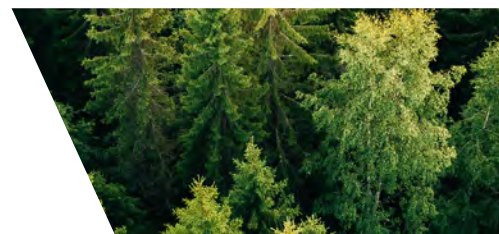
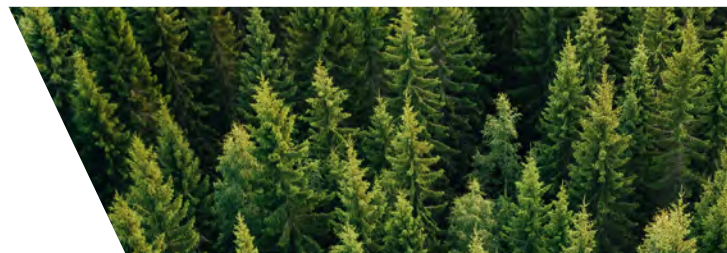


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Climate crisis and the role of armed forces



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Editorial of the Secretary-General

Dear Reader!

Experts from all over the world view climate change as one of the major long-term security risks of our time. It is to be feared that this will have drastic effects on people, nature, society, the economy and therefore also on the defence sector. Massive changes in environmental conditions are already affecting the living conditions of millions of people and acting as drivers of conflict and threat multipliers. Resource scarcity resulting from climate change combined with population growth, especially in fragile regions, could in the worst case lead to social upheavals, a cycle of poverty, oppression and vio-

lence, the erosion of the state, and ultimately also to further massive migration movements.

International organisations and, naturally, states have been focusing on this for quite some time and are working intensively on preparing themselves for these complex and difficult-to-calculate challenges that thus far extend beyond the limits of borders and policy areas.

At the EU level, the Strategic Compass is a landmark strategic document that identifies climate change, environmental degrada-

Arnold H. Kammel



Dr Arnold H. Kammel has been Secretary-General at the Federal Ministry of Defence since June 2022.

tion and natural disasters as multipliers of instabilities and conflicts worldwide. It calls on the member states of the European Union to devise national strategies for the security and defence sector by 2023. On the one hand, this involves recognising climate change as a security threat and integrating it into national efforts in crisis prevention and stabilisation. On the other, armed forces must take measures to reduce their ecological footprint and develop climate neutral capabilities.

The Federal Ministry of Defence has already done its homework in this field and has drawn up a national policy on Climate Change and Defence.

Defence policy ambitions are primarily geared towards further enhancing resilience and self-sufficiency, raising awareness, developing strategic foresight and early detection, and taking timely adaptation measures to make the Austrian Armed Forces greener and the capabilities climate-proof. These measures are naturally only part of the international, European and national efforts. It must be clear to all of us that only a joint effort can lead to the goals of climate neutrality and adaptation to climate change.

**Sincerely,
Arnold Kammel**



Climate change as a factor for geopolitical considerations

In recent years, we have been confronted with numerous crises simultaneously. Even though we tend to believe that such events are isolated from each other, we must not forget that they interact with one another. One crucial cross-sectional aspect is often insufficiently taken into account: the megatrend of climate change.

Peter Vorhofer

Climate change does not only cause higher temperatures in summer, but also affects us in other ways—on a massive scale. In addition to the direct and indirect global consequences of climate change, such as more frequent and more intensive heat waves, storms, forest fires, floods and the resulting threats to human security, the geopolitical and geostrategic significance is also enormous and needs to be taken into account in all defence policy risk analyses.

Rising global average temperatures cause cascading effects that affect the economy, society, health and both national and international security. Melting ice does not only cause ocean levels to rise, but also opens up new areas and trade routes. Especially in the Arctic, where large oil and natural gas



Brigadier General Dr Peter Vorhofer has been head of the Defence Policy and International Relations Directorate of the Federal Ministry of Defence since 2022.

deposits as well as rare earths are suspected to exist, the geopolitical component is highly significant. The race regarding the exploration of these raw materials, which are becoming accessible, has already started. Above all, major powers such as Russia, China or the U.S. are already present. Europe must be careful not to fall behind.

Rising sea levels cause coastal areas to become uninhabitable, islands to disappear and force people to migrate. The same applies to long periods of drought and the resulting increase in water scarcity. Land that is currently used for agriculture and serves as livelihoods becomes useless. This threatens the food and water security of billions of people. In the worst case, entire states will be destabilised.

Moreover, competition for scarce resources such as water, land, food and raw materials is expected to become a breeding ground for future conflicts or geopolitical tensions. In particular, the energy transition will lead to complex geopolitical power shifts and new competitive relationships due to a shift in demand from fossil to renewable energy sources.

But how can we successfully counteract this? It must be in the interest of both the European Union and Austria that risks and possible consequences are identified and analysed. However, this is not enough. Strategies must also be formulated and, above all, appropriate measures for implementation must be taken.

The Austrian Armed Forces are already on the right track with the policy paper "Climate Change and Defence". Sustainable self-sufficiency of military properties is gradually being expanded, the Austrian Armed Forces are being prepared for the security-related implications of climate change through appropriate adaptation measures in the field of capacity building, and measures are taken to reduce the ecological footprint as a contribution to climate neutrality by 2040.



Bild: Nick Rainer, CC BY-NC-SA 2.0

Climate crisis and the role of armed forces

The Austrian Armed Forces' core mission of ensuring military national defence to protect and defend the Austrian population and their livelihoods has remained unchanged. Climate change, however, makes this task more difficult and complex. The environment and security are closely interconnected. Therefore, the Austrian Armed Forces must proactively identify the risks of climate change in a nationwide and Pan-European effort, and develop and build capabilities to prepare for and adapt to new threats and environments.

Purpose of this brochure

This brochure is intended to show the implications of the long-term megatrend of climate change on security and defence policy through analyses by renowned experts, and to look at the implications

from different angles. On the one hand, this is achieved by demonstrating the complexity and interrelations of social, environmental, economic, geopolitical, security and defence policy domains, and by outlining the role of the armed forces as part of a large global effort. On the other hand, the enor-

Eva Widhalm
Ottokar Jindrich
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Eva Widhalm works in the Defence Policy and Strategy Division of the Federal Ministry of Defence, with a focus on climate change and defence.

mous effects of climate change on security policy as a whole and the defence sector in particular are to be clarified. In doing so, the advantages of the use of new green technologies are also discussed with a view to an enhancement of operational effectiveness and the efficiency of domestic and international operations and missions. Finally, the measures taken and planned by the Federal Ministry of Defence are elucidated.

Climate change as a cross-cutting issue

Climate change as a multi-dimensional global challenge to security policy affects all disciplines and policy areas and has to be seen as a future strategic challenge for armed forces as well. As a risk multiplier and amplifier of crises and conflicts, as a root cause of direct and indirect global and geopolitical implications, such as water scarcity, an increase in natural disasters and migration movements or the competition for scarce resources, it also affects Europe and Austria. Even more frequent and intense extreme weather and climate events and other consequential effects, such as pandemics or a blackout are also expected in Austria. A state's security ultimately also depends on the stability of its ecosystems.

In addition, there are numerous interconnections with other security threats. The impact of natural disasters on critical infrastructure, the destruction of ecosystems or the use of energy, food, water, natural resources or even migration as leverage (hybrid threats) are closely linked to climate change and the concept of ecological security. Unless these complex interrelations are properly taken into account in security and defence policy, Europe and Austria may face adverse consequences.

Role of armed forces

To cope with the implications of climate change, armed forces are increasingly being deployed on domestic and international operations. In Austria, this currently affects in particular assistance and support operations provided by armed forces, for example in the fields of disaster relief, pandemic response or border protection. As a result, military capacities are increasingly tied up and only available to a limited extent for conventional threats, despite the increasingly volatile security situation. In addition, the implications directly affect the framework conditions, personnel, operational readiness, military assets, equipment and infrastructure,

due to even more extreme weather and climatic conditions, such as storms, extreme heat and cold, floods or droughts. Therefore, the defence sector and the armed forces are massively affected. The mitigation and adaptation measures that have to be taken in this context to develop and build the required capabilities and to achieve climate neutrality in Austria by 2040 will result in increasing financial requirements.

Climate change and defence

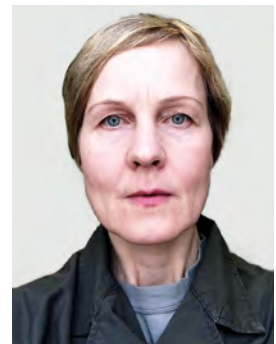
Austria and the Austrian Armed Forces face a variety of risks, challenges and threats. No one can face these risks and threats alone any longer. Outdated concepts, structures and processes need to be revised for these complex, interconnected risks and threats.

Military national defence and climate action are not mutually exclusive. Climate mitigation measures strengthen the constitutional tasks of the Austrian Armed Forces and, on the basis of the Environmental and Climate Policy of the Federal Ministry of Defence that has been implemented, also provide the armed forces with advantages and opportunities to actively shape the future in the energy and climate sector.

In parallel with climate policy goals, resilience-building and adaptation measures must be advanced as quickly as possible. This results from the uncertainty as to whether appropriate worldwide measures to limit global warming and to adapt to the implications of climate change will be taken in time to prevent the worst effects. By establishing a policy on “Climate Change and Defence” and the goals and measures defined therein, the Federal Ministry of Defence significantly contributes to meeting this challenge, which is above all a challenge for the whole country.



Dr Ottokar Jindrich is the head of the Environmental Protection, Ecology, and Sustainability Unit at the Federal Ministry of Defence.



Colonel Sabine Pitterle works in the Environmental Protection, Ecology, and Sustainability Unit at the Federal Ministry of Defence.



Climate change changes everything

Climate change occupies a special position in the spectrum of unsolved problems—it threatens the continuation of civilisation, but also harbours the chance of a transformation into a more just and peaceful world within the ecological boundaries of our planet. The verdict will appear within this decade.

Helga Kromp-Kolb

When, if not now?

Time and again it can be heard that now is not the right time to talk about climate change. Now the energy crisis is the most pressing matter, before it was the war in Ukraine, before that the economic crisis as a consequence of the then-dominating COVID crisis, and so on. Apparently, there is no right moment to talk about climate change—and this has been

the case for at least 30 years. Meanwhile, global greenhouse gas emissions are increasing continuously, climate change has turned into a climate crisis and even has to be designated a climate disaster in many regions. Just think about the weeks-long heat wave on the Indian subcontinent with persistent temperatures above 45 °C, the extreme drought in large parts of the northern hemisphere, and the large-scale floods in Pa-

kistan following heavy monsoon rains—all this happened within six months in 2022. The longer the required measures to radically reduce greenhouse gas emissions are postponed, the more costly climate change will be and the more likely a global disaster scenario in which humanity will be powerless to act will become.

It appears as if governments could only focus their attention on one problem at a time, although the climate, energy, and economic crises could be solved better together and, above all, more long term. As then-German Chancellor Angela Merkel put it in light of the catastrophic floods in Germany in 2021, a “complete transformation of our way of doing business” is needed to solve the climate crisis. Crises that can only be managed with state support providing ideal preconditions for implementing state control measures. Many countries have realised this, while Austria is in danger of forfeiting its opportunity.

Worst-case scenario

As each year of rising emissions diminishes the hope of limiting the global temperature rise to 1.5 °C, the consequences of non-compliance need to be addressed.

From the climate of the past hundreds of millennia, we know there are warm and cold states (ice ages) on earth, within which the climate has been reasonably stable. This change between the two conditions, which happens approximately every 100,000 years, is caused by external, astronomic changes. The dramatic rise in greenhouse gas concentrations in the atmosphere has pushed up temperatures over the past five decades, and now the climate is in danger of leaving its reasonably stable state. Nothing in the paleo-data suggests that there is another reasonably stable state at higher temperatures.

There are different self-reinforcing processes inherent in the climate system, which, upon reaching a certain dynamic, can no longer be contained by humans (tipping points). The choice that now lies ahead is therefore one between a stable climate with at most +1.5 °C, and the risk of no longer being able to stabilise the climate—the so-called “hot house earth”. Although our understanding of this scenario is still incomplete, the risk appears too great to bet against.

An increasing number of scientists believe it is possible that we have already passed the point where climate stabilisation was

feasible. This ultimately means in the words of Noam Chomsky “the end of orderly co-existence”, i.e. of civilisation. Although it is not clear what form this will take, it must be assumed that it will not happen without armed conflict. Strategies to deal with this development are being formulated, among others, under the term “deep adaptation”.

Change is inevitable

Even if we succeed in limiting the rise in temperature to 1.5 °C, the world will not remain as it is. The hottest cities will be temporarily uninhabitable, up to 3.7 months of drought can be expected in the Mediterranean region annually, 70 to 90 percent of all coral reefs worldwide are threatened with extinction, and sea levels could rise by more than one meter, thereby forcing over 200 million people to migrate.

But the measures that need to be taken to meet the goal of 1.5 °C will also change the world. Given that +1.5 °C will likely be reached in the early 2030s, emission reductions must be implemented within this decade and achieve at least 50 percent. The transition to renewable energy, humus-building, carbon-storing agriculture and forestry, improvements to effi-

ciency and strategies of sufficiency are the tools to achieve this. Industrialised countries like Austria will only manage with their allotted emissions (climate budget) if they drastically reduce energy consumption.

The tight time window means that the required reductions have to be achieved with the technologies available now. If one also considers the scarcity of resources—including land and rare earths—it must be assumed that, for example, air traffic will practically grind to a halt, individual mobility will predominantly take place on foot and by bicycle, cars will be borrowed rather than possessed, but that public transport will be attractively expanded. Building construction will be limited to enhancements of existing buildings, and food will be healthier—seasonal, regional, organic and lower in meat—and agriculture will be organic and small-scale. Production and the economic volume will shrink, and the financial system, which is not geared towards a shrinking economy, will have to be realigned. All these changes mean a loss of prosperity, but if implemented well and in discourse with the population, they can simultaneously raise the quality of life significantly.

Tackling transformation quickly and making it equitable

Whether and how peaceful this profound transformation proceeds within the state and the international community will depend,

among other things, on the education and awareness of the population, on the social balance of the measures, on the political skill of those responsible and on the required speed of the changes.



Prof. Dr Helga Kromp-Kolb headed the BOKU Center for Global Change and Sustainability and is active in the Alliance of Sustainable Universities in Austria as well as the UniNETZ project.



Climate change as a threat to national and international security

The increasing magnitude of climate change impacts will exacerbate existing conflicts and tensions and already affects the security interests at the national, European and international levels.

Susanne Dröge

Relevant to security policy: the implications of climate change

Based on a broadly defined concept of human security, risk analyses and security policy considerations are primarily concerned with increasing shortages in food and water supplies, loss of land due to floods and droughts, and long-term effects, such as the melting of Arctic ice and rising sea lev-

els. For a long time, climate risks did not appear to be an imminent threat.

They are now being incorporated into strategic planning, albeit with major differences across national governments, the EU, NATO and the UN. This is because climate change has various dimensions. For the U.S. and Canada, one of the issues is the condition of the Arctic, where dwindling ice

leaves the sea routes permanently open and economic competition increases, for example, over access to fossil resources with Arctic neighbour Russia. Thawing permafrost not only accelerates emissions of the greenhouse gas methane, but also leads to tangible threats to infrastructure. Defence capabilities, military operations and the concrete effects on the supply lines of troops are thus also at the centre of attention.

Increasing migration from African countries caused by climate change is one of the elements relevant to European security policy, because the consequences of climate change generally increase the pressure on people to leave their home countries for good. In addition, domestic and regionally limited migration is already encountering highly tense and fragile situations, for example in the Lake Chad region. Terrorist groups exploit the plight of the local population for recruitment.

In order to prevent climate change from causing ever greater security threats, preventive measures, i.e. above all the reduction of global emissions, is the most urgent concern of international climate policy efforts. However, conflicts are still caused predominantly by social, political, ethnic, religious and economic factors—and thus

form the starting point for security policy analyses. On the global climate risk index of countries most at risk from climate hazards, fragile states such as Puerto Rico, Myanmar and Haiti rank first, and seven out of the ten highest-ranking countries are developing countries.

International negotiations on climate action

Already in the early 1990s, the UN Framework Convention on Climate Change (UNFCCC) was intended to help advance climate action. The Kyoto Protocol, which entered into force in 2005, committed primarily industrialised and transitioning countries to reduce their emissions. It was binding under international law, yet the U.S. rejected it in 2001, and other countries withdrew in the following years. In 2015, the Paris Agreement was adopted. It also includes major emerging economies in climate protection and covers adaptation to climate impacts as well as support for poor countries at the international level. This global climate agreement was signed by over 190 states. In 2022, the negotiations on climate action focused on how to deal with loss and damage caused by global warming, such as the loss

of fertile soil and entire islands, as well as the growing financial needs of poor countries for climate change adaptation and mitigation.

International climate policy remains a difficult process, especially since geopolitical tensions between the U.S., China, Russia and other states have long since reached the UN climate forums. The UN Security Council has repeatedly deliberated on the international consequences of climate change. Some resolutions, including one on the UN mission in Somalia, codified these risks. However, not all Security Council members support addressing climate risks—Russia and China explicitly reject it. Moreover, without direct causal links, it is difficult to identify an acute security threat. If climate change were classified as a “threat to world peace and international security”, which would be a prerequisite for applying the enforcement mechanisms of Chapter VII of the UN Charter, non-military measures, such as sanctions, could be taken.

Security implications

Russia’s attack on Ukraine constitutes the greatest security challenge to European countries and their concerted actions in the

European Union since the end of World War II. It will become increasingly difficult to make longer-term risks, of which climate change is one, heard.

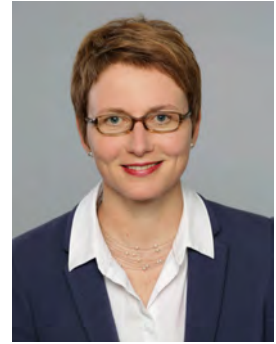
On the one hand, this requires suitable analysis tools. Due to the continuously rising level of knowledge about security aspects of climate risks, this information can now be processed and incorporated in a targeted manner into security policy planning. Forecasts of climate change security risks must match the requirements at the national and European levels.

Another factor that will above all enhance international cooperation within NATO and the UN is the expected large-scale effect of global warming. To date, the average temperature has already risen by one degree compared to pre-industrial levels. It is becoming increasingly likely that, contrary to what was agreed in the Paris Agreement, the temperature threshold of 1.5 °C will be reached within the next two decades.

This could lead to a sharp increase in systemic risks, as can already be seen in the prolonged droughts and heat waves. Extreme weather is becoming more frequent, ecosystems are collapsing and glaciers are disappearing.

This threatens the livelihood of the populations of many countries. This in turn threatens political and economic stability in Europe and worldwide.

The dimension of the challenges will steadily increase, which ultimately can only be overcome through cooperation in Europe and internationally.



Dr Susanne Droege is Senior Fellow at the German Institute for International and Security Affairs.



Questions to Minister of Climate Action Leonore Gewessler



Leonore Gewessler has been Federal Minister for Climate Action, Environment, Energy, Mobility, Innovation, and Technology since January 2020.

Climate and energy crisis, which way should Austria go?

Gewessler: The climate crisis and the energy crisis are a huge challenge due to Russia's attack on Ukraine. Our response must be energy transition. Ambitious and bold measures for a good and climate-friendly future enhance the resilience of our energy and mobility systems and make us more independent of fossil energy imports and geopolitical conflicts. Therefore, the motto "get out of dependence and into renewables" is particularly important right now.

What do you see as the most important security and geopolitical implications of climate change for Austria?

Gewessler: For some time, climate policy has been more than "just" environmental protection and is, equally, about energy, economic and security policy. We have to recognise the consequences of the climate crisis as risks or multipliers of such risks. If, as a result of the climate crisis, large parts of the world become de facto uninhabitable due to heat or rising sea levels, and if, in addition, water or food become scarce, this will jeopardize international cohe-

sion and security worldwide. This is another reason why we must take countermeasures. International efforts for climate action are therefore crucial.

Do we currently have the right national bodies, policies and strategies in place to be prepared for these challenges?

Gewessler: Many existing and important strategic foundations provide us with a good picture of what it takes to be ready—ranging from the long-term climate and energy policy long-term strategy to the Mobility Master Plan, the Hydrogen Strategy and the Strategy for Adaptation to Climate Change.

With a new Climate Change Act, we also want to revise the existing committee landscape as soon as possible and integrate climate protection even more into the decision-making processes. Because time is pressing.

How do you see the future role of the Federal Ministry of Defence and the Austrian Armed Forces under these aspects?

Gewessler: The extreme events caused by the climate crisis pose an ever greater threat. This requires our increased attention, and we must have additional resources available. In addition to the security policy dimension, disaster management will also continue to gain in importance. Climate action and national defence must therefore go even more hand in hand in the future.



Questions to Minister of Defence Klaudia Tanner

Climate crisis: What are the tasks of the Austrian Armed Forces in this regard?



Klaudia Tanner has been Federal Minister of Defence since January 2020.

Image: Austrian Armed Forces/Peter Lechner

Tanner: It must be clear that climate change will be unstoppable for the next few decades, no matter how much we wish to do so. Therefore, all states must be prepared for the consequences and mitigate the worst effects, by implementing measures to achieve climate neutrality and re-establish ecosystems. This can only be achieved jointly at the European, international and national levels. Efforts in the field of defence policy are, thus, only one part of crisis management and are integrated into Austria's national objectives. This is currently reflected in the tasks of

the Austrian Armed Forces, especially in the massive assistance and support operations to civilian authorities, including in the fields of pandemic control, border protection or disaster management. Due to an increasingly volatile security environment, the Austrian Armed Forces will have to concentrate again on their core task of military national defence, especially at EU level. Therefore, the aim is to intensify civil-military cooperation and to strengthen resilience, self-sufficiency and self-provision of the population in Austria.

Austria has set itself the goal to achieve climate neutrality by 2040. How do you intend to make the armed forces green?

Tanner: I have and will continue to advocate for obtaining sufficient long-term financial and personnel resources for military national defence, adaptation measures and our contribution to Austria's climate neutrality by 2040. Enormous investments into resilience and self-sufficiency are required in order to reduce our dependencies and vulnerabilities and to continue to guarantee Austria's military national defence.

Most recently, we have also succeeded in securing the Army budget for the medium term and thus ensuring planning security. For the first time, the defence budget is secured by a National Defence Financing Act. In this way, we have created a basis that will enable our armed forces to plan ahead and to clearly develop their capabilities.

What measures would be necessary at the national level to advance Austria's resilience, and what contribution could the Ministry of Defence make?

Tanner: Our analyses must be based on an expanded security concept and pursue a comprehensive national approach to crisis management, so that, with the help of early warning systems, strategic foresight and an overall national risk assessment, the right decisions can be taken for Austria (national situation centre). The Ministry of Defence's contributions include, among others, the development of the policy "Climate Change and Defence", the revival of intellectual defence and the establishment of emergency self-sufficiency of 100 military properties by 2026. It is time to decisively meet the new challenges in a proactive, prepared, resilient and joint manner.



Climate change: impact on and opportunities for armed forces

Armed forces face major challenges from climate change, but also have competencies to address them. This creates opportunities, particularly through adaptation measures, new forms of cooperation, reduction of fossil fuel requirements, and strengthening resilience in vulnerable parts of the world.

Richard Nugee

With Europe suffering its worst drought for a very long time, temperature records being broken regularly and extraordinary wildfires that have affected many parts of the continent, it is impossible to miss the changing environment and the effects of climate change. The military pride themselves on being able to adapt their equipment and tactics to any environment, to be effective whatever the conditions thrown at them. So, it should be no surprise that the military must take the rapidly changing environment into account—to be an increasingly important ‘factor’ in their planning.

Military bases and training areas

The impact on the military comes in many forms. The first is in the effect on military bases and training areas. Rising sea levels will affect low lying Naval bases; flooding, such as that seen in Germany recently, and Pakistan as an even more stark example, could threaten bases by rivers or subject to glacial melt; and training areas catch fire much more easily in a drought environment, more frequent in the future, forcing changes and loss to training schedules, and temporary bans on some ammunition types. For units training for operations, on necessarily tight programmes, this causes potential loss of operational effectiveness and excess cost and disruption as alternatives are found.

Extreme temperatures

Secondly, the effectiveness of equipment and the degradation of troops from excessive heat on operations. While equipment in the design phase can easily be adapted to operate in a different environmental envelope, current equipment will have to be upgraded to cope with the additional requirements from heat—high temperatures in high altitude zones make helicopter operations

more difficult and fixed wing take-offs energy-hungry. Similarly, with some surface sea temperatures reaching up to 40 °C in the future, marine engines will have to be adapted. And the opportunity to traverse the Arctic Ocean, to preserve the freedom of international sea lanes, will require both operational and equipment changes. In places, Intelligence, Surveillance and Reconnaissance will be made more difficult by climactic changes creating harsh weather conditions that are difficult to penetrate.

Troops will need to be better protected from infectious disease transmission, the potential for a degradation of air quality and from the effects of overheating. This all adds complexity and cost to military training: there is more to train for, with adapted equipment and procedures, just to be able to operate to the same level of effectiveness and readiness as today. Time to prepare, acclimatise and operate will become a critical factor.

Natural disasters, conflict and migration

The third impact will be on where and when military forces are used. Powerful and more extreme climactic events will force militaries to spend more time and effort in

Humanitarian Assistance and Disaster Relief, at home and abroad. This could lead to new opportunities of collaboration and cooperation between allies and also internally between different elements of government, both in terms of procedures and specialised equipment.

But while this is a good use of military soft power, there is little doubt that climate change also shapes conflicts and multiplies their intensity and likelihood. Excessive droughts, floods and an increasingly high ambient air temperature will make parts of the world untenable: as more and more are displaced the effect will be an increase in population tensions (exacerbated by population growth) and the potential for conflict. Cascades of causal effect, from environmental stress to failing crops to people displacement to tension and migration, will become more common. Some commentators anticipate one billion climate change migrants worldwide by 2100, all increasingly desperate as they are unable to sustain any form of living where they originally came from. And whilst few (the UN estimate about 10 percent) move permanently from their local region, with such large numbers even a small percentage coming to Europe has the ability to destabilise; the temptation

to use the military against refugees—as protectors of boundaries on land or at sea - is already being witnessed, with all the moral and political issues this brings.

Energy dependence and freedom of trade

But there is a further, more pernicious threat from climate change, as we transition away from fossil fuels. Europe is far from self-sufficient in the raw materials needed for renewable energy, either in terms of mining or refining the necessary minerals, making us increasingly dependent on others, such as China, where up to 80 percent of the refining occurs. While maintaining trade is not an obvious current military task, it is sensible that the freedom of trade and trade routes should be at the very least monitored by the military, with exercises to test ideas.

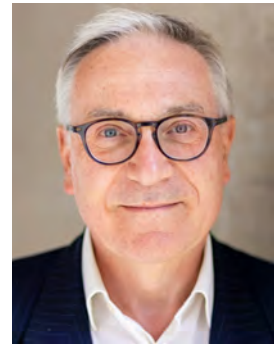
When the increasing harshness of the environment is added to the strategic geopolitical shift in alliances of changing from fossil fuel providers to renewable energy, the potential for global tension and conflict becomes apparent. Europe, as is evident in 2022, is far from immune from others weaponizing energy and cannot afford to ignore this.

Contribution of the armed forces

But there is also significant opportunity for militaries both to act to reduce dependencies and to be used to enhance resilience for the most vulnerable parts of the world. Militaries reducing their need for fossil fuels, perhaps through static renewables (solar, wind, geothermal, hydro) or through deployable technologies (solar, micro-nuclear), will make them more self-sufficient, resilient and therefore stronger. In doing so, they will reduce the logistic resupply needed on operations as well, saving money, equipment, combat forces and lives.

Their planning capability and environmental understanding offers opportunity to build capacity in less fortunate, more vulnerable parts of the world, encouraging others to adapt to floods and drought, building resilience in understanding and governance and bolstering local military skills in disaster relief.

So, while climate change is likely to bring a much more difficult future, militaries from all countries in Europe have the ability to use their skills to adapt their bases, equipment and policies and, at the same time, build the resilience of others who are more vulnerable. Simultaneously, they will be called upon to offer disaster relief, and potentially to secure borders. Climate change will affect us all, even in Europe. Militaries, small or large, offer solutions and opportunities.



Lieutenant General Richard Nugee was appointed Non-Executive Director of Defence for climate change and sustainability. He wrote the climate change and sustainability report for the British Ministry of Defence in 2020.



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With climate change on its doorstep, the military is called to play its part

The role of armed forces remained obscure within the debate about climate change, but there are first signs of re-thinking their role. Besides generating advantages from reducing the need for fossil fuels, detrimental effects of climate change come to the foreground. This concerns, inter alia, conflicts and migration, which are aggravated by climate change, as well as extreme weather events, and the role of armed forces as first responder. Furthermore, armed forces begin to intensify their own efforts to reduce their carbon emissions.

Akash Ramnath
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Whilst the past decade has seen an acceleration in climate action mainstreaming, especially decarbonisation, this has hardly been applied to the military. Climate activists have leaned towards pacifism and thereby tended to overlook the military as emitter, whereas generals considered decarbonisation not a key priority in times of budget cuts. When climate change started to be recognised as a growing security threat, this was oftentimes not translated into changes to military doctrines and defence poli-

cies. This is now slowly evolving as calls for military assistance are on the rise due to an increase of extreme weather events at home and abroad. Greater attention is also being paid to climate change's impacts on military installations and equipment, and more recently, to military emissions, illustrated by NATO aiming to achieve carbon neutrality by 2050. Considering these developments, this contribution will outline not only why the armed forces should be perceived as important players in climate action, but also what contributions they could make.

Climate change as a driver of conflict and migration

There is a growing recognition that climate change can drive or accelerate worsening conditions for conflict or violence to emerge. An example of this is in the Sahel region. For instance, in Northern Nigeria, drought and soil degradation has driven herder tribes, such as the Fulani and Hausa, further south and into the lands of agriculturalist Christian tribes. Tensions and clashes over what little fertile land is left have escalated to the point where the pastoralists see joining the radical Islamist insurgency of Boko

Haram as attractive alternative to herding. In response, the region is subject to enhanced international scrutiny and the Nigerian state has almost doubled military spending to cope with the spiralling of the conflict into more regions (5.2 billion US dollar in 2022; an increase of 269 per cent from 2015).

In addition, climate change has the potential to influence migratory patterns. Whilst there are numerous global examples, one region of concern is again the Sahel region, as desertification and agricultural collapse become more prevalent. Even though this might also mean impoverished people might no longer have the means to migrate, there are also indications that it boosts their motivation to leave the region. Already 48,983 migrants reportedly crossed the Western and Central Mediterranean in the first six months of 2022, and with the numbers likely to only increase, militaries might be called upon to take an even greater role in assisting the policing of Europe's borders, especially across the Mediterranean. This can add further strategic planning and resourcing pressures to the military, particularly navies and the European border protection agency, Frontex.



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Humanitarian Assistance and Disaster Reduction (HADR)

In a year that saw record heatwaves and wildfires afflict Europe, militaries are likely to be called upon more frequently to support HADR efforts. The EU, for example, has the RescEU plan, which puts 13 firefighting aircrafts, and a number specialist teams on alert for rapid deployment to areas in most need. However, by summer 2022, just eight days into the wildfire season, four countries had already called for aid, putting intense pressure on resourcing and coordination. This is especially concerning at a time when the EU's Civil Protection Mechanism is under strain from supporting efforts in Ukraine. As Europe gets treated to the full face of climate-induced disasters, it is likely that national militaries will have to step in to plug the gap, meaning that the planning of capabilities must shift towards more existential risks.

Cutting emissions

Whilst militaries have largely been exempted from climate policy frameworks such as the Nationally Determined Contributions that are submitted as part

of the Paris Agreement on Climate Change and the EU's Fit For 55 package to reduce emissions by 55 percent in 2030, their contribution cannot be overlooked. European military emissions alone in 2019 could have run 14 million cars on the road annually. Whilst we are still a long way off from a net-zero jet fighter, there is growing recognition, including within military circles, about their emissions contributions and the benefits of supporting the transition. Reducing dependency on fossil fuels would cut strategically vulnerable supply chains, enhancing operational autonomy. Examples include the UK's commitment to a net-zero Royal Air Force base by 2025, the Swedish Air Force trialling jet fuel containing a mixture which is 50 percent from sustainable sources and the proposed integration of Small Modular Reactors (nuclear) into military mobility by France.

Military as a hub for innovation

In times of crisis, innovation is accelerated. We are already observing this in 2022 in relation to decarbonisation. The NATO announcement of a Climate Change and Security Centre of Excellence to help integrate climate-friendly practices into members activities,

as well as a new 1 billion US dollar NATO Innovation Fund shows that once climate mitigation becomes of interest to military actors, investment can be mobilised rapidly. Whilst more needs to be done, enhancing the militaries focus on contributing to decarbonisation can scale up and accelerate green innovations, with likely spill overs to civilian sectors.

Conclusions

Whilst the role of the military for now may remain slightly aloof of the climate change debate, green shoots of improvement are emerging. Benefits of reducing fossil energy usage and the accompanying supply line improvements are being observed with greater interest. With more extreme weather, the role of the military as first responders will only increase and slowly this has also made them reconsider their own contribution to the decarbonisation process. Whether enough can be done in time is a question for another day.



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Climate change: challenges for Europe's armed forces

A comprehensive assessment of the implications of climate change on Europe's armed forces is due. If done properly, this complex challenge harbours a multitude of possibilities to enhance the (planning) processes, operational capabilities, as well as the safety and health of deployed armed forces in a sustainable manner.

Raphaela Engel

Climate change belongs on top of the security policy agenda

Climate change has an immediate impact on the armed forces: Military equipment and assets are sometimes not (fully) operational in extreme weather conditions such as high heat, heavy swell or sandstorms. The resilience of the military and critical infrastructure

must be adapted to the new challenges, with the added issue of supply and energy security in addition to climate change. Areas of operation are becoming increasingly challenging.

In parallel, the military has to prepare for a world in which climate change acts as a threat multiplier and driver of political unrest, instability and conflicts,

especially over habitat and resources. By 2050, for example, more than one billion people are expected to have inadequate access to clean water. The military—in conjunction with other relevant actors—will have to deal with this growing instability in the extended neighbourhood of the European Union. It will also be increasingly called on to support civilian authorities in dealing with natural disasters.

Armed forces and defence ministries are not only the largest landowners in the EU, but also the largest energy consumers in the public sector, comparable to a smaller member state. While armed forces are adapting to these new or intensified conditions, it is also important to ensure that the military reduces its own contribution to climate change. In addition to climate policy considerations, there is also a growing strategic interest in reducing military dependence on fossil fuels. The war in Ukraine and the ensuing energy crisis show how important it is to decarbonise defence in order to prevent financing Russia's war and to strengthen Europe's freedom to act.

In this context, the operational advantage of rapidly rethinking the defence sector and the armed

forces should be mentioned: Targeted attacks on supply convoys in Iraq and Afghanistan accounted for around half of the fatalities suffered by U.S. troops. Enhanced energy efficiency and sustainability also increases the safety of soldiers in the field.

Geopolitical, economic and climate policy interests converge in the need to decarbonise the defence sector and improve the energy efficiency and sustainability of the armed forces. This compels political leaders, whether in Brussels or at the national level, to follow a comprehensive EU-wide and national approach. This raises the question of whether member states and EU institutions are already following these requirements.

Time to take stock

In November 2020, the European External Action Service (EEAS), together with the European Commission (EC) and in cooperation with the European Defence Agency (EDA) presented the EU Climate Change and Defence Roadmap. Expanding on EU efforts to further strengthen the climate change-security nexus in the EU's external actions, the Roadmap is the first targeted effort to address the intersec-

tion of climate change, defence, and EU-led missions and operations within the framework of the EU's Common Security and Defence Policy (CSDP). The document contains over 30 concrete measures covering operational engagement, the development and adaptation of military capabilities, and partnerships.

The goal is to strengthen decision-making, planning and implementation of EU CSDP and defence industry activities, for example by providing strategic foresight, collecting data and measuring the environmental footprint of EU-led missions, offering training modules for soldiers and civilian experts as well as investing in innovative technologies for increased energy efficiency and sustainability in the defence sector. Furthermore, the EU has initiated a dialogue with the United Nations and NATO and identified areas for closer cooperation.

The Concept for an Integrated Approach on Climate Change and Security from October 2021 in some ways complemented the Roadmap with a broader approach to the EU's foreign and security policy, in particular by including the full crisis management cycle. In March 2022, the EU Strategic Compass for Security and De-

fence highlighted climate change as a threat multiplier and called on the member states to develop national strategies for the armed forces by the end of 2023, as a contribution to the full implementation of the Roadmap.

With respect to the Roadmap, it is uncontested that concrete results and progress have been achieved in the implementation of the measures presented. CSDP missions and operations are increasingly addressing climate and environmental aspects in their training and advisory tasks for the host country, based on a solid conceptual foundation. In addition, the EU is taking new steps to begin measuring its environmental footprint to identify opportunities for resource optimisation. Environmental advisors are expected to be deployed in all CSDP missions and operations by 2025. There have also been achievements in developing enhanced capabilities, such as the establishment of the Incubation Forum for Circular Economy in European Defence or the fact that 82 million euros of the European Defence Fund (EDF) have been allocated to projects for energy efficiency.

The question whether the policy framework developed by the EU suffices to address the challenges

mentioned can only be answered with both a Yes and a No. Successes are evident, but the current situation requires more ambition, a broader approach and a better linkage of EU actors and instruments. This also concerns better access to financing through EC instruments. In this context, the EC's so-called Defence Package of February 2022 should be mentioned, in which the EC commits itself to establishing a policy framework in the area of defence and climate change. But there is also potential to establish synergies in the national strategies to be submitted by the member states as early as next year.

By merging these new work strands, a new policy framework will consequently be developed already during the first half of 2023, jointly between the EEAS, the EC and the EDA. Concrete measures and an ambitious timeline should ensure that this framework indeed benefits the EU institutions, the member states and ultimately our environment.

How can Austria reinforce its efforts?

Austria's national strategy ought to define a clear objective that is substantiated by concrete steps and measures. The recent climate

and defence strategies of France and the U.S. can provide inspiration, and the EEAS is going to activate a network of national POC's by the end of autumn 2022. Austria should actively use cooperation opportunities at the EU level, for example within the framework of PESCO, EDF and EDA. The latter, for example, provides important forums for sustainable energy and circular economy.

Furthermore, training and education to enhance the Austrian Armed Forces' climate competence at all levels is central - this is a decisive factor in bringing about necessary mindset changes. Here, the Austrian Federal Ministry of Defence could also play an important role, for example within the framework of the European Security and Defence College (ESDC).

Finally, the significance of communicating the issue must be highlighted. It is necessary to develop a strong narrative that represents the clear and operational benefit of taking this topic seriously.



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Strategic positioning of armed forces in the midst of climate change

Climate change is a global threat and has already affected human security and political stability in some of the most endangered regions of the world. Climate security thus has become a vital national security interest for the Member States of the European Union.

Robert Brieger

Climate change is a risk multiplier and root cause amplifier of current and potential future conflicts. In conjunction with resource scarcity and strong demographic growth, climate change may have an additional destabilising or conflict-exacerbating effect in regions with fragile state structures. In the worst case, this could lead to the failure of states, armed conflicts and uncontrolled migration movements.

This phenomenon will likely predominantly affect the issue of climate refugees and the potentially increased destabilisation of the European neighbourhood (particularly in the south). This has, and will continue to have, a direct impact on Europe, through migration to the nearest areas of affluence, terrorism or emerging humanitarian disasters in the wake of non-international (civil wars) or international armed conflicts

(wars), often in combination with natural disasters.

Climate change and its consequences for the armed forces in the European Union

What actual consequences does climate change have with respect to the positioning of armed forces, in particular those of the EU Member States (MS)? The armed forces of the EU MS do not have to reposition themselves as such and have already recognised climate change as a concrete security threat. The challenge is to now draw the strategic, operational, and tactical conclusions from this insight, and to adapt the related aspects of material, equipment, provisions and training to current and future scenarios. The armed forces of the EU MS are only at the beginning of this development, although in the field of material and equipment, a lot of testing for adaptation to climate change is already happening. Both at the political and the military-strategic level of EU MS, there is a growing number of conceptual papers that consider climate change to be a concrete challenge to security policy. It is, however, essential to rapidly take the required measures derived from this understanding.

Therefore, future military planning is of crucial significance, to clarify how the military should adapt to climate change and how it should contribute to the comprehensive goals of the EU's Green Deal. The military leadership's main concern should be to enhance the operational effectiveness and efficiency of operations/missions, or at least to alleviate potential losses in effectiveness. Through appropriate adaptations, operations/missions could, for example, become increasingly independent, use less energy and be less susceptible to attacks. Ships, vehicles and facilities that burn less fuel and consume less energy would be cheaper and easier to operate. Even more important is that greater self-sufficiency could considerably ease the requirements of military supply operations. The argument is that these measures might eventually not only cut costs but also save lives.

Precautions

In the future, the EU will have to increasingly prepare for operations that correspond neither to classic defence nor to prevailing international operations, but which are still considered military missions. As global warming progresses, multilateral operations within the framework of coalitions/co-opera-

tions or alliances will also be called on to control refugee movements or provide humanitarian assistance. This task spectrum is not new, but will likely increasingly affect the armed forces of the EU MS, under even more difficult climatic conditions.

To face these complex emergency challenges, military (operational) planning has to take suitable precautions to compensate for climate change-induced diminished access to resources, such as operating resources, energy, water and food, which are indispensable for frictionless operations of military deployments.

Within the framework of preventive measures, the military energy infrastructure must be modernised, early warning systems for potential conflicts established, European energy independence promoted and the interlinkages between conflict and climate research improved. In this context, the EU MS must cooperate much closer and in a uniform manner.

The Green Deal in the armed forces

Greater attention is to be paid to the impacts of climate change on the medium- to long-term development of armed forces. This in-

cludes, among other things, military infrastructure and the requirements for energy efficiency. In the future, military activities must take into account the EU goals for carbon neutrality, in order to contribute to combating climate change, while not endangering the security of operations and missions or undermining the operational capacities of armed forces. Beyond that, defence infrastructure and capacities, which are energy-intensive consumers of fossil fuels, must adapt to the changing environment, to enhance both energy resilience and autonomy.

Green and sustainable energy sources are becoming increasingly important for the armed forces, especially as it provides additional benefits. For one, energy is a key factor for operations/missions. Enhanced energy efficiency helps armed forces save considerable amounts of funding, which instead can be invested in other areas. In addition, the transition from fossil fuels to sustainable energy sources should be a key objective for the defence sector, particularly in areas of operation in which supply lines are expensive and difficult to maintain. Furthermore, a greater share of renewable energy and alternative fuels would decrease our dependence on energy sources from outside the EU, which in

turn could increase our resilience, energy-strategic autonomy, and operational efficiency.

To this end, the European Defence Agency (EDA) plays a crucial role, since the armed forces of the EU MS are strongly supported by EDA on their way to energy sustainability. This is also in line with the EDA's main task of developing the European defence capabilities, including in the field of energy efficiency, and facilitating defence cooperation between its member states.

The EDA also invests in the advancement of clean energy solutions, the reduction of environmental risks and the fight against climate change, especially through the Energy and Environment Working Group, the Consultative Forum for Sustainable Energy in the Defence and Security Sector, and the Incubation Forum for Circular Economy in European Defence. The EDA contributes to the implementation of the European Green Deal via these pillars, in particular through the Climate Change and Defence Roadmap, the first EU action plan to address the linkages between defence and climate change. The EU Military Committee (EUMC) deals with the status of implementation relating to defence development within the context of this action plan.

Conclusions

Military-strategic adaptation to climate change is not only a question of legitimacy but also a factor of force protection, considering the high losses suffered in operations in which task accomplishment carries higher risks. From a military viewpoint, we can say that the adjustment of our concepts, operations/missions and processes is an important aspect in ensuring operational effectiveness and efficiency, and in fulfilling our military tasks under rapidly changing environmental conditions. Particularly in the context of our international operations and military commitments, Western/European armed forces are among the first actors to be confronted with the effects of changes to the climate and environment. We must not forget that in some industrialised countries, the armed forces are responsible for up to 50 percent of emissions from public institutions.

In summary, the important question is not whether there is a connection between climate change and defence, but how we as the military can adapt our systems, operations/missions and equipment in the future.

For the future of the armed forces of the EU MS, this would mean



General Mag. Robert Brieger ist seit Mai 2022 der Vorsitzende des Militärausschusses der Europäischen Union. Zuvor war er Generalstabschef des Österreichischen Bundesheeres.

that military strategies are to be developed at the international and national levels and be embedded within the general climate agenda. It is therefore crucial to move away from an ad-hoc approach and instead pursue a structured and sustainable development.

Moreover, the military training and education system must be expanded on the basis of a holistic approach. The armed forces' approach to climate change also requires cooperation with the industry through civil-military cooperation, in order to exploit the potential in the fields of research, innovation and development of new technologies.



Climate Change and Defence Policy

Security policy in general and defence policy in particular have regained new relevance in view of the Russian war of aggression against Ukraine. The armed forces' core task to ensure military national defence has moved to the foreground again, also in Austria. Against this backdrop, the Austrian Armed Forces will receive a defence budget of 16 billion Euros over the next four years. The Armed Forces Build-up Plan 2032 serves to restore the Austrian Armed Forces' military national defence capabilities. In addition to rebuilding immanent basic military capabilities, new capabilities will be created to ensure the country's future defence capacity—for which the challenges of

climate change also must be taken into account.

Climate change does not universally alter the tasks of armed forces, but they may be needed more frequently, and their tasks will become more challenging and complex. Within the defence policy risk assessment, the consequences of climate change in a ten-year horizon become apparent through changes to the geostrategic environment, a massive deterioration of the ecological conditions, and of the frequency and intensity of national and international military operations.

For the adequate orientation of defence capabilities, climate

Silvia Angerbauer

change must be recognised as a multiplier of security threats alongside other interconnections, deviating environmental conditions must be adapted to, and a changed operational profile has to be developed.

Context and goals of the Federal Ministry of Defence

The European Union has set itself the ambitious goal to achieve climate neutrality by 2050, whereas Austria wants to do so already by 2040. The EU's Strategic Compass prompted the EU Member States to develop national strategies by 2023, for implementing the "EU Climate Change and Defence Roadmap", meant to prepare the armed forces for the future. To meet these requirements in a targeted manner, the defence policy paper "Climate Change and Defence" was developed through an internal strategic process within the Federal Ministry of Defence.

This policy serves as a central framework of action for future armed forces development and command, as well as the Ministry's involvement in the national approach to climate and security. The goal is to maintain the operational readiness of the Austrian

Armed Forces vis-à-vis the challenges caused by climate change, to enhance perseverance, operational readiness and self-sufficiency, and to reduce vulnerabilities and dependencies in a timely manner. To this end, five concrete goals have been formulated:

1. Developing an expanded concept of security for strategic foresight;
2. Increased awareness raising, cooperation and development of goal-oriented partnerships;
3. Increase of resilience and adaptation;
4. Contribution to Austria's climate neutrality by 2040;
5. Contribution to the stabilisation of the geostrategic environment;

For each of these goals, short-, medium- and long-term measures have been determined and recommendations for actions on the national level were formulated (see figure 1). Regular evaluations will be held to review the efficacy of this policy and adjustments will be implemented accordingly.

During the implementation process of the measures, the core task of military national defence ("mission-first" principle) as well as the high transformation costs and budgetary feasibility (duplication in operating systems, cli-

mate neutrality by 2040) must be borne in mind.

The multidisciplinary topic of climate change is one of the most significant threats of our time, with serious consequences for national and international security as well as our natural and social systems. A solo effort by the Federal Ministry of Defence in this complex field is not possible, as the formulated goals may only be achieved through close cooperation with national and international partners, particularly within the

framework of the EU's Common Security and Defence Policy. The Federal Ministry of Defence's contribution to the implementation of national and international climate goals not only contributes to the preservation of a liveable future for our descendants, but also strengthens Austria's role as a reliable partner in efforts related to combating the global implications of climate change.



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Goals	Measures (examples)
Strategic foresight	Cross-cutting integration of climate change impacts into risk analysis
Awareness-raising, cooperation, and development of goal-oriented partnerships	Integration of the topic in education and training
	Promotion of trained specialists in the field of green technologies
Increase of resilience and adaptation	Gradual increase of emergency self-sufficiency of military infrastructure towards a sustainable self-sufficiency
	Review of supply and supply chains relevant to the Ministry of Defence for vulnerabilities
Contribution to Austria's climate neutrality by 2040	Measures regarding energy efficiency, decarbonisation, and increasing the circular economy
Contribution to the stabilisation of the geostrategic environment	Training and deployment of Environmental Advisory (Climate Security) in CSDP missions and operations
	Contribution to reducing the ecological footprint of missions and operations
Whole-of-government recommendations for action	Development of a whole-of-government cross-sectional strategy as well as the establishment of an inter-ministerial "Climate and Security" working group
	Integration of the topic in a national situation centre

Table 1: Extract of the policy "Climate change and defence"

