World icebreakers overview

For those who share our passion, we present a snapshot of the world icebreaking fleet as of 1st January 2024.

There is a multitude of ice-strengthened vessels designed for various purposes in the world. Some possess exceptional ice-going capabilities while others are suited only for light ice conditions. Only a select few can truly be classified as icebreakers.

Icebreakers pave the way

An icebreaker is a vessel designed for icebreaking duties. Its core features include a reinforced hull shaped to break the ice, a robust and powerful propulsion system, and appropriate winterization against low ambient temperatures. All characteristics are meticulously selected based on the intended area of operation and planned tasks. These typically include escort or ice management functions.

Major classification societies such as American Bureau of Shipping, Bureau Veritas, Det Norske Veritas, Lloyd's Register, Russian Maritime Register of Shipping and – most recently – China Classification Society have established rigorous standards and guidelines for icebreakers to ensure safe navigation in ice-covered waters.

Hard to draw the line

The diversity of icebreaking ships makes compiling an exhaustive list of icebreakers challenging. It is difficult to draw a clear line between ships that should be included and ships that should be left out.

In addition to purpose-built icebreakers, many research ships, offshore vessels, and even one luxury cruise ship have been officially classified as icebreakers. However, their ability to operate independently in difficult ice conditions is merely a means to carry out other tasks. Although smaller ice-strengthened tugboats are often used for icebreaking operations in harbours, they are not considered as icebreakers. Oil tankers, LNG carriers, and other cargo ships are also excluded even if they are fully capable of independent year-round operation in the most challenging Arctic ice conditions.

Market intelligence

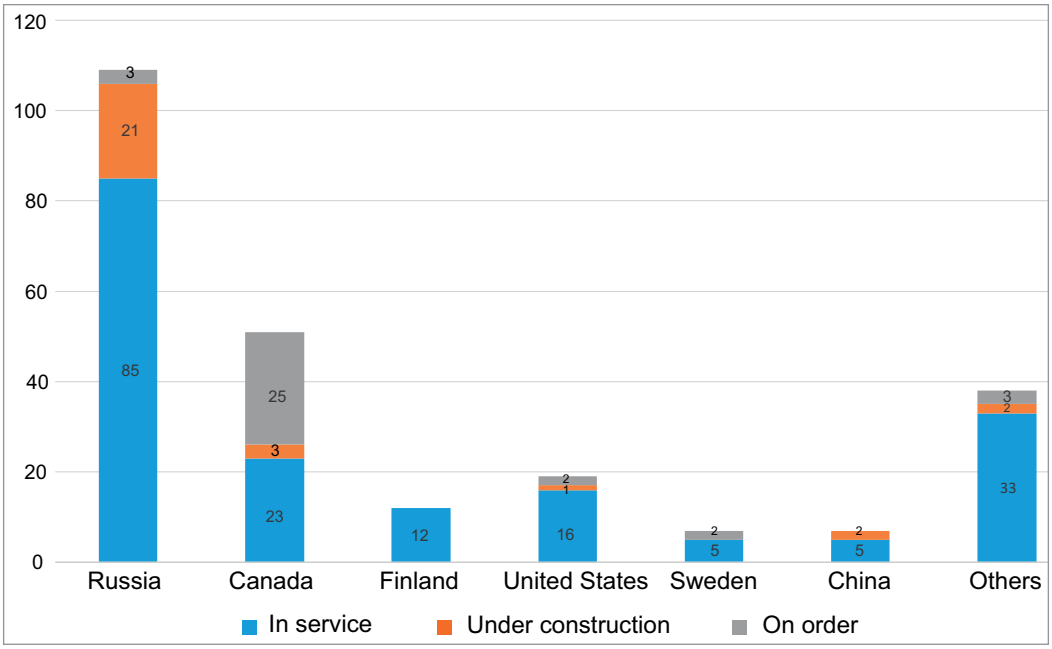
At Aker Arctic, we keep a close track on all world icebreakers, including ship type, size, ice class, primary mission, icebreaking capability, and other technical characteristics in addition to expected lifespan.

"This is a cornerstone of our expertise, rooted in our keen interest in monitoring market evolution in our field," notes Senior Naval Architect Tuomas Romu, who has compiled the overview of the world's icebreaking fleet presented here.

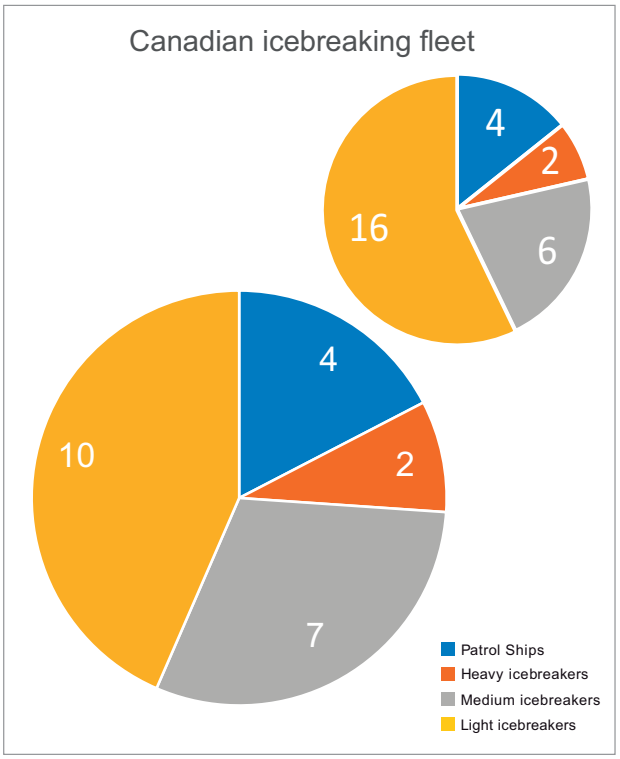
"However, different countries' fleet sizes should not be directly compared due to the diversity in the sizes, capabilities and characteristics of individual ships on the list," Romu adds.

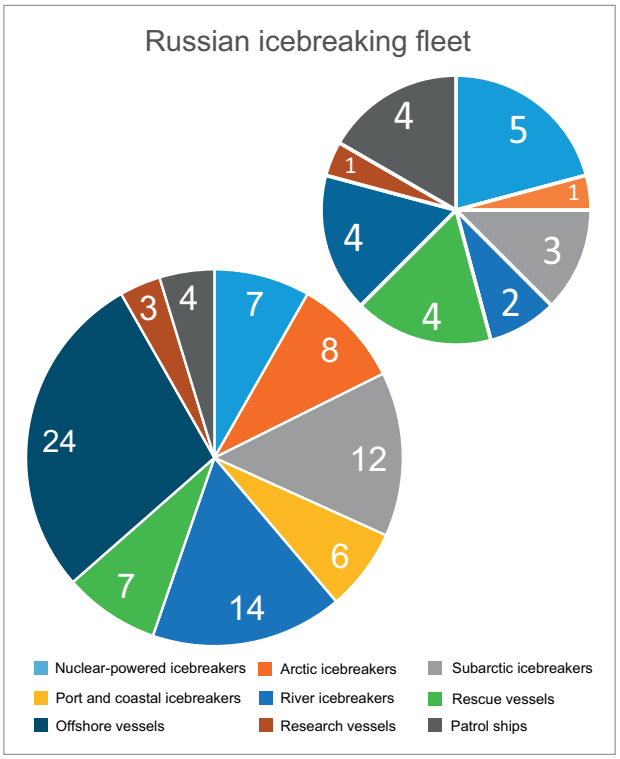
As of 1 January 2024, the complete list of icebreaking ships includes 243 ships: 179 in service worldwide, 29 under construction, and 35 in the shipyards' orderbooks or included in various procurement programs. While the global fleet is gradually increasing in numbers, many of the new icebreakers are built as replacement to older ships.

World icebreaking fleet 1 January 2024.



Examples of two different classification systems: Canada and Russia. The larger chart shows vessels in use, the smaller chart planned vessels.





Although an icebreaker is a very specific ship type, a review of the global icebreaking fleet must consider not only the diversity of the vessels themselves but also the different ways icebreaking ships are perceived and classified worldwide.

For example, United States and Canada each use their own way of classifying icebreakers as "heavy", "medium" or "light". On the other hand, Russia's vast icebreaking fleet can be split into a number of categories based on type, purpose and key technical characteristics.

Finland leads the world

Following World War II, Finnish companies made rapid advancements in icebreaking technology, pushing the state of the art in icebreaking design, construction, power supply, and propulsion systems. Today, Finland is a global leader in icebreaker design and construction, with most of the world's icebreakers originating from Finnish expertise. Naturally, every single icebreaker in service in Finland has been designed and constructed locally.

The strong Finnish maritime cluster is composed of engineering offices, shipyards, equipment manufacturers, universities, model testing facilities, and other related entities. The cluster collectively foster research, new ideas and innovations, continually inventing ways to improve operations in ice.

The task of how to break ice more efficiently and sustainably has intrigued naval architects and ship engineers for generations, constantly pushing the boundaries of the icebreaker design using new hull forms, alternative fuels, different propulsion systems, and new engine types.

Full-scale references

The Finnish maritime industry also maintains the most extensive full-scale reference database, ensuring that every new vessel meets its performance requirements set before construction.

"Anyone considering acquiring an icebreaker looks to Finland first. With over 80 years of experience, we consistently pioneer new market innovations," says Romu. "Moreover, our vessels have received global acclaim for their performance and quality."

Environmental stewardship

The global icebreaker market represents a diverse and dynamic sector, essential for supporting operations in challenging ice conditions worldwide. Finnish leadership in this field, marked by decades of innovation and excellence, sets a high standard for icebreaker design and construction. With increasing demand for efficient icebreaking vessels and sustainable maritime solutions, the Finnish maritime cluster remains at the forefront of technological innovation and environmental stewardship.

We at Aker Arctic are dedicated to monitoring developments, sharing our insights and fostering collaborations to further enhance our own capabilities. We believe this is vital for pushing the state of the art of icebreaking in order to ensure safety and optimal efficiency for maritime operations in icy waters in a constantly evolving world.