

Press Release

New Report! No River, No Power

A new CWR report explores if 10 major climate-sensitive rivers can still power 16 countries across Asia

Hong Kong, 24 May 2023 – CWR releases [***“No River, No Power – Can Asia’s rivers power growth in a changing climate?”***](#), a new report which mapped a third of global power generation capacity to find that escalating climate risks and rivers running dry can strand sizeable portions of national power generation assets. The report showed clear national energy security implications for 16 countries from China, India, Pakistan, Laos, Myanmar, Afghanistan, Nepal to Bhutan and warned that given such material exposure, fossil fuel dependent Asia could hinder its own economic prosperity unless stakeholders make the right energy decisions today for economic, water and energy security tomorrow.

The report findings are shocking but timely and cannot be ignored especially since droughts, floods and rising temperatures along the Yangtze, Rhone, Colorado and Indus rivers last year disrupted power supply and wreaked havoc across global supply chains. Climate risks already pose grave threats to energy security, yet the report cautioned that worse is still to come.

There is sizeable trifecta exposure of power assets to rising water risks highlighted in the report. Of the 1.9TW analysed by CWR: 1) almost half (or 865GW) is clustered in 10 rivers that flow from the Hindu Kush Himalayan Water Towers – for perspective, this is greater than the combined electricity generation capacity of the G7 ex-US; 2) over 94% of this needs water to generate electricity and 3) almost 330GW or 38% is located in basin areas that already face ‘High’ to ‘Extremely High’ water stress or are arid. Clearly, power exposure to chronic and acute river basin risks is high.

What are the 10 rivers? They are the Amu Darya, Brahmaputra, Ganges, Indus, Irrawaddy, Mekong, Salween, Tarim, Yangtze and Yellow – the cradles of Asia’s civilization. So there’s much more riding on getting water and energy policies right. [*“Components of river flow such as glacial melt, snow/rainfall and monsoon patterns are all impacted by climate change so it’s not just national power assets that can be stranded, lives and livelihoods are also at stake – one in two Asians live in these 10 river basins where over US\\$4.3trn of GDP is generated annually,”*](#) explained Debra Tan, Head of CWR and lead author of the report.

Yet Asia is still power hungry. The ADB projects that APAC energy demand will double by 2030, and since key types of power generation in the region such as thermal power (coal, gas, oil and nuclear) and hydropower require water to generate electricity, demand for water will also rise. Indeed, the global scientific consensus under the IPCC projects that under all 2°C scenarios, the energy sector’s share of global freshwater use is projected to increase to almost a quarter by 2050; driven mainly by the rapid increase in electricity demand across developing nations.

However, adding more fossil fuel based power to meet development needs could result in a vicious cycle – more carbon emissions will exacerbate water scarcity which in turn will accelerate the stranding of power assets that require water to operate. So since power choices can impact water and the lack of water can strand power assets, the report pointed out that water security should inform energy security and urged governments to plan economic development and power expansion with water resource availability in mind.

[*“Uncertain future flows of the 10 rivers and extreme weather mean we must curate mountains-to-oceans wateromic roadmaps and energy systems that are resilient to climate change. National energy and water security plans must thus dovetail. The need to do all this is ever more urgent as doing so will help us manage escalating and compounding water risks as well as meet rising demand for water”*](#) said Tan.

As it is, extreme weather in river systems can already trigger systemic shocks on a national scale. The devastating Indus floods last year are case in point – over 30mn people in Pakistan lost their homes and its GDP took an estimated 10% hit. But impacts could be a lot worse: the new report showed the Indus river basin houses around 276mn or 88% of Pakistan’s population as well as 75% of national installed power capacity. Moreover, 92% of national GDP is generated there – the Indus cannot be allowed to fail. As the Indus also has the highest risk exposure profiles to drought and flood risk, building resilience to extreme weather is key, said the report.

National water and energy security futures as well as economic growth are clearly tied via the 10 rivers. Besides Pakistan, the report also illustrated national energy dependence on singular to multiple rivers – for example, Bhutan & Nepal’s power generation face single key river risk with 100% of their generation assets located in the Brahmaputra and Ganges respectively. Meanwhile, a third of India’s national installed capacity straddled three rivers whereas around half of China’s national capacity installed is spread across seven rivers. Beyond power generation, the report also found that people and GDP are significantly exposed to river basin risks: for China, around 44% of its population and 30% of its GDP are clustered in nine rivers; for India, 54% of its population and 43% of its GDP are clustered in four rivers.

There are also transboundary issues. While installed capacity ranged from 9GW on the Amu Darya to 373GW on the Yangtze, the report noted that some rivers only serve one country whereas others serve multiple countries. For example,

power assets along the Mekong serve five countries whereas power assets on the Tarim, Yangtze and Yellow only serve China. *“This means that the transboundary management of 8 out of the 10 rivers should not just be about water sharing but also energy policies and development as well”* said Dr. CT Low, CWR’s Geospatial Risk Lead and co-author of the report.

This is a mammoth task and the authors acknowledged that much more work needs to be done. *“The report is far from perfect, with clear data gaps, but given the risks, we felt compelled to make a start in unpacking Asia’s tight water-energy-climate nexus so that we can make informed energy decisions today for water tomorrow”* said Dr. Low. Regardless, *“what’s clear is that the eight countries which fall into the ‘Overall High Risk Group’ must let basin risks guide energy policies”* he added.

While the report classified the 16 countries into 4 risk groups, it is worth noting that China and India are not in the ‘Overall High Risk Group’. However, the report emphasized that coal-reliant China and India can do more to de-risk their power generation assets for regional energy and water security as they have the most amount of GW clustered in areas facing severe water stress in the 10 river basins: 188GW or 43% of China’s coal-fired capacity in the 10 basins face ‘High’ to ‘Extremely High’ water stress; and although India’s fleet facing similar water stress exposures is smaller at 55GW, its exposure to severe water stress is higher at 83%.

According to the IPCC, one way to build energy resilience is to shift power expansion towards less water and carbon intensive power generation types such as solar PV and wind. However, this may be easier said than done as it may be difficult to completely de-coal from an energy security standpoint. So, the report suggested as part of its **“8 recommendations”** that coal-fired plants, which are key for base load and energy security, to maximise energy efficiencies; consider carbon capture; and retrofit plants with cooling tech to alleviate water stress in severely water stressed areas. The report’s deep dive into cooling technologies showed that there is indeed room for improvement.

It’s imperative that China and India along with the other 14 countries choose the right type of power but Dr Low cautioned to *“beware of the trade-offs – carbon capture is water intensive, so limited water can constrain such options and while air-cooling can alleviate water stress, it uses more power”*. Perversely, *“as extreme weather can cause disruptions in hydropower, more coal-fired capacity may be added to balance the grid and avoid disruption”* he added. Here, the report did note a surge in “just-in-case” coal-fired power additions in China after the severe droughts along the Yangtze in 2022.

Balancing the power generation mix, carbon emissions, water use and energy security is challenging but CWR remains optimistic about the transition. *“We are optimistic that Asia can fast track the transition given the speed of growth in clean energy. For example, did you know that China’s clean electricity output of 2,960TWh in 2022 has already surpassed the EU’s 2021 total electricity generation of 2,785TWh?”* remarked Tan. Investments in renewables are rising from Asia; according to Bloomberg, China spent close to US\$100bn in large-scale solar and wind in 1H2022 alone.

Also, the IEA stated that China and India are both doubling renewable expansion for the next five years. But, given their coal fleet exposure to water risks, China and India can do more to de-risk: *“In developing Asia, we have the luxury of real time adjustments to our development models to rein in emissions plus build infrastructure to adapt to climate impacts. Asia must absolutely grasp this opportunity to fast track the transition as well as prepare and adapt for escalating water risks.”* urged Tan.

The stakes cannot be higher – if we do not manage to rein in emissions, the IPCC projects that 3-4bn people could face chronic water scarcity. Ultimately, all carbon intensive energy assets around the world will raise Asia’s water risks. The current oil boom as a result of the Russia-Ukraine war only adds oil to fire, steering us dangerously towards the IPCC SSP3 “Regional Rivalry Scenario” of over 4°C of warming. As the report projects that four of the 10 rivers will see overall falls in river flows by mid-century under a 1.5-2°C scenario, 4°C will truly be *“climate hell”*. This leaves China and India with no choice but to step up and lead the world in fast tracking decarbonisation.

CWR hopes that the report will change the way we look at power and rivers. It has certainly provided a compelling case. Now it’s up to those of us with a stake in Asia to build on this work so that we can better inform and shape our shared energy and water futures. As Tan succinctly summed, *“Now is the time for Asia to put in place sensible energy policies that will protect and not destroy our rivers. If we do not fail our rivers, our rivers will not fail us”*.

Media

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Report funding

CWR is grateful to the Growald Climate Fund for the funding of this report. The Growald Climate Fund is a venture philanthropy fund that incubates, seeds, and scales organizations with potential for outsized impact.

About CWR

CWR (China Water Risk) is a non-profit think tank that aims to create a world where water and climate risks are embedded in business & finance. Since its launch in 2011, it has worked from its Hong Kong base to engage with global business and investment communities in understanding and managing various types of water risks in China and across Asia. CWR's collaborative reports with financial institutions, IGOs, scientists as well as government related bodies have been considered ground-breaking and instrumental in understanding Asia's water challenges. They are widely cited by the media, academia, IGOs and finance as well as the IPCC. CWR also works with corporates and the financial sector to help them assess, strategize and adapt to water-related climate risks. Together, we can make better decision-making today for a water secure tomorrow. Join the conversation at www.chinawaterrisk.org

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Understand the new risk landscape | Assess water & climate threats | Identify clustered risk hotspots & compound risks

STRATEGIZE

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ADAPT

Protect & prepare for locked-in climate impacts | Ideate flexible innovations | Be ready to survive & thrive

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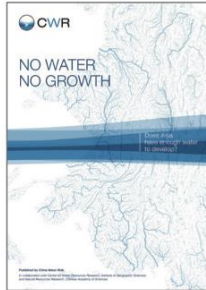
CWR track record

Please refer to the following page for an idea of CWR's work in the water-energy-climate nexus.

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CWR: a decade of unpacking & valuing interlinked water-nomic risks in the water-energy-climate nexus ...

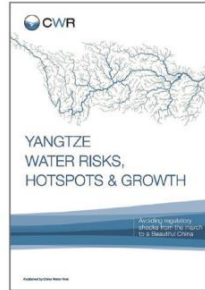


No Water No Growth – Does Asia have enough water to develop?
CWR with CAS-IGSNRR, 2018

Notably:

- Cited by IPCC AR6 WG2: “Climate Change 2022: Impacts, Adaptation & Vulnerability”
- Led to a water-nomics chapter in a 2021 Nature Springer book: “Water Security Under Climate Change” launched by Scotland’s Minister of Net Zero ahead of COP26 in Glasgow

Yangtze Water Risks, Hotspots & Growth – Avoiding regulatory shocks from the march to a Beautiful China
CWR, 2019

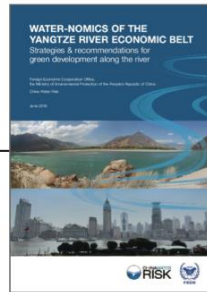
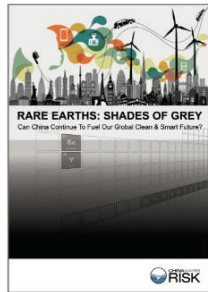


长江经济带水资源环境指标评估及对策
Journal of Beijing Normal University (Natural Science), 2019 (Chinese only)

Rare Earths: Shades Of Grey Can China continue to fuel our clean and smart future?
CWR, 2016 (EN / 中文)

Institutional investor highlighted CWR’s report in the 2016 PRI in persons meeting

The PRI tabled rare earths as an emerging risk along with cybersecurity and antibiotics



Water-nomics of the Yangtze River Economic Belt
CWR with MEP-FECO, 2016 (EN/中文)

Findings were:

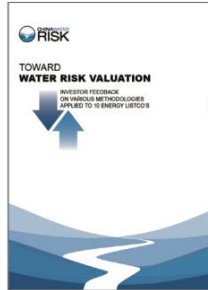
- Distributed internally as “red-heading” communication to central & provincial government bodies & environmental authorities of China
- Published in national academic journal “Environmental Protection” (Issue 15, 2016), one of the most influential environmental journals in China

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”

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



Water Use in China’s Power Sector: Impact of Renewables & Cooling Technologies to 2030
CWR & IRENA, 2016 (EN / 中文)

Findings were presented by IRENA in:

- Clean Energy Ministerial (CEM) 7 Preparatory Meeting in Beijing in March 2016
- The 12th Council of the International Renewable Agency

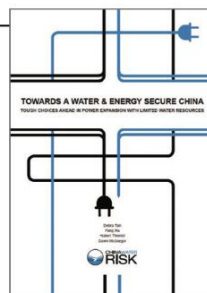


Water for Coal – Thirsty miners will feel the pain
CWR for CLSA U, 2013

Unpacking water risks in the power sector in sell side research (institutional investors only)



No water, no power Does China have enough power to fuel expansion?
CWR for HSBC, 2012



Towards A Water & Energy Secure China – Tough choices ahead in power expansion with limited water
CWR, 2015

Unpacking water risks for different power types - coal, hydro, nuclear & renewables (open source)



Water Risk Analysis & Recommendations for Water Resource Management in Ningxia
WRI with CWR, 2015 (EN/中文)

Provincial case study on water use permit trading between the power sector & agriculture