ARCTIC DEVELOPMENT OPPORTUNITIES

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BACKGROUND

- Black carbon emissions seriously threaten the Arctic ice sheet
- The melting of the Arctic sea ice to record lows in recent years has prompted many nations, principally those with an Arctic coastline – US, Canada, Russia, Norway, Denmark, Greenland – to reassess their commitments and strategic interests
- Ice free summers in the Arctic are expected in a matter of decades, which would open up the region to greater commercialization, including natural resource exploitation, energy production and shipping
- The Arctic sea ice has slowly declined in the past three decades to the lowest levels in history
- Arctic sea ice is younger and thinner, hence more inclined to melt. Less white ice and more dark sea means that more solar radiation is absorbed, accelerating the thaw

Scientist expect a nearly ice-free Arctic Ocean in September before 2050

[Graph showing declining sea ice extent from 1979 to 2016]
Several international and regional bodies must work together with the Arctic countries in cooperation to safely meet strategic objectives in the Arctic.

**Arctic Council**
- Finland regards this as the primary cooperation forum on Arctic matters.

**Barents Euro Arctic Council**
- Introduces a regional perspective to the more general Arctic policies.

**Nordic Council**
- Has a program in place for mutual Arctic cooperation.

**IMO**
- Prepares regulations for vessels navigating on the Polar seas; developed the Polar Code.

**UN**
- Various UN bodies promote international cooperation in important areas of the Arctic, like UNCLOS.

**EU**
- Closely involved with the Arctic region through the Northern Dimension.

Other legal conventions governing the Arctic include the MARPOL Convention and the Spitsbergen Treaty.
STRATEGIC IMPORTANCE

Of nearly 60 large oil and natural gas fields discovered in the Arctic, 43 are in Russia, 11 are in Canada, 6 are in Alaska and 1 is in Norway.

90 billion barrels of oil represents 13% of the undiscovered oil in the world.

44 billion barrels of natural gas represents 30% of undiscovered conventional natural gas resources. 16.5 million metric tonnes per year will be produced at Total, CNPC and Novotek’s Yamal LNG terminal in Russia.

700 various minerals such as copper, nickel, zinc and rare earth elements in hundreds of deposits have been found in Russia, the US, Canada and Norway.

4,000 miles Maritime routes between Asia and Europe could be reduced by as much as 4,000 miles or 30% compared to the traditional route through the Suez Canal. The NSR handles about 1.5 million tonnes of cargo.
STRATEGIC IMPORTANCE

Industries other than fuels and minerals include tourism and fishing, while residents of this area and national security play a role in decision making.

200 years

INTERNATIONAL FISHING
Beyond the 200-mile zones, international waters may be open to un-regulated fishing, rich with pollock, salmon, halibut and crab, already yielding nearly half of America’s seafood catch and a third of Russia’s. 50% of Arctic caught fish are consumed in the EU.

8 billion m³

GROWING STOCK
The Barents region forest is about 87 million hectares and annual fellings nearly 48 million m³. About 80% of the forest area and growing stock volume are Russia. Intensity of forest utilisation is much lower in Russia and Norway than in Finland and Sweden.

8.5 million tonnes

STRATEGIC MILITARY OIL PRESENCE
In December 2015, the Russian Vaygach set a new speed record along the Northern Sea Route (NSR), travelling 2200 nautical miles in 7.5 days to allow it to deliver fuel to a number of ports along the NSR for the Russian Ministry of Defense.

TOURISM IN THE ARCTIC
In the past 2 centuries, numerous advances in transport technologies have contributed to the growth of Arctic tourism. Currently, advanced ship technologies, improved marine charts and navigational aids have allowed cruise ship travel to increase exponentially.
Mineral resources provide a huge opportunity, both in countries with established mining operations and those where new deposits are opening, such as Greenland.

USA
- 67 million tons of zinc
- 67.6 million tons of lead

CANADA
- Mining and mineral processing generated 3.4% of the national GDP
- Canada’s Arctic minerals include diamond, gold, gypsum, iron ores, lead, salt, uranium and zinc

NORWAY
- About 80 million tonnes of various mineral resources
- Northern Norway and Svalbard account for about half of the value of non-petroleum minerals production
- About 1,000 million tons of iron

SWEDEN
- 2413 million tons of iron ore

FINLAND
- Over 1/8th of Finland has been designated for mining
- Sokli mine has a phosphorus deposit of 12.4 billion tons and other ores
- Estimated 140 million tons of nickel in Kevitsa
- Estimated 150 million tons iron in Kolari
- Existing Kittilä gold min of 6 million ounces

RUSSIA
- More than 700 minerals have been found.
- The estimated value of the Russian mineral reserves are at 1.5 – 2 TUSD
- Nickel – copper ore, alumina, rare metals, titanium and semi – precious stones, mica, tin, titanium, fossil ivory
- Estimated 16 billion tons of phosphorus ores
- 687 million tons of proven apatite ore reserves
- Iron ore reserves of 3.2 billion tons estimated
ARCTIC BOUNDARIES

A coastal nation can claim exclusive economic rights to natural resources on or beneath the sea floor up to 200 nautical miles beyond their land territory (exclusive economic zone or EEZ).

If the continental shelf extends beyond that distance, the country must provide evidence to a UN commission.

CONTINENTAL SHELF CLAIMS

1. 350 nm from territorial sea baseline
2. 100 nm past a water depth of 2,500 m
3. 60 nm from foot of continental slope
4. Minimum thickness of sediment
GEOGRAPHICAL SCOPE

In addition to Russia presenting a revised claim of Arctic Territory to the United Nations in February 2016, several other nations are staking claims:

- Denmark is attempting to prove that a 1,000-mile undersea mountain range, the Lomonosov Ridge, is linked geologically to Greenland, a semi-autonomous Danish territory.
  - If it finds such a link, Denmark could make a case that the North Pole belongs to the Danes.

- Canada and the United States could also claim a huge area, and then face challenges from the other Arctic nations.

- Ilulissat Declaration
  - US maintains that the NW passage is an international strait with free navigation rights, while Canada says it's an inland waterway over which it maintains exclusive jurisdiction.
  - Washington and Ottowa also disagree on their maritime boundary in the resource rich Beaufort Sea.
ICEBREAKERS AS A STRATEGIC NECESSITY

CANADA
7 ICEBREAKERS IN CANDADIA COAST GUARD
1 IN ROYAL CANADIAN NAVY
1 COMMERCIAL

USA
2 HEAVY ICEBREAKERS

USA
2 HEAVY ICEBREAKERS

SWEDEN
5 SWEDISH MARITIME ADMIN
3 TRANS-VIKING

FINLAND
7 ICEBREAKERS
1 UNDER CONSTRUCTION

DENMARK
3 ICEBREAKERS

CHINA
2 POLAR RESEARCH INSTITUTE
1 COMMERCIAL

INDIA
COMMISSIONING FIRST COMMERCIAL ICEBREAKER FOR COMPLETION IN 2017

RUSSIA
41 ICEBREAKERS

FINLAND
7 ICEBREAKERS
1 UNDER CONSTRUCTION

DENMARK
3 ICEBREAKERS

CHINA
2 POLAR RESEARCH INSTITUTE
1 COMMERCIAL

INDIA
COMMISSIONING FIRST COMMERCIAL ICEBREAKER FOR COMPLETION IN 2017

APRIL 2016 ARCTIC DEVELOPMENT OPPORTUNITIES
SHIPPING

As the Arctic ice cap retreats, shipping lanes are opening, that could rival or complement conventional routes during the summer months

- Two sea routes through the Arctic: the Northwest Passage and the Northeast Passage
- The Northern Sea Route (NSR) is a shipping lane across the rim of Siberia, connecting the Atlantic to the Pacific
- Shanghai to Hamburg through the NSR reduces the shipping distance by 30% versus the traditional route through the Suez Canal and avoids waters at risk for piracy
- Only 4 cargo vessels sailed the whole route in 2010, 46 in 2012 and up to 71 in 2013
  - 17000 ships pass through the Suez Canal annually
- Possible increase in the Northwest Passage, above North America from Alaska through the Canadian Arctic Archipelago, which would decrease the length of the route by several days compared to the Panama Canal
- The Danish Nordic Orion became the first bulk carrier to traverse the Northwest Passage in 2014, saving around 80 000 USD in fuel costs. But this route is much less potential than the NSR
- Opening the North-East Passage will increase the importance of the Bering Straits in the future. Similarly, the North-West Passage may be increasingly used for shipping in the long term
1) Gazprom’s Novy Port: build with the capacity to handle up to 8.5 million tons of crude oil annually from the nearby Novoportovskoye oil and gas field. Testing of the port is scheduled to begin early this year.

2) Novatek’s Sabetta Port is where the long-planned Yamal LNG project is scheduled to come online in 2017, with 16.5 million tonnes / year LNG to be shipped eastward along the Northern Sea Route on Korean-built, Chinese-owned Arctic-class LNG tankers, with an expected cost of 25 BEUR.

3) China and Russia have signed an MoU to study how to achieve 10 - 15 % transit cost reductions along the NSR.

4) The China – Russia MoU is also planning Primorye-1 is a maritime route that will extend through the Sea of Japan from Harbin, China overland to the Russian port of Vladivostok.

5) Primorye-2 will go from Hunchun, China overland to the port of Zarubino, Russia, from where onward shipments by sea to China will be possible. This represents a practical coupling of the Silk Road and the Eurasian Economic Union.

6) China’s state-owned, €36 billion Silk Road Fund, whose goal is to develop the “One Belt, One Road” project, received a 10% stake in the Yamal LNG project in exchange for a 700 million euro loan.

7) 40 Chinese insurance companies and asset managers raised €5.5 billion to establish a new fund called China Insurance Investment Limited, which will finance energy and infrastructure projects overseas.

8) Investment by Statoil and the Norwegian government into Snohvit, a complex being built to receive natural gas piped from the Barents Sea and liquefy the gas for shipping.

9) OmniTrax estimates it has spent €46 million modernizing the port to accommodate big ships carrying exports like grain and farm machinery to Murmansk, and incoming Russian products, including fertilizer and steel.

10) The Russian Defense Ministry has ordered a pilot project for a mobile low-power nuclear station compatible for the Arctic by 2020, with demand for about 30 such units.

11) Archangelsk port to raise capacity to 100 000 dwt ships, to become a strategic logistics hub.
If only the most northern regions of Europe are taken into account, the ongoing and planned investments for this decade total over 100 billion euros.

**Chinese Loans**
To Russia to build an oil pipeline from Siberia to China and to develop Arctic oil fields.

**Radio Coverage**
Radio Holland has expanded coverage from the Kara, Norwegian and Barents Sea.

**Aframax Tanker**
A modern tanker designed for transporting crude oil in the Arctic has been developed by Finnish companies.

**Majority Interest**
Finnish Industry Investment purchased on a 66.4% majority stake of the shares of Aker Arctic Technology.

**Territory Claims**
Russia has submitted vast territory claims to the UN of over 1.2 million km² of Arctic sea shelf extending 650 km from shore.

**Sea – Ice Maximum**
The annual maximum reached an all time low of 1.1 million square kilometers below average in 2015.

**Oil & Gas Demand**
Expected to increase by 35% by 2035, outweighing the initial investment costs.
Investment will depend on global commodity prices, exploration and production technologies, geographic access and infrastructure, legal and political climates.

**Russian Strategy**
State investments may amount to €13.8 billion with an additional €45 billion in private investments in telecom, mining and other sectors within this decade.

**Finnish Rail Investment**
Linking the mining region with northern Norway and the Barents Sea.

**Danish Claims**
Denmark filed a claim for the territory of approximately 895,541 square kilometers of the Arctic seabed after 12 years of research and over $55 million worth of investments.

**Chinese Strategy**
In Canada, Chinese firms have acquired interests in two oil companies that could afford them access to Arctic drilling.

**Sea Routes**
Two sea routes through the Arctic: the Northwest Passage and the Northeast Passage.

**Gazprom Yamal**
Complex development in the Yamal peninsula will cost Gazprom 170 million rubles (2.2 MEUR) by 2030.

**Rosneft**
By 2022, Rosneft will have invested 250 BEUR, mainly developing oil field in the Siberian Arctic.

**China**

**2.2 MEUR**

**250 BEUR**

**CHINA**

**SEA ROUTES**

**2**

**RUSSIAN STRATEGY**

**58.8 BEUR**

**FINNISH RAIL INVESTMENT**

**260 MEUR**

**DANISH CLAIMS**

**50 MEUR**
ARCTIC POLICY

Each country which claims a stake in the importance and value of the Arctic has outlined their own policy objectives with various priorities.

<table>
<thead>
<tr>
<th>RUSSIA</th>
<th>USA</th>
<th>GERMANY</th>
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<tbody>
<tr>
<td><strong>MILITARY INFRASTRUCTURE</strong> Russian Northern Fleet will deploy military infrastructure in most of the archipelagos and islands of the Arctic Ocean on the borders of Russia</td>
<td><strong>INCREASE INVESTMENT</strong> New steps to accelerate the acquisition of additional icebreakers to ensure the US can operate year-round in the Arctic</td>
<td><strong>RESOURCES</strong> Sees the great potential for economies of Germany and Europe that Arctic resources hold</td>
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<tr>
<td><strong>DEVELOPMENT</strong> Ship voyages to Franz Josef Land, Severnaya Zemlya, Novosibirsk Islands and Wrangel Island are planned</td>
<td><strong>SAFE MARINE OPERATIONS</strong> Through mapping and charting efforts in the Bering, Chukchi and Beaufort Seas regions</td>
<td><strong>ENVIRONMENT</strong> Stresses the importance of protecting the Arctic environment and the establishment of protected areas to maintain Arctic biodiversity</td>
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<tr>
<td><strong>MILITARY &amp; MARITIME</strong> Northern Fleet actions are not only military, but also serve to ensure maritime economic activities in Russia in the Arctic and the Northern Sea Route as a national transport route</td>
<td><strong>MARINE BIODIVERSITY</strong> 3 sampling cruises in 2015 as part of a 5-year demonstration project to gather data about birds, mammals and water-columns, microbes, plankton, sediment and fish</td>
<td><strong>FREEDOM OF NAVIGATION</strong> In accordance with high safety and environmental standards</td>
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**ARCTIC POLICY**

The tone of the policies in various countries and regional bodies differs, ranging from 'safety and sustainability' to 'investments and opportunity'.

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<tr>
<th><strong>EU</strong></th>
<th><strong>CHINA</strong></th>
<th><strong>FINLAND</strong></th>
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</table>
| **CLIMATE CHANGE & THE ENVIRONMENT**  
The EU stresses the importance of strict compliance with stringent environmental standards to avoid damage to this sensitive region. | **INVEST & COLLABORATE**  
To gain access to the Arctic by investing and joining with local companies and financing good works to earn good will. | **ARCTIC EXPERTISE**  
Expertise in energy efficiency and renewable energy sources. |
| **INCLUSIVE DIALOGUE**  
Constructive engagement with Arctic States, indigenous peoples and other partners. | **MULTINATIONAL RESEARCH**  
Using own icebreakers for joint scientific research. | **CROSS BORDER DIMENSION**  
As the costs of any investments will be extremely high, the transport system must be addressed in a comprehensive way. |
| **SUSTAINABILITY**  
Will publish a new communication on economic development with focus on the sustainable use of resources and environmental expertise. | **ICELAND & GREENLAND**  
Economic agreements, covering geothermal energy and free trade. Financing the development of mines and discoveries of gems or minerals. | **TOURISM**  
To cherish natural scenery, environment and the uniqueness of the local culture. |
|  | **ARCTIC COUNCIL**  
China is an observer member of the Arctic Council. | **ARCTIC COUNCIL**  
New Arctic Policy with strategic priorities as Chair of the Arctic Council from 2017 – 2019. |
OTHER ARCTIC POLICIES

CANADA
Holds large land and sea areas where it underlines its sovereignty. Plays an important role in the Arctic council and leads Arctic research. Canada began patrolling the most remote Arctic reaches with army rangers and plans to launch Radarsat 2, a satellite system that will allow surveillance of the Arctic and sea approaches as far as 1,000 miles offshore.

USA
Current chair of the Arctic Council 2016 – 2017. The United States the Senate has refused to ratify the Convention of the Law of the Sea. This means the United States has not been able to formally stake out its underwater boundaries.

ICELAND
Underlines the importance of regional and multilateral cooperation.

DENMARK
Because of Greenland, Denmark has a significant position in EU Arctic issues.

RUSSIA
Socio-economic development, advanced ICT infrastructure, environmental safety, international cooperation, assurance of military security and defense of the state borders. Russia signaled its ambitions already in 2007 when it sent two submersibles 14,000 feet down to seabed beneath the North Pole and planted a titanium Russian flag.

SWEDEN
Priorities include climate, environment, economic development and the human dimension. Infrastructure developments and mining, e.g. Kiruna, where railroads and energy infrastructure (mainly wind) are being developed.

NORWAY
Heavy on-shore infrastructure investment, including ports and roads. University of Tromsa developed into a growing research and educational center. Off-shore oil and gas developments. Arctic Economic Council secretariat located in Tromsa.

CHINA
Chinese mining companies have proposed building runways for jumbo jets on the ice in Greenland’s far north to fly out minerals until the ice melts enough for shipping. Investing actively in North-Western Russia, with a focus on natural resource exploitation.
STRATEGIC FINNISH OBJECTIVES – THE NORTHERN DIMENSION

Finland has several levels of strategic objectives for their increased involvement in Arctic affairs, importantly the cooperation in Northern Dimension.

INTERNATIONAL

- Business opportunities in mining technologies and increasing transport volumes
- Enhance Finland’s international image for sustainable management of high quality raw material and forestry
- Identify Finland as a global logistics hub with connections through the Atlantic, Arctic and Central Europe through investments in cables, communications, data and rail
- Promote investment in Finland through emphasis on Finland’s expertise in energy efficiency and operating in cold climates

NATIONAL

- Attract foreign investments in growing mining industry
- Lapland's geographic location is ideal for satellite reception, and may serve investments in the Arctic Research Centre of the Finnish Meteorological Institute

REGIONAL

- Nordic labour market in Lapland, with strategic objectives related to tourism, renewable energy sources, land use, mining operations, transport and indigenous peoples
- The forest sector creates opportunities for small-to-medium enterprises
FINNISH OPPORTUNITIES

Finland’s position may prove essential to transport routes both on land and at sea for the transfer and delivery of natural resources, fuel sources and equipment.

**SHIP BUILDING**
There will be a great demand for icebreaker expertise. Finland has expertise in winter navigation, maritime industry and ice-breakers, as well as expertise in mechanical oil recovery in icy conditions.

**FORESTRY**
The total forest area of Lapland is 9 million hectares, of which 4 million is actively managed. The forest sector and timber industries employ 3,200 people in Lapland alone, accounting for a larger percentage of overall activity than in the rest of Finland.

**ARCTIC COUNCIL CHAIR**
Finland will assume Arctic Council chairmanship in 2017. Finland would also have a clear role in the EU Arctic policy. Nearly 1/3rd of the people living north of the 60th parallel are Finns.

**ARCTIC EXPERTISE**
Expertise in mining, energy and other sectors will be invaluable to the further development in the Arctic. Finland has the opportunity to offer advisory services, machinery and invest in the discovery of oil, gas and minerals.

**NORTH DIMENSION PARTNERSHIP**
TEN-T core network corridor “North Sea-Baltic” starts from the ports of Belgium and Netherlands of the North Sea and passes through Germany and Poland and stretches until the Baltic States and Finland.

APRIL 2016
FINNISH OPPORTUNITIES

To date, Finland’s involvement in Arctic development has been limited to policy advisory and education and research initiatives, not commercial development.

ENERGY

The Arctic region needs new electricity transmission lines, de-centralised energy production and lines between Norway and Russia need to be upgraded. This environmental stress will offer opportunities to the Finnish clean-tech companies engaged in this line of business as well.

TELECOMM

Lapland’s geographic location is ideal for satellite reception, and may serve investments in the Arctic Research Centre of the Finnish Meteorological Institute. This could be used in partner with other research initiatives, as well as for safety improvement initiatives.

EDUCATION


COOPERATION

Since Russia is the main market for Finnish Arctic energy expertise, exports necessitate close cooperation between Finnish and Russian companies.
SECURITY ISSUES IN THE ARCTIC

The far northern Arctic Ocean belongs to no country, though most of the resources are in an area which is already clearly carved up

BOUNDARY DISPUTES

In a place where exact boundaries were never much of a concern, haggling over borders has begun among the primary nations.

Russia and Canada have both recently made claims to the UN for review to extend the boundary to which they claim access to resources on the continental shelf. Countries outside of the Arctic, such as China, are securing rights to access through investments and collaboration.

MILITARY PRESENCE

Coastal States have upgraded their maritime surveillance and military capabilities as well as the frequency of exercises in the region.

The various capabilities of the Defense Forces play an important part in supporting civilian safety and rescue authorities in search and rescue operations and the mitigation of the effects of potential natural catastrophes and environmental damage.
Russia’s investment targets oil, gas, mining and military, as well as a nuclear power plant. Finland has mostly plans, with available space in Kemintulli and Kromilaakso and Simo-Karsikko industrial areas in Lapland, as well as a push for tourism.

**Russia**

Very active in the Arctic, developing drills, ports, icebreaking capabilities and exploratory efforts.

- **8.5 million tons oil at Sabetta Port**
- **1.2 million km² of new territorial claims to the United Nations**
- **170 billion USD to develop Yamal port**
- **S-400 missile defense system deployed in the Arctic in December with more deployed in 2018**

**Finland**

Prioritizing education and training for the Arctic region as an opportunity to push the Finland brand, tourism, and local employment through industry and energy.

- **€1 billion investments in tourism in Lapland**
- **130 BEUR investments in the European High North in the next 10 – 15 years**
- **1 billion USD investment in Sokli mine project in Lapland to mine phosphorus**
- **270 billion USD to develop oil fields by Rosneft**
- **2020 defense ministry pilot power station by 2020**
- **By 2020, generate 2,500MW inland wind power at 3.5 BEUR**
- **15 billion EUR industrial investments in Lapland within the next decade**
- **8.5 million tons oil at Sabetta Port**
- **1.2 million km² of new territorial claims to the United Nations**
- **38,000 troops participated in the Arctic War Games**
- **By 2020, generate 2,500MW inland wind power at 3.5 BEUR**
RUSSIA’S CLAIM OVER ARCTIC AND NORTH POLE

Russia has re-submitted its petition to the UN claiming exclusive control over 1.2 km$^2$ of the Arctic sea shelf.

- This is the second time Russia has staked its claim to what it sees as its territory. Earlier in 2002, the UN rejected the bid on lack of evidence.
- According to the 1982 UN Convention on the Law of the Sea, a nation may claim an exclusive economic zone up to only 200 nautical miles from their recognized borders, unless it can prove continental shelf on which it sits extends beyond in which case the zone is extended to 350 miles.
- Russia claims area even beyond that. This would include the North Pole and give Russia access to an estimated 4.9 billion tonnes of hydrocarbons. Its claim includes the Mendeleev Rise as well as the Lomonosov Ridge, which Denmark and Canada also claim. Russia says these and the North Pole are part of the Eurasian continent.
- Russia has over the last decade conducted nine expeditions to the Arctic to map the ocean floor over tens of thousands of kilometers and substantiate its territorial claim.
- If the new proposal is accepted by the UN commission, Russia would not only gain the right to the mineral deposits but also be able to expand its frontiers.
- Russia lays claims to the Lomonosov Ridge, Alpha Ridge and Chukchi Cap, and to the Podvodnik and Chukchi Ocean Basins separating them.
- Russia has begun militarising the region by restoring some of the military bases in the islands and outposts in the Arctic, calling it a move to protect the crucial shipping routes.
- The Laptev Sea, as has already been proven, has a diamond canal on the surface of its shelf, which will allow Russia to become even more competitive with other countries in the production of diamonds.
- Denmark, Canada, Norway and the U.S. are also laying claims to sometimes-overlapping territories under the Arctic Ocean.
CHALLENGES AHEAD

Despite the many opportunities that the Arctic region may offer, there are many hurdles to be overcome on the path to profits - and developments take time.

Even during the summer, the harsh environment makes navigation difficult with unpredictable weather and ice floes. Technology and expertise in oil spill cleanup and search and rescue need to be significantly improved.

Ships may require an icebreaker escort (approximately 400 000 USD) and additional insurance that offset some of the routes potential fuel savings.

Container shipping, which operates on a tight delivery schedule, may not be able to utilize this route if some of the passage is not open.

There is a great need to develop telecommunications including satellites to make conditions safe in the Arctic.

Moscow controls most of the NSR and the attendant icebreaking fleet, requiring close communication and cooperation with government administrations in Russia.