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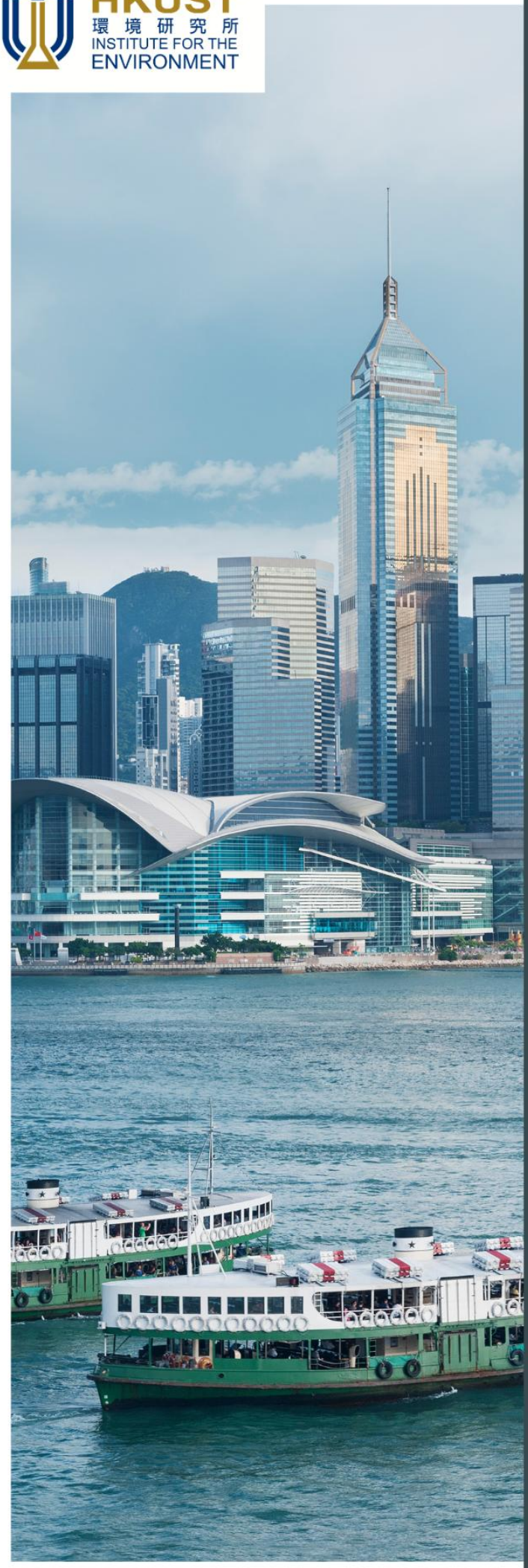

FROM PORT 1.0 **TO PORT 2.0**

HONG KONG'S NEXT LEAP TO EVOLVING A BLUE ECONOMY VISION

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Executive Summary

Hong Kong's maritime sector has achieved significant environmental progress over the past two decades, particularly through targeted efforts to reduce air pollution from ships as well as improve harbour water quality. These measures have moved the city beyond the conventional Port 1.0 model focused narrowly on cargo throughput toward a more sustainable and integrated future. However, with tightening international regulations, intensifying climate risks, and shifting public expectations for urban waterfronts, Hong Kong must now take a decisive leap toward Port 2.0.

Port 2.0 reimagines the port not just as industrial infrastructure, but as a multifunctional interface that connects sea, land, city, people, technology and ecology. It calls for sector electrification, the adoption of green maritime fuels, digital innovation, and coordinated regional action. Crucially, it also demands a new approach to urban coastal planning – one that supports economic competitiveness, environmental stewardship, and inclusive public access to the harbour and inshore waters.

At the heart of this next transition is also the need to embrace a broader *Blue Economy* vision. Increasingly reflected in Mainland China's policy and international sustainable development agendas, the Blue Economy concept integrates port development with marine conservation, biodiversity, climate resilience, recreation, technology and the responsible use of ocean resources. Hong Kong, with its world-class harbour, diverse coastline, and global connectivity, is uniquely positioned to become a leader in this space but aligned public policy is essential.

Drawing on its past environmental reforms, regional cooperation in the Greater Bay Area, its emerging green shipping initiatives, and attention to shaping a new Biodiversity Strategy and Action Plan under the UN Convention on Biological Diversity, Hong Kong can demonstrate what a truly sustainable 21st-century maritime city can be – cleaner, smarter, more inclusive, and deeply connected to its sea.

I: Rethinking Port Development: From 1.0 to 2.0

The concept of Port 1.0 defines the traditional role of ports as infrastructure dedicated to industrial logistics and the efficient movement of goods. Ports used to be largely inward-facing, prioritizing cargo throughput over environmental impact, community integration, and urban design. Emissions from ships and port operations were major contributors to local air and harbour water pollution, fenced-off waterfronts and degraded marine ecosystems.

The emergence of global imperatives of sustainability and liveability have given rise to another vision, which could be referred to as Port 2.0. This paradigm reimagines ports as multifunctional interfaces that connect sea, land, city, people, technology and ecology, as well as serve as platforms for innovation and civic life.

Port 2.0 is characterized by decarbonization, digital port operations, green maritime fuels, shore power infrastructure, and integrated planning that brings communities back to the waterfront and the use of the sea for enjoyment. Many port cities globally, such as Rotterdam, Singapore, Shanghai, and Los Angeles, are already advancing these principles to improving quality of life while enhancing their economic competitiveness and appeal as places to live, work, and visit. This vision requires integrated policy planning, implementation and investment, as well as skilful articulation at domestic and international levels to attract business and visitors.

2. Hong Kong's Transition: From Pollution to Policy Innovation

Hong Kong's maritime sector offers a compelling case study of incremental yet impactful environmental reform. In the mid-1990s, public concern particularly over worsening air quality was mounting, particularly as policy efforts had largely concentrated on controlling emissions from power generation and road transport, leaving those from shipping unaddressed. Despite being a major contributor to local air pollution with serious public health implications, emissions from vessels had not yet attracted regulatory attention.

Civic Exchange, a local think tank, played a pioneering role in changing this. In the mid-2000s, it commissioned research from the Hong Kong University of Science and Technology (HKUST) and convened stakeholder dialogues to highlight the growing problem of air pollution from marine sources. These efforts brought greater clarity to the scale and health consequences of shipping emissions. In collaboration with the HKSAR Government and HKUST, Civic Exchange helped lay the groundwork for policy change that began to take shape from 2012 onward.

One of the most significant catalysts for action was the *Fair Winds Charter*, a shipping industry–funded initiative launched in 2012. This voluntary agreement urged the Hong Kong authorities to introduce regulatory measures on shipping emissions and advocated for regional coordination to extend fuel-switching practices to nearby ports in Guangzhou and Shenzhen.

A critical milestone came in 2013, when the HKSAR Government announced its intention to regulate fuel use by ships at berth. The HKSAR Government also began to engage national and regional authorities on aligning approaches. In 2015, Hong Kong became the first jurisdiction in Asia to mandate fuel switching at berth. Under this regulation, ocean-going vessels (OGVs) were required to switch from high-sulphur to low-sulphur bunker fuel while docked, leading to a significant reduction in sulphur dioxide and particulate matter emissions in densely populated port-side areas.

Building on this progress, Mainland China followed suit by adopting similar policies. It introduced fuel-switching requirements in 2016 and later expanded to designated Emission Control Areas (ECAs) in 2019. As a result, vessels entering the regulated waters of Hong Kong and Mainland China were obliged to switch to cleaner fuel even before berthing. This alignment helped harmonize emissions standards across the Greater Bay Area, one of the world's busiest shipping bay areas, and marked a significant step forward in regional environmental cooperation.

These foundational reforms underscore the importance of cross-sector collaboration and policy innovation. Government agencies, industry leaders, academic institutions, and non-governmental organizations each played critical roles in developing and implementing effective responses. Together, they demonstrated that collective action can lead to meaningful environmental progress in complex, high-impact sectors such as maritime transport.

3. Urban Coastal Planning and Public Access

As a city of over seven million people with limited land, Hong Kong's coastline plays a crucial social, ecological, and spatial role. Since the passage of the Protection of the Harbour Ordinance in 1997, which effectively halted most new reclamation within the boundaries of Victoria Harbour, there has been growing recognition that the harbour is not only a geographic centrepiece but also a vital civic asset.

Despite this shift in mindset, large portions of the waterfront had remained physically and visually inaccessible to the public. Fenced cargo yards, private ferry piers, industrial facilities, and major roadways create significant barriers between communities and the water's edge. Civic campaigns advocating for improved urban planning and waterfront design gained momentum. A particularly important milestone was the establishment of the Harbourfront Commission in 2010 by the HKSAR Government, following the earlier Harbour-front Enhancement Committee (2004–2009), to steer planning and policy efforts toward creating a more vibrant, accessible, and people-friendly harbourfront.

These efforts have led to meaningful improvements, most notably the development of continuous walkways along Victoria Harbour and the progressive opening of public spaces for leisure and recreation. The reimagining of harbourfronts is part of a broader global trend among port cities, which are increasingly integrating port functions with urban life. This includes the creation of promenades, cultural precincts, mixed-use developments, and restored natural habitats – all designed to reconnect communities with the waterfront and celebrate the maritime identity that defines port cities.

4. The Emerging Challenge: Achieving Port 2.0 in Practice

Despite these many advances, Hong Kong's port remains heavily reliant on fossil fuels. Onshore Power Supply (OPS) infrastructure is not yet in place, and critically, there is no policy and timetable yet for its implementation – despite OPS being standard policy in many leading port cities. As a result, vessels continue to burn carbon-intensive fuels while at berth, contributing to both local air pollution and greenhouse gas emissions. The domestic shipping sector, including ferries, barges, and river trade vessels, also lags significantly in the adoption of zero-emission technologies.

To realize the vision of Port 2.0, Hong Kong must take decisive action in three key areas:

a. Electrification and Infrastructure Readiness

Electrification is the linchpin of a clean port. However, deploying OPS at the Kwai Tsing container terminals is not straightforward. Retrofitting berths, investing in

transformers and substations, and coordinating with the power grid all require significant planning and multi-year lead times.

A further challenge is that the majority of OGVs calling at Hong Kong are not currently equipped to receive shore power. Yet, as more port cities, particularly in Mainland China, provide OPS, the global fleet will adapt. Without a clear OPS deployment strategy, Hong Kong risks being bypassed by newer, OPS-enabled vessels and becoming a destination for older, higher-emitting ships.

Adding to the challenge, Hong Kong's container terminals are privately owned and operated. Without a government mandate and clear policy direction, terminal operators have little incentive to invest in OPS infrastructure, given the substantial capital requirements and uncertain cost recovery. Regulatory leadership will be necessary to trigger the level of investment and coordination required.

In contrast, the electrification of harbour craft and domestic vessels, such as ferries, barges, and river trade vessels, is entirely within the HKSAR Government's regulatory reach – including the government's own fleets. The technology for zero-emission propulsion is increasingly available and viable for short-distance routes. However, barriers remain, including limited shore charging infrastructure and the high upfront capital costs of battery-electric systems. Government intervention will be essential to de-risk private sector investment and accelerate adoption.

b. Regional Coordination on Marine Emissions

The maritime geography of the Greater Bay Area means that pollution and climate impacts are shared. Many OGVs calling at ports in Shenzhen and Guangzhou pass through Hong Kong waters. Passenger ferries, river cargo vessels, and other craft crisscross the boundaries between Hong Kong, Macau, and Guangdong. Harmonized policies and monitoring systems in emissions reductions make obvious sense.

A regional emissions strategy is needed. This could involve joint commitments to vessel electrification, shared data platforms on emissions, coordinated incentives, and infrastructure planning for alternative fuels. Hong Kong, as a global financial and maritime centre, is well positioned to lead such efforts. This had been done before in 2012 on fuel switching – there is no reason why Hong Kong cannot trigger a new stage of regional collaboration.

c. Scaling Up Green Fuels and Green Corridors

To decarbonize the deep-sea segment of shipping, Hong Kong must prepare for the future of alternative fuels. On 15 November 2024, the HKSAR Government announced its strategic vision to establish Hong Kong as a green shipping fuels trading and bunkering hub. This includes positioning the city to supply low-and zero-carbon fuels, such as green methanol, and to serve as a node in international and regional green shipping corridors.

Achieving this vision requires coordinated investment in fuel supply chains, safety standards, and bunkering infrastructure. Clear guidelines and certification systems will be needed to ensure fuel quality, operational safety, and environmental integrity. Hong Kong should also work with other ports to align protocols for green corridors and stimulate first-mover demand, which is now urgent considering the International Maritime Organisation's new mandate (IMO MEPC 83) on decarbonizing shipping.

By enabling green fuel availability and supporting decarbonized shipping routes, Hong Kong can enhance its competitiveness as a maritime hub while accelerating global efforts toward net-zero shipping. These efforts are also being pursued by the shipping community in Hong Kong through dialogue and cooperation with the HKSAR Government. The shipping community sees the importance for Hong Kong to be a first mover in this endeavour.

5. Advancing a Blue Economy Vision

The long-term transformation of Hong Kong's port and waterfront must be guided not only by decarbonization and operational upgrades, but also by a broader vision of ecological and economic sustainability – i.e. realization of the new concept of Blue Economy. This concept was recently raised in the Legislative Council – a signal that the time has arrived for Hong Kong to think differently for greater gains.

This concept, increasingly adopted internationally and in Mainland China's marine and coastal development strategies, encompasses sustainable shipping and logistics, marine ecosystem protection, coastal resilience, technology and innovation, and the

responsible use of ocean resources for economic growth and social well-being.

For Hong Kong, aligning with this vision means treating the harbour not merely as infrastructure for commerce and transport, but as a living system that supports biodiversity, recreation, and quality of life. A clean harbour, healthier marine habitats, and restored shorelines are core to realizing the Blue Economy approach in the whole of the city – as it is a coastal city with magnificent marine assets. Port 2.0 principles, pollution control, decarbonization, digital integration, and community reconnection, are fully compatible with the Blue Economy framework.

Urban design and coastal planning initiatives must now integrate Blue Economy considerations. For instance, recent proposals such as Skytopia on Lantau Island to include a new yachting marina and expanded waterfront access, and the Urban Renewal Authority's new proposal to create the Victoria Cove Area, should embed ecological sustainability into their design at the earliest planning and design stage. Such developments offer a chance to showcase how recreation, economic activity, and environmental stewardship can coexist.

A robust Blue Economy vision can also provide a unifying framework for government Bureaux, especially Development Bureau, Environment and Ecology Bureau, Transport and Logistics Bureau, Technology and Innovation Bureau, Culture, Sports and Tourism Bureau, and Financial Services and Treasury Bureau to coordinate more effectively. Indeed, policy fragmentation threatens Hong Kong's competitiveness.

Significantly, Hong Kong, as part of China's obligations under the United Nations Convention on Biological Diversity, is also required to draft its own Biodiversity Strategy and Action Plan (BSAP) to guide local conservation and ecosystem restoration efforts. The HKSAR Government has launched the outline of a new BSAP for public consultation, which recognises the threat of climate change, and the potential for leveraging our unique natural marine assets in a sustainable manner. Collaborative partnering with a focus on deepening collaborations with neighbouring cities and the Greater Bay Area is one of four key areas.

By aligning its port development, coastal revitalization, and sustainability-cum-BSAP efforts with the emerging Blue Economy agenda, Hong Kong can strengthen its leadership as a green and blue maritime city that is economically competitive, environmentally resilient, and deeply connected to its harbour and sea.

6. Reimagining Recreation, Sports, and Well-being on the Water

An essential yet often underemphasized dimension of the Port 2.0 and Blue Economy vision is the role of recreation, sports, and public well-being. Hong Kong's exceptional natural coastline, renowned for its biodiversity and scenic beauty, offers immense, yet underutilized, potential for water-based recreation and sports that enhance quality of life, promote physical and mental health, and foster a deeper connection between people and the sea.

The tourism sector has increasingly recognized that Hong Kong's natural assets offer a unique currency for the city. Today's visitors seek memorable, immersive experiences, and destination promotion is now driven largely through social media. The seamless continuum of experiences – from port infrastructure to ships, from the harbour to coasts, beaches, waters, sports, technology, and ecology – and including local history and culture – constitutes a valuable package. Hong Kong needs a refreshed mindset to creatively bundle these offerings in innovative ways that promote domestic ecotourism and attract international visitors.

The harbour and its adjacent coastal waters are already witnessing a resurgence of recreational interest. Signature events such as cross-harbour swims, coastal races, and dragon boat festivals have demonstrated how marine spaces can be dynamically shared between industrial activity and public enjoyment. Water sports and competition, yachting and excursion vessels, coastal swimming, and even swim instruction for families and domestic helper communities have gained traction, illustrating how safe, inclusive, and well-managed access to the sea can become an integral component of urban life.

However, expanding marine recreation requires strategic foresight and integrated planning. This includes sensitive coastal design, improved water quality, clearly designated safe navigation zones, and effective management of competing marine uses. A well-connected network of marine areas protected for biodiversity can also serve as a foundation for sustainable tourism, with activities thoughtfully planned and regulated throughout Hong Kong's territorial waters. Purpose-built infrastructure to

support swimmers, non-motorised and electric watercraft, and community-based aquatic activities should be embedded into urban and harbourfront development plans – not as afterthoughts, but as core features of a liveable, inclusive, and people-friendly waterfront city.

By embracing the fusion of port, harbour, sea, economy, recreation and sustainability, Hong Kong can create a model for urban coastal living that advances both economic and ecological objectives, while simultaneously enhancing the health, happiness, and well-being of its residents.

Conclusion

Hong Kong stands at a crossroads. It has made meaningful progress in maritime pollution control and harbourfront revitalization, but the challenges of decarbonization, technological transformation, and spatial integration remain. Embracing the Port 2.0 model, rooted in electrification, green fuels, regional collaboration, and public access, will allow Hong Kong to lead in the era of sustainable port cities.

By also aligning with the broader Blue Economy agenda, Hong Kong can build a port and marine system that is competitive, inclusive, and resilient. This is not only about cargo, but also about rethinking the harbour as a space for innovation, for communities, for sustainability and climate action, and for convivial living.

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