



“The Arctic requires a robust, comprehensive and coordinated policy environment that provides for a better setting of the economy and sustainable development in the region. However, it remains unclear to what extent existing institutions are the right fit to manage change till 2050.”

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Image Source: The LNG Fedor Litke icebreaker accompanied by a Rosatom icebreaker offshore of the Northern Sea Route between Murmansk and Dudinka. Photo Rosatom by courtesy of the co-author, all rights reserved ©.





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## Sustainable mindset. The Arctic in 2050, towards a new territory of progress?

The latest 2021 report by the Intergovernmental Panel on Climate Change<sup>1</sup> presents a worrying future for humanity. The Arctic is one of the places on planet that is disproportionately affected by the climate change. The Arctic is projected to experience the highest increase in the temperature of the coldest days, at about 3 times the rate of global warming. The warming is expected to amplify permafrost thawing, and loss of seasonal snow cover. The changes taking place in the Arctic mean that the shipping routes become more accessible, and the Arctic's natural resources

are starting to be more easily extractable. Climate change and shifting geopolitical context create new realities for the region, which now has become a point of interest for a number of national and international actors. That brings several questions on the Arctic future development, potential stakeholders interests, enabling environment, resources and pace of technological development. But why are the Arctic resources needed? The world's population is expected to increase by 2 billion people in the next 30 years, from 7.7 billion currently to 9.7 billion in 2050<sup>2</sup>. Increasing demand for e.g., electrical vehicles, means that rare earth metals need to be sourced in places like Arctic. In fact, KoBold Metals<sup>3</sup>, a mineral exploration company backed by billionaires Jeff Bezos and Bill Gates, has entered into an agreement with London-listed Bluejay Mining to search for critical materials used in electric vehicles in Greenland.

- Six factors of change

To understand what the Arctic of the future will look like in 2050, we applied scenario planning which enables stakeholders to make more informed decisions in uncertain situations and to plan for a variety of possible outcomes. In the first step, we needed to disentangle certainties and uncertainties. In scenario planning, relative certainty is commonly assumed, these are future predictions that are highly probable and so can be written in any situation.

We identified key developments, forces and processes which will affect the global landscape and the Arctic in

particular to draft different futures of the Arctic on a 2050 horizon. In doing so it is important to separate what we know is about to happen, which might be called certainties, from developments that cannot be foretold but which might impact the development of the Arctic in the next 30 years – or uncertainties, which are crucial to outline the context for the region's development:<sup>4</sup>

- The pace of climate change

Global warming will make a significant impact on the Arctic, one of the most fragile ecosystems. While the change is evident, we cannot predict the dynamics of the possible damage. The pace of global warming affects decision-making processes and the business environment, at the same time, this creates an incentive for innovation.

- Economic development in the region

The future of the Arctic economy depends on the availability of sustainable solutions and technologies that encourage responsible business activities that are respectful of the environment while giving opportunities for indigenous and local populations.

- The trajectory of social development

The prospect of social development is not certain in the Arctic given the demographic and social challenges that Arctic people are facing. Both incoming and outgoing migration bring new dynamics to the region.

- Quality of the institutional environment

Arctic needs a comprehensive enabling environment – a set of laws, regulations, policies, international trade agreements, and other soft infrastructure to ensure sustainable growth of the region. However, it is unclear how adequate and balanced these institutions could be and whether stakeholders could reach a consensus.

- Pace of technology development and innovation

Harsh weather conditions require special technologies for each industry and sector. Social and environmental considerations add more requirements that new technologies should meet. Technologies required for the future development of the Arctic require substantial funding, political will, and entrepreneurial risk for their implementation.

- Dynamics of geopolitics and international consensus

Developing geopolitics defines Arctic stability and will stay as one of the critical uncertainties of the region's development. The increasing complexity of the geopolitical game defines the security and international relations context of the Arctic and could transform current cooperation models.

On the next step we mapped these factors by their uncertainty and impact, selecting the most critical ones that will form alternative scenarios for the Arctic region. The identification of the two drivers having the greatest influence and uncertainty on the future development of the Arctic was a vital phase in the scenario planning process. This was done from among the components that were critically ranked. It

took numerous discussions and rounds of deliberation with the Arctic stakeholders including state officials, indigenous peoples, academics and NGOs to identify the two most critical and uncertain scenario drivers.

The Arctic requires a comprehensive and coordinated environment that provides for a better setting for the economy and sustainable development in the Arctic region - laws, regulations, policies, international trade agreements and other soft infrastructures, such as public awareness and acceptance. However, it remains unclarified to what extent these institutions are adequate and balanced before 2050. Is there agreement among stakeholders? In the extreme Arctic weather conditions, the development of specific technology for each business and sector is necessary. Additional requirements on new technology are imposed on social and environmental factors. Significant financial support, political determination and entrepreneurial risk are needed for future development of the Arctic. Will inventions in the Arctic drive economic growth? Or will innovation stagnate, hindering Arctic progress?

- Four development scenarios from doomed wasteland to territory of progress

In order to visualise the Arctic in 2050, four scenarios emerged. Each scenario reflects the strength or weakness of the institutional environment's quality as well as the rate of technological development and innovation.

1. In the Dark Ages, the slow rate of change, the lack of coordinated national and international governance, the lack of new development and deployment of technology are a halt to Arctic development. The Arctic is a site for pitiless environmental use and the Arctic is being depopulated and ravaged. The Arctic economy is dominated by nation-states and companies, whether public or private.

2. In the Age of Discovery, the quest for the Arctic's resources, fueled by state-funded innovation, leads to the discovery of Arctic riches, which boosts the economy and attracts opportunity seekers to the region. Both environmental regulation and disaster response are fragmented and ineffective, failing to prevent the Arctic ecosystem from deteriorating. As the climate crisis worsens, indigenous peoples' natural habitats and livelihoods deteriorate.

3. In Romanticism, the Arctic is transformed into a showcase for all things beneficial to the ecosystem, including only sustainable energy and transportation, no mining or extraction of resources is allowed. Indigenous peoples maintain their traditional lifestyles while receiving government assistance. All extraction activities have come to a halt.

4. In Renaissance, the nations agreed to make Arctic exploration a symbol of international cooperation as well as humanity's eternal pursuit for progress and invention. Many governments agreed on standards for doing business in the Arctic in the hope of encouraging the use of cutting-edge and innovative technologies.

• Conditions for a new sustainable leadership agenda  
The Arctic is a complex phenomenon that brings together a unique natural ecosystem and a dynamic industrialized, highly urbanized, multicultural and creative community with a stake in responsible development. The strategic importance of the Arctic is continuing to increase. Although the scenario approach does not help to predict the future, they are the road markings for the future and help to navigate toward it. The scenarios for the Arctic future development reflect a clear paradigm shift towards sustainable development and new emerging leadership agenda<sup>5</sup>:

- policymakers will have to work towards creating an enabling environment and soft infrastructure, incentivizing more responsible investment mechanisms in the Arctic, ensuring responsible resource exploitation.
- need for facilitating multi-stakeholder dialogues and raising public awareness and public acceptance over the Arctic agenda. It is impossible to discuss the development of the Arctic from the standpoint “whether we are going to exploit it or not”, as the industrial development of the Arctic started about 100 ago. Today 10 million people live here, only about 10% of them are indigenous peoples<sup>6</sup>. The main question is how we can make this development responsible and sustainable to ensure all three aspects - economic, social and environmental - in the long term and who should be a stakeholder in this activity.
- business could be an integral stakeholder for two reasons: firstly because business is a driver of innovation and

technology required for responsible development of the Arctic; secondly because only business can mobilize sufficient resources to implement the scenario of sustainable development of the Arctic based on advanced technologies and integrated environmental protection measures.

A new leadership agenda evolves in each and every sector, emphasizing the need for multi-stakeholder dialogue and collaboration among the local population, businesses and policymakers to maintain the balance between the three dimensions – social, environmental and economic – and provide the Arctic region with a long-term strategic and sustainable mindset.

1. AR6: Climate Change 2021. URL: <https://www.ipcc.ch/report/ar6/wg1/>
2. Growing at a slower pace, world population is expected to reach 9.7 billion in 2050 and could peak at nearly 11 billion around 2100. URL: <https://www.un.org/development/desa/en/news/population/world-population-prospects-2019.html>
3. Billionaire-backed mining firm to seek electric vehicle metals in Greenland. URL: <https://www.reuters.com/business/billionaire-backed-mining-firm-seek-electric-vehicle-metals-greenland-2021-08-09/>
4. Arctic 2050: Mapping the Future of the Arctic. URL: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3784762](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3784762)
5. Ibid
6. The population of the Arctic is 4.5 -10 mil people depending on the definition of the Arctic used.