Futures of shipping in the Arctic until 2050

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Our focus: Shipping in the Arctic

**Destination** shipping:
- From outside the Arctic to the Arctic or from the Arctic to outside the Arctic, i.e., ships going to the Arctic to load, unload, or perform an economic activity there

AND

**Transit** shipping:
- From outside the Arctic to outside the Arctic via the Arctic

https://www.marinetraffic.com/ (August 9, 2021, 13:34 CEST)
Foresight for the Euro-Asian Arctic: Socio-economic scenarios

- Deeply uncertain system
- Describe various plausible socio-economic futures of the Euro-Asian Arctic until 2050 in the form of short narratives
- Account for both Arctic (endogenous) and global (exogenous) factors – political, economic, social, technological, environmental, legal (PESTEL)
- Developed based on extensive literature research and input from various experts from academia and industry using the morphological analysis method
- Original focus on emerging trade routes between Europe and Asia, i.e., shipping in the Euro-Asian Arctic
Four plausible visions of Arctic shipping

- High volume of destination & low volume of transit shipping
- High volume of destination & transit shipping
- Low volume of destination & transit shipping
- Low volume of destination & high volume of transit shipping
Foresight exercise
Morphological analysis

Major steps:

1. Identification of the relevant factors
2. Identification of these factors’ realizations (alternative states)
3. Construction of the morphological matrix
4. Cross-consistency analysis

Example

<table>
<thead>
<tr>
<th>SATURDAY'S WEATHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
</tr>
<tr>
<td>Hot</td>
</tr>
<tr>
<td>Pleasant</td>
</tr>
<tr>
<td>Cold</td>
</tr>
<tr>
<td>Freezing</td>
</tr>
</tbody>
</table>

Hot sunny day
Warm dry day
Cold grey day
Thunderstorm – wildcard!

## Morphological matrix

<table>
<thead>
<tr>
<th>Climate change effects</th>
<th>Decarbonization pace</th>
<th>Global order</th>
<th>Infrastructure investment</th>
<th>Arctic governance</th>
<th>Arctic technologies</th>
<th>Regulatory barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme</td>
<td>Slow decarbonization</td>
<td>Unilateral action</td>
<td>Low investment</td>
<td>No cooperation in the Arctic</td>
<td>Gradually upgraded technologies</td>
<td>High barriers or unstable rules</td>
</tr>
<tr>
<td>Moderate-to-severe</td>
<td>Several competing blocs</td>
<td>National investment</td>
<td>Arctic for Arctic</td>
<td>Restricted access</td>
<td>Low barriers</td>
<td></td>
</tr>
<tr>
<td>Limited</td>
<td>Radical decarbonization</td>
<td>Strong international cooperation</td>
<td>Large international investments</td>
<td>Open Arctic for all states</td>
<td>Disruptive technologies</td>
<td></td>
</tr>
</tbody>
</table>

### Legend

- **Global Resource Base**: High volume of destination & low volume of transit shipping
- **Global Route**: High volume of destination & high volume of transit shipping
- **Abandoned Land**: Low volume of destination & low volume of transit shipping
- **Sanctuary**: Low volume of destination & high volume of transit shipping
- **Transpolar Shortcut**: Low volume of destination & high volume of transit shipping
Scenarios
High volume of destination & low volume of transit shipping
The world is divided into several geopolitical and geoeconomic blocs. The global trade shifts from Asia-to-Europe to other regions. Technological progress and decarbonization are slow. The demand for Arctic fossil resources rises. Climate change brings about moderate-to-severe effects including more frequent and dangerous natural hazards such as drifting ice and icebergs, as well as stronger winds and higher waves. Marine infrastructure develops gradually and is often of dual purpose. Militarization of the Arctic increases, however, it does not lead to an armed conflict. Investment in large-scale land-based transport infrastructure proves infeasible due to climate risks and an unstable geopolitical landscape.
High volume of destination & transit shipping
Global cooperation facilitates rapid technological progress. International organizations lead the collective action of countries to combat climate change. The Arctic acts as a key source of indispensable metals for the low-carbon economy. However, high climate sensitivity hampers reaching the Paris agreement goals. As a result, the warming of the Arctic continues. Modern infrastructure supported by large-scale international investment is deployed to support destination shipping which develops rapidly.
Low volume of destination & transit shipping
Countries act on a unilateral basis. The global economic recession continues. Energy security concerns slow down decarbonization worldwide. Innovation is lacking. Extreme climate change effects manifest. Activities and investment in the Arctic are limited and focus on extracting fossils which are mostly used domestically.
Scenario “Sanctuary”

Strong political and economic cooperation among all countries develops. Growing national and citizen aspirations for modern green technologies facilitate rapid decarbonization. The climate change effects in the Arctic are relatively limited. The Arctic Council plays a prominent role in the governance of the Arctic. The Arctic states ban economic activity of non-Arctic actors in the Arctic and stop any new fossil extraction projects to conserve the unique nature. The Arctic economies diversify. Infrastructure development is limited.
Low volume of destination & high volume of transit shipping
Countries cooperate in the economic and technological spheres. The Earth continues to get warmer following suboptimal decarbonization paths undertaken by the international community. Melting permafrost destroys the existing onshore infrastructure. Mining in the Arctic becomes impossible. Economic activities decline. The population leaves the Arctic. Significant retreat of the sea ice in the Central Arctic Ocean is observed.
Plausibility of Euro-Asian shipping scenarios

- Global Resource Base
- Global Transportation Route
- Abandoned Land
- Sanctuary
- Transpolar Shortcut

Almost unimaginable to Highly certain Decreasing to Increasing
Thank you!