

# **High-Tech Import Shortages: The Aftermath of Sanctions in the Russian Shipbuilding Industry**

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## **Introduction**

As of April 7, 2022, almost all of Russia's major shipbuilding facilities and conglomerates have been put under sanctions. Prominent coverage has been given to the United Shipbuilding Corporation, which either owns (or is owned by, in the case of the individual board-members) or does direct business with a sizeable portion of the entities mentioned in the announcements published by the U.S. State Department<sup>1</sup> and U.S. Department of<sup>2</sup>Treasury. The USC was targeted specifically for its ownership of the facilities that built the warships currently participating in the invasion of Ukraine, but the broad nature of the sanctions combined with the sheer size of USC as a portion in the Russian domestic industry means that the sanctions effectively target Russian shipbuilding as an industry.

Specifically, the sanctions ban all USC subsidiaries and partners – a category which by default includes almost all of the major dockyards, ship design bureaus, and repair facilities in Russia – from doing business with Western suppliers and customers. Notably, the targets of the sanctions have been restricted in their ability to procure foreign-made components for their ships.

In this paper, I will analyze the Russian shipbuilding industry's ability or lack thereof to cope with the new batches of sanctions. For my analysis, I will focus specifically on the supply of advanced industrial and electronic components, two areas of shipbuilding supply which in Russia are generally considered to be most reliant on foreign imports, and thus most vulnerable to the current sanctions freeze.

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<sup>1</sup> "State Department Sanctions Designations." <https://www.state.gov/additional-state-department-designations-targeting-russian-state-owned-defense-shipbuilding-enterprise/>

<sup>2</sup> "United States Sanctions." <https://home.treasury.gov/news/press-releases/jy0707>

In general, the Russian economy has long suffered from a lack of advanced manufacturing capabilities required to produce technical components essential for modern high-tech equipment. Even in areas like computers and semiconductors, where Russian designers are fully capable of developing some of the best-quality products in the world, the actual production must by necessity take place in factories abroad, and in much smaller quantities than similar products designed and produced elsewhere.

Based on the available evidence, Russian shipbuilders are beginning to find themselves under the same general restrictions as the semiconductor industry or the Russian fossil fuel/energy extraction industry, all of which are also reliant on technology from abroad and have witnessed a decrease in capability following the imposition of Ukraine-related sanctions on doing business with foreign suppliers and investors.

The shortage of such high-tech components in the shipbuilding industry is an issue which the government and major industry players have been aware of for a long time. Over the last decade, considerable investment has been poured into increasing output from domestic manufacturers, and notable improvements have been achieved according to the latest available figures. However, both the available data and recent critical analyses from industry experts suggest that as of early 2022 these improvements have not progressed as far as they need to in order to guarantee a steady and sufficiently large supply of domestic components, and will therefore not be enough to effectively cushion Russian shipbuilders from the effects of sanctions.

## **Russian Shipbuilding Industry and Market Prior to Sanctions**

Shipbuilding is a highly developed industry in Russia. Modern Russia inherited a sizeable portion of the maritime and shipbuilding infrastructure of the former Soviet Union, and although the industry, like the economy as a whole, went through a downturn in the decade immediately following the collapse of the Soviet Union, in recent years it has experienced a revival. Until very recently, that revival looked poised to continue developing even further.

According to the Russian Maritime Register of Shipping's latest numbers, the Russian shipbuilding industry produced a total of 116 ships in 2020, with several hundred more under construction. The majority of these were small-value craft like barges and pontoons, but a number of larger, more advanced and valuable vessels were manufactured as well. Prominent among the latter category are the latest additions to Russia's top-of-the line icebreaker fleet, including the nuclear-powered icebreakers *Arktika*<sup>3</sup>, *Sibir*<sup>4</sup>, and the completed but not yet commissioned *Ural*<sup>5</sup>. These ships, which were fully designed and constructed in Russia, represent the cutting edge of icebreaker technology, as well as the broader potential of the Russian shipbuilding industry. Following from these successes in icebreaker design and construction, the Russian shipbuilding industry has also begun making some progress in developing capabilities for design of large-tonnage cargo ships and commercial fishing vessels<sup>6</sup>.

While the above examples clearly demonstrate the domestic shipbuilding industry's capability for producing good-quality merchandise, the icebreakers represent only a small handful of vessels constructed over the course of the last several years. More broadly, Russia's quantity of output in

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<sup>3</sup> "Arktika icebreaker." <https://www.world-nuclear-news.org/Articles/Arktika-icebreaker-completes-first-mission>

<sup>4</sup> "Sibir." <https://en.portnews.ru/news/323194/>

<sup>5</sup> "Ural commissioning." <https://sudostroenie.info/novosti/35256.html>

<sup>6</sup> "Market Analysis of Russian Shipbuilding." <https://www.en.nevainter.com/upload/doc/Book-en-demo.pdf>

terms of ships leaves a lot to be desired compared to industry leaders like China or South Korea – as was mentioned above, the industry’s total output over the course of a decently good year is in the low hundreds, with most of those being small and fairly basic designs. Over the past decade, considerable resources and finances have been invested into expanding these capabilities. Most notably, the Russian government invested considerably in the development of modern, world-class shipbuilding facilities like the Zvezda Shipbuilding Complex<sup>7</sup>. Comprising part of Russia’s ongoing investment in its far-eastern industrial capabilities, Zvezda received approximately \$4.2 billion in investment from both domestic and foreign (particularly South Korean) sources, as well as the most advanced machinery from South Korea, Norway, Finland, etc. By the estimates of its own management<sup>8</sup>, the complex was expected to be fully operational by 2024. Its planned output involves producing ships for both the military and civilian industries like LNG transport.

While the best-quality and best-advertised products of the Russian shipbuilding industry go towards priority domestic development projects like developing Arctic shipping routes, many other Russian-manufactured ships are slated for export. In 2020, this export market totaled \$742 million, an increase of more than 40% compared to the previous year. The majority of Russian-made ships were sold to buyers in the European Union, which comprised about 53% of the market, with a total value of \$392 million. South Korea was another prominent customer, purchasing about 17% of Russia’s output with a value of approximately \$126 million.

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<sup>7</sup> “Zvezda Shipbuilding Complex.” <https://www.ship-technology.com/projects/zvezda-shipbuilding-complex-bolshoi-kamen/>

<sup>8</sup> “About Zvezda.” <https://sskzvezda.ru/index.php/en/about>

## **Sanctions as of 2020**

In the years following the annexation of Crimea, US sanctions were imposed on a number of Russian companies in the shipbuilding sector. The previous major package was published by the Department of the Treasury on March 15, 2019, in direct response to the then-recent Russian seizure of Ukrainian ships in the Strait of Kerch<sup>9</sup>. In partnership with the EU and Canada, OFAC sanctioned four Russian officials who participated in the seizure of the vessels and six defense firms with business operations in Crimea. These included major dockyards and facilities such as Yaroslavsky Shipbuilding Plant, Zelenodolsk Shipyard Plant, and others which had been identified by OFAC as working on Russian military ships stationed in or operating out of Crimea.

The latest batch of U.S. government sanctions against Russian shipbuilders was imposed on April 7, 2022. This package encompassed the United Shipbuilding Corporation and various affiliated suppliers, dockyards, owners/managers/shareholders, etc<sup>10</sup>. In particular, the list includes the USC itself, eight members of the company's Board of Directors, and 28 subsidiaries owned by the corporation, including shipyards, research and design bureaus, and ship repairing facilities. The United States' sanctions package joins an already-in-place sanctions package passed by the European Union on March 15, 2022. In their iteration, the member states of the EU banned their citizens and companies from doing business with a grand total of 24 Russian individuals and entities, including those in the shipbuilding sector<sup>11</sup>. Specifically, Regulation (EU) No 269/2014 targets JSC United Shipbuilding Corporation and all of the "multiple shipyards and design bureaus" owned by it; as well as JSC Zelenodolsk Shipyard. Japan also joined the sanctions regime

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<sup>9</sup> "Treasury Sanctions." <https://home.treasury.gov/news/press-releases/sm629>

<sup>10</sup> "Russia-Related Designations Updates." <https://home.treasury.gov/policy-issues/financial-sanctions/recent-actions/20220407>

<sup>11</sup> "EU Introduces Additional Sanctions." <https://sanctionsnews.bakermckenzie.com/eu-introduces-additional-sanctions-against-russia/>

on Russian shipbuilders only days after the EU. On March 21, 2022, the Japanese government likewise imposed sanctions on the United Shipbuilding Corporation and Zelenodolsk Shipyard, joining the broader coalition<sup>12</sup>.

In addition, sanctions against Russia's maritime industry also include a proposed ban on Russian-flagged ships entering US ports (though interestingly not all Russian-owned ships, just ones registered in Russia and flying Russian flags).

### **Impact of the Sanctions on Vulnerable Imports**

In terms of its access to modern high-tech methods and components, the Russian shipbuilding industry faces the same shortcomings as other high-tech Russian industries, including semiconductor manufacturers, computer hardware developers, and the energy/fossil fuel extraction sector. On the one hand, the Russian work force's high level of education in the various science and technology fields has ensured the rise of a thriving domestic technological industry. Across the board, the design and marketing of high-tech components increasingly takes place within Russia, by Russian companies. Thanks to government support over the last decade, this has become increasingly true in the shipbuilding industry as well. In many cases, these Russian-designed components are generally recognized by industry experts as being similar in quality to their counterparts designed by Western and East Asian competitors, despite not being nearly as well-known outside of Russia.

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<sup>12</sup> "Japan Sanctions on Russian Shipbuilding." <https://dredgewire.com/japan-imposed-sanctions-united-shipbuilding-corporation-and-zelenodolsk-shipyard/>

The weakness, as elsewhere, is Russia's comparative lack of modern industrial manufacturing capabilities. While increasingly fully capable of envisioning and designing the high-tech components required for modern design, Russian companies still rely on factories abroad to actually produce and import these components. For the shipbuilding industry, these imports come predominantly from the West and advanced East Asian economies. Among other components, Russia depends heavily on the import of electronics. In 2015, it was estimated that 70 percent of electrical components used by the domestic shipbuilding industry came from abroad<sup>13</sup>. Ironically, the biggest supplier back in 2015 was Ukraine. In that capacity, 2022 was actually not the first time the Russian shipbuilding industry was forced into a construction suspension due to a lack of resources coming in from abroad. In the 2014-2015 sanctions cycle, this shortage even affected Russian military naval projects.

Russian expert evaluations of the domestic shipbuilding industry before and after the implementation of sanctions paint a clear picture of the likely course of events for Russian shipbuilders over the coming few years. Prior to the 2022 invasion, Russian experts were highly optimistic that the domestic shipbuilding industry was entering a period of growth and revival. Nevertheless, a number of weaknesses were also assessed at the time, including a shortage of domestic Russian manufacturing of marine component equipment<sup>14</sup>.

The Russian government has a long history of attempting to address the shortage of quality domestic supplies through both direct investment and the enactment of regulations encouraging improvement. Import-substitution of industrial components critical to the shipbuilding sector has

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<sup>13</sup> "Russian Shipbuilding Electronics Imports." <https://www.themoscowtimes.com/2015/05/21/russian-shipbuilding-is-70-dependent-on-foreign-electronics-a46761>

<sup>14</sup> "Shipbuilding Growth Over Three Decades." <https://www.bairdmaritime.com/work-boat-world-features/feature-russias-shipbuilding-industry-steady-growth-over-three-decades/>



been identified as a focus of Russian government efforts since before the initial sanctions packages of 2014. In 2019, the Russian Ministry for Industry and Trade (Minpromtorg) published a new Strategy for the Development of the Shipbuilding Industry through 2035<sup>15</sup>. The 2035 Strategy specifically highlighted eight areas for long-term development, the fourth of which was Scientific and Technical Development [Научно-техническое развитие]. The main issue as identified in this section was that Russian-made components were inferior in quality to those available for purchase abroad, and that more concerted government involvement was needed to bolster the industry's quality standards. The key means of doing so, as highlighted in the report, consisted of developing industrial competencies in the advanced technical fields, improving industry standards, and sharing the much-more advanced expertise of the military and government sectors with civilian shipbuilding. In line with the latter, the 2035 report envisioned giving civilian shipbuilding sectors such as fishing and river transport far more support than before: up until that point, 90 percent of import-substitution efforts had been concentrated in military shipbuilding.

Furthermore, within its “Goals and Objectives” [Цель и задачи] category, the Ministry included an objective highlighting the specific numeric improvements it intended to achieve as a result of these new policies. By 2035, the plan envisioned that 75 percent of advanced industrial and electronic components would be manufactured by domestic suppliers. The base figure for 2019, as given in the document, was 42 percent.

Over the news few years, leading up to the present day, the available data as provided by the government suggests that Russia's ability to provide domestically-manufactured shipbuilding components has definitely improved. In 2021, Director Boris Kabakov of Minpromtorg's

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<sup>15</sup> “Strategy for the Development of the Shipbuilding Industry through 2035 [Стратегия развития судостроительной промышленности на период до 2035 года].” <http://static.government.ru/media/files/WlszFJXA26YAXaOifb1H2KQqmi1D7S7.pdf>

Department of Shipbuilding and Maritime Technology [Департамент судостроительной промышленности и морской техники Министерства промышленности и торговли] gave an interview in the Russian Maritime Politics [Морская политика России] journal<sup>16</sup>. As part of his comments, Director Kabakov outlined some promising numbers related to domestic supply of materials. Specifically he highlighted that as of 2020, of the 0.6 billion rubles spent by the shipbuilding industry on technical licenses and components, 54% (0.32 billion rubles) went to Russian domestic manufacturers. Kabakov did, however, point out that the progress was uneven, as domestic manufacturing was still heavily focused on relatively lower-tech components. Meanwhile, higher-tech components, including those used in such capabilities as automation and engine construction, remained at much lower levels of 48 and 20 percent domestic production, respectively.

In addition, although the exact numbers for this were not released, the positive numbers at the time were likely still heavily skewed towards military production, as it is unlikely that the 2019 numbers mentioned above (in which 90% of import-substitution had been aimed at military and government contracts) leveled out to any significant degree among the other industries. At the time of writing, major suppliers of advanced domestic components include military components manufacturers GUP RK KTB Sudokompozit and PAO Zvezda (distinct from the Zvezda Shipbuilding Complex), as well as AO Zavod Fiolent, an electronics manufacturer in Crimea. These, however, are explicitly identified as suppliers of advanced components to the military, with no indication that they provide similar services to civilian shipbuilders. As I highlight below, existing database evidence suggests that there are comparatively few suppliers of these types of components for the civilian sector.

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<sup>16</sup> "В. Кабаков. Russian Shipbuilding: Realities and Perspectives [Б.Кабаков: Судостроение России - реалии и перспективы]." *Russian Maritime Politics*, December 22, 2021, <https://marine.org.ru/publication/russian-maritime-policy/11098/>

In the area of advanced components, Russian shipbuilding suppliers also appear to be lacking. To assess the exact numbers of facilities putting out these components, I looked at Korabel.ru<sup>17</sup>, an industry information resource containing a database of all factories and companies in Russia working on any stage of domestic shipbuilding. For the sake of consistency, I looked specifically at three sectors that matched the profile of manufacturing advanced components: Machine-building production [Машиностроительное производство], Production of machine-building components [Изделие МСЧ (машиностроительной части)], and Electrical Installation [Электромонтажное производство]. In total, only eight facilities in the country were supplying the highlighted components: six for the first category, and one apiece for the latter two. At the time of evaluation, the eight facilities collectively supplied components for 64 ships currently under construction, 46 of which were being built for the military or some other government security entity. According to the same database, the Russian industry currently has a total of 295 ships in some stage of construction<sup>18</sup>. All the rest of these ships presumably depend on imports of foreign components.

The Ministry for Industry and Trade's 2035 Strategy, as well as Director Kabakov's 2021 comments, seemed to operate from a base assumption that Russia's manufacturing base has the technical and industrial capability to achieve both the quality standards and the higher levels of output that the government hopes to encourage. Other industry reports, however, shed some doubt on this assumption. During the first quarter of 2021, for example, the NEVA International Maritime Exhibition and Conference reported on the issue in the latest iteration of their Russian Shipbuilding Market Analysis<sup>19</sup>. In the analytical report, even taking into account the

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<sup>17</sup> "Shipbuilding." <https://www.korabel.ru/shipbuilding.html>

<sup>18</sup> "List of Russian Shipbuilding Facilities." <https://www.korabel.ru/shipbuilding/search.html>

<sup>19</sup> "Market Analysis of Russian Shipbuilding." <https://www.en.nevainter.com/upload/doc/Book-en-demo.pdf>

government's initiatives, NEVA specifically highlighted the vulnerability of the Russian high-tech marine equipment (MRE) market to foreign sanctions, and advocated ramping up domestic production in the field.

In the aftermath of the initial imposition of sanctions, Russian media saw a series of publications commenting from varying perspectives, and with varying degrees of confidence and clear-sightedness, about the effects of sanctions on the industry. One article, pointedly titled "Kaliningrad's shipbuilders are not afraid of sanctions"<sup>20</sup>, provided a comprehensive list of at least six ships currently under construction in Kaliningrad's wharfs, along with planned contracts with customers in at least five countries. "Despite sanctions, work is continuing, not a single project has been frozen", the article pointed out, while also highlighting their plan to purchase machinery and electronics "of exclusively domestic design."

Other publications on the topic by Russian analysts bear out the substance of both major claims made in the above article. On the whole, it is agreed that work on Russian-manufactured ships is unlikely to stop anytime soon, despite the imposition of sanctions. The urgent need for domestic machinery and electronics to replace now-inaccessible foreign suppliers is also highlighted with considerable frequency, as indeed it has been for several years. The primary component of long-term, industry-wide analysis that is missed by the Vesti article, however, is the fact that Russian dockyards' ability to maintain their output in spite of sanctions is far from indefinite, and given current capabilities their economic stability from 2023 onward is far from guaranteed. According to analyses of the industry published in Kommersant<sup>21</sup> and New Defense Order Strategy<sup>22</sup>, the

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<sup>20</sup> "Kaliningrad's shipbuilders are not afraid of sanctions [Калининградские кораблестроители санкций не боятся]." <https://amp.vesti.ru/article/2703569>

<sup>21</sup> "The slipways will last until winter [Стапели продержатся до зимы]." <https://www.kommersant.ru/doc/5304305>

<sup>22</sup> "Shipbuilding Sanctions: Delayed Effect." <https://dfnc.ru/import/sanktsii-na-sudostroenie-otlozhennyj-effekt/>

underlying reason for what they refer to as the “delayed effect” of sanctions has to do with the timing of material purchases and supply fulfillment in the shipbuilding industry. Specifically, most if not all of the advanced components required for Russian dockyards’ current shipbuilding needs had already been procured and delivered prior to the imposition of sanctions in April. In other words, shipbuilders in Kaliningrad, Zvezda, and elsewhere are currently drawing from previously-accumulated stores of such components. The consensus seems to be that the current rate of manufacturing can be maintained through to the end of the year, and that the true bite of the sanctions will thus not be felt in full until early 2023. At that point, however, comprehensive government intervention will be needed to keep the domestic shipbuilding industry afloat and competitive. According to analysis carried out by Infoline-Analytica, the most urgent priority is to significantly expand import-substitution in the shipbuilding industry, or the provision of domestic alternatives to now-inaccessible foreign imports. The shipping, crabbing, passenger, and research vessel sectors were identified as most vulnerable to import shortages, and therefore highlighted as the ones which would require the most immediate attention in any import-substitution scheme. As was covered in the previous section, the military and many industry-specific tanker shipment sectors have already benefited from import-substitution schemes in recent years, so their vulnerability to sanctions was rated as lower than that of the others.

The management of the Russian shipbuilding conglomerate “Ъ” elaborated further by commenting that import-substitution would need to focus specifically on certain specific manufactured products, including factory equipment and advanced components. Given recent analysis of Russia’s underproduction of electronics for ships, it also likely makes sense to include electronics

production in this list<sup>23</sup>. Equally important is the likely nature of the government intervention in the immediate aftermath of the sanctions, as analyzed by these same commentators. In the likely absence of new contracts, true import-substitution measures are described as “illusory”, and replaced with calls for much more direct government assistance to ensure enterprises’ ability to keep the lights on. Considering that the recently-imposed sanctions are not likely to be removed anytime soon, “B”’s projection is not an optimistic one for the prospects of the industry.

The exception to these gloomy predictions would be if Russian shipbuilders can find alternative exporters from the ranks of nations who have not imposed sanctions. At the time of the imposition of sanctions, Russian manufacturers had long-lasting and in many cases growing contracts and partnerships with industrial suppliers from a multitude of foreign countries. The Zvezda Shipbuilding Complex alone had pre-existing contracts with French engineering company GTT and Dutch firm Damen for maritime technology and equipment supplies; long-standing cooperation agreements for electronics imports from German company Siemens and US-based General Electric; and a considerable amount of investment and imports from South Korean conglomerates Hyundai and Samsung Heavy Industries, including provision of technology for the construction of fourteen LNG-powered tankers<sup>24</sup>. Other partnerships include that with Finnish engine manufacturers Wartsila and ABB-Marine, which supply engines to a range of projects in Russia; Turkey’s Elkon Elektrik, with supplies of electrical and automation equipment, HVAC

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<sup>23</sup> “Russian Shipbuilding Electronics Imports.” <https://www.themoscowtimes.com/2015/05/21/russian-shipbuilding-is-70-dependent-on-foreign-electronics-a46761>

<sup>24</sup> “Sanctions on Russia shipbuilders, Zvezda and LNG carriers.” <https://loydslist.maritimeintelligence.informa.com/LL1140181/Sanctions-on-Russia-shipbuilders-turn-attention-to-Zvezda-and-LNG-carriers>

(heating, ventilation, and air conditioning) systems from Norwegian supplier Novenco; and electrical products from Phoenix Contact, a German company with a Russian-based subsidiary<sup>25</sup>.

At the time of writing, all but two of the aforementioned nations had imposed sanctions on Russian shipbuilding, cutting off the above partnerships and supply sources for the foreseeable future. South Korea's lack of immediate economic condemnation was perhaps due to Samsung's already-considerable investment in the Zvezda Complex. However, Seoul has imposed sanctions on other elements of Russian industry, and an expansion of restrictions into the shipbuilding sector is not out of the question. Turkey's likelihood of joining the sanctions regime is low, but so too is the likelihood that the country would be able to supply all of Russia's electrical and technical needs for the foreseeable future.

The one remaining holdout is, predictably, the People's Republic of China, and it is on the PRC that some elements of the Russian shipbuilding industry now appear to be placing a disproportionate amount of their hope, at least in the short run. The feasibility of importing considerable amounts of components from China, however, is unclear. While an in-depth analysis of the PRC's domestic shipbuilding industry is outside the purview of this paper, what is relevant is that at the time of the imposition of Western sanctions in February-April of 2022, very few technological and electronic components used in Russian-built vessels appeared to come from Chinese manufacturers. One possible reason for this might be that Russian consumers preferred the higher-quality products on offer by Western producers. If this is the case, then with few other options available, Russian shipbuilders may turn to major Chinese shipbuilding conglomerates like the China Shipbuilding Industry Corporation (the PRC's equivalent of the Russian USC) and the

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<sup>25</sup> "Market Analysis of Russian Shipbuilding." <https://www.en.nevainter.com/upload/doc/Book-en-demo.pdf>

China State Shipbuilding Corporation to make up the current shortfall. Precedents for such a move already exist, for example, in the Russian semiconductor industry's shift towards Chinese manufacturers like SMIC and Taiwan's TSMC. However, considering that the PRC's own shipbuilding industry is currently the largest in the world in terms of output, and therefore a voracious consumer of components in its own right, an additional unanswered question concerns whether Chinese shipbuilding component manufacturers would even be willing or able to export their components to Russia. If the apparent lack of Chinese exports of advanced components is due to the prioritization of domestic high demand, Chinese suppliers may be at best reluctant and at worst completely unable to supply anything close to the 46 percent of components that Russia still has to import from abroad.

## **Conclusion**

While the United States' April 2022 sanctions were not the first to directly or indirectly target Russian shipbuilders, they were unquestionably the most comprehensive to date. Over the last few months, they have exposed the limits of Russian economic reforms and domestic development efforts implemented in the last decade.

Over the last eight years, Russian shipbuilders, along with every other major Russian industry, have grappled with the reality of sanctions as a restricting factor. As we have seen, the government's response to the threat of a Western cutoff of supplies has been remarkably comprehensive. Russian government and industry leaders accurately identified the most vulnerable link in the supply chain – advanced technical components – and invested significant funds and efforts to remedy this shortfall. At the time of writing, that investment has paid off in



several key regards. Most notably, most if not all of the Russian military and government-contracted shipbuilding sector is effectively self-sufficient at the time of writing. In some sectors, like nuclear-powered icebreaking, Russian designers and manufacturers have capitalized on these new capabilities by becoming global industry leaders.

However, as of the industry's moment of truth in the early months of 2022, this success was deeply uneven in its distribution. In particular, by all indications it appears to have barely scraped the surface when it comes to the needs of most areas in the civilian shipbuilding sector. Given time – specifically the additional decade and a half required to complete the Ministry of Industry and Trade's ambitious Strategy for 2035 – Russia might have increased the quality of outputs in its domestic advanced components industry to cover as much as 75 percent of shipbuilding demand. According to statements made by officials in 2021, two years into the strategy's implementation Russia had already made some real if unspectacular progress towards this objective. In early 2022, however, when the real test of capabilities came, the Russian domestic industry was nowhere near advanced enough to meet it effectively.

Subsequent analyses of what the Russian government can and should do to alleviate the present crisis likewise do not present the immediate future in a positive light. Across most of the non-Russian-government analyses cited above, authors reference the need for immediate and thorough government aid, significantly in the form of immediate relief to keep struggling dockyards and companies afloat from 2023 onwards. Even heavily military-focused dockyards, whose claims to be unafraid of sanctions perhaps have some basis in reality, have cited their efforts at renegotiating their terms of business with government clients, terms which will involve longer time windows for project completion and likely more direct assistance to procure necessary components. Lastly, and despite the government's optimism in the capabilities of Russian industry to get the job done

in the long run, available evidence from shipbuilding databases suggests that there are simply not enough domestically-produced components to go around.

With all of this being the case, a shortage of advanced technical components in the Russian shipbuilding sector is unavoidable. With this, starting in 2023 Russia will almost certainly see a sharp decline in the number of civilian vessels produced. Absent a massively expanded government investment effort, it will also see a significant lengthening of the time frame required to bring its import-substitution ambitions to fruition. In turn, the sanctions that will cause the supply crunch could only be removed contingent on Russia's withdrawal from Ukraine, a course of action which Vladimir Putin has made no indication of considering. Overall, the substantial decline of Russia's once-promising shipbuilding industry may well become one of the hallmarks of the Putin regime.

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