江门市	143247.[illegible]																		
127253SH	广东惠州天然气发电有限公司	惠州市	143247.34																		
127253SH	国能粤电台山发电有限公司	江门市	143247.34																		

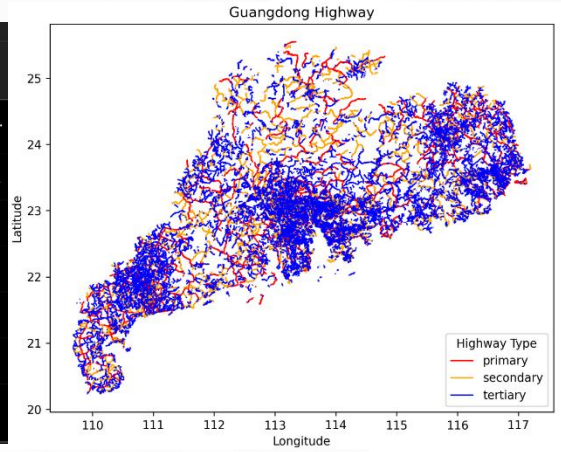
Risk_Detail_Equity | Risk_Detail_FI

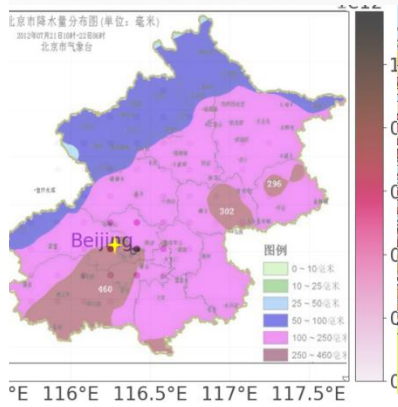
CAT Bond Analysis: Assets Exposure Assessment

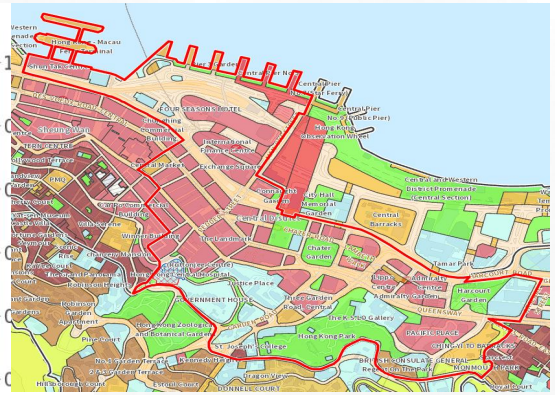
YoujiVest CRMS Provides analysis on

- Distance to the coast
- Construction quality
- Age of building
- Sponsors underwriting track record
- Loss reserving
- Business mix and geographical footprint
- Absolute risk tolerance assessment









Introduction to YoujiVest

Our mission, team, and position

About Us

YoujiVest transforms sustainability challenges into market alpha by combining cutting-edge AI, quantitative finance, and climate modeling expertise to empower asset managers, banks, insurers, and corporations to navigate climate risks, meet regulatory requirements, and capture sustainable investment opportunities.

Industry Affiliations

TCFD Task Force on Climate-Related Financial Disclosures

Signatory of: PRI Principles for Responsible Investment

HKGFA 香港綠色金融協會 Hong Kong Green Finance Association

ESBN We support Green Deal for Business

ESCAP Economic and Social Commission for Asia and the Pacific

3GFA

Founding

Founded in 2017 with five offices in Hong Kong, Beijing, Shanghai, Guangzhou and New York to support ESG investment and climate analytics.

Core Team

Core team consisted of engineers and finance practitioners from Chinese Academy of Sciences, Tsinghua Univ., Fudan Univ., UC Berkeley with decades of ESG product experience serving BlackRock, State Street, Nomura, Allianz and more.

R&D

Combining AI and deep learning techniques to build ESG Ratings, Carbon/Environmental Metrics, and Climate Risk Models.

Qualifications

National high-tech enterprise

ISO9001 certification

Beijing

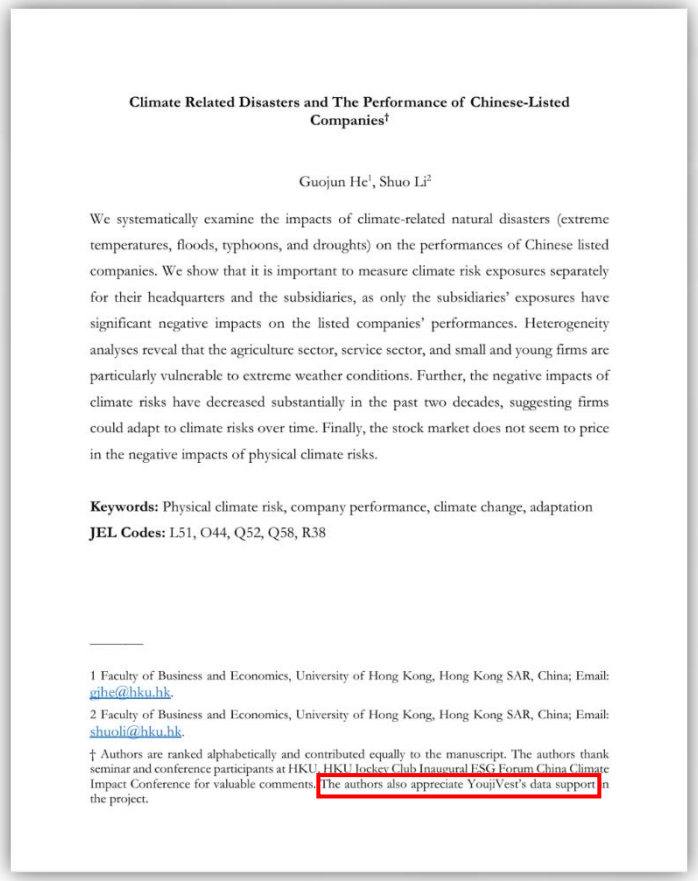
Shanghai

Guangzhou

Hong Kong

New York

Research Collaboration



Climate Related Disasters and The Performance of Chinese-Listed Companies†

Guojun He[1], Shuo Li[2]

We systematically examine the impacts of climate-related natural disasters (extreme temperatures, floods, typhoons, and droughts) on the performances of Chinese listed companies. We show that it is important to measure climate risk exposures separately for their headquarters and the subsidiaries, as only the subsidiaries' exposures have significant negative impacts on the listed companies' performances. Heterogeneity analyses reveal that the agriculture sector, service sector, and small and young firms are particularly vulnerable to extreme weather conditions. Further, the negative impacts of climate risks have decreased substantially in the past two decades, suggesting firms could adapt to climate risks over time. Finally, the stock market does not seem to price in the negative impacts of physical climate risks.

Keywords: Physical climate risk, company performance, climate change, adaptation
JEL Codes: L51, O44, Q52, Q58, R38

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策略实操系列专题（二）
ESG 数据如何在股票投资中获取超额收益？

核心观点

企业环保行为对企业财务绩效、上市公司股票走势的影响是非线性的。从短期来看，企业减排支出会增加企业的成本负担，压缩利润空间，甚至对生产性支出具有一定的挤出效应，企业的减排与企业的财务绩效就会呈现此消彼长的关系；从中长期来看，企业减排与财务绩效的增长并非绝对对立，适度的环境规制可以激励企业技术创新，优化自身的资源配置，进而提高企业的长期竞争力，企业技术水平的提升及效率改进所带来的长期收益可以覆盖掉环境规制所带来的短期成本上升，从而实现污染减排和财务绩效增长的双赢。

企业环保类排污数据的检测和应用，是 ESG 领域较为高频且可覆盖到独立样本的数据口径。本报告的排污环保数据来源于有机数，该数据收集了全国各省市环保行政部门发布的排污许可证及环保处罚信息，覆盖排污企业超过 44 万家。其中包含上市公司 2800 余家及其下属子公司超过十万家，覆盖污染物超过 600 个种类。该数据具有覆盖全面、更新及时、数据准确、结构清晰的特点。每月定期数据采集流程后有数据质量校验模块进行自动检验，在监测到异常时会人工介入来校验数据，提高数据精度。本报告通过测算排污量和股票表现的关系来探讨检测环保类数据对具体公司投资的可实践性，验证污染量和股价表现是否存在线性或者非线性的关联。

有机数环保排污数据包含的内容有企业的基本信息和排污信息。其中企业的基本信息有企业名称、社会信用代码、省份、生产所在地、行业、主要产品等属性信息；企业的排污信息主要有排污许可证信息（编号、行政区划、行业、发证日期、生效/失效时间等）、排污信息（污染物类别、种类、排放规律、执行标准等）、污染物监测数据（监测的时间、地点、项目、结果、浓度、阈值以及是否超标等）和环保处罚信息（处罚机关、处罚的事由、时间、详情等）。

实证检验发现，企业排污情况与股票截面收益率呈 U 型关系。从各投资组合的年化收益和波动来看，排污环比增长最高的分组 5 的年化收益高达 21%，排污环比增长居中的分组 3 的年化收益最低，仅为 13%。虽然各投资组合的年化收益率存在明显差距，但年化波动却几乎没有区别，排污环比增长次高的分组 4 的年化波动最高，为 23%，比其他组合高 1%。因此各投资组合的夏普比例与年化收益相似，与排污环比增长成 U 型分布。综上，排污数据在可控范围内出现一定走高反馈的信息是订单获取与产量走高的正向效应，而排污量超过一定阈值时则通过环保限产、声誉风险等效应对股票价格形成抑制，因此对股价表现呈现出短多长空的逻辑。

风险提示：(1)企业污染排放数据的可得性、高频性与连续性；(2)企业排污数据覆盖率有限，部分企业可能存在选择性偏误问题。

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HKU BUSINESS SCHOOL 港大經管學院

Hong Kong Economic Policy Green Paper 2025

Transform Climate Risks into Development Opportunities

– Implications for Hong Kong's Economic Development in an Era of Climate Change

Guojun He Qidan Wang Vivi Hu Cheng Bi

1 Introduction

According to the World Economic Forum's Global Risks Report (2024), three key climate issues have been identified as critical challenges facing humanity: extreme weather events, critical change to earth systems, and biodiversity loss and ecosystem collapse. The current warming of 1.44°C, compared to pre-industrial times, is already causing disruptive global economic impacts (NASA, 2023).

As a coastal city with low-lying terrain, Hong Kong is frequently affected by extreme weather events and has experienced multiple climate disasters in the past decades. Two climate risks are particularly concerning: the occurrence of severe typhoons and rising sea levels. On the one hand, strong tropical cyclones bring heavy rainfall, strong winds, storm surges, and flooding, often disrupting economic production and negatively affecting vulnerable areas and people. On the other hand, most of the economic activities in Hong Kong are concentrated in low-latitude regions, making the economy particularly susceptible to the damages caused by sea level rises.

In the following chapter, we first summarize the major climate risks Hong Kong has been exposed to, with an emphasis on typhoons and sea level rise. Taking "Saola," a recent typhoon, as an example, we review the impact of its path, surge height, and wind intensity. Next, we focus on how typhoons and sea level rises would affect public housing and conduct scenario analysis on the potential economic losses under different climate pathways. Finally, we provide policy recommendations for adaptive strategies to enhance climate resilience and mitigate risks.

2 Overview of Climate Risks in Hong Kong

Hong Kong has been warming up in the last century. Analysis from the Hong Kong Observatory (HKO) showed that the average mean temperature has increased by 0.14°C per decade from 1885 to 2023.

118 HONG KONG ECONOMIC POLICY GREEN PAPER 2025

That number reached 0.30°C per decade from 1994 to 2023. Consistent with this trend, the annual average number of hot nights from 2001 to 2023 has increased by 67.18%, while the number of cold days has decreased by 18.19%, relative to 1991-2000 averages.[1] The sea level is also steadily rising, with a growth rate in mean sea level of 31 mm per decade at Victoria Harbor from 1954 to 2023.

Meanwhile, Hong Kong has experienced more typhoons and heavy rainfall in the last two decades. These weather events, including storm surges, strong winds and coastal flooding, have caused significant damages.

2.1 Typhoons: The Most Frequent Climate Disaster in Hong Kong

With its back to the northwest Pacific Ocean, Hong Kong is bordered by a range of east-west mountains to the north and a vast ocean to the south, making it highly susceptible to typhoons. The city's temperature and humidity provide ample moisture for tropical cyclones, creating ideal conditions for typhoon formation.

Figure 1. Historical typhoon tracks and intensity from 2014 to 2023.

Panel A. Historical Typhoon Tracks | Panel B. Historical Typhoon Intensity

Notes: This figure shows the analysis of typhoons affecting Hong Kong with two panels. Panel A (Left) shows the statistical representation of typhoons in the northwest Pacific region from 2014 to 2023. Typhoons are categorized by intensity levels equal to or exceeding Category 3 typhoons, which is significant for Hong Kong. The depicted line segments represent typhoon trajectories, with a color gradient from purple to red indicating increasing storm intensity. The maximum intensity recorded is capped at ≤137 knots, or 210 km/h, with the peak observed in 2023. Panel B (Right) illustrates the historical record of the maximum intensities of typhoons impacting Hong Kong. Peak intensities across different regions range from 40 m/s to 83 m/s. Data source: YoujiVest Climate Lab)

[1] According to the Hong Kong Observatory's definition, a hot night is a night with a minimum temperature of 28°C or above, and a cold day refers to a night with a minimum temperature of 12°C or below.

Transform Climate Risks into Development Opportunities 119

Latest Publish (HKU Prof Guojun He):
Climate Related Disasters and The performance of Chinese-Listed Companies

Source：Guosen Securities

Hong Kong Economic Policy Green Paper 2025

Recognition: 2025 Hong Kong Green Fintech Map

ESG / Climate Risk Modelling & Assessment

Recognition: 2025 Global Resilience Technology Competition

After three competitive rounds and over 120 tech innovators from 17 countries, YoujiVest has taken 2nd runner-up at the global finals of the 2025 **Prudence Foundation** SAFE STEPS D-Tech Awards.

Representing China's innovation frontier, Youji Climate Risk Modelling System (CRMS) was recognized for pushing the boundaries of precision in early-warning systems for extreme weather and climate disasters.

2025 ACCA Latest Climate Technology Report

YoujiCRMS is included in the ACCA report as an excellent case study.

YoujiCRMS: A high-resolution solution for climate risk assessment

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assessment model that delivers detailed
ic asset locations.

o-economic data with state-of-the-art
raws on climate data – temperature,
ctively capture both localised fluctuations

https://stories.accaglobal.com/climate-tech-forecast/case-studies/youjicrms-ai-climate-tech-drives-advanced-risk-assessment/index.html

Products and Client Segments

	ESG Risk Scores (CERS)	Environmental Pollutant Discharge (CEPD)	Carbon Emission Metrics (CCEM)	Climate Risk Model Solutions (YoujiCRMS)	ESG Disclosure / Enhancement	Index Solutions
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	Data			Analytics	Consulting	Indexing

Our Clients

Our clients span financial institutions, academic institutions, and corporates, with tailored solutions for each:

- Financial institutions: YoujiVest's data and climate modeling solutions are widely adopted by leading asset managers, hedge funds, insurers, banks, and brokers for ESG investing, climate stress testing, quantitative strategies, risk management, and actuarial modeling.
- Academic institutions: Our comprehensive datasets support cutting-edge research in sustainability, climate, and biodiversity, enabling their groundbreaking discoveries. Collaborated with more than 100 global academic institutions.
- Corporates: YoujiVest offers comprehensive ESG reporting services aligned with international standards, along with customized strategies to enhance third-party ESG ratings and ESG sectors. Our tailored solutions support corporate sustainability initiatives, including pollutant prevention, climate risk resilience planning, natural capital analysis, and supply chain management.

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Cutting-Edge ESG Data Advancing Sustainability