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Confronting China's Dual-Use Shipbuilding Empire

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A Report of the Hidden Reach Special Initiative

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Executive Summary

Background

China's shipbuilding sector has undergone a striking metamorphosis. Twenty years ago, the country was a peripheral player in the global shipyard business. Today, it dominates the industry. At the heart of this transformation is the China State Shipbuilding Corporation (CSSC), the world's biggest shipbuilding group. The firm built more commercial vessels by tonnage in 2024 than the entire U.S. shipbuilding industry has built since the end of World War II.[1]

CSSC's reach extends beyond powering global commerce. It is also the driving force behind China's bid for a "world-class navy" that is increasingly capable of projecting power farther from China's shores.[2] Over the past two decades, CSSC has churned out advanced warships at an alarming clip, upgrading the People's Liberation Army Navy (PLAN) from a modest coastal force into a regional juggernaut.

Operating under the firm grip of China's top political leadership, CSSC has become a poster child of Beijing's "military-civil fusion" (MCF, 军民融合) strategy, which seeks to eliminate barriers between the country's commercial and defense sectors. Driven by this initiative, CSSC has deliberately blurred the lines between its commercial and military shipbuilding operations, leveraging its extensive commercial network to support China's naval modernization.

While much attention has been paid to how MCF has helped upgrade China's military, there has been considerably less focus on the ways that companies located outside of China are supporting its defense industrial ecosystem. China's deliberately opaque dual-use shipbuilding network makes it

hard for foreign companies to gauge how their ship orders, technology transfer, and other activities ultimately bolster China's military development.

This report demystifies the intricacies of China's shipbuilding ecosystem, offering U.S. policymakers, business leaders, and other stakeholders a clearer perspective on the strategic challenges it poses.

The Tiered Risk System: Assessing the Dual-Use Threat

This CSIS report explores the close ties between commercial and military shipbuilding in China, focusing in particular on the role that foreign firms are inadvertently playing in facilitating the expansion and modernization of the PLAN. Utilizing data accessed through intelligence platforms S&P Global and Datenna, as well as satellite imagery and other open-source materials, this study categorizes each of the 307 Chinese shipyards active from 2019 to 2024 into four tiers that reflect their degree of integration with the country's military industrial ecosystem:

- Tier 1 (Very High Risk): CSSC-owned shipyards known to produce warships for China's navy.
- Tier 2 (High Risk): CSSC-owned shipyards that build commercial ships but maintain close ties to military projects, personnel, and state funding mechanisms.
- Tier 3 (Moderate Risk): Shipyards owned by other state firms besides CSSC, which can be mobilized to support national security needs.
- Tier 4 (Lower Risk): Private or foreign-owned shipyards that have limited documented military involvement but are subject to China's regulatory and political control.

Key Findings

The tiered categorization clarifies how commercial shipbuilding is distributed across China. While all Chinese shipyards operate under state directives, those in higher tiers demonstrate closer ties to the country's military and national security apparatus.

Table 1: Tiered Breakdown of China's Shipbuilding Industry, 2019–2024

	Risk level	No. of shipyards	Total production (No. of hulls)	Total production (GT, millions)	Share of production (%)	Share of production for foreign buyers (%)
Tier 1	Very High	12	434	28.1	17%	75%
Tier 2	High	23	659	37.5	23%	76%
Tier 3	Moderate	46	1,034	39.3	24%	58%
Tier 4	Lower	226	2,325	59.3	36%	71%

Source: Authors' research; and S&P Global Sea-web.

The analysis reveals that a disproportionate share of China's commercial shipbuilding occurs at shipyards that are closely intertwined with the country's sprawling defense industrial base. Tier-1 and Tier-2 yards represent just 15 percent of active shipyards in China but produce a striking 40 percent of its total commercial output by tonnage. Private shipyards, although far more numerous, combine for just 36 percent of the country's commercial production.

Foreign buyers are responsible for the vast majority of shipbuilding production across China's industry, but especially at Tier-1 and Tier-2 yards. Over 75 percent of the production at these shipyards was destined for firms based outside of China or Hong Kong. This includes U.S. military allies like Denmark, France, Greece, Japan, and South Korea, as well as other partners like Qatar, Singapore, Switzerland, and—most strikingly—Taiwan.

By purchasing vessels from these yards, foreign firms have funneled billions of dollars of revenue into entities that are central to China's naval modernization. Given the substantial overlap in material inputs, production techniques, personnel, and infrastructure required for both commercial and military shipbuilding, commercial revenues effectively subsidize China's naval expansion. By offsetting fixed costs, these earnings enable Chinese shipyards to scale military production more efficiently and at lower marginal expense. Even when military and commercial production is not co-located, the shared ownership structures between many of the leading commercial and military shipyards enables assets and processes to be easily transferred across the civil-military divide.

Foreign firms have also provided China's defense contractors with key dual-use shipbuilding technology through joint ventures, licensing agreements, and direct purchases. These transfers have been essential to enabling the PLAN to overcome important technical hurdles in areas like marine propulsion.

Finally, China's key naval shipbuilders continue to benefit from access to financial markets in the United States and its allies. Foreign capital flows, including from U.S. institutional investors, help fund CSSC and its subsidiaries despite their central role in China's military industrial ecosystem.

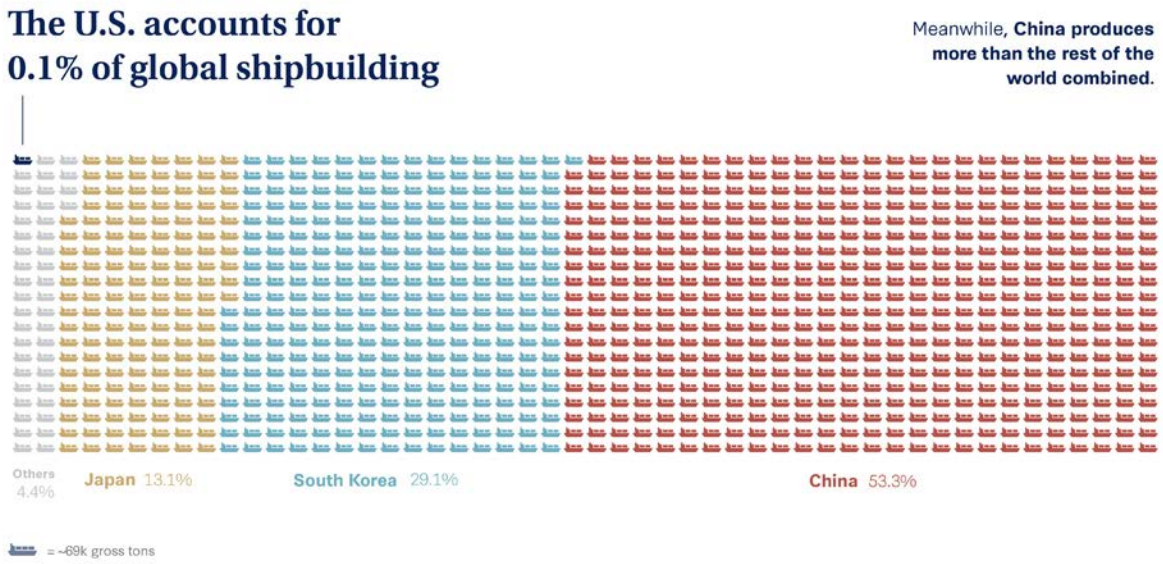
Strategic Risks and Global Implications

China's growing dominance in global shipbuilding presents critical economic and national security challenges for the United States and its allies. The country's rapid naval expansion, enabled by its dual-use shipbuilding model, is closing the gap with U.S. naval forces. The PLAN now fields more warships than the U.S. Navy and is on track to deploy a 425-ship fleet by 2030, sustained by an industrial base capable of replacing and repairing vessels far faster than U.S. yards.

Economically, China's industrial policies are marginalizing U.S. and allied shipbuilding industries. Japan and South Korea, once dominant, are losing market share, even in advanced sectors like liquefied natural gas (LNG) tanker production. European shipbuilders also face growing competition as China expands into high-value markets like cruise ships. The U.S. commercial shipbuilding sector

has been nearly eliminated, with its market share falling to just 0.11 percent of the global total in 2024.

Figure 1: Global Commercial Shipbuilding in 2024



Source: Authors' calculations; and S&P Global Sea-web.

The erosion of U.S. and allied shipbuilding capabilities poses an urgent threat to military readiness, reduces economic opportunities, and contributes to China's global power-projection ambitions. Addressing these disparities is essential not only for military deterrence but also for maintaining economic and strategic stability.

The time to act is now.

Policy Recommendations

China's naval buildup and its commercial shipbuilding dominance are not distinct challenges. Policy measures to address these threats must simultaneously factor in both the economic and security dimensions. Policymakers must balance both short-term responses and long-term strategy, addressing immediate security concerns while anticipating the broader implications of China's expanding military-industrial reach.

In the short term, Washington needs to take actions—along with its partners and allies—to level the playing field and disrupt China's murky dual-use ecosystem. In the long term, the United States needs to invest in expanding shipbuilding capacity outside of China by rebuilding U.S. industry and by leveraging the existing strengths of key like-minded nations.

This report offers concrete policy recommendations to achieve these objectives. They are summarized below, with more detailed recommendations located at the end of the report.

1. **Impose scalable docking fees on global shipping companies operating Chinese-built vessels.** Work is already underway in Washington to devise a scheme to impose docking fees on Chinese-made vessels when they call at port in the United States. The authors recommend tailoring those fees so that they impose higher costs on purchasing ships from the most concerning shipyards, such as Tier-1 and Tier-2 shipyards. Taking a weighted approach would allow for more effectively targeting China's shipbuilding ecosystem to achieve not just economic objectives but also national security objectives.
2. **Sever remaining U.S. financial and business ties with CSSC and its subsidiaries.** The U.S. government has already blacklisted CSSC, but there are still loose ends to tie up. Tightening financial restrictions would better prevent U.S. capital and technology from supporting China's naval expansion.
3. **Monitor Chinese shipyards and remain flexible in enforcing actions.** China's shipbuilding ecosystem is opaque, and private firms can be co-opted for military purposes. Some shipyards may shift production strategies to bypass measures, necessitating a flexible enforcement approach. Ongoing industry and intelligence assessments will help ensure U.S. measures remain effective.
4. **Use targeted diplomacy to encourage other countries to limit ties with China's dual-use shipyards.** Many non-U.S. companies rely on Chinese shipbuilding, making global coordination crucial. Targeted measures—rather than blanket bans—will make it easier to secure allies' buy-in. Diplomatic efforts should emphasize the shared risks of supporting shipyards tied to China's military ambitions.
5. **Make targeted investments in long-term shipbuilding capacity in the United States.** Docking fees and other measures can help raise funds to reinvest into U.S. shipbuilding capacity. Policymakers should maintain realistic expectations for the short term, but targeted investments can help set the foundation to build a minimum shipbuilding capacity needed to meet national security and strategic requirements. Strengthening domestic capacity will also create high-skilled jobs and bolster national security.
6. **Attract foreign investments into the U.S. shipbuilding industry.** Washington should encourage and incentivize key global players—especially South Korea and Japan—to invest in U.S. shipbuilders. Policymakers should also look for investments from European companies that are global leaders in high-tech areas of the shipbuilding industry. As Washington courts investments, it should offer reciprocal investments in other areas as an incentive and strengthen economic and security ties with key partners.
7. **Coordinate with partners to build additional shipbuilding capacity outside of China.** Given U.S. constraints, reducing China's dominance in global markets will require friendshoring. Shipyards in Japan, South Korea, and Europe can be strengthened through coordinated investment and policy incentives. Prioritizing emerging technologies—such as clean energy vessels—may provide opportunities to compete with China more effectively in the long term.

1

China's Strategic Approach to Shipbuilding

Generations of Chinese leaders have prioritized shipbuilding as a foundational pillar of economic and military power. The industry has benefited from decades of state support and industrial policy, initially focused on spurring economic development and modernization. As China's geopolitical environment has evolved, however, the strategic and security dimensions of shipbuilding have come to the fore.

Since Xi Jinping's ascent to power in 2012, Beijing has accelerated efforts to transform China into a "strong maritime power" (海洋强国). This concept encompasses not only naval power but also economic influence, scientific discovery, and technological innovation in the maritime domain.[3] Under Xi, the shipbuilding sector has been directed decisively toward serving national objectives, producing a fundamental shift in the global market in favor of Chinese shipbuilders—many of which play a key role in China's defense industrial base.

Military-Civil Fusion

The meteoric rise of China's commercial shipbuilding industry is closely tied to the relentless pace of its military modernization. Rather than establishing firewalls between civilian and military production, China has actively sought to integrate these activities. This aligns with China's military-civil fusion (MCF, 军民融合) strategy, a national strategy elevated and spearheaded by Xi Jinping to fuse together the country's national security and economic development policies to simultaneously level up the defense industry and broader economy.[4]

Maximizing the overlap between commercial and military production through MCF provides a key channel for the exchange of resources, technology, and personnel between sectors. China's 13th Five-Year Plan for the Development of Strategic Emerging Industries highlights "military-civilian common standardization projects [that] promote two-way transfer of military-civilian technology."[5] The prominent role of sprawling state-owned enterprises (SOEs) in strategic industries further facilitates this process, as it consolidates commercial operations, research and development, and military production under direct government control.

In recent years, shipbuilding has emerged as a poster child of MCF in action. Policies such as the 2015 Technical Standards for New Civilian Ships to Implement National Defense Requirements intentionally blur the lines between military and civilian production by requiring civilian vessels built for China's commercial fleet to conform to military specifications.[6] In 2017, Xi established the Central Commission for Integrated Military and Civilian Development and elevated MCF to a national strategy. At the commission's opening plenary session, he called for the country "to make military-civilian integration better and faster," and sea power topped the list of priority areas.[7]

At the heart of Beijing's MCF ambitions in shipbuilding lies the China State Shipbuilding Corporation (CSSC), an expansive conglomerate of shipyards, factories, and research institutes overseen by China's top political and military leadership. CSSC is the world's largest shipbuilding group, and in 2024 alone, it produced more commercial vessels by tonnage than the United States has since World War II. Yet, the company is also responsible for building warships for the ever-expanding People's Liberation Army Navy (PLAN), which is rapidly amassing the world's largest fleet.

China State Shipbuilding Corporation is the world's largest shipbuilding conglomerate by both revenue and market share. It boasts 84 subsidiaries and employs over 200,000 people across shipbuilding, marine engineering, research and development, and various other portfolios. The firm calls itself the "main force" in developing China's naval forces, and "undertakes the scientific research and production tasks of all the main combat equipment of the Chinese Navy."[8] Similar to U.S. firms like Boeing or Lockheed Martin, it is a major defense contractor with significant commercial operations. However, CSSC has fewer lines separating its commercial and military operations, creating inherent risks for companies seeking to do business without inadvertently contributing to China's military development. In 2020, the U.S. Department of Commerce placed 25 CSSC subsidiaries on its Entity List, restricting the transfer U.S. technology to those entities.[9] In 2021, the U.S. Department of the Treasury added the company to its Non-SDN Chinese Military-Industrial Complex Companies List, restricting certain financial transactions with the firm.[10]

Senior executives at China's leading shipbuilders have openly embraced the push to integrate commercial and military production. In 2017, Hu Wenming, then-chairman of CSSC, described Xi's MCF drive as a "mobilization order" to accelerate fusing the civilian and military sectors.[11] Hu Keyi, chief engineer at CSSC's Jiangnan Shipyard and a member of the Chinese People's Political

Consultative Conference, urged the industry to "focus on the transfer of civilian technology to military technology, especially the transfer of shipyard civil shipbuilding methods."[12]

"At present, we should focus on the transfer of civilian technology to military technology, especially the transfer of civilian ship construction methods in shipyards."

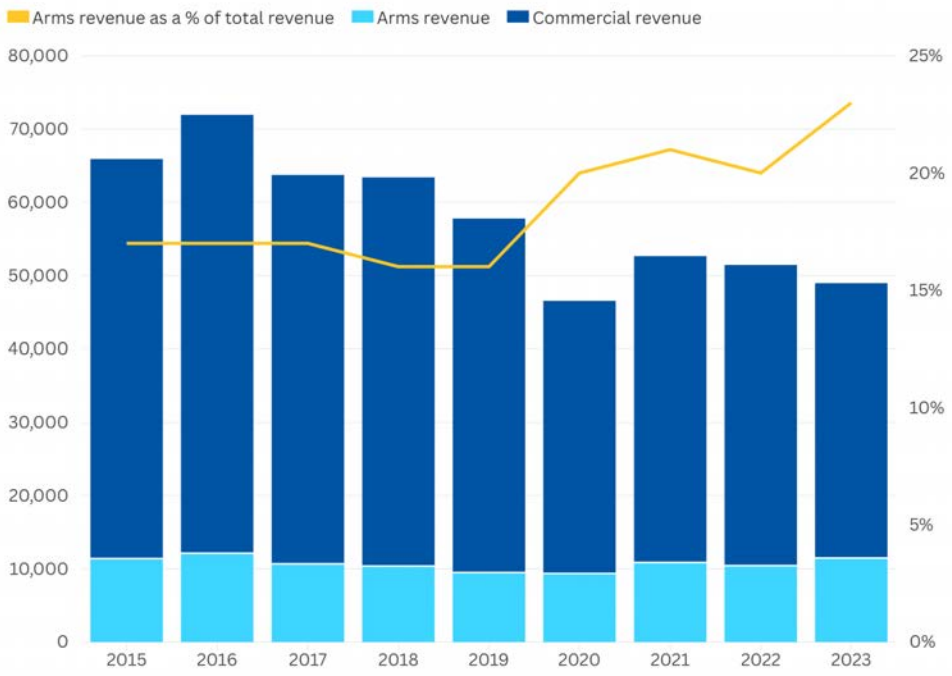
Hu Keyi, chief engineer of Jiangnan Shipyard

MCF offers China's commercial shipbuilders a significant competitive advantage in global markets. The shipbuilding industry is prone to volatile boom-and-bust cycles driven by shifts in international trade flows. After the 2007–08 global financial crisis, for instance, many shipyards worldwide faced severe downturns and closures. During such rough patches, Chinese shipyards benefited from counter-cyclical investments through naval contracts. This practice continues today.

While a direct comparison between commercial and military vessels is difficult due to their differing labor and material requirements, one reliable estimate suggests that a single aircraft carrier can generate as much work for a shipyard as 10 bulk carriers or supertankers.[13] In fact, the difference may be even more stark. Unofficial estimates put the cost of China's third aircraft carrier a roughly $6–$8 billion compared to the $130–$140 million price tag for a new supertanker.[14]

This steady demand has enabled Chinese shipyards to maintain high capacity levels, allowing them to ramp up production quickly when commercial markets rebound—unlike many of their foreign competitors, which are often forced to downsize or exit the industry entirely.

Figure 2: CSSC/CSIC Arms Revenue as Share of Total Revenue



Source: "SIPRI Arms Industry Database," Stockholm International Peace Research Institute (SIPRI), https://www.sipri.org/databases/armsindustry.

Figure 3: Integrated Civilian and Military Production Visible at Changxing Island Shipbuilding Base and Longxue Island Shipbuilding Base

Although it ranks among the world's leading defense contractors, CSSC generates a uniquely large share of its revenue from civilian production (see Figure 1). In 2023, just 23 percent of CSSC's revenue came from defense, well below the global average of 56 percent for major defense firms.[15]

Even Boeing, one of the world's leading commercial aircraft manufacturers, depends on defense for over 40 percent of its revenue.[16]

Unlike Boeing, which largely separates its defense and commercial business units, CSSC can readily redirect its commercial revenue toward bolstering naval production. In 2016, an entity within CSSC transferred the assets of one of its most prolific commercial shipyards, Qingdao Beihai Shipbuilding Heavy Industry, to Wuchang Shipbuilding, another subsidiary shipyard that builds warships, particularly submarines, for the PLAN.[17] A spokesperson for the company stated that "the integration (of Qingdao and Wuchang) will have complementary advantages. The new shipyard will be capable of producing not only military ships, including the next-generation frigates and amphibious warfare ships, but a wide range of commercial ships."[18]

MCF in shipbuilding has been further accelerated by state-driven consolidation efforts. In 2019, Beijing orchestrated a merger between CSSC and its largest domestic rival, the China Shipbuilding Industry Corporation (CSIC), which had been separated since 1999.[19] The merger placed the two giants' dual-use shipyards, as well as nearly 100 subsidiaries and research institutes, under one corporate umbrella. This has helped further streamline financing, technology sharing, and personnel transfers across civilian and military lines.

At major shipbuilding hubs—such as Changxing Island in Shanghai, Longxue in Guangzhou, and facilities in Dalian—commercial and naval production lines have been increasingly co-located, further reducing barriers between merchant and military shipbuilding across China.[20]

It is worth noting that state-directed consolidation, coupled with the prioritization of military demands, can stifle competition and impede transparency. This has facilitated systemic corruption in China, exemplified by the high-profile fall from grace of former CSSC Chairman Hu Wenming. In 2023, Hu was sentenced to 13 years in prison for his role in a graft scandal in which the state alleged he received $8.4 million of personal kickbacks.[21] Hu's conviction followed a 12-year sentencing of another shipbuilding executive, Sun Bo, who was imprisoned several years earlier for accepting millions of yuan worth of bribes during his tenure.[22] Such corruption inflates costs and can slow technological progress as resources are diverted toward personal gain or politically directed projects rather than market-driven innovation.

Even so, Beijing's continued promotion of MCF reflects the leadership's confidence in the approach. Xi Jinping's ongoing, far-reaching anti-corruption campaign, which targets top figures in the military and defense industrial base, suggests that Xi and the Chinese Communist Party are confident they can combat corruption while still driving forward MCF.[23]

Beijing's Policy Push

China's emergence as a global shipbuilding powerhouse gained momentum in the early 2000s, driven by major policy shifts. Recognizing that the rapid growth of containerized maritime trade would be a boon for global shipbuilders, Beijing began developing ambitious plans to position Chinese firms at the forefront of the industry. In 2002, Zhu Rongji, China's premier and chief

economic architect at the time, visited the headquarters of CSSC, where he declared that China would seek "to become the largest shipbuilding country . . . by 2015."[24]

The following year, the State Council published the Outline for the Maritime Economy Development, which laid the groundwork for three major shipbuilding industrial clusters in Bohai, Shanghai, and Guangzhou. These regions remain the powerhouses of the country's shipbuilding output today.

Table 2: Selected Chinese Shipbuilding Policies, 2000–2020

Policy name	Year	Description
10th Five-Year Plan	2001–2005	Set goal to "develop [China's] shipbuilding industry into a major world-leading industry"
National Maritime Economy Development Plan	2003	Targeted an increase in total maritime production
State High-Tech R&D Program (863 Plan)	2004	Encouraged technical development in the shipbuilding industry
11th Five-Year Plan	2006–2010	Focused on indigenous ship design capabilities
Medium- and Long-Term Plan for Shipbuilding	2006	Introduced broad support for industry and the goal to acquire foreign ship equipment manufacturing technology
Shipbuilding Industry Adjustment & Revitalization Plan	2009	Aimed to speed up R&D in marine engineering after the 2007–08 financial crisis
Made in China 2025	2015	Promoted high-tech shipbuilding and innovation
14th Five-Year Plan	2021–2025	Continued emphasis on innovation, including in green shipbuilding technologies

Source: Authors' research.

Since 2003, China has issued at least 25 national-level plans involving the shipbuilding sector. Each successive Five-Year Plan, widely regarded as the government's principal economic blueprint, has included directives to bolster shipbuilding. China's influential Made in China 2025 plan also designated shipbuilding as a strategic priority. An array of lower-level sectoral guidance and implementation documents published by various ministries and party organs sets specific development benchmarks and outlines policy support measures.[25]

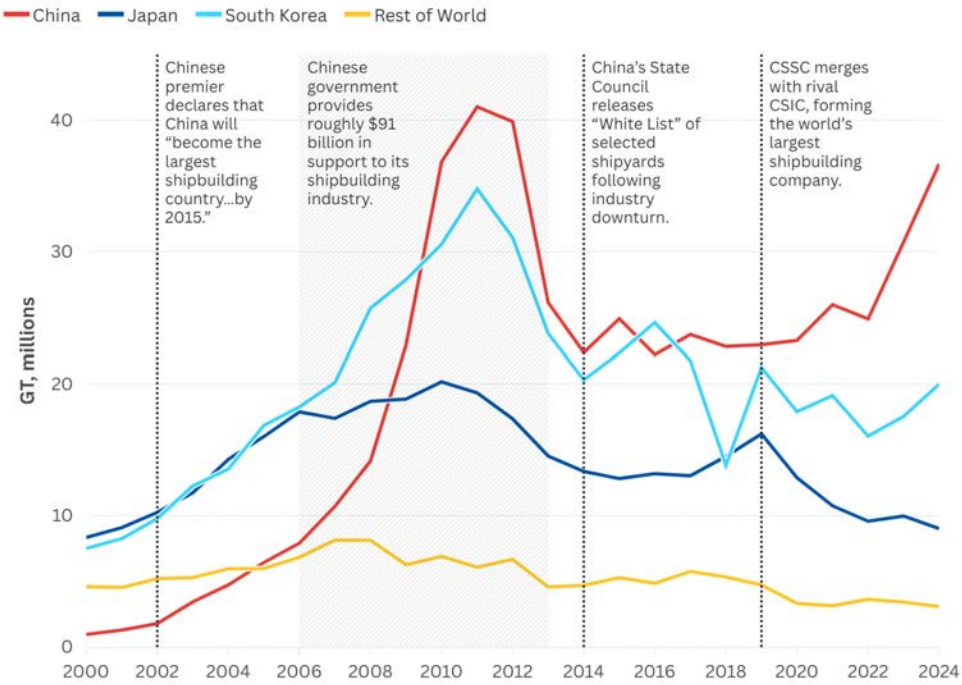
This surge in policy attention has translated into a wellspring of financial and regulatory support for China's shipbuilders. Recent academic estimates suggest that between 2006 and 2013, government subsidies for shipbuilding totaled $91 billion, accounting for a startling 46 percent of the industry's total revenue during that period.[26] These measures directly increased China's global market share by an estimated 42 percent, predominately at the expense of shipbuilders in South Korea and Japan.[27]

Direct state support continued through the 2010s, even as the global shipbuilding market suffered a significant downturn following the 2007–08 global financial crisis. Research by CSIS estimates that from 2010 to 2018, China's government provided at least $132 billion to the shipbuilding and shipping industries, predominantly through preferential financing from state banks.[28] Massive subsidies funneled into China's steel industry helped artificially suppress the cost of steel plates, a critical input that accounts for as much as a quarter of shipbuilding costs.[29]

Reshaping Market Forces

Over the past two decades, China's ability to leverage its massive scale and industrial capacity to manipulate global markets fundamentally reshaped the shipbuilding industry. Having produced less than 5 percent of the world's tonnage in 2000, Chinese shipyards today account for more than half of total commercial production. Formerly dominant Japanese and South Korean shipbuilders have experienced declining production since 2011 as shippers from around the world place more orders with Chinese yards to upgrade their fleets.

Figure 4: Global Commercial Shipbuilding Production in Gross Tonnage (GT), 2000–2024

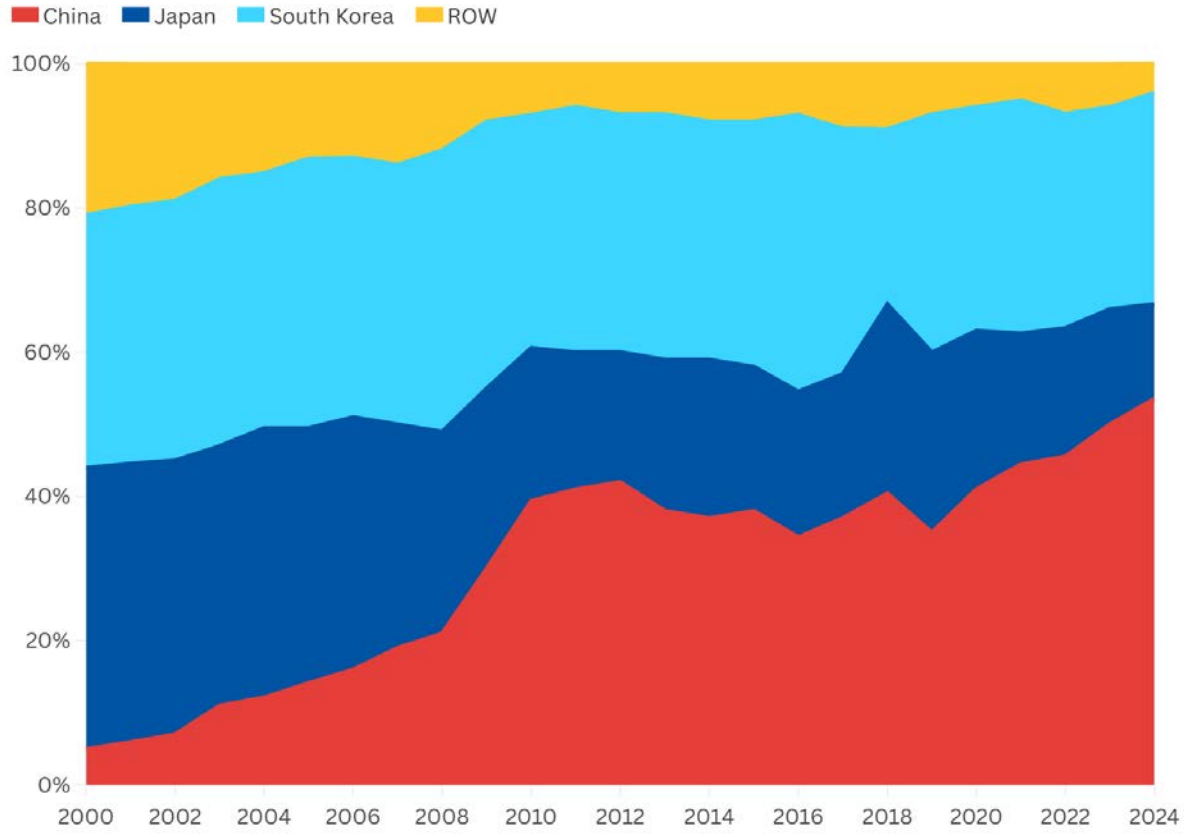


Source: Authors' research; and S&P Global Sea-web.

These shifts began at the turn of the twenty-first century, when policy signals from China's central government kicked off a surge of entrants into the industry. Between 2000 and 2010, hundreds of new shipyards sprung up across China, attracted by booming global demand and generous government subsidies. Data from S&P reveals that the decade saw the number of active shipyards in China explode from 46 to 296. Production rose even more dramatically, with annual output jumping by over 3,700 percent during the same period.

This frenetic production quickly outpaced global demand, leading to substantial overcapacity worldwide. The influx of low-cost Chinese vessels drove down prices and eroded industry profits, forcing many competitors to scale back or exit the market. Japan and South Korea, both industry leaders in 2000, saw their share of global shipbuilding output rapidly fall as Chinese shipyards clamored to ramp up operations.

Figure 5: Share of Global Commercial Shipbuilding Production, 2000–2024



Source: Authors' research; and S&P Global Sea-web.

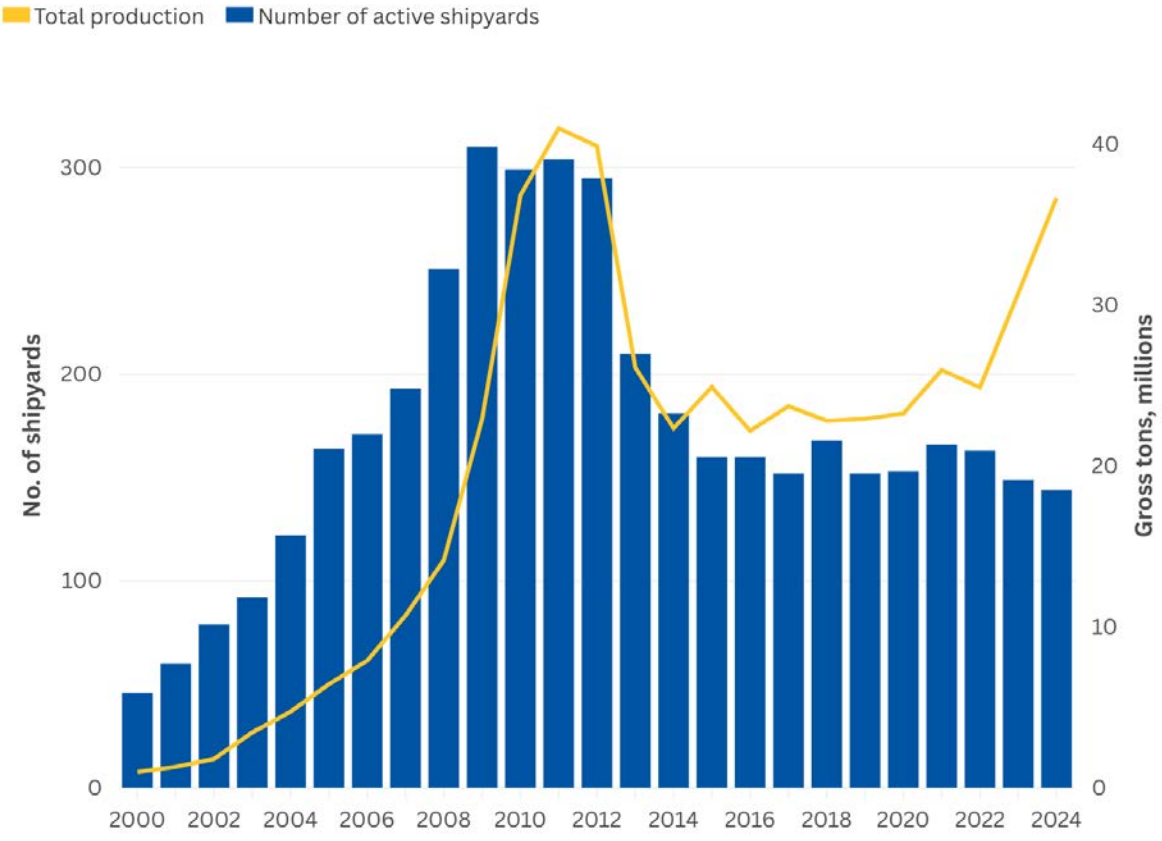
The global financial crisis of 2007–08 proved to be another massive shock to the industry. As global trade faltered and demand for new shipping vessels fell, orderbooks in shipyards worldwide dried up. Global shipbuilding production peaked in 2011 before falling dramatically as order backlogs cleared out.

For China's budding industry, this sudden collapse in demand was an existential challenge. Production in the country was dispersed across hundreds of small, inefficient shipyards that had few tools to weather the crisis, making them highly vulnerable to unexpected demand shocks.

To prevent the industry's collapse, China's State Council imposed a moratorium on new shipbuilding firms and launched a series of measures to spur consolidation. Preference was given to larger shipyards that could benefit from economies of scale and more efficiently allocate central funding.[30] Most notably, the government channeled resources to companies included on a "White List" of handpicked shipyards. Initially comprising 51 (mostly state-owned) companies in 2014, the list grew to 70 by 2019.[31] These yards received directives to increase investment and production, even though global demand remained sluggish.[32]

Surviving shipyards were, on average, larger, more efficient, and more likely to be backed by the state. They were also more globally competitive.

Figure 6: Chinese Shipyards by Number and Output, 2000–2024



Source: Authors' research; and S&P Global Sea-web.

Consolidation efforts culminated in the 2019 merger of CSSC and CSIC, creating by far the largest shipbuilding group in the world. The new behemoth oversaw $120 billion of assets after its merger,

dwarfing the $33 billion owned by its main rival, South Korean builder Hyundai Heavy Industries, which had just executed its own merger with a major domestic competitor. Hyundai Heavy's chief executive at the time remarked that the industry was "consolidating to survive."[33]

As part of these policies, authorities also began to push shipyards to expand into higher-end segments of the shipbuilding market such as LNG tankers, cruise ships, chemical carriers, and roll-on/roll-off (ro-ro) car-carrying vessels. These more complex vessels had historically been dominated by technologically superior South Korean, Japanese, and European shipyards.[34] Their higher profit margins contrast with the relatively simple bulk carriers that formed the lion's share of China's early output.

Together, China's use of state-driven industrial policy to stabilize its industry, reduce overcapacity, consolidate production, and ascend the value chain was often a blunt force that created significant waste and inefficiency.[35] Yet when measured against the strategic goal of wresting market share from global leaders, it has proven ruthlessly effective. Other major industrial powers such as Japan, South Korea, and the United States have also provided significant government support and protection to their own shipbuilders but still have failed to keep pace with China.[36]

China's hold over the global shipbuilding market is poised to deepen over the next decade. As of January 2025, it held roughly 62 percent of the global orderbook for merchant vessels through 2033.[37] This includes over 80 percent of orders for new containerships and 30 percent of orders for LNG carriers.[38] If these trends continue, a substantial majority of the world's merchant fleet put to sea in the coming years will be built in China.

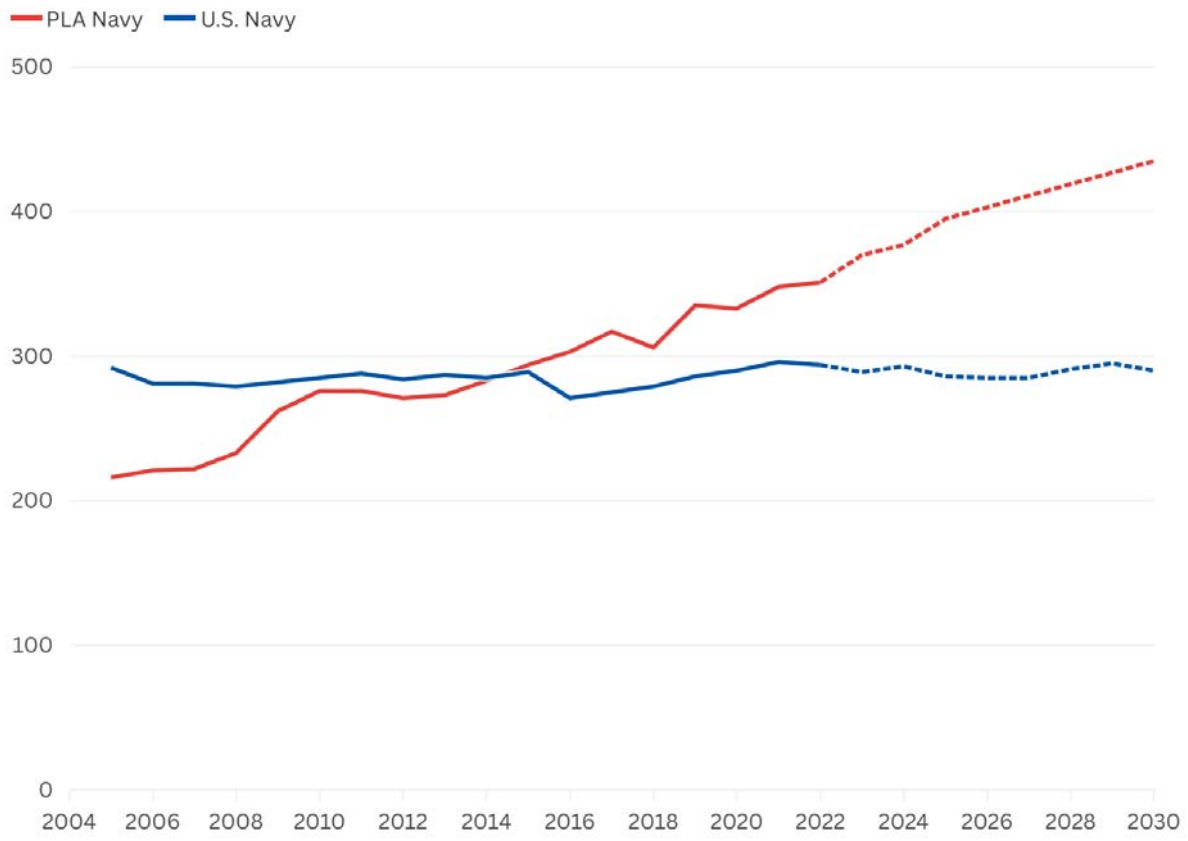
The Rise of the PLAN

While China's commercial shipbuilding industry was racing past its rivals, the country was also undertaking a breakneck expansion and modernization of its naval forces. In just 30 years, the PLAN has evolved from a modest regional force into the world's largest navy by number of vessels, surpassing even the U.S. Navy. As of 2022, the PLAN operated a battle force fleet of 351 ships, compared to the U.S. Navy's 294.[39]

The pace of naval shipbuilding at China's key shipyards has been astounding. The growing shipbuilding base at Shanghai's Changxing Island alone has churned out not just large cruisers and destroyers but even bigger vessels. The expansive facilities there are nearly finished constructing China's third aircraft carrier as well as the first of an all-new class of drone-carrying amphibious assault ships—the largest of its kind in the world.

To the north, the storied Dalian Shipyard refitted and built China's first two aircraft carriers, along with several other surface combatants, and the nearby Bohai Shipyard has produced a growing fleet of nuclear-powered submarines. All of these—and other warship builders—are owned by the state-owned defense giant CSSC.

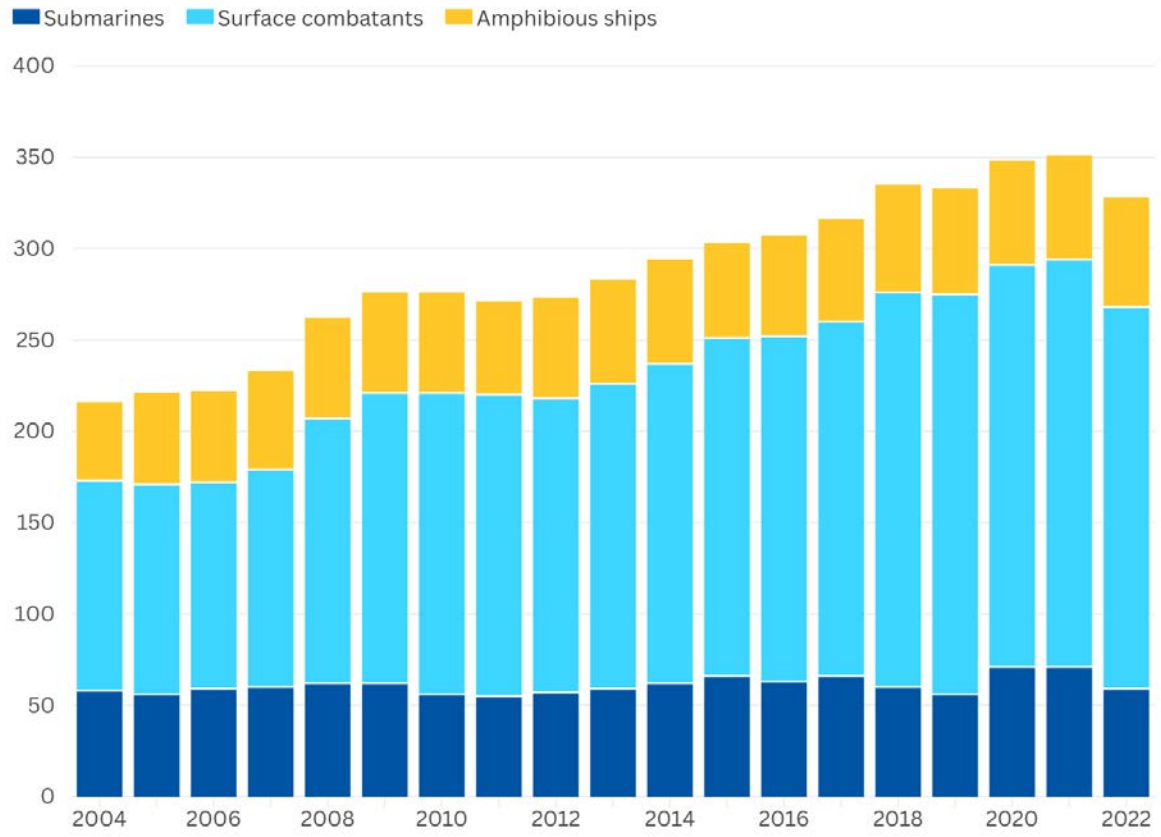
Figure 7: Total Battle Force Ships, PLA Navy vs. U.S. Navy



Note: Totals beyond 2022 based on U.S. Navy estimates.
Source: Ronald O'Rourke, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, CRS Report No. RL33153 (Washington DC, Congressional Research Service, August 2024), https://sgp.fas.org/crs/row/RL33153.pdf.

These new assets have transformed the PLAN into a veritable "blue water navy" capable of projecting power farther from China's shores. Chinese naval doctrine is evolving accordingly. The country's 2019 defense white paper asserted that it was "speeding up the transition of its tasks from defense on the near seas to protection missions on the far seas," reflecting an expanding vision of power projection toward a globally capable force. In its 2024 report about China's military power, the U.S. Department of Defense assessed that China's naval modernization efforts are aligned "with [its] growing emphasis on the maritime domain and increasing demands for the PLAN to operate at greater distances from mainland China."[40]

Figure 8: PLAN Fleet Composition



Source: O'Rourke, *China Naval Modernization*.

China's naval buildup is part of a much broader military modernization project. In the medium and long term, Chinese leaders have set their sights on "basically complet[ing] national defense and military modernization by 2035" and possessing a "world-class military by mid-century."[41] Achieving these goals would both afford Beijing much greater military capability to achieve its broader ambition of pushing the United States farther from China's periphery and strengthen China's hand with respect to key contested issues like control over Taiwan and the South China Sea.

2

Demystifying China's Dual-Use Shipbuilding Network

As the global shipbuilding industry becomes increasingly dependent on China's shipyards, it is essential to scrutinize how these commercial relationships fuel the rapid expansion of the Chinese navy. The integration between China's commercial shipyards and its military industrial complex is deliberately opaque, with political elites and business leaders often masking the extent of these connections.

While some shipyards openly engage in both naval and commercial production, others maintain ambiguous or indirect ties to military entities, and still others appear to have no defense involvement at all. This deliberate lack of transparency complicates efforts to fully assess the national security implications of China's dominance in global shipbuilding.

To clarify this risk landscape, CSIS compiled a comprehensive dataset of 307 Chinese shipyards active between 2019 and 2024. Drawing from data accessed through two intelligence platforms, S&P Global and Datenna, as well as open-source Chinese-language material, this study classifies each Chinese shipyard into one of four tiers based on its level of integration with the country's defense industrial base and broader national security enterprise.[42]

Table 3: Tiered Categorization System

	Risk level	Description
Tier 1	Very high	CSSC-owned shipyards known to produce warships for China's navy
Tier 2	High	CSSC-owned shipyards that primarily build commercial ships but maintain close ties to military projects, personnel, and state funding mechanisms
Tier 3	Moderate	Shipyards owned by other state-owned firms that could be mobilized to support military and national security needs
Tier 4	Lower	Private or foreign-owned shipyards that have limited documented military involvement but are subject to China's regulatory and political control

Source: Authors' research; and S&P Global Sea-web.

TIER 1: KNOWN NAVAL CONTRACTORS

This tier includes 12 CSSC-owned shipyards that are responsible for constructing virtually all of China's modern naval fleet. However, several are also commercial shipbuilding powerhouses. While there are only a dozen Tier-1 shipyards in China, representing a small fraction of the hundreds of shipyards spread across the country, they produce over 17 percent of China's annual commercial output by tonnage.

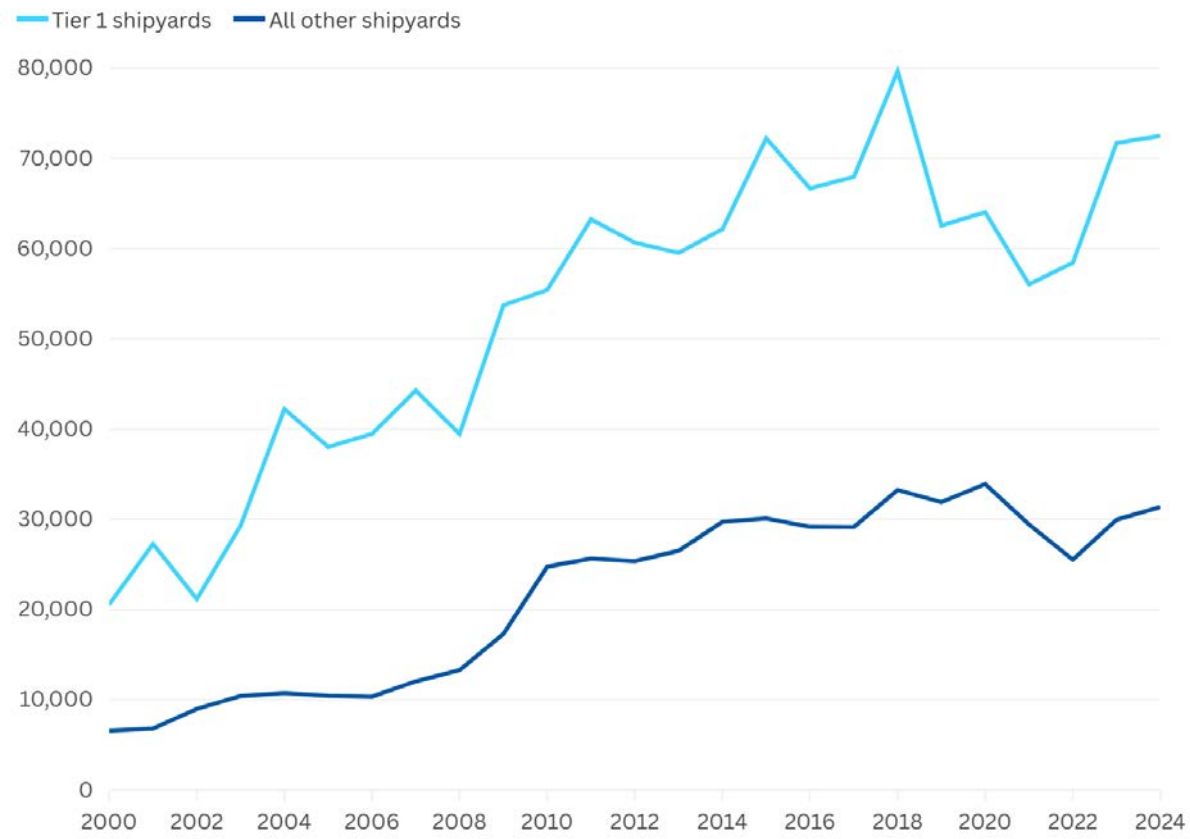
The scale of activity at some of these shipyards is mind boggling, with their production lines rapidly churning out some of the largest and most advanced merchant hulls in the world. On average, the vessels produced at these shipyards are nearly twice as large as those constructed elsewhere in the country, underscoring their outsized importance in China's shipbuilding industry.

Due to their foundational role in China's naval modernization, Tier-1 shipyards receive substantial state funding and contracts, ensuring a steady stream of resources to fuel rapid production. These dual-use facilities blur the line between commercial and military activity, leveraging their infrastructure and output to accelerate naval production.

The lion's share of Tier-1 shipyard production occurs at just four shipbuilding epicenters: Dalian, Guangzhou, Jiangnan, and Hudong-Zhonghua (the latter two of which are now co-located on Changxing Island). These shipyards rank among the most prolific in the world, excelling in both naval and commercial production. Between 2019 and 2023, these four facilities launched at least 39 warships, totaling over 550,000 tons of displacement—equivalent to a fleet larger than the United Kingdom's entire Royal Navy.[43] Among these vessels are some of the largest and most sophisticated in the PLAN's arsenal. During the same period, these shipyards also produced an astounding 19

million gross tons (GT) of commercial vessels, a figure that rivals the annual output of South Korea, the world's second-largest shipbuilding nation.

Figure 9: Average Ship Size (GT)



Source: Authors' research; and S&P Global Sea-web.

This dual-focus production model underscores the immense capacity and versatility of Tier-1 shipyards, where commercial and naval production occur in tandem. The opaque nature of these operations allows these shipyards to attract foreign clients who inadvertently pour billions of dollars into commercial ship orders that are often constructed alongside advanced surface combatants for the PLAN.

Between 2019 and 2024, upwards of 72 percent of the commercial output of Tier-1 shipyards was destined for foreign buyers. Top purchasers included firms from Singapore, a critical U.S. defense partner in the Indo-Pacific, and Switzerland, a U.S. treaty ally, which together accounted for 34 percent of Tier-1 exports.

Figure 10: PLAN Warships Built Alongside Merchant Vessels at Tier-1 Shipyards (See Appendix for Additional Imagery)

Taiwan's position as a top client of China's naval shipyards is particularly striking, given the direct threat the PLAN's rapid expansion poses to the island's security. Evergreen Marine Corporation, one of the world's largest shipping companies and a cornerstone of Taiwan's economy, has invested heavily in expanding and upgrading its container fleet. Many of these orders have gone to Tier-1 shipyards like Hudong-Zhonghua and Jiangnan—the same facilities producing warships explicitly designed to support the PLAN in conducting amphibious assaults or other military operations across the Taiwan Strait.[44]

Table 4: Top Buyers from Chinese Tier-1 Shipyards, 2019–2024

Economy	No. of hulls	Total tonnage (GT, millions)	Share of tonnage (%)
China & Hong Kong	129	7.1	25
Singapore	84	5.8	20
Switzerland	30	4.1	14
France	24	2.9	10
Taiwan	17	1.5	5

Source: Authors' research; and S&P Global Sea-web.

CSIS calculations reveal that fully 15 percent of Evergreen's current active fleet was built at Tier-1 shipyards, with more on order. The symbolism of Evergreen's distinctive green hulls built just beside the PLAN's *Fujian* aircraft carrier—named for the province from which China would launch an invasion of Taiwan—is eye-catching.

Even two U.S.-based companies, Pangaea Logistics Solutions and Seabulk Fleet Management, acquired six hulls from these shipyards during the period investigated.

It is important to note that these companies, and many others that buy vessels from China, are simply responding to market incentives. Thanks in part to subsidies and other state support, China's shipyards are often able to deliver high-quality vessels faster and at lower costs than competitors, making them a preferred supplier.

Still, governments should balance the potential benefits of cost savings with the risk of contributing to China's naval development. Many of these firms are based in economies that have signaled concern over China's rapid military modernization and assertive foreign policy, like Taiwan or Japan, creating a misalignment of market incentives and strategic interests. Even for countries like Greece or Switzerland, which are home to major global shipping firms and face little immediate threat from China's military expansion, Beijing's track record of coercive behavior should raise eyebrows.

TIER 2: CSSC COMMERCIAL SHIPYARDS

This category comprises shipyards fully or partially owned by CSSC but not clearly identifiable as producers of warships. There are 23 shipyards in Tier 2. Among them are some of China's most productive commercial shipbuilders, including Shanghai Waigaoqiao Shipbuilding and Qingdao Beihai Shipbuilding HI. Together, Tier-2 shipyards account for approximately 24 percent of China's annual commercial ship production by tonnage.

While CSIS found no direct evidence of naval production at these facilities, they remain strategically significant due to their ties to CSSC. These shipyards may still provide dual-use technologies, build components or modules, and transfer personnel or expertise to Tier-1 yards. They also benefit from CSSC's access to state financing and industrial policy support, raising questions about their indirect contributions to China's naval modernization.

Despite not building naval vessels directly, Tier-2 shipyards are structurally tied to China's defense industrial base through their affiliation with CSSC. For example, the Shanghai Waigaoqiao shipyard openly acknowledges on its website that it has undertaken research projects for military entities such as the State Administration for Science, Technology, and Industry for National Defense (formerly the Commission for Science, Technology, and Industry for National Defense) and CSIC.[45] This dual-use potential, combined with access to state resources, underscores the latent risks associated with Tier-2 shipyards.

In many cases, Tier-2 shipyards are co-located with Tier-1 yards, further complicating the distinction among CSSC entities. For example, two major Tier-2 shipbuilders, Shanghai Jiangnan Changxing Shipbuilding and Shanghai Jiangnan Changxing Heavy Industry, are located alongside the Tier-1 Jiangnan Shipyard and Hudong-Zhonghua Shipyard on the massive Changxing Island Shipbuilding Base in Shanghai.[46] Similarly, in the country's south, several Tier-2 yards are based within the Longxue Shipbuilding Base in Guangzhou, home to naval shipbuilders Guangzhou International Shipbuilding and Huangpu Wenchong Changzhou.

Table 5: Top Buyers from Tier-2 Shipyards, 2019–2024

Economy	No. of hulls	Total tonnage (GT, millions)	Share of tonnage (%)
China & Hong Kong	196	9.1	24
Singapore	137	7.5	20
France	30	3.7	10
Greece	37	2.7	7
Germany	49	2.5	7

Source: Authors' research; and S&P Global Sea-web.

Tier-2 shipyards have also swept up billions of dollars in contracts from foreign buyers seeking to upgrade their commercial fleets, despite their physical proximity and organizational integration

with China's naval industrial base. These close ties have done little to deter international clients, who purchased over three-quarters of the total production at Tier-2 shipyards—the highest share among all four tiers.

Top customers have included major shipping companies from France and Singapore, as well as other shipping heavyweights, such as Germany and Greece. This strong international demand highlights the global reliance on these facilities, even as their strategic ties to China's defense industry raises critical security concerns.

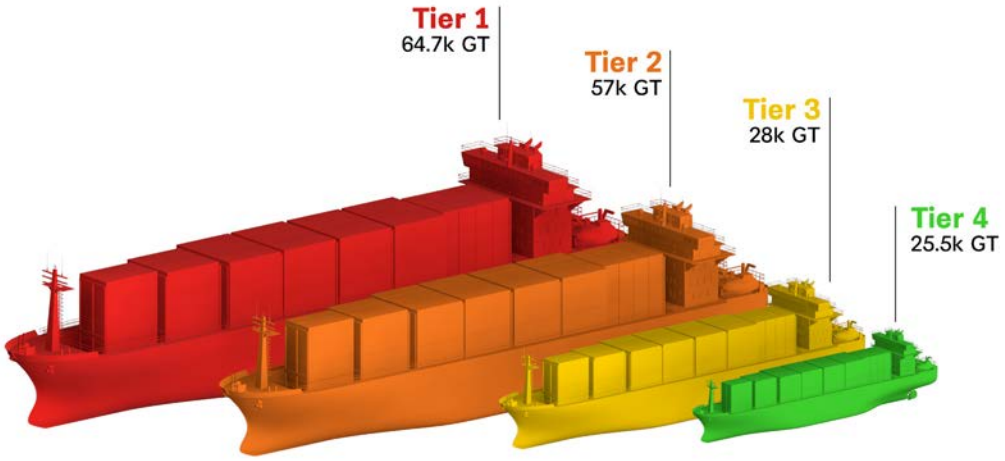
TIER 3: OTHER STATE-OWNED SHIPYARDS

Shipyards in this tier are fully or partially owned by state-owned enterprises other than CSSC, such as COSCO and China Merchants Group, or by provincial governments like Jiangsu or Fujian. They may play supporting roles in supporting MCF by supplying equipment or materials, but their primary portfolios center on commercial production. Although not directly linked to China's military industrial ecosystem, they remain important conduits for state-led economic and technological initiatives.

The 41 active Tier-3 shipyards account for approximately 23 percent of China's commercial ship production. However, the average size of vessels built in Tier-3 shipyards is significantly smaller than those produced in Tier-1 and Tier-2 facilities. This disparity highlights the comparatively smaller scale and limited capabilities of Tier-3 yards, especially when contrasted with the massive CSSC shipyards, which are capable of constructing vessels exceeding 200,000 GT.

Tier-3 shipyards generally represent a lower—but not absent—risk of integration with China's military production ecosystem compared with Tier-1 and Tier-2 yards. State ownership means that these companies are directly managed by central government authorities through the State-owned Assets Supervision and Administration Commission of the State Council (SASAC). SASAC's primary responsibility is ensuring that state capital is channeled according to national strategic objectives.

Figure 11: Average Ship Size by Tier



Source: Authors' research; and S&P Global Sea-web.

If it chose to, Beijing would have considerable latitude to leverage the capacity and assets of any state-owned shipyards for military or broader security purposes. For example, in a wartime scenario, Chinese authorities would face few obstacles to mobilizing these shipyards to build, repair, or service its naval forces.

Still, at present, Tier-3 yards are physically and organizationally detached from military production, meaning Beijing cannot as easily leverage their capacity for dual-use purposes. The lack of necessary infrastructure, cleared personnel, and security requirements at these shipyards could raise the costs of tasking them with sensitive military projects.

Table 6: Top Buyers from Tier-3 Shipyards, 2019–2024

Economy	No. of hulls	Total tonnage (GT, millions)	Share of tonnage (%)
China & Hong Kong	409	16.6	42
Singapore	106	3.9	10
Japan	78	3.8	10
Greece	83	3.3	8
Brazil	8	1.5	4

Source: Authors' research; and S&P Global Sea-web.

Foreign buyers represent a considerably lower share of production at Tier-3 shipyards than their counterparts in Tiers 1 and 2, with 58 percent of production at these yards being ordered by overseas firms. Notably, Japan is a leading foreign buyer of vessels built in Tier-3 shipyards, despite having its own strong domestic shipbuilding industry. This underscores the difficulty Japanese shipyards face in competing with lower-cost ships built by Chinese state-owned entities, compounded by capacity limitations within Japan's own domestic industry.

TIER 4: PRIVATE OR FOREIGN-OWNED SHIPYARDS

These yards are majority-owned by private Chinese companies or by corporations headquartered outside mainland China or Hong Kong. They primarily focus on commercial shipbuilding and generally have limited or no direct involvement in defense-related activities. Informal or indirect ties to China's military industrial ecosystem remain possible through joint ventures, component sourcing and procurement, or technology transfers, but are far less robust than at higher tiers.

Tier-4 shipyards comprise the largest group of Chinese shipbuilders by both number and share of production. These 210 privately-owned yards together account for 36 percent of China's annual commercial production. Many are small firms focused on niche sectors of the market, like refrigerated cargo carriers and passenger ships. Yet, several are highly prolific, boasting sophisticated operations that rival or even surpass the production of CSSC's largest shipyards.

Table 7: Top Buyers from Tier-4 Shipyards, 2019–2024

Economy	No. of hulls	Total tonnage (GT, millions)	Share of tonnage (%)
China + Hong Kong	1,176	17.1	29
Singapore	167	6.7	11
Switzerland	37	4.5	8
Greece	79	4.3	7
Germany	118	3.5	6

Source: Authors' research; and S&P Global Sea-web.

The two largest Tier-4 shipyards, New Times Shipbuilding Co. and Jiangsu New Yangzi Shipbuilding, rank first and third, respectively, in production among all Chinese shipyards. Together, these two behemoths account for 15 percent of China's total production. Both firms are investing millions of dollars into expanding capacity to keep pace with demand, including in state-of-the-art shipbuilding production technologies, such as smart manufacturing and energy efficient construction techniques.

Jiangsu New Yangzi Shipbuilding is one of the few major Tier-4 shipyards owned by a company listed outside of China. The yard is owned by Yangzijiang Shipbuilding Group, a Singapore-listed enterprise that also controls two other Chinese shipyards, Jiangsu Yangzi Xinfu Shipbuilding and Jiangsu Yangzi-Mitsui Shipbuilding. Other foreign owners of Tier-4 shipyards include major Asian manufacturers, including South Korea's Samsung Heavy Industries and Japan's Mitsui Engineering and Shipbuilding.

While large, foreign-owned shipyards have a degree of separation from the Chinese government, private ownership alone should not shield these yards from scrutiny. Ultimately, private Chinese companies are still subject to state regulations and oversight, including laws that mandate cooperation with national security objectives when requested. Private companies are also often under the state's indirect influence through partial ownership by the central or local governments, and many firms have internal party committees, which allow the Chinese Communist Party to influence corporate decisionmaking.

In one infamous example of risk at Tier-4 shipyards, the privately owned Fujian Yihe shipyard was named in a 2021 UN Security Council report for violating international sanctions by helping to obscure the identity of a ship after it engaged in illicit trade with North Korean vessels.[47]

Other Tier-4 yards openly promote their ties to Chinese entities involved in military activities. Jiangsu Huatai Shipbuilding Co., for example, claims to have established technical cooperation partnerships with several CSSC research institutes known to support military projects.[48] Another private yard, Jianglong Shipbuilding Co., reports that it builds vessels for quasi-military Chinese entities like the Chinese Coast Guard and the Ministry of Public Security.[49] These cases reflect the fluidity of China's shipbuilding ecosystem and underscore the need for greater transparency into how private shipyards interact with the country's sprawling security state.

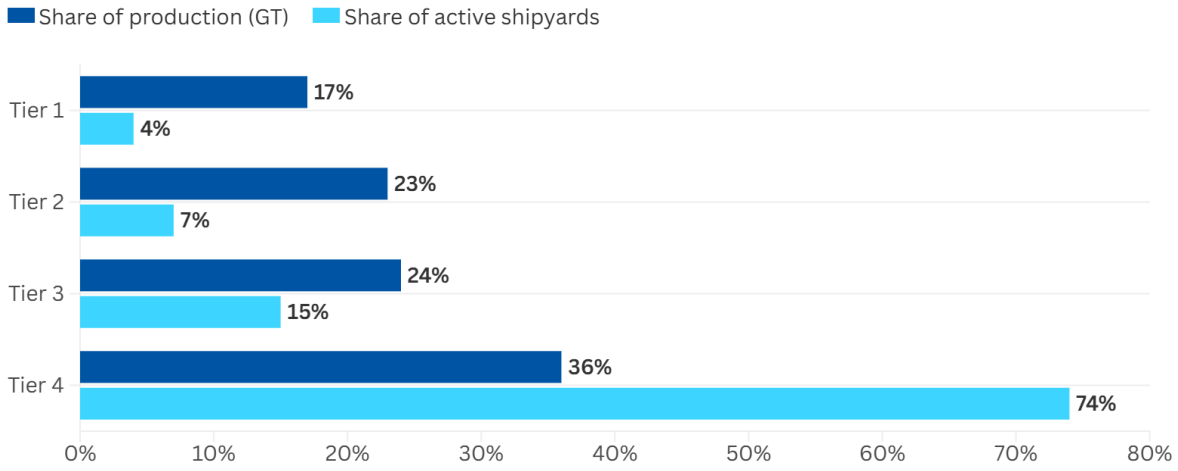
Foreign buyers account for nearly 70 percent of the production at Tier-4 yards (see t. Notably, the two largest private shipyards mentioned above—New Times Shipbuilding and Jiangsu New Yangzi Shipbuilding—were responsible for nearly half (46 percent) of the output contracted by foreign buyers among all Tier-4 shipyards.

KEY TAKEAWAYS

Taken together, these findings reveal key insights about China's shipbuilding industry:

- **Privately owned yards dominate in numbers, but not capacity.** While 74 percent of the 307 surveyed shipyards are privately owned, production capacity is heavily dominated by state-backed enterprises. The 81 shipyards in Tiers 1, 2, and 3 collectively account for more than 64 percent of commercial output by tonnage.

Figure 12: Share of Total Production vs. Share of Active Shipyards, 2019–2024



Source: Authors' research; and S&P Global Sea-web.

- **Industry consolidation drives output.** Half of China's total shipbuilding output since 2019 has come from just 10 shipyards. New Times Shipbuilding, China's top-producing privately owned yard, produced more tonnage than all of Europe, North America, Australia, and New Zealand combined. Still, only three of China's top 10 shipbuilders are privately owned, while 5 are CSSC subsidiaries—including 3 Tier-1 yards that also construct warships for the PLAN.

Table 8: Top 10 Chinese Shipyards by Commercial Production, 2019–2024

	Shipyard	Tier	Total production (GT, millions)	Share of production (%)
1	New Times Shipbuilding Co Ltd	4	12.9	7.8
2	Shanghai Waigaoqiao Shbldg	2	11.4	6.9
3	Jiangsu Newyangzi Shipbuilding	4	10.3	6.3
4	Qingdao Beihai Shipbuilding HI	2	7.3	4.5
5	COSCO Shipping HI Yangzhou	3	7.2	4.4
6	Jiangnan Shipyard Group Co Ltd	1	7	4.3
7	Jiangsu Yangzi Xinfu Shbldg	4	6.7	4.1
8	Guangzhou Shipyard Intl Co Ltd	1	6.5	4.0
9	Hudong-Zhonghua Shipbuilding	1	6.1	3.7
10	Nantong COSCO KHI Ship Eng	3	6	3.7

Source: Authors' research; and S&P Global Sea-web.

- **Overseas buyers dominate demand.** Foreign companies headquartered outside China or Hong Kong accounted for nearly 70 percent of the commercial tonnage built in China between 2019 and 2024. Major buyers included countries such as Singapore, Greece, Switzerland, and Japan, home to leading global shipping companies with increasing demand for large oceangoing vessels. However, these nations are also key U.S. partners that have voiced concerns over China's military expansion and its potential impact on Indo-Pacific stability.

Table 9: Tiered Breakdown of Chinese Shipbuilding Production for Foreign Buyers, 2019–2024

	Risk level	Total production going to foreign buyers (GT, millions)	Share of production going to foreign buyers (%)
Tier 1	Very high	20.9	75
Tier 2	High	28.4	76
Tier 3	Moderate	22.6	58
Tier 4	Lower	42.2	71

Source: Authors' research; and S&P Global Sea-web.

3

Foreign Entanglements

The vast size and growing sophistication of China's shipbuilding industry has provided it with tremendous market power. It is now nearly impossible for competitive international companies looking to purchase vessels or sell subcomponents to avoid China's market. Firms from around the world have flocked to the country, building up close relationships with Chinese shipyards, including by signing shipbuilding contracts worth billions of dollars and transferring critical technology and expertise.

While this close embrace has been lucrative for major multinational companies, it has also directly benefited China's naval development. By providing capital and technology to China's dual-use shipyards, foreign firms have helped to subsidize the country's naval industrial buildup and allowed the PLAN to overcome important technological hurdles.

This section discusses the specific ways that foreign capital and technology have diffused across the civil-military divide to support China's naval shipbuilding capabilities.

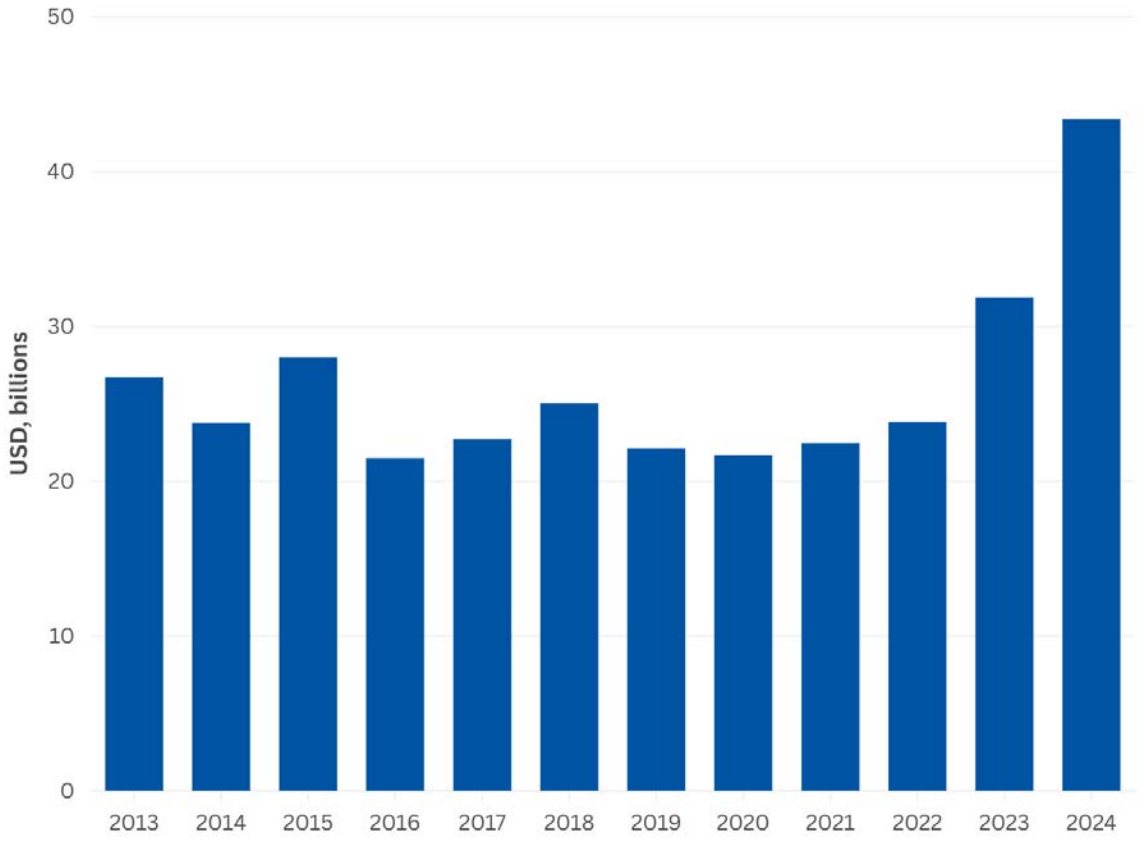
Foreign Ship Orders

As previously noted, foreign companies headquartered outside of China and Hong Kong account for roughly 70 percent of commercial tonnage produced in Chinese shipyards. Detailed financial information about these transactions is rarely made public, making it difficult to calculate the total revenue generated from these sales. However, sporadic public announcements reveal that China's major shipyards regularly win contracts with overseas buyers reaching billions of dollars in value.

Many of the largest deals have flowed to Tier-1 shipyards owned and operated by CSSC. In 2024, for example, Hudong-Zhonghua signed a world-record contract worth nearly $6 billion with QatarEnergy to build 18 LNG carriers by 2031.[50] The previous year, France's CMA CGM signed a deal worth nearly $3 billion with CSSC to build 16 dual-fuel container ships in what was then the largest single shipbuilding order at Chinese shipyards.[51] The vessels are set to be built at Jiangnan, Dalian, and Hudong-Zhonghua—all Tier-1 dual-purpose yards.

Those deals are just two prominent cases of a much wider challenge. Data analyzed by CSIS shows that, in total, between 2019 and 2024 foreign firms purchased 304 hulls from Tier-1 shipyards alone, collectively bringing in tens of billions of dollars in revenue and pushing China's naval yards further into the forefront of the global commercial shipbuilding market.

Figure 13: Chinese Commercial Ship Exports, 2013–2024

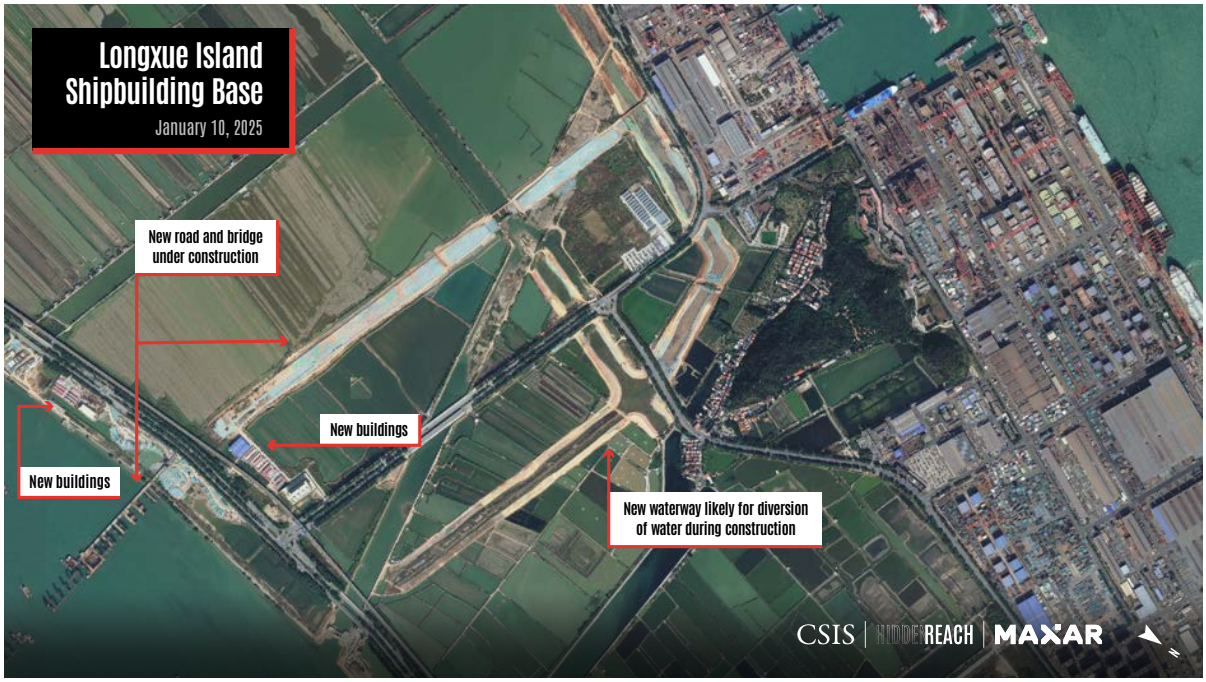


Source: China Association of the National Shipbuilding Industry.

According to annual announcements by China's national shipbuilding industry association, the country's commercial ship exports have pulled in a combined $165 billion between 2019 and 2024 (see Figure 13).[52] While no publicly available information specifies how much of this revenue went into CSSC's coffers, a conservative estimate based on the company's share of China's total

production (roughly 40 percent) suggests it made at least $66 billion from ship exports over that period.

Figure 14: Major Expansion Underway at Changxing Island Shipbuilding Base and Longxue Island Shipbuilding Base (See Appendix for Additional Imagery)



CSSC's high share of revenue from commercial operations means that these funds likely help absorb much of the fixed costs at its shipyards, including maintenance, infrastructure, R&D, and logistics costs. At shipyards where commercial and naval production is co-located, as is the case at many of CSSC's most productive yards, this likely indirectly reduces the per-unit costs for military vessels, making China's naval production more efficient.

CSSC's public filings and other financial documents provide few details on how the profits from these sales are allocated; however, major expansion projects underway across CSSC's main shipyards suggest that the company is spending heavily to boost its long-term capacity and efficiency. In Shanghai, builders have nearly completed a $2.6 billion project to relocate the Hudong-Zhonghua shipyard to the sprawling Changxing Island Shipbuilding Base, alongside the recently expanded Jiangnan shipyard. The facilities will cover 7.7 kilometers end-to-end and encompass an area twice the size of midtown Manhattan.[53]

Similar investments are underway in CSSC's yards in southern China, where the company is spending $2.3 billion to expand the Longxue Shipbuilding Base in Guangzhou. Once complete, the colossal facility is expected to have the capacity to produce 10 million deadweight tons each year—equating to roughly two-thirds of Japan's entire shipbuilding output in 2023. Chinese state media has proudly touted the effort in Guangzhou as helping "to build a military-civilian integrated marine science and technology industrial city" (军民融合海洋科技产业城).[54] In recent months, the Guangzhou shipyard has been the center of a flurry of concerning construction activity, including an experimental large drone carrier, an unmanned combat surface vessel, a new set of special barges likely designed for amphibious landings, and a novel sail-less submarine or large unmanned underwater vehicle.[55]

The revenue provided by CSSC's commercial shipbuilding contracts with foreign firms will likely continue to be key to offsetting some of the massive costs of upgrading and expanding China's naval forces. The U.S. Navy estimates that China is seeking to build a modern battle force fleet of 425 ships by 2030, an unprecedented procurement effort that will cost hundreds of billions of dollars to build and maintain.[56] In the face of slowing growth and considerable economic headwinds that may constrain China's budgetary environment, maintaining its access to revenues and financing from foreign sources will be critical for the PLAN to keep pace with its ambitious modernization goals.

Technology Transfer

Business ties are just one of the ways that foreign firms have facilitated the rise of China's naval industrial base. Perhaps just as importantly, global companies across the shipbuilding supply chain have helped supply China with world-class technology and expertise that has found its way into PLAN warships and production lines.

Like many of the world's most advanced industries, shipbuilding has a highly complex and globalized production ecosystem. Modern vessels require intricate design and construction processes and are made up of thousands of components, including specialized engines and propellors, navigation and control systems, integrated electronics, and radar modules, among many others. Many of the

advanced construction techniques, design software, and critical subcomponents used to build complex commercial vessels are also applicable to the production of warships.

Table 10: Selected Technology Transfers from Foreign Companies to China's Shipbuilding Industry

Company	Country	Key Expertise/Products
Wartsila	Finland	Dual-fuel engines, electrical & automation systems (E&A), controllable pitch propellers, navigation systems
GTT	France	LNG carrier design, construction, engineering
ABB	Switzerland	Power and propulsion systems
ZF Friedrichshafen AG	Germany	Heavy-duty transmissions (JV with Nanjing Highspeed, a known Chinese military supplier)
Kawasaki Heavy	Japan	Liquefied petroleum gas (LPG) carrier production
Mitsubishi Hitachi Power Systems	Japan	Gas turbine technology
STX Shipbuilding	South Korea	Full production line in Dalian (recently acquired by Chinese firm Hengli Heavy)

Source: Authors' research.

China has capitalized on the dual-use nature of these technologies to circumvent rules put in place by many countries to restrict the export of defense-related equipment. Companies like CSSC have leveraged their commercial success to gain access to foreign technology through licensing agreements and joint ventures. Despite clear evidence that Chinese firms have used these technologies for military development, overseas companies—often based in the United States or allied countries—have proven to be willing partners.

Gaztransport & Technigaz SA (GTT) is a leading multinational marine engineering firm headquartered in France. The company specializes in designing and building membrane containment systems, which are critical for the transport and storage of LNG. The firm has signed several significant technology-sharing agreements with CSSC, including a 2023 strategic partnership that "provides for cooperation between GTT and twelve subsidiaries of the CSSC conglomerate."[57] Among these are three of the largest Tier-1 shipyards in China, Hudong-Zhonghua, Jiangnan, and Dalian, which are explicitly authorized to build GTT technologies under a special arrangement known as a technical assistance and license agreement. Notably, GTT also has contracts with the U.S. Department of Defense to build fuel storage facilities in the United States.[58]

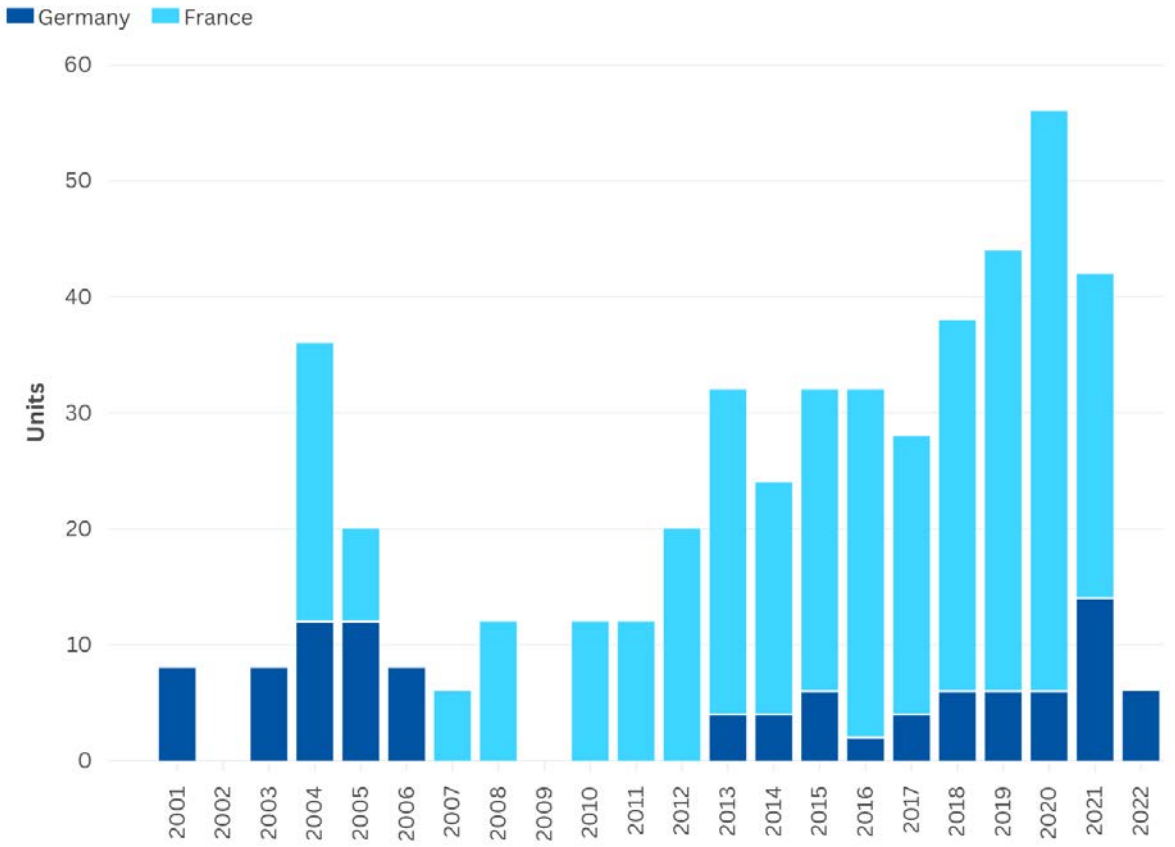
These issues are perhaps best on display in China's pursuit of advanced propulsion technologies, namely marine diesel engines and naval gas turbines.

MARINE ENGINES

China's shipbuilders have historically struggled to develop domestically produced marine engines on par with those built by their European counterparts. The PLAN has long preferred to outfit many of its warships with imported engines, even with the added risk associated with relying on foreign suppliers for key defense platforms.

Most of these engines have been supplied by two European firms, German-based MTU and the former French firm SEMT Pielstick (now part of Germany's MAN Diesel & Turbo). Starting in the early 2000s, these companies began licensing their high-performance diesel engines for manufacture within China. According to data from the Stockholm International Peace Research Institute (SIPRI), between 2001 and 2022, no less than 528 MTU and SEMT-Pielstick engines were built under license in China and supplied to China's rapidly growing navy. This included some of the PLAN's most important and lethal platforms, including Type 055 cruisers, Type 052D destroyers, Type 054/A frigates, and Type 039 diesel-electric attack submarines.[59]

Figure 15: French and German Marine Engine Exports to China, 2001–2022



Source: "SIPRI Arms Transfers Database," Stockholm International Peace Research Institute, https://www.sipri.org/databases/armstransfers.

Despite their end use in Chinese naval systems, MTU and SEMT Pielstick engines were permitted for export to China under German and EU law due to their status as dual-use technologies. In 2013, a spokesman for Man Diesel & Turbo explained that the arrangements were legal because "none of these engines is specifically designed for military purposes. There is a broad variety of civil applications for these engines, too."[60]

GAS TURBINES

Gas turbines are another critical component in high-performance propulsion systems, particularly for large surface combatants. China's earliest turbine-equipped warships relied on technology provided by the U.S.-based firm General Electric beginning in 1985.[61] Following the Tiananmen Square massacre in 1989, however, the United States placed restrictions on exports of sensitive military technology to China, including gas turbines. In response, China turned to a Ukrainian supplier, Zorya-Mashproekt, which in 1993 agreed to license its UGT-25000 gas turbines to China and transfer full technical documentation.[62]

China reverse engineered the technology, and by 2004, CSIC subsidiary Longjiang GH Gas Turbine (GHGT) introduced a domestically produced variant named the GT-25000 (also known as QC-280).[63] The power and efficiency enabled by GT-25000 turbines was key to China's ability to develop many of its modern surface combatants, including the Type 055 cruiser and Type 052D destroyer. Still, China's initial GT-25000 turbines remained reliant on advanced cooling blades and other components sourced from overseas, leaving China vulnerable to export restrictions and supply chain disruptions.

CSSC and its subsidiaries have persistently worked to reduce their reliance on foreign technology, including by tapping commercial markets. In 2011, CSSC's 703rd Research Institute, a subsidiary focused on gas turbine development, made targeted investments in Wuxi Yongda, a Chinese manufacturing company. Wuxi Yongda had recently signed a joint venture with a leading UK firm specializing in advanced alloy casting technology needed to build turbine cooling blades.[64] The 703rd Research Institute's investment was likely intended to gain access to the technology to improve its own naval turbine design and production process. State media cheered the venture as "a typical case of the defense industry achieving military-civilian integration through mixed ownership reform."[65]

Efforts like these have paid off for China's military shipbuilders and the PLAN. In the 2018 edition of its annual report on China's military power, the U.S. Department of Defense assessed for the first time that China had reached near-total self-sufficiency in naval gas turbine technology.[66]

This success, however, has not slowed China's pursuit of cutting-edge gas turbine technology from overseas. In 2019, GHGT inked a licensing agreement with Japanese firm Mitsubishi Power to produce its H-25 series compact gas turbines in northern China.[67] These advanced turbines are designed to be capable of running on green fuels such as hydrogen and ammonia—a capability that China has sought to integrate across its shipbuilding industry.[68]

More recently, in 2023, GHGT was nearly successful in an attempted purchase of the gas turbine division of Germany's MAN Energy Solutions, which was set to shutter operations. The sale was initially approved, but Berlin moved to block the transaction in July 2024 due to concerns that the technology would be used to support China's naval development.[69]

Foreign Capital Markets

Aside from direct revenue flows and technology transfer, CSSC has gained access to foreign capital markets through its listing on various stock markets under a subsidiary, CSSC Holdings Ltd. As of March 2025 CSSC Holdings Ltd. remained accessible to investors in the U.S. through major China ETFs held by leading institutional investors like Blackrock and Vanguard.[70]

This is in spite of CSSC's inclusion on a list of firms tied to China's military that then-president Donald Trump blacklisted from U.S. investments through a 2020 executive order.[71] CSSC is also included on the U.S. Treasury Department's Chinese Military-Industrial Complex Companies List (CMIC), which is aimed at curtailing U.S. entities from engaging in transactions involving publicly traded securities of listed firms.[72]

Open-source reporting also suggests that China's naval shipbuilders have raised billions on global stock and bond markets. Between 2004 and 2015, publicly listed arms of CSSC and CSIC raised a combined total of $22.3 billion from selling stock and bonds on global markets, including on the foreign investor-friendly Hong Kong Stock Exchange.[73]

In 2018, CSIC successfully raised at least $1 billion in capital from a bond issued on its behalf by a Cayman Islands-based firm called Poseidon Finance 1 Ltd. This bond was available to American investors, who may have contributed significant funding to its sale.[74] These transactions may have helped CSSC and CSIC fund large naval shipbuilding and shipbuilding expansion projects, including the construction of the *Shandong*, China's first domestically produced aircraft carrier launched at Dalian shipyard in 2017.

Given the continued structural consolidation underway within CSSC's labyrinth of subsidiaries, holding companies, and research institutes, it will likely continue to grow easier for Chinese authorities to direct the transfer of privately raised capital between sub-entities of the company to meet strategic requirements. In September 2024, CSSC announced that it was undertaking an internal restructuring to bring CSIC's financial holdings fully under CSSC, placing all of the companies' expansive assets under the control of one mega-entity.[75]

4

National Security and Economic Implications

China's increasingly dominant position in global shipbuilding presents significant challenges for the economic and national security of the United States and its allies. As now-U.S. National Security Advisor Mike Waltz said at CSIS in 2024, "The industry is really decimated over time here in the United States, but it's not as though it shifted to a friend of the United States. . . . It shifted to our greatest adversary."[76]

Even as emerging technologies like drones and artificial intelligence change the character of warfare, the ability to build ships at scale remains a core facet of military power. This is particularly true in a largely maritime theater like the Pacific, where U.S.-China competition is most acute. China's breakneck naval buildup—enabled in large part through the success of its commercial shipbuilding industry—is rapidly shifting the balance of power in Asia and undermining the ability of the United States and its allies to check Beijing's growing assertiveness in the region.

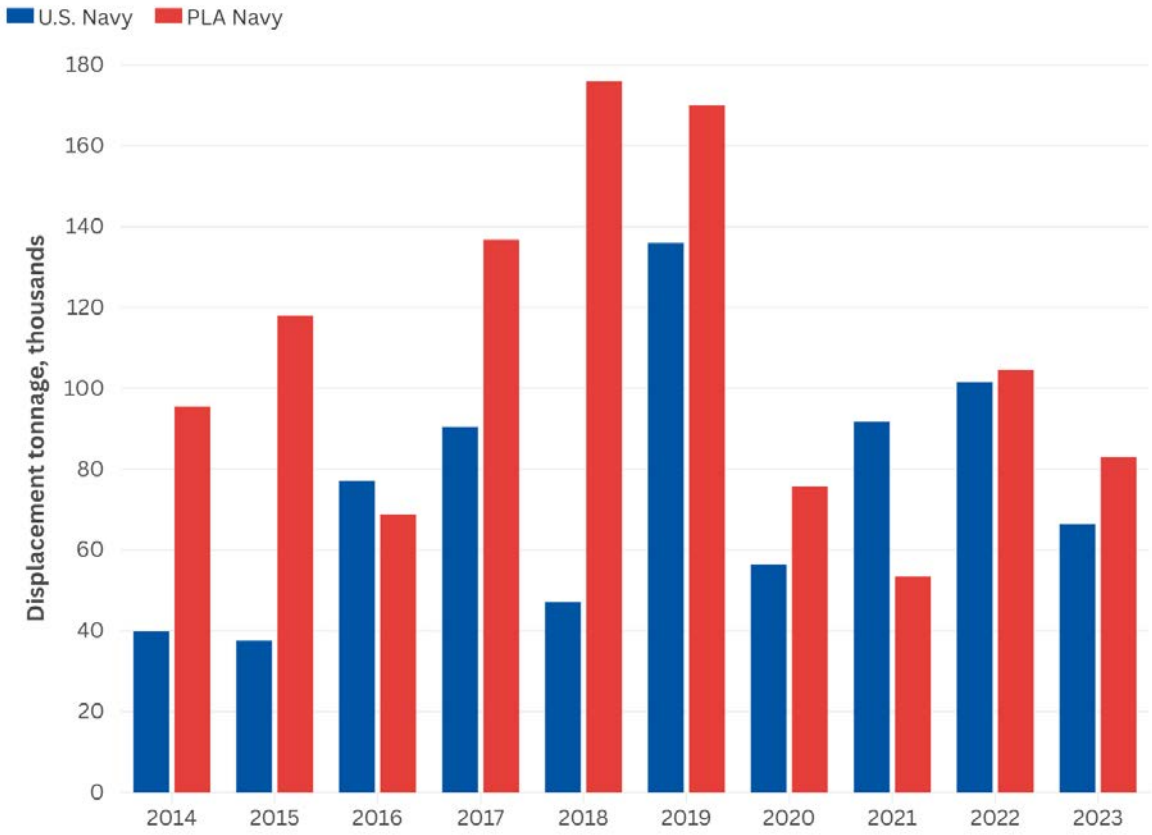
National Security Concerns

China's rapidly modernizing navy has emerged as a major area of concern for U.S. military planners. The PLAN has already overtaken the U.S. Navy by hull count, and it is rapidly closing the gap in qualitative measures like fleet tonnage and vertical launch system (VLS) missile cells. A comparison of net tonnage shows that the PLAN has shrunk its tonnage gap with the U.S. Navy from roughly 4 million tons in 2010 to under 1.6 million tons today.[77]

It has similarly managed to rapidly reduce the disparity in VLS cells deployed on its surface combatants, reaching half the number boasted by the U.S. Navy in 2024—up from just a quarter

in 2019.[78] Compounding these concerns, the overwhelming majority of China's naval forces are concentrated close to home in the Indo-Pacific, whereas U.S. forces are dispersed globally.

Figure 16: U.S. Navy and PLA Navy Warship Annual Tonnage Launched



Source: Tom Shugart, "Warship Tonnage 2014-2023 Update," email conversation with authors, November 14, 2025.

These problems are poised to worsen. U.S. naval shipbuilding has been hampered by years of delays, backlogs, and cost overruns at its major shipyards. In 2024, the Government Accountability Office (GAO) reported that less than 40 percent of U.S. Navy ships completed maintenance on time, compromising readiness and raising costs.[79] A 2022 GAO report similarly found that a 20-year, $21 billion effort to modernize and optimize the U.S. Navy's shipyards launched in 2018 had already seen its scheduling goals slip by three years and was 400 percent over budget after just the first 3 of 17 dry docks.[80]

Significant labor shortages in the U.S. industry are compromising production capacity as well. In a 2024 speech at CSIS, then-U.S. National Security Advisor Jake Sullivan said that the United States needed to fill a gap of "an additional 140,000 more skilled workers . . . to meet submarine production demand over the next 10 years."[81] These bottlenecks have direct implications for U.S. naval procurement: in 2025, the navy was forced to reduce its annual order of new Virginia-class attack submarines from two to one due to delays and ballooning costs.[82]

The challenge is magnified even further by China's use of its deep reserve of commercial vessels to augment military operations. For example, China is accelerating its production of "roll-on/roll-off" (ro-ro) ships, which are designed to carry commercial vehicles but can also be called on to transport troops and military equipment during a conflict.[83] The PLA has actively incorporated civilian ro-ros into amphibious assault exercises and retrofitted some to meet military requirements, a practice that is explicitly prohibited in the U.S. Navy's operational guidelines.[84] More broadly, China has used a wide range of nominally civilian ships, including fishing vessels, research vessels, drilling vessels, and containerships, to operate in service of Beijing's military and strategic objectives.[85]

Together, these dynamics are helping the PLAN grow its quantitative advantage over U.S. forces, creating a "quality all its own."[86] In 2022, U.S. STRATCOM commander Admiral Charles A. Richard remarked: "as I assess our level of deterrence against China, the ship is slowly sinking. As those curves keep going, it isn't going to matter how good our [operating plan] is or how good our commanders are, or how good our forces are—we're not going to have enough of them."[87]

China's ability to vastly outpace the U.S. industrial base in the production of naval and quasi-military vessels presents a concerning challenge to deterrence.[88] A robust shipbuilding sector signals the capacity to sustain operations during a protracted conflict, particularly one one with the high losses that would almost certainly result from a full-scale U.S.-China kinetic war. Leaders in Beijing may calculate that China's vastly greater ability to mobilize its shipbuilding ecosystem to surge production or restore and replace sunk and damaged vessels would allow it to continue a conflict to victory despite heavy losses. Even short of all-out war, this disparity could alter Beijing's risk perceptions and shift escalation dynamics in unpredictable ways. Addressing this disparity is thus as much about preventing a war as it is about winning one.

Looking beyond a near-term conflict, China's shipbuilding capabilities will be key to supporting the PLAN's transformation into a blue water force capable of operating anywhere in the world. China has rapidly expanded its expeditionary forces in recent years, building the first of a new class of aircraft carriers (the Type 003), launching four modern Type 075 amphibious assault vessels, and introducing the Type 076, a brand-new class of assault ship outfitted with an electromagnetic launch system likely optimized for unmanned platforms.[89]

These capabilities will allow China to project joint combat power farther from its coastline into areas such as the Western Pacific, South China Sea, and Indian Ocean. As the PLAN's capabilities improve, political leaders in Beijing may be emboldened to act more aggressively to assert China's expanding global interests.

Economic Challenges

From an economic standpoint, China's anti-competitive practices and growing hold over global shipbuilding threatens to further undercut the industrial capabilities of the United States and its allies, marginalizing them from important emerging markets. This will foreclose important economic opportunities offered by an emerging wave of new shipbuilding orders driven largely by an industry-wide push to decarbonize fleets and transition to green technology.[90]

Japan and South Korea, once dominant players in shipbuilding, are experiencing shrinking market shares due to China's aggressive expansion. In recent years, several major Japanese shipbuilders, including Sumitomo Heavy Industries, Mitsui E&S, and Sasebo Heavy Industries, have closed or reassigned their shipbuilding facilities due to rising costs and falling profits.[91] Japan has seen the number of technical and engineering staff employed at its shipyards tumble to below 10,000, down from over 15,000 in 2010.[92]

While South Korea's industry has proven more resilient due to its strong position in high value-added sectors like LNG carriers and dual-fuel vessels, it also faces challenges from China's booming shipyards. In 2024, South Korea's market share in global shipbuilding fell below 20 percent for the first time in nearly a decade, despite strong demand and full orderbooks.[93] A major contributing factor is that China's share of global LNG tanker orders—where South Korean builders were previously dominant—has more than doubled since 2020, rising from 14 percent to 32 percent in 2024.[94] This trend is partly driven by capacity limits at South Korea's major shipyards, forcing buyers to look increasingly toward Chinese yards.[95] Some Korean shipbuilders, like Samsung Heavy Industries, have even begun to outsource production to Chinese shipyards to help fill in gaps in capacity due to labor shortages and lack of dock space.[96]

European countries, traditional leaders in specialized shipbuilding sectors like cruise liners and icebreakers, face similar challenges as Chinese shipyards expand into these high-value markets. In 2024, CSSC's Waigaoqiao shipyard delivered China's first domestically built cruise ship, the *Adora Magic City*, to Adora Cruise Lines, a joint venture between CSSC and the U.S.-based company Carnival Cruises. The delivery represented a significant first step in challenging Europe's dominance over the $117 billion passenger ship industry.[97] This trend raises concerns about the sustainability of Europe's shipbuilding industry and its ability to compete globally. In 2022, a German shipbuilding association said in a press release that "without a decisive response from Europe, the loss of substantial capabilities in this industry could turn out to be irreversible in the coming years."[98]

While the United States has maintained a negligible share of the global commercial shipbuilding market for decades, the rise of China's shipbuilders has further hollowed out its commercial industry. Between 2014 and 2024, U.S. market share fell from 0.33 percent to 0.11, and since 2010, at least three major U.S. shipyards (Bender Shipyard, Avondale Shipyard, and Alabama Shipyard) have either closed down or suspended operations.[99] Employment in the sector, which offers wages nearly 50 percent higher than the average private sector wage, according to the U.S. Maritime Administration, dropped by nearly 15 percent from 2008 to 2022, foreclosing high-quality economic opportunities for workers.[100]

5

Recommendations for Countering China's Dual-Use Shipbuilding Empire

Policy Objectives

The United States needs to take decisive action to address the multifaceted security and economic challenges posed by China's shipbuilding industry. New policies should be framed around the following objectives:

1. **Actively counter China's MCF strategy by severing the flow of foreign capital and technology into Chinese shipyards.** Given measures already in place to limit U.S. ties with China's defense industrial base, the focus needs to be on reducing the flow of capital and technology from other countries into Chinese shipyards.
2. **Reduce China's dominance in the global shipbuilding industry.** Past experiences in industries like solar panels and electric vehicle batteries, where U.S. and allied firms were nearly completely pushed out of the market by low-cost Chinese manufacturing, offer sober warnings of what can happen without intervention. Taking action to limit China's outsized influence will promote the economic security of not just the United States but also key U.S. allies like South Korea and Japan. Eroding China's market dominance will also indirectly support the first objective of limiting Beijing's ability to leverage its commercial shipbuilding industry to support its naval modernization through its MCF strategy.
3. **Encourage friendshoring to key U.S. allies—namely South Korea and Japan—as a counterweight to China.** It will be impossible to completely shift commercial order books away from Chinese shipyards. There is too much global demand and not enough capacity outside of China (Chinese shipyards currently claim 62 percent of the global orderbook

through 2033). It is similarly unrealistic to expect the United States to become a major player in the global shipbuilding market in the short-to-medium term. Achieving even a 5 percent market share would require a nearly 50-fold increase in domestic production. While the United States can take steps to scale up its industrial capacity, it should also prioritize enhancing the competitiveness of South Korea and Japan against their Chinese counterparts. This represents the most efficient and viable strategy for expanding alternative market options outside of China.

4. **Nurture U.S. domestic shipbuilding capacity in key areas.** Washington should set realistic goals for enhancing its domestic shipbuilding capacity. As noted above, even capturing a small share of the global market in the near-to-medium term would be a significant challenge. Rather than striving to become a global shipbuilding power, the United States should prioritize developing a commercial shipbuilding industry that meets critical national security needs. Investments should focus on these priorities rather than direct competition with China. This could also include developing specialized capabilities, such as icebreaker construction, and fostering technological innovation to strengthen the broader maritime industry.
5. **Limit costs to the United States and its key international partners.** There are implicit tensions in the goals outlined above. The optimal set of policies will achieve important strategic and national security objectives while not overly burdening consumers and firms in the United States and allied countries.

Existing Lines of Effort

There are nascent efforts underway in Washington to address some of these objectives. In April 2024, the Office of the U.S. Trade Representative (USTR) initiated a Section 301 investigation of "China's Acts, Policies, and Practices Targeting the Maritime, Logistics, and Shipbuilding Sectors for Dominance."[101] The USTR launched the investigation at the request of petitioners comprising several labor unions seeking to protect the U.S. shipbuilding industry from unfair Chinese economic practices.[102] Those petitioners sought several remedies, including a request that the government impose a fee on every Chinese-built vessel that docks at a U.S. port.[103] They also recommended that the money collected from those fees be redirected to a "U.S. Commercial Shipbuilding Revitalization Fund" which could help support U.S. shipyards.[104]

In February 2025, the USTR released a public report based on its investigation, finding that China's non-market practices in the shipbuilding, marine engineering, and logistics sectors had harmed U.S. commerce.[105] It proposed a set of remedies, including an expansive docking fee regime on not only Chinese shipping companies, but also on any global shipping firms that operate Chinese-built vessels in their fleets (see Table 11). The proposal also calls for requirements to gradually increase the share of U.S. exports that should be carried on U.S.-flagged vessels, starting at 1 percent immediately and rising to 15 percent after seven years, at which point 5 percent must also be transported on U.S.-built vessels.

Table 11: Summary of USTR Proposed Docking Fee Structure

Fee type	Fee structure
Service Fee on Chinese Maritime Transport Operators	Up to $1,000,000 per vessel entrance to a U.S. port; OR up to $1,000 per net ton per vessel entrance.
Service Fee on Operators with Chinese-Built Vessels	Fee based on percentage of Chinese-built vessels in fleet, per vessel entrance: **≥50.0 percent:** $1,000,000, **25.0–49.9 percent:** $750,000, **0–24.9 percent:** $500,000; OR additional fee of up to **$1 million** if fleet has **≥ 25 percent** Chinese-built vessels.
Service Fee on Operators with Orders for Chinese Vessels	Fee based on percentage of vessels ordered from Chinese shipyards (expected delivery in 24 months), per vessel entrance: **≥50 percent:** $1,000,000, **25.0–49.9 percent:** $750,000, **0–24.9 percent:** $500,000; OR additional fee of up to **$1 million** if orders from China are **≥ 25 percent.**
Service Fee Remission for U.S.-Built Vessels	Refunds to operators of up to **$1 million** per vessel entrance for using U.S.-built vessels.

Source: Office of the U.S. Trade Representative, "Proposed Action in Section 301 Investigation of China's Targeting of the Maritime, Logistics, and Shipbuilding Sectors for Dominance," press release, February 21, 2025, https://ustr.gov/sites/default/files/files/Press/Releases/2025/Ships%20Proposed%20Action%20FRN.pdf.

There is also movement within Congress. In December 2024, a bipartisan group of senators and representatives introduced the SHIPS for America Act, which is the most significant legislation on U.S. maritime industrial revitalization in decades.[106] It has the support of major U.S. shipbuilding industry groups and key figures in the Trump administration, including National Security Advisor Mike Waltz, who played a key role in drafting the bill in his previous role as a member of Congress.

The SHIPS for America Act offers numerous provisions to fund the growth of a U.S. commercial fleet and includes other incentives—such as substantial tax credits, loans, and loan guarantees—to invest in U.S. shipyards. Among its many different prospective programs, one of the most notable is the establishment of a "Strategic Commercial Fleet" of 250 privately owned U.S.-built, U.S.-flagged, and U.S.-crewed oceangoing vessels. Crucially, the program would provide funding to cover the difference in costs that accrue from building and operating a U.S.-made and U.S.-flagged hull instead of buying a ship from a foreign shipyard or flagging it under another country.[107]

Another crucial provision of the act is a series of incentives for recruiting the maritime workforce needed to sustain efforts to build up U.S. shipbuilding capacity. The bill offers loan forgiveness and educational assistance and funds recruiting programs for relevant U.S. government agencies. These steps will be essential to reducing the massive workforce deficit—a gap of over 100,000 in submarine production alone—while benefiting communities across the country with high-paying job opportunities.[108]

Policy Recommendations

The following suite of policy recommendations offers a detailed road map for achieving the aforementioned objectives. Several of these recommendations build on and refine the existing lines of effort.

1. **Impose scalable docking fees on global shipping companies operating Chinese-built vessels.**

   The United States should adopt many elements of the USTR's proposed docking fee scheme, but with notable changes. The primary issue with USTR's proposal is that it is designed to impose costs on buying any Chinese-made ships; it does not differentiate between which Chinese ships are being bought. As a result, the scheme only achieves economic objectives. A better-designed proposal could achieve the same economic objectives while also achieving key national security objectives.

   Taking even a limited sample of the types of activities impacted under USTR's proposal reveals the wide-ranging impacts it could have on the shipping and shipbuilding industry. Table 12 provides an estimate of the annual docking fees that would apply to the top 10 container ship operators servicing U.S. ports, based only on the share of Chinese-built ships in their fleet (additional fees would apply based on their orderbooks and other factors). At a minimum, fees assessed on these 10 firms, which collectively represent roughly 70 percent of the container ship traffic at U.S. ports, would combine to over $8 billion per year. Top firms like MSC, Maersk, and CMA CGM would pay over $1 billion each.

Table 12: Top 10 Container Shipping Lines by No. of U.S. Port Calls, 2019-2024

Operator	Operator domicile	Share of Chinese-built vessels in fleet	Share of fleet from tier-1 shipyards	Avg. annual U.S. port calls (2019–2024)	Est. annual fees based on USTR proposal (USD, millions)*
MSC	Switzerland	25%	6%	2,671	$2,004
Maersk	Denmark	23%	4%	2,476	$1,238
CMA CGM	France	43%	9%	1,729	$1,297
Hapag-Lloyd	Germany	21%	4%	1,403	$702
ONE	Japan	25%	3%	1,228	$921
COSCO	China	59%	15%	650	$650

Evergreen	Taiwan	15%	10%	593	$297
Seaboard Marine	USA	60%	4%	458	$458
Zim	Israel	35%	2%	441	$331
Orient Overseas	Taiwan	33%	16%	369	$276

Source: Import Info; authors' research; and S&P Global Sea-web..
*Calculated by multiplying the number of annual U.S. port calls by USTR's proposed vessel entrance fee based on the share of Chinese-built vessels in the operator's fleet. Does not include additional fees proposed by USTR based on orderbook or ship ownership (see Table 11).

Rather than assigning docking fees based only on the share of total Chinese-built ships within a company's fleet, the authors recommend designing the fees so that they are partially weighted according to which Chinese shipyards made those ships. This would allow for imposing greater pressure on China by targeting specific shipyards.

The tier system proposed in this report offers the most streamlined system for organizing and prioritizing fees. A company's docking fees should be higher if it has a greater proportion of ships made at higher-risk shipyards. This could be achieved in several ways, and U.S. policymakers will need to fine-tune the fee structure. However, one general method would be to impose a blanket baseline fee along the lines proposed by USTR while layering on additional surcharge fees that are weighted according to the percentage of the fleet that comes from each of the tiers of Chinese shipyards.

The two tables below offer an example of how such a system could be designed. In these examples, a different multiplier value is assigned to each of the four tiers, and that multiplier is applied to each tier's proportion of the company's Chinese-made fleet to calculate the accompanying surcharge. Those surcharges are then summed to calculate the total percent surcharge that would be applied to the baseline USTR fee.

Table 13-A shows what a surcharge might look like for a hypothetical Chinese shipping company that has a higher percent of Tier-1 and Tier-2 ships in its fleets. Table 13-B depicts how a surcharge might be calculated on a hypothetical European shipping company that has fewer Tier-1 ships and more Tier-3 and Tier-4 ships. In this example, the Chinese company would face a significantly higher surcharge: 93 percent compared to 39 percent.

Table 13-A: Potential Structure of Surcharge Fee on a Hypothetical Chinese Company

Tier	Share of Chinese-made fleet*	Multiplier	Surcharge
Tier 1	15%	4	60%
Tier 2	25%	1	25%

Tier 3	30%	0.25	8%
Tier 4	30%	0	0%
Total surcharge			**93%**

Table 13-B: Potential Structure of Surcharge Fee on a Hypothetical European Company

Tier	Share of Chinese-made fleet*	Multiplier	Surcharge
Tier 1	5%	4	20%
Tier 2	10%	1	10%
Tier 3	35%	0.25	9%
Tier 4	50%	0	0%
Total surcharge			**39%**

*Based on the composition of Chinese-made vessels only, not the composition of the entire fleet.

This fee structure ensures that companies purchasing from high-risk shipyards bear the highest costs, encouraging them to shift orders elsewhere. For example, if a hypothetical Chinese shipping company (Table 13-A) acquired 60 percent of its fleet from China, it would have a baseline fee of $1 million per port call. With 2,000 annual port calls, its total fees, including surcharges, would reach about $3.9 billion per year. In contrast, if the European company (Table 13.B) got only 26 percent of its fleet from China, it would have a lower baseline fee of $750,000 per port call. With the same 2,000 annual port calls, its total fees with surcharges would be significantly lower, at $2.1 billion per year (see Table 14).

Table 14: Comparing Annual Fees with Tier-based Surcharge for Hypothetical Chinese and European Companies*

Hypothetical company	Share of Chinese-built fleet	Baseline fee per port call (per USTR)	Annual port calls	Tier-based surcharge	Total annual fees
Chinese company (Table 13-A)	60%	$1,000,000	2,000	93%	$3.9 billion
European company (Table 13-B)	26%	$750,000	2,000	39%	$2.1 billion

*Based only on service fees applied according to current fleet composition. Does not include additional fees proposed by USTR based on orderbook or ownership (see Table 11).

It is worth emphasizing that if the surcharges recommended here are adopted, the underlying baseline fees proposed by USTR could be scaled down to retain an optimal overall fee burden for the industry. Ultimately, this approach favors flexibility in enforcement to achieve the desired national security objectives while minimizing broader economic disruption.

The proposed USTR docking fees could also be modified in another important way. As currently designed, the existing USTR proposal essentially creates fines for behavior that has already taken place. That is, it imposes fines for Chinese-made ships already in companies' fleets plus ships already on order (to be delivered in the next 24 months). Yet, the goal of the fees should ultimately be to deter that behavior from taking place in the future. As such, future orders of ships from Chinese shipyards should result in greater fees than ships already bought or ordered. The simple solution for this is to impose higher docking fees if a company places an order from Chinese shipyards after a certain date.

Incorporating these changes has several advantages.

First, the United States would get more bang for its buck. Much of the costs imposed on shipping companies through docking fees are likely to be passed on to U.S. consumers. An optimal policy would impose more costs on China while not increasing the costs for U.S. consumers. This approach achieves that by raising the costs of supporting China's defense industrial base while imposing the same overall costs on U.S. consumers as a blanket approach.

Second, a more tailored approach could make the financial burdens more manageable for the companies of U.S. allies and partners. As shown above, merchant shipping companies headquartered in Europe, Japan, South Korea, Singapore, and other allied countries buy heavily from Chinese shipyards. Imposing blanket fines based on operating any Chinese-made ships creates costs without offering a clear remedy in the short term. If, however, companies have a clearer sense of which Chinese shipyards are most concerning, they can avoid Tier-1 and other higher-risk shipyards in the near term and buy from lower risk Chinese shipyards as a stopgap in the near term. This would ease the transition away from Chinese shipyards, making the policies more sustainable in the long term.

Third, weighting fees based on tiers would more directly undermine China's MCF ambitions in the shipbuilding sector. If foreign orders decline at Tier-1 and Tier-2 shipyards, it will undercut Beijing's ability to maximize the benefits of sharing resources between commercial and military production lines. In this scenario, Tier-1 shipyards may opt to become dedicated naval shipyards with little to no commercial production, while Tier-2 yards would be discouraged from being converted to military production. It is possible that China could avoid this scenario by simply replacing foreign commercial ship orders at these yards with ship orders by Chinese-owned shipping companies, but this would still be a policy success from a U.S. perspective because it would mean that foreign companies will no longer be funneling resources directly into shipyards producing warships for China's navy.

Finally, CSSC-owned yards (i.e. those in Tier-1 and Tier-2) and other state-owned shipyards (i.e., in Tier-3) have likely received more direct support through state-driven industrial policies. They are also, by definition, under more direct supervision by the Chinese

Communist Party and the state than private firms, meaning they are most aligned with Beijing's strategic interests. Accordingly, ships built in their shipyards should come at a premium for foreign buyers.

In short, China will continue to build commercial vessels and military vessels, and it will try to continue to integrate those production lines to support its MCF ambitions. The United States cannot stop China from doing so, but it can put in place policies that help level the playing field and incentivize Chinese shipbuilders to change their behavior—all while mitigating the negative economic fallout for the United States and like-minded countries.

2. **Sever remaining U.S. financial and business ties with CSSC and its subsidiaries.**

   On national security grounds, the U.S. government should restrict U.S. companies from conducting any financial transactions with the 35 Tier-1 and Tier-2 shipbuilders owned by CSSC. Tier-1 shipyards directly build warships for the PLAN, and Tier-2 yards have clearly defined links to China's defense industrial base and broader national security apparatus.

   There are precedents for such moves. In September 2024, the U.S. Department of Commerce's Bureau of Industry and Security published a Notice of Proposed Rulemaking (NPRM) that would prohibit the sale or import of connected vehicles integrating specific pieces of hardware and software (or their components) if they have sufficient ties to Chinese or Russian companies.[109] In 2021, President Biden signed into law the Uyghur Forced Labor Prevention Act, which presumes that goods manufactured in China's Xinjiang Region are made with forced labor and therefore bans their importation into the United States, unless proven otherwise.[110]

3. **Monitor Chinese shipyards and remain flexible in enforcing actions.**

   As Washington takes these actions, regulators should periodically monitor activity at Chinese shipyards and evaluate whether additional companies need to be targeted.

   The tiered system outlined in this report is a useful first step toward assessing the relative level of threat and concern posed by Chinese shipyards, but as previously noted, China's shipbuilding ecosystem is murky. Firms not directly building warships can still provide significant support for China's ongoing naval modernization, and private firms can be co-opted by the party-state to support national security objectives. To make U.S. measures as effective as possible, analysts from various U.S. government agencies—including the intelligence community—should coordinate to vigilantly monitor the evolving situation and adjust course as needed.

4. **Use targeted diplomacy to encourage other countries to limit ties with China's dual-use shipyards.**

   Measures to dissuade firms from buying from or transferring technology to Tier 1 and 2 Chinese shipyards will be far more effective if coordinated with key countries that also share concern over China's military modernization. The vast majority of firms that engage in these

kinds of transactions are based in key U.S.-allied nations in Europe and Asia. In addition, much of the dual-use technology transfer into China's shipbuilding ecosystem has occurred through companies based outside of the United States.

Parallel measures by like-minded governments would reduce the opportunity for China to exploit loopholes to help its firms circumvent penalties and undermine the effectiveness of U.S. actions. While these measures may rankle some allied governments that are home to companies benefitting from business deals with China's dual-use shipyards, they also will bring about opportunities for their own shipbuilding industries to benefit from the growth in global demand for ships built by shipyards outside of China.

President Trump has made clear that he expects U.S. allies and partners to increase their own investments and other efforts to compete with China in the security and economic domains. His administration should incorporate discussions on shipbuilding into its broader strategy to rally allies and partners in pushing back against China's MCF efforts and unfair economic practices.

Most other nations will not be as forward-leaning as the United States on this issue, as they will be worried about the potential costs for their companies and any diplomatic blowback from Beijing. Nevertheless, as a baseline, Washington should encourage its allies to take quiet, informal actions to discourage their companies from buying from Tier-1 shipyards. This is particularly true of Taiwan, as it stands to lose the most from China's ongoing naval modernization. At a minimum, the United States should work with other countries to better align their technology restrictions to ensure key dual-use technologies are not directly helping upgrade China's naval capabilities.

Crucially, taking the more tailored approach outlined above (i.e., focusing on the most concerning shipyards rather than all Chinese shipyards) will present a far more palatable offer for allies and partners. In the past, Washington has been able to better rally other countries to its side when it can demonstrate that it is taking targeted measures to address specific issues rather than a broader pursuit of strategic containment against China.

5. Make targeted investments in long-term shipbuilding capacity in the United States.

The punitive and protective measures outlined above will help reduce China's dominance over the shipbuilding industry, but building up even a minimally viable commercial shipbuilding capacity in the United States will require significant investment. Given fiscal and budgetary constraints, alongside limited political appetite for major public investments, the U.S. government will need to find creative funding mechanisms to spur investment in the sector.

One clear path to establishing a funding baseline for maritime revitalization is through the imposition of the proposed targeted docking fees collected from shipping firms operating Chinese-built vessels. As indicated above, a conservative estimate of a tier-focused fee regime could raise tens of billions of dollars per year—funding that can be reinvested in jumpstarting U.S. shipbuilding activity.

Policymakers should be clear-eyed about what can be achieved through public investment in the industry. Washington should not seek or expect to make the United States a global shipbuilding powerhouse. The U.S. shipbuilding industry currently accounts for just 0.11 percent of global production, meaning even a 50-fold increase would bring it to just 5.5 percent. Still, these investments can help the United States build up a minimum shipbuilding capacity needed to meet national security and strategic requirements.

6. **Attract foreign investment into the U.S. shipbuilding industry.**

Investments in U.S. shipyards need not only come from U.S. coffers. Washington should encourage and incentivize key global players—especially South Korea and Japan—to invest in U.S. shipbuilders. Policymakers should also court investment from European companies that are global leaders in high-tech areas of the shipbuilding industry. Doing so would bring much-needed jobs, expertise, and capital into the U.S. industry.

In 2024, South Korean company Hanhwa purchased a leading U.S. shipbuilder, Philly Shipyard, for $100 million, and there are indications that Hanhwa could significantly expand its capacity there and potentially also expand its footprint to include other U.S. shipyards.[111] Such investments should be encouraged going forward.

The U.S. government can also take steps to facilitate educational exchanges, technical trainings, and knowledge-sharing efforts between its workforce and those from allies like South Korea and Japan. While these exchanges can be hampered by language and cultural differences, the U.S. government can take steps to mitigate these challenges by providing translation support and cultural trainings.

Understandably, even with allies there can be national security concerns about foreign ownership and investment in strategically important industries. However, these deals can be constructed to include provisions to protect national security while still allowing for foreign ownership or investment. U.S. investment screeners, namely the Committee on Foreign Investment in the United States (CFIUS), should avoid being overprotective when reviewing investments from two of the United States' closest and most important Indo-Pacific allies.

In February 2025, the Trump administration signaled it would take steps along these lines with the America First Investment Policy memorandum. The policy aims to streamline the investment review process for allied and partner sources, while placing heavier restrictions on investments from Chinese firms or companies that support China's MCF activities.[112]

Beyond reducing barriers to investment, Washington should identify areas in which the United States can offer reciprocal investments in partner economies. Failing to do so would risk foregoing needed investments in the United States and alienating close U.S. partners.

7. **Coordinate with partners to build additional shipbuilding capacity outside of China.**

Beyond implementing the proposed penalties on companies operating Chinese-built vessels, the United States can help incentivize investment in allied shipbuilding capacity by creating market demand for ships built outside of China.

One approach is to require that a certain subset of U.S. goods be transported on a list of trusted vessels that were built in the United States or select partner countries. The USTR proposal includes a far more expanded restriction, requiring that a progressively increasing share of U.S. exports be transported by U.S.-flagged vessels. To limit broader economic impacts, this requirement could be narrowed to apply only to critical strategic goods essential to national security, like LNG or critical minerals, or be adjusted to allow some cargo to be carried by vessels built in trusted shipyards outside of the United States.

Another model is to directly collaborate with other countries on the development of specialized shipbuilding technologies needed for strategic applications. This approach has shown some promise. In July 2024, the United States, Canada, and Finland came together to establish the Icebreaker Collaboration Effort, or ICE Pact. The trilateral partnership focuses on bolstering the shipbuilding capacity of all three countries, including promoting the exchange of information and expertise in the field of icebreakers.

President Trump had likewise signaled the importance of a U.S. icebreaker fleet to secure U.S. and allied interests in the polar regions. In 2020, he issued a memorandum calling for "a ready, capable, and available fleet of polar security icebreakers that is operationally tested and fully deployable by Fiscal Year 2029."[113] President Trump has since signaled his dislike of the Biden administration's ICE Pact, instead preferring to go it alone.[114] Yet given the limitations on U.S. shipbuilding capacity, the ICE Pact's multilateral approach may offer the best chance of fielding a capable icebreaker fleet in the near term. If the existing ICE Pact does not meet President Trump's expectations, his administration should look for ways to revise it rather than scrapping it altogether.

More broadly, the Trump administration should remain open to multilateral cooperation on shipbuilding, as it offers the best opportunity to quickly and successfully erode China's dominant position and achieve lasting gains in the shipbuilding industry. The United States and its allies and partners would bring different assets to such efforts. South Korea and Japan possess raw shipbuilding capacity as well as decades of expertise and experience in high-capacity, advanced shipbuilding techniques. South Korea, in particular, is a global leader in producing LNG tankers, which are some of the most technologically complex commercial vessels in the world.

European companies are also prominent in developing technologies and subcomponents that support the global industry. For its part, the United States is limited in its experience in producing massive oceangoing vessels, but its shipyards are relatively more proficient in building smaller ships optimized for regional trade.

Even without a major presence within the industry itself, Washington does have immense convening power and market potential. If it puts its diplomatic and economic heft behind multilateral efforts, it could help to create and lead a network of builders and suppliers that can collectively be more competitive vis-à-vis China.

Crucially, as Washington works with its allies and partners, it should look for specific areas where they can make targeted gains. In some areas, such as massive containerships, China's

lead may be insurmountable in the near and medium term. In other areas, however, the United States and its partners may be able to make greater headway. Efforts should focus on identifying less-mature technologies—such as autonomous navigation or future-fuel engines—where opportunities remain to leapfrog China.

About the Authors

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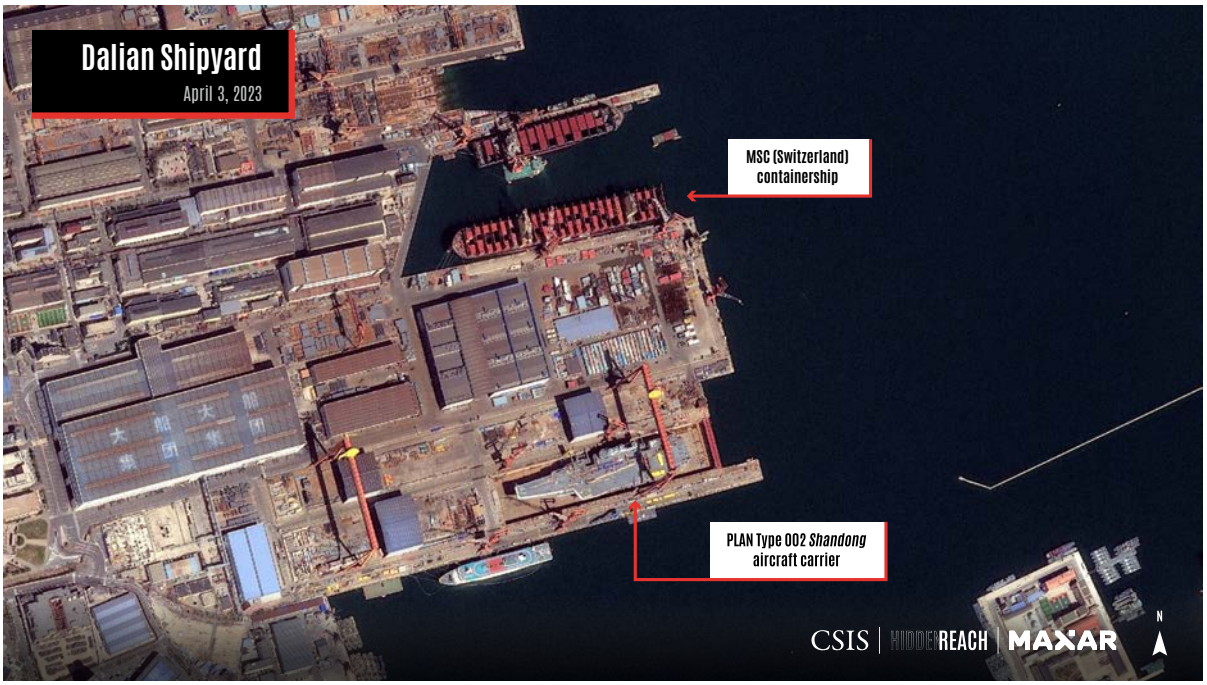
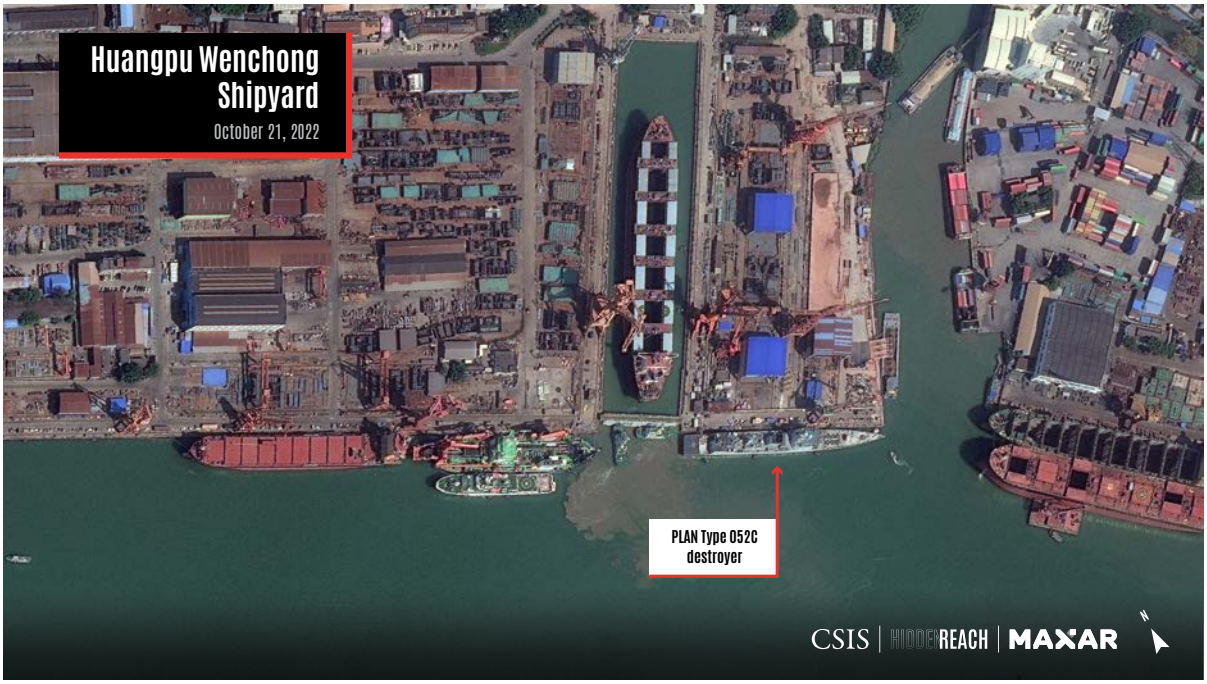
Appendix

Satellite Imagery

Figure A1: Additional Imagery of Merchant Vessels Under Construction Beside Warships at Tier-1 Shipyards


Dalian Shipyard
April 3, 2023
MSC (Switzerland) containership
PLAN Type 002 *Shandong* aircraft carrier
CSIS | HIDDEREACH | MAXAR
N


Huludao (Bohai) Shipyard
November 11, 2019
Highly likely Berge Bulk (Singapore) bulk carrier
PLAN Type 094 nuclear-powered ballistic missile submarine
CSIS | HIDDEREACH | MAXAR


Huangpu Wenchong Shipyard
October 21, 2022
PLAN Type 052C destroyer
CSIS | HIDDEREACH | MAXAR

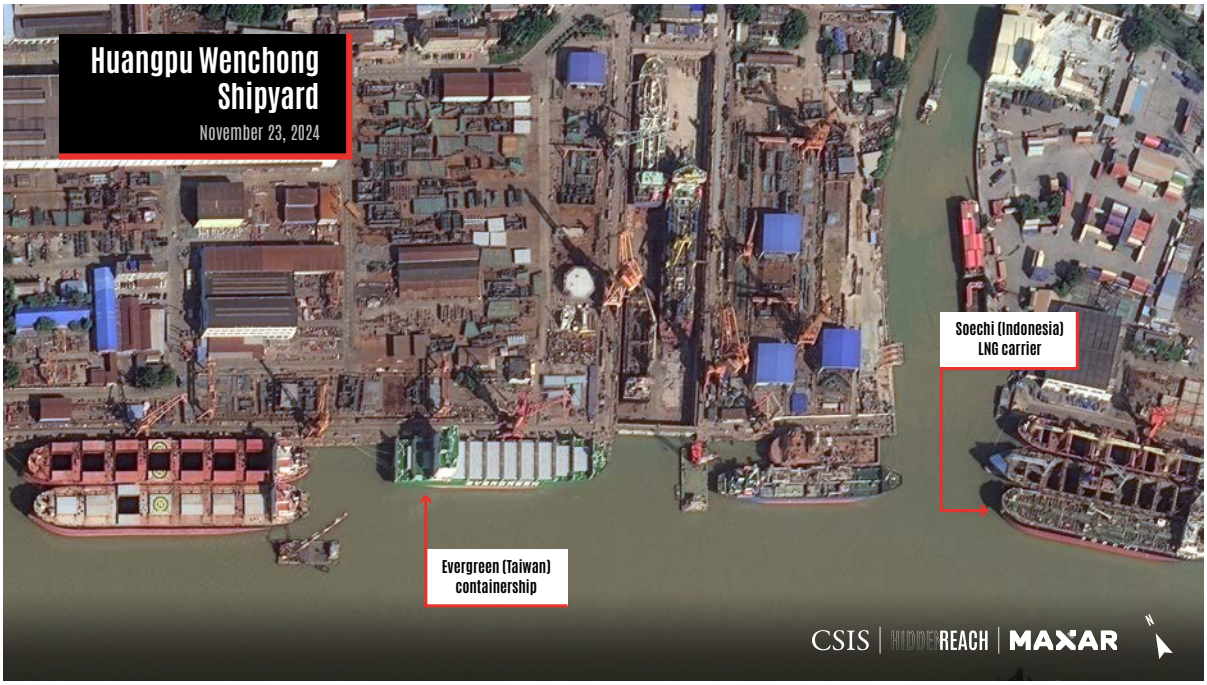
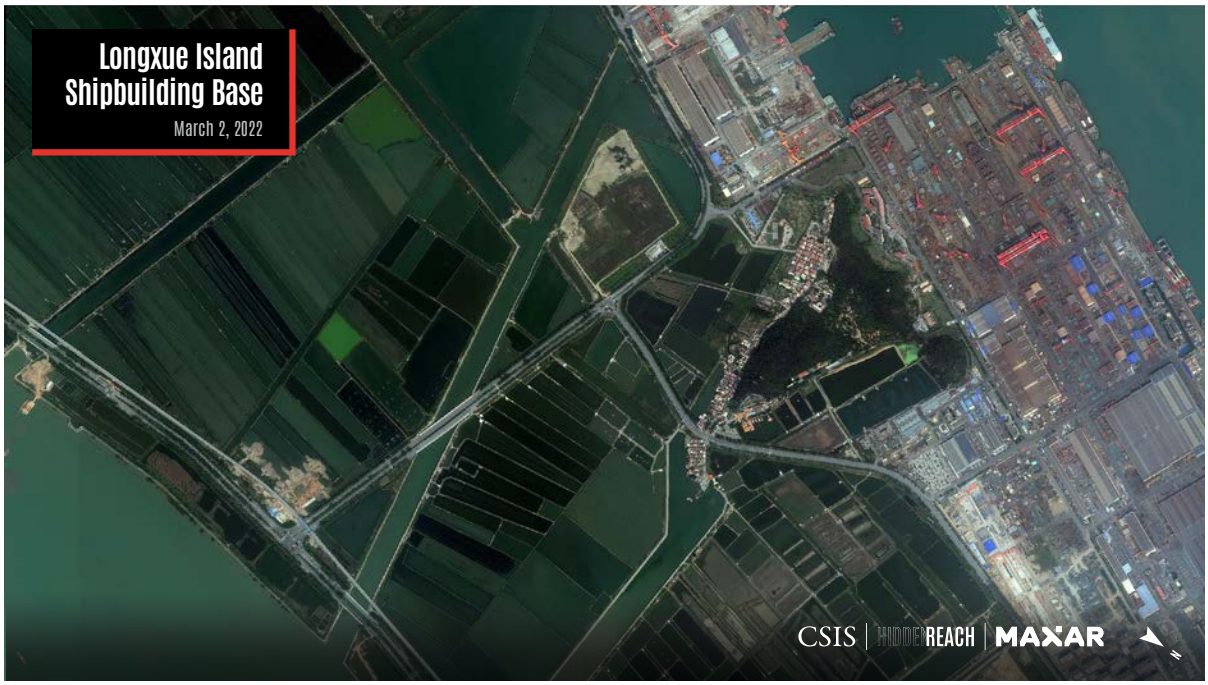
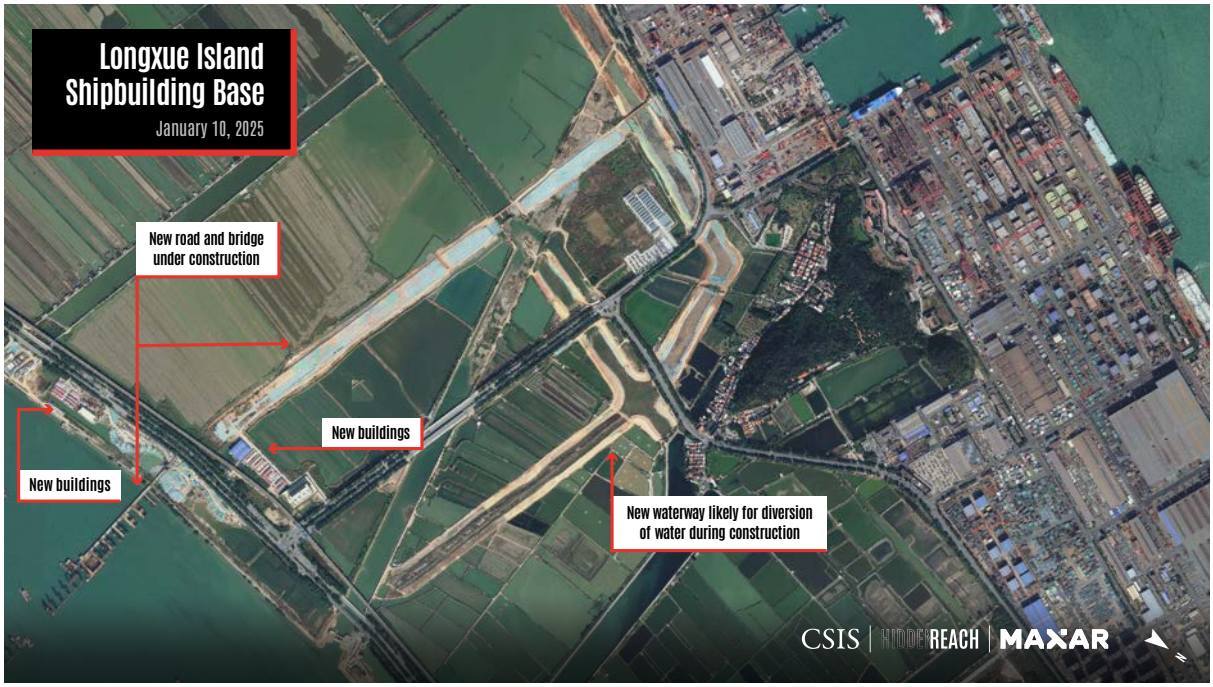

Huangpu Wenchong Shipyard
November 23, 2024
Soechi (Indonesia) LNG carrier
Evergreen (Taiwan) containership
CSIS | HIDDEREACH | MAXAR

Figure A2: Additional Imagery of Expansion Underway at Longxue Island Shipbuilding Base in Guangzhou


Longxue Island
Shipbuilding Base
March 2, 2022
CSIS | HUDSON REACH | MAXAR


Longxue Island
Shipbuilding Base
January 10, 2025
New road and bridge under construction
New buildings
New buildings
New waterway likely for diversion of water during construction
CSIS | HUDSON REACH | MAXAR

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