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EDITOR'S WELCOME

Welcome to *The CCASCOE Brief*!

This first issue of *The CCASCOE Brief* establishes our commitment to our Community of Practice (CoP), contributes to our Centre's engagement and outreach mission, and creates a space for research-based and policy-relevant discussions, bridging gaps between academic disciplines and between research, expert, and practitioner knowledge.

The aim of the *Brief* is to disseminate and promote rigorous climate security analyses that expand and explore different facets of the consequences of climate change on security and defence. Whether our articles come from the perspective of the natural and physical sciences, the social sciences and humanities, or the policy and operational worlds, they are meant to be accessible to all, to share new ideas and possibilities, to create fruitful debates and possibilities, and grow an expanding Community of Practice.

The guiding foundations and principles of the *Brief* are those of the CCASCOE mission: to support the NATO Climate Change and Security Action Plan and NATO allies and partners to adapt to, and prepare for, the impacts and consequences of climate change. The *Brief* is another step towards CCASCOE becoming an internationally recognised hub of expertise on climate change, security, and defence.

Our first issue contains two articles. One, by Professor Duncan Depledge, looks at the state of climate security work and discussions, and argues for a rethinking and a more strategic and systemic approach. The second article, by Burgess Langshaw Power and Jessica Stewart, focuses on an opportunity that increased defence spending presents: to build a NATO-wide waterbombers capability.

We want *The CCASCOE Brief* to serve the needs of our Community of Practice and all those interested or working in the field of climate security. Please do not hesitate to share feedback and ideas as we continue to build both the *Brief* and the CoP.

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Thinking Strategically about the Climate Crisis

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Introduction: Climate Change and NATO

NATO's 2010 Strategic Concept was the first to formally recognise that climate change is impacting the security environment.[1] In the years since, NATO publications have continued to conclude that the implications of global warming will lead to greater insecurity and instability in core areas of interest to Allies, as well as negatively impact military installations, operations, equipment and force readiness. Over the same period, another issue emerging for the Alliance was the risk associated with increasing operational energy demand.[2] During NATO operations in Afghanistan and Iraq, fuel convoys were frequently targeted by insurgents, resulting in significant casualties. As force protection requirements increased, so too did the financial cost of getting fuel to the frontline. Notably, this was happening against the backdrop of record-high oil prices, putting further financial pressure on Allies.

NATO responded to these developments with several programmes and initiatives that aimed to reduce energy consumption through improved efficiency and experimentation with alternative forms of fuel (e.g., bio- and synthetic) and energy generation (e.g., solar photovoltaic).[3]

A 'Smart Energy Initiative' was launched in 2011 and a year later, the NATO Energy Security Centre of Excellence was established. Exercises (e.g., Capable Logistician) were used to field test various energy saving technologies. In 2014, the Alliance created the 'Green Defence Framework' to help develop 'green standards' that could be applied across NATO political military structures and facilities.

However, there appeared to be little attempt to join-up these initiatives with clear strategic ends. Rather, these initiatives were principally geared towards reducing costs and mitigating environmental harms associated with NATO operations. Success was to be measured in terms of increased energy efficiency and reduced military emissions – and only if it did not interfere with or restrict NATO's ability to 'win' on the battlefield. Given this logic, it is unsurprising that attention shifted away from 'greening defence' and 'energy efficiency' as operations in Afghanistan and Iraq wound down, and NATO put renewed emphasis on deterring and defending against Russian aggression in Europe.[4]

[1] NATO (2010).
[2] During the Second World War, the US forces consumed roughly a gallon of fuel per soldier per day. By 2006, US forces in Iraq and Afghanistan were burning about 16 gallons of fuel per soldier per day (Samaras *et al.* 2019).
[3] Kertysova (2023).
[4] Rühle (2020).

Climate change and energy matters returned to NATO's agenda in 2021 following ministerial endorsement of a new Climate Change and Security Agenda.[5] The Alliance issued a stark warning that climate change had become "a defining challenge of our time, with a profound impact on allied security" and holding implications for all of the Alliance's core tasks. Nevertheless, climate and energy challenges continued to be framed broadly in the same way.

The most notable change was captured in repeated remarks by then NATO Secretary General Jens Stoltenberg expressing concern that the global energy transition would impose requirements on Allies to reduce their reliance on fossil fuels. The same concern was reiterated in three Climate Change and Security Impact Assessments published by the Secretary General's office between 2022 and 2024 – before being further reinforced by Stoltenberg's call, ahead of the 2022 NATO Summit, for a 'military energy transition by design'.[6] The 2024 Climate Change and Security Impact Assessment went further still, concluding that the challenge facing NATO was that it would have to adapt concurrently to both the impacts of climate change and the ongoing energy transition. However, to meet this challenge, NATO requires a more strategic approach than previous 'greening defence' initiatives have allowed – an approach which must start with a fundamentally different understanding of what climate change could mean for the future of military operations and, ultimately, war.

Rethinking Climate Change and War

The conventional military view of climate change, as reflected by many NATO documents, is that as Earth's temperature rises, instability, insecurity, and armed conflicts all become more likely. Increased demand for military operations will be further exacerbated by the broadening of tasks as civilian authorities turn more often to military forces to assist with disaster relief efforts. Nevertheless, while some planners may acknowledge that mitigating greenhouse gas emissions from military activity will help broader efforts to prevent further global warming and improve the reputation of the defence sector, the same documents make clear that core tasks will still be prioritised, even if that requires burning vast quantities of fossil fuels. Of course, such a standpoint ought not to surprise. The purpose of maintaining a political-military alliance like NATO has little to do with the risks and hazards posed by a changing climate.

From a moral perspective, NATO can and must play its part in mitigating climate change by driving down greenhouse gas emissions and reducing other forms of environmental harm where possible. Yet from a strategic perspective, the main question that the Alliance needs to be concerned with is how to ensure it retains the capacity to defend against and deter threats from aggressors in an age of climate crisis. The shift, here, to the term 'climate crisis' is deliberate since the word 'crisis' denotes that it is not climate change per se that is the main issue at stake. Rather, what ought to be of concern to NATO are the crises that climate change is creating as the world grapples with how to respond to planetary heating – crises that are primarily rooted in the long-dominant role fossil fuels have played in meeting global energy needs and the sweeping

[5]NATO (2022).
[6]Stoltenberg (2022).

cross-sector transformations required to transition to cleaner energy sources and prevent potentially catastrophic climate tipping points from being breached.

The climate crisis is therefore not only a product of the risks and hazards associated with planetary heating. It is also being driven by the scale of the energy transition required to prevent the potentially catastrophic collapse of the environmental envelope within which modern human civilisations emerged. As has been pointed out elsewhere, crudely speaking, a 'massive multidimensional transformation' is now all but inevitable.[7] Whether it happens because of the totality of climate impacts or because of a global shift away from fossil fuels remains to be seen. Either way, the status quo is dead.

It is for this reason that some scholars, including this author, are moving beyond the narrow prism of climate change as a 'threat multiplier' and towards a conceptual understanding of the climate crisis as a structural parameter of the contemporary international system.[8] From a strategic perspective, what this move does is position the need to reckon with the climate crisis as central to the understanding of the *context* of the present age of international relations, geopolitics, war, and (in)security.

Thinking Strategically About the Climate Crisis

In strategic thought, context is everything when it comes to understanding the changing character of war over time.

And it is the changing character of war in an age of climate crisis – not war's ever-variable causes – that ought to be of greatest concern to NATO as it seeks to ensure it retains the capacity to defend against and deter threats from aggressors. As the eminent strategist Colin Gray reminded us, 'We cannot know who in the future will fight whom, when, with what, and over exactly which issues': the most we can hope for is to be 'broadly correct' in our grasp of the context in which future war is likely to unfold.[9] Plainly speaking, this context is always shaped by its political, socio-cultural, economic, technological, and geographical dimensions.

Today, the various contextual dimensions referred to above are all being reworked as climate- and energy-related transformations reconfigure the frequency and intensity of extreme weather events, sea levels, agricultural productivity, the distribution of freshwater, and access to energy, as well as the possibilities of both civilian and military settlement, infrastructure, and logistics. For NATO strategists, this means far more attention ought to be paid to understanding the future purpose and utility of wielding military force amid the uncertainties, instabilities, insecurities, and transformations generated by the climate crisis. At the very least, strategists should be cautious about assuming that in the coming decades, the only path to strategic success will be via the use of fossil-fuelled forces.

In the Clausewitzian view of war, the answers to the kinds of questions just posed are to be found in the way context weaves together specific and contingent configurations of what the Prussian General described as the 'remarkable trinity' comprising the tendencies of the people, the military, and the political leadership. [10]

[7] Patterson (2023).
[8] Busby (2022); Charbonneau (2022); Dalby (2024).
[9] Gray (2006).
[10] Waldman (2016).

Simply put, strategic possibilities are always conditioned by the political ends for which force is deployed, the military capabilities available, and the willingness/capacities of wider society to support the effort. Yet while this dynamic is a timeless feature of all war, the constituent parts are understood to be ever-changing and conditioned only by what Clausewitz referred to as 'the spirit of the age'.

The climate crisis is already transforming the possibilities of life on Earth and will continue to do so as the effects of planetary heating deepen and become more widespread, and alternative energy pathways emerge for humanity to escape its dependence on fossil fuels. It is now surely impossible to imagine that neither the contexts that strategists are interested in (political, social, economic, technological, geographical), nor the trinity of people, political leaders, and militaries, will remain untouched in the process. Again, this crucial point is one that will affect both allies and adversaries alike.

The challenge that has been issued to NATO and other military organisations around the world, to engage seriously with the prospect of a military energy transition, draws directly from this understanding that the future context of war will be greatly influenced by the course of the climate crisis.[11]

For instance, the key question underpinning the nascent debate about 'low-carbon warfare' is to ask what possibility is there of maintaining 'high-carbon militaries' in a world reshaped by a massive scaling back of fossil fuel combustion?

If infrastructure is reworked to serve a low-carbon global economy, if vehicles are decarbonised, if societal capacity (i.e. knowledge, skills) to maintain a fossil-fuelled system diminishes, and if political tolerance of fossil-fuel combustion falls, then could militaries bear the cost of being one of the last remaining sectors dependent on oil and gas?"

Such questions are difficult to answer. However, that does not mean that strategists can afford not to contemplate them. Of course, some are likely to remain sceptical that an energy transition of such scale could ever occur. But if that is the case, then the corollary must be to resign ourselves to a world of unprecedented levels of climate-related risk that will have its own transformational impact on how – and how easily – military force is generated, deployed, sustained, and, ultimately, wielded. This would mean another set of questions that must be answered about whether the status quo can realistically survive the totality of climate impacts in the coming decades.

Conclusion

The purpose of this short intervention has been to start sketching out what it means to take the climate crisis seriously, not from a national security perspective focused on protecting countries from the risk of violence, but from a strategic perspective concerned with the possibilities – and the purposes – of continuing to wield military force – such as it exists today – as we travel deeper into a 21st century that will, in the long run, be defined by the mounting destructiveness of climate change and humanity's attempts to escape dependence on fossil fuels.

[11] Depledge (2023).

Crucial to this strategic reorientation is the recognition that the climate crisis will touch upon every aspect of planning that ought to be of interest to strategists: from the changing political, societal, economic, technological and geographical contexts that define the possibilities of war and warfare, to the individual elements of Clausewitz's 'remarkable trinity': people, political leaders and militaries, to the actions of adversaries also trying to adapt to and exploit the climate crisis for strategic advantage. The need to contemplate 'low-carbon warfare', for instance, is not driven by any military requirement to prevent the current climate crisis from turning catastrophic, but by the risk of being left behind as the civilian societies and industrial bases that they rely upon transition away from fossil fuels. NATO has already recognised that climate change is transforming the strategic environment in ways that will affect its capacity to defend against and deter adversaries. What the Alliance still needs is a new strategic prism for thinking through how to respond – this article has sought to take the first step in that endeavour.[12]

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[12]The author is grateful to Professor Bruno Charbonneau for the invitation to submit this article. My involvement in seminars organised as part of the NATO Office of the Chief Scientist-funded project 'Foresight: Planning for Low-Carbon Warfare' (2025) played a valuable part in helping me to develop the ideas discussed.

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A Project of (Inter)National Interest: Canadian Waterbombers

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As the global security environment rapidly shifts, security can no longer be understood solely in military terms, but must also encompass resilience across economic, environmental, and societal domains. Defence, security, and sovereignty are increasingly central themes as the Alliance adapts to an era of compounding risks. Within this context, climate change is moving from the periphery of security thinking to the mainstream, widely recognised as a threat multiplier that intensifies instability, undermines military readiness, damages critical infrastructure, and increases the scale and frequency of humanitarian crises.[1]

As NATO members commit record levels of defence spending, there is an opportunity to rethink what strategic investment looks like in practice. Environmental security and resilience stand out as areas where NATO members can simultaneously advance economic interests, strengthen alliance cohesion, and enhance global stability.

Against this backdrop, there is one striking and underutilized opportunity that aligns directly with NATO's emerging climate-security agenda: waterbombers.

The De Havilland CL-415 and the newer DHC-515 are the world's leading amphibious firefighting aircraft and are currently manufactured in Calgary, Alberta, Canada.[2] These aircraft are in such high demand that their entire production capacity has effectively been pre-sold for the next decade, with the next several years of deliveries already fully committed primarily to European customers. Orders have been placed by Greece, Spain, Portugal, Croatia, Italy, and France, reflecting the growing wildfire risk faced by NATO allies across Southern Europe and the Mediterranean.[3]

Earlier this year, the provincial Manitoba government committed CA $80 million toward the purchase of three new waterbombers.[4] However, these aircraft are not expected to be operational until the 2031 and 2032 wildfire seasons, highlighting the widening gap between need and availability, even in Canada where they are manufactured.[5] The province of Ontario has ordered six aircraft, yet across Canada—and more broadly across NATO—existing aerial firefighting capacity remains insufficient. De Havilland Canada estimates global demand for between 250 and 350 aircraft, a figure that is almost certainly conservative given accelerating climate trends.

[1]United Nations (n.d.).
[2]De Havilland Canada (n.d.).
[3]Catchpole (2025).
[4]Province of Manitoba (2025).
[5]Major (2025).

NATO allies, including Spain, Greece, Portugal, Italy, France, and Croatia, are likely to require dozens more aircraft over the next decade simply to maintain baseline preparedness no less expanding to meet increasing climate threats.[6]

Recent events underscore this shortage. The January 2025 Southern California wildfires revealed severe constraints on available aerial firefighting assets, despite occurring in one of the world's wealthiest and most technologically advanced regions.[7] Similar capacity gaps have been evident during wildfire seasons in Southern Europe, where allied states increasingly rely on ad hoc pooling arrangements and emergency assistance. These systems are valuable, but they are not designed to meet the scale or persistence of climate-driven fire risk now confronting the Alliance.

This shortfall has been acknowledged in policy, if not yet addressed strategically. Canada's most recent federal budget proposes CA $257.6 million over four years, beginning in 2026–27, to lease four aircraft to bolster provincial and territorial firefighting capacity.[8] While this is a necessary stopgap, it also reflects a broader Allied pattern: reliance on temporary measures rather than long-term investment in sovereign or Allied production capacity and scaling effectively to meet new threats.

From both a Canadian and NATO perspective, this represents a missed opportunity to align immediate operational needs with enduring strategic capability not only nationally but across the Alliance.

Rather than treating aerial firefighting as a civilian emergency service operating at the margins of security policy, Canada (as the current country of manufacture) and NATO should recognize it as critical climate-security infrastructure. Wildfires increasingly threaten military installations, industrial zones, transportation corridors, energy infrastructure, and civilian populations. They disrupt supply chains, strain public finances, and place additional demands on armed forces already stretched by disaster response missions.

The economic consequences of failure are staggering. The 2025 Los Angeles fires alone caused an estimated US$95–164 billion in total property and capital losses.[9] Globally, the World Bank estimates that wildfires caused average annual losses of approximately US$82 billion between 2010 and 2020.[10] In the United States, the total annual economic burden of climate-exacerbated wildfires has been estimated at nearly US$900 billion. In Canada, the 2024 Jasper wildfire generated roughly CA$880 million in insured losses.[11] It is virtually certain that faster and more robust aerial response could have prevented a significant portion of this damage.

[6] Catchpole (2025).
[7] Josephs (2025).
[8] Public Safety Canada (2025).
[9] Li and Yu (2025).
[10] Hooda, Raina and Wahba (2025).
[11] Williams (2024).

This creates a compelling strategic case for NATO to invest through a coalition of willing allies in expanding waterbomber production capacity while simultaneously building a standing Allied wildfire response fleet. Canada, as the home of De Havilland's waterbomber production and as the host nation of NATO's Climate Change and Security Centre of Excellence (CCASCOE) in Montreal, is uniquely positioned to lead such an initiative.

Climate impacts directly affect operational effectiveness, military readiness, territorial stability, and civilian protection. A NATO-aligned wildfire response capability would translate this strategic analysis into tangible operational capacity. Under this model, a multinational fleet of waterbombers, crewed by Allied pilots and supported by shared training and maintenance infrastructure, could be rapidly deployed to assist NATO members during peak wildfire seasons. Over time, this capability could also support partner nations and crisis regions beyond the Alliance, reinforcing NATO's role as a provider of stability in an era of climate-driven insecurity.

Such a system would be expensive, but the costs must be weighed against the immense and recurring losses caused by uncontrolled wildfires. Moreover, countries facing mounting disaster costs, and potentially even insurers, would likely be willing to pay for access to rapid-response support that prevents catastrophic damage – building soft power and promoting multilateral cooperation in an era where it is desperately needed. From an Allied perspective, this represents not only a security investment but a form of collective insurance.

Beyond economics, the reputational benefits would be substantial. The image of NATO-aligned waterbombers protecting communities across Europe, North America, and beyond could become as iconic as traditional military deployments once were.

Crucially, this is not a speculative or future-oriented project. The aircraft already exist. They are being built today in a NATO country by skilled workers, using proven designs, with a clear and growing global market. The barrier is not technology, but strategic coordination and investment. Failure to act risks allowing new competitors to emerge or existing manufacturers to be acquired by non-Allied interests, further constraining Allied access to critical capability.

If acted upon decisively, however, this opportunity could catalyze the growth of a broader climate-security industrial ecosystem across NATO, extending beyond waterbombers into disaster-response aviation, dual-use aerospace manufacturing, and resilient supply chains. Recent Allied proposals to expand aerospace production in Canada and elsewhere demonstrate that such growth is both feasible and timely.

For decades, lost opportunities in aerospace have served as cautionary tales. Climate security now offers a rare chance to align strategic necessity, economic opportunity, and Allied leadership. A NATO-aligned waterbomber initiative would not merely fight fires—it would redefine how the Alliance prepares for and responds to the defining security challenges of the 21st century.

This is a project not only of national importance, but of genuine international and Allied significance. If the opportunity seized, it could strengthen NATO cohesion, protect populations, reduce economic losses, and position Canada within the Alliance as a central contributor to a safer, more resilient future.

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