



# CLIMATE CHANGE AND SECURITY IN THE ARCTIC

JANUARY 2021

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Cover Photo:

*Listening post and Norwegian coast guard in Svalbard, Norway.*

NEIL MORALEE

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# EXECUTIVE SUMMARY

Across the world, climate change already poses severe threats to the natural and human systems on which security depends. These changes are of acute concern in the High North, the geography of land, sea, and ice that lies above the Arctic Circle.

The temperatures in the Arctic are rising faster than any other area on earth, causing permafrost thaw, ice melt, rising sea levels, and more frequent and extreme weather. As a result, there is increased interest in how these changes will affect the security situation in the Arctic. This report identifies key climate trends and their security implications by the year 2030, from the Norwegian perspective.

Our analysis relies on two different scenarios of global climate change to compare these effects: one in which humans substantially curb climate-change causing emissions (Curbed Warming) and one in which they do not (Uncurbed Warming). These two scenarios do not diverge substantially in terms of the direct climate change impacts faced in the Arctic in the next few years. However by 2030, it will be increasingly clear which future climate trajectory is more likely, allowing for planning for two significantly different Arctic climate security realities in the decades to follow.

Our Curbed Warming Scenario describes a future of a relatively swift transition to renewable energy, as the world works to constrain global warming to below 2°C from pre-industrial levels (the 2015 Paris Agreement target). In this scenario, melting ice, sea level rise and extreme weather will significantly impact the Arctic, but are likely to happen at a more manageable pace compared to the Uncurbed Warming Scenario. Further, climate change mitigation policies aimed at a swift reduction of emissions may result in new political dynamics, economic shifts, and so-called “stranded assets” for Russia and other fossil fuel-dependent economies. However, climatic changes in the Arctic in this scenario will have both regional and global consequences, which could drive broader international security risks with highly uncertain consequences.

The Uncurbed Warming Scenario describes a future where emissions have not been constrained, and the globe is on track to well above what climate scientists deem “safe” levels of warming. In the Arctic, temperatures could rise as much as 3-5°C by mid-century, and as much as 9°C by 2100, compared to pre-industrial levels.<sup>1</sup> This level of swift warming, due to the lack of a global energy transition, would create an ice-free Arctic for much of the year, rocked by rapid environmental changes, and crowded with commercial shipping, drilling, mining, and potentially military activities. The most intense climate impacts of this scenario will begin in the next decade, and become increasingly severe approaching mid-century and beyond. In this scenario, the most significant security risks are the destabilization of security infrastructure in the region, the opportunities for more aggressive or accidental interaction of militaries and commercial interests; and the lack of institutional capabilities to handle the rate of change.

From the perspective of the Norwegian security and defense apparatus, the security risks associated with a warmer Arctic must be layered on top of the already intensifying tensions projected for the next decade in the High North. Increasing threats of kinetic warfare, commercial competition, and demand for search and rescue is likely to put strains on military operations in the region under both climate scenarios. Moreover, existing infrastructure in the region will deteriorate due to extreme weather, and existing institutional frameworks (e.g. UNCLOS) and capabilities (e.g. Arctic Council) have not been designed or empowered to manage the new security challenges caused by climate change.

One need look no further than the Arctic island of Svalbard to understand how climate change and security risks are together destabilizing infrastructure and institutions. Interest in access and control to the port, including by Russia and China, is leading to more commercial activity around the island, as well as more aggressive military and diplomatic posturing. As warming increases, particularly if fossil fuel interests in the High North do not eventually wane, Svalbard could become a more contested area.

With protection of expanding commercial interests across the Arctic of increasing importance, and distinguishing between defensive and offensive realities more difficult, the Arctic region could see accidents or misunderstandings more easily leading to escalation of conflicts. These activities and tensions will be present in both climate scenarios, but more acute under the Uncurbed Warming Scenario.

There are five key takeaways resulting from our analysis:

1. A warmer Arctic will lead to more commercial and civilian activity, rendering the Arctic increasingly navigable, and more prone to accidents and misunderstandings between major players.
2. Increased commercial activity significantly expands the likelihood of states like Russia and China using civilian and commercial actors as vehicles for strategic positioning and for gray zone operations which may escalate to direct confrontation.
3. The institutions that have helped depoliticize and produce stability in the Arctic for several decades may not be resilient enough to withstand new demands resulting from climate change, as climate change introduces significant uncertainties about established rules and norms, and may open the door to politicization of existing institutions.
4. To manage in a more complex operating environment in the Arctic, with ever more state and non-state actors, governments will need an integrated toolbox that includes legal, economic, diplomatic, and military instruments. Robust mechanisms for cooperation and communication with civilian and commercial actors will be particularly useful.
5. States are likely to place higher demands on their military forces in the Arctic, particularly as regards to monitoring and assertions of sovereignty, given higher levels of overall activity in the region. New climactic realities may also reduce the constraints for force projection in the region. At the same time, over-reliance on military approaches in the region could risk escalating conflicts.

Against this backdrop, a key recommendation for the Norwegian Ministry of Defense is to carefully consider its opportunity to approach its American counterparts at the start of a new US Administration. As President-elect, Joe Biden has pledged to advance rapid decarbonization and diplomacy to confront the climate challenge world wide, including on climate security risks. He has likewise pledged to expand cooperation in the Arctic region, and together with similar goals expressed by NATO and EU member states, new opportunities to confront climate security risks in the Arctic could be dawning.

Should the Norwegian Ministry of Defense ask the US to advance a Military Code of Conduct for Arctic Forces, or other form of renewed dialogue among Arctic security forces, the new Biden Administration is likely to seriously consider these opportunities. As historic precedent, when the Norwegian Minister of Defense in 1994 requested that the US Secretary of Defense engage Russia in Arctic Military Environmental Cooperation, this request became the basis of a decade long effort to reduce the risk of liquid waste streams from decommissioned Russian submarines in the Kola Peninsula. Norway may again have such a moment, when its priority can shape the direction of Arctic security for the coming decades.

Overall, the difference between a low or high warming scenario will be the difference between a changed world to which states can adapt or a world in which states are constantly scrambling to keep up with escalating and destabilizing change. These dramatic changes will be felt early, and perhaps most acutely in the next few years, in the Arctic. How states respond to threats and alter their behaviors to mitigate risks in the High North will reverberate globally.

# INTRODUCTION: CLIMATE CHANGE IN THE ARCTIC

As the world's climate increasingly warms due to human activities, the climate across the High North region is changing rapidly. As of the summer of 2020, the earth had warmed an average of 1.1 °C from pre-industrial times, while the Arctic region experienced an average of 2.3 °C in warming from the 1970s alone.<sup>2</sup> With these temperature anomalies have come other extreme events across the region, including rapid permafrost thaw, increased and enduring wildfires, sea ice decline, and shifting ecosystem dynamics.

As the climate and environmental realities of the High North shift, so too are regional interactions in this increasingly navigable space. Such shifts are already palpable and by as soon as the next decade could define a new operational reality for militaries in the region. Several forecasts indicate that the Arctic will begin experiencing ice-free summer months as soon as the 2030s.<sup>3</sup> The opening of northern maritime routes will have large implications for shipping and economic activities, with an open Northern Sea Route (NSR) route between the European and Asian continents projected to reduce transport times by up to 40 percent.<sup>4</sup> These changes are also presenting new security realities, including the potential for increased drone, submarine, and intelligence-gathering activities, and concerning signs of a strategic capabilities arms race starting in the region.

How exactly climate change might impact security outcomes in the Arctic, particularly in the near-term window of the next decade, depends on a number of causal factors of varying levels of uncertainty, including: the speed and nature of regional environmental change; the ambition of global mitigation efforts to curb climate pollution; and the actions of governmental and non-governmental actors to advance their interests in the region. The effects of these changes on security will be felt across a few response variables which this study analyzes. The report sets out from two future scenarios for understanding climate and security implications in the Arctic: one in which the world pursues aggressive climate change mitigation (Curbed Warming Scenario), and the other in which few attempts are made to shift global economic systems away from fossil fuels (Uncurbed Warming Scenario). By comparing these two scenarios across a range of dimensions focused on i) commercial activity and infrastructures, ii) institutional frameworks and distributional effects, and iii) military and operational issues, the aim is to provide a realistic assessment of how climate change will affect security dynamics in the Arctic and its implications for Norway.

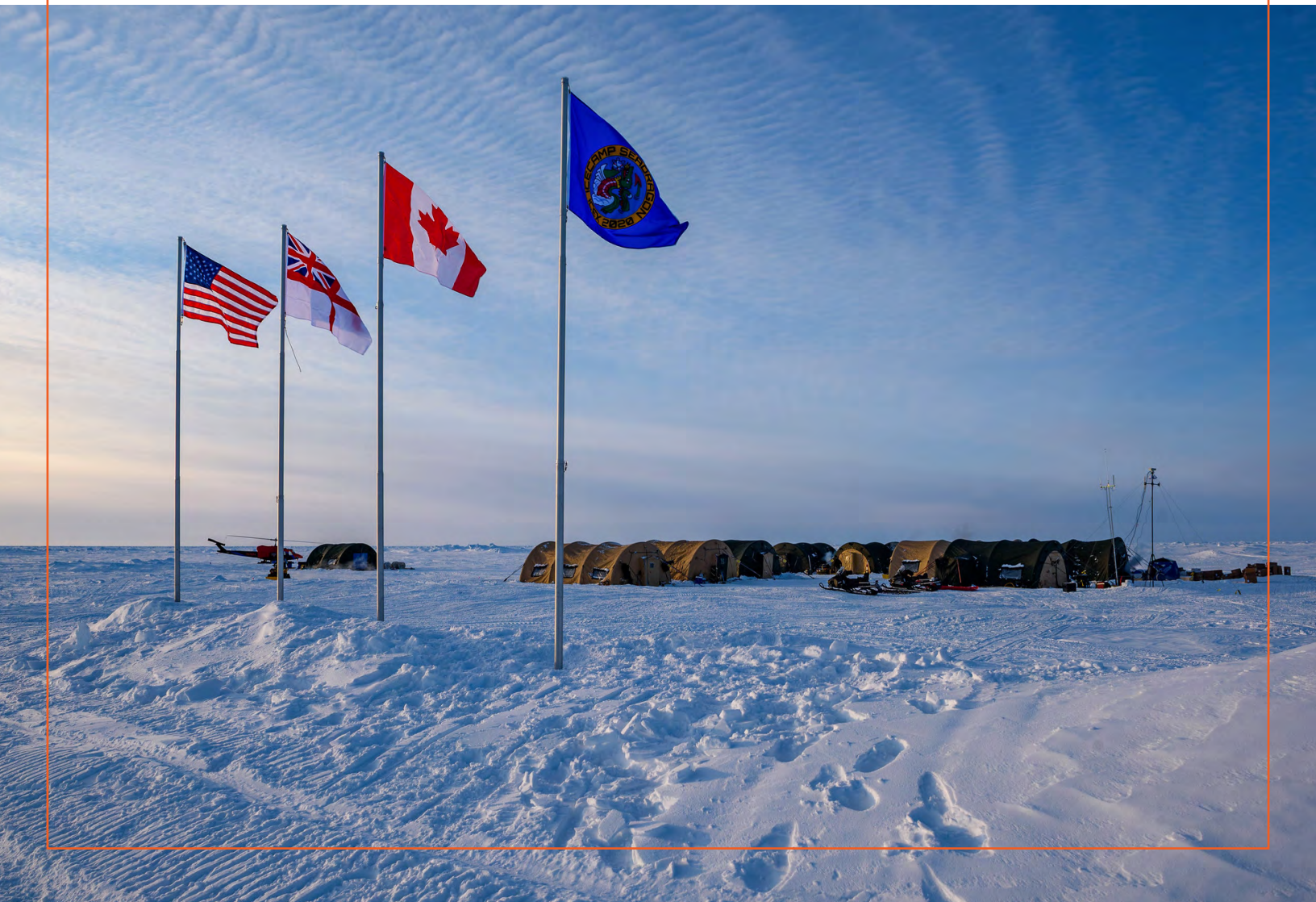
How climate change will concretely affect Norwegian *security* in the Arctic will depend on a range of factors. These include geopolitical developments, some of which proceed independently from the physical effects of climate change, but they also include the effects of political efforts to curb climate change emissions.<sup>5</sup> For example, will the EU succeed in shifting to a renewable resource base by 2050? How will the Russian and Norwegian economies be affected by a more permanent fall in oil prices? These economic and political variables, which are ultimately determinants of the security situation in the Arctic, must be considered in conjunction with the *physical* changes caused by climate change.

Against this backdrop, the report focuses on the direct, physical effects of climate change and what these mean for both military and economic infrastructures in the Arctic, while also assessing likely broader political-economic

effects of climate change. For example, one of the most important determinants of Norwegian security in the Arctic region relates to developments in Russia. A key question is how a global shift towards renewable energy will affect the Russian economy and how this, in turn, will shape its ability and willingness to project force in the Arctic.

To manage the considerable uncertainty about likely or plausible future developments, we rely on *scenarios*. These scenarios are identified using the scientific projections of future climate change, but we expand on these to identify political dimensions and security dimensions in each scenario. In this, we follow the methods used in other research and official reports, such as that of the Norwegian Climate Risk Commission,<sup>6</sup> the International Military Council on Climate and Security,<sup>7</sup> the Center for Climate and Security's National Security, Military, and Intelligence Panel on Climate Change,<sup>8</sup> and the NUPI-Wilson Center report on Arctic Security.<sup>9</sup> Each scenario is not an exact description of the world to come, but a snapshot of how things might look a decade from now if certain trends develop in likely ways. They should be used as a planning instrument to better understand how different risks interact and impact security futures in the Arctic region, and globally.

Partner nation's flags fly over Ice Camp Seadragon during Ice Exercise (ICEX) 2020.  
U.S. NAVY PHOTO BY MASS COMMUNICATION SPECIALIST 1ST CLASS MICHAEL B. ZINGARO / FLICKR



# CLIMATE SECURITY SCENARIOS

Whether humankind allows global temperatures to rise as high as 3.2°C from pre-industrial averages by 2100, as current trajectories predict, or limits the temperature increase to 1.5°C above pre-industrial levels, as the 2015 Paris Climate Agreement commits, will make a considerable difference for long-term climate security challenges, though the fate of the next decade is relatively locked in by past greenhouse gas emissions. This is because these two scenarios do not diverge significantly in terms of temperature change or physical impacts until the decades following 2030. However, the next decade is crucial for setting the warming path to 2050 and beyond; the IPCC cautions that by 2030 the world must achieve an average 45 percent global reduction in greenhouse gas emissions to be on track to become net-zero by 2050--the target needed to meet the Paris goal. Thus, soon, we will know which trajectory is most likely: one that points towards a successful transition to reduced climate emissions and a warming of around 1.5°C degrees (Curbed Warming Scenario), or one that leads to a higher level of warming with much more dramatic effects (Uncurbed Warming Scenario).

To achieve the curbed climate change scenario, new and comprehensive climate policies must be quickly implemented, and new economic and distributional consequences will follow. For example, a rapid shift from fossil fuels to renewable energy is likely to lead to a reduction in the value of petroleum resources (so-called “stranded assets”), with significant economic consequences for fossil fuel-dependent economies.<sup>10</sup>

Uncurbed climate change will likely cause significant economic effects in the long term. This scenario would likely alter the security priorities of many states as global economic markets are impacted by more frequent and severe climate impacts, and could lead to an increase in Russian force projection in the Arctic.

In both scenarios, it is likely that investments in and maintenance of infrastructure will increase due to changes in weather conditions, and that transport, commercial activity (fish, minerals, and oil and gas) and military activity will increase---and there are strong signs that these trends have already begun. The rise in commercial and military activity is likely to increase the risk of misinterpretation and miscommunication, which could lead to accidents and threaten infrastructure safety.<sup>11</sup>

The analysis underlying these scenarios is based on a triangulation of sources. Most importantly, we rely on scientific climate research to understand the potential differences between the curbed and uncurbed warming trajectories and to identify probable developments and risks associated with each scenario towards 2030. The focus on 2030 is informed by considerations of the time horizon for military planning. To compare these scenarios, this report draws on existing studies of climate change impacts in the Arctic, including on the US military.<sup>12</sup> In addition, the report draws on the GeGaLO index<sup>13</sup> that assesses gains and losses of a green energy transition, coupled with other analyses focused on economic gains and losses for different countries due to climate change.<sup>14</sup> We also draw from international climate security institutional analyses to understand impacts at the systemic level.<sup>15</sup>

In sum, the methodology is to extrapolate differences from Curbed and Uncurbed warming futures, and to identify the operational, infrastructural, and institutional-distributional effects that these scenarios will have on security in the Arctic region by 2030. We stress that while in both scenarios there are both negative and positive security effects of climate change, the negative effects significantly outweigh the positive when understood from the perspective of cumulative and destabilizing effects. It is necessary to use these two scenarios as one input among many, and a means of looking more specifically at the implications for Norwegian security in the region.



## CURBED WARMING SCENARIO

This scenario is based on a world in which global mean temperatures are kept to around or under 2°C of warming from pre-industrial levels. In the Arctic, continued sea ice melting will occur by the timeframe of 2030, with a moderate rise in sea levels and gradual opening of sea routes, especially in the summer. Fish and seafood stocks will be impacted by northern migrations and acidification. Economic exploration of the Arctic increases, but the value of oil and gas resources in the region will be less certain, significantly impacting the Russian economy, but also the economies of Norway and other Arctic states. The effects on military relevant infrastructures are serious, but manageable. Operational challenges for force projection will require adaptation within existing platforms. Under this scenario, the political landscape will likely shift in the direction of more cooperation on climate change, and the expectation is that success in curbing emissions will yield higher trust among states. However, the transition away from non-renewable energy will be costly and unevenly distributed, which may cause friction and political tension between and within key states.<sup>16</sup>

## UNCURBED WARMING SCENARIO

In this high emission, low mitigation scenario, human-caused emissions are not dramatically changed from their current trajectory, and global mean temperatures are on track to rise well above 3°C by the end of the century. In the Arctic, these changes are felt more rapidly, leading to extensive ice melting, rising sea levels, and ice-free summers in just a few decades. These changes may lead to a relatively short-term burst of economic activity in the area, with shipping and oil and mineral exploration, as well as more fishery activity. However, there will be uncertainty about long-term economic investments as ecosystems become more unstable. Adaptation to climate change will be costly, and increasingly so over time. Demand on security services for both force projection and search and rescue operations will increase, including possible contestation over sea routes and economic zones. Increased tension between states is also likely, as the cost of managing climate change grows. Institutions for international cooperation will likely lack the capability to manage the results of climate change.

As presented in Figure 1, below, the two scenarios are quite different in terms of their effects on the broader political context in which Arctic security must be assessed. These effects are identified here as a frame for the subsequent detailed discussion below of commercial and infrastructure developments, institutional and distributional challenges, and military and operational issues.

FIGURE 1: SUMMARY OF CLIMATE SCENARIOS

	Curbed Warming	Uncurbed Warming
<b>Climate change regime</b>	Low emission/high mitigation	High emission/low mitigation
<b>Direct effects of climate change</b>	Moderate/manageable	Significant/dramatic
<b>Effects of climate change policies for Norway</b>	Costly and potentially politically difficult energy transition.	Small climate policy adjustments, long term radical political and security effects.
<b>Effects of climate change policies on global political context</b>	Owners of non-renewable resources lose political power. Global context characterized by friction and debates over burden-shifting and institutional change.	Owners of non-renewable resources maintain economic position in the short/medium term, but intensified political pressure produces rapid shifts in economic-political power. Global turmoil and high levels of institutional uncertainty hinder efforts to manage dramatic effects of climate change.

# CLIMATE IMPACTS ON INFRASTRUCTURE AND COMMERCIAL ACTIVITY

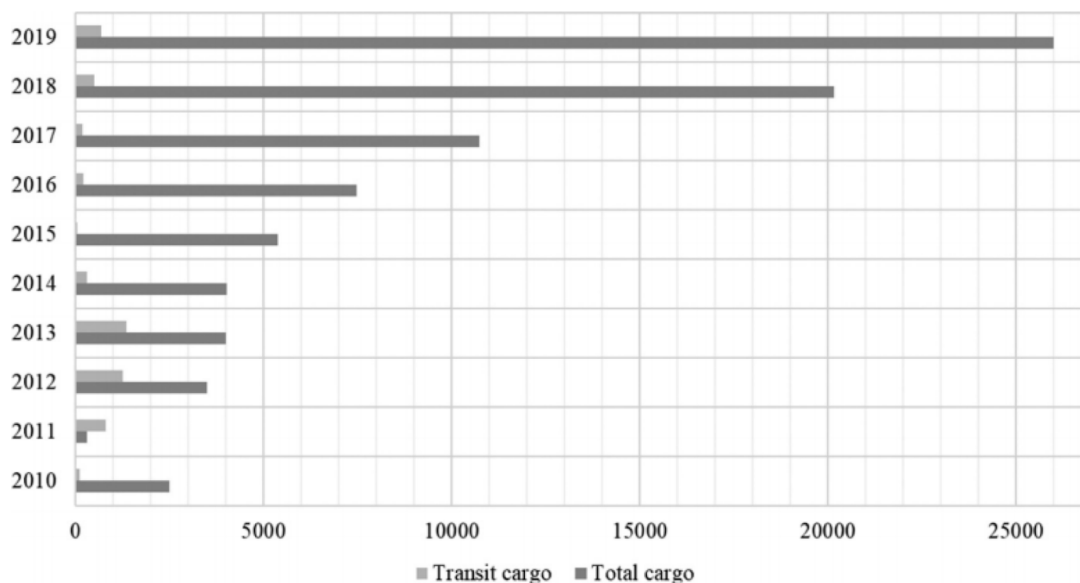
One of the more direct and noticeable effects of climate change will be on infrastructure in the Arctic. As warming intensifies, commercial activities will also increase, subsequently increasing demand for patrolling and introducing new actors to the region. Below, we discuss the Northern Sea Route, effects on development and maintenance, and increases in commercial activity as a result of climate change.

## THE NORTHERN SEA ROUTE WILL INCREASE IN IMPORTANCE

There has been much discussion of the economic and strategic potential for the Northern Sea Route (NSR), as it reduces costs and time of sea transport from Asia. Even under our Uncurbed Warming Scenario, however, the Northern Sea Route is unlikely to emerge as a real competitor to southern sea routes such as the one that transits the Suez Canal. The risks and associated costs will remain considerable under both scenarios.<sup>17</sup> Even so, the melting of ice has and will continue to increase commercial activity in the Arctic. China, for example, is interested in developing the NSR as part of its “Polar Silk Road,” linked to the Belt and Road Initiative. Future ice melting will extend the period each year in which NSR risks are manageable, leading to an increase in the use of the route. One constraint that will remain unchanged, however, is the seasonal variation in sunlight, including the persistence of Polar Night where the region is in perpetual night for extended periods of time, increasing operational complexity.

We note that there is a significant – and politically important – difference between transit cargo and destination cargo via the NSR. It is the latter that has placed the NSR as a possible game changer for international transport, with clear commercial and also security implications for Arctic states, including Norway. Figure 2, below, shows that after an initial increase in transit cargo in 2012-2013, almost all of the increase in cargo using the NSR is destination cargo, with ships transporting supplies to infrastructure projects and gas installations in the Arctic. During this time period, the primary drivers were Russia's Yamal LNG facility, in which China and France both own a stake, and the construction of the Sabetta Port.

FIGURE 2: CARGO TONNAGE IN THE RUSSIAN ARCTIC, 2010-2019 <sup>18</sup>





The Yamal Liquefied Natural Gas Plant, Sabetta, Russia. YAMAL LNG.

Russian authorities expect destination cargo to reach around 75 million tons per year by 2025, a three-fold increase from 2019. Again, the big driver is the planned expansion of LNG infrastructure: The Russian company Novatek, aided by the Russian government through tax breaks and regulatory support, is planning new plants close to the existing Yamal plant, aiming to make the Russian Arctic a zone for gas production and export on par with Qatar and the United States.<sup>19</sup>

At the same time, growing public and corporate awareness about the risks and environmental impacts of expanded shipping in the Arctic could act as a potential counterweight to these trends. For example, support may increase for initiatives such as The Arctic Shipping Corporate Pledge, a voluntary commitment of companies to not send ships through the Arctic region.

Given that ever more private actors have significant stakes in the Arctic, and we can observe a trend toward private regulatory efforts on climate issues in general, such initiatives are not without importance, also in the context of debates about security issues.<sup>20</sup> These developments raise important questions about the interface between military, civilian and commercial actors in the overall management of security in the Arctic, an issue to which we return below under military operational issues.

## REGIONAL COMMERCIAL ACTIVITY INTENSIFIES

With increased temperatures, ice melt, and accessibility, commercial activity in the Arctic will intensify. As noted above, the emissions over the next decade will be crucial in determining whether climate changes will follow a Curbed or an Uncurbed Warming Scenario. Thus, by 2030, one of the scenarios will be much more likely than the other, with important effects on investment decisions for future economic activity and also for how, and where, infrastructure will be built in the Arctic. There is already increased economic activity, mainly in oil and gas. But mineral extraction, including potentially sub-sea extraction, commercial fishing and tourism are also emerging as areas for commercial expansion.<sup>21</sup> There are considerable differences among the Arctic states in how important Arctic economic activity is for the country as a whole, with Russia by far the most reliant. Whereas

the US Arctic accounts for 1% of US GDP, the Russian Arctic accounts for around 20% of Russian GDP.<sup>22</sup> The Russian Arctic economy is significantly larger than the Arctic economies in Canada, Norway, and Finland as well. The sectors which dominate the respective Arctic economies vary; oil and gas extraction minerals, fisheries (harvest, farmed, processing), and resource sectors each play significant roles in different states.<sup>23</sup>

Under the Curbed Warming Scenario, the world moves away from fossil fuels toward renewable energy, whereas in the Uncurbed Warming Scenario, oil and gas remain central. How these two different scenarios will affect global oil prices, and more regionally determined gas prices, is uncertain.<sup>24</sup> It is therefore difficult to assess how climate change will affect oil and gas activity in the Arctic over the next decade, but given the increase in global demand for energy, the assumption here is that – ceteris paribus – the Uncurbed Scenario would increase oil and gas exploration in the Arctic. Investment decisions made during the next decade will have a significant impact on the patterns of pipelines, ports, and installations in the Arctic in the longer term.

The extent to which warmer temperatures will affect commercial fishing is also uncertain. One report notes that while “large commercial harvests in future accessible areas of the Arctic Ocean are not likely, at least not in the next 10–20 years,” there is also potential for increased activity as states expect migration of fish northward, and possible development of harvesting further north.<sup>25</sup> Given the extent of fishing already conducted in the Arctic by both Arctic and non-Arctic states, it is likely that increased commercial activity will further strain the monitoring and enforcement of existing regulatory agreements.<sup>26</sup>

#### **INFRASTRUCTURE COSTS WILL INCREASE, NECESSITATING NEW PLANNING AND INVESTMENTS**

One of the more direct and noticeable effects of climate change will be on infrastructure in the Arctic. As detailed above, states and private companies are likely to expand infrastructure development as warming occurs, including plants, pipelines, ports, roads and railroads. Also, the region is already home to critical telecommunications infrastructure such as SVALSAT (owned jointly by the Kongsberg Group and Norwegian Space Authority), which includes fiber optic cables between Svalbard and mainland Norway, and satellite coverage of fourteen polar orbits. The costs of maintaining such infrastructure will increase with warmer temperatures and more extreme weather, such as heavy rain which causes flooding, melting of permafrost, rising sea levels, and stronger winds. One recent report, focused principally on permafrost thaw, concludes that climate change could lead to “a 27% increase in infrastructure lifecycle replacement costs across the circumpolar permafrost regions.”<sup>27</sup> This will imply a significantly higher cost of building and maintaining the necessary *military* infrastructures in the region. In the Curbed Scenario, these costs will be significantly lower, given that the predictability of weather systems in the Uncurbed Scenario is much lower, with much more extreme weather expected.

#### **INCREASING RISK OF GRAY ZONE OPERATIONS, BUT OPPORTUNITIES FOR COOPERATION RISE**

The likely increase in commercial and civilian activity in the region under both scenarios will have direct and indirect consequences for Norwegian security. On the one hand, increased commercial activity increases the demands on the military to monitor and patrol the Arctic. This is especially important because we know from other theatres – e.g., Georgia and Ukraine – that military tactics are evolving towards relying on hybrid and “gray zone” operations.<sup>28</sup> In a context of increased military and political tensions, it is likely that some states, like Russia, may deploy commercial vessels and installations for military purposes. Further, increased activity also makes the region more prone to accidents, which can not only lead to loss of life, but also be a source of misunderstanding between states. On the other hand, increased commercial activity also provides the potential for increased cooperation on technical and regulatory issues where the actors have some level of converging

interests in a shared governance regime, and to expand existing agreements and exercises on Search and Rescue (SAR). Established by the Arctic Council in 2011, the *Arctic SAR Agreement* notes that “Parties shall ensure that assistance be provided to any person in distress” but does not specify the resources that parties are obliged to provide.<sup>29</sup> A series of tabletop and live full-scale exercises has been conducted under the Arctic SAR Agreement to date, and the Arctic Coast Guard Forum still includes active participation from all eight Arctic states, even after Russia’s annexation of Crimea.

One clear impact of climate change is thus that the Arctic becomes more *accessible* for both military and commercial activity, and that operations there will be more *complex and costly* due to extreme weather, increasing unpredictability in conditions, and permafrost thaw. As we discuss in the next section, there are considerable ripple effects for the institutional frameworks that govern activity in the area, and for the relevance and efficacy of both civilian and military capabilities. In particular, we focus on how climate change introduces uncertainty about the institutional fitness of existing governance arrangements, and about the capabilities shortfall when security depends on managing a more complex set of activities and actors (both military and civilian) in the Arctic.

The archipelago of Svalbard is seen as a potential flashpoint between Moscow and the West as climate change has opened up the region and Russia has built up its military presence. CHRISTOPHER MICHEL / FLICKR



# CLIMATE IMPACTS ON INSTITUTIONAL CAPABILITIES

Climate change will challenge established economic models for key Arctic states, and will also constitute a stress-test on institutions tasked with promoting cooperation and security in the region. Globally, the rapid onset of the effects of climate change is likely to put multilateral institutions under new strains over the next decade. These realities could lead to a significant capability shortfall crucial for the provision of security in the Arctic and other regions, including the strengthening of diplomatic engagement and conflict reduction mechanisms. As geopolitical tensions grow, and climate effects intensify, the ability of states to collaborate and trust each other could further weaken.

International law, guided by treaties such as the United Nations Convention for the Law of the Sea (UNCLOS), provides a stabilizing force in the Arctic, and Arctic nations continue to have common interests in this stability and the rule setting it provides. There is no legal vacuum in the Arctic. However, resolving international legal disputes in the Arctic can be a lengthy process—such as the process for resolving maritime boundary disputes—is in some ways evidence of the stability of the regime, as the requirement to provide evidentiary support for the claims and to have a thoroughly adjudicated process evinces the wheels of justice at work.

A high emissions scenario may portend immense challenges to the legitimacy not only of states as they struggle to manage the demands of a world experiencing the destabilization of multiple complex systems. This may then challenge the legitimacy and the perception of higher order multilateral institutions (such as The International Tribunal for the Law of the Sea, an independent judicial body established by UNCLOS) to remain effective.

If institutions tasked with providing global or regional stability in the Arctic fail to respond to the rate of change, they could likewise face increasing politicization and gridlock, as can be observed in many other global institutions such as the World Trade Organization. Shortfalls in the capabilities of the NATO alliance or the Arctic Council may undermine member countries' political and defense abilities. Growing political divisions within countries, particularly democracies, are beginning to threaten the consensus at the heart of multilateral security cooperation and international institutions. Grievances among affected populations, be they the vulnerable geographies of northern indigenous communities or the wealthy elites owning coastal properties, could be further mobilized by actors adversarial to Arctic stability.

The implications of the Curbed and Uncurbed Warming Scenarios for the likely resilience of international governance are hard to assess given the uncertainties involved. Some analysts argue that climate change may unleash a perfect storm of intractable problems, destabilizing the foundations on which the modern state system is based. One report notes, for example, that “seemingly stable states can be overburdened by the combined pressures of climate change, population growth, urbanization, environmental degradation and rising socio-economic inequalities.”<sup>30</sup> The same stressors experienced by the state would influence the efficacy and legitimacy of multilateral institutions, which are key to a stable and conflict-free Arctic.

We seek to assess the impact on institutions by providing a description of existing mandates and capabilities in light of the challenges that are likely to emerge with climate change. Moreover, the distributional and economic risks associated with our two scenarios depend on the future of global demand for oil and gas, new technological advances in carbon capture and storage and renewable energy, among many other factors. For distributional

risks, we rely on the GeGaLo Index, which assesses likely geopolitical gains and losses associated with an energy transition, including “the changes in geopolitical power relative to the situation before the energy transition and specifically related to energy resource access.”<sup>31</sup>

## **GROWING STRESS ON ESTABLISHED ARCTIC INSTITUTIONS**

In both warming scenarios, it is likely that the combined pressure of managing climate change effects and other security issues will increasingly stress the capabilities of the Arctic Council, NATO, the United Nations Security Council, and other relevant regional and security institutions.

Since 1996, the Arctic Council has seen success as the premier intergovernmental forum to discuss Arctic issues. In no small part, this success can be attributed to how member states have deliberately sought to depoliticize issues and focus on technical cooperation.<sup>32</sup> In either scenario, the Arctic Council is likely to have to expand its mandate or seek partnerships with other intergovernmental bodies to remain relevant and effective. Several challenges are likely to emerge, including negotiations of existing agreements and treaties on fisheries and biodiversity, marine protected areas, the development of economic zones, and the freedom of navigation, among others.

In addition, increased commercial and military activity in the Arctic is likely to lead other organizations – notably NATO, the EU, and the Nordic Council – to become more engaged in pushing new agendas. This will complicate the development of new institutional arrangements, but may also lead to innovation in tools to address new challenges. Private regulatory arrangements are likely to increase in importance, given the importance of such mechanisms in climate governance.<sup>33</sup>

In a high emissions, Uncurbed Warming Scenario, the competition and efforts to shift costs and political blame for the effects of climate change are likely to become much more intense. It is doubtful the rules and norms of existing arrangements will be able to withstand and channel such developments in a direction that reduces conflict. Rather, intense competition typically produces situations where states (mis)use established institutions to weaken their opponents and gain advantages at the expense of institutional rules.<sup>34</sup> This will likely apply to the Arctic Council and a myriad of other key bilateral and multilateral regulatory arrangements.

To help manage these challenges, the eight Arctic nations would benefit from a venue for discussing hard security issues. Prior to Russia’s illegal annexation of the Crimean region of Ukraine in 2014, Moscow was engaged in the Arctic Security Forces Roundtable and the Arctic Chiefs of Defense—two fora for discussing hard security matters with the 7 other Arctic nations. Following 2014, Russia was barred from both groups, which has resulted in a lack of dialogue about regional military matters. This is increasingly problematic as military forces conduct more training, exercises and operations in the Arctic, raising the risk of a potential misunderstanding, miscommunication, accident, or spillover from another regional conflict.<sup>35</sup> In either a low or high emissions scenario, military presence in the region will continue to grow, so it would be useful to develop Track II dialogues as a step towards better communication and reducing risk. Additionally, high level dialogues among civilian leaders of Arctic defense ministries could become the basis for developing confidence building measures and early warning mechanisms.

NATO will continue to be the primary security guarantor for Norway, and NATO’s efforts to adapt to climate change in the Arctic are already underway. A complicating factor is that NATO may not have the necessary political and diplomatic tools at its disposal to successfully manage climate change issues, particularly given the increase in civilian and commercial activity in the Arctic. The EU is arguably better positioned to shape the future trajectory of climate-related issues in the region because it has more non-military instruments to deploy. Even so, the development towards ever tighter military cooperation within the framework of the EU will be an issue in the Arctic.



Arctic Council Ministerial Meeting, Rovaniemi, Finland, 2019. JOUNI PORSANGER / MINISTRY FOR FOREIGN AFFAIRS OF FINLAND

The increased investment in Nordic Defence Cooperation (NORDEF), as well as Sweden and Finland's ever tighter partnership with NATO,<sup>36</sup> forms an integral part of the institutional framework of Norwegian security in the Arctic and provides a solid platform for addressing climate-related challenges. NORDEF's future strength will likely be more greatly influenced by US and European Union political dynamics than by the different climate scenarios. However, given the overlap between Arctic Council and NORDEF members, and the tradition of cooperation within the Nordic region, NORDEF will likely emerge as an important platform for discussing shared security interests in the Arctic.<sup>37</sup> In the same vein, all Nordic states are members of the European Civil Protection Mechanism and the NATO Euro-Atlantic Disaster Response Coordination Centre (EADRCC), both of which could be strengthened in areas relevant to climate security such as civilian preparedness.

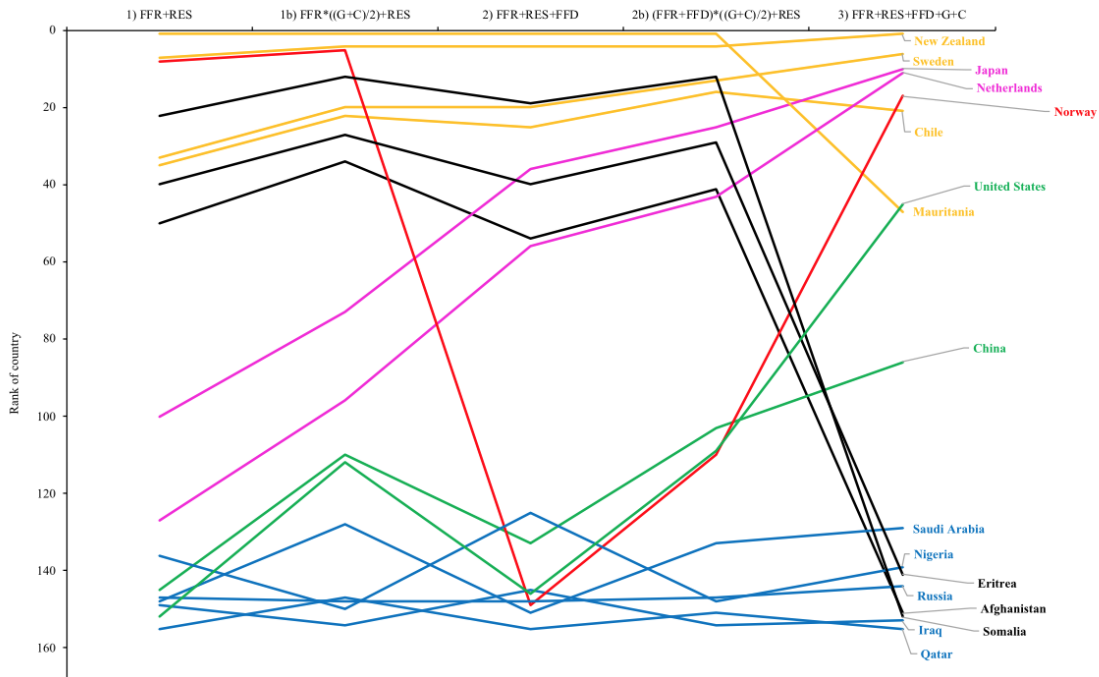
### GEOPOLITICAL AND DISTRIBUTION EFFECTS OF CLIMATE CHANGE VARY BY SCENARIO

The GeGaLo Index (see Fig. 3) is based on a set of indicators to determine countries likely to emerge as geopolitical winners and losers after a full-scale transition to renewable energy. Indicators used in the index include: fossil fuel production, fossil fuel reserves, renewable energy resources, governance, and conflict. While these outcomes will materialize beyond our report's time frame by 2030, there will be clear indications whether the planet is on a trajectory toward a full energy transition by the next decade. Figure 3 below provides a diverse picture of which countries stand to lose or gain from a transition to a system more heavily based on renewable energy.

Of the 156 countries included in the study, Iceland stands to gain the most from a global energy transition, while Norway and the US are likely to perform quite well despite their current reliance on oil and gas exports. Russia (and a handful of other major oil and gas producers) stand to lose significantly, with China occupying a



FIGURE 3: THE GeGALo INDEX - POSSIBLE OUTCOMES OF GREEN TRANSITION ON ECONOMIC RESOURCES FOR SELECT COUNTRIES<sup>38</sup>



position in-between. Perhaps counterintuitively, developments in Russia are arguably *more* negative under a Curbed Warming Scenario than in an Uncurbed Warming Scenario, given that quickly constraining emissions will require a swift economic transition with massive losses in fossil fuel-based income.

The distributional effects of climate change must also be assessed with a view to relations *between* states. There is considerable debate on this topic, with some arguing that policies to mitigate climate change and a shift to renewable energy will not affect fundamental geopolitical dynamics, whereas others see renewable energy as less prone to politicization and securitization. Rothkopf, for example, notes that a new energy system will produce “new types of conflict, controversies, and unwelcome surprises in our future.”<sup>39</sup> Manson, in contrast, stresses that the technical attributes of renewable energy as well as its wider geographical distribution, will reduce the motivation to “weaponize” renewable energy.<sup>40</sup> Valchuk, Overland and Scholten summarize this discussion by noting that “the geopolitics of renewables will probably be different from the geopolitics of fossil fuels, regardless of whether it is more peaceful or not,” suggesting that “energy- security concerns will generally shift from a strategic emphasis on energy resources to a focus on energy distribution.”<sup>41</sup> On balance, however, we judge climate change will indirectly affect the distribution of valued assets, with Russia more vulnerable than most other countries given that the Russian economy is so dependent on oil and gas. The security implications are difficult to pinpoint, but an economically weaker Russia is likely to be more politically unstable, given the economic burdens of an aging population, and a regime organized around a strong leader which makes power transitions more uncertain.<sup>42</sup>

Though Norway is in a stronger position than Russia given its more diverse and open economy it will still face economic risks associated with climate change. The government-appointed Climate Risk Commission, whose mandate was to assess economic risks associated with climate change, highlighted Norway’s dependence on global economic trends, and noted that climate change will increase the risk of “political instability, humanitarian disaster and violent conflict in and between states.”<sup>43</sup> While these effects of climate change are beyond the scope of this report, they matter to the extent that global political stability affects broader security dynamics, and economic resources determine the ability to invest in military capabilities.

# CLIMATE IMPACTS ON MILITARY OPERATIONS

As noted in the introduction of this report, the potential for conflict in the Arctic is lower than in many other parts of the world. However, with the changes brought about by climate change and rising geopolitical tensions generally, the region's stability is now much more uncertain than a few years ago. Russia's deteriorating relations with the West and NATO, especially after the 2008 invasion of Georgia and worsened by the Ukraine conflict in 2014, have strained its bilateral relations with Norway and neighboring countries. On the one hand, it is expected that Russia will have an interest in good cooperation with other Arctic coastal states, including Norway. This applies to areas such as fisheries supervision, maritime safety (including SAR-operations) and oil spill preparedness.<sup>44</sup> On the other hand, Russian military infrastructure and activity in the Arctic has increased significantly in recent years, with a notable increase in frequency of military exercises and their proximity to Norwegian territory and assets of importance.<sup>45</sup> However, it is important to note that the Russian military modernization on the Kola Peninsula and in other parts of the Arctic began prior to 2014.

As discussed in sections IV and V, above, climate change will lead to i) more commercial and civilian activity in the Arctic, and ii) greater uncertainty about the ability of existing institutions to manage risks. When viewed in the context of the increased military activity in the region, these developments may together produce a more lasting security dilemma in the High North. This is because higher activity overall - commercial, civilian, and military - may make it more difficult to discern intentions. This is perhaps most clearly expressed in the case of Svalbard, which may become a greater vulnerability for Norway, as Russia, China, and other actors seek to establish a stronger presence there and commercial, research and military interests intersect.

This is all the more important given that the rules governing the islands under the Svalbard Treaty are perceived as insufficiently defined.<sup>46</sup> There is disagreement about whether the Treaty extends to the continental shelf and Exclusive Economic Zone surrounding Svalbard. Russia also has the option of using the protection of its own national or economic interests as a pretext for intervention, possibly using gray zone operations as discussed above. Of particular concern for gray zone conflicts are regions geographically separated from the rest of a country's territory, or that have their own status under international law -- Svalbard is both.

An example of these dynamics is the Fisheries Protection Zone (FPZ) around Svalbard, established by Norway in 1977, but which is contested by Russia. The Norwegian Coast Guard has enforced the FPZ by arresting Russian fishing vessels, for example. In several cases – in 1998, 2001, 2005 and 2011 – these operations risked escalation due to tense reactions both from fishermen and from Russian officials. In the past, Norway and Russia have managed these volatile incidents by both sides recognizing their shared interests in reducing tensions. As with other governance arrangements in the Arctic, climate change may alter economic and military stakes, rendering the FPZ more fragile and increasing the potential for conflict.<sup>47</sup>

## BALANCING MILITARY AND CIVILIAN ACTIVITIES

Russia's military posture in the Arctic will continue to be shaped by climate change, alongside a changing geopolitical environment. The state's core security priorities in the region are organized around the maintenance of sea-based nuclear deterrence and control over sea lanes in the North Atlantic. In addition, to ensure perimeter defence of the Kola Peninsula for the survivability of second-strike nuclear assets, Russia's 'Bastion' defence concept consists of the projection of multi-layered sea denial and interdiction capabilities.

Another Russian priority is to ensure the Northern Fleet's access to, and passage along, the NSR from the Atlantic Ocean to the Pacific Ocean. This has up to now been achieved through the development of military infrastructure along the NSR. However, due to the receding ice caused by climate change, Russia is likely to seek to assert increased control over a larger portion of its Arctic area that it deems to be part of its territory into the future. Moscow has upgraded portions of its military, including the Arctic Brigade, to be "Arctic-capable" and has developed concepts of operations tailored to that specific environment. Moreover, parts of the Northern Fleet have provided military technology and training adapted to the Arctic environment to its forces.<sup>48</sup> We have also observed a substantial strengthening of multi-role submarines, for instance with a new submarine class developed for operations in the High North (Severodvinsk-class).

The melting of the Arctic ice will increase access to new areas and open new possibilities for naval operations, but will also reduce the ability of submarines to hide under the ice and diminish other kinds of underwater capabilities. The melting of land-based ice is resulting in an influx of freshwater into the ocean, affecting overall salinity, with implications for submarine operations and other underwater capabilities dependent on sonar and hydrophones. These are examples of the known changes affecting the Arctic operating environment, but uncurbed warming and rapid environmental changes will impact infrastructure and technologies in unforeseen ways.

These changing conditions are also rising to the strategic level. Exercises with and tests of strategic assets are increasingly common, often accompanied by news coverage and other strategic communications efforts to portray military might.

In an important sign, for years Russia has been expanding its cruise missile capabilities in the Arctic. In response, the United States has stated the intention of building cruise missile capabilities into future Arctic Coast Guard icebreakers. This sends a strong signal of how both countries view the strategic situation. Unless both countries forego nuclear cruise missiles in the future, these weapons if deployed in the Arctic could introduce significant ambiguity in the region, with both countries unable to distinguish if a cruise missile that is launched is carrying a nuclear or conventional warhead.<sup>49</sup>

In this context, Norwegian and allied military and policy planners are faced with a delicate balancing act between the need for upgrading plans and investments to adjust to a different and more active Arctic, while at the same time avoiding security dilemma dynamics and maintaining the Arctic as a region of low tension. To achieve this balance, an inclusive process to establish a regulatory framework guiding military security in the Arctic would be stabilizing. Such a policy framework could help Norway and its allies in the region strengthen military security and domain awareness in a careful way which is cognizant of sensitivities so as to not heighten tensions. This could start with the creation of a "Military Code of Conduct for the High North." It would send a powerful signal that cooperation should remain an absolute priority for all Arctic states, and that maintaining the region's 'low tension' status requires deliberate action and investments in institution-building to reduce uncertainty.

Norway's strategic location requires a cautious approach as it seeks to signal peacetime control of the High North to the rest of NATO, attract allies to train and exercise, and signal deterrence, restraint, and reassurance to Russia.<sup>50</sup> As military and civilian activity increases on the heels of a warming Arctic, and existing institutions are not resilient enough to manage new challenges linked to climate change, it will be even more important for Norway's defence apparatus to have a coherent security policy that encapsulates the full spectrum of risks. In operational-military terms, this also means investing in new guidelines on how to update and change operational concepts as well as develop and introduce new and adapted technology. Additionally, developing a more robust interface for cooperation with foreign, commercial, and civilian actors to manage accidents and crises in a way that builds trust will be critically important.

# CONCLUSION

As the High North becomes more accessible and gains strategic importance, it will play a critical role in regional and global security relations in the years to come. Geopolitical tensions, institutions in various states of flux, increased commercial, civilian, and military activity, and emerging threats to populations and infrastructure are likely to pose significant challenges to stability in the region, particularly in an Uncurbed Warming Scenario.

At the macro-level, these risks are unfolding against the backdrop of accelerating climate change and increasing global instability, which will challenge conventional methods of international cooperation. Climate change effects will further exacerbate existing international cooperation challenges on trade, arms control, and cyber operations, especially under an Uncurbed scenario. Climate change will also offer opportunities for cooperation on shared risks, including with commercial and other non-state actors, as evidenced by the Paris Agreement and other initiatives. In an era that is increasingly characterized by irregular warfare, however, part of the challenge will be in balancing cooperation with an appropriate recognition of the risks of hybrid warfare and gray zone tactics.

These macro-level developments will affect security in the Arctic, where climate change serves as a multiplier of risks. In a low emissions scenario, likely marked by high levels of multilateral cooperation on shared climate concerns, smaller Arctic countries like Norway are likely to retain relative strength. In a high emissions scenario, climate change will rapidly destabilize systems without the benefits of strong multilateral action, requiring states and other actors to take on higher costs, deal with internal instabilities, and compete in new ways, all of which could be particularly dangerous to small countries.

Developments across 2021 and the early years of this decade will have profound implications on the direction of security and stability in the region over the ten year time horizon of this report. With the election of U.S. President Joe Biden, it is likely that an aggressive climate foreign policy agenda, with the overarching goal of curbing global emissions, will be pursued by the United States. The global pressures of the coronavirus pandemic and related economic crisis could produce significant green stimulus spending from the worlds' major economies, as global expectations also mount for countries to follow a path to reach carbon neutrality by mid-century. These growing domestic and diplomatic mitigation commitments increase the likelihood of realizing a Curbed Warming Scenario.

Likewise, global commitments to better integrate climate change into security planning could be promising for multilateral defense capabilities in the High North. President Biden has pledged to exert significant U.S. diplomatic power in the Arctic region, which could be a stabilizing force and opportunity for the development of new regional institutional capabilities. NATO has likewise begun new efforts to integrate climate into its 2030 strategic planning processes, and the EU is emerging as a more important actor to coordinate and mobilize resources to mitigate and adapt to climate change in the region and abroad.

Given these opportunities and growing regional challenges, it is a key moment for the Norwegian Ministry of Defense to advance new efforts to address the critical shortfall in capabilities and partnerships around climate security in the Arctic. Dialogue will be critical among militaries operating in the region, and few rules or institutions exist to resolve crises or misunderstandings that may arise alongside the changes caused by a warming climate. Norway is well-positioned to establish new mechanisms of cooperation, and could readily advance a Military Code of Conduct for Arctic Forces, as described in this report.

If Arctic tensions continue to grow in the years ahead, it will be increasingly important for security actors in the region to prioritize understanding climate change in their forecasts and scenarios. It is clear from our initial forecasting in this report that long-term security outcomes in the High North will significantly depend upon success in efforts to curb global climate change. The current decade will be critical for determining which security pathway the Arctic region will follow - one of cooperation, clean energy transition, strengthened institutions, resilient infrastructure, and globally proportionate military activity; or one of rapidly escalating change, fossil fuel demand, destabilized institutions, and high likelihood of short-term focused, aggressive commercial endeavors.

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# CLIMATE CHANGE AND SECURITY IN THE ARCTIC

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