

Infographics & Quick Stats Pack

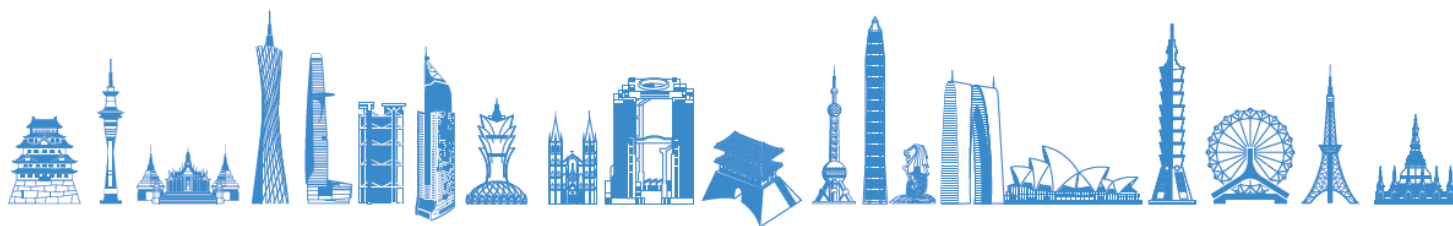
The CWR Survival Guides to Avoiding Atlantis

Infographics & quick stats:

- **What's at stake**
At-a-glance impacts for the APAC region from coastal threats for 20 APAC capitals & key economic hubs.
- **CWR APACCT 20 Index city rankings**
Index rankings are for two scenarios – one at 1.5°C that we will lock-in and another at 4°C that we must try to avoid. See how cities rank in terms of vulnerability to sea level rise, subsidence and storm surge risks plus which cities are ahead and which lag in adaptation efforts to protect their residents and assets.
- **Triggers of systemic shocks in finance**
Concentrated and clustered risks from GDP, trade and markets to bank loans that could trigger systemic shocks and financial collapse.
- **Need-to-know to threats to survive**
Shocking stats on fast & furious warming, ice melt, rising seas, storm tides and sinking cities.

Overview & Access 5 reports

Recommended next steps

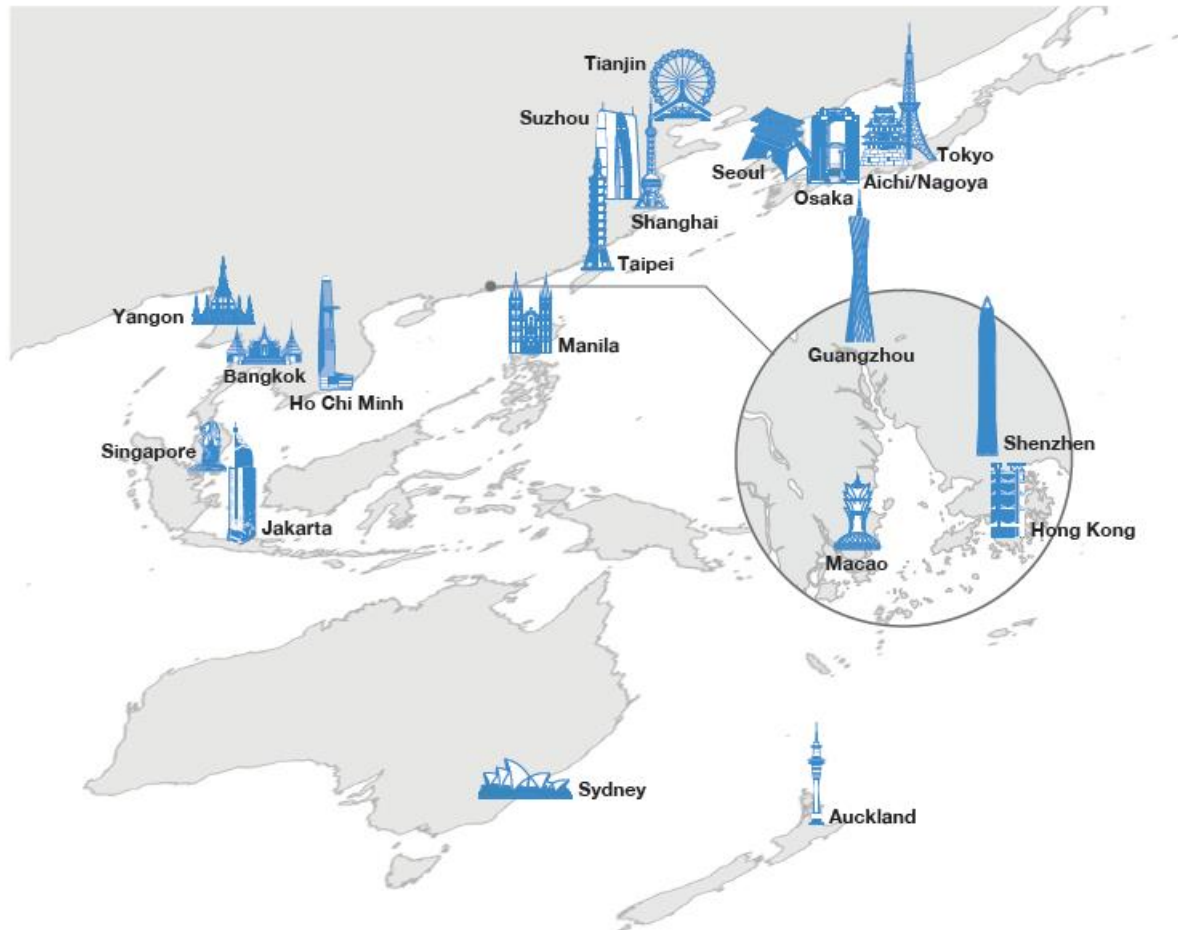


WATER MATTERS

DECISIONS TODAY FOR WATER TOMORROW

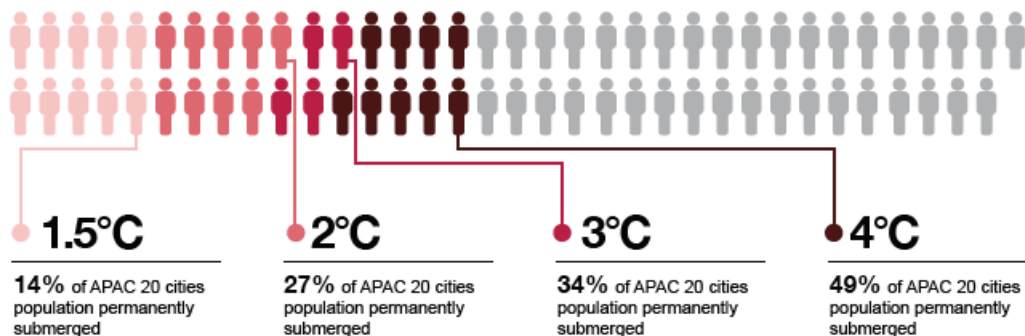
Infographics & quick stats: What's at stake

The 20 cities of the CWR APACCT 20 Index...



The CWR APACCT 20 Index: What's at stake...

20 = **207mn** + **\$5.7trn**
 APAC COASTAL CAPITALS & CITIES PEOPLE RESIDE IN THE 20 CITIES OF GDP AT RISK FROM COASTAL THREATS



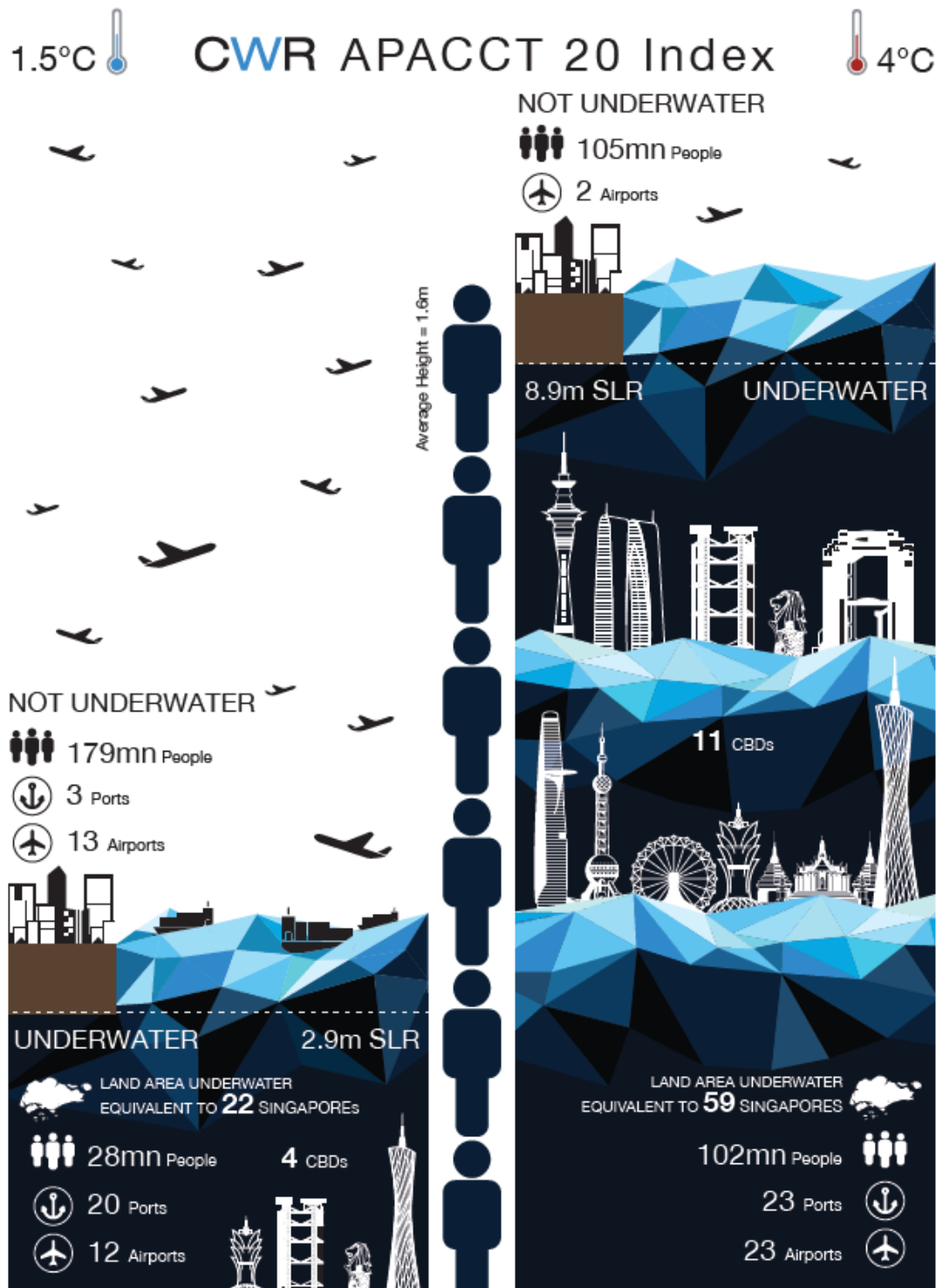
 3 million people

Source: CWR APACCT 20 Index; CWR report "Sovereigns at Risk: APAC Capital threats", 2020

Note: The impacts on population are based on estimates for 2020 and do not include any further population growth and increases/decreases in urbanisation in the future. For more details, please see "CWR APACCT 20 Index: benchmarking chronic tail risks & adaptation actions to avoid Atlantis" in Section 3.

Infographics & quick stats: What's at stake

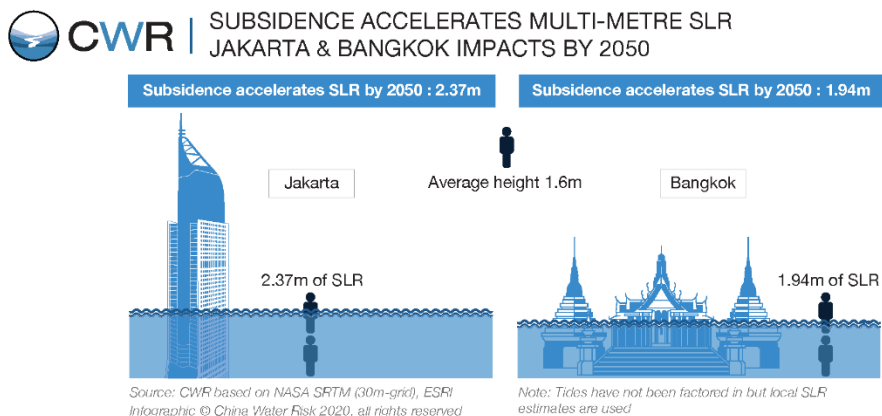
Submerged! Sea level rise we lock-in at 1.5°C vs 4°C



Source: CWR report "Avoiding Atlantis: The CWR APACCT 20 Index", 2020 Infographic © China Water Risk 2020, all rights reserved

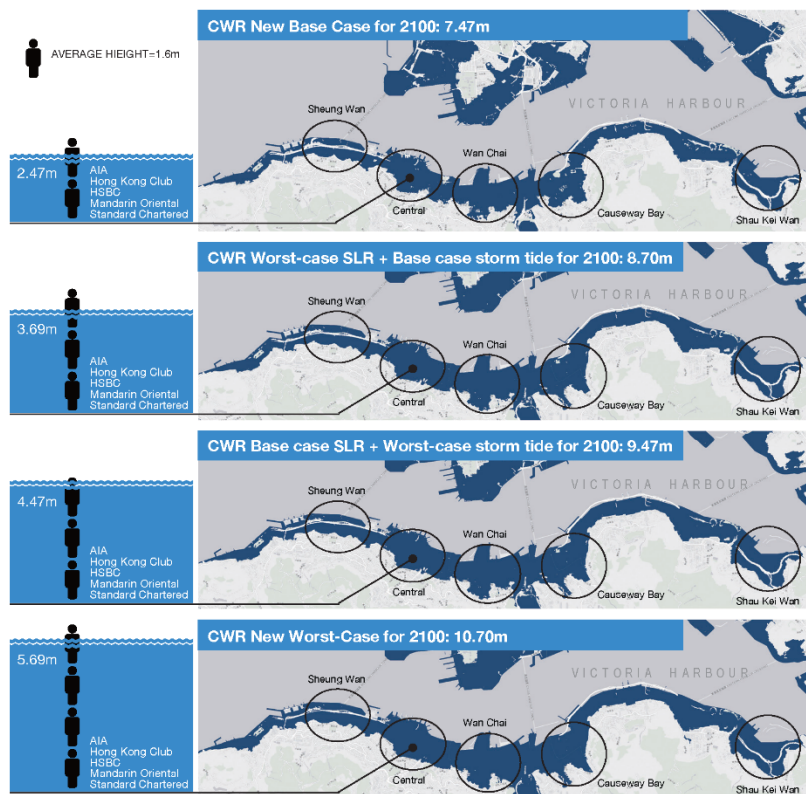
Infographics & quick stats: What's at stake

Subsidence and storm surge exacerbate threats



CWR | 2100 SLR & STORM TIDE SCENARIOS FOR HONG KONG

The charts below show the impacts of various combination scenarios of base & worst-case SLR and storm tides. While the affected areas for various scenarios may look similar on the various maps, the flooding levels differ drastically – standing at AIA, Hong Kong Club, HSBC, Mandarin Oriental or Standard Chartered buildings in Central, you will be hit by 2.47m to 5.69m waves depending on the scenario.

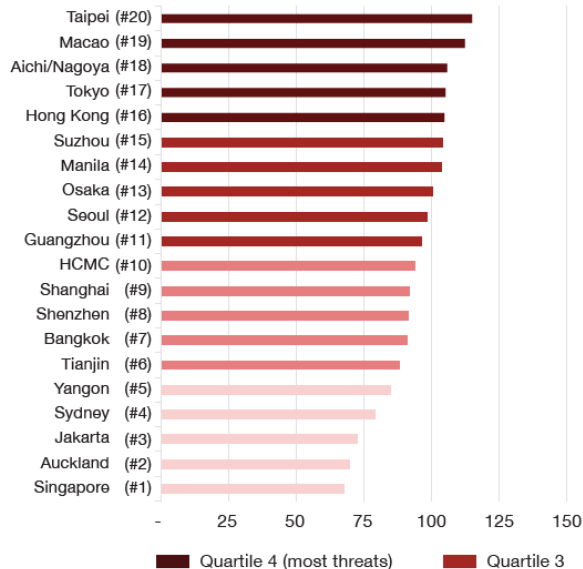


Source: CWR based on HKDTM (5m-grid) from the Lands Department of Hong Kong, ESRI
Note: This graphic has been extracted from the CWR report, "Changing Risk Landscapes: Coastal Threats to Central Banks", 2020
Infographic © China Water Risk 2020, all rights reserved

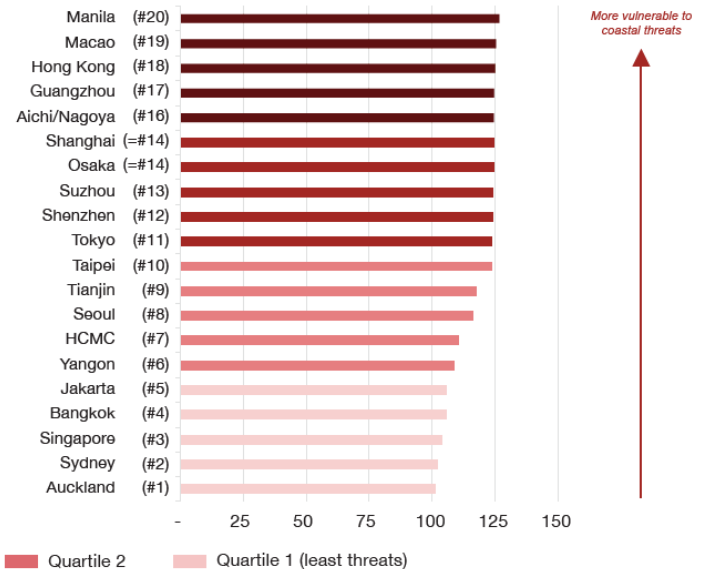
Infographics & quick stats: CWR APACCT 20 Index city rankings

CWR APACCT 20 Index

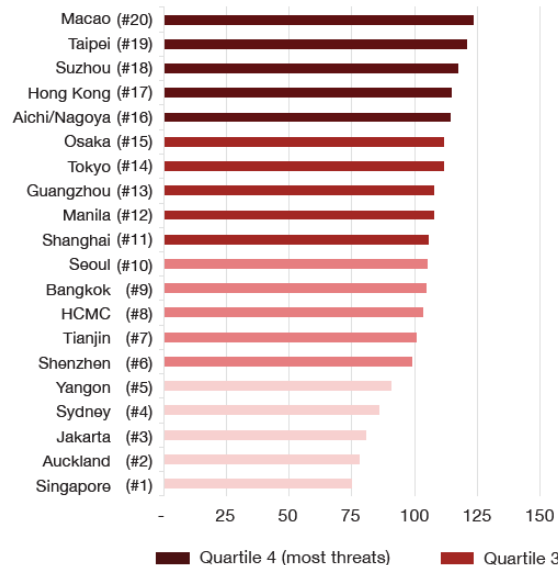
1.5°C CWR APACCT 20 INDEX



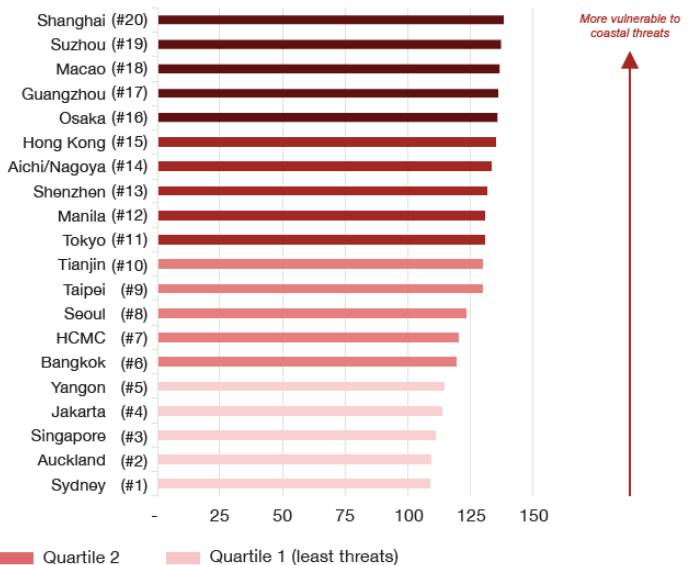
1.5°C CWR APACCT 20 INDEX - ex. Govt Action



4°C CWR APACCT 20 INDEX



4°C CWR APACCT 20 INDEX - ex. Govt Action



Source: CWR APACCT 20 Index

Infographic © China Water Risk 2020, all rights reserved

The CWR APACCT 20 Index - We have benchmarked 20 capitals & cities in the APAC region for chronic risks presented by coastal threats. Our index reflects mapped stacked SLR risks for four climate scenarios (1.5°C, 2°C, 3°C and 4°C) across key indicators (population, land area and key infrastructure assets) for each city. Storm surge threats from typhoons/tropical cyclones/hurricanes, subsidence plus government adaptation actions to reduce physical risks have also been assessed and benchmarked in the index. Over 100 finance professionals from chairs/directors of bank boards to research analysts as well as financial industry associations, asset owners and financial regulators have provided feedback on the development of this index through survey, one-on-ones and countless Zoom calls.

Source: CWR report "Avoiding Atlantis: The CWR APACCT 20 Index", 2020

Infographics & quick stats: CWR APACCT 20 Index city rankings

CWR APACCT 20 Index

How to read the index: The CWR APACCT 20 Index includes government adaptation action and so the ex. Govt Action index reflects just the physical risks from coastal threats from SLR, storm surge & subsidence. Changes in rankings between 1.5°C and 4°C indices - ex Govt Action Indices are mainly due to the topography of the city as our index reflects stacked SLR risks for four temperature scenarios.

Governments are doing the most vs. are doing the least to protect their cities

The Top 5 Proactive Cities

- Cities that are less vulnerable are making more adaptation efforts. Singapore, Jakarta and Auckland are in the Top 5 “Least Threats” list and yet they are also amongst the Top 5 Proactive Cities.
- Shenzhen and Shanghai significant adaptation efforts saw their rankings improve in both the 1.5°C and 4°C CWR APACCT 20 Index.
- We expected Tokyo, Seoul, Sydney and Hong Kong to be in the Top 5, but they are not. In fact, Seoul ended up in the Bottom 5 Laggard Cities.

CWR Government Adaptation Analysis

	Proactive		Laggards
#1	Singapore	#16	Seoul
#2	Jakarta	#17	HCMC
#3	Shenzhen	#18	Bangkok
#4	Shanghai	#19	Macao
#5	Auckland	#20	Taipei

Source: CWR reports “Avoiding Atlantis: The CWR APACCT 20 Index” & “City Factsheets”, Nov 2020

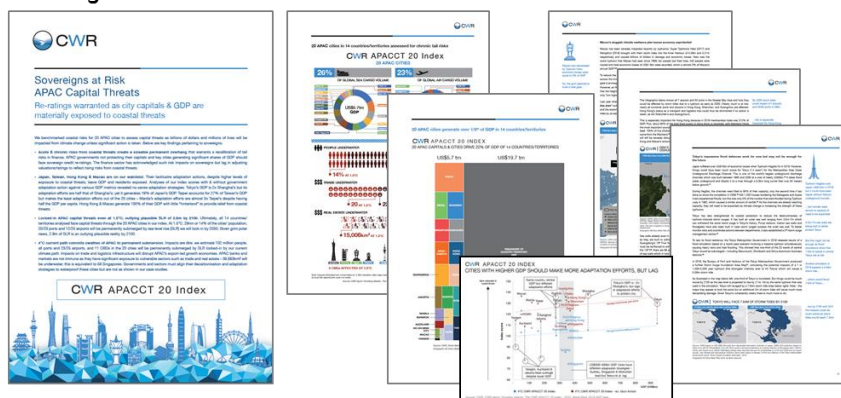
The Bottom 5 Laggard Cities

- Cities that are vulnerable are lagging in adaptation efforts. Macao is particularly at risk at both 1.5°C and 4°C; yet it also lags in adaptation efforts.
- Although Taipei ranks mid-pack in terms of physical risks, its laggard performance on the adaptation front caused it to slip in the CWR APACCT 20 Index rankings to the bottom quartile in both scenarios.
- While Seoul, Ho Chi Minh City and Bangkok are also amongst the laggards, they face relatively less at risk than Taipei and Macao.

Note: Most governments do not disclose all actions being taken to reduce impacts of physical risks, let alone the budget being set aside for it. Also, the exact impacts of government actions to adapt for coastal threats are difficult to quantify as actions are unique across cities. However, with the help of 100+ financial professionals, we reached consensus on key proxy indicators to help benchmark adaptation actions. However, due to the lack of information available, we could not score government adaptation actions at both 1.5°C and 4°C, nor could we score their plans for effectiveness. That said, do check to see if governments are prepared by seeing if they are planning for no-regret scenarios. The worst-case plausible SLR is currently around 3m by 2100 so if they are adapting to that they are on track to protect their cities.

Please see more in-depth government action analysis vis-à-vis various GDP metrics as well as government case studies in our report [“Sovereigns at Risk: APAC Capital Threats”](#). CWR welcomes feedback on the CWR APACCT 20 Index – please contact info@chinawaterrisk.org

Sovereigns at Risk ...



Source: “Sovereigns at Risk: APAC Capital Threats”, 2020

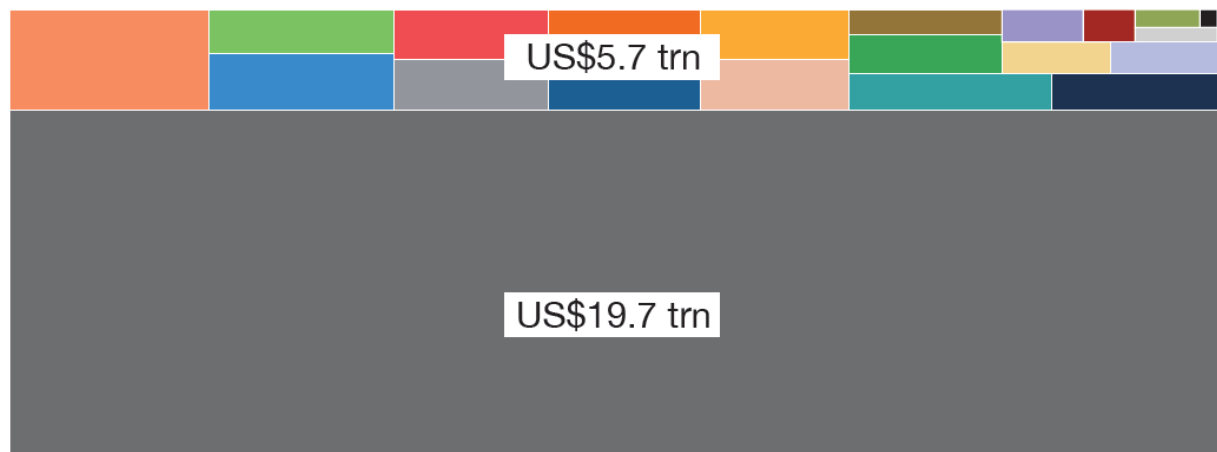
Infographics & quick stats: Triggers of systemic shocks in finance

These 20 coastal capital & economic hubs in the CWR APACCT 20 Index account for:

- US\$5.7trn of annual APAC GDP: this is equivalent to annual GDP of Germany and Canada combined. It's not just sizeable but also clustered as 20 cities account for 22% of annual GDP of their respective 14 countries/territories;
- A large share (25%-100%) of their own country/territory's GDP: ~25% (Sydney, Seoul, Taipei & Yangon), 38% (Auckland & Manila) to 100% (Hong Kong, Macao & Singapore). For Japan, three cities on Tokyo, Aichi/Nagoya and Osaka account for 33% of its annual GDP. Whereas for mainland China five cities of Shanghai, Shenzhen, Guangzhou, Tianjin and Suzhou account for 13% of its annual GDP;
- Trade risk: cities account for 26% of global sea cargo and 23% of global air cargo volumes, yet, 20/23 ports and 12 airports will be impacted by locked-in SLR at 1.5°C;
- Export-led growth, trade, food & energy security at risk: Almost half the cities have trade-to-GDP ratios greater than 100%; ratios can be as high as 312% (HK), 211% (Singapore) and 202% (Seoul). There will also be energy and food security implications for some cities;
- Significant global market risk: The APAC 20 cities have seven stock exchanges that account for US\$29trn of equity trading value in 2019 compared to NASDAQ's US\$16trn; and
- Substantial loan book risk for "16 APAC Banks": 16 large banks by market capitalisation in five financial hubs in APAC have 66% of their loan books clustered in Japan, Australia/New Zealand, Hong Kong, South Korea and Singapore. Revenues & profits may be even more concentrated.

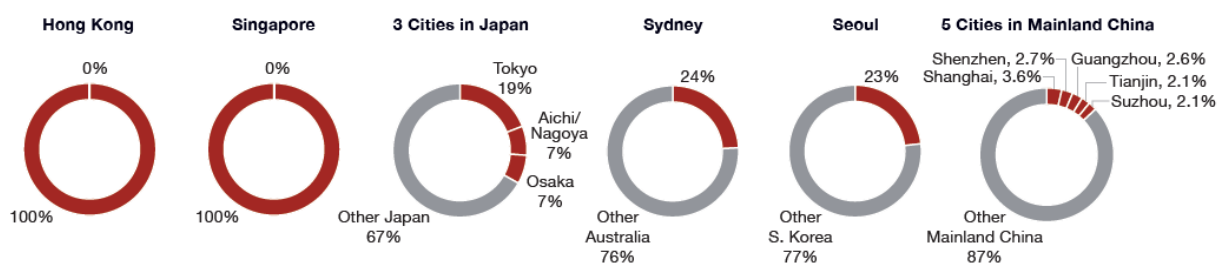
CWR APACCT 20 INDEX

20 APAC CAPITALS & CITIES DRIVE 22% OF GDP OF 14 COUNTRIES/TERRITORIES



Source: CWR, World Bank 2018 GDP data, Individual government sources
Infographic © China Water Risk 2020, all rights reserved

SIGNIFICANT % OF COUNTRY/TERRITORY GDP GENERATED BY APAC CITIES

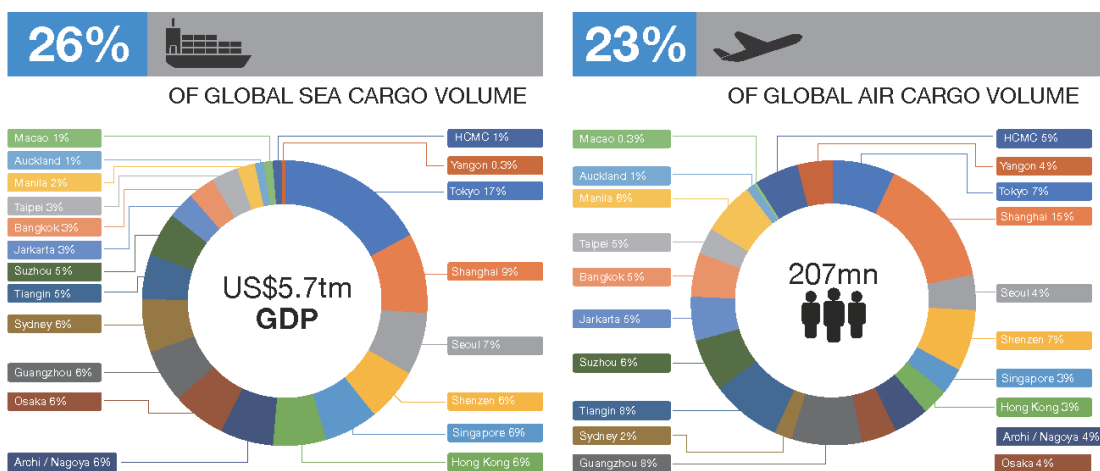


Source: CWR, World Bank 2018 GDP data, Individual government sources
Infographic © China Water Risk 2020, all rights reserved

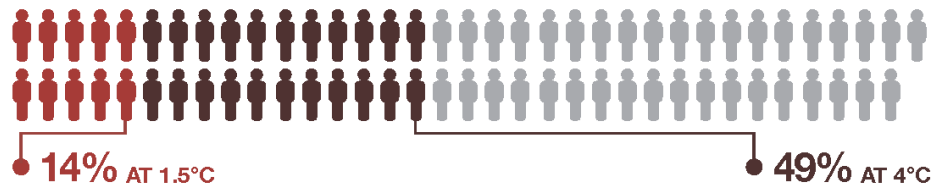
Infographics & quick stats: Triggers of systemic shocks in finance

20 APAC cities in 14 countries/territories assessed for chronic tail risks

CWR APACCT 20 Index 20 APAC CITIES



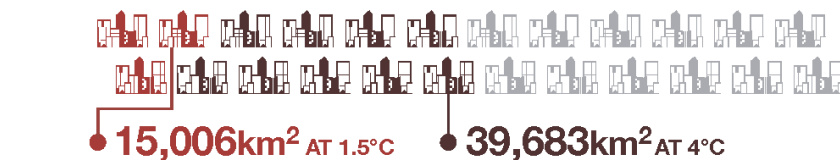
PEOPLE UNDERWATER



TRADE UNDERWATER



REAL ESTATE UNDERWATER



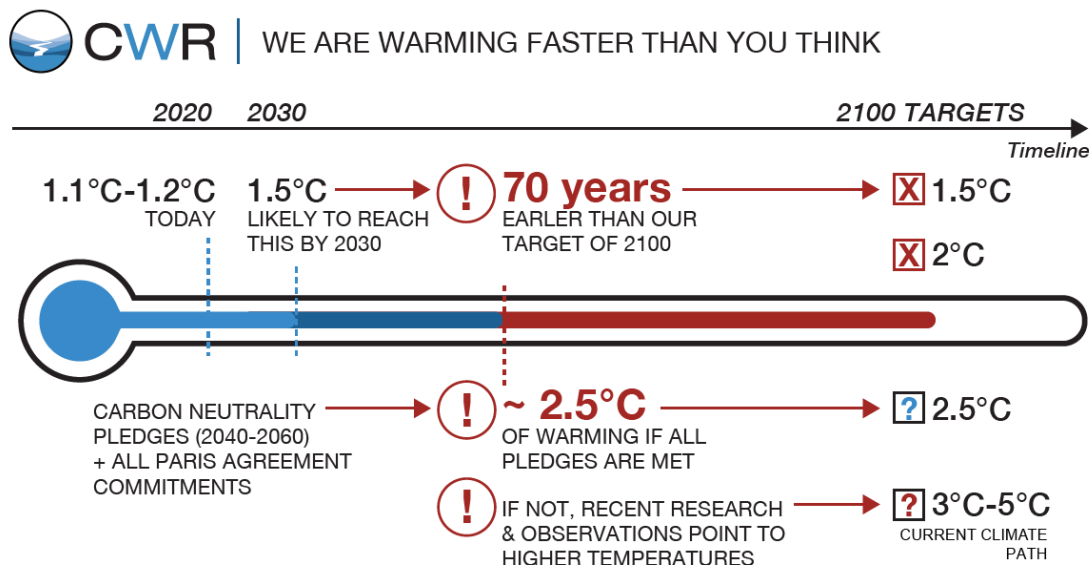
Note: Impacts illustrated are conservative as 1) 30m elevation data maps were used to benchmark coastal threats; 2) median of the locked-in SLR range was used and 3) local tide adjustments were not made.

Source: CWR report "Avoiding Atlantis: The CWR APACCT 20 Index", 2020

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Infographics & quick stats: Need-to-know threats to survive

Fast & furious warming = sooner and greater coastal threats

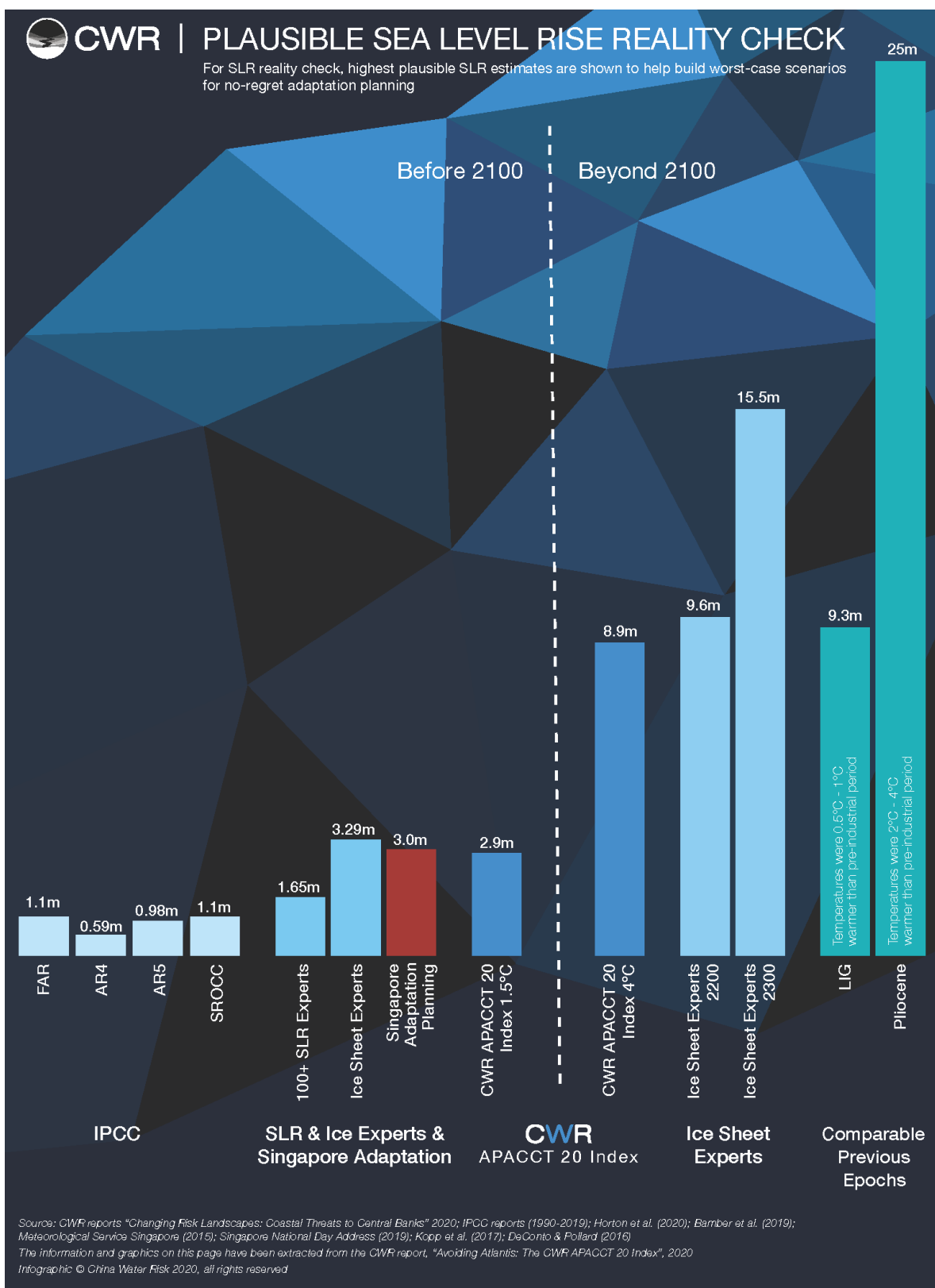


Source: CWR; WMO (2020); IPCC Special Report 2018; UNEP Emissions Gap Report (2019); Climate Action Tracker; Schwalm et al. (2020); Meehl et al (2020)
Infographic © China Water Risk 2020, all rights reserved

The information and graphics on this page have been extracted from the CWR report, "Changing Risk Landscapes: Coastal Threats to Central Banks", 2020
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- Don't let COVID-19 and recent carbon neutrality pledges distract you;** 1.5°C is pretty much locked-in so we must adapt for its impacts now. Another decade of coronavirus is needed to get us back on track for 1.5°C by 2100 and carbon neutrality pledges can help us avoid 4°C but not 1.5°C as those that will make a difference are for 2050 at the earliest;
- Our oceans are taking the heat = sea level rise (SLR) + oxygen production at risk.** Oceans have warmed at an alarming rate – the heat absorbed is equivalent to dropping five Hiroshima bombs per second in the ocean for the last 25 years. So the warmer our oceans get, the higher the seas rise due to thermal expansion. And it's not just rising seas, warming oceans will also affect oxygen production;
- Greenland and Antarctica are losing ice 6x faster than they were in the 1990s.** 6.4trn tonnes of ice have been lost from 1992 to 2018 – for perspective, this is equivalent to 39x the coal tonnage produced in the same period;
- Freshwater threats from melting glaciers.** Vanishing ice from Switzerland to Himalayas eventually end up flowing into the ocean contributing to SLR. Mountain glaciers already face accelerated glacial melt as many mountain regions are already warmer, but beyond SLR, they also bring threats to our freshwater;
- Glacier melt and associated SLR will be locked-in when we reach various temperature tipping points.** Although 8m of SLR may occur beyond 2100, we have already locked-in this in at today's temperatures. As we will likely reach 1.5°C as early as 2030, plausible SLR by 2100 can be as high as 3m – see infographic for more;
- SLR estimates are conservative = get on top of latest projections!** Don't just rely on SLR estimates from the IPCC to build scenarios; they have a conservative bias and can impede risk management. 3m of SLR is a plausible reality by 2100 – the CWR best-case 1.5°C CWR APACCT 20 Index's locked-in SLR of 2.9m was expected beyond 2200 but may now be an outlying plausible reality by 2100. The CWR base-case 4°C CWR APACCT 20 Index's locked-in SLR of 8.9m was expected beyond 2200 but may now be an outlying plausible reality by 2200; and
- Reality check.** The last time we were 0.5°C-1°C warmer than the pre-industrial period, it was during the Last Interglacial Period when SLR was as high as 9.3m; and the last time our world faced similar CO₂ concentrations (400ppm+) our seas were 25m higher – see infographic for more.

Infographics & quick stats: Need-to-know threats to survive



Tipping points & runaway melt – window to act closes by 2030

It's not that far away! We will be 70 years ahead of our 2100 warming target if we reach 1.5°C by 2030. We must start paying attention to temperature trigger points and their SLR impacts. Parts of massive ice sheets covering Antarctica and Greenland, together holding over 60m of SLR, have already started irreversibly melting at today's temperatures. All 2020 observations regarding our cryosphere is grim. Given accelerated ocean warming plus rapid loss of ice in the Polar Regions, we have less than a decade to make a real difference. Get on top of these tipping points to avoid inadvertently locking in unsurvivable SLR. There are also other feedback loops to consider – see box below. We must avoid triggering them at all costs. We must try our best to stay at 1.5°C, if not 2°C by 2100.



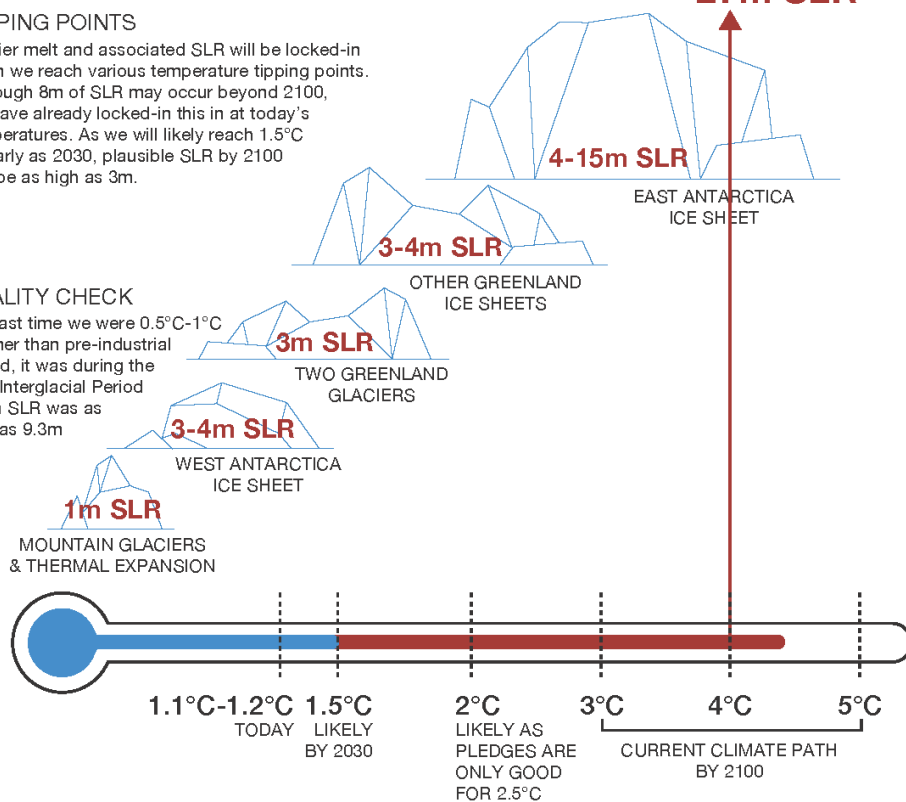
TIPPING POINTS

Glacier melt and associated SLR will be locked-in when we reach various temperature tipping points. Although 8m of SLR may occur beyond 2100, we have already locked-in this in at today's temperatures. As we will likely reach 1.5°C as early as 2030, plausible SLR by 2100 can be as high as 3m.



REALITY CHECK

The last time we were 0.5°C-1°C warmer than pre-industrial period, it was during the Last Interglacial Period when SLR was as high as 9.3m



Other feedback loops. If we cross a tipping point in our climate, vicious cycles/feedback loops take over and we become irreversibly set (i.e. locked-in) for an uninhabitable planet. Here are two other important feedback loops:

- 1. Ice-albedo effect** – A more well-known feedback loop is the ice-albedo effect - the more ice that is melted, the less surface area there is to reflect sunlight. This in turn means the dark ocean surface absorbs the sunlight and accelerates melt. We are already experiencing this feedback loop.
- 2. Permafrost thaw** – As our world warms, permafrost (frozen ground) in polar and tundra regions begin to melt, releasing methane, one of the most potent greenhouse gases. This in turn heats the world even more, releasing more methane. *"Permafrost experts agree that even a 30% loss of near-surface permafrost at 1.5°C warming may result in about 50Gt additional carbon emissions by 2100: this, when the 2-degree carbon budget allows only for 275Gt carbon released from all sources."* This additional release of carbon from permafrost has not yet been taken into account by current IPCC carbon budgets.

Source: CWR; International Cryosphere Climate Initiative report (2015); Rignot Expert Opinion (2018); Blackburn et al. (2020); IPCC-SROCC (2019); DeConto & Pollard (2016); Burke et al. (2018)

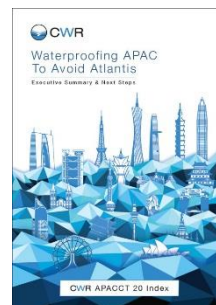
The information and graphics on this page have been extracted from the CWR report, "Avoiding Atlantis: The CWR APACCT 20 Index", 2020
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NEW 5-REPORT SERIES: **CWR Survival Guide to Avoiding Atlantis**

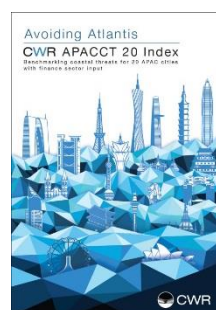
A series of five reports on benchmarking coastal capital threats in Asia Pacific (APAC) by CWR (China Water Risk)



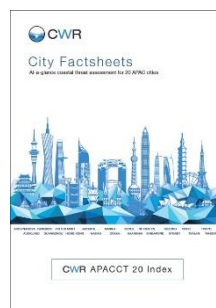
1. **Waterproofing APAC To Avoid Atlantis – Executive Summary & Next Steps.** This report is CWR's survival guide to avoiding Atlantis. It is the executive summary of the entire series of reports and is full of infographics plus need-to-know facts about the new risk landscape. It also guides you through 3-steps to waterproof APAC including next steps and to-do lists for asset owners, asset managers and banks; central banks and regulators; and governments. So if you don't have time to read the rest of the series, we recommend you [read this one](#).



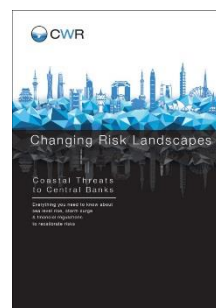
2. **Avoiding Atlantis: CWR APACCT 20 Index – Benchmarking coastal threats for 20 APAC cities with finance sector input.** This report covers the development of the CWR APACCT 20 Index (CWR APAC Coastal Threat Index for 20 cities) including the benchmarking methodology and finance sector feedback which shaped the parameters of the index, its indicators plus weightings. The index reflects impacts on land area, population, key infrastructure – stacked locked-in sea level rise (SLR) risks for 1.5°C, 2°C, 3°C & 4°C are assessed for each indicator; subsidence + storm surge + government action also included. To gauge relative risk across APAC, see which cities are ahead and which cities are behind in surviving our rising seas and [access the index](#).



3. **CWR APACCT 20 Index City Factsheets – At-a-glance coastal threat assessment for 20 APAC cities.** This is a collection of factsheets for each of the cities in the CWR APACCT 20 Index illustrating at-a-glance exposure for various climate scenarios. Cities included are Aichi/Nagoya, Auckland, Bangkok, Guangzhou, Ho Chi Minh, Hong Kong, Jakarta, Macao, Manila, Osaka, Seoul, Shanghai, Shenzhen, Singapore, Suzhou, Sydney, Taipei, Tianjin, Tokyo & Yangon. Use factsheets to help gauge absolute risks – see a [risk snapshot for each city now](#).



4. **Changing Risk Landscapes: Coastal Threats To Central Banks – Everything you need to know about sea level rise, storm surge & financial regulations to recalibrate risks.** Central Banks around the world have formed a 68+ member strong coalition to prepare for systemic risks triggered by climate threats. Recent grim polar news means multi-metre SLR is more imminent than we think yet we have not factored in such chronic risks. This report thus provides an overview of the latest science-based research on SLR & storm surge and their tail risk implications for finance. A summary of the evolving financial landscape plus how-to-build scenarios guide to assess hotspots are provided. So stay ahead of the curve and get on top of this [new risk landscape](#).

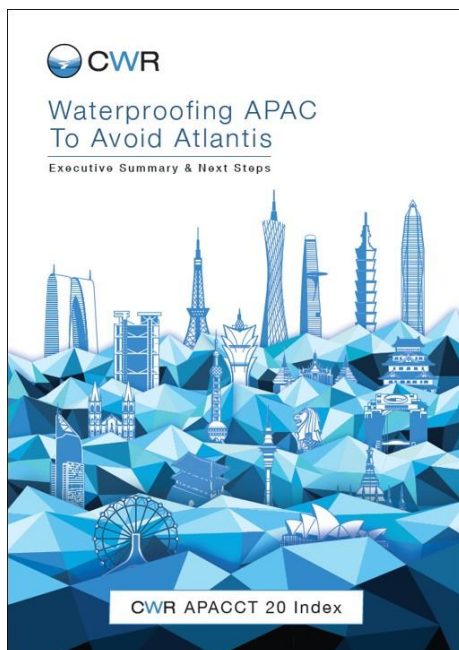


5. **Sovereigns at Risk – APAC Capital Threats – Re-ratings warranted as city capitals & GDP are materially exposed to coastal threats.** Acute & chronic risks from coastal threats create a sizeable permanent overhang that warrants a recalibration of risks across finance. APAC governments that are not protecting their cities and revenue only compound the physical threats ahead. In this report, we analyse clustered risks from GDP to trade and markets plus run through the implications for sovereign credit ratings of the 14 APAC countries/territories. See why we have put Japan, Taiwan, Hong Kong and Macao [on our watchlist](#).



Recommended next steps

1. Read “[Waterproofing APAC To Avoid Atlantis](#)” for an overview of what you need to know about the changing risk landscape, how to assess threat exposure and next steps;
2. Use the CWR APACCT 20 Index to gauge relative coastal risks by seeing index rankings of 20 APAC cities for various scenarios. See who the 100+ finance experts were that inputted into the development of the index and what they had to say in “[Avoiding Atlantis: CWR APACCT 20 Index](#)”;
3. Assess absolute risk exposure to each of the 20 APAC cities using the “[CWR APACCT 20 Index City Factsheets](#)”;
4. Use our How-to-Guides in “[Changing Risk Landscapes: Coastal Threats To Central Banks](#)” to conduct in-depth analysis of SLR, subsidence and storm risks for hotspots;
5. Assess what governments are doing to protect cities in hotspots compared to what’s at risk in terms of GDP “[Sovereigns at Risk: APAC Capital Threats](#)”;
6. Understand actions by financial regulators as they will act to avoid the lethal cocktail of 1) no-sense climate strategies; 2) over-valuation of all assets in vulnerable cities; and 3) concentrated financial risk, which can trigger financial collapse;
7. Supplement the analysis with other recommended tools – the CWR APACCT 20 Index was created to plug a gap in the existing toolbox, but this does not mean the other tools are not useful; and
8. Follow our to-do list for all stakeholders as well as the more specific next steps for central banks & financial regulators, asset owners & asset managers, banks, and governments.



We don't have that long to get prepared.

So get on top of these existential coastal threats and clustered risks today and take steps to waterproof APAC.



START NOW WITH:

**Waterproofing APAC
To Avoid Atlantis**
Executive Summary & Next Steps

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