

No Sense Climate Strategies!

Top 4 HK real estate listco's unprepared & highly exposed to imminent coastal threats

Authors:

Dharisha Miranda
Sophie Kutsunai Lam
Debra Tan

Published by:

CWR

Publication Date:

February 2025

Graphics & layout:

ROKO Studio
www.rokostudio.com

Contact:

For any enquiry,
please contact:
info@cwrrr.org

Acknowledgements:

CWR would like to
acknowledge the
contribution of Yisih Chai
& Dr. CT Low

- **The HSPDMI 4 listco's emissions = 1/4th of HK's 2022 GHG emissions.** UNEPFI states that real estate accounts for around 40% of global greenhouse gas (GHG) emissions but just 4 of the Hang Seng Property Development & Management Index constituents (the HSPDMI 4) – CK Asset Holdings (CKAH), Henderson Land Development (HLD), New World Development (NWD) & Sun Hung Kai Properties (SHKP) – have Scope 1, 2 & 3 emissions of 8MtCO₂e. **66% of this has net zero targets but emissions are still rising as Scope 3 disclosure is improving but gaps remain; only SHKP has yet to set net zero targets.**
- **HSPDMI 4 listco's say they face “no” to “very high” risks for storm surge flooding & sea level rise (SLR).** All 4 listco's have conducted stress tests but types of risks, timelines & sample size differed resulting in a diverse range of results disclosed from no risk for storm surge & SLR for SHKP to “very high” for CKAH. **But CWR stress tests for storm tides & SLR in HK & mainland China showed that SHKP faces the highest risks of the 4 listco's.**
- **CWR stress test of 900+ properties (existing & in development) of the HSPDMI 4 in HK & the Mainland showed high risks:** Given the diverse physical risks disclosed, a more intense 2024 typhoon season & 1m of SLR by 2070 if current emissions continue, we conducted our own stress tests to see real risks ahead. **These showed that “unlucky” storm tides could impact 37-56% of properties today; rising to 51-81% by 2050; and by 2100 31-44% could be permanently submerged.** SHKP can see 56% of its 220+ assets hit today, but by 2050 a whopping 81% can be hit. NWD with the lowest risk, still has substantial exposure: 37% of its 235+ assets can be hit today from unlucky storm tides, rising to 51% by 2050. For HLD, 47% of its 190+ assets can be hit today & 68% by 2050; CKAH can see 40% of its 270+ assets hit today & 62% by 2050.
- **HSPDMI 4 leaders have no-sense climate strategies = unprepared for risks ahead!** Clear material exposure & long investment timelines should lead to cohesive climate strategies that reduce risks but the HSPDMI 4 leaders have no-sense climate strategies:
 - **Carbon pledges should be 1) maximised & 2) met sooner to “slow down” risks like SLR & storm surge but they aren't.** CKAH, HLD & NWD have net zero pledges by 2050 whereas SHKP has none but CKAH, HLD & NWD emissions rose in the last year. All 4 have higher emissions to 5 years ago.
 - **Not facing reality! Only CKAH stress test results matched CWR's; others are not on top of coastal threats.** CKAH didn't disclose how many assets it assessed for 2030/50 but its results match CWR's. NWD's stress test is the best on paper as it assesses long timelines and all risks, but its results show much lower risks than CWR's. SHKP shows no high risks likely because it's only assessing 8 projects. HLD did not even assess SLR.
 - **Adaptation plans disclosed by the HSPDMI 4 don't match their respective identified risks, let alone CWR stress test results.** Robust adaptation actions can reduce risks and ensure long term resilience but none of them disclose adaptation plans in detail. All except for CKAH mention that they are protecting properties they have identified as at-risk. CKAH noted that adaptation is important but provides no further details, which is surprising given the high risks it identified.
- **HSPDMI 4 with a combined asset value of HK\$2.3trillion could warrant higher insurance premiums & valuation reductions due to significant risks + no-sense climate strategies.** Our analysis shows that the HSPDMI 4 are not prepared for rising risks ahead. This is likely due to a lack of board focus, reflected in the annual report (AR). Start getting on top of these risk gaps now and see our **recommendations for listco's, finance & regulators to ensure resilience.**

Why we are writing this...

2024 was the hottest year ever. Alarm bells had started ringing when monthly warming breached 1.5°C in January 2024 but with persistent warming throughout the year, we have ended up with annual warming of 1.55°C for 2024.¹ As water is how we mostly feel climate change, we saw an escalation of water risks – from the widely covered devastating floods in Spain to the less covered fast melting of polar & mountain ice which have resulted in fast rising seas and freshwater resource losses.

Here in Hong Kong, we saw our most scary typhoon season yet with three Super Typhoons. We were lucky that Super Typhoon Yagi, Yinxing & Man-yi skirted by and we were spared from direct hits. Guangdong, Hainan, Vietnam, Thailand & the Philippines were not so lucky – Typhoon Yagi which skirted past Hong Kong with winds of over 230km/h affected millions across the four countries causing almost US\$14billion in economic damages with over 450,000 homes destroyed²; even ‘typhoon-resistant’ wind turbines in Hainan, China were knocked down.

But we cannot count on luck all the time as we are more vulnerable than we think. Although Hong Kong only hoisted a T1 for Super Typhoon Man-yi, it caused water levels to reach a record-breaking 3.36m above the Chart Datum in Quarry Bay and Tai O and 3.52m in Tai Po Kau.³ This led to flooding in low-lying areas and one of the authors of this report was stuck on the ferry which had trouble docking at Discovery Bay on her way home.

Meanwhile, other members of the team at COP29 in Baku were getting the lowdown from the Cryosphere Pavillion where we presented. The cryosphere is in a dire state. Ice scientists are worried as observed ice losses from the Greenland Ice Sheet are already tracking the worst-case projections from the IPCC AR6. If current emissions continue, the 2024 State of the Cryosphere Report notes that we could potentially see 1m of SLR by 2070.³ We fear that this may be even sooner in Asia due to regional disparities in SLR.

Hong Kong is not immune. Indeed, our stress tests of over 195,000 assets (see 8-Factsheet Survival Guide below) show existential threats under 2-3m of SLR by 2100 which the IPCC AR6 warned *“cannot be ruled out due to deep uncertainty in ice sheet processes”*. As a 2024 Singapore study says 1.9m of SLR by 2100 is possible if emissions continue, we’re likely tracking this scenario now.⁴ We are also worried that finance & business are not stress testing for these levels of SLR (see HK Case Study below), which can trigger systemic shocks. So given rising storm tide risks, we wanted to see how resilient the top 4 HK real estate developers are because with a combined asset value of HK\$2.3trillion and market cap of HK\$470billion, what they do or do not do can sink the HKSAR.

To gauge this, we explored 1) where they are on transition as this is the only action that will “slow down” fast rising seas; 2) if they have a proper grasp of the magnitude of risks ahead and if the physical risks they are disclosing are realistic; and 3) if they have any adaptation strategies and whether these matched the risks that lie ahead.

What we found was shocking but we also saw signs for optimism. There’s clearly a long way to go so we hope the analyses in this brief and the company factsheets help the HSPDMI 4 as well as other stakeholders from finance, governments to NGOs ensure better alignment of climate strategies for resilience against escalating water risks. This will not only help them, but all of us. It’s high time to ensure that we are not shooting ourselves in the foot with nonsense climate strategies – start building resilience with this report now.

Surging Seas in a warming world UN Technical Brief 2024

“Since the start of the 20th century, global-mean sea level has risen faster than over any prior century in at least the last 3,000 years, and the rate of increase is accelerating.”

“The frequency of present-day, extreme-but-rare sea-level events is projected to increase substantially in most regions.”

Recommended reading...

If you would like to dive deeper on Hong Kong’s coastal exposure, we recommend you read this report together with the following:



8-Factsheet Survival Guide for HK to survive rising seas

August 2022

If HK gets it wrong, up to 82% of the HKSAR’s revenue streams could be underwater.

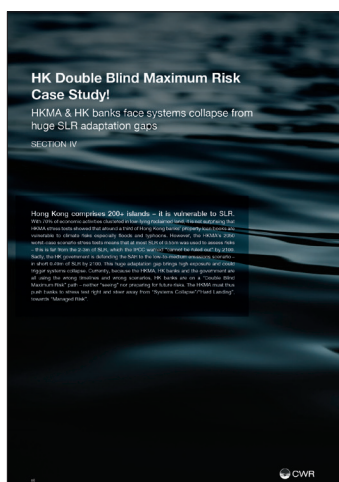
Plus, we could lose our homes, critical infrastructure & basic needs to permanent submersion unless we take proactive action to effect transformative “low-regret” adaptation for locked-in multi-metre sea level rise.



State of Cryosphere 2024 – Lost Ice, Global Damage

International Cryosphere Climate Initiative (ICCI)

“Many ice sheet scientists now believe that exceeding even 1.5°C will be sufficient to melt large parts of Greenland and West Antarctica, and potentially vulnerable portions of East Antarctica; generating inexorable sea-level rise that exceeds 10 meters in the coming centuries.”



HK Double Blind Maximum Risk Case Study

November 2022

CWR’s deep dive case study on HK clearly shows that adapting to only 0.5m of sea level rise (SLR) by 2100 instead of 2-3m, which the IPCC warns “cannot be ruled out”, will put 24x more residential, commercial & industrial buildings at risk in Hong Kong.

Yet, the HK government is defending the SAR to the low-to-medium emissions scenario – in short 0.49m of SLR by 2100.



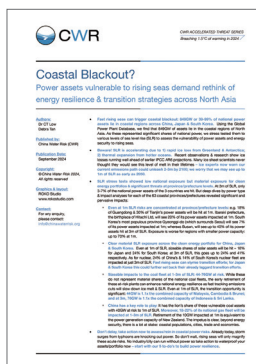
CWR Accelerated Threat Series

The “**Accelerated Threat Series**” launched in 2024, is our response to the increasing challenges due to rapid global warming. Today, compounded by El Niño, temperatures are rising at an alarming rate – annual warming shot up from 1.15°C for 2022 to 1.45°C in 2023 and 1.55°C in 2024. Although we will head back into a “cooler” La Niña period it is worth noting in the last La Niña, we still had many temperature peaks.

Sadly, accelerated global heating only exacerbates water scarcity – carbon causes climate change but water is how we will largely feel it. Already, we are reeling from the impacts – floods, droughts, rising water scarcity and so on. Seas are also rising faster than expected due to unprecedented warming of our oceans causing thermal expansion as well as rapid ice sheet losses from our polar regions. All these only serve to accelerate physical risks which have material implications for governments, asset owners and the financial sector.

Our first report in the **Accelerated Threat Series** focused on freshwater challenges posed by the ICT sector – it explored how AI & climate risks amplify existing water risks faced by thirsty data centres. The second, focused on threats posed by fast rising seas to the global seaborne oil trade & how not fast tracking oil transition impacts the energy security of Japan & South Korea. The third explored how fast rising seas could cause coastal blackouts in China, Japan & South Korea. This time, we look closer to home and conduct a deep dive to see how the Top 4 property developers are dealing with rising coastal threats – do they have transition & adaptation strategies? Are their climate strategies aligned? Do they have a real grasp of the risks ahead? Basically, how prepared are they?

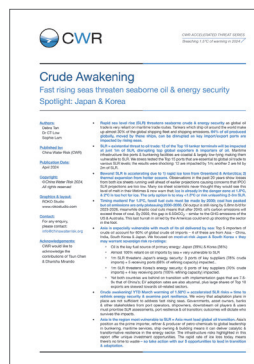
While this series of reports are meant to be briefs to raise awareness and inform discourse around accelerating risks so that we can design adequate responses and have typically not included assessments of the adequacy of adaptation, we have made an exception for this one. We feel that with fast rising risks, it is high time to ensure that we are not shooting ourselves in the foot with no-sense climate strategies.



Coastal Blackout? Power assets vulnerable to rising seas demand rethink of energy resilience & transition strategies across North Asia

Sept 2024

The report, which analysed 849GW of power assets located in coastal regions in China, Japan and South Korea, reveals that fast rising seas could swamp coastal power plants of these economic powerhouses sooner than we think, causing coastal blackouts.



Crude Awakening Fast rising seas threaten seaborne oil & energy security Spotlight: Japan & Korea

May 2024

The report warns that the entire oil chain is in for a crude awakening as almost two-thirds of oil produced globally is shipped by oil tankers, yet stress tests to rising seas show that 12 of the world's Top 15 Tanker Terminals will be impacted at just 1m of SLR.



China ICT running dry? The rise of AI & climate risks amplify existing water risks faced by thirsty data centres

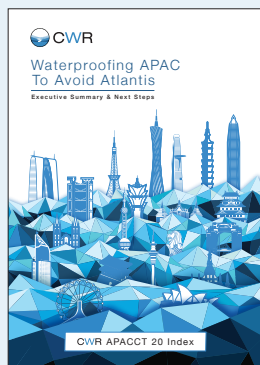
April 2024

The report reveals 4.3mn data centre racks in China consume around 1.3bn m³ of water today; but data centre growth can more than double this to over 3bn m³ by 2030.

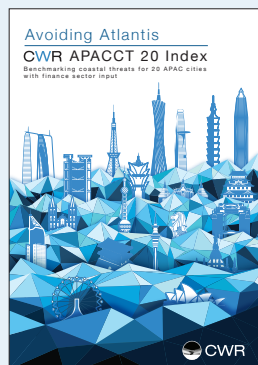
This will put pressure on already stressed water resources, especially as the rise of generative AI and chatbots could see water use surge by a shocking 20x.

Recommended reading on coastal threats...

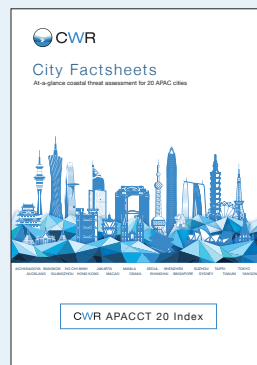
CWR APACCT 20 Index CWR Survival Guide to Avoiding Atlantis



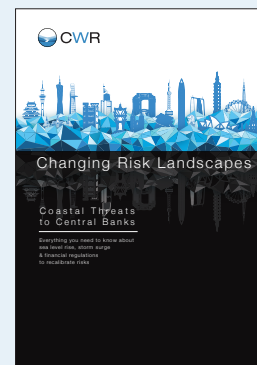
Waterproofing APAC To Avoid Atlantis Executive Summary & Next Steps



Avoiding Atlantis: CWR APACCT 20 Index Benchmarking coastal threats for 20 APAC cities with finance sector input



The CWR APACCT 20 Index City Factsheets At-a-glance coastal threat assessment for 20 APAC cities



Changing Risk Landscapes: Coastal Threats To Central Banks Everything you need to know about sea level rise, storm surge & financial regulations to recalibrate risks

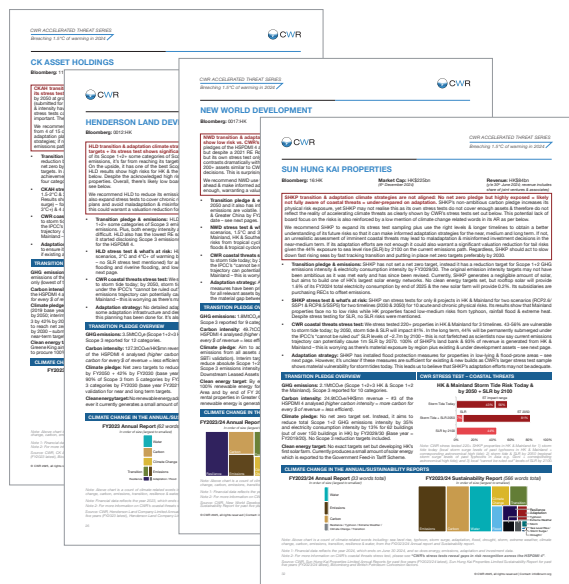


Sovereigns at Risk – APAC Capital Threats Re-ratings warranted as city capitals & GDP are materially exposed to coastal threats



Contents

Why real estate & why we picked these 4 listco's	6
No-sense climate strategies = higher premiums & valuation write-downs	7
3 of the HSPDMI 4 have net zero targets but total emissions still rising	8
CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4	12
CWR stress test methodology: SLR & storm tide	16
Facing reality! What accelerated heating means for storm tides & SLR	17
Adaptation lags own identified risk, let alone rising risks identified by CWR	18
HKSAR government adaptation efforts disclosed so far leave HK assets at risk	20
Transformative adaptation: 4 tips summarised from the IPCC AR6	21
Recommendations for listco's, finance & regulators to ensure resilience	22
HSPDMI 4 Factsheets: climate pledges, stress tests & adaptation action	
CK Asset Holdings	23
Henderson Land Development	26
New World Development	29
Sun Hung Kai Properties	32



Each 3-page HSPDMI 4 factsheet contains:

- At-a-glance overview of the listco's own:
 - Transition pledges + key energy & emissions data
 - Physical risk stress test results + recognition of what's at risk
 - Adaptation strategies disclosed
 - Financials: revenues by region/segment + land bank analyses + balance sheet, owners & lenders at risk
- CWR analysis of:
 - Board focus on climate risks: AR vs. sustainability reports
 - CWR stress tests for various storm tide & SLR scenarios across 3 timelines – today, 2050 & 2100 to gauge if HSPDMI 4 disclosure & recognition of climate risks ahead are adequate
 - Risk exposure of properties in HK & Mainland
 - Risk exposure of existing properties & those under development

Abbreviations & Definitions

AR	Annual report		
CCWGI	Climate Change Working Group on Infrastructure		
CEDD	Civil Engineering and Development Department		
CKAH	CK Asset Holdings Limited		
ESG	Environmental Social and Governance		
FI	Financial Institution		
FY	Fiscal year		
GBA	Greater Bay Area		
GHG	Greenhouse gas		
HK	Hong Kong		
HKEX	Hong Kong Exchange		
HKMA	Hong Kong Monetary Authority		
HKO	Hong Kong Observatory		
HKSAR	Hong Kong Special Administrative Region		
HLD	Henderson Land Development		
HSPDMI	Hang Seng Property Development & Management Index		
HSPDMI 4	4 major real estate development companies listed on the Hong Kong Stock Exchange and constituents of the HSPDMI analysed in this report – they are CK Asset Holdings, Henderson Land Development, New World Development & Sun Hung Kai Properties		
IPCC	Intergovernmental Panel on Climate Change		
IPCC AR6	Intergovernmental Panel on Climate Change 6th Assessment Report		
IPCC AR6 WG1	Intergovernmental Panel on Climate Change 6th Assessment Report Working Group 1		
IPCC AR6 WG2	Intergovernmental Panel on Climate Change 6th Assessment Report Working Group 2		
mgmt	Management		
NGFS	Network for Greening the Financial System	Units	
NGO	Non-governmental Organisation	bn	Billion
NWD	New World Development	CO ₂	Carbon dioxide
P&L	Profit and Loss	CO ₂ e	Carbon dioxide equivalent
PPA	Power purchase agreement	GJ	Gigajoule
RCP	Representative Concentration Pathways	kWh	Kilowatt hour
RE	Renewable energy	mn	Million
REC	Renewable energy certificates	MtCO ₂	Million metric tonnes of carbon dioxide
REDA	The Real Estate Developers Association of HK	MtCO ₂ e	Million metric tonnes of carbon dioxide equivalent
REIT	Real Estate Investment Trust		
SAR	Special Administrative Region		
SBTi	Science Based Targets Initiative		
SCHK	Stock Connect Hong Kong	Mwh	Megawatt-hour
SE Asia	Southeast Asia	tCO ₂	Metric tonne of carbon dioxide
SHKP	Sun Hung Kai Properties	tCO ₂ e	Metric tonne of carbon dioxide equivalent
SLL	Sustainability-linked loans		
SLR	Sea Level Rise		
SSP	Shared Socioeconomic Pathways		
ST	Storm tide		
UNEPFI	United Nations Environment Programme Finance Initiative		
WMO	World Meteorological Organization		
Emissions			
Scope 1	Direct emissions from owned or controlled sources		
Scope 2	Indirect emissions from purchased power and heat		
Scope 3	All other emissions in the value chain		
Dates			
The cut-off date for this research including data gathering (e.g. emissions, pledges, finances etc.) was 15 January 2025. All data beyond this date has not been included. CKAH and HLD financial year ends on 31 st December; NWD and SHKP ends on 30 th June. Latest information for CKAH and HLD is from annual reports ending 31 Dec 2023; for NWD and SHKP it is 30 June 2024.			

Why real estate & why we picked these 4 listco's...

- Real estate sector is ~40% of all GHG globally & vulnerable to coastal threats = must step up carbon cuts or it will shoot itself in the foot.** According to UNEPFI, the real estate sector (directly and indirectly) contributes nearly 40%⁵ of all GHG emissions globally and therefore, plays a key role in achieving global climate goals. This is especially important as rising temperatures and uncontrolled emissions will lead to more physical risks such as SLR and more frequent typhoons, which will impact the sector directly as many of its valuable assets are located in highly vulnerable areas such as along expensive coastlines. In Hong Kong where buildings account for approximately 90% of total electricity consumption and over 60% of carbon emissions⁶, the HKMA pilot climate stress test in 2021 clearly highlighted the risks for the sector as it showed that **around HK\$1trn or 32%⁷ of property related lending of 27 HK banks is pledged with collateral in vulnerable areas exposed to typhoon & flood risks based on ~0.55m of SLR by 2050.**

Entity	Share of Emissions (%)
Global	~40%
HK	~60%

Source: CWR, UNEPFI Climate Risks in the Real Estate Sector 2023, Hong Kong's Climate Action Plan 2050.
- Real estate companies have little flexibility with climate risks = should have best aligned climate strategies.** When it comes to physical climate risks such as SLR and storm surge, the real estate sector has the least flexibility as the companies can't easily move their assets. They can protect them through better flood barriers and planning, but this won't be enough for SLR when the entire area & surrounding infrastructure is permanently flooded. Therefore, the real estate sector should have some of the best climate strategies – 1) deep carbon cuts to slow down accelerating physical climate risks; 2) robust stress tests that highlight the properties most at risk; and 3) transformative adaptation plans to protect assets at risk for the scenario that “cannot be ruled out”. **On this front, as developers have long term investment horizons, they should be more climate aligned than REITs and so we only focused on developers in this report.**

HKMA – 27 Banks Stress Test

32% of property loan books exposed to typhoon & flood risks based on 0.55m of SLR by 2050

Source: CWR, HKMA Pilot Banking Sector Climate Risk Stress Test 2021.
- The HSPDMI 4 listco's are also in various other Hang Seng property indices.** The Hang Seng Property Development and Management Index (HSPDMI) includes the 30 largest companies that are engaged in property development & management and are listed in HK. We selected the only 4 HK companies in the HSPDMI that are HK Ordinary share type. These companies are also in the Hang Seng Property Service and Management Index, which covers the 50 largest property management service companies that are listed in HK. Moreover, the HSPDMI 4 can also be found in the Hang Seng SCHK Properties & Construction Index (58 constituents) and the Hang Seng SCHK Properties & Construction (Investable) Index (49 constituents), which both aim to reflect the performance of Stock Connect eligible companies in the Properties & Construction Industry and are listed in HK.

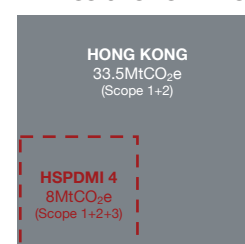
	Hang Seng Index	HSPDMI	Hang Seng Property Service & Mgmt Index	Hang Seng SCHK Properties & Construction Index	Hang Seng SCHK Properties & Construction (Investable) Index
Sun Hung Kai Properties	✓	✓	✓	✓	✓
Henderson Land Development		✓	✓	✓	✓
CK Asset Holdings	✓	✓	✓	✓	✓
New World Development		✓	✓	✓	✓
Swire Properties				✓	✓
Link REIT	✓				
Wharf REIC				✓	✓
Hang Lung Group				✓	
Hang Lung Properties				✓	✓
Sino Land			✓	✓	
Guoco Group			✓		
Hysan Development				✓	✓
K. Wah International				✓	

Source: CWR, Hang Seng Index website. Note: only HK Ordinary share types are shown.

- HSPDMI 4 emissions = 1/4th of Hong Kong's emissions so what they do matters for HK's net zero goals.** The 4 listco's Scope 1+2+3 emissions amount to 8MtCO₂e, which is 24% of Hong Kong's annual (2022) Scope 1+2 emissions. Given that Hong Kong is aiming for net zero by 2050⁸ what these listco's do on the transition front matters.

Note that emissions will be higher as Scope 3 is underdisclosed – more on this later in “3 of the HSPDMI 4 have net zero targets but total emissions still rising”.

HSPDMI 4 Emissions vs. HK's Emissions



Source: CWR, Latest Company Sustainability Reports, HKSAR Press release- Hong Kong greenhouse gas emission inventory for 2022 released 30 Nov 2023.

No-sense climate strategies = higher premiums & valuation write-downs...

- **The HSPDMI 4 should have climate strategies to address rising climate risks.** Climate risks are escalating and while we can see the rise of event driven risks like typhoons, floods & fires, the acceleration of chronic risks such as rising seas caused by rapid melting of polar ice sheets & ocean warming is out of sight and out of mind. To see if the HSPDMI 4 have a clear understanding of the risks ahead & to gauge their resiliency, we explored:
 - 1) where they are on transition as this is the only action that will “slow down” fast rising seas – **to find that they are shooting themselves in the foot. Carbon pledges should be 1) maximised & 2) met sooner to “slow down” risks like SLR & storm surge but aren’t.** While 3 listco’s have 2050 net zero pledges, it’s hard to see how they can achieve these as they all have higher total emissions to 5 years ago. For more see **“3 of the HSPDMI 4 have net zero targets but total emissions still rising”**.
 - 2) if they have a proper grasp of the magnitude of risks ahead and if the physical risks they are disclosing are realistic – **to find that they are not facing reality! Only one listco’s stress test results matched CWR’s; the others are not on top of coastal threats.** Physical risks disclosed for storm tides & rising seas for 3 listco’s did not match CWR’s own stress test results, indicating a poor grasp of coastal threats ahead. For more see **“CWR’s stress tests reveal gaps in risk recognition across the HSPDMI 4”**.
 - 3) if they have any adaptation strategies and whether these matched the risks that lie ahead – to find that **adaptation plans disclosed by the HSPDMI 4 don’t match their respective identified risks, let alone CWR stress test results.** Also, none of them disclose adaptation plans in detail – for more see **“Adaptation lags own identified risk, let alone rising risks identified by CWR”**.

Overview of HSPDMI 4 Climate Pledge, Stress Tests & Adaptation Strategies

	CKAH	HLD	NWD	SHKP
HSPDMI 4 carbon pledges				
Has net zero target	✓	✓	✓	✗
Pledge validated by SBTi	✓✗ ¹	✓	✓✗ ³	✗
Has RE targets	✓✗ ²	✗	✓	✗
Scope 1+2 has materially fallen in last 5 years	✗	✗	✓	✗
HSPDMI 4 stress tests				
Long timeline analysed (2080/2100)	✗	✗	✓	✗
1.5°C and 3°C+ scenarios	✓	✓	✓	✓
Analyse 150+ properties	? ⁴	? ⁴	✓	✗
Acute and chronic risks	✓	✗	✓	✓
SLR risk analysed	✓	✗	✓	✓
Stress test results for coastal threats				
Significant risks identified by the HSPDMI 4	✓	✓	✗	✗
Risks identified match CWR’s stress test results	✓	✗ ⁵	✗	✗
HSPDMI 4 adaptation strategies				
Claims to be protecting assets identified at risk ⁶	✗	✓	✓	✓
Detailed adaptation plan disclosed	✗	✗	✗	✗

Note 1: CKAH’s group level pledges have not been validated, only Greene King’s near-term pledges have been validated; Note 2: CKAH – Greene King has RE targets, group does not; Note 3: NWD – only near term targets have been validated; Note 4: CKAH & HLD do not disclose the number of assets stress tested; Note 5: HLD does not stress test for SLR, it only analysed acute risks; Note 6: HLD, NWD & SHKP all claimed that they are protecting assets identified at risk, but it is unclear to what scenario/timeline.

Source: CWR, Latest Company Annual Reports and Sustainability Reports.

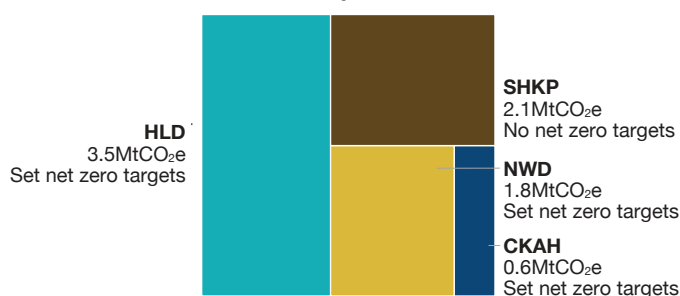
- **Our analysis revealed that HSPDMI 4 leaders have no-sense climate strategies = unprepared for risks ahead!** Clear material exposure identified by our stress tests & long investment timelines should lead to cohesive climate strategies that reduce risks but instead HSPDMI 4 leaders have no-sense climate strategies. It is clear from the summary table above that while some listco’s fare better at some climate strategies than others, none of their transition, stress tests & adaptation strategies are aligned. We have distilled all the information & data we have poured through into this report + HSPDMI 4 factsheets. We hope the HSPDMI 4 use these to improve their pledges, stress tests and adaptation action; and that investors, insurers, lenders & other stakeholders use these to engage the HSPDMI 4, support and finance their transition and adaptation. We’ve also made a to-do list – see **“Recommendations for listco’s, finance & regulators to ensure resilience”**.
- **HSPDMI 4 (total asset value of HK\$2.3trillion) could warrant higher insurance premiums & valuation write-downs if no-sense climate strategies persist & vulnerabilities not addressed.** Our analysis shows 1) clear & significant exposure to coastal threats, and 2) that the HSPDMI 4 are not prepared for such risks. Pledges & transition plans must be improved as should the quality & disclosure on stress testing; adaptation must be stepped up. HSPDMI 4 boards must take action to address coastal threats otherwise increases in insurance premiums for unprotected vulnerable properties could be warranted. **Also worrying are significant SLR tail risks plus gaps in HSPDMI 4 & HKSAR government adaptation plans to address these – if high emissions persist, fast rising seas could permanently submerge 2-18% of the HSPDMI 4’s portfolio in 25 years’ time (by 2050) & 31-44% by 2100 – clearly failure to adapt could warrant material valuation write downs. HSPDMI 4 boards must thus prioritise sensible climate strategies & engage governments on adaptation.**

3 of the HSPDMI 4 have net zero targets but total emissions still rising...

1. **Decarbonisation action varies: SHKP with 2nd highest emissions does not have a net zero target!** It is clear from the graphic below that HLD & SHKP have the highest emissions of the four listco's. Although HLD recently (13th January 2025) announced net zero targets for 90% of its Scope 1+2+ some categories of Scope 3 emissions; SHKP still has not. Instead, SHKP has weaker emissions intensity and electricity consumption intensity targets as shown in the table below. Even more worrying is that SHKP does not appear to be on top of its physical risks – see “CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4” later.

Meanwhile, NWD & CKAH with less emissions, have both set 2050 net zero goals for Scope 1+2+3, which have been submitted to SBTi for validation. HLD albeit announcing its net zero targets later has already received SBTi validation (near & long term). As HLD's net zero targets do not cover all of its total emissions disclosed, this leaves **34% of the HSPDMI 4 emissions of 8MtCO₂e without net zero targets. SHKP clearly needs to up its game on transition. Also, emissions could be higher as CKAH does not fully disclose Scope 3 thus resulting in the lowest emissions of the HSPDMI 4** – more on Scope 3 inconsistencies below.

The HSPDMI 4 Scope 1+2+3 Emissions



Source: CWR, Latest Company Sustainability Reports, HLD Press Release on 13th January 2025.



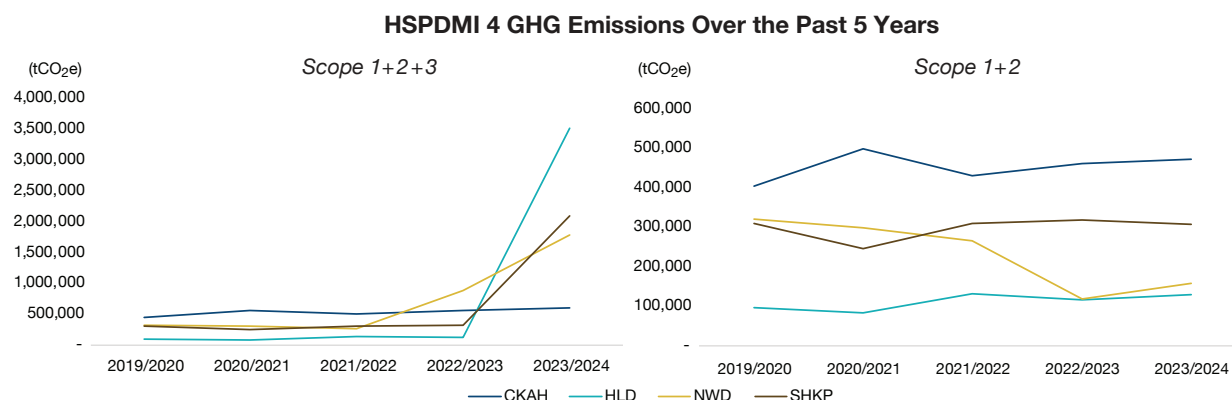
It's worth noting that other developers like Hang Lung Properties, Hongkong Land and Swire Properties also have transition plans that are already validated by SBTi and are near term 1.5°C aligned.

Overview of the HSPDMI 4 Climate Pledges

CKAH	HLD	NWD	SHKP
Greenhouse gas emission targets			
- Scope 1+2: 99.6% reduction by 2050 (base year 2019) and 46.8% reduction by 2030 – seeking SBTi validation. - Scope 3: 99.6% reduction (base year 2021) by 2050 and 42% reduction by 2030 – seeking SBTi validation. - Greene King (subsidiary) – net zero by 2040 – seeking SBTi validation; and 50% reduction for Scope 1+2+3 by 2030 – received SBTi validation.	- Scope 1+2: 90% reduction by FY2050 + 42% reduction by FY2030 (base year FY2021) – received SBTi validation. - Scope 3: reduce 90% of emissions from 5 categories by FY2050 + 25% from 3 categories by FY2030 (base year FY2021) – received SBTi validation.	- Scope 1+2+3: Net zero for all assets and operations by 2050 – seeking SBTi validation. - Interim targets (approved by SBTi) – by 2030 reduce absolute Scope 1+2 by 46.2% and reduce Scope 3 intensity from Capital Goods by 22% + Downstream Leased Assets by 29.8% (FY2019 base year).	No net zero target. - Scope 1+2: reduce GHG emissions intensity by 35% for 62 buildings (out of over 150 buildings in HK) by FY2029/30 (base year FY2019/20). - No Scope 3 reduction targets included.
Energy consumption & clean energy targets			
No Group clean energy targets. - Greene King aims to achieve 80% renewable electricity adoption by 2025 and 100% by 2030 – 100% RE procurement started in Dec 2023. - Reduce electricity consumption by 11% by 2030 at group level (base year 2019).	No clean energy targets. - By 2030, reduce energy intensity by 20% (base year 2019) for Hong Kong portfolio. - By 2030, achieve a cumulative 10% reduction in electricity consumption (from base year 2021) for Mainland China portfolio.	By end of FY2026 it aims to achieve 100% renewable energy for rental properties in Greater Bay Area and by end FY2031, 100% renewable energy for rental properties in Greater China.	- Reduce elec consumption intensity by 13% for 62 buildings (out of over 150 buildings in HK) by FY2029/30 (base year FY2019/20). No clean energy targets set but has rooftop solar & aims to build HK's first solar farm (rooftop solar will provide 1.6% of its FY2024 total electricity consumption by end 2025 & new solar farm will provide 0.2%). Subsidiaries are also purchasing RECs.

Source: CWR, Latest Company Annual Reports and Sustainability Reports, HLD Press Release on 13th January 2025.

2. **Despite transition plans, the HSPDMI 4 all have rising total emissions from the previous year, making it more difficult to meet their targets.** For Scope 1+2+3, the chart below left shows rising emissions in the past year despite 2050 net zero pledges for CKAH, HLD & NWD. Meanwhile, SHKP with no net zero pledge has also seen a rise in emissions in the past year. Such rising emissions could be due to Scope 3 disclosure improving (see below) but when we only look at Scope 1+2 as per the chart below right only NWD has materially reduced emissions over the past 5 years; the others have higher/similar Scope 1+2 compared to 5 years ago. **As the HSPDMI 4 have emissions equivalent to 24% of HK's annual emissions, their inability to reduce emissions could impede the SAR's decarbonisation efforts.**



It is hard to see how CKAH, HLD & NWD will achieve net zero without more aggressive RE sourcing.

NWD has the most ambitious RE targets of the 4 (100% RE for rental properties in GBA by FY2026 and for rental properties in Greater China by FY2031) but its RE sourcing is currently 0.04%. As for CKAH we expect its RE sourcing to rise from a mere 0.1% as Greene King has started to procure 100% RE as of December 2023. But no group wide goals have been set for RE. HLD has the lowest RE sourcing of the HSPDMI 4 at 0.03%. On the other hand, SHKP only aims to reduce electricity consumption intensity for 13% of its HK buildings by FY2029/30 and is investing in RE but low energy output means emissions will not be greatly offset.

3. **Scope 3 disclosure must improve: HLD reports 12 of the 15 Scope 3 categories whereas CKAH reports only four.** The table below shows that HLD reports the greatest number of Scope 3 categories (12 out of 15), compared to 10 for SHKP, 9 for NWD, whereas CKAH only disclosed 4 categories.

Overview of HSPDMI 4's Scope 3 Emissions Disclosure

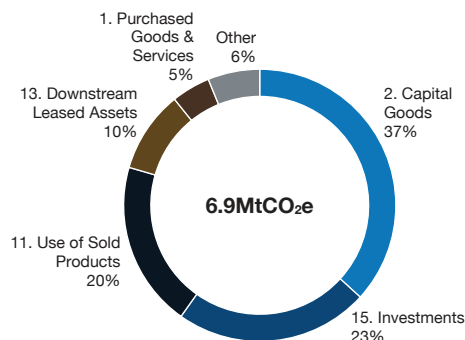
	CKAH	HLD	NWD	SHKP
1. Purchased Goods and Services	✓	✓		✓
2. Capital Goods	✓	✓	✓	✓
3. Fuel-and-energy-related Activities		✓	✓	✓
4. Upstream Transportation and Distribution		✓		✓
5. Waste Generated in Operations	✓	✓	✓	✓
6. Business Travel		✓	✓	✓
7. Employee Commuting		✓	✓	✓
8. Upstream Leased Assets		✓		
9. Downstream Transportation and Distribution				
10. Processing of Sold Products				
11. Use of Sold Products		✓	✓	✓
12. End of Life Treatment of Sold Products		✓	✓	✓
13. Downstream Leased Assets	✓	✓	✓	✓
14. Franchises				
15. Investments		✓	✓	

Source: CWR, Latest Company Annual Reports and Sustainability Reports.

Other key points of note are:

- **The HSPDMI 4 overlap on three Scope 3 categories:** 2. Capital Goods, 5. Waste Generated in Operations and 13. Downstream Leased Assets.
- **Except for CKAH, the other 3 listco's provide a breakdown of emissions per Scope 3 category.** Although disclosing Scope 3 by business segment, CKAH is the only listco that didn't provide a Scope 3 breakdown by category. It's worth noting that even though NWD disclosed less categories than SHKP, it has the most elaborate breakdown of each category with detailed descriptions, methodology/exclusion and emission factors. As can be seen per the chart below showing combined Scope 3 emissions by category of HLD, NWD and SHKP, the highest Scope 3 emissions comes from: 2. Capital Goods, 15. Investments and 11. Use of Sold Products. CKAH only reports on one of these three high Scope 3 emission categories – 2. Capital Goods – so its emissions could be much higher if it reported more Scope 3 categories. This means that **CKAH's actual emissions will be higher with better Scope 3 accounting** – see below.

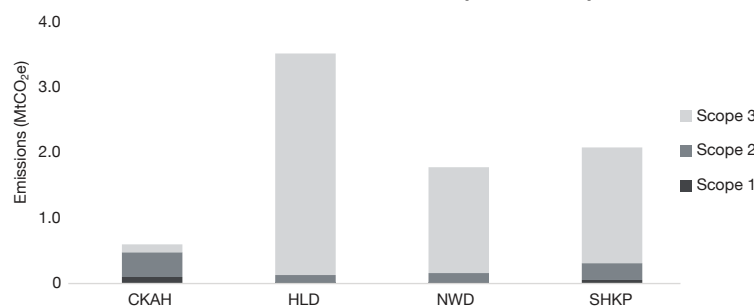
Scope 3 Emission by Category for HLD, NWD & SHKP



Source: CWR, Latest Company Annual Reports and Sustainability Reports.

- **CKAH would likely have higher total emissions than HLD if it accounted for Scope 3 properly as it has the highest Scope 1+2 emissions.** A quick glance at the chart below shows that HLD has the highest total emissions followed by SHKP, NWD and finally CKAH. However, this is an unfair comparison as HLD reports the highest number of Scope 3 categories – 3x that of CKAH. Looking at just Scope 1+2 the rankings are reversed with CKAH having the highest emissions and HLD with the lowest. Therefore, if CKAH were to account for Scope 3 properly it would likely have the highest emissions of the HSPDMI 4.

HSPDMI 4 GHG Emissions (FY2023/24)



Note: Scope 3 - CKAH only reports 4 categories, NWD reports 9, SHKP 10 & HLD 12.
Source: CWR, Latest Company Sustainability Reports.



HKSAR government & HSPDMI 4 must step up action on embodied carbon. For developers, the category “Capital Goods” is typically the largest chunk of Scope 3 emissions due to embodied carbon from building materials & construction processes associated with development. Cities like Vancouver are thus aiming to reduce embodied carbon in construction by 40% by 2030 by changing the Vancouver Building By-law to require designers to calculate, limit, and later reduce embodied carbon. This is in line with the World Green Building Council which also advocates that by 2030, all new buildings must be net zero operational carbon.

NGOs are pushing the HKSAR government to do something similar for new buildings requiring developers to calculate, limit, and later reduce embodied carbon in order to obtain gross square foot concessions or occupation permits but to no avail. Meanwhile, in the Mainland by 2025, new urban buildings are to meet green building standards; 50% rooftop solar for new public institution & factory buildings; 8% renewable energy substitution for urban buildings plus more. There are also ambitious industrial targets for steel & building material industries which should help lower embodied carbon. Introducing new building regulations for HK can thus provide support for steel/building materials decarbonisation in the Mainland.

It's worth noting that while none of the HSPDMI 4 have clear strategies to tackle embodied carbon, other developers like Hang Lung Properties have targeted strategies to tackle steel emissions which accounted for ~40% of its total embodied carbon emissions in 2023. Collaboration with Baosteel has resulted in using nearly 100% low carbon steel in the building structure of its Plaza 66 extension in Shanghai. Such efforts show that it is clearly possible to design, calculate & limit embodied carbon emissions and that HK based developers can lead the way. We therefore urge the HSPDMI 4 to step up action to reduce embodied carbon.

Source: CWR, City of Vancouver, Embodied Carbon Guidelines (2023), World Green Building Council, China Briefing 2024, Hang Lung press release 2024.

4. **Overall, there is room for improvement on disclosure & climate pledges for the HSPDMI 4.** HLD did not have a net zero pledge in its latest annual report and sustainability report, but it published a press release on 13th January 2025 with new net zero targets that have been verified by SBTi for 90% of its Scope 1+2+ some categories of Scope 3 emissions. CKAH on the other hand must improve its emissions disclosure, particularly Scope 3, but it has a net zero target and a strategy in place. NWD is currently doing the best in terms of both carbon emissions disclosure and climate pledges – its 2030 targets are approved by SBTi while 2050 targets are still pending SBTi validation; plus, it's actually cutting Scope 1+2 emissions. SHKP must follow suit and should put in place a net zero pledge and strategy.

Overview of HSPDMI 4's Carbon Related Disclosure

	CKAH	HLD	NWD	SHKP
GHG emissions				
Reports Scope 1+2	✓	✓	✓	✓
Reports Scope 3	✓	✓	✓	✓
Reports Scope 3 by category	✗	✓	✓	✓
Electricity				
Reports electricity consumption	✓	✓	✓	✓
Reports renewable energy consumption	✓	✓	✓	✓
Has renewable energy targets	✓✗ ¹	✗	✓	✗ ²
Climate pledges				
Has climate policy	✓	✓	✓	✓
Has a decarbonisation strategy	✓	✓	✓	✓✗ ³
Set net zero targets	✓	✓ ⁴	✓	✗
- Pledge submitted for SBTi validation	✓	✓	✓	✗
- Pledge validated by SBTi	✓✗ ⁵	✓	✓✗ ⁶	✗
Carbon management				
Has climate-linked incentives	✗	✗	✗	✗
Has internal carbon pricing	✓	✗	✓	✓
ESG				
Adopts ISSB standards	✗	✓	✓	✓
ESG Data Verified	✓	✓	✓	✓

Note 1: CKAH's Greene King has renewable electricity targets; but there are no group level targets.

Note 2: SHKP has no clean energy targets but has rooftop solar & aims to build HK's first solar farm (rooftop solar will provide 1.6% of its FY2024 total electricity consumption by end 2025 & new solar farm will provide 0.2%).

Note 3: SHKP's decarbonisation strategy is very vague. Near term reduction targets are Scope 1+2 and electricity intensity focused.

Note 4: HLD's net zero targets are for 90% of its Scope 1+2+ some categories of Scope 3 emissions.

Note 5: CKAH received SBTi validation for near term Greene King targets only.

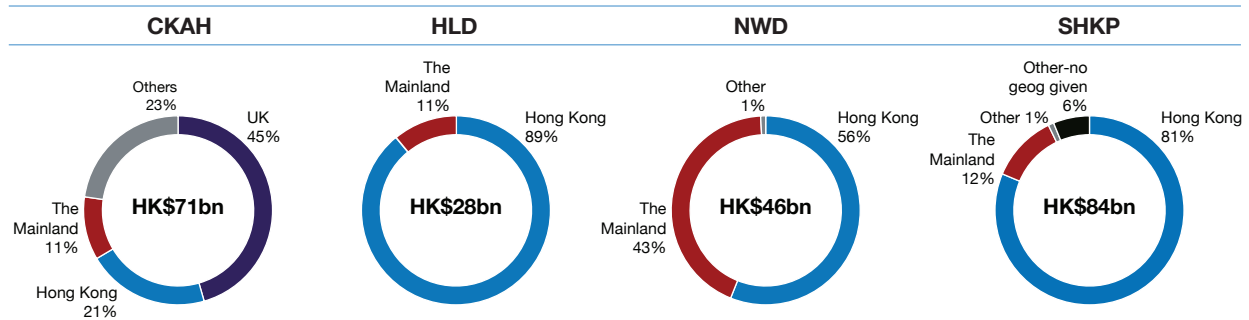
Note 6: NWD near term targets are approved by SBTi while 2050 targets are still pending SBTi validation.

Source: CWR, Latest Company Annual Reports and Sustainability Reports, HLD Press Release on 13th January 2025.

CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4...

- Physical exposure disclosed by the HSPDMI 4 varies widely despite similar geographical operations with the exception of CKAH.** As can be seen from the pie charts below all 4 listco's have operations in HK and the Mainland; with the exception of CKAH the majority of revenues are derived from HK. As physical risks are tied to locations, we expected the risks identified by the HSPDMI 4 to be similar, especially HLD and SHKP as 81-89% of their revenues are derived from HK, but they vary widely – HLD says they have the highest risk in HK from coastal and riverine flooding whereas SHKP says it has “low-medium” risk. We have summarised below the results of their physical risk stress test disclosed in their annual reports and/or sustainability reports:

Overview of the HSPDMI 4 Climate Pledges



Source: CWR, Latest Company Annual Reports.

An overview of HSPDMI 4's own stress test & what they say is at risk ...

CKAH	HLD	NWD	SHKP
Timeline 2030/50	Timeline 2030/50/60	Timeline 2030/50/80	Timeline 2030/50
Scenarios 1.5-2°C & 3°C+ of warming by 2100.	Scenarios RCP2.6 (2°C) & RCP8.5 (4°C+).*	Scenarios SSP1-2.6 (1.5°C) & SSP5-8.5 (3.3°C+).*	Scenarios SSP1/RCP2.6 (1.5-2°C by 2100) & SSP5/RCP8.5 (3°C+ by 2100).*
Risks 5 acute risks (incl. storm surge) 4 chronic risks (incl. SLR)	Risks 3 acute risks (incl. coastal flooding) - No chronic risks (no SLR)	Risks 5 acute risks (incl. storm surge) 3 chronic risks (incl. SLR)	Risks 4 acute (incl. storm surge & typhoon) 6 chronic (incl. SLR)
Assets analysed Key undisclosed locations of Group (HK, Shanghai, Beijing & UK).	Assets analysed Assets in HK & Mainland (Beijing, Guangzhou, Shanghai, Xian) – number undisclosed.	Assets analysed 200+ assets – 70% in Mainland, 28% in HK & 2% in SE Asia.	Assets analysed 8 projects in HK & Shanghai.
Stress test results HK: “Very high” risk from 3 chronic (incl. SLR but at 3°C+) & 3 acute (incl. storm surge). Mainland: “Very high” risk from 1 chronic risk (SLR at 3°C+) & 4 acute (incl. storm surge; extreme heat & rain days at 3°C+ only).	Stress test results HK: Highest risk from coastal flooding (all timelines + scenarios) & riverine flooding (2050+2060). Mainland: Highest risk from coastal flooding & riverine flooding (2050+2060).	Stress test results HK: “Moderate-extreme” risk from tropical cyclones. Mainland: “Major-extreme” risk from river flood, “moderate-extreme” risk from rainfall flood, “moderate-major” risk from tropical cyclones (2050+2080).	Stress test results HK: No “high risk” – “low-medium” risk from typhoon, rainfall flood & extreme heat. Mainland: No “high risk” – “medium risk” from extreme heat & “low” risk from typhoon, rainfall flood & river flood.

Note*: We note that the degrees of warming vary for the same scenario across the HSPDMI 4. These different RCP/SSP temperature scenarios are extracted directly from the HSPDMI 4 reports – CWR has not amended these.

Source: CWR, Latest Company Annual Reports and Sustainability Reports.

For detailed overviews see the HSPDMI 4 Factsheets, which cover climate pledges, stress tests & adaptation action.

Key points of note are:

- **Different timelines & scenarios = different results.** The HSPDMI 4 stress tested for 2030 and 2050, with HLD also including 2060 & NWD extending timelines to 2080; none however included 2100. We advocate stress testing for longer timelines as this provides a view of tail risks and enables better decision making to avoid mal-investments and maladaptation. All 4 listco's are also using the worst-case scenario of 3°C+ when stress testing as advocated by the NGFS. However, they are using different versions of this – some using RCP8.5 and others SSP5-8.5, which leads to different results. Moreover, these scenarios provide a range of projections but it's not clear which part of the range they're using – those using the lower end will show lower risks and vice versa but given the lack of detail we are unable to ascertain this. This has led to the HSPDMI 4 having different stress test results.

For a detailed guide on how to stress test better, please see the CWR 2022 report **"Futureproofing APAC Banks & Savings – Stress Test Right Today"**.



- **Sampling size differs = different results.** NWD stress tested the most assets with 200+ and SHKP only analysed 8 projects; CKAH and HLD do not disclose the number of assets assessed. In comparison, we stress tested ~200 assets per listco in HK and the Mainland, which shows this level of stress testing is possible. The different sample sizes could be another reason for different results. **We recommend CKAH & HLD to disclose their sample sizes and for SHKP to increase its sample size.** For more on CWR's stress test findings please see the following page.
- **HLD assessed the least risks of the HSPDMI 4 – only acute risks but not chronic risks; the rest did both.** HLD only analysed 3 acute risks, the others analysed 4-5 acute risks and 3-6 chronic risks. All 4 assessed storm surge and/or coastal flooding in acute risks; and all except HLD assessed SLR as part of their chronic risks. **HLD's lack of chronic risk stress testing is worrying especially as our stress test shows it faces significant risks** – please see the CWR stress test results on the following page.
- **Different tools used by the HSPDMI 4 could have contributed to the varied results.** Even though there is an overlap in timelines, scenarios and risks analysed, the results differ widely for the HSPDMI 4 as shown in the table on the previous page and below. For example, CKAH showed "very high" risk from 6 risks in HK and 5 in the Mainland (incl. storm surge & SLR); HLD noted the highest risk level for one acute risk in HK and two acute risks in the Mainland (incl. coastal flooding, but not SLR); NWD had "extreme risk" in HK from tropical cyclones (wind & rain, but insignificant storm surge/SLR risk); and in the Mainland "extreme risk" from river & rainfall floods (but minor storm surge/SLR risk); and SHKP found no "high" risks. This could be due to the use of different tools but none of the listco's go into detail on what tool they used – see box below for more on tools.

HSPDMI 4's Own Stress Test Results Showing High/ Very High/ Highest/ Extreme Risk Levels

		CKAH	HLD	NWD	SHKP
Storm surge	HK	✓	✓*	✗	✗
	Mainland	✓	✓*	✗	✗
SLR	HK	✓	✗	✗	✗
	Mainland	✓	✗	✗	✗

Note*: HLD said it stress tested for "coastal flooding (acute)"; storm surge was not specifically mentioned. Coastal flooding could also occur due to intense rain events.

Source: CWR, Latest Company Annual Reports and Sustainability Reports.

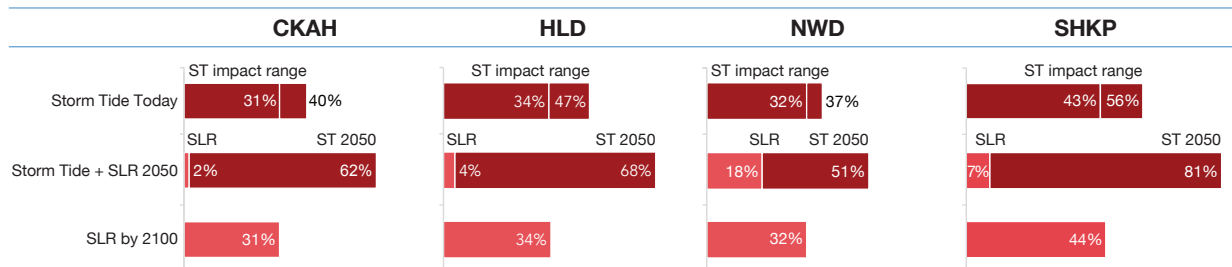
- **Inconsistent parameters = benchmarking difficulties.** Due to all the above (from inconsistent parameters to inadequate disclosure), the differing results make it difficult for investors to benchmark the listco's against each other for physical climate risks. Therefore, we conducted our own stress test for storm tides and SLR today, by 2050 and 2100 to gauge if the HSPDMI 4 have a proper grasp of the magnitude of risks ahead and if the physical risks they are disclosing are realistic. Only one company's results match our own – read on.



Different stress testing tools = different results. A wide variety of physical risk stress testing tools currently exist but they are all different. We are constantly asked what the best tool is, but this is a complicated question because most tools are a "black box" with opaque methodologies. They don't provide details on the stress testing range and/or have very low spatial resolution such as 30km grids; whereas for CWR's HK stress tests we used a 5m grid resolution. In addition, some tools are better at assessing some risks than others and therefore more than one tool should be used to assess the variety of physical climate risks. However, listco's, banks and investors like to have a "one size fits all" solution, which could result in stress testing quality tradeoffs. We recommend using the tool that is best for each risk, which does mean using multiple tools. For important risks like SLR, we have not come across any tools that cover this chronic risk well – so it's best to perform this in-house – if you need help on this front, please contact us!

2. **Not facing reality! Only CKAH stress test results matched CWR's; others are not on top of coastal threats.** To see if the HSPDMI 4 have a proper grasp of the magnitude of risks ahead and if the physical risks they are disclosing are realistic, we also performed stress tests for 900+ properties (existing & in development) in HK & Mainland to find that only CKAH's results matched ours. Although CKAH didn't disclose how many assets it stress tested, its results of "very high" risk in HK (incl. storm surge & SLR) + in the Mainland (incl. storm surge & SLR) for 2030/50 did match CWR's; whereas the other 3 listco's did not. CWR stress test results are set out below:

Overview of CWR's Stress Test Results for the HSPDMI 4



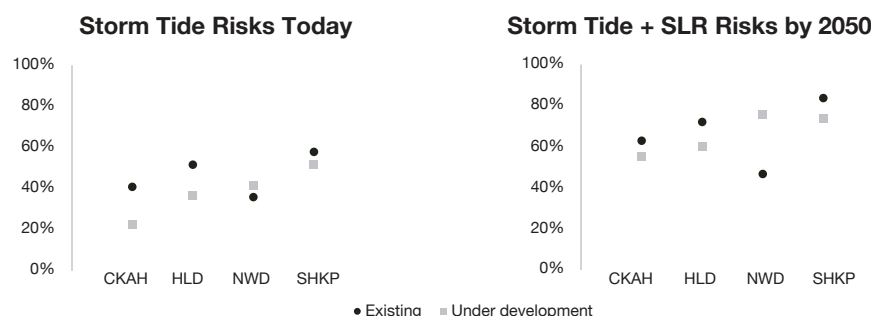
Source: CWR, Latest Company Annual Reports and Company Websites, Hong Kong Lands Department DTM 5m-grid, HKO, NASA SRTM 30m-grid, IPCC AR6 WG1 (2021), Climate Analytics and storm surges based on various sources.

Note: CWR stress tested ~200 properties per listco in HK & the Mainland for 1) storm tide today (local storm surge levels of past typhoons in HK & Mainland + corresponding astronomical high tide); 2) storm tide & SLR by 2050 (regional storm surge levels of past typhoons in Asia e.g. Goni + corresponding astronomical high tide); and 3) local "cannot be ruled out" levels of SLR by 2100.

Key points of note are:

- **CWR stress test of 900+ properties of the HSPDMI 4 in HK & the Mainland showed significant risks:**
 - **37-56% at risk today from storm tides.** Acute risks from unlucky storm tides which result when typhoons hit during high tide are clearly significant for the HSPDMI 4. As typhoons are increasing in frequency & intensity, the likelihood of such impacts is rising. Here, for storm tide today in HK, we used a storm tide range of 5-6m for a T8 typhoon hit. This is not far-fetched as even Typhoon Man-yi, a T1, in 2024 caused water levels to reach 3.36m above Chart Datum in Quarry Bay & Tai O and 3.52m in Tai Po Kau. **This is thus a realistic assessment of possible impacts in the near term.**
 - **51-81% by 2050 from storm tides.** As for future storm surge, we used regional storm surge levels of past typhoons in Asia and corresponding astronomical high tides as well as SLR by 2050 to assess impacts. Here, while we used past typhoons to determine stress test levels, we used the high end of the 2050 regional impacts under the IPCC AR6's "cannot be ruled out" scenario for SLR – this ranges from 0.67-0.7m for HK and the Mainland. This is not too high as the 2024 State of the Cryosphere Report notes that we could potentially see 1m of SLR by 2070 if current emissions continue. Besides, observed ice losses today from the Greenland Ice Sheet are already tracking IPCC AR6's worst-case projections. **We therefore believe this is a realistic stress test.**
 - **31-44% of assets face permanent submersion by rising seas by 2100.** Here, we have used IPCC's "cannot be ruled out" scenario at 2100 to assess the risks to see the full downside of a 3°C scenario as recommended by the NGFS.
- For details on CWR scenarios, please see "CWR stress test methodology: SLR & storm tide"; for the latest science see "Facing reality! What accelerated heating means for storm tides & SLR".
- **Across all 3 CWR scenarios, SHKP faces the highest risks; NWD the lowest.** SHKP faces the highest risks as 56% of its assets are at risk today from unlucky storm tides, which could rise to 81% by 2050, and 44% face permanent submersion by 2100. NWD faces relatively lower risks, but it is still substantial as 37% of its assets are at risk today from unlucky storm tides, rising to 51% by 2050, and 32% face permanent submersion. For HLD, 47% of its 190+ assets can be hit today & 68% by 2050; CKAH can see 40% of its 270+ assets hit today & 62% by 2050.
- **Material gaps in stress test results = NWD, SHKP & HLD are not on top of coastal threats = must improve quality of stress testing.** The material differences between the risks identified by these 3 listco's and our own stress tests signal that they are likely not on top of their true exposure to coastal threats:
 - **NWD says it has "insignificant risk" from storm surge & SLR in HK & "minor risk" in the Mainland.** NWD only identified moderate to extreme risk from tropical cyclones (from wind & rainfall) in HK & at a minor level in the Mainland but sees no storm surge & SLR risk in HK & only at a minor level in the Mainland. **This differs greatly from CWR's analyses which show material risk.**
 - **SHKP says it has no risk from storm surge/SLR for HK & Mainland properties.** But, it did identify typhoon risk (from wind & rainfall) as low-medium risk in HK & no-low risk in the Mainland. However, **CWR's analyses shows it as the highest risk of the HSPDMI 4 – this is likely as we analysed 200+ properties compared to SHKP which only analysed 8 = SHKP must widen stress testing.**
 - **While HLD stress tested for "coastal flooding (acute)", it did not stress test for chronic risks e.g. SLR.** HLD assigned the highest risk for "coastal flooding" for HK & Mainland properties but did not explicitly mention stress testing for storm surges, although implied. CWR's stress test for storm tides also showed significant risks for HLD. But HLD didn't perform any stress tests for chronic risks – **since SLR could permanently submerge more than a third of HLD's 190+ buildings by 2100, we recommend HLD to start stress testing for SLR now.**

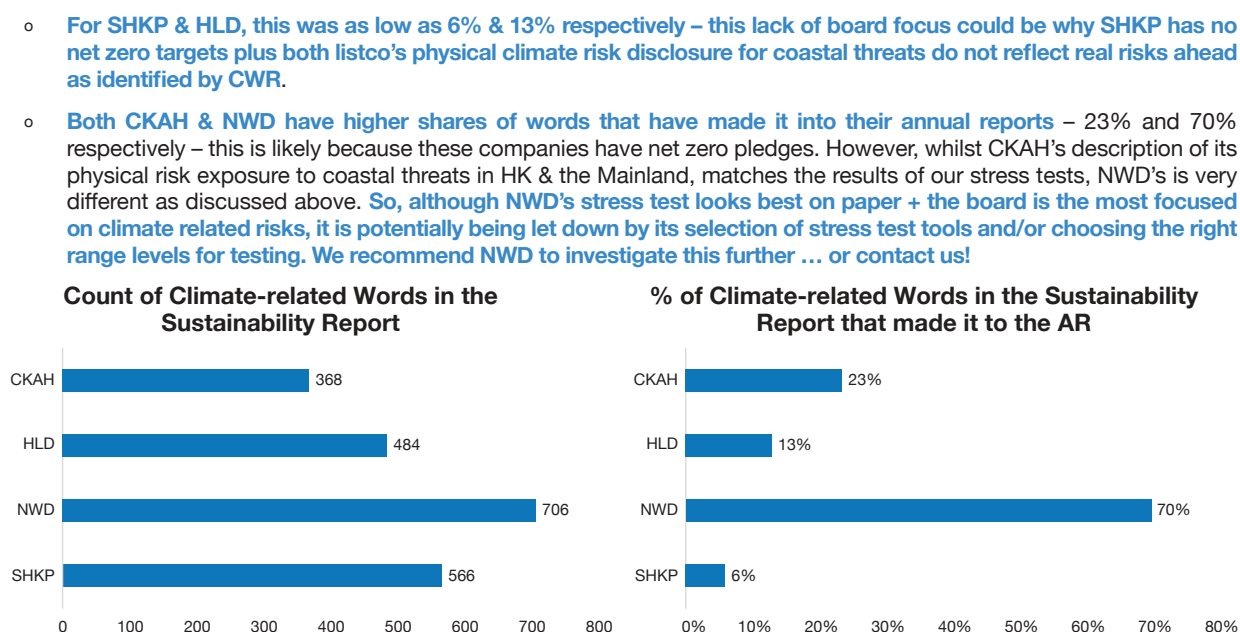
3. **We were surprised to see a high % of properties under development at risk.** We expected that properties under development would face much lower risks than existing properties as these should have gone through robust risk analyses before proceeding. However, this does not seem to be the case as can be seen from the charts below, which shows a surprisingly high percentage of properties under development at risk from storm tides today of 23-52%. This rises to 55-76% from storm tides & SLR by 2050.



Source: CWR stress tests on HSPDMI 4 disclosed assets.

Other points to note are:

- **NWD's properties under development are more at risk than its existing portfolio for all scenarios.** Despite high shares of properties under development at risk, CKAH, HLD and SHKP's properties under development are less vulnerable than their existing portfolio to storm tides today and storm tides + SLR by 2050. NWD however, is showing the opposite trend and more aggressively so by 2050 – 42% of properties under development are at risk today compared to 36% of its existing portfolio, the gap is worse at 76% for properties under development vs. 47% for its existing portfolio by 2050. This is clearly worrying especially when NWD's board seems to be more engaged on climate risks than the rest of the HSPDMI 4. More on board focus below.
 - **CKAH, HLD and SHKP are likely considering near term rather than medium term coastal threats for properties under development.** All 3 listco's properties under development face lower risks than existing properties especially CKAH and HLD for storm tide risks today – risks are half that for CKAH with 23% of under development properties at risk vs 41% of existing portfolio. This could indicate that they're taking into consideration near term coastal threats prior to starting these new developments. However, gaps close between the existing portfolio and those under development by 2050. This could signal that medium term coastal risks are less factored in.
 - **Interestingly, 18% of SHKP's properties under development face permanent submersion from SLR by 2050** – all the more reason to expand its stress testing sample size. For more see the SHKP factsheet.
4. **HSPDMI 4 vs. CWR gaps likely due to lack of board focus on climate risks = must up board engagement given the magnitude of their exposure to escalating physical climate risks.** We conducted simple word count analyses of climate-related words such as climate change, carbon, emissions, transition, water, resilience, sea level rise, typhoon, storm surge, adaptation and so on for the HSPDMI 4's latest annual reports and their sustainability reports. Despite hundreds of climate-related words (368-706) in the sustainability reports as shown in the chart below left, only a small share of such words made it to the annual report as per the chart below right:



Note: The above charts are a count of climate-related words including: sea level rise, typhoon, storm surge, adaptation, flood, drought, storm, extreme weather, climate change, carbon, emissions, transition, resilience & water.

Source: Latest Company Annual Reports and Sustainability Reports.

CWR stress test methodology: SLR & storm tide...

- **To see if the HSPDMI 4 have a proper grasp of the magnitude of risks ahead and if the physical risks they are disclosing are realistic, we performed stress tests for 900+ properties** which are existing as well as in development in both HK & the Mainland. We felt this was important because 1) global warming is accelerating – this has resulted in higher & sooner SLR across the world and regionally, and we have seen a rise in major typhoon/storm frequency & intensity; and 2) there is a lack of tools that stress test right for SLR.
- **CWR stress test parameters:**
 - **Timelines:** Impact today, by 2050 and 2100.
 - **Scenarios:** To determine exposure, we carried out stress tests for the 3°C “current policies” scenario as recommended by the Network for Greening the Financial System (NGFS).
 - **Risks assessed:** We carried out stress tests for the following 3 risks; company and/or government adaptation measures and coastal defences were not included at this stage:
 - 1) **Impact by storm tide today** – to determine the storm tide levels 1 & 2 we used for the stress tests, we used local storm surge levels of past typhoons in HK & the Mainland and adjusted these with the corresponding local astronomical high tides. Note that these ranges differ for HK & the Mainland as impacts and tides are not the same for the different locations. For HK, we used levels based on storm surges recorded in Quarry Bay & Tai Po Kau from Super Typhoon Mangkhut (2018). For the Mainland, the range was based on storm surge levels in the GBA (Guangdong & Macao), Yangtze Delta (Shanghai & Hangzhou), and Bohai Sea (Tianjin) from Super Typhoon Hato (2017), Super Typhoon Mangkhut (2018), Super Typhoon Lekima (2019), and Typhoon Bebinca (2024);
 - 2) **Impact by storm tide & SLR by 2050** – regionally, storm surges are much higher such as 5m for Typhoon Goni which ravaged neighbouring Philippines in 2020. We used this as benchmark for future storm tides for HK and the Mainland after adjusting for corresponding local astronomical high tides. While we used past typhoons to determine storm tide levels, for SLR we used the high end of the 2050 impacts under the IPCC AR6’s “cannot be ruled out” scenario – this ranges from 0.67-0.7m for HK & the Mainland. We do not believe this is too high as the 2024 State of the Cryosphere Report notes that we could potentially see 1m of SLR by 2070 if current emissions continue. Besides, observed ice losses today from the Greenland Ice Sheet are already tracking IPCC AR6’s worst-case projections; and
 - 3) **Permanent submersion by SLR by 2100** – the high-end of the range of IPCC AR6’s “cannot be ruled out” levels of SLR by 2100 were used. Indeed, we are likely tracking this scenario as a 2024 Singapore study now says 1.9m of SLR is possible if emissions continue. More on this on the following page **“Facing reality! The latest on what accelerated heating means for storm tides & SLR”**.
 - **Number of properties:** We stress tested ~200 properties (existing & under development) per listco in HK & the Mainland. For each of the HSPDMI 4, we used property locations disclosed in its latest annual report & company website. For some of the properties under development, we had to do extra research to locate their coordinates, but some could not be mapped due to limited information on its exact location. It’s worth noting here that we did not assess the vulnerability of agricultural land banks which make up a large chunk of some of the listco’s land banks. For Mainland properties, only coastal properties were assessed.
 - **Mapping granularity:** For HK we used the 5m-grid HK DTM from the Lands Department of Hong Kong. For the Mainland we used the 30m grid NASA’s SRTM. Local tides were adjusted accordingly depending on maps used.
 - **Flooding method:** This analysis used the bathtub flooding methodology to identify assets that are lower than the stress test levels that would be flooded. The main idea behind the bathtub flooding method is that an area which lies under a certain height gets flooded like water overflowing from a bathtub without considering hydrological connectivity criteria and dynamics of water motion.

Source: CWR; NGFS; HKO; various news sources: IPCC AR6 WG1 (2021); Climate Analytics; ICCI State of the Cryosphere Report 2024; Otsuka et al. (2023), Earth System Science Data; Grandey et al. (2024), Earth’s Future.

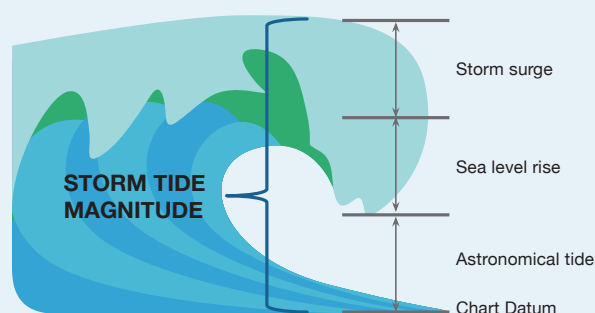


Why we used storm tides in this stress test...

Storm surge is dependent on the angle of the storm, but the severity of impacts depends on the time of arrival of the storm – at high tide or low tide. Arriving at high tide will bring higher storm tides than arriving at low tide. So, when projecting the impacts of storm surge, it is the storm tide that must be estimated. As shown in the graphic, the storm tide can be estimated by adding the astronomical tide at the time of the storm, sea level rise projections as well as the storm surge estimate of the storm to chart datum. Here, the chart datum is the base water level to which tide heights are referenced.



CWR | WHAT IS STORM TIDE?



Source: The above is extracted from “Changing Risk Landscapes: Coastal Threats to Central Banks”, CWR 2020.

Facing reality! What accelerated heating means for storm tides & SLR...

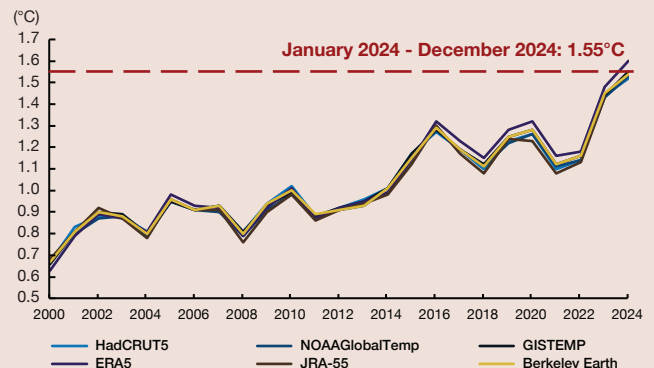


We breached 1.5°C of global heating in 2024.

Last year was the hottest year ever. Alarm bells had started ringing when monthly warming breached 1.5°C in January 2024 but with persistent warming throughout the year, we ended up with annual warming of 1.55°C for 2024. As water is how we mostly feel climate change, we saw an escalation of water risks – from the widely covered devastating floods in Spain to the less covered fast melting of polar & mountain ice which have resulted in fast rising seas and freshwater resource losses.

Although we will head back into a “cooler” La Niña period (when the world is on average cooler than it should be), it is worth noting in the last La Niña, we still had many temperature peaks.

2000-2024
Global Warming Levels Since Pre-Industrial Period



Source: CWR, The Meteorological Office (Met Office), Copernicus.



Storm tides are getting more frequent & just a little bit of SLR has made impacts more expensive!

A 2023 study showed that SLR is leading to coastal floods becoming more frequent than in the past, with floods occurring multiple times per year globally. According to the study's estimate, HK will experience over 350 days of 'minor' flood at 1m of SLR, and approximately 70 days of 'major' flood every year. This could cause unimaginable economic damages as the intensity of typhoons is also increasing. Worse still, SLR will exacerbate these floodings. For example, Hurricane Sandy hit the US east coast in 2012 causing over US\$60bn of economic damage. It is estimated that US\$8.1bn of Sandy's damages was solely due to ~10cm SLR from human-caused climate change, and that the higher sea levels of just ~10cm allowed the floodwater to affect 71,000 additional people. Global mean sea levels have already risen by 20cm according to the IPCC AR6 between 1901 & 2018 but if we are unable to rein in emissions, ice scientists warn that we could potentially see 1m of SLR by 2070 and 1.9m by 2100.



Emissions are still going up! The UN says meeting current climate policies only gets us to 3.1°C so 3°C by 2100 is technically the base case, NOT worst-case scenario. Global GHG emissions increased 1.3% from 2022 to 2023 to reach 57.1GtCO₂e according to the UN's "Emissions Gap Report 2024". The UN report notes that current policies track a 3.1°C path, while delivering on all unconditional & conditional pledges by 2030 will only lower this estimate to 2.6°C. Sadly, the report continues to note that key countries are not on track to meet their pledges. With wars continuing to escalate plus tense global geopolitics expected to persist, the current base case we are tracking is the IPCC's SSP3-7.0 "Regional Rivalry Scenario – A Rocky Road" (SSP3). Under SSP3, the best estimate for warming by 2081-2100 is 3.6°C. Not surprisingly, in a survey by The Guardian in 2024, 80% of respondents surveyed (all IPCC scientists) foresee at least 2.5°C of global heating while almost half anticipate at least 3°C. Actual emissions are still rising and **actual y-o-y growth in CO₂ levels indicates that we are tracking SSP5-8.5.**

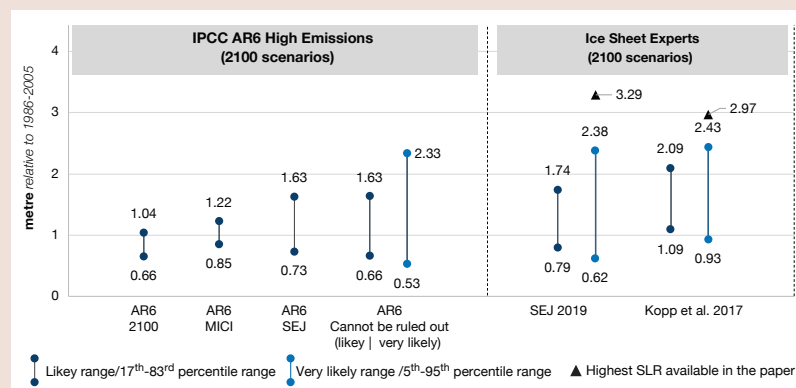


Under SSP5, or the current warming path, the upper end of IPCC's SLR projections range from 1.04m to 2-3m by 2100; but rapid ice melt could point to 3m+ by 2100. The IPCC AR6 released in 2021 noted that "Approaching 2-5m by 2100 and 2150 cannot be ruled out due to deep uncertainty in ice sheet processes". Even then, ice sheet experts warned of multi-metre SLR as per the chart below. Unfortunately, rapid ice losses observed today are running ahead of earlier projections plus new research shows that **Antarctica is warming with 20-50% more intensity than estimates from climate models in the IPCC AR6. Also, Greenland Ice Sheet losses are already tracking worst-case projections from the IPCC AR6. Indeed, a growing body of scientific research shows that IPCC AR6 may have significantly underestimated ice losses & projected SLR.** Given this, it pays to face reality & adjust levels for stress testing/adaptation planning to the "real base case" of multi-metre SLR by 2100.

Source: CWR; WMO; The Meteorological Office (Met Office); Copernicus; Hague et al (2023), Earth's Future; Strauss et al (2021), Nature Communications; IPCC AR6 WG1 (2021); ICCI State of the Cryosphere Report 2024; UN Emissions Gap Report 2024; The Guardian "World's top climate scientists expect global heating to blast past 1.5°C target" (8 May 2024); Otsuka et al. (2023), Earth System Science Data.



THE REAL BASE CASE – SLR PROJECTIONS AT THE CURRENT WARMING PATH



Source: CWR; IPCC AR6 WG1 (2021); Bamber et al. (2019) "Ice sheet contributions to future sea-level rise from structured expert judgement", PNAS; Kopp et al. (2017) "Evolving Understanding of Antarctic Ice-Sheet Physics and Ambiguity in Probabilistic Sea-Level Projections", Earth's Future; Infographic © China Water Risk 2024, all rights reserved.

Current policies path of 3°C = rapid SLR in ~30years' time & 3m by 2100...



DeConto et al. (2021)

"The Paris Climate Agreement and future sea-level rise from Antarctica", Nature.

"...scenarios more consistent with current policies (allowing 3°C of warming) give an abrupt jump in the pace of Antarctic ice loss after around 2060..."



International Cryosphere Climate Initiative

"State of the Cryosphere 2023 – Two Degrees Is Too High"

"Once 3°C is passed, ice loss from Greenland & West Antarctica may become extremely rapid. Together with extensive ice loss from parts of East Antarctica..."

...3m might be passed early in the 2100s, wiping out entire low lying nations and coastlines..."

Adaptation lags own identified risk, let alone rising risks identified by CWR...

1. **Adaptation disclosed do not match risk identified by companies, let alone from CWR's stress tests.** Robust adaptation actions can reduce risks and ensure long term resilience but as the table below shows, none of the HSPDMI 4 provide detailed adaptation plans. The following are interesting points of note:

- **HLD, NWD & SHKP – all say that they are protecting properties they have identified as at-risk, but as noted previously none of their stress test results matched CWR's = many vulnerable assets may not be protected.** While HLD & SHKP do mention some adaptation infrastructure for high risk properties, the lack of chronic risks stress testing for HLD and sample size issues for SHKP will likely leave these companies blind to future coastal threats. Note that just a little SLR can result in massive additional damages – US\$8.1bn of Sandy's damages was solely due to just ~10cm SLR!⁹ NWD has better plans in place with a target to have climate adaptation & resilience plans for all relevant assets by 2030 but again due to its poor assessment quality this may leave many assets at risk.
- **CKAH – despite 1) high risks identified by CKAH for storm surge & SLR; and 2) the Chairman's Statement in the sustainability report stating that "accelerated action and adaptation" is needed – CKAH provides no details on adaptation plans.**

The HSPDMI 4 must step up respective adaptation plans as well as disclose more details/case studies.

Overview of HSPDMI 4's adaptation plans

CKAH	HLD	NWD	SHKP
• CKAH acknowledges that adaptation is important in its sustainability report. • However, despite the clear impacts identified in its risk assessment it doesn't disclose adaptation measures.	• No detailed adaptation plan was disclosed. • But HLD states that for properties identified as high risk, different precautions are being taken such as installing flood protection infrastructures & putting in place emergency response plans. • However, it's unclear whether these measures are sufficient for RCP8.5 climate impacts.	• Assets identified as having inherent risks from its stress tests were further assessed. HK has the greatest number of "most vulnerable" assets – adaptation measures have been prioritised for these. • However, it's unclear whether these measures are sufficient for RCP8.5 climate impacts. • NWD aims to have climate adaptation & resilience plans set for all relevant assets by 2030.	• Within managed buildings, SHKP has installed infrastructure such as floodgates, flood sensors and submersible pumps in properties located in lowlying and flood-prone areas. • However, it is unclear whether these measures are sufficient for RCP8.5 climate impacts. Examples of extreme heat related adaptation measures were outlined as it has been identified as a risk.

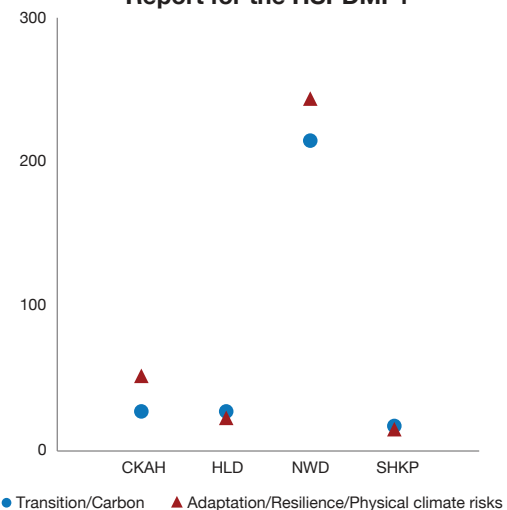
Source: CWR, Company Annual Reports and Sustainability Reports.

2. **Under preparedness for escalating physical risks appears not to be due to a lack of board focus = more worrying.** We expected that a lack of board focus on adaptation was what was leading to a lack of detailed adaptation plans. However, when we looked at the ratio of words in the AR related to transition/carbon vs. adaptation/resilience/physical climate risks we found:

- A similar or higher number of adaptation/resilience/physical climate risks related words in all the HSPDMI 4's annual reports compared to transition/carbon related words as shown in the chart on the right. This surprised us.
- Even more surprising was NWD – it's the only company to mention its stress test in its annual report, but its stress test results do not match CWR's.

These are worrying signs, and we recommend the boards of the HSPDMI 4 to better coordinate their adaptation efforts to protect their vulnerable assets. Otherwise, the lack of adaptation planning and their significant risk exposure could warrant material valuation adjustments – for more please see **"No-sense climate strategies = higher premiums & valuation write-downs"**.

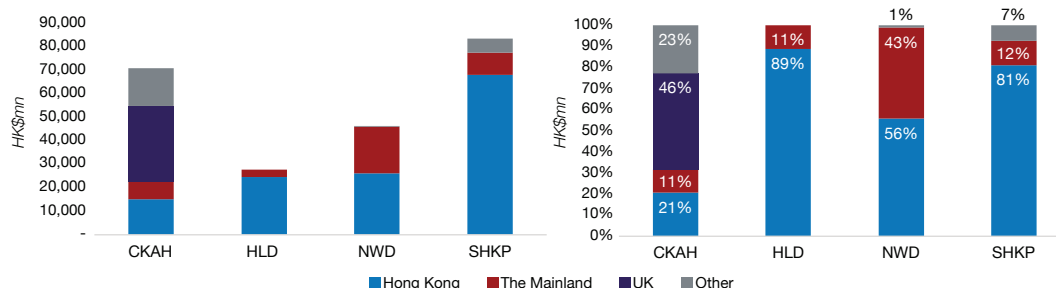
Transition vs. Adaptation in the Annual Report for the HSPDMI 4



Source: CWR, Latest Company Annual Reports.

3. **HSPDMI 4 cannot adapt without the HKSAR government.** The HSPDMI 4 derive significant revenue from HK – the charts below show that other than CKAH, the other three listco's generate the majority of revenue from HK ranging from 56-89%. This concentration of revenue in HK means that what the HKSAR government does or does not do on adaptation will have material financial impact on the HSPDMI 4 as there's only so much the listco's will be able to achieve alone – even if their properties are adapted, the roads and railways around them might still be at risk leaving their properties stranded. The HSPDMI 4 must therefore engage, collaborate and coordinate with the government to improve on its adaptation plans. There is good news on this front – **the Real Estate Developers Association (REDA) of which the HSPDMI 4 are members of & The Hong Kong Federation of Insurers (HKFI) are taking proactive action to engage the government on adaptation.** For more on this and what HKSAR government is or is not doing on adaptation please see **“HKSAR government adaptation efforts disclosed so far leave HK assets at risk”**.

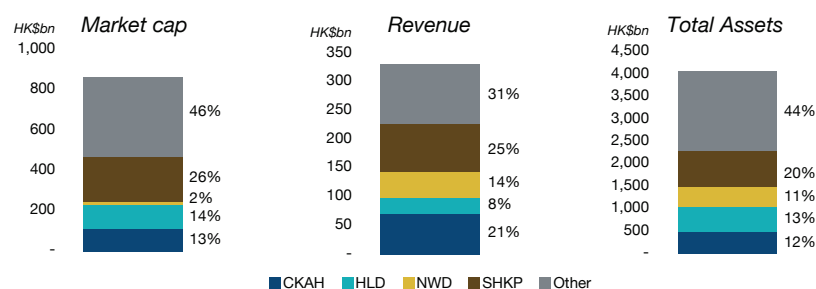
HSPDMI 4 Revenues by Location: Hong Kong = Material %



Source: CWR, Latest Company Annual Reports.

4. **Conversely the HKSAR government cannot adapt without the HSPDMI 4.** The real estate sector is important to the HKSAR. According to the 2022 CWR **“Futureproofing HK Revenues”** factsheet, 38% of HKSAR revenues are derived from land premiums and property taxes & rates, with a further 23% of HKSAR revenues collected from corporates of which many are real estate companies such as the HSPDMI 4. As per the charts below it is clear that the HSPDMI 4 makes up a significant part of the SAR's real estate sector – they are 54% of market cap, 69% of revenue and 56% of total asset value of the 13 HK Ordinary share type “Properties & Construction” companies across the different Hang Seng property indices. It is thus imperative for the government to engage and collaborate with these listco's to ensure that they are resilient. Moreover, the HKSAR government should not foot the entire bill for both decarbonisation and adaptation for HK alone. The real estate sector is a significant part of the HKSAR's economy, so without the sector the government would struggle to act on climate change.

HSPDMI 4 = >50% of Market Cap, Revenue and Total Asset Value of the 13 HK Ordinary Share Type “Properties & Construction” Companies on the Hang Seng Prop Indices



Source: CWR, Latest Company Annual Reports, Yahoo Finance.



Real Estate Developers Association (REDA) & The Hong Kong Federation of Insurers (HKFI) are taking action to engage the government on adaptation. They are currently requesting increased transparency from the HK government regarding its strategy to address SLR risks. They are also inquiring about the existence of contingency plans to address the “cannot be ruled out” scenario.

Various seminars have been arranged – in the last seminar, the CEO of Hongkong Land represented REDA in asking the government for more transparency. In his presentation, he showed a map of the central financial district flooded under the IPCC AR6's “cannot be ruled out” scenario demonstrating understanding of the real risks ahead. Other HK listed property companies like Link REIT have also stress tested for 8m storm tides and “low-regret” scenarios, which account for multi-metre SLR. CWR performed these coastal threat assessments for Link REIT published in its 2021/2022 Annual Report; this assessment is featured as a case study in **“APREA ESG Guidebook for Real Assets in Asia Pacific”** published in 2022.

HKSAR government adaptation efforts disclosed so far leave HK assets at risk...



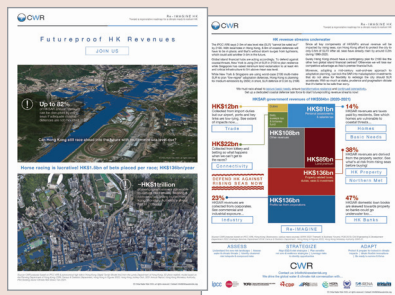
The HSPDMI 4 face a double whammy hit: high physical climate risks + there are no city-wide adaptation plans for higher & sooner SLR in HK. The HSPDMI 4 can only do so much to protect their properties, the HKSAR government needs to take action to ensure infrastructure resiliency. In 2022, we stress tested 195,000+ assets in Hong Kong and summarised our findings in the factsheet series below, which clearly highlights how coastal threats pose existential risks to the HKSAR's revenues; commercial, residential & industrial properties; trade infrastructure; transportation; food, water & energy security plus more. Yet, as the bullets below show, the government is currently slow to act on adaptation, leaving the SAR and the real estate sector at risk.



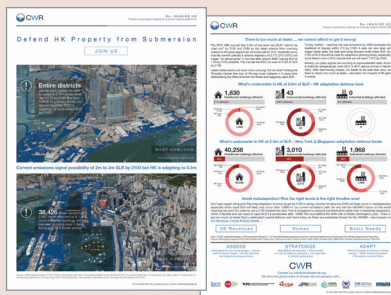
The HKSAR government is only using SSP2-4.5 to plan adaptation; worse still they are using the median of the projection ranges rather than the upper end = they are protecting HK against 0.2m of SLR by mid-century and 0.47m by end of 2100. As current climate policies will bring us to 3.1°C of warming the HKSAR government seems to be too optimistic. In fact, our current emissions point to 4-5°C so the government should be using SSP5-8.5 to plan adaptation. HK has yet to issue a standalone adaptation plan, and its adaptation efforts are currently described in HK's Climate Action Plan 2050, which was published in 2021. There has since been a growing body of scientific evidence of higher and sooner SLR but neither this nor any other official climate change related plans so far have mentioned the IPCC AR6's "cannot be ruled out" scenarios for SLR. We are not convinced that the HKSAR is prioritising adaptation for fast rising seas as there was no mention of "adaptation" in the Chief Executive's Policy Address in October 2024 despite the UN releasing a technical brief warning of surging seas a month earlier in September. **Interestingly, only the HK International Airport has publicly stated that it has plans to adapt the airport to 2.5m of SLR by 2100.**

8-Factsheet Survival Guide for HK to Survive Rising Seas

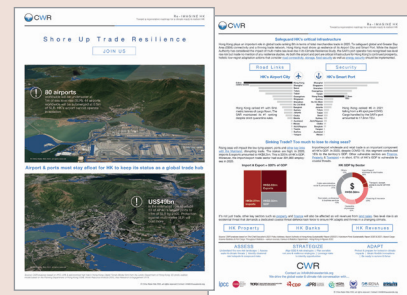
Futureproof HK Revenues



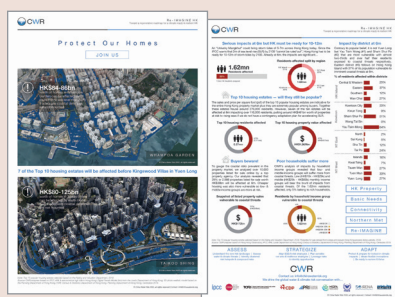
Defend HK Property from Submersion



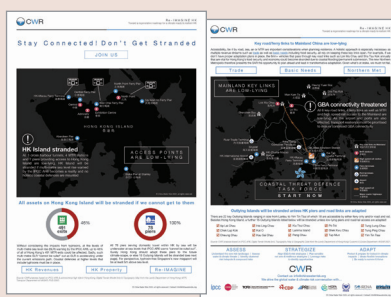
Shore Up Trade Resilience



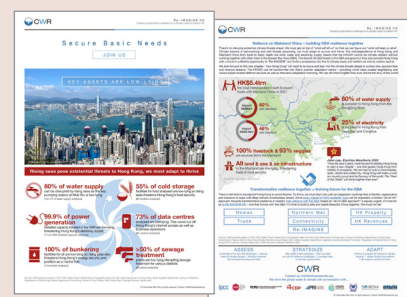
Protect Our Homes



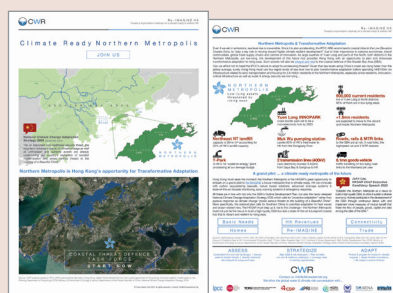
Stay Connected! Don't Get Stranded



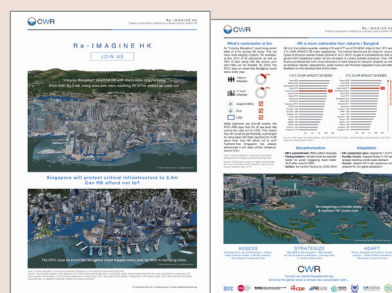
Secure Basic Needs



Climate Ready Northern Metropolis



Re-IMAGINE HK



Transformative adaptation: 4 tips summarised from the IPCC AR6...

The IPCC AR6 WG2 **“Climate Change 2022: Impacts, Adaptation and Vulnerability”** report provides adaptation guidance – we have summarised this information into 4 tips below:

- 1. Fragmented action will not protect against complex cascading risks ahead.** Some good news first: growing public and political awareness of climate impacts and risks means that 170 countries and many cities have included adaptation in their climate policies and planning processes. But the bad news is that the AR6 WG2 finds that *“Most observed adaptation is fragmented, small in scale, incremental, sector-specific, designed to respond to current impacts or near term risks, and focused more on planning rather than implementation”*. To tackle escalating risks, visionary adaptation responses will have to be *“comprehensive, effective, and innovative”* requiring an *“all-together”* / city-wide approach towards resilience that includes ensuring water & food supply, low/no carbon power generation, sufficient financing as well as economic and social stability. To deliver this, there needs to be transformative change across systems from government, business to finance as they were all designed to tackle the “old climate”. Each of these challenges are daunting on their own; together they are monumental, but we have to start somewhere.
- 2. Maladaptation limits transformation & future solutions.** The IPCC AR6 WG2 report devotes a substantial amount of its Summary to Policymakers (SPM) to maladaptation and its pitfalls highlighting the problem of ignoring long-term impacts and adaptation commitments. The report summarises it well, *“Actions that focus on sectors and risks in isolation and on short-term gains often lead to maladaptation if long-term impacts of the adaptation option and long-term adaptation commitment are not taken into account”*. Maladaptation is highly possible due to the short-sightedness of governments, finance and corporates. The right timelines are key when assessing risks and planning adaptation. Multiple stakeholders (business, finance and governments) will likely assess risks in the near-term and plan adaptation accordingly instead of analysing the risks in the medium and long term. Such actions could lead to a massive undervaluation of risks. Clearly, if we only assess risks and plan adaptation for the near term, adaptation actions will only be incremental and will not be able to withstand escalating risks. **If we were planning for 2m-5m of SLR in the long term, we'll be bolder and more transformative with our adaptation actions than for 0.4-1m of SLR.** Short term planning could lock us into an adaptation path that would be difficult to deviate from due to the millions of dollars already invested leading to maladaptation. We cannot “undo” drainage/levees/sea walls that are not enough or suddenly redesign parts of a city as SLR accelerates. Short term spending on infrastructure must be part of an integrated long-term adaptive plan. Otherwise, like the IPCC cautions, we could box ourselves in if we are not careful.
- 3. Don't look to the past when planning for the future – aim for low-regret & flexible strategies.** Short-term and longterm climate risk assessments could deliver wide outcomes (like in the case of SLR), and when this happens, we tend to look to past trends for answers. But climate science is fast-evolving so we must resist the pull of the past. Given that we have underestimated impacts in the past, we could well underestimate them again in the future especially due to “deep uncertainty” ahead in dynamic ice processes. The IPCC AR6 accounted for such ice uncertainties by providing a *“low-confidence high emissions”* scenario and using language like *“cannot be ruled out”*. However, since the publication of the report on impacts, adaptation & vulnerability in 2022, we have seen year-on-year publication of more evidence/observations & scientific research papers that indicate accelerated ice melt and higher & sooner rising seas. **For example, ~1m of SLR used to be the worstcase scenario under RCP8.5 by 2100 but now the 2024 State of the Cryosphere Report published in November warned that 1m of SLR is now long-term inevitable by the mid-2100s regardless of scenarios and that we could potentially see these levels by 2070 on our current emissions path.** Here, the level of adaptation will depend on how much is at risk. If there is concentrated risk, to avoid human misery ahead, it is better to err on the side of caution and opt for low-regret scenarios when planning adaptation. Because of fast-evolving science, these adaptation strategies must be flexible – accelerating implementation as and when impacts escalate or when we have gathered better science to inform better decisions. They must be monitored, reviewed and updated constantly to remain adequate and up to date.
- 4. There are hard limits to adaptation – we won't be able to fix everything!** The IPCC is clear – we caused this, but we may not be able to fix it *“Climate change, through hazards, exposure and vulnerability generates impacts and risks that can surpass limits to adaptation and result in losses and damages”*. The AR6 identifies two types of limits to adaptation:
 - **Soft adaptation limits:** Adaptation options may exist but are currently not available due to a range of constraints – primarily financial/poverty, governance/inequity, institutional and policy constraints or technical.
 - **Hard adaptation limits:** No adaptive actions are possible to avoid intolerable risks – ecosystems that are already reaching or surpassing hard adaptation limits include some warm water coral reefs, some coastal wetlands, some rainforests, and some polar and mountain ecosystems.

While stepping up finance and moving from incremental to transformational adaptation can help overcome soft adaptation limits, sadly, many natural systems are already near the hard limits of their natural adaptation capacity. And further warming only means that more systems will reach their limits. **Here, the AR6 WG2 is very clear – it explicitly warns that overshooting 1.5°C will be disastrous as we will not be able to reverse impacts – especially pertaining to SLR, which is irreversible.** The AR6 WG2 is also very clear that we will not be able to protect everything – *“Adaptation does not prevent all losses and damages, even with effective adaptation and before reaching soft and hard limits”*. Ultimately, we may have to abandon locations that are undefendable or beyond the hard limits; we will have to put in *“advance and planned relocation”* strategies that are implemented over time so as to cause minimal disruptions to lives and livelihoods.

Source: CWR (2022) Futureproofing APAC Banks & Savings: Stress Test Right Today, Avoid Hard Landing from Rising Seas; IPCC (2022) Climate Change 2022: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Sixth Assessment Report of the International Panel on Climate Change.

Recommendations for listco's, finance & regulators to ensure resilience...

HSPDMI 4 listco's

- ✓ **Put in place credible net zero targets & transition plans to cut emissions including Scope 3 emissions + improve disclosure.** Net zero plans including near term interim targets should be validated by SBTi. Also, we should see actual emission cuts, not just emission or energy intensity targets improvements. Setting quantifiable material interim & 2050 clean energy targets are also key as the HSPDMI 4 have abysmally low renewable shares. More detailed carbon emissions disclosure especially for Scope 3 methodology are also welcome.
- ✓ **Perform realistic stress tests for coastal threats** by using longer timelines + cover more assets + analyse a range of acute & chronic risks. Given fast rising seas, SLR must be assessed as even 10cm can amplify damage costs. We recommend the use of different tools for different risks as no one-size fits all solution exists yet. But as current tools may not stress test right for SLR due to fast evolving science, we recommend listco's perform their own SLR stress tests – see more in **“Facing reality! What accelerated heating means for storm tides & SLR”**.
- ✓ **Draw up transformative adaptation plans.** Adaptation plans must be long term & flexible to cope with fast evolving risks. Such transformative adaptation plans for all at-risk assets should be disclosed in more detail. Case studies can also be communicated to satisfy investors, insurers & other stakeholders that vulnerable assets are protected – see tips in **“Transformative adaptation: 4 tips summarised from the IPCC AR6”**.
- ✓ **Engage & collaborate with the government on city-wide adaptation plans.** The HSPDMI 4 derive material shares of revenues from HK & have significant assets at risk in the SAR. Given the lacklustre adaptation action so far from the HKSAR government on long term multi-metre SLR adaptation, the listco's should take more proactive stances to drive REDA's engagement with the HKSAR government on city-wide adaptation – see more in **“HKSAR government adaptation efforts disclosed so far leave HK assets at risk”**.

Financial institutions (FIs) – from investors, insurers to lenders

- ✓ **Engage listco's on their climate pledges & encourage them to have credible net zero targets.** FIs can have robust conversations with the companies to encourage them to fast track their transition. They can also encourage developers to up their Scope 3 disclosure & action to address embodied carbon. While for a different sector, the following may be a useful checklist of questions – see the **“Engagement checklist for investors & lenders to gauge ICT transition risks + opportunities”** in CWR's 2023 report on **“China ICT transition”**.
- ✓ **Push for better quality in stress testing & disclosure.** Until listco's carry out full stress tests and disclose what they stress tested and the results, FIs will have to carry out their own stress tests to gauge exposure/ investment/ lending risks. As this is not always realistic given the size of portfolios, FIs should engage companies to stress test right & disclose methodologies & results.
- ✓ **Engage listco's on their adaptation plans for vulnerable assets.** It is difficult to glean from the HSPDMI 4's adaptation disclosure if they have adequately protected vulnerable assets. FIs, particularly insurers, should not just gauge if listco's have a good grasp of the risks ahead but also engage on adaptation action taken to address such risks. Effective adaptation should help reduce insurance premiums & avoid valuation write downs.
- ✓ **Engage governments on their city-wide adaptation plans.** Like listco's, FIs should start engaging governments where they have significant funds at risk. FIs can push governments to disclose their adaptation plans and encourage them to draw up long term city-wide adaptation plans for the “cannot be ruled out” scenario. Whether or not governments have adequate long term plans in place to protect against escalating risks including fast rising seas will inform future capital allocation. For more on how government action can help avoid systemic shocks in finance, see CWR's 2022 report **“Futureproofing APAC Banks & Savings – Stress Test Right Today”**.

Regulators & government

- ✓ **Regulators must ensure proper assessment & disclosure of risks for benchmarking.** The IFRS International Sustainability Standards Board (ISSB) disclosure standards will help benchmark transition and physical risks. However, as this report shows standards of physical risks are misleading plus benchmarking is difficult due to different methodologies. As investors will rely on these, physical stress test results should reflect real risks ahead. Regulators should thus help standardise stress testing procedures to ensure comparable and credible disclosure before the standards become mandatory.
- ✓ **Financial regulators should engage government departments on adaptation.** The HKMA pilot climate stress test in 2021 showed material risks to bank mortgage loan books from typhoon & flood risks. As such risks could be alleviated by transformative adaptation action by the government, financial regulators should engage governments on their adaptation plans especially for chronic risks like fast rising seas.
- ✓ **Governments must have transformative adaptation plans in place + be flexible.** Given accelerating physical climate risks, the past is no longer a good predictor of what the future holds. To cope with escalating risks adaptation plans should thus incorporate low regret scenarios for maximum flexibility, plus limits of adaptation should be understood. It is imperative for governments to draw up long term city-wide adaptation plans that are transformative, not fragmented as this helps avoid maladaptation + ensure economic & social resilience.
- ✓ **Governments must keep the public informed of real risks ahead + updated adaptation plans/pilots.** The public should not be kept in the dark about future risks – instead the government should be upfront about such and disclose its adaptation plans. This will reassure all stakeholders that the economy & society are protected even for multi-metre SLR levels, which the IPCC warns “cannot be ruled out”. This will provide confidence that the city is prepared for the worst-case scenario. However, **as the government should not foot the entire bill, it should collaborate with the private sector to find adaptation solutions that benefit multiple stakeholders.**

CK ASSET HOLDINGS

Bloomberg: 1113:HK

Market Cap: HK\$114bn
(6th December 2024)Revenue: HK\$71bn
(Group revenue & share of revenue of joint ventures 2023)

CKAH transition & adaptation climate strategies are not aligned: Despite net zero pledges emissions are still rising + its stress test shows significant risks, yet adaptation plans not disclosed. CKAH aims for a fall of 99.6% of Scope 1+2+3 by 2050 at group level (submitted for SBTi approval) with its subsidiary Greene King (1/3rd revenue) aiming for net zero by 2040 (submitted for SBTi approval). Greene King also started to procure 100% RE in Dec 2023. Despite ambitious targets, emissions & intensity have risen recently. CKAH's own stress tests show significant risks by 2050 from storm surge & SLR in HK; CWR's stress tests confirm this – see below & next page. However, CKAH has not disclosed adaptation plans; it has only said it's important. The low mention of physical risks in its AR also reflects the board prioritising decarbonisation over adaptation.

We recommend CKAH to reduce emissions, disclose how it will achieve its carbon target & expand Scope 3 disclosure from 4 of 15 categories (lowest of HSPDMI 4). It should also stress test using longer timelines so that it can make informed adaptation plans, plus avoid maladaptation & misinformed investment decisions. Then it can establish adequate adaptation strategies; if not, this may warrant a valuation reduction for tail risks given the 31% exposure to SLR by 2100 on the current emissions path.

- **Transition pledge & emissions:** By 2050 CKAH aims to reduce 99.6% of Scope 1+2+3 GHG emissions with a 46.8% reduction by 2030 – seeking SBTi validation. Greene King, a major subsidiary (accounts for 1/3rd of revenue), aims to reach net zero by 2040 & a 50% reduction for all Scopes by 2030 – submitted for SBTi approval & received validation for near-term targets. In addition, Greene King has also started to procure 100% RE as of Dec 2023. However, despite these targets and achievements actual emissions & emissions intensity have risen over the past few years & CKAH only discloses Scope 3 for four categories – see following pages.
- **CKAH stress test & what's at risk:** CKAH conducted a physical climate risk assessment for 2030 & 2050 for two scenarios, 1.5-2°C & 3°C+ of warming by 2100, for four chronic risks & five acute risks, for key locations (HK, Shanghai, Beijing & UK). Results show HK assets face “Very High” risk by 2050 from 3 chronic risks (including SLR) & 3 acute risks (including storm surge) – for both scenarios, except SLR, which is very high risk only at 3°C+, Mainland assets face 1 chronic risk (SLR at 3°C+) & 4 acute risks (including storm surge); and UK assets face 1 chronic risk (SLR at 3°C+) and 1 acute risk.
- **CWR coastal threats stress test:** We stress tested 270+ properties in HK & Mainland for 3 timelines. 31-40% are vulnerable to storm tide today; by 2050, storm tide & SLR will impact 62%. In the long term, 31% will be permanently submerged under the IPCC's “cannot be ruled out” SLR levels of ~2.7m by 2100 – this is not farfetched as scientists now say current emissions trajectory can potentially cause 1m SLR by 2070. 95% of CKAH's land bank & 32% of revenue is generated from HK & Mainland – this is worrying as there's material exposure by region plus existing & under development assets – see next page.
- **Adaptation strategy:** Despite the clear impacts identified in its risk assessment CKAH does not mention adaptation strategies to ensure its assets remain resilient in the long term. It has however stated that adaptation is important. Currently it is not clear if existing and new builds are resilient for imminent threats.

TRANSITION PLEDGE OVERVIEW

GHG emissions: 0.6MtCO₂e (Scope 1+2+3) – lowest total emissions of the HSPDMI 4. Scope 3 reported for 4 categories only (lowest of the HSPDMI 4 analysed).

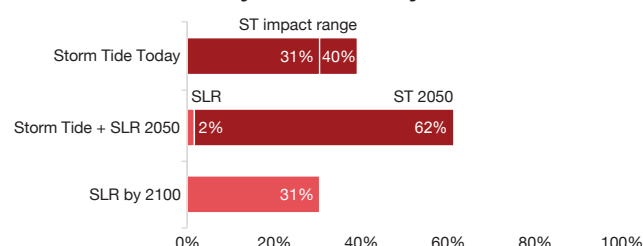
Carbon intensity: 8.43tCO₂e/HK\$m revenue – #4 (i.e. best) of the HSPDMI 4 analysed (*higher carbon intensity = more carbon for every \$ of revenue = less efficient*).

Climate pledge: 99.6% reduction in Scope 1+2 GHG emissions (2019 base year) & Scope 3 GHG emissions (2021 base year) by 2050; interim target to reduce Scope 1+2 by 46.8% & Scope 3 by 42% by 2030 – seeking SBTi validation. Greene King aims to reach net zero by 2040 & to reduce Scope 1+2+3 by 50% by 2030 – submitted for SBTi approval & received validation for near-term targets.

Clean energy target: No Group level RE targets set. However, Greene King aims to achieve 100% RE by 2030 and has started to procure 100% RE as of Dec 2023.

CWR STRESS TEST – COASTAL THREATS

HK & Mainland Storm Tide Risk Today & by 2050 + SLR by 2100

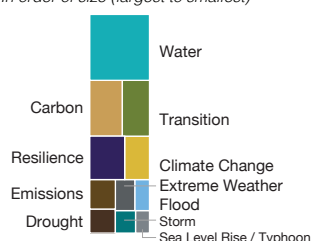


Note: CWR stress tested 270+ CKAH properties in HK & Mainland for 1) storm tide today (local storm surge levels of past typhoons in HK & Mainland + corresponding astronomical high tide); 2) storm tide & SLR by 2050 (regional storm surge levels of past typhoons in Asia e.g. Goni + corresponding astronomical high tide); and 3) local “cannot be ruled out” levels of SLR by 2100.

CLIMATE CHANGE IN THE ANNUAL/SUSTAINABILITY REPORTS

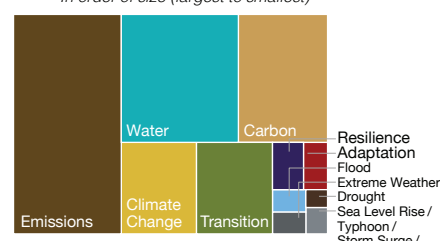
FY2023 Annual Report (86 words total)

In order of size (largest to smallest)



FY2023 Sustainability Report (368 words total)

In order of size (largest to smallest)



Note: Above chart is a count of climate-related words including: sea level rise, typhoon, storm surge, adaptation, flood, drought, storm, extreme weather, climate change, carbon, emissions, transition, resilience & water, from the FY2023 Annual report and Sustainability report.

Note 1: Financial data reflects the year 2023, which ends on December 31 2023, and so does energy, emissions, adaptation and investment data.

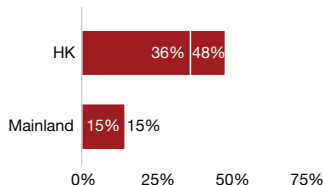
Note 2: For more information on CWR's coastal threats stress test, please see “CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4”.

Source: CWR, CK Asset Holdings Limited Annual Reports for past five years (FY2023 latest), CK Asset Holdings Limited Sustainability Report for past five years (FY2023 latest), Bloomberg.

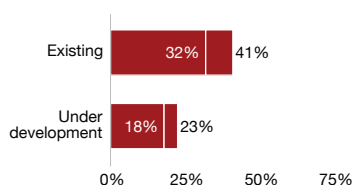
CK ASSET HOLDINGS

CWR COASTAL THREATS STRESS TEST

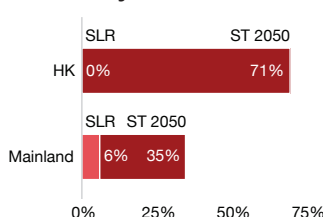
Storm Tide Risk Today by Location



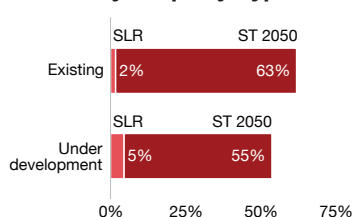
Storm Tide Risk Today by Property Type



2050 SLR & Storm Tide Risk by Location



2050 SLR & Storm Tide Risk by Property Type



Note: CWR stress tested 270+ CKAH properties in HK and Mainland for 1) storm tide today (local storm surge levels of past typhoons in HK & Mainland + corresponding astronomical high tide); and 2) storm tide & SLR by 2050 (regional storm surge levels of past typhoons in Asia e.g. Goni + corresponding astronomical high tide). HK: Mainland split = 75%:25%; Existing: Under development = 92%:8%.

CKAH STRESS TEST + ADAPTATION

CKAH does not disclose adaptation measures, which is surprising given the high risk shown in its own stress test as well as CWR's.

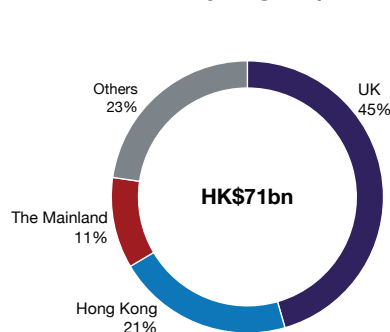
CKAH Stress Test: CKAH conducted a physical climate risk assessment for 2030 & 2050 for two scenarios, 1.5-2°C and 3°C+ of warming by 2100, for four chronic risks and five acute risks for key locations of the Group (HK, Shanghai, Beijing & UK) – number of assets stress tested not disclosed. Its analysis identified the following as having a “very high” impact on asset values by 2050:

- **HK:** 3 chronic risks (increase in temperature, rainfall & SLR) and 3 acute risks (increase in extreme heat, storm surge & extreme rain days) – risks are “very high” for both scenarios except for SLR (at 3°C+ only).
- **Mainland:** in both scenarios for 1 chronic risk (SLR at 3°C+ only) and 4 acute risks (extreme heat & rain days (at 3°C+ only), storm surge & extreme cold).
- **UK:** at 3°C+ for 1 chronic risk (SLR) and for both scenarios for 1 acute risk (extreme cold days).

CKAH Adaptation: CKAH acknowledges that adaptation is important in its sustainability report but despite the clear impacts identified in its risk assessment it doesn't disclose adaptation measures.

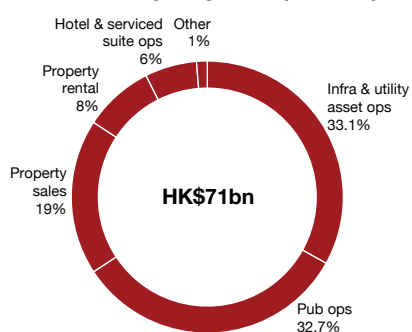
REVENUE BY REGION & SEGMENT + LAND BANK

Revenue by Region (FY2023)



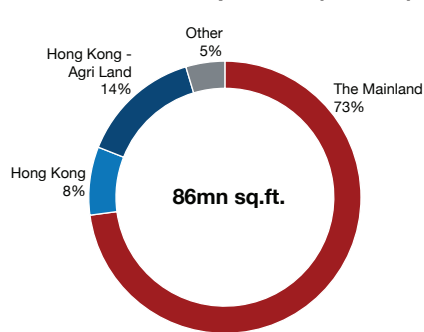
Note: Includes revenue from joint ventures.

Revenue by Segment (FY2023)



Note: Includes revenue from joint ventures.

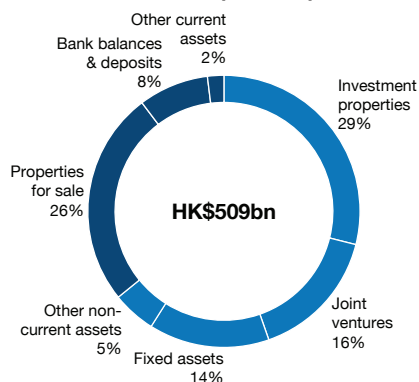
Land Bank Composition (FY2023)



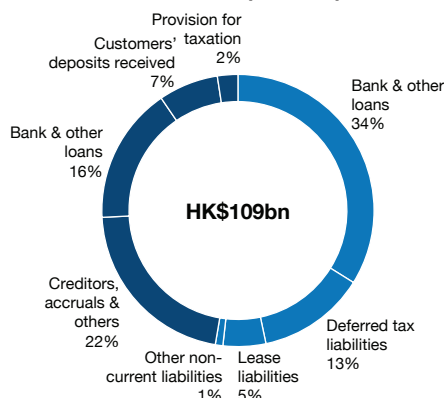
Note: Includes developers' interest in joint development projects (floor area) and agri land (approx site area); excludes completed properties.

BALANCE SHEET, OWNERS & LENDERS AT RISK

Assets (FY2023)



Liabilities (FY2023)



Top 5 Shareholders (31 Nov 2024)

- 1) Li Ka-Shing Unity Trustee Co Ltd
- 2) Li Ka Shing Foundation Ltd
- 3) Eagle Insight International
- 4) Capital Group Cos Inc
- 5) JPMorgan Chase & Co

Major Lending Banks (FY2023)

- HSBC
- DBS (HK)
- SMBC
- Hang Seng Bank
- OCBC
- Mizuho Bank
- Scotia (HK)
- Citibank
- CIBC
- Deutsche Bank

Note 1: Financial data reflects the year 2023, which ends on December 31 2023, and so does energy, emissions, adaptation and investment data.

Note 2: For more information on CWR's coastal threats stress test, please see “CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4”.

Source: CWR, CK Asset Holdings Limited Annual Reports for past five years (FY2023 latest), CK Asset Holdings Limited Sustainability Report for past five years (FY2023 latest), Bloomberg.

CK ASSET HOLDINGS

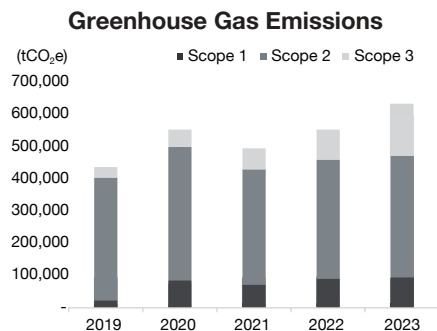
TRANSITION PATHWAY

CKAH aims for a 99.6% reduction in GHG emissions by 2050 – this is for Scope 1+2 compared to 2019 & Scope 3 compared to 2021. It also has interim targets to reduce Scope 1+2 by 46.8% and Scope 3 by 42% by 2030 – seeking SBTi approval. Greene King aims to reach net zero by 2040 – seeking SBTi approval; with an interim target to reduce 50% of all scopes by 2030 – received SBTi validation.

CKAH's emissions are rising – Scope 1+2 GHG emissions rose 7.5% from FY2021 to 2022 and again by 2.4% from FY2022 to 2023. Scope 3 emissions increased by 36% and 38% for the same years. This puts into question how the company will achieve its 2030 and 2050 targets as Scope 1+2 have increased by 17% since 2019 & Scope 3 by 88% since 2021.

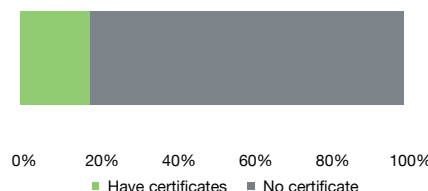
Scope 3 only disclosed by four categories – this is the lowest for the HSPDMI 4 analysed e.g. SHKP reports on 10 categories & HLD reports 12. CKAH also does not provide the breakdown of emissions per category as the others do, instead it breaks them down by business segment. No info given on what Scope 3 categories were disclosed in 2021 & 2022.

CKAH aims to reduce electricity consumption as it is “the most consumed form of energy of the Group” and is currently 63% of total emissions – the plans to reduce this include better ventilation systems & AC efficiency plus using LED tubes, adopting solar panels & energy lightings; however, Greene King's aim for 80% renewable electricity adoption by 2025 & 100% by 2030 is the most impressive as it has started to procure 100% RE as of December 2023.



Note: From 2023 Scope 3 emissions was calculated via 4 categories, until then Scope 3 was reported under “other indirect GHG emissions”.

Green Building Certificates (FY2023)



Note: 49 properties in HK have green-building-related certificates. Total property count from CK Asset Holdings website & 2023 Annual report. More information on property count in the methodology.

Latest Sustainability Financing Products Raised

- **2021:** HK\$5.5bn sustainability linked loan (SLL) with financial institutions. The loan proceeds will support the business requirements and ESG objectives of the Group.
- **2023:** 2 additional SLL for an aggregate amount of HK\$5bn – will be used for the same purpose as 2021 SLL.

Our Decarbonisation Progress

Commitment to SBTi

- Submitted the following science-based targets (“SBTs”) for the Company's property-related businesses:–
 - 46.8% reduction in absolute Scope 1 & 2 greenhouse gas (“GHG”) emissions by 2030 from a 2019 base year;
 - 42.0% reduction in absolute Scope 3 GHG emissions by 2030 from a 2021 base year;
 - 99.6% reduction in absolute Scope 1 & 2 GHG emissions by 2050 from a 2019 base year; and
 - 99.6% reduction in absolute Scope 3 GHG emissions by 2050 from a 2021 base year.

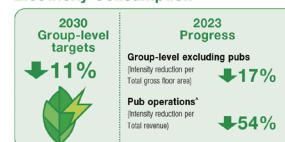
- Received SBTi's validation of the following near-term SBTs for Greene King:–

- 50% reduction in absolute Scope 1 and 2 GHG emissions by 2030 from a 2019 base year; and
- 50% reduction in absolute Scope 3 GHG emissions within the same timeframe.

- Greene King: publicly committed to reaching carbon net zero by 2040, and is seeking SBTi's approval for this target.

Our Footprint

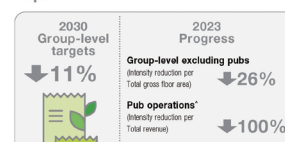
Electricity Consumption



GHG Emissions



Paper Waste



Water Consumption

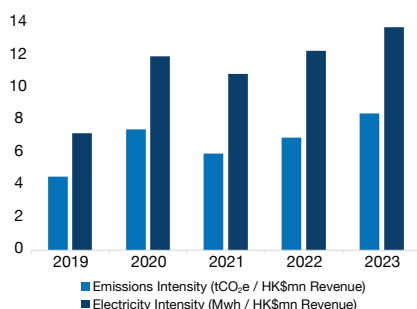


* All pub operation's paper waste has been collected and recycled during the year. No paper waste was recorded.
* 2020 (base year) intensity figures of pub operation were impacted by the COVID-19 pandemic.

Source: CK Asset Holdings Limited Sustainability Report 2023.

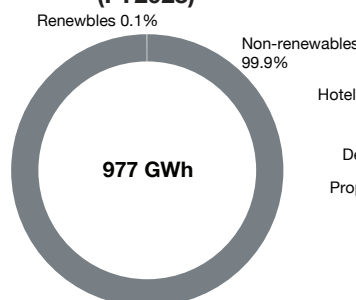
KEY ENERGY STATS

Emissions & Electricity Intensity



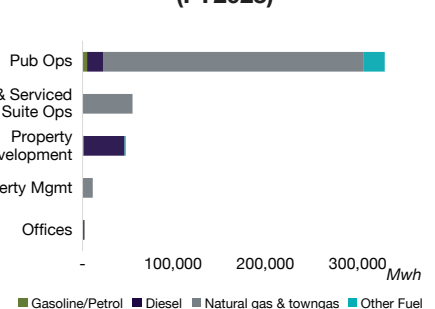
Note: From 2023 Scope 3 emissions was calculated via 4 categories, until then Scope 3 was reported under “other indirect GHG emissions”.

Electricity Mix (FY2023)



Note: All renewable electricity (on-site generated & off-site purchased) is from pub operations.

Direct Energy Consumption (FY2023)



Note: Other fuels include gas oil, kerosene & LPG.

Note 1: Financial data reflects the year 2023, which ends on December 31 2023, and so does energy, emissions, adaptation and investment data.

Note 2: For more information on CWR's coastal threats stress test, please see “CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4”.

Source: CWR, CK Asset Holdings Limited Annual Reports for past five years (FY2023 latest), CK Asset Holdings Limited Sustainability Report for past five years (FY2023 latest), Bloomberg.

HENDERSON LAND DEVELOPMENT

Bloomberg: 0012:HK

Market Cap: HK\$121bn
(6th December 2024)

Revenue: HK\$28bn

HLD transition & adaptation climate strategies are not aligned: Has set net zero pledge but far from meeting its carbon targets + its stress test shows significant risks, yet adaptation plans not disclosed. HLD has net zero targets for 90% of its Scope 1+2+ some categories of Scope 3 emissions; this covers 82% of its total emissions. However, due to a rise in emissions, it's far from reaching its targets. It also does not have RE targets & has the lowest RE levels of the HSPDMI 4. On the upside, it has one of the best Scope 3 disclosures of the 4 listco's. Despite stress testing for only three acute risks, HLD results show high risks for HK & the Mainland from coastal & riverine flooding; CWR's stress tests confirm this – see below. Despite the acknowledged high risks, HLD has not disclosed adaptation plans; but does say it's protecting at-risk properties. Overall, there's likely low board focus on climate change given the low mention of related words in the AR – see below.

We recommend HLD to reduce its emissions and improve its renewable energy sourcing to help meet its targets. It should also expand stress tests to cover chronic risks such as SLR plus use longer timelines so that it can make informed adaptation plans and avoid maladaptation & misinformed investment decisions. HLD should provide detailed adaptation plans; if not this could warrant a valuation reduction for tail risks given the 34% exposure to SLR by 2100 on the current emissions path.

- **Transition pledge & emissions:** HLD recently (13th January 2025) announced net zero targets for 90% of its Scope 1+2+ some categories of Scope 3 emissions and has received SBTi validation. However, this only covers 82% of its total emissions. Plus, both energy intensity and Scope 2 (electricity) emissions are rising, which will make meeting these targets difficult. HLD also has the lowest RE sourcing levels of the HSPDMI 4 & has no RE targets. However, on the positive side, it started disclosing Scope 3 emissions in the latest sustainability report for 12 categories (out of 15), which is the highest for the HSPDMI 4.
- **HLD stress test & what's at risk:** HLD conducted a physical climate risk assessment for 2030, 2050 & 2060 for two scenarios, 2°C and 4°C+ of warming by 2100, for three acute risks (coastal flooding, riverine flooding & tropical cyclones – no SLR stress test mentioned) for assets in Mainland & HK. Results show that HK assets face high risks from coastal flooding and riverine flooding, and low-medium risks from tropical cyclones. Mainland properties face similar risks – see next page.
- **CWR coastal threats stress test:** We stress tested 190+ properties in HK & Mainland for 3 timelines. 34-47% are vulnerable to storm tide today; by 2050, storm tide & SLR will impact 68%. In the long term, 34% will be permanently submerged under the IPCC's "cannot be ruled out" SLR levels of ~2.7m by 2100 – this is not farfetched as scientists now say current emissions trajectory can potentially cause 1m SLR by 2070. 100% of HLD's land bank & revenue is generated from HK & Mainland – this is worrying as there's material exposure by region plus existing & under development assets – see next page.
- **Adaptation strategy:** No detailed adaptation plan was disclosed but HLD states that for properties identified as high risk, some adaptation infrastructure and design planning is being put in place. However, it is not clear what scenario or timeline this planning has been done for. It's also not clear if new builds are resilient for imminent threats.

TRANSITION PLEDGE OVERVIEW

GHG emissions: 3.5MtCO₂e (Scope 1+2+3 HK & the Mainland). Scope 3 reported for 12 categories.

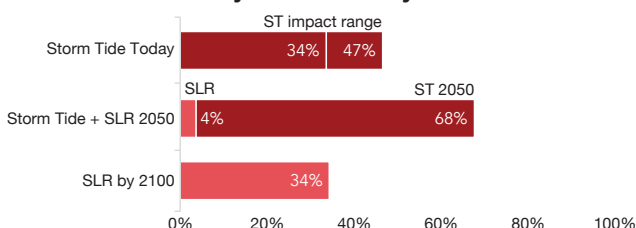
Carbon intensity: 127.3tCO₂e/HK\$m revenue – #1 (i.e. worst) of the HSPDMI 4 analysed (*higher carbon intensity = more carbon for every \$ of revenue = less efficient*).

Climate pledge: Net zero targets to reduce 90% Scope 1+2 by FY2050 + 42% by FY2030 (base year FY2021); reduce 90% of Scope 3 from 5 categories by FY2050 + 25% from 3 categories by FY2030 (base year FY2021) – received SBTi validation for near and long term targets.

Clean energy target: No renewable energy adoption targets, however it currently generates a small amount of renewable energy.

CWR STRESS TEST – COASTAL THREATS

HK & Mainland Storm Tide Risk Today & by 2050 + SLR by 2100

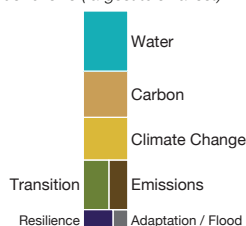


Note: CWR stress tested 190+ HLD properties in HK & Mainland for 1) storm tide today (local storm surge levels of past typhoons in HK & Mainland + corresponding astronomical high tide); 2) storm tide & SLR by 2050 (regional storm surge levels of past typhoons in Asia e.g. Goni + corresponding astronomical high tide); and 3) local "cannot be ruled out" levels of SLR by 2100.

CLIMATE CHANGE IN THE ANNUAL/SUSTAINABILITY REPORTS

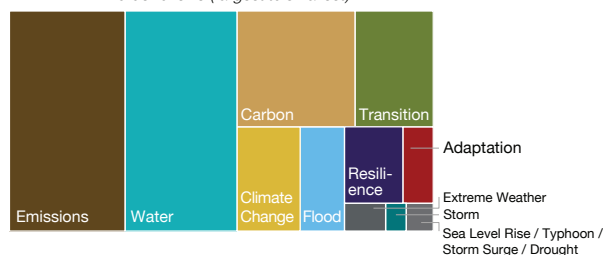
FY2023 Annual Report (62 words total)

In order of size (largest to smallest)



FY2023 Sustainability Report (484 words total)

In order of size (largest to smallest)



Note: Above chart is a count of climate-related words including: sea level rise, typhoon, storm surge, adaptation, flood, drought, storm, extreme weather, climate change, carbon, emissions, transition, resilience & water, from the FY2023 Annual report and Sustainability report.

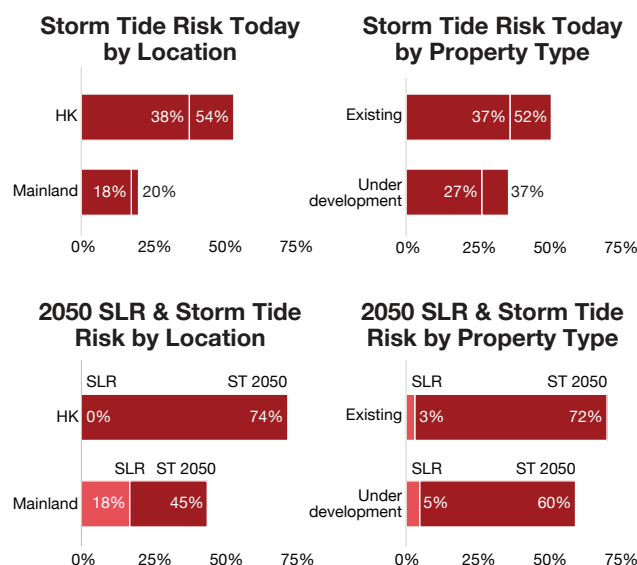
Note: Financial data reflects the year 2023, which ends on December 31 2023, and so does energy, emissions, adaptation and investment data.

Note 2: For more information on CWR's coastal threats stress test, please see "CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4".

Source: CWR, Henderson Land Company Limited Annual Reports for past five years (FY2023 latest), Henderson Land Company Limited Sustainability Report for past five years (FY2023 latest), Henderson Land Company Limited Press Release (13 January 2025), Bloomberg.

HENDERSON LAND DEVELOPMENT

CWR COASTAL THREATS STRESS TEST



Note: CWR stress tested 190+ HLD properties in HK & Mainland for 1) storm tide today (local storm surge levels of past typhoons in HK & Mainland + corresponding astronomical high tide); and 2) storm tide & SLR by 2050 (regional storm surge levels of past typhoons in Asia e.g. Goni + corresponding astronomical high tide). HK: Mainland split = 79%:21%; Existing: Under development = 67%:23%.

HLD STRESS TEST + ADAPTATION

HLD acute risk stress test showed high risks but says these identified assets are being protected. But, no mention of a SLR stress test could lead to maladaptation.

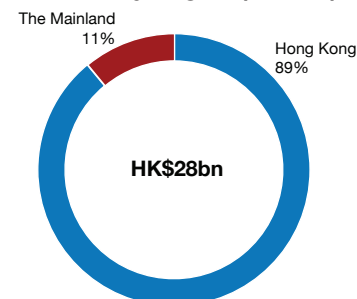
HLD Stress Test: Conducted a physical climate risk assessment for 3 acute risks (coastal flooding, riverine flooding & tropical cyclones) for two scenarios, RCP2.6 (2°C) and RCP8.5 (4°C+) for 2030, 2050 & 2060 for assets in HK & Mainland (excludes current adaptation measures). Its analysis identified the increase in the % of expected damage annually, as compared to the 2022 base from a low of <1% to 1%-10%, 11%-20% & the highest risk level of >20% as follows:

- HK:** >20% increase in risk for coastal flooding for all timelines & scenarios, >20% increase in risk for riverine flooding by 2050 & 2060 for both scenarios, and for tropical cyclones 1-10% increase in risk for all timelines in the 2°C scenario, and in the 4°C scenario a 1-10% increase by 2030 & 11-20% for 2050 + 2060. However, a map of HK showing coastal flooding with a 100-year return period in 2050 in a 4°C scenario shows only slightly elevated risks.
- Mainland:** >20% increase in risk for coastal flooding in 2050 + 2060 for both scenarios, >20% increase in risk for riverine flooding by 2060 for the 2°C scenario and for 2050 & 2060 at 4°C, and 1-20% increase in risk for tropical cyclones.

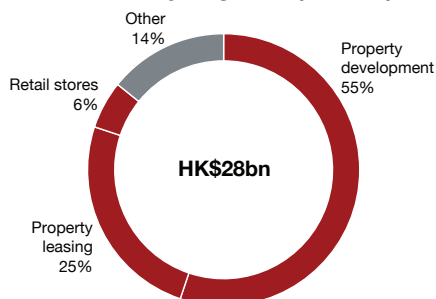
HLD Adaptation: No detailed adaptation plan was disclosed but HLD states that for properties identified as high risk, different precautions are being taken such as installing flood protection infrastructures & putting in place emergency response plans.

REVENUE BY REGION & SEGMENT + LAND BANK

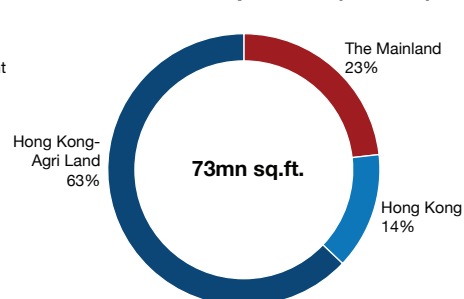
Revenue by Region (FY2023)



Revenue by Segment (FY2023)



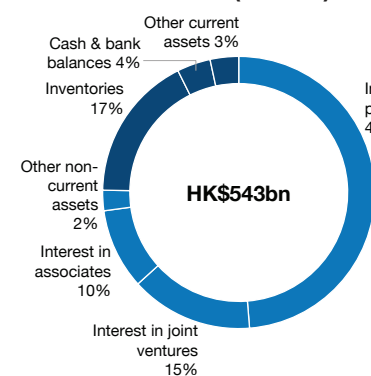
Land Bank Composition (FY2023)



Note: Includes HK and Mainland projects pending/under development & unsold units of major development projects (attributable gross floor area). HK Agri Land is measured as attributable land area.

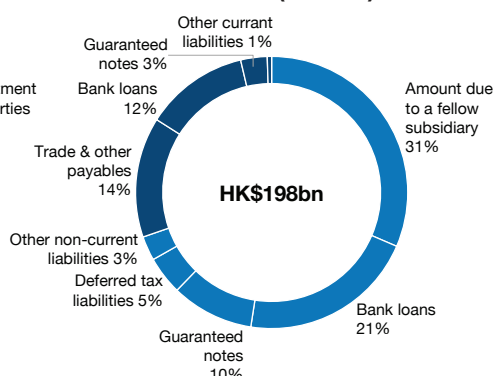
BALANCE SHEET, OWNERS & LENDERS AT RISK

Assets (FY2023)



Note: Includes assets of the disposal group classified as held for sale.

Liabilities (FY2023)



Note: Includes liabilities associated with assets of the disposal group classified as held for sale.

Top 5 Shareholders (31 Nov 2024)

- Hopkins Cayman Ltd
- Henderson Sunlight Asset Management Ltd
- Uplite Ltd
- Wintrade Ltd
- Cobase Ltd

Major Lending Banks (FY2023)

- BOC (HK)
- HSBC
- Hang Seng Bank
- Sumitomo Mitsui
- DBS (HK)

Note 1: Financial data reflects the year 2023, which ends on December 31 2023, and so does energy, emissions, adaptation and investment data.

Note 2: For more information on CWR's coastal threats stress test, please see "CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4".

Source: CWR, Henderson Land Company Limited Annual Reports for past five years (FY2023 latest), Henderson Land Company Limited Sustainability Report for past five years (FY2023 latest), Henderson Land Company Limited Press Release (13 January 2025), Bloomberg.

HENDERSON LAND DEVELOPMENT

TRANSITION PATHWAY

Has set net zero targets. HLD recently (13th January 2025) announced net zero targets for 90% of its Scope 1+2+ some categories of Scope 3 emissions and has received SBTi validation (near & long term). This covers only 82% of its total emissions.

Emissions are rising = difficult to adhere to targets. HLD's Scope 1+2 GHG emissions increased by 11% from FY2022 to FY2023 and are now 35% higher than in FY2019. Scope 2 emissions continue to rise which will make it difficult for HLD to adhere to its net zero targets. Its own measure of energy intensity (kWh/m²) has also risen by 10% between FY2022 to FY2023.

Scope 3 emissions being disclosed & for a high number of categories. Scope 3 emissions started to be disclosed in 2023 – it makes up 96% of total emissions, so it is a good start that HLD is now disclosing it, especially as it discloses the most Scope 3 categories (12 out of 15 categories) out of the four companies analysed.

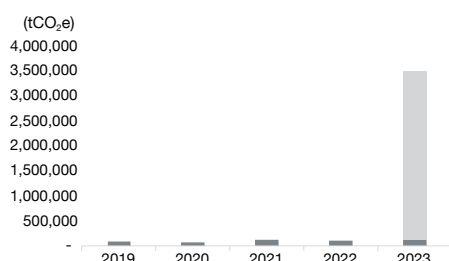
HLD does not have renewable energy targets – it currently produces a negligible amount of renewable energy as can be seen below. However, it does state that it is looking to install RE infrastructure at its properties and is considering purchasing RECs, where applicable – no further details given.

DRIVER	TARGET	PROGRESS IN 2023
G Green for Planet	Achieve provision of electric vehicle ("EV") charging facilities for all car parking spaces in 90% of new residential developments and new commercial developments by 2030	Incorporating designs into new developments to ensure provision of EV charging facilities for 100% of car parking spaces
	By 2030, reduce energy intensity by 20% from base year 2019 for Hong Kong portfolio ¹	↓ 12.2% compared to 2019
	By 2030, achieve a cumulative 10% reduction in electricity consumption from base year 2021 for mainland China portfolio ²	↓ 9.7% compared to 2021
	Implement retrofitting or energy saving initiatives at all managed properties progressively by 2030 according to energy audit report	On track of the retrofitting or energy saving initiatives schedule
	Implement retro-commissioning ("RCx") according to the Electrical and Mechanical Services Department's technical guidelines for 80% of the managed properties by 2030	On track of the planned retro-commissioning schedule
	All new office development projects target to achieve BEAM Plus Gold Rating or above	Starting from 2021, there are 3 BEAM Plus Gold Rating or above in our new office development projects
	Conduct life cycle assessment during design and construction stages for over 20 new property developments by 2030	Conducted life cycle assessment for 10 new property development projects
	For all new developments which require demolition, recycle 15% and 30% of demolition waste by 2025 and 2030 respectively	Our new developments are actively working towards achieving this target
	For all new developments, recycle 15% and 30% of construction waste by 2025 and 2030 respectively	Our new developments are actively working towards achieving this target
	Achieve estimated annual water reduction of 20% and 30% for all new residential and office developments respectively	Our new developments are actively working towards achieving this target

Source: Henderson Land Development Company Limited Sustainability Report 2023.

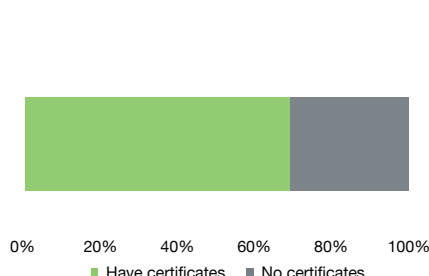
Greenhouse Gas Emissions

■ Scope 1 ■ Scope 2 ■ Scope 3



Note: From 2023 Scope 3 emissions was calculated via 12 categories.

Green Building Certificates (FY2023)



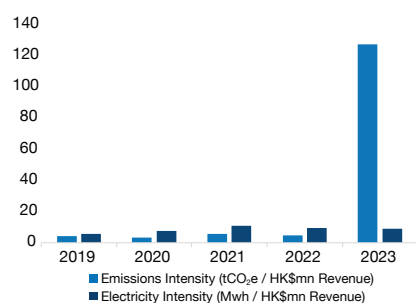
Note: 133 properties in HK and Mainland have green-building related certificates. Total property count from HLD website & 2023 Annual report. More information on property count in the methodology.

Latest Sustainability Financing Products Raised

- **2023:** Secured over HK\$50bn various green facilities including green loans, green undertakings, social loan and sustainability-linked loans. Below are some recent examples:
 - **HK\$2.5bn green loan with BOC (HK):** to strengthen green portfolio of investment & development properties with BEAM Plus, BEAM, LEED & Green Building Design Label pre-certifications.
 - **HK\$2bn sustainability-linked and social loan with CCB (Asia).**

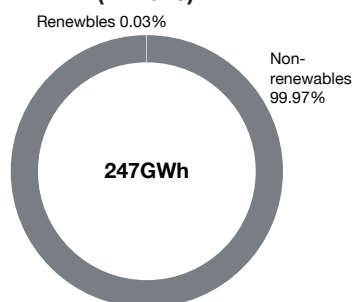
KEY ENERGY STATS

Emissions & Electricity Intensity

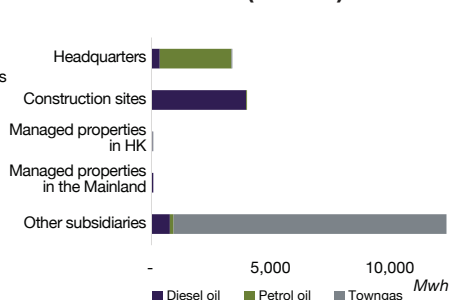


Note: From 2023 Scope 3 emissions was calculated via 12 categories.

Electricity Mix (FY2023)



Direct Energy Consumption (FY2023)



Note: Other Subsidiaries includes The Hong Kong and China Gas Company Limited.

Note 1: Financial data reflects the year 2023, which ends on December 31 2023, and so does energy, emissions, adaptation and investment data.

Note 2: For more information on CWR's coastal threats stress test, please see "CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4".

Source: CWR, Henderson Land Company Limited Annual Reports for past five years (FY2023 latest), Henderson Land Company Limited Sustainability Report for past five years (FY2023 latest), Henderson Land Company Limited Press Release (13 January 2025), Bloomberg.

NEW WORLD DEVELOPMENT

Bloomberg: 0017:HK

Market Cap: HK\$16bn
(6th December 2024)Revenue: HK\$46bn
(Includes both continued and operations discontinued during FY2024)

NWD transition & adaptation climate strategies are not aligned: NWD has net zero targets but its stress test results show low risk vs. CWR's high risk leaving it blind = under-prepared on adaptation. NWD has one of the better climate pledges of the HSPDMI 4 as it aims for net zero by 2050 but emissions have been volatile. It has ambitious renewable targets but despite a 2021 RE Roadmap, progress is unclear. On adaptation, it says it has plans for assets identified as at risk, but its own stress test only found "minor risk" for the Mainland and "no risk" for HK from storm surge (including SLR). This contrasts dramatically with material risks shown by CWR's stress tests below – results are comparable as NWD stress tested 200+ assets similar to CWR's 235+ assets. This gap is worrying & implies maladaptation and likely misinformed investment decisions. This is surprising as NWD has the highest AR climate related word count; "resilience" is the top word – see below.

We recommend NWD use the right tools & stress test coastal threats to the right levels so that it can see accelerated threats ahead & make informed adaptation strategies for the near, medium & long term. If not, its adaptation efforts are likely far from enough, warranting a valuation reduction for tail risks given a 32% exposure to SLR by 2100 on current emissions path.

- **Transition pledge & emissions:** NWD aims to achieve net zero for all emissions across all assets and operations by 2050 and it also has interim 2030 targets – interim targets approved by SBTi and 2050 targets submitted for approval. Yet emissions are volatile. It has ambitious targets for renewable energy – 100% RE for rental properties in GBA by FY2026 & Greater China by FY2031, through on-site RE generation & purchasing RE but little detail provided on achievements to date – see next pages.
- **NWD stress test & what's at risk:** NWD conducted a physical climate risk assessment for 2030, 2050 & 2080 for two scenarios, 1.5°C and 3.3°C+ of warming by 2100, for three chronic risks and five acute risks for over 200 assets in the Mainland, HK & Southeast Asia. The results show that HK assets face no risk from storm surge (including SLR) but do face risks from tropical cyclones (wind & rainstorms), Mainland assets face moderate-extreme risks from river floods, rainfall floods & tropical cyclones, and SE Asia properties face extreme risk from tropical cyclones for all timelines and all scenarios.
- **CWR coastal threats stress test:** We stress tested 235+ properties in HK & Mainland for 3 timelines. 32-37% are vulnerable to storm tide today; by 2050, storm tide & SLR will impact 51%. In the long term, 32% will be permanently submerged under the IPCC's "cannot be ruled out" SLR levels of ~2.7m by 2100 – this is not farfetched as scientists now say current emissions trajectory can potentially cause 1m SLR by 2070. 100% of NWD's land bank & 99% of revenue is generated from HK & Mainland – this is worrying as there's material exposure by region plus existing & under development assets – see next page.
- **Adaptation strategy:** Assets identified as having inherent risks from NWD's stress tests were further assessed – adaptation measures have been prioritised for the most vulnerable of these. NWD aims to have climate adaptation & resilience plans set for all relevant assets by 2030. No info is given if adaptation measures are for 1.5/3.3°C+ scenario & to which timelines. Given the material gap between NWD & CWR stress tests for coastal threats, it is likely that current adaptation is not sufficient.

TRANSITION PLEDGE OVERVIEW

GHG emissions: 1.8MtCO₂e (Scope 1+2+3 HK & the Mainland). Scope 3 reported for 9 categories.

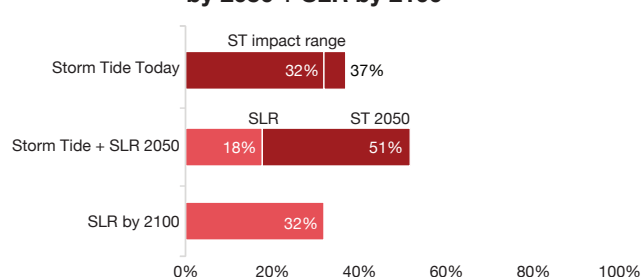
Carbon intensity: 49.7tCO₂e/HK\$m revenue – #2 of the HSPDMI 4 analysed (*higher carbon intensity = more carbon for every \$ of revenue = less efficient*).

Climate pledge: Aim to achieve net zero for Scope 1+2+3 emissions from all assets and operations by 2050 (seeking SBTi validation). Interim target (approved by SBTi) – by 2030 reduce absolute Scope 1+2 emissions by 46.2% and reduce Scope 3 emissions intensity from Capital Goods by 22% and Downstream Leased Assets by 29.8% (FY2019 base year).

Clean energy target: By end of FY2026 it aims to achieve 100% renewable energy for rental properties in Greater Bay Area and by end of FY 2031, 100% renewable energy for rental properties in Greater China. Currently a small amount of renewable energy is generated.

CWR STRESS TEST – COASTAL THREATS

HK & Mainland Storm Tide Risk Today & by 2050 + SLR by 2100

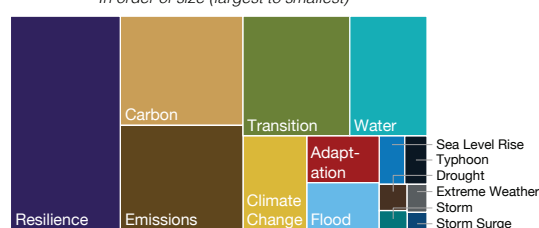


Note: CWR stress tested 235+ NWD properties in HK & Mainland for 1) storm tide today (local storm surge levels of past typhoons in HK & Mainland + corresponding astronomical high tide); 2) storm tide & SLR by 2050 (regional storm surge levels of past typhoons in Asia e.g. Goni + corresponding astronomical high tide); and 3) local "cannot be ruled out" levels of SLR by 2100.

CLIMATE CHANGE IN THE ANNUAL/SUSTAINABILITY REPORTS

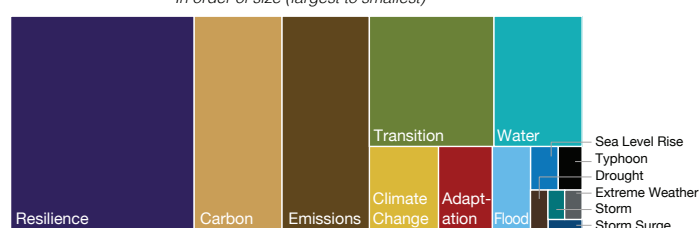
FY2023/24 Annual Report (492 words total)

In order of size (largest to smallest)



FY2023/24 Sustainability Report (706 words total)

In order of size (largest to smallest)



Note: Above chart is a count of climate-related words including: sea level rise, typhoon, storm surge, adaptation, flood, drought, storm, extreme weather, climate change, carbon, emissions, transition, resilience & water, from the FY2023/24 Annual report and Sustainability report.

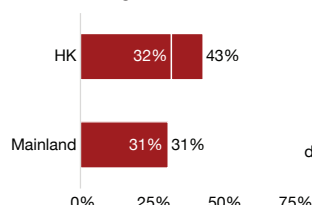
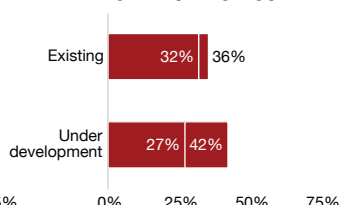
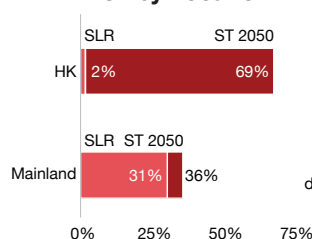
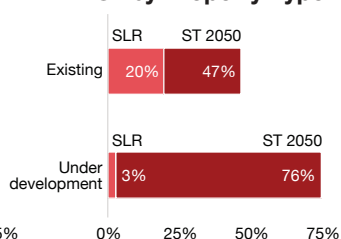
Note 1: Financial data reflects the year 2024, which ends on June 30 2024, and so does energy, emissions, adaptation and investment data.

Note 2: For more information on CWR's coastal threats stress test, please see **"CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4"**.

Source: CWR, New World Development Company Limited Annual Reports for past five years (FY2023/24 latest), New World Development Company Limited Sustainability Report for past five years (FY2023/24 latest), Bloomberg, Online electricity converter.

NEW WORLD DEVELOPMENT

CWR COASTAL THREATS STRESS TEST

Storm Tide Risk Today
by LocationStorm Tide Risk Today
by Property Type2050 SLR & Storm Tide
Risk by Location2050 SLR & Storm Tide
Risk by Property Type

Note: CWR stress tested 235+ NWD properties in HK & Mainland for 1) storm tide today (local storm surge levels of past typhoons in HK & Mainland + corresponding astronomical high tide); and 2) storm tide & SLR by 2050 (regional storm surge levels of past typhoons in Asia e.g. Goni + corresponding astronomical high tide). HK: Mainland split = 46%:54%; Existing: Under development = 86%:14%.

NWD STRESS TEST + ADAPTATION

There are clear gaps between NWD & CWR stress tests for coastal threats. As NWD is only adapting for assets it has identified as at-risk, it is likely that NWD adaptation plans are not sufficient as CWR has identified higher levels of assets at-risk.

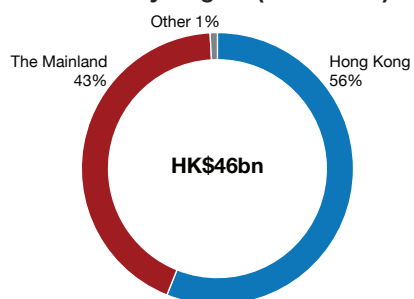
NWD Stress Test: Physical climate risk assessments for 5 acute & 3 chronic risks for 2 scenarios, SSP1-2.6 (1.5°C) & SSP5-8.5 (3.3°C+) for 2030, 2050 & 2080. Over 200 assets were tested – 70% in the Mainland, 28% in HK & 2% in SE Asia. Key results are:

- **HK:** moderate to extreme risk from tropical cyclones, minor heat stress in 2080 for SSP5-8.5, and insignificant risks from storm surge (including SLR).
- **Mainland:** major to extreme impact from river flood, moderate to extreme impact from rainfall flood, minor impact from tropical cyclone, which increases to moderate & major in 2050 & 2080 for SSP5-8.5, minor impact from heat stress, which rises to moderate in 2080 for SSP5-8.5, and minor impact from storm surge (including SLR).
- **SE Asia:** extreme risk from tropical cyclone for all timelines & scenarios, minor-moderate rainfall flood risk (SSP5-8.5), minor-moderate heat stress, and insignificant risks from storm surge (including SLR).

NWD Adaptation: Assets identified as having inherent risks from its stress tests were further assessed. HK has the greatest number of “most vulnerable” assets – adaptation measures have been prioritised for these. NWD aims to have climate adaptation & resilience plans set for all relevant assets by 2030.

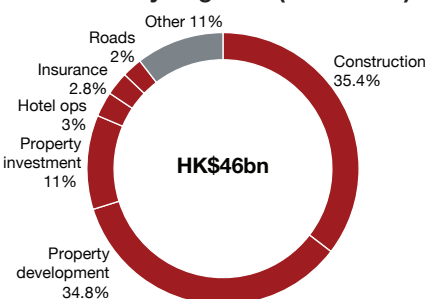
REVENUE BY REGION & SEGMENT + LAND BANK

Revenue by Region (FY2023/24)



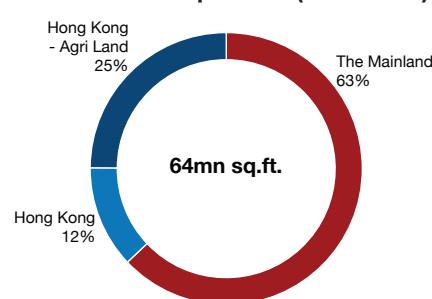
Note: Includes both continued and discontinued operations during FY2024.

Revenue by Segment (FY2023/24)



Note: Includes both continued and discontinued operations during FY2024.

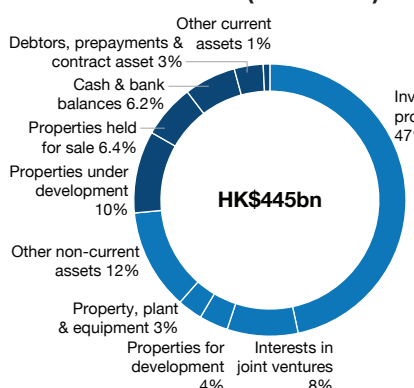
Land Bank Composition (FY2023/24)



Note: Hong Kong Agri Land is attributable land area that is pending land use conversion. The rest of land bank in HK & the Mainland is for Gross Floor Area.

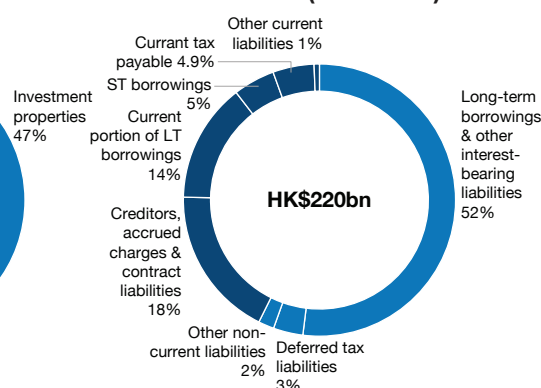
BALANCE SHEET, OWNERS & LENDERS AT RISK

Assets (FY2023/24)



Note: Includes assets of disposal groups held for sale.

Liabilities (FY2023/24)



Note: Includes liabilities of disposal groups held for sale.

Top 5 Shareholders (31 Nov 2024)

- 1) Chow Tai Fook Holding Ltd
- 2) Blackrock Inc
- 3) The Vanguard Group, Inc.
- 4) Dimensional Fund Advisors LP
- 5) Northern Trust Corp

Major Lending Banks (FY2023/24)

- | | | |
|--------------|------------------|--------|
| • ABC | • CIB | • NCB |
| • BOC (HK) | • DBS | • OCBC |
| • BOCOM | • Hang Seng Bank | • SPDB |
| • BEA | • ICBC | • SMBC |
| • CCB (Asia) | • Mizuho | • SC |
| • CMB | • MUFG | • HSBC |

Note 1: Financial data reflects the year 2024, which ends on June 30 2024, and so does energy, emissions, adaptation and investment data.

Note 2: For more information on CWR's coastal threats stress test, please see “CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4”.

Source: CWR, New World Development Company Limited Annual Reports for past five years (FY2023/24 latest), New World Development Company Limited Sustainability Report for past five years (FY2023/24 latest), Bloomberg, Online electricity converter.

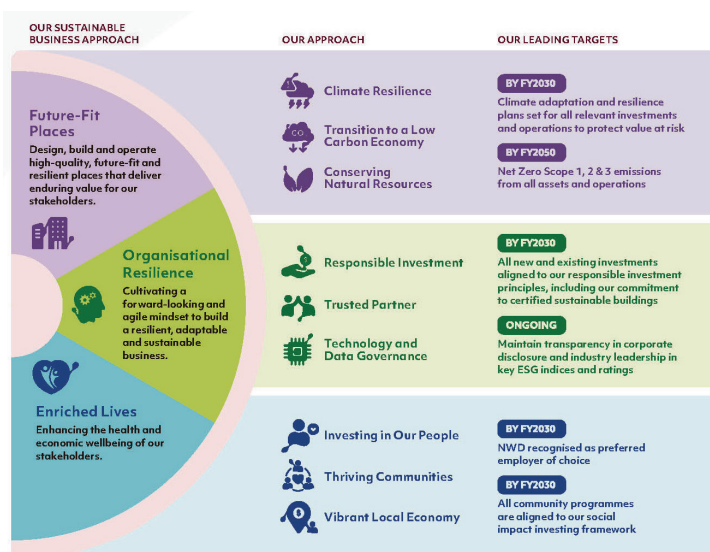
NEW WORLD DEVELOPMENT

TRANSITION PATHWAY

NWD aims to achieve net zero for Scope 1+2+3 emissions from all assets and operations by 2050. Also have interim targets to reduce absolute Scope 1+2 emissions by 46.2% and reduce Scope 3 emissions intensity from Capital Goods by 22% and Downstream Leased Assets by 29.8% (FY2019 base year) by 2030. Interim targets have been approved by SBTi and 2050 targets have been submitted for approval.

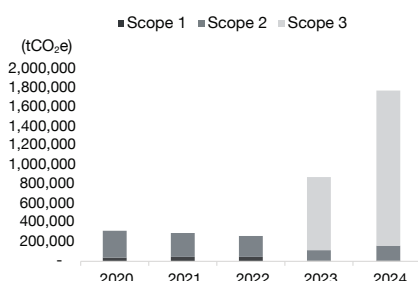
Actual emissions are volatile. NWD's Scope 1+2 GHG emissions decreased by 56% from FY2022 to 2023 but then increased by 35% from FY2023 to 2024. This puts into question how NWD will achieve its net zero goal for all emissions by 2050 and its interim goals for 2030. Scope 3 emissions increased by 113% from FY2023 to 2024 but this was due to an improvement in how NWD calculates its emissions and due to divestments.

Ambitious RE targets but little detail on what has been achieved so far. NWD has ambitious targets to reach 100% renewable energy for rental properties in the Greater Bay Area by FY-end 2026 and 100% renewable energy for rental properties in Greater China by FY-end 2031. However, as seen from the electricity chart below, NWD currently produces a negligible amount of renewable energy which is exported for the Government Feed-in Tariff. A 2021 RE Roadmap outlines that NWD will reach this target by 1) maximising on-site renewable energy generation and storage, 2) procuring offsite renewable energy through long-term Power Purchase Agreements ("PPAs") and 3) purchasing RECs in HK and the Mainland. Given the limitations of on-site RE, it recognizes the majority of this will be through PPAs and RECs – however no detailed numbers have been provided on what has been achieved so far as targets were set in 2021.



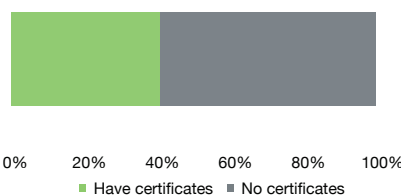
Source: New World Development Company Limited Sustainability Report 2024.

Greenhouse Gas Emissions



Note: From 2023 Scope 3 emissions was calculated via 9 categories.

Green Building Certificates (FY2023/24)



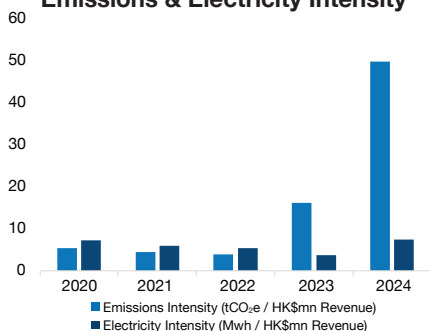
Note: 97 properties have green-building related certificates. Total property count from NWD website & 2024 Annual report. More information on property count in the methodology.

Latest Sustainability Financing Products Raised

- May 2023:** HK\$4bn Green Loan, towards green buildings project 11 SKIES.
- April 2023:** HK\$500mn Green Loan, towards green buildings on project Wing Hong Street.
- Feb 2023:** issued 5-year HK\$2bn Sustainability Linked Loan, linked to S&P CSA performance & CSV Lease adoption.
- Oct 2022:** HK\$300mn Green Loan, towards green buildings on project 11 SKIES.

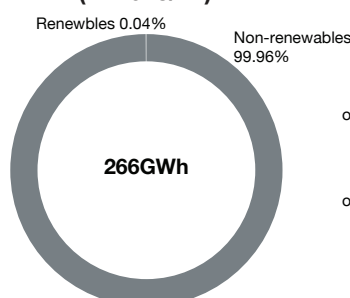
KEY ENERGY STATS

Emissions & Electricity Intensity



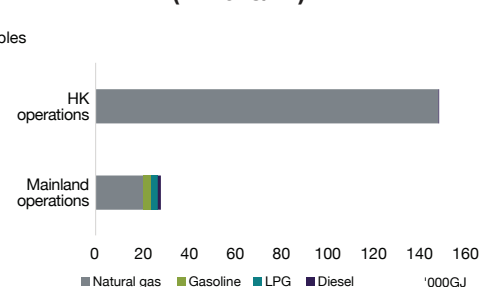
Note: From 2023 scope 3 emissions was calculated via 9 categories. Electricity was converted to MWh from GJ using an online converter.

Electricity Mix (FY2023/24)



Note: The on-site renewables electricity generated by the Group was exported to the Government Feed-in-Tariff Scheme.

Direct Energy Consumption (FY2023/24)



Note 1: Financial data reflects the year 2024, which ends on June 30 2024, and so does energy, emissions, adaptation and investment data.

Note 2: For more information on CWR's coastal threats stress test, please see "CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4".

Source: CWR, New World Development Company Limited Annual Reports for past five years (FY2023/24 latest), New World Development Company Limited Sustainability Report for past five years (FY2023/24 latest), Bloomberg, Online electricity converter.

SUN HUNG KAI PROPERTIES

Bloomberg: 16:HK

Market Cap: HK\$225bn
(6th December 2024)

Revenue: HK\$84bn
(y/e 30th June 2024; revenue includes share of joint ventures & associates)

SHKP transition & adaptation climate strategies are not aligned: No net zero pledge but highly exposed = likely not fully aware of coastal threats = under-prepared on adaptation. SHKP's non-ambitious carbon pledge increases its physical risk exposure, yet SHKP may not realise this as its own stress tests do not cover enough assets & therefore do not reflect the reality of accelerating climate threats as clearly shown by CWR's stress tests set out below. This potential lack of board focus on the risks is also reinforced by a low mention of climate change related words in its AR as per below.

We recommend SHKP to expand its stress test sampling plus use the right levels & longer timelines to obtain a better understanding of its future risks so that it can make informed adaptation strategies for the near, medium and long term. If not, an unrealistic assessment of imminent coastal threats may lead to maladaptation & misinformed investment decisions in the near-medium term. If its adaptation efforts are not enough it could also warrant a significant valuation reduction for tail risks given the 44% exposure to sea level rise (SLR) by 2100 on the current emissions path. Regardless, SHKP should act to slow down fast rising seas by fast tracking transition and putting in place net zero targets preferably by 2030.

- **Transition pledge & emissions:** SHKP has not set a net zero target, instead it has a reduction target for Scope 1+2 GHG emissions intensity & electricity consumption intensity by FY2029/30. The original emission intensity targets may not have been ambitious as it was met early and has since been revised. Currently, SHKP generates a negligible amount of solar, but aims to build one of HK's largest solar energy networks. No clean energy targets set, but rooftop solar will provide 1.6% of its FY2024 total electricity consumption by end of 2025 & the new solar farm will provide 0.2%. Its subsidiaries are purchasing RECs to offset emissions.
- **SHKP stress test & what's at risk:** SHKP ran stress tests for only 8 projects in HK & Mainland for two scenarios (RCP2.6/SSP1 & RCP8.5/SSP5) for two timelines (2030 & 2050) for 10 acute and chronic physical risks. Its results show that Mainland properties face no to low risks while HK properties faced low-medium risks from typhoon, rainfall flood & extreme heat. Despite stress testing for SLR, no SLR risks were mentioned.
- **CWR coastal threats stress test:** We stress tested 220+ properties in HK & Mainland for 3 timelines. 43-56% are vulnerable to storm tide today; by 2050, storm tide & SLR will impact 81%. In the long term, 44% will be permanently submerged under the IPCC's "cannot be ruled out" SLR levels of ~2.7m by 2100 – this is not farfetched as scientists now say current emissions trajectory can potentially cause 1m SLR by 2070. 100% of SHKP's land bank & 93% of revenue is generated from HK & Mainland – this is worrying as there's material exposure by region plus existing & under development assets – see next page.
- **Adaptation strategy:** SHKP has installed flood protection measures for properties in low-lying & flood-prone areas – see next page. However, it's unclear if these measures are sufficient for existing & new builds as CWR's larger stress test sample shows material vulnerability for storm tides today. This leads us to believe that SHKP's adaptation efforts may not be adequate.

TRANSITION PLEDGE OVERVIEW

GHG emissions: 2.1MtCO₂e (Scope 1+2+3 HK & Scope 1+2 the Mainland). Scope 3 reported for 10 categories.

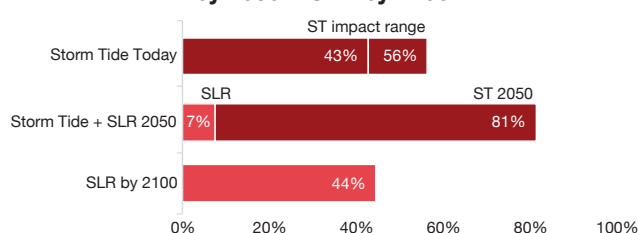
Carbon intensity: 24.9tCO₂e/HK\$m revenue – #3 of the HSPDMI 4 analysed (*higher carbon intensity = more carbon for every \$ of revenue = less efficient*).

Climate pledge: No net zero target set. Instead, it aims to reduce total Scope 1+2 GHG emissions intensity by 35% and electricity consumption intensity by 13% for 62 buildings (out of over 150 buildings in HK) by FY2029/30 (Base year = FY2019/20). No Scope 3 reduction targets included.

Clean energy target: No exact targets set but developing HK's first solar farm. Currently produces a small amount of solar energy which is exported to the Government Feed-in Tariff Scheme.

CWR STRESS TEST – COASTAL THREATS

HK & Mainland Storm Tide Risk Today & by 2050 + SLR by 2100

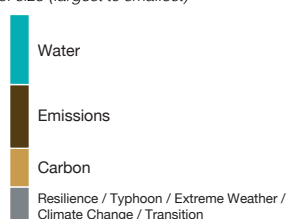


Note: CWR stress tested 220+ SHKP properties in HK & Mainland for 1) storm tide today (local storm surge levels of past typhoons in HK & Mainland + corresponding astronomical high tide); 2) storm tide & SLR by 2050 (regional storm surge levels of past typhoons in Asia e.g. Goni + corresponding astronomical high tide); and 3) local "cannot be ruled out" levels of SLR by 2100.

CLIMATE CHANGE IN THE ANNUAL/SUSTAINABILITY REPORTS

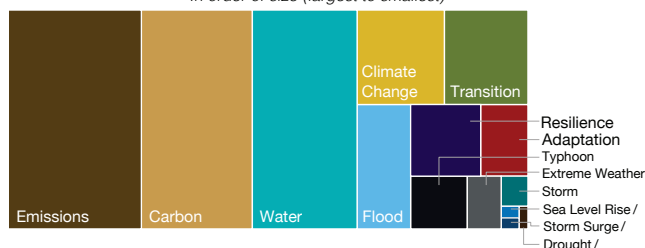
FY2023/24 Annual Report (33 words total)

In order of size (largest to smallest)



FY2023/24 Sustainability Report (566 words total)

In order of size (largest to smallest)



Note: Above chart is a count of climate-related words including: sea level rise, typhoon, storm surge, adaptation, flood, drought, storm, extreme weather, climate change, carbon, emissions, transition, resilience & water, from the FY2023/24 Annual report and Sustainability report.

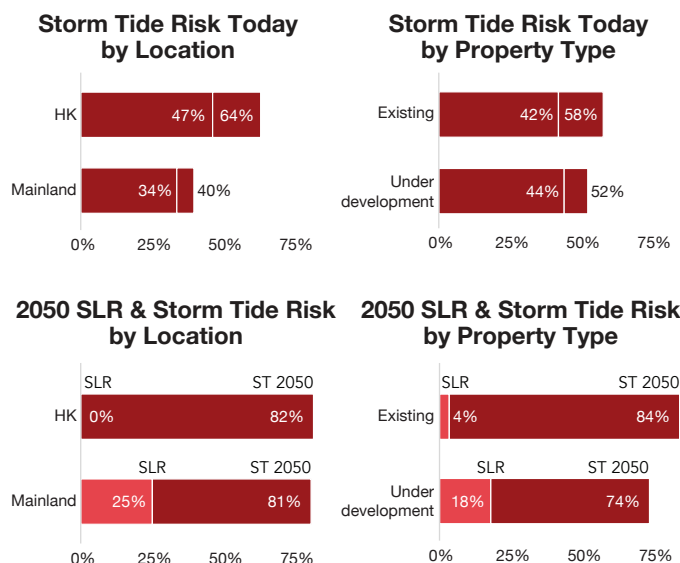
Note 1: Financial data reflects the year 2024, which ends on June 30 2024, and so does energy, emissions, adaptation and investment data.

Note 2: For more information on CWR's coastal threats stress test, please see "CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4".

Source: CWR, Sun Hung Kai Properties Limited Annual Reports for past five years (FY2023/24 latest), Sun Hung Kai Properties Limited Sustainability Report for past five years (FY2023/24 latest), Bloomberg and British Petroleum Conversion factors.

SUN HUNG KAI PROPERTIES

CWR COASTAL THREATS STRESS TEST



Note: CWR stress tested 220+ SHKP properties in HK & Mainland for 1) storm tide today (local storm surge levels of past typhoons in HK & Mainland corresponding astronomical high tide); and 2) storm tide & SLR by 2050 (regional storm surge levels of past typhoons in Asia e.g. Goni + corresponding astronomical high tide). HK: Mainland split = 70%:30%; Existing: Under development = 73%:27%.

SHKP STRESS TEST + ADAPTATION

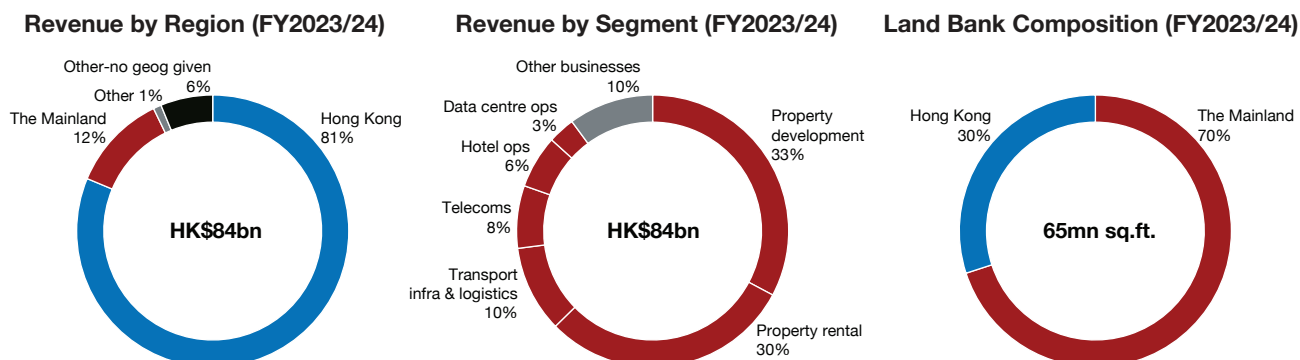
SHKP has not identified the same SLR & storm tide risk level as CWR – thus many of these at-risk properties could be left exposed.

SHKP Stress Test: SHKP's physical climate risk assessment was for 8 projects in HK & Shanghai for two scenarios, RCP2.6 (1.5-2°C by 2100) and RCP8.5 (3°C+ by 2100) for 2030 & 2050. 10 climate risks were assessed – four acute (including storm surge & typhoon) & six chronic (including SLR).

Its analysis identified 3 acute risks (typhoon, rainfall flood & river flood) & 1 chronic risk (extreme heat) as low to medium risk for both timeframes – the other 6 were deemed negligible. HK faced no river flood risk & for the other 3 risks faced low to medium risk for both scenarios & time frames. Shanghai had low risk for all 4 physical risks except for extreme heat (medium risk for RCP8.5 in 2050).

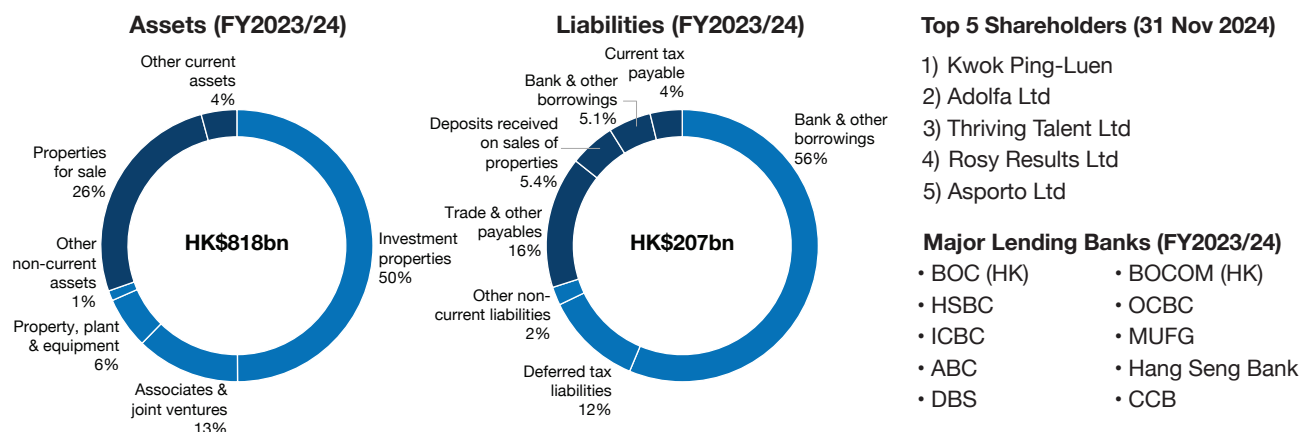
SHKP Adaptation: Within managed properties, SHKP has installed infrastructure such as floodgates, flood sensors and submersible pumps in properties located in low-lying and flood-prone areas. However, it is unclear whether or not these measures are sufficient for RCP8.5 climate impacts. Examples of extreme heat related adaptation measures were outlined as it has been identified as a risk.

REVENUE BY REGION & SEGMENT + LAND BANK



Note: Includes revenue from associates & joint ventures. Note: Includes revenue from associates & joint ventures. Note: Land bank accounts for properties under development.

BALANCE SHEET, OWNERS & LENDERS AT RISK



Note 1: Financial data reflects the year 2024, which ends on June 30 2024, and so does energy, emissions, adaptation and investment data.

Note 2: For more information on CWR's coastal threats stress test, please see "CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4".

Source: CWR, Sun Hung Kai Properties Limited Annual Reports for past five years (FY2023/24 latest), Sun Hung Kai Properties Limited Sustainability Report for past five years (FY2023/24 latest), Bloomberg and British Petroleum Conversion factors.

SUN HUNG KAI PROPERTIES

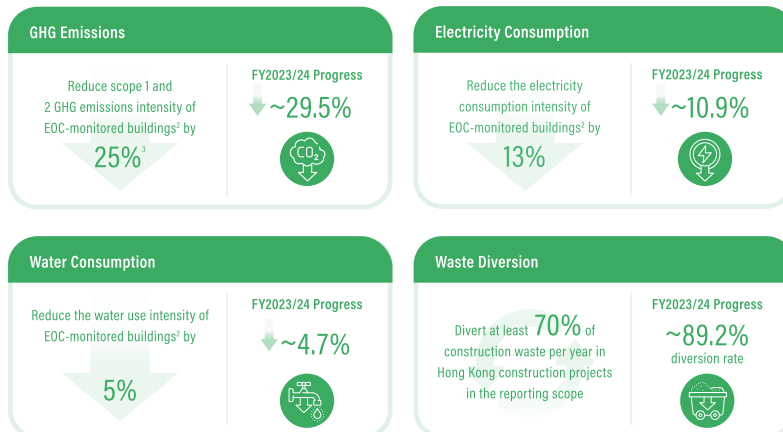
TRANSITION PATHWAY

SHKP has no net zero targets, instead it has emissions intensity (tonnes CO₂e/m² total gross floor area) & electricity consumption intensity targets for FY2029/30. Its latest sustainability report states it has already met its original emissions intensity target (25% reduction by FY2029/30 from FY2019/20), which may indicate this was not ambitious; this target has been revised to a 35% reduction.

SHKP's emissions have not changed a lot in past few years. Its Scope 1+2 GHG emissions reduced by 3.6% from FY2022/23 to FY2023/24 – but overall has not changed dramatically in the last few years. Scope 3 emissions were only fully disclosed (for 10 categories) in the most recent sustainability report.

Unclear how SHKP intends to achieve targets as renewables are low. It currently generates a negligible amount of solar (see below), which is exported to the government. No clean energy targets set but has rooftop solar & aims to build HK's first solar farm (rooftop solar will provide 1.6% of its FY2024 total electricity consumption by end of 2025 & the new solar farm will provide 0.2%). Its subsidiaries, Hong Yip & Kai Shing, has purchased local & international RECs. Another subsidiary, HK's largest data centre provider, SUNeVision, aims to purchase RECs 100% linked to the solar power generated by the solar farm.

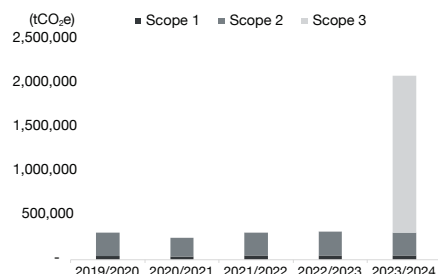
10-year Targets for FY2029/30 (Base Year: FY2019/20)



SHKP prioritizes targets that are robust and achievable, while aligning with our long-term sustainability objectives and the evolving regulatory landscape in Hong Kong. We are conducting thorough research and analysis to determine the most appropriate and impactful targets for the Group. We have developed a scope 3 emissions inventory to better reflect our GHG emissions along the value chain, which is crucial for our target-setting in the long term.

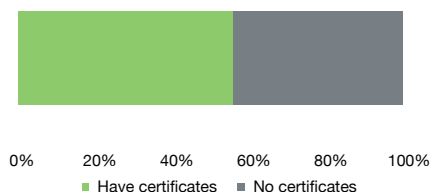
Source: Sun Hung Kai Properties Sustainability Report 2023/2024.

Greenhouse Gas Emissions



Note: Scope 2 emissions for HK are market-based, whilst only location-based was disclosed for Mainland. Scope 3 emissions from 2020-2022 were only business air travel but from 2023 onwards 10 categories were reported.

Green Building Certificates (FY2023/24)



Note: According to SHKP the 56% green building-related certificates relates to total gross floor area of managed properties in the reporting scope.

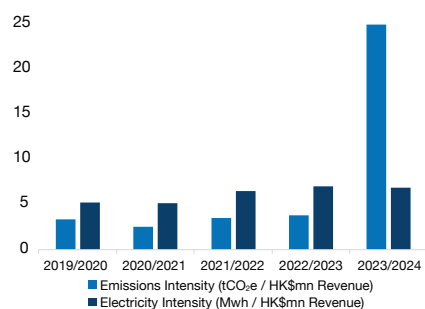
Latest Sustainability Financing Products Raised

- **2021:** 4-year sustainability linked loan (SLL) worth HK\$8.7bn with international and local banks.
- **2022:** 5-year SLL facility worth HK\$20.7bn with international and local banks.

Proceeds will be used to support SHKP's ongoing sustainability initiatives: electricity consumption intensity reduction, sustainability benchmark & indices improvement & green building certifications.

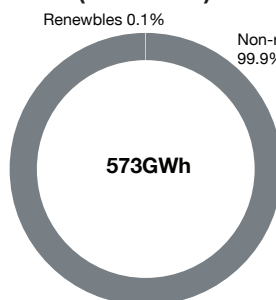
KEY ENERGY STATS

Emissions & Electricity Intensity



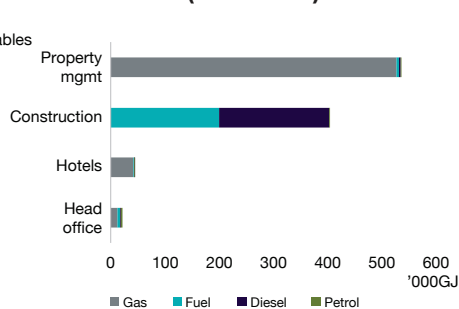
Note: 2019/2020 does not include Scope 3 emissions, from 2020/2021 onwards Scope 3 emissions was reported but only includes business air travel. In 2023/2024 10 categories of Scope 3 emissions was disclosed.

Electricity Mix (FY2023/24)



Note: The renewable electricity generated by the Group is solar in HK and exported to the Government's Feed-in Tariff Scheme.

Direct Energy Consumption (FY2023/24)



Note: Diesel and petrol were converted into GJ using British Petroleum's conversion factors so that all energy consumption types are comparable.

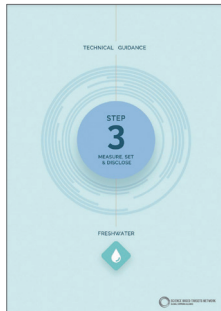
Note 1: Financial data reflects the year 2024, which ends on June 30 2024, and so does energy, emissions, adaptation and investment data.

Note 2: For more information on CWR's coastal threats stress test, please see "CWR's stress tests reveal gaps in risk recognition across the HSPDMI 4".

Source: CWR, Sun Hung Kai Properties Limited Annual Reports for past five years (FY2023/24 latest), Sun Hung Kai Properties Limited Sustainability Report for past five years (FY2023/24 latest), Bloomberg and British Petroleum Conversion factors.



Decade+ of unpacking & valuing
interlinked climate & water risks +
driving global disclosure ...



SBTN

Technical Guidance on Freshwater

- CWR on the Practitioners Advisory Group



SCIENCE BASED TARGETS NETWORK
GLOBAL COMMONS ALLIANCE

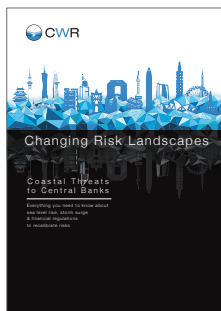


Futureproofing APAC Banks & Savings: Stress test right today to avoid hard landing

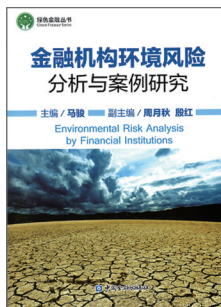
CWR, 2022

- Catalysed an open letter from the AIGCC & CWR to APAC banks to stress test right for rising seas in 2023
- At the time, the AIGCC had an AUM of US\$32trn

Changing Risk Landscapes: Coastal Threats To Central Banks CWR, 2020



Sovereigns at Risk: APAC Capital Threats CWR, 2020



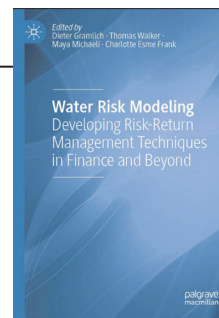
Green Finance Series: Environmental Risk Analysis by Financial Institutions CWR for China's Green Finance Committee, 2018 中文 only

CWR co-authored the chapter
on water risk valuation with
WRI & RMS

CWR was part of
China's Environmental
Risk Assessment Task
Force chaired by
Dr. Ma Jun in 2017



No water, more trade-offs Managing China's growth with limited water CWR for HSBC, 2015



Water Risk Modeling

CWR for Palgrave Macmillan
(EN 2023 / DE 2024)

- CWR wrote the textbook chapter on re-calibrating chronic tail risks & re-assessing long-term capital allocation decisions given rising locked-in coastal threats



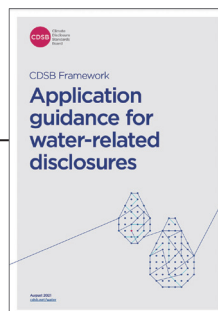
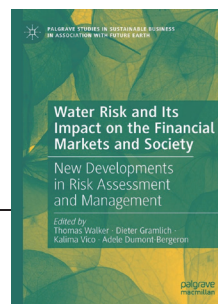
CDP

Shaping High-Quality Mandatory Disclosure: taking stock & emerging best practice

- CWR on the Steering Committee

Water Risk and Its Impact on the Financial Markets and Society CWR for Palgrave Macmillan, 2021

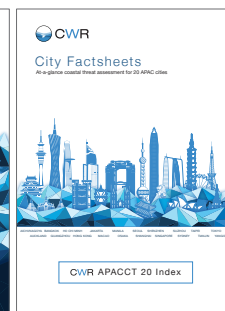
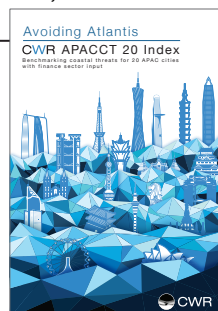
- CWR wrote two textbook chapters:
1) The Developing Field of Water Risk Valuation for the Financial Industry; and
2) Chronic Coastal Water Threats Warrant a Valuation Re-Think



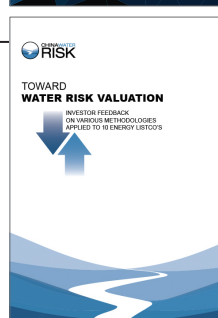
CDSB Framework, 2021 Application guidance for water-related disclosures

- CWR on CDSB's Technical Working Group on water-related disclosures; the Climate Disclosure Standards Board was consolidated into IFRS in 2022
- Recommended reading includes CWR's reports on water risk valuation & coastal threats benchmarking

Avoiding Atlantis: CWR APACCT 20 Index Benchmarking coastal threats for 20 APAC cities with finance sector input CWR, 2020



- 1st ever benchmarking of coastal threats for cities with & without adaptation
- Included in CDSB framework & Palgrave Macmillan 2021 & 2023 textbooks (see above)



Toward Water Risk Valuation: Investor Feedback on Various Methodologies Applied to 10 Energy ListCo's CWR, 2016 (EN / 中文)

Methodologies included in:

- 1st ever book on "Environmental Risk Analysis by Financial Institutions" by Dr Ma Jun (Chinese only)
- Palgrave Macmillan 2021 Textbook: "Water Risk and Its Impact on the Financial Markets and Society"

This report is "Recommended Reading" in the 2021 CDSB (now IFRS) Framework: "Application guidance for water-related disclosures"

References

- ¹ World Meteorological Organization (10 January 2025) WMO confirms 2024 as warmest year on record at about 1.55°C above pre-industrial level. <https://wmo.int/media/news/wmo-confirms-2024-warmest-year-record-about-155degc-above-pre-industrial-level>
- ² Hong Kong Observatory (3 December 2024) The Weather of November 2024 - A wet November with three tropical cyclone episodes. <https://www.hko.gov.hk/en/wxinfo/pastwx/mws2024/mws202411.htm>
- ³ International Cryosphere Climate Initiative (12 November 2024) State of the Cryosphere 2024: Lost Ice, Global Damage. <https://iccinet.org/statecryo24/>
- ⁴ Grandey, B. S., Dauwels, J., Koh, Z. Y., Horton, B. P., & Chew, L. Y. (2024) Fusion of probabilistic projections of sea-level rise. *Earth's Future*, 12(12), e2024EF005295.
- ⁵ United Nations Environment Programme Finance Initiative (March 2023) Climate Risks in the Real Estate Sector. <https://www.unepfi.org/themes/climate-change/climate-risks-in-the-real-estate-sector/>
- ⁶ Gov HK (October 2021) Hong Kong's Climate Action Plan 2050. https://cnsd.gov.hk/wp-content/uploads/pdf/CAP2050_booklet_en.pdf
- ⁷ Hong Kong Monetary Authority (2021) Pilot banking sector climate risk stress test. https://www.hkma.gov.hk/media/eng/doc/key-functions/banking-stability/Pilot_banking_sector_climate_risk_stress_test.pdf
- ⁸ Nature Communications (18 May 2021) Economic damages from Hurricane Sandy attributable to sea level rise caused by anthropogenic climate change. <https://www.nature.com/articles/s41467-021-22838-1>

WATER MATTERS

DECISIONS TODAY FOR WATER TOMORROW

info@cwrrr.org

CWR, Suite 2405, 24/F 9 Queens Road Central
Hong Kong

About

In an era marked by unprecedented accelerating water & climate threats, CWR aims to unpack and value complex climate & water risks; rethink transition to “slow down” these risks; and build resilience so that finance, corporates and governments can all make better decisions today for water tomorrow. Since 2011, the think tank has worked from its Hong Kong base to engage with global finance and business in understanding and managing various types of water & climate risks in China and across Asia. CWR's collaborative reports with financial institutions, IGOs, scientists as well as government related bodies are widely cited by the media to banks and the IPCC – they have been instrumental in understanding Asia's water challenges and informing disclosure frameworks; they compel us to rethink climate & water risks for resilience. Join the conversation at cwrrr.org

Disclaimer

This document (“Document”) has been prepared by CWR for general introduction, overview and discussion purposes only and does not constitute a comprehensive statement of any matter and it should not be relied upon as such. The Document should not be regarded by recipients as a substitute for the exercise of their own judgment. Information contained in this document has been obtained from, or is based upon, third party sources believed to be reliable, but has not been independently verified and no guarantee, representation or warranty is made as to its accuracy or completeness. All statements contained herein are made as of the date of this Document. CWR makes no representation or warranty, expressed or implied, with respect to the accuracy or completeness of any of the information in the Document, and accepts no liability for any errors, omissions or misstatements therein or for any action taken or not taken in reliance on this Document. None of CWR, its sponsors, affiliates, officers or agents provide any warranty or representation in respect of information in this Document. In no event will CWR be liable to any person for any direct, indirect, special or consequential damages arising out of any use of the information contained in this Document. This Document, graphics and illustrations must not be copied, in whole or in part or redistributed without the written consent of CWR (copyright © China Water Risk, 2025, all rights reserved).
