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Low-Competitive Cooperation: EU-NATO Climate Security Interaction from the Perspective of Institutional Interplay

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ABSTRACT

2024 has become the hottest year since relevant records began in 1850, however, the military and defence industry, as the largest source of hydrocarbon emission worldwide, have long been subject to insufficient international constraints and have not implemented strong emission reduction actions. NATO and the EU play a unique role in the climate mitigation and adaptation in the field of defence as international organizations that bring together major greenhouse gas emitters and focus on defence and security issues, what influence their cooperation and competition in climate security and how their interaction impacts the inter-organizational and transatlantic relationship is worth investigating. According to the Institutional Interplay Theory, the EU-NATO climate security interaction is influenced by the degree of interest alignment of major member states of international organizations such as the US, France, Germany and the UK, the overlap of organizational functions such as crisis management and the overlap of organizational members such as the CEE and Nordic member states. To be specific, the alignment of major member states' national interests with the organizational goals of the EU and NATO and the organizational integration strategy of these member states, the similar norms and values of the two organizations, the overlapping membership of the EU and NATO and these common member states' need for both organizations are main cooperative factors, while the inefficiency and ineffective in resources distribution and utilization between the EU and NATO hinders the collective efforts of the two organizations. Thus, the EU-NATO climate security interaction has been and will remain a "low-competitive cooperation", and there are generally more communication and discussion such as seminars than collective policies and actions between the two organizations in climate security. Besides, since the forces of cooperation are generally greater than that of competition between the EU and NATO in the field of climate security, the EU-NATO climate security interaction has the positive impact on improving the inter-organizational as well as the transatlantic relationship under the objective of enhancing the Western world's climate security governance capabilities and influence.

GLOSSARY

CEE-Central and Eastern Europe (including Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia)

CFSP-Common Foreign and Security Policy

CF SEDSS-Consultation Forum for Sustainable Energy in the Defence and Security Sector

COP-Conference of the Parties

CSDP-Common Security and Defence Policy

DGA-Direction générale de l'armement

DG CLIMA-Directorate General for Climate Action

DG DEFIS-Directorate General for Defence Industry and Space

DG ECHO-Directorate General for European Civil Protection and Humanitarian Aid Operations

DG INTPA-Directorate General for International Partnerships

EEAS-European External Action Service

EPWG-the Environmental Protection Working Group

EU-European Union

GHG-Greenhouse Gas

Hybrid CoE- European Centre of Excellence for Countering Hybrid Threats in Helsinki

IMCCS-the International Military Committee on Climate and Security

IMO-International Maritime Organization

LDC-Less Developed Countries

NATO-North Atlantic Treaty Organization

NATO STO- NATO Science and Technology Organization

SIDS-Small Island Developing States

SRSP-Structural Reform Support Programme

STEEEP-the Specialist Team on Energy Efficiency and Environmental Protection

UNCT-UN Country Teams

UN CSM-United Nations Climate Security Mechanism

UN OCHA-UN Office for the Coordination of Humanitarian Affairs

WPS-Women, Peace and Security

INTRODUCTION

2024 has become a landmark for climate change and global climate governance and has sounded the alarm and raised higher requirements for climate governance actions in countries around the world. According to the latest data from the EU climate monitoring agency, 2024 has become the hottest year since relevant records began in 1850, and global temperatures in 2024 has exceeded 1.5 Celsius above the pre-industrial era for the first time, indicating that the world is at a critical juncture in achieving climate goals.[1] However, as the largest source of hydrocarbon emission worldwide, the military and defence industry have long been subject to insufficient international constraints and have not implemented strong emission reduction actions due to the exemption reporting regulations of the Kyoto Protocol and the voluntary reporting regulations of the Paris Agreement.[2] This has prompted emission reduction and energy transition in the defence and military fields to rely heavily on the voluntary contributions and self-monitoring of relevant countries and organizations, among which NATO and the EU play a unique role as international organizations that bring together major greenhouse gas emitters and focus on defence and security issues, mainly manifested in the facts that they lead to set the ambitious collective goals for Western countries in the field of climate security and has a reference significance for improving the global climate governance system. At the same time, since both the EU and NATO have developed policy agendas that address the climate security risks, they are also prominent examples for exploring how international organizations deal with climate security risks.

I. Purpose and Significance of The Research

In general, climate security is the condition where people, communities and states have the capacity to manage stresses emerging from climate change and variability.[3] Climate change can cause ten types of security risks, including water security risks, food security risks, health security risks, ecosystem security risks, economic security risks, infrastructure security risks, national security risks, military security risks, international security risks and new

[1] "Copernicus: 2024 is the first year to exceed 1.5°C above pre-industrial level," European Commission, achieved January 10, 2025, accessed March 26, 2025, https://climate.copernicus.eu/copernicus-2024-first-year-exceed-15degc-above-pre-industrial-level.

[2] In the Kyoto Protocol in 1997, emission from military activities were excluded from carbon reporting requirements because of the potential vulnerabilities to national security that could arise from disclosing energy consumption information. In the 2015 Paris Agreement, a mechanism to contribute to the mitigation of greenhouse gas emission was established under the document for use by parties on a voluntary basis.

[3] Rüttinger L, Smith D, Stang G, Tänzler D, Vivekananda J, *A New Climate for Peace: Taking Action on Climate and Fragility Risks* (Adelphi and International Alert, 2015), 24.

security risks.[4] Among them, the United States and European countries are particularly concerned about the impact of the climate crisis on military operations, national security capabilities and the international security situation,[5] which also influence the development of organizational goals and functions of the EU and NATO. Both the EU and NATO have increasingly emphasized addressing climate security risks and made it an important target of security and foreign policy.

International organizations are non-state actors, which are created by states, established by means of a treaty and able to express a will distinct from that of their members, they are important actors in the international community and one of the manifestations of international institutions. Since the end of World War II, the number of international organizations has increased dramatically. As of 2022, there are more than 75,000 international organizations in the world.[6] Therefore, the overlap and interaction between international organizations are becoming increasingly important. Since EU member states still adopt an intergovernmental cooperation approach and have the final decision-making power in many areas, both the EU and NATO can be regarded as international organizations, and the interaction between the two is essentially a matter of institutional interplay.

After the end of the Cold War, the European security environment has undergone historic changes, which have profoundly promoted the transformation of the organizational goals and functions of the EU and NATO. On one hand, the EU has focused on enhancing its own security capabilities and responding to complex internal and external security threats. The EU's CSDP, an important part of the CFSP, has developed rapidly. The EU has established multiple professional institutions to support its own security operations and implemented the "Permanent Structured Cooperation". On the other hand, NATO not only paid more attention to new security threats such as terrorism, cyber-attacks, energy security, and climate change in addition to traditional military threats, but also promoted the expansion of broader organizational missions such as conflict prevention, crisis management, and cooperative security. Against this background, both the EU and NATO have increasingly emphasized addressing climate security challenges, made it an important target of crisis management and continued the communication and coordination on relative issues.

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[4] "The World Climate and Security Report 2021," IMCCS, achieved June 2021, accessed March 26, 2025, https://imccs.org/wp-content/uploads/2021/06/World-Climate-and-Security-Report-2021.pdf.

[5] Li Xinlei, "Climate Security and Hegemonic Maintenance: Global Promotion of the US Climate Security Strategy," *Journal of International Security Studies* 41, no. 2 (2023): 87.

[6] "The Yearbook of International Organizations," Union of International Association, accessed March 27, 2025, https://uia.org/yearbook.

For a long time, the EU and NATO have carried out bilateral cooperation based on the principles of mutual openness and transparency, inclusiveness and reciprocity, mutual respect of the decision-making autonomy and procedures, and no prejudice to the specific character of the security and defence policy of any member state.[7] Around 2003, with the conclusion of the "Berlin Additional Agreement" between the EU and NATO, the two sides formed a "strategic partnership" in the field of crisis management and agreed to act together in this area based on a functional division of labour.[8] From 2005 to 2006, NATO established the NATO Liaison Group in the EU Military Staff, and the EU also set up a permanent working group within NATO's Allied Command Europe. The NATO Secretary-General and the High Representative of the EU for Foreign Affairs and Security Policy regularly report on the progress of cooperation to the member states, providing a formal mechanism for both sides to enter each other's defence planning systems and jointly formulate and decide on crisis response plans.[9] In 2016 and 2018, the EU and NATO issued two joint statements, emphasizing the continued strengthening of their strategic partnership and addressing multiple and changing security challenges.[10] After the Russia-Ukraine conflict in 2022, NATO and the EU accelerated the pace of deepening strategic cooperation, further clarified the nature of bilateral relations, and consolidated the European security architecture of "NATO as the main and EU as the auxiliary".[11] In 2023, the EU and NATO have for the first time explicitly identified the security impacts of climate change as a priority area of work in their latest joint statement. In February 2024, the EU and NATO launched a structured dialogue on climate change, security and defence, focusing on climate security risk prediction and early warning, climate change adaptation and mitigation, education and training, joint exercises, etc.[12]

From this, I will attempt to find the answers to three separate but also interconnected questions: first, why is the EU-NATO climate security interaction both cooperative and

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[7] "EU-NATO COOPERATION," EEAS, achieved March 2022, accessed March 29, 2025, https://www.eeas.europa.eu/sites/default/files/documents/2022-03-24-EU-NATO-COOPERATION-NewLayout.pdf.

[8] Zhang Ming, "Whither the "Strategic Partnership": from the perspective of EU-NATO relations," *Chinese Journal of European Studies*, no. 3 (2009): 54.

[9] Wang Yiwei, NATO in Transition and a Changing World (World Knowledge Press, 2015), 134-139.

[10] "EU-NATO Joint Declaration," The Council of the European Union, achieved July 8, 2016, accessed March 29, 2025, https://www.consilium.europa.eu/media/21481/nato-eu-declaration-8-july-en-final.pdf; "EU-NATO Joint Declaration," The Council of the European Union, achieved July 10, 2018, accessed March 29, 2025, https://www.consilium.europa.eu/media/36096/nato_eu_final_eng.pdf.

[11] Zhao Huaipu, "Evolvement Logic and Development Trend of Relations Between the EU and the NATO," *Pacific Journal* 32, no.7 (2024): 36.

[12] "Ninth progress report on the implementation of the common set of proposals endorsed by EU and NATO Councils on 6 December 2016 and 5 December 2017," NATO, achieved June 13, 2024, accessed March 29, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2024/6/pdf/240613-progress-report-nr9-EU-NATO.pdf.

competitive? Second, how do national-level factors affect the EU-NATO climate security interaction? Third, how do organizational-level factors affect the EU-NATO climate security interaction? It is of great value to explore the EU-NATO climate security interaction from the perspective of institutional interplay. On the theoretical level, first, characterizing the factors and mechanisms that affect EU-NATO climate security interaction will provide new examples for understanding the cooperation and competition among overlapping international organizations. Second, exploring international climate security interactions based on both national and organizational levels will further enrich the analytical perspective of climate security research. On the practical level, first, observing the competition and cooperation between the EU and NATO in the field of climate security policy will help us better understand how non-traditional security threats, especially emerging security threats, affect the evolution of transatlantic relations. Second, exploring the climate security interactions between the EU and NATO, which mainly consist of the world's major developed countries, will help predict the prospects and implementation results of the global climate security governance system.

II. Literature Review

So far, there are relatively rich research on the security interaction between the EU and NATO, and there is also a relatively systematic analysis of the climate security governance of international organizations such as the EU and NATO.

In the first place, the "Competitive Substitution Theory" believes that the development of the EU's common foreign and security policy will enhance the competitiveness between the EU and NATO in terms of strategic functions, strategic assets, strategic space, etc., and will profoundly challenge the dominant position of the United States and NATO in the European security system. First, the enhancement of the EU's defence capabilities will not only enhance the voice of European countries within NATO but will also intensify the identity politics of NATO member states, thereby weakening NATO's unity and effectiveness.[13] Second, the overlapping functions of the EU and NATO will intensify the competition between the two in areas such as allocation of organizational assets and dominance of security operations, and the "double eastward expansion" will further increase the intensity of competition between them.[14] Third, increased European political and defence

[13] Stanley R. Sloan, *NATO, the European Union, and the Atlantic Community: the Transatlantic Bargain Challenged*, (Rowman & Littlefield Publisher, Inc, 2005); Barry R. Posen, "European Union Security and Defense Policy: Response to U nipolarity?" *Security Studies* 15, no.2 (2006): 149-186, https://doi.org/10.1080/09636410600829356.

[14] Anne Deighton, "The European Security and Defence Policy," *JCMS* 40, no.4 (2002): 719-741, https://doi.org/10.11

cooperation is a response to U.S. unilateralism and hegemonic advantage, which will weaken U.S. control over European security and may reshape the transatlantic partnership.[15]

Next, the "Balanced Cooperation Theory" believes that the similarities between the United States and Europe will consolidate the cornerstone of security cooperation between the EU and NATO. In the future, the two organizations will form a new security framework through cooperation, thereby more effectively maintaining European and international security. First, the development of the EU's common security and foreign policy is not only an important supplement to NATO's defence operations but will also contribute to the prosperity and stability of the United States.[16] Second, the EU and NATO will strengthen division of labour and cooperation in the security field based on similarities such as common values and shortcomings such as limited organizational capabilities, and promote the networking of the European security system and the balance of transatlantic security cooperation.[17]

Furthermore, the "Suspension Theory" believes that the security interaction between the EU and NATO is subject to multiple internal and external factors and is difficult to be attributed to a single nature. The effectiveness of the interaction between the two depends on the comparison of competitive and cooperative forces, exploring the action mechanism of factors affecting the interaction. In general, the development of EU strategic autonomy, the relations and strategic choices among major member states, the policy orientations of countries with single and joint membership, and the overlap of mandates are important

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11/1468-5965.00395; Anand Menon, "Why ESDF is Misguided and Dangerous for the Alliance," in *Defending Europe: the EU, NATO and the Quest for European Autonomy*, ed. Jolyon Howorth and John T.S. Keeler, (Palgrave Macmillan, 2003), 2 03-217; Hanna Ojanen, "The EU's Responsibility for Global Security and Defence," in *A Responsible Europe? Ethical Foun dations of EU External Affairs*, ed. Hartmut Mayer and Henri Vogt, (Palgrave Macmillan, 2006), 36-56.

[15] John R. Schmidt, "Last Alliance Standing? NATO After 9/11," *The Washington Quarterly* 30, no. 1 (2007): 93-106, https://doi.org/10.1162/wash.2006-07.30.1.93; Derek E. Mix, "The European Union: Foreign and Security Policy," *CRS Rep ort for Congress*, (2013): 23-25; Kristin Archick, "The European Union: Questions and Answers," *CRS Report for Congress*, (2017): 8-9.

[16] John Howorth, "Why ESDP is Necessary and Benificial for the Aliance," in *Defending Europe: the EU, NATO and t he Quest for European Autonomy*, ed. Jolyon Howorth and John T.S. Keeler, (Palgrave Macmillan, 2003), 219-235; Calleo, David P. "Transatlantic Folly: NATO vs. the EU," *World Policy Journal* 20, no. 3 (2003): 17–24. http://www.jstor.org/stable /40209872.

[17] Zhu Liqun, *European Security Organizations and Security Structure*, (World Knowledge Press, 2002); Zheng Qiron g, *EU Common Foreign and Security Policy from a Global Perspective*, (World Knowledge Press, 2008); Zhang Ming, "Wh ither the "Strategic Partnership": from the perspective of EU-NATO relations," *Chinese Journal of European Studies*, no. 3 (2009): 52-67; Zhao Huaipu, "Evolvement Logic and Development Trend of Relations Between the EU and the NATO," *Pa cific Journal* 32, no.7 (2024): 27-42; Heinz Gärtner, "European Security, the Transatlantic Link, and the Crisis Management," in *Europe's New Security Challenges*, ed. Heinz Gärtner, Adrian Hyde-Price, Erich Reiter, (Lynne Rienner Publishers, 200 1), 125-148; Alexis Debat, "Looking Down the Road: NATO-EU Relations in the Age of Intelligence and the 'Age of Acces s'," in *NATO and the European Union: New World, New Europe, New Threats*, ed. Hall Gardner (Aldershot: Ashgate, 2004), 107-114; Caja Schleich, "NATO and EU in Conflict Regulation: Interlocking Institutions and Division of Labour," *Journal of Transatlantic Studies* 12, no.2, (2014): 182-205.

factors affecting the security relationship between the EU and NATO.[18] In this context, there are many possibilities for the comparison of security capabilities between the EU and NATO,[19] the sharing of responsibilities and the master-slave relationship in bilateral security interactions.[20] The two organizations are likely to maintain a state of security interaction of "harmony but difference".[21]

Finally, given the transnational nature of climate security risks, countries around the world are increasingly relying on international organizations such as the EU, NATO, and the United Nations to develop solutions to climate security issues. Why, how, and to what extent international organizations can effectively respond to climate security risks has aroused concern. International organizations mainly respond to climate security risks by constructing discourse and participating in governance. On one hand, most international organizations have securitized the climate change, but securitization of climate change cannot ensure effective policy responses.[22] NATO hopes to use securitization of climate change to protect its military forces.[23] The EU emphasizes that the impact of climate change on security is subject to political, social and economic factors.[24] The "knowledge community" of climate security largely dominated the climate security discourse of the EU from the beginning of the 21st century to 2009.[25] The climate refugees, diplomacy and conflict prevention, and the

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[18] Kong Fanwei, *EU and NATO: An Analytical Perspective on Inter-Organizational Relations*, (Nankai University Pres s, 2018); Zheng Chunrong and Wang Xiaotong, "EU-NATO Relations: Trends, Implications and Responses," *Peace and De velopment*, no. 6 (2023): 17-36; Nicole Koening, "The EU-NATO: Towards a Joint Future in Crisis Management?" EU Dipl omacy Papers, achieved 2010, accessed March 29, 2025, https://www.coleurope.eu/sites/default/files/research-paper/edp_11 _2010_koenig_0.pdf; Chris Smith, "EU-NATO Relations," working paper of Euro Broad Map, Nordregio, achieved 2011, a ccessed March 29, 2025, https://shs.hal.science/halshs-00638381/file/EWP_politics_ideology_Eu_NATO.pdf; Ferdinand Gj ana, *The EU-NATO Relations in Post-Cold War Era*, (MCSER and EUSER, 2015); Aghniashvili, Tinatin. "Towards More E ffective Cooperation? The Role of States in Shaping NATO-EU Interaction and Cooperation." *Connections* 15, no. 4 (2016): 67–90. http://www.jstor.org/stable/26326460.

[19] Howorth, Jolyon. "Strategic Autonomy and EU-NATO Cooperation: Squaring the Circle." Egmont Institute, 2017. h ttp://www.jstor.org/stable/resrep06626.

[20] He Qisong, *Building a Fortress—European Joint Defence Research*, (Military Science Press, 2008).

[21] Li Yao, "Changes in the EU Member States' Attitudes towards NATO and CSDP," *Chinese Journal of European St udies* 31, no.4 (2013): 88-107; Zheng Chunrong and Ni Xiaoshan, "The Evolution of EU-NATO Relations and What to Expe ct during the Biden Administration," *Global Review* 13, no.2 (2021): 45-64.

[22] Brzoska, Michael. "The securitization of climate change and the power of conceptions of security," *S&F Sicherheit Und Frieden* 27, no. 3 (2009): 137-145.

[23] Floyd, Rita, "Global Climate Security Governance: A Case of Institutional and Ideational Fragmentation." *Conflict, Security & Development* 15, no. 2 (2015.): 119-146. doi:10.1080/14678802.2015.1034452.

[24] Vogler, John, "Changing Conceptions of Climate and Energy Security in Europe." *Environmental Politics* 22, no. 4 (2013): 627–645, doi:10.1080/09644016.2013.806634; Youngs R, *Climate Change and European Security* (Routledge, 201 5); van Schaik L, Schunz S, "Explaining EU activism and impact in global climate politics: Is the union a norm- or interest-d riven actor?" *Journal of Common Market Studies* 50, no.1 (2012):169–186, https://doi.org/10.1111/j.1468-5965.2011.02214.x; Geddes, Andrew, "Governing Migration from a Distance: Interactions bet ween Climate, Migration, and Security in the South Mediterranean." *European Security* 24, no. 3 (2015): 473–490, doi:10.10 80/09662839.2015.1028191.

[25] Zwolski, Kamil, and Christian Kaunert, "The EU and Climate Security: A Case of Successful Norm Entrepreneurshi

integration of climate and energy security are the main content of the climate security discourse of the EU.[26] On the other hand, many international organizations have established formal institutions or rule systems formed in informal institutions to address climate security risks, but the politicization of climate change and the fragility of the resource endowments of the international organizations have partially hindered the effectiveness of climate security actions. NATO focuses on promoting the military forces of its member states to adapt to climate change in order to address potential security risks,[27] while the EU has developed a more comprehensive climate security policy based on the European External Action Service.[28] Integrated governance is becoming an important means for international organizations to address climate security risks, committed to promoting cross-community learning, building a common understanding of key concepts and enriching expertise across policy areas.[29] Among them, there is potential for integrated governance between NATO and the EU, and policy makers from these organizations acknowledge the importance of one another in the management of climate security risks.[30]

However, the above research has shortcomings in dealing with the EU-NATO climate security interaction. On the one hand, the "Competitive Substitution Theory", "Balanced Cooperation Theory" and "Suspension Theory" all mainly explore the interaction and bilateral relations between the EU and NATO from the perspective of traditional security, and

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p?" *European Security* 20, no. 1 (2011): 21–43, doi:10.1080/09662839.2010.526108.

[26] Youngs R, *Energy security: Europe's new foreign policy challenge* (Routledge; 2009); Strambo C, Nilsson M, Måns son A, "Coherent or inconsistent? Assessing energy security and climate policy interaction within the European Union," *Ene rgy Research & Social Science* 8 (2015):1–12, https://doi.org/10.1016/j.erss.2015.04.004; Umbach, Frank, "The Intersection of Climate Protection Policies and Energy Security," *Journal of Transatlantic Studies* 10, no. 4 (2012): 374–387, doi:10.108 0/14794012.2012.734672..

[27] Floyd, Rita, "Global Climate Security Governance: A Case of Institutional and Ideational Fragmentation." *Conflict, S ecurity & Development* 15, no. 2 (2015.): 119-146. doi:10.1080/14678802.2015.1034452; Sun Chenghao and Wang Yinuo, "NATO's Climate Security Agenda: Green Transformation within the Collective Security Framework," *International Forum* 25, no.6 (2023): 72-91.

[28] De Jong S, Schunz S, "Coherence in European Union external policy before and after the Lisbon Treaty: The cases o f energy security and climate change," *European Foreign Affairs Review* 17, no. 2 (2012):165–187, https://doi.org/10.54648/ eerr2012020; Zhang Rui and Kou Jingna, "The Evolutionary Logic of Global Climate Security Governance: An Empirical A nalysis of the United Nations and the European Union," *International Forum* 23, no.3 (2021): 18-37; Zhou Yijiang, "The Ev olution and Directions of the EU Climate Security Agenda in the Context of Climate Geopolitical Competition and Cooperat ion," *Russia, East European and Central Asian Studies*, no.3 (2024): 139-161; Frank Wendler, *Framing Climate Change in t he EU and US after the Paris Agreement*, (Springer Nature Switzerland AG, 2022).

[29] Bauer S. Stormy, "Weather: International security in the shadow of climate change," In *Coping with Global Environ mental Change, Disasters and Security*, eds. Brauch HG, Oswald Spring Ú, Mesjasz C, Grin J, Kameri-Mbote P, Chourou B, Dunay P. Birkmann J (Springer, 2011), 719–733; Kelman I, "Climate change and the Sendai framework for disaster risk red uction," *International Journal of Disaster Risk Science* 6 (2015):117–127, https://doi.org/10.1007/s13753-015-0046-5; Tyler H. Lippert, *NATO, Climate Change, and International Security—A Risk Governance Approach*, (Springer Nature Switzerlan d AG, 2019).

[30] Elina Ankler, "Climate Security Synergies? —Investigating the Policy Response of the EU and NATO," (Bachelor Thesis, Uppsala University, 2023).

rarely pays attention to the impact of emerging and low-political issues such as climate change on the interaction between the EU and NATO. On the other hand, research on the EU and NATO's respective climate security agendas and actions only points out that the relevant process will affect the development of transatlantic relations but does not explore the specific impact paths and mechanisms in depth, especially seldom touch the national factors at the member states level. Thus, there's still no answer to one essential question: **Whether and how climate security issues, as a low-political topic, enhance cooperation between the EU and NATO**?

III. Research Objectives and Content

This dissertation is based on the analytical framework of institutional interplay, first analyses relevant empirical facts of EU and NATO climate security actions before January 2025, and then judge the nature of EU-NATO climate security interactions.

The content of this dissertation mainly includes four parts: First, the background and content of EU-NATO climate security interaction. This section will sort out the development of the EU and NATO's own climate security agenda and actions, and then explore the main content and characteristics of their climate security governance. Second, the international institutional theory and the analytical framework of institutional interplay. This section will focus on sorting out the research of representative scholars of international institutional theory on institutional interplay and summarize the main factors and mechanisms that affect the interaction between overlapping international organizations, especially in the field of climate security. Third, based on the analysis framework of overlapping institutional interplay mentioned above, this section will further explore the mechanism which the degree of interest alignment among major member states, the overlap of crisis management functions, and the overlap of special member states affect the EU-NATO climate security interaction, and then analyse the nature of the EU-NATO climate security interaction. Fourth, the future of EU-NATO climate security interaction. As the new Trump administration has taken multiple measures to undermine transatlantic relations and global climate governance actions, this section will briefly explore the possible direction of EU-NATO climate security interaction after January 2025 based on the analytical framework of institutional interplay.

IV. Methodology and Innovation

This dissertation will apply a qualitative case-study approach, with case studies being the EU and NATO. Case-study approach is "a research strategy based on the in-depth

empirical investigation of phenomena to explore the configuration of each case and to elucidate features of a larger class of phenomena by developing and evaluating theoretical explanations",[31] and Vennesson divides it into four types, namely descriptive, interpretative, hypothesis-generating and theory evaluating. This dissertation will apply the interpretive one, which "uses theoretical frameworks to provide an explanation of particular cases".[32] On this basis, this dissertation will further apply two methods to proceed the interpretive case-study approach.

Historical analysis method. Historical analysis is the examination of evidence in coming to an understanding of the past. This dissertation will sort out the evolution of the EU and NATO's climate security agenda based on a long historical period, focusing on analysing the phased characteristics of the climate security governance of the two organizations, and then study the EU-NATO climate security interaction.

Document analysis method. This dissertation will analyse documents both from primary and secondary sources, such as official documents, statements, press releases, media publications, speeches and academic articles of the EU, NATO and their major member states. It will not only refer to the conferences outcomes and official reports of the two organizations when analysing the climate security goals and mechanisms of the EU and NATO, but also refer to relevant national security strategy reports when exploring the climate security interests and policies of the United States, France, Germany and the United Kingdom. It will also refer to the legal texts of the two organizations when discussing the crisis management functions of the EU and NATO. All will be examined in chronological order.

There are mainly two kinds of innovation in this dissertation: First, by comprehensively combing the development of the EU and NATO climate security agenda, the main areas and core characteristics of EU-NATO climate security interaction are proposed. Second, from the perspective of the overlapping institutional interplay, the mechanism of EU-NATO climate security interaction is analysed in a systematic manner.

[31] Vennesson, P, *Case Studies And Process Tracing: Theories And Practices*, (Cambridge University Press, 2008), 226.
[32] Vennesson, P, *Case Studies And Process Tracing: Theories And Practices*, (Cambridge University Press, 2008), 226.

Chapter 1 Analytical Framework of the EU-NATO Climate Security Interaction

Before looking at the specific EU-NATO climate security interaction, it's essential to understand the development of climate security agenda of the EU and NATO respectively as well as the research design based on the institutional interplay theory. NATO recognized the environmental challenges for the first time in 1969 and gradually turns more attention to the climate security risks since 21st century. However, it pays more attention to adaptation rather than mitigation to the climate change, its approach to the climate agenda is highly securitized, which makes the measures developed by NATO to ensure climate security are always secondary to its political and military objectives.[33]Compared to NATO, the EU attached the importance to climate change challenges much earlier and has the stronger ambition as well as more solid strategic and policy support. On this basis, the theory of institutional interplay gives us a comprehensive and appropriate perspective to investigate the interaction between NATO and the EU in this field, which values the role of organizational functions as well as national preference and choice.

1.1 The Evolution of The EU Climate Security Agenda Since The End of The 20th Century

The EU promotes international security through regional integration and effective multilateralism.[34] After the 1990s, climate change gradually became a high-profile international political issue. As climate change intensively damages the ecological environment of Europe, the need to ensure energy security and maintain economic development expands, and secondary actors within the organization actively promote, the EU has gradually regarded climate change as a security risk and improved its response measures.

From the 1990s to 2007, the EU actively engaged in climate security debates and explored the security impacts of climate change, aiming at including climate change in its security agenda. In 1999, the European Parliament began to discuss climate security issues and produced a final report aimed at paying attention to and strengthening the response to climate security risks.[35] Subsequently, the EU not only released its first European Security

[33] Timakova, O. A, ""Green" Security: NATO's Climate Change Adaptation Strategy," *Vestnik RUDN. International R elations 25,* no.1 (2025): 107, doi: 10.22363/2313-0660-2025-25-1-98-108.

[34] Anniek Barnhoorn, "Comparing responses to climate-related security risks among the EU, NATO and the OSCE," S tockholm International Peace Research Institute, April 2023, 12.

[35] "Report on the Environment, Security and Foreign Policy," European Parliament, achieved January 14, 1999, access ed March 29, 2025, https://www.europarl.europa.eu/doceo/document/A-4-1999-0005_EN.html.

Strategy in 2003, emphasizing that climate change is a security issue that must be addressed, otherwise it will trigger competition for scarce resources,[36] but also released the Green Paper "Europe's Adaptation to Climate Change" in 2007, calling for the integration of climate adaptation policies into the Community's conflict prevention plan for natural resources caused by climate change.[37] This showed that the EU was paying more and more attention to climate security and the potential threats which the climate change may pose to the development of the Community and its member states.

From 2008 to 2018, the EU integrated climate security policies and improved the climate security governance framework, aiming at strengthening climate security capacity. In 2008, the EU called on member states to strengthen civil and military capabilities, improve early warning capabilities, and maintain international cooperation to respond to climate security threats, marking the beginning of its efforts to integrate EU climate security tools at the community level.[38] In 2012, the European Parliament passed a resolution calling on the High Representative of the European Union for Foreign Affairs and Security Affairs and the European Commission to incorporate climate change into the external action strategy, financial instruments and common security and defence design of the EU.[39] Subsequently, the EU not only listed climate change as an important factor in early warning, conflict prevention, crisis response and management, post-conflict recovery, peacebuilding, and migration management in 2013,[40] but also proposed in 2015 a master plan for building a resilient energy union aimed at overcoming the energy security risks caused by climate change,[41] and in 2016

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[36] "A Secure Europe in a Better World," Council of the European Union, achieved June 20, 2003, accessed March 29, 2025, https://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/reports/76255.pdf.

[37] "Green Paper: Adapting to Climate Change in Europe—Options for EU Action," European Commission, achieved J une 29, 2007, accessed March 29, 2025, https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0354:FIN:en: PDF.

[38] Hannes SonnsjÖ, Niklas Bremberg, "Climate Change in an EU Security Context: The Role of the European External Action Service," Stockholms Universitet, achieved 2016, accessed March 29, 2025, https://www.statsvet.su.se/polopoly_fs/ 1.295524.1473162984!/menu/standard/file/Sonnsjo%CC%88%20&%20Bremberg,%20Climate%20change%20in%20an%2 0EU%20security%20context,%202016.pdf.

[39] Cao Hui and Zhao Chen, "Climate security research: From the perspective of the European Union," *Expanding Hori zons*, no. 1 (2017): 123.

[40] "Climate Change, Environmental Degradation and Migration," EUR-Lex, achieved April 16, 2013, accessed March 29, 2025, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=swd:SWD_2013_0138; "Joint Communication to the Europe an Parliament and the Council, The EU's Comprehensive Approach to External Conflicts and Crises," EUR-Lex, achieved D ecember 11, 2013, accessed March 29, 2025, https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52013JC003 0.

[41] "A Framework Strategy for a Resilient Energy Union with a Forward—Looking Climate Change Policy," EUR-Lex, achieved February 25, 2015, accessed March 29, 2025, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52015 DC0080.

clarified a comprehensive approach to addressing climate security risks in multiple directions such as development, diplomacy, and defence.[42]

Since 2019, the EU has been redefining the meaning of climate security and giving geostrategic importance to climate security actions, aiming at increasingly elevating the strategic status of climate security action. In 2019, the EU not only historically raised the priority of climate issues by proposing the goal of achieving climate neutrality by 2050,[43] but also made it clear that more conflict prevention tools would be used to address climate security risks.[44] In 2021, the EU decided to integrate climate change and security concerns across all relevant policy domains,[45] which showed its strong will to deal with climate security issues under foreign, security and defence strategy. In 2020 and 2022, the EU systematically assessed the progress of member states in improving climate and environmental capabilities, reducing carbon emission from military data collection, and improving military energy efficiency,[46] and pointed out future directions for action and set up regular regulatory positions.[47] In June 2023, the European Commission and the High Representative issued a joint communication on how to better respond to the impact of climate change in the EU's foreign policy, with a focus on defence,[48] and the 2025 progress report showed great achievements across all four pillars of the joint communication.[49] This highlights that the EU is paying more and more attention to climate security policy and sees it as a key tool to contribute to peacebuilding and enhance its international competitiveness and influence.

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[42] "Shared Vision, Common Action: A Strong Europe—A Global Strategy for the European Union's Foreign and Security Policy," EEAS, achieved June 2016, accessed March 29, 2025, https://www.eeas.europa.eu/sites/default/files/eugs_review_web_0.pdf.

[43] "Communication on the European Green Deal," European Commission, achieved December 11, 2019, accessed March 30, 2025, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52019DC0640.

[44] "Council Conclusions on Security and Defence in the Context of the EU Global Strategy-Council Conclusions," Council of the European Union, achieved June 17, 2019, accessed April 1, 2025, https://www.consilium.europa.eu/media/39786/st10048-en19.pdf.

[45] "Concept for an integrated approach on climate change and security," Council of the EU, achieved October 5, 2021, accessed April 11, 2025, https://data.consilium.europa.eu/doc/document/ST-12537-2021-INIT/en/pdf.

[46] "The EU's Climate Change and Defence Roadmap," EEAS & European Commission, achieved March 2022, accessed April 1, 2025, https://www.eeas.europa.eu/sites/default/files/documents/2022-03-28-ClimateDefence-new-Layout.pdf.

[47] "A Strategic Compass for Security and Defence," EEAS, achieved March 2022, accessed April 1, 2025, https://www.eeas.europa.eu/eeas/strategic-compass-security-and-defence-1_en.

[48] "EU proposes comprehensive new outlook on threats of climate change and environmental degradation on Peace, Security and Defense," European Commission, achieved June 28, 2023, accessed April 1, 2025, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3492.

[49] "Joint Staff Working Document: Progress Report on the Implementation of the Joint Communication— 'A New Outlook on the Climate and Security Nexus'," European Commission, achieved February 17, 2025, accessed June 1, 2025, https://data.consilium.europa.eu/doc/document/ST-6321-2025-INIT/en/pdf.

1.2 The Formation of NATO Climate Security Agenda Since The Beginning of The 21st Century

NATO promotes international security through military cooperation and deterrence.[50] Climate change not only directly affects military operations at home and abroad, but also increases security pressure by exacerbating social tensions, raising the risk of conflict and accelerating migration.[51] Therefore, NATO has gradually acknowledged that climate change is connected with its organizational goals and functions, paid attention to and responded to the security impact of climate change and formulated and improved its own climate security agenda.

From 2007 to 2009, NATO started to work on climate security governance, aiming at shaping collective understanding of climate security at the organizational level. In 2007, the NATO Parliamentary Assembly issued a special report entitled "Climate Change: Thinking Beyond the Kyoto Protocol", which expressed NATO's basic position and concerns about the security significance of global warming, called on all countries to take positive action and emphasized that NATO should play a role in global climate security governance.[52] The 2009 NATO summit recognized for the first time that other challenges, such as energy security and climate change, could also have adverse effects on allies and international security.[53] This marks that NATO's long-standing concern for environmental security has begun to specifically focus on the emerging issue of climate change, and responding to climate security risks is gradually becoming an independent and critical task for NATO in the field of environmental governance.

From 2010 to 2020, NATO's climate security governance was institutionalized, it focused on building a climate security governance framework. "Climate change" was first listed as one of the security risks in NATO's strategic concept in 2010.[54] In the same year, the United States pushed NATO to establish an Emerging Security Challenges Department and prepare for the establishment of a "Green Defense Framework", and formally adopted the above framework in 2014, making emission reduction measures such as improving military

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[50] Anniek Barnhoorn, "Comparing responses to climate-related security risks among the EU, NATO and the OSCE," S tockholm International Peace Research Institute, April 2023, 12.

[51] Louise van Schaik, "Climate Security at NATO: Looking Beyond Today's Wars," *IAI*, July 29, 2024, https://www.ia i.it/en/pubblicazioni/c05/climate-security-nato-looking-beyond-todays-wars.

[52] Li Yongcheng, "The History and Characteristics of NATO's Environmental Security Strategy," *International Inform ation*, no. 2 (2009): 17.

[53] "Declaration on Alliance Security," NATO, achieved April 4, 2009, accessed April 1, 2025, https://www.nato.int/cp s/en/natohq/news_52838.htm.

[54] "Active Engagement, Modern Defense," NATO, achieved November 19, 2010, accessed April 1, 2025, https://www. nato.int/cps/en/natohq/official_texts_68580.htm.

energy efficiency and investing in green technologies an important concern.[55] In 2015, NATO adopted a resolution on "Climate Change and International Security", clarifying that climate change has a significant impact on the security of the alliance.[56] Subsequently, during the 2019 summit, NATO proposed the NATO 2030 initiative to reiterate the above position,[57] continuously consolidating and emphasizing NATO's determination and will to safeguard collective security by strengthening its ability to respond to climate change. This has greatly promoted the construction of NATO's institutional framework for ensuring climate security and laid a solid foundation for the formation of NATO's climate security agenda.

Since 2021, NATO has been in the process of formulating and improving its climate security governance agenda, aiming at implementing a collective action plan for climate security. In March 2021, the Biden administration pushed for the approval of NATO's climate change and security agenda. In June, the NATO summit announced that climate change would be regarded as a "threat multiplier" for alliance security,[58] proposed to become the first international security actor to reduce CO2 emission by at least 45% by 2030 and to achieve net-zero emission by 2050, and officially launched the "Climate Change and Security Action Plan" (CCSAP).[59] Firstly, NATO would conduct and annual climate change and security impact assessment, and would support research on the impact of climate change on security with its science and technology programmes. Secondly, NATO would not only incorporate climate change considerations into its work on resilience, civil preparedness, defence planning, capability delivery, assets and installations, standards, innovation, training, exercises and disaster response, but adapt its capabilities more prominently in its procurement practices and partnerships with industry. Thirdly, NATO would contribute to climate change mitigation by designing tool for mapping greenhouse gas emission from military activities and installations. Fourthly, NATO would improve outreach with international organizations such as the EU and civil society actors to contribute to the global response to climate change.[60] It is also worth noting that this is the first time that NATO recalibrated its priorities

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[55] "NATO and its Partners Become Smarter on Energy," NATO, achieved April 7, 2015, accessed April 1, 2025, https://www.nato.int/cps/en/natohq/news_118657.htm.

[56] Caitlin Werrelland and Francesco Femia, "NATO Parliamentary Assembly on Climate Change and International Security," the center for climate and security, April 13, 2015, https://climateandsecurity.org/2015/04/nato-parliamentary-assembly-on-climate-change-and-international-security/.

[57] "NATO 2030," NATO, achieved June 2021, accessed April 1, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2021/6/pdf/2106-factsheet-nato2030-en.pdf.

[58] "Brussels Summit Communiqué," NATO, achieved June 14, 2021, accessed April 1, 2025, https://www.nato.int/cps/en/natohq/news_185000.htm?selectedLocale=en.

[59] "NATO Climate Change and Security Action Plan," NATO, achieved June 14, 2021, accessed April 1, 2025, https://www.nato.int/cps/cn/natohq/official_texts_185174.htm.

[60] Immacolata Ciotta, "NATO and Climate Change: a crossroads between adaptation and awareness," *European Army Interoperability Centre*, July 26, 2022, https://finabel.org/nato-and-climate-change-a-crossroads-between-adaptation-and-aw

by placing, both the political and military sides in agreement "on the marching order" to keep the climate issue very high on the agenda, which would avoid downgrading it compared to other security issues.[61] Since then, NATO has released three assessment reports in 2022, 2023 and 2024, and gradually transformed its defence and security initiatives to meet the needs of climate governance and green development.[62] On this basis, NATO fully incorporates climate change into the alliance security architecture and forms a climate security agenda, opening a new and strong development stage of NATO's climate security governance.

1.3 Theoretical Framework For EU-NATO Climate Security Interaction

The overlapping international organizations are those organizations who have overlap in terms of membership, mandate and resources,[63] describing situations in which institutions partly intersect in many cases accidentally.[64] The highly overlapping membership and systematic organizational cooperation mechanism make the interaction between the EU and NATO suitable for the framework of overlapping institutional interplay theory, while the transnational, long-term, systematic and interactive nature of climate security issues requires joint responses from countries and international organizations. On this basis, this dissertation hopes to apply a two-level analytical framework that considers both national and organizational factors to systematically explore the climate security interaction between the EU and NATO, and to judge the nature and future of the EU-NATO climate security interaction.

1.3.1 The Institutional Interplay Theory and Global Environmental Governance

Institutional interplay refers to situations in which the operation, performance and development of one institution is affected by another institution.[65] International institutional

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areness/.

[61] Immacolata Ciotta, "NATO and Climate Change: a crossroads between adaptation and awareness," *European Army Interoperability Centre*, July 26, 2022, https://finabel.org/nato-and-climate-change-a-crossroads-between-adaptation-and-awareness/.

[62] "Climate Change & Security Impact Assessment," NATO, achieved June 2022, accessed April 1, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/280622-climate-impact-assessment.pdf; "NATO Climate Change and Security Impact Assessment," NATO, achieved July 2023, accessed April 1, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2023/7/pdf/230711-climate-security-impact.pdf; "NATO Climate Change and Security Impact Assessment," NATO, achieved July 2024, accessed April 1, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2024/7/pdf/240709-Climate-Security-Impact.pdf.

[63] Hofmann, S. C., "Why Institutional Overlap Matters: CSDP in the European Security Architecture," *Journal of Common Market Studies* 49, no. 1 (2011): 103.

[64] Brosig, M, "Overlap and Interplay between international organizations: theories and approaches," *South African Journal of International Affairs* 18, no. 2 (2011): 155.

[65] Sikina Jinnah, "Overlap Management in the World Trade Organization: Secretariat Influence on Trade-Environment Politics," *Global Environmental Politics* 10, no. 2 (2010): 54–79, doi: https://doi.org/10.1162/glep.2010.10.2.54; Oberthür, S., & Stokke, O. S, *Managing Institutional Complexity: Regime Interplay and Global Environmental Change* (MIT Press, 2011).

interplay is a frontier research field in international institutional theory, mainly describing the mutual influence between the international institutions. Scholars such as Oran Young, Olav Schram Stokke, Sebastian Oberthür and Thomas Gehring have made comprehensive and profound discussions on this issue.

Firstly, based on the level of interaction, Oran Young divides institutional interplay into two categories: vertical linkages and horizontal linkages. The former focuses on the relationship between institutions operating at different levels of social organization, while the latter emphasizes the relationship between institutions operating at the same level of social organization. Among them, horizontal linkages in the international community can be divided into four categories according to the form of interplay: embedded mechanisms, nested mechanisms, clustered mechanisms, and overlapping mechanisms.[66] On this basis, Oran Young further explores the vertical interplay and horizontal interplay logic of international institutions. As for the former, political will, power, matching and material capabilities affect the effectiveness of member states in implementing international mechanisms. As for the latter, one type is "cooperation to achieve common goals", in which cognitive experience, organizational functions and interest preferences of key actors affect the formation and operation process of institutional connections; the other type is "competition to safeguard one's own interests", in which institutional occupation, institutional transformation and institutional integration are the main strategic choices for actors to participate in institutional interplay.[67]

Secondly, Olav Schram Stokke mainly discussed the institutional interplay from the perspective of mechanism effectiveness and divided institutional interplay into three categories: Utilitarian Interplay, Normative Interplay and Ideational Interplay.[68] Specifically, Utilitarian Interplay emphasizes that the rules and procedures of one mechanism change the costs and benefits of the choices of actors in another mechanism. Cost-efficiency, externalities, and competition affect the utilitarian interplay process; Normative Interplay emphasizes that one mechanism can influence the "normative push" result of another mechanism by confirming or contradicting its norms. Determinacy, coherence, and procedural validity affect the normative interplay process; Ideational Interplay emphasizes

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[66] Oran R. Young, *Governance in World Affairs*, trans. Chen Yugang and Bo Yan, (Shanghai People's Publishing Hou se, 2007), 155-174.

[67] Oran R Young, *the Institutional Dimensions of Environmental Change: Fit, Interplay, and Scale*, (MIT Press, 2002), 83-138.

[68] Olav Schram Stokke, "The Interplay of International Regimes: Putting Effectiveness Theory to Work," FNI Report 1 4, Fridtjof Nansen Institute, 2001, 5-23.

mutual learning between mechanisms by enhancing the "cognitive prominence" of specific issues or behavioural choices, mainly through increasing attention and diffusing successful solutions of the mechanism.

Finally, Sebastian Oberthür and Thomas Gehring focused on comparative studies of institutional interplay, arguing that institutional interplay is a causal relationship between source institutions and target institutions, and can therefore be divided into three levels of interplay: output, outcome, and impact, specifically manifested in cognitive interplay, commitment interplay, behavioural interplay, and functional interplay.[69] Cognitive interplay emphasizes that the information, knowledge and opinions generated by the source institution affect the decision-making process in the target institution by changing decision makers' cognition. Commitment interplay emphasizes that the commitment of actors in the source institution affects the decision-making process in the target institution by changing actors' preferences. Behavioural interplay emphasizes that the source institution affects the effectiveness of the target institution by causing behavioural effects in a certain problem area. Functional interplay emphasizes that the behavioural effects within the source institution affect the governance objectives and effectiveness of the target institution by changing the organizational governance results.[70]

In the field of global environmental governance, existing research pays great attention to the types and dimensions, pathways and effects, fragmentation and complexity of institutional interplay at the international level. First, horizontal interplay among international organizations may improve the transparency, legitimacy and efficiency of environmental governance by integrating multilateral environmental agreements,[71] but the interplay between international mechanisms with overlapping jurisdictions is more complicated.[72] The effectiveness of vertical interplay among international organizations depends largely on the domestic politics of member states and specific regional institutions.[73] Second, interplay management among international organizations can promote mutual respect for specific

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[69] Sebastian Oberthür and Thomas Gehring, *Institutional Interaction in Global Environmental Governance: Synergy a nd Conflict Among International and EU Policies*, (MIT Press, 2006), 22-46.

[70] Kong Fanwei, "Institutional Interplay: a New Area for Analysis of International Institution," *International Review*, n o.3 (2009): 48-49.

[71] Oberthür, S, "Clustering of Multilateral Environmental Agreements: Potentials and Limitations," *International Envir onmental Agreements: Politics, Law and Economics* 2 (2002): 317–340, https://doi.org/10.1023/A:1021364902607.

[72] Stokke, O. S, "Trade Measures and Climate Compliance: Institutional Interplay Between WTO and the Marrakesh A ccords," *International Environmental Agreements: Politics, Law and Economics* 4 (2004): 339–357, https://doi.org/10.1007/ s10784-004-2471-6.

[73] Skjærseth, J. B, "Managing North Sea Pollution Efectively: Linking International and Domestic Institutions," *Intern ational Environmental Agreements: Politics, Law and Economics* 3, no. 2 (2003): 167–190, https://doi.org/10.1023/A:10248 65728762; Stokke, O. S, "Regime interplay in Arctic shipping governance: Explaining regional niche selection," *Internation al Environmental Agreements: Politics, Law and Economics* 13 (2013): 65–85, https://doi.org/10.1007/s10784-012-9202-1.

environmental requirements by promoting inter-organizational learning, thereby improving the efficiency of environmental governance and enhancing the consistency of the environmental governance system.[74] Third, the fragmentation of global environmental governance may reduce regulatory competition and inter-organizational conflict,[75] but it may also exacerbate the problem of institutional adaptability and weaken governance effectiveness and legitimacy.[76]

1.3.2 The Mechanism of The EU-NATO Climate Security Interaction

Considering the existing research on international institutional interplay and the nature of climate security governance, the degree of interest alignment of major member states of international organizations, the overlap of organizational functions and the overlap of organizational members affect the interactions among overlapping international organizations with respect to climate security. In terms of interest alignment, on the one hand, a country's ideas on a certain issue shape its national interests. The degree of alignment of major national interests determines the consistency or divergence between the goals of international organizations, and thereby affects the interplay between international organizations. On the other hand, when an international organization prepares for organizational interaction, major countries choose occupation strategy, substitution strategy or integration strategy based on their own interests, and their organizational strategy choices lead to cooperation or competition among international organizations. In terms of functional overlap, on the one hand, whether the resource interplay between international organizations is balanced affects the interplay between international organizations. On the other hand, whether the normative interplay between international organizations improves the legitimacy of the organizations, reduces the operating costs of the organizations, and improves the operating efficiency of the organizations affects the nature of the interplay between international organizations. In terms of the overlapping membership, the degree of overlap is positively correlated with the tendency of cooperation among international organizations, and mainly affects that by amplifying or reducing the degree of interest fit between member states.

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[74] Oberthür, S, "Interplay management: Enhancing environmental policy integration among international institutions," *International Environmental Agreements: Politics, Law and Economics* 9 (2009): 371–391, https://doi.org/10.1007/s10784-009-9109-7.

[75] Gehring, T, "The Institutional Compels of Trade and Environment: Toward an Interlocking Governance Structure and a Division of Labor," In *Managing Institutional Complexity: Regime Interplay and Global Environmental Change,* eds. S. Oberthür & O. S. Stokke (MIT Press, 2011), 227–254.

[76] Moltke, K., & v., & Mann, H, "Misappropriation of Institutions: Some Lessons from the Environmental Dimension of the NAFTA Investor-State Dispute Settlement Process," *International Environmental Agreements: Politics, Law and Economics* 1 (2001): 103–119, https://doi.org/10.1023/A:1010122011573; Hackmann, B, "Analysis of the governance architecture to regulate GHG emissions from international shipping," *International Environmental Agreements: Politics, Law and Economics* 12 (2012): 85–103, https://doi.org/10.1007/s10784-011-9155-9.

To answer why there are both cooperation and competition in the EU-NATO climate security interaction and whether the climate security interaction can improve the cooperation between the EU and NATO, this dissertation will further divide the international organizations interplay into different categories and specify relevant operationalisation (**Table 1**). First, "Full Cooperation" means that the interests of major countries coincide with each other, leading to the consistency of the goals of international organizations, and major countries tend to adopt organizational integration strategies. At the same time, the two organizations are not only resource-balanced and complementary, but also have consistent main rules and their interplay helps to enhance the certainty and legitimacy of the rules of each organization. Second, "Competitive Cooperation" means that the interests of major countries coincide with each other, leading to the consistency of the goals of international organizations, and major countries tend to adopt organizational integration strategies. However, there is resource competition and rule differences between the two organizations, and their interaction leads to a decline in the legitimacy of each other. But if resource competition and rule differences do not exist at the same time, the two organizations are in a "Low-Competitive Cooperation". Third, "Cooperative Competition" refers to the divergence of interests between major countries that leads to divergence of goals of international organizations, and major countries tend to adopt organizational occupation strategy or organizational substitution strategy. However, the balance and complementarity of resources between the two organizations and the consistency of major rules promote their mutual enhancement in organizational functions. Similarly, if resource complementarity and rule consistency do not exist at the same time, the two organizations are in a "Low-Cooperative Competition". Fourth, "Full Competition" means that the divergence of interests among major countries leads to divergence of goals of international organizations, and major countries tend to adopt organizational occupation strategy or organizational substitution strategy. At the same time, the two organizations not only have low resource complementarity and interdependence, but also have conflicting major rules and their interaction leads to a decline in the legitimacy of each other. As an important intervening variable, the higher the degree of overlap of member states, the more aligned the interests of the common member states of the two organizations are and the more inclined they are to adopt an organizational integration strategy, thereby promoting inter-organizational cooperation.

Table 1 Analytical Scheme

	The interest and strategy of major countries	Resource of the organizations	Norms of the organizations	Overlap of member states	Whether improve the cooperation between organizations?
Full Cooperation	coincide; organizational integration strategies	balanced and complementary	consistent	the higher the degree, the more cooperation	Yes
Low-Competitive Cooperation	coincide; organizational integration strategies	competitive (or balanced and complementary)	consistent (or different)		
Competitive Cooperation	coincide; organizational integration strategies	competitive	different		
Cooperative Competition	diverge; organizational occupation strategy or organizational substitution strategy	balanced and complementary	consistent		No
Low-Cooperative Competition	diverge; organizational occupation strategy or organizational substitution strategy	competitive (or balanced and complementary)	consistent (or different)		
Full Competition	diverge; organizational occupation strategy or organizational substitution	competitive	different		

	strategy				

According to the above framework, this dissertation will further figure out the cases used as the independent variables to explain the EU-NATO climate security interaction (**Table 2**). Firstly, since the European Armed Forces have not been subject to binding obligations under EU law or NATO constitutive instruments, the leadership of member states is essential in promoting climate security cooperation between the EU and NATO.[77] Among them, the United States, France, Germany, and the United Kingdom, especially, play a key role in coordinating relations between the EU and NATO and are also the main actors influencing EU-NATO climate security interactions. On the one hand, these countries were among the first countries to recognize the security impact of climate change and actively improve their national strategies to address climate security issues. The climate security cognition and interest preferences of these countries affect the progress of the EU and NATO in promoting climate security goals and their interactions in this area by changing the institutional agenda, resource allocation, mechanism setting and integration. On the other hand, as the importance of climate security issues has been accelerated and the "alliance" trend of the two organizations has become more and more obvious since 2021, these major member states are stepping up efforts to push the EU and NATO to debug and formulate the feasibility and methods of organizational cooperation on climate security issues under the traditional European security framework.

Table 2 Cases of the Independent Variables

	Major member states	**Organizational function**	**Overlapped member states**
Cases	Non-common members: United States, United Kingdom	Crisis Management	Eastern European member states
	Common members: France, Germany		Northern European member states

Secondly, since the EU and NATO both see climate security as internal and external risks, [78] they have common ground in strengthening climate security cooperation in the

[77] Anniek Barnhoorn, "Comparing responses to climate-related security risks among the EU, NATO and the OSCE," S tockholm International Peace Research Institute, April 2023, 37.

[78] Anniek Barnhoorn, "Comparing responses to climate-related security risks among the EU, NATO and the OSCE," S

institutional level. For the EU, climate security has often linked to external action through the CFSP and CSDP, and the EEAS, the European Commission and its Directorate Generals, such as DG INTPA, DG CLIMA, DG ECHO and DG DEFIS, are main actors addressing climate security risks.[79] For NATO, the Office of the Secretary General and its Policy Planning Unit are responsible for the organization's long-term vision for the climate security agenda, while the Climate Change and Energy Security Section of the Emerging Security Division deals with the operationalization of the agenda.[80] Crisis management is the main common function of the EU and NATO, strengthening crisis management exercises helps the two organizations improve their resilience and preparedness. For a long time, the EU and NATO have been following the Parallel and Coordinated Exercises (PACE) implementation plan to participate in each other's crisis management exercises in different fields in a reciprocal manner. Given that climate change can trigger regional crises and even conflicts by generating large numbers of climate refugees, the compatibility and coordination of the EU and NATO's crisis management decision-making bodies, principles and procedures, as well as the military resources and the use of force will affect the climate security interaction between the two organizations.

Finally, the multiple enlargements of the EU and NATO in history have given rise to many common member states, and the common membership of the two organizations may continue to increase in the future. Since 1990, both the EU and NATO has experienced the largest enlargement, mainly including the former Soviet Union countries and Nordic countries.[81] (**Table 3**) Among them, the former is considered a laggard in addressing climate security risks, while the latter is ambitious in green transition. By 2022, the EU and NATO already have had 21 common member states. In 2023, the EU decided to start accession negotiations with Ukraine and Moldova and grant Georgia EU candidate country status. NATO accepted Finland and Sweden as members in 2023 and 2024 respectively, further expanding the scope of common membership of the two organizations. The new member states are mostly small countries, which mainly seek to position themselves as

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tockholm International Peace Research Institute, April 2023, 17.

[79] Elise Remling and Anniek Barnhoorn, "A reassessment of the European Union's response to climate-related security risks," Stockholm International Peace Research Institute, March 2021.

[80] Anniek Barnhoorn, "Comparing responses to climate-related security risks among the EU, NATO and the OSCE," S tockholm International Peace Research Institute, April 2023, 19.

[81] "EU enlargement," European Union, accessed April 13, 2025, https://european-union.europa.eu/principles-countries-history/eu-enlargement_en; "NATO Enlargement in 1994: What Actually Happened," *Council on Foreign Relations*, access ed April 13, 2025, https://education.cfr.org/learn/simulation/nato-enlargement-1994-nsc/what-actually-happened#:~:text=I n%202004%20seven%20new%20countries,that%20are%20currently%20pursuing%20membership.

advantageously as possible in the interaction between the EU and NATO.[82] Given the unique roles of the new Eastern and Northern European member states as well as the candidate countries of the EU and NATO in addressing climate security issues, the interests and strategic choices of the relevant countries is important intervening variable affecting EU-NATO climate security interactions.

Table 3 The Enlargement Process of the EU and NATO since 1990

	EU	NATO
1st enlargement	**1995**: Austria, Finland, and Sweden	**1999**: Czech Republic, Hungary and Poland
2nd enlargement	**2004**: Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia	**2004**: Bulgaria, Estonia, Latvia, Lithuania, Romania, Slovakia and Slovenia
3rd enlargement	**2007**: Bulgaria and Romania	**2009**: Albania and Croatia
4th enlargement	**2013**: Croatia	**2017**: Montenegro
5th enlargement		**2020**: North Macedonia
6th enlargement		**2023**: Finland
7th enlargement		**2024**: Sweden

Sources: "NATO member countries," NATO, March 11, 2024, https://www.nato.int/cps/en/natohq/topics_52044.htm#coldwar; "EU enlargement," European Union, https://european-union.europa.eu/principles-countries-history/eu-enlargement_en;

On this basis, this dissertation will explore how the interests and strategies of major member states, the overlap of organizational function, and the overlapping membership influence the EU-NATO climate security interaction from the three main aspects of addressing climate security risks: military emission reduction and energy transition, climate conflict warning and crisis prevention, and climate security concepts and standards setting. To be specific, the first and second aspects reflect the mitigation operation and adaptation operation within the two organizations, while the third aspect reflects the international operation of the two organizations towards neighbouring countries and regions and in the UN.

[82] Gunilla Herolf, "The Nordic countries and the EU–NATO relationship: further comments," accessed May 2, 2025, https://www.sipri.org/sites/default/files/files/books/SIPRI06BaHeSu/SIPRI06BaHeSu03.pdf.

Chapter 2 The EU-NATO Climate Security Interaction in Military Emission Reduction And Energy Transition

Climate change increasingly threatens the normal conduct of national defence and military operations, not only disrupts military training and exercise plans by increasing the frequency of wildfires, but also lead to the death of combat personnel, the failure of submarine sonar and the reduction of aircraft take-off capabilities by causing extreme high temperatures and disrupts the operation of critical defence infrastructure by exacerbating sea level rise.[83] The military emission reduction and energy transition are essential methods to mitigate and adapt climate change, and reduce the related security risks to the national defence and military operations. Therefore, NATO needs to accelerate military emission reduction and clean energy applications to maintain its core mission, and the EU also needs to achieve the goal of "strategic autonomy" through that, which make the military emission reduction and energy transition paly important role in the EU-NATO climate security interaction.

2.1 The Impact of The Alignment of Interests Among Major Member States on The Interaction in Military Emission Reduction And Energy Transition

As climate change and the extreme weather events it brings increasingly threaten the security of national defence infrastructure and the conduct of military operations, the major member states such as the United States, France, Germany and the United Kingdom have actively promoted climate securitization within the EU and NATO in general, make it as one of the organizational goals and prefer to implement organizational integration strategies in dealing with related issues, including military emission reduction and energy transition. To be specific, the above countries have gradually regarded the energy infrastructure risks brought about by climate change as an important challenge to national security and have gradually recognized the importance of military emission reduction and energy transition in mitigating climate change and enhancing the military's adaptability. However, they have also acknowledged that reliable fuels and technologies cannot be implemented for defence at a scale that would allow deep cuts enough to achieve net zero in the near or medium term.[84] On

[83] Heidi Hardt and Jacqueline Burns, "NATO Wants to Be a Leader on Climate Security. Here Are the Next Steps to G et There," *Atlantic Council*, August 19, 2024, https://www.atlanticcouncil.org/blogs/new-atlanticist/nato-wants-to-be-a-leade r-on-climate-security-here-are-the-next-steps-to-get-there/.

[84] Marju Kõrts , "Climate change mitigation in the Armed Forces: greenhouse gas emission and reduction—challenges and opportunities for Green Defence," NATO, achieved December 2023, accessed April 27, 2025, https://www.enseccoe.org /wp-content/uploads/2023/12/Climate-change-mitigation-in-the-Armed-Forces.pdf.

this basis, they have sought to use the major international organizations they participate in, such as the EU and NATO, to strengthen the sharing and coordination of best practices in the field of military emission reduction and energy transition.

2.1.1 Organizational Goal Approach And Results of The United States, France, Germany And The United Kingdom

The United States began to pay attention to the potential security threats of climate change in the early 21st century, the U.S. Department of Defence has been playing essential role in addressing climate security issues since then, which to some extent has overcome the negative influence of bipartisan politics and kept it within the national security agenda. During the Bush administration, the Intelligence Office of the U.S. Department of Energy established the Energy and Environmental Security Bureau, which is dedicated to assessing and responding to energy security issues caused by climate change. The U.S. Central Intelligence Agency, Navy, and Centre for a New American Security have also successively introduced climate security plans.[85] During the Obama administration, the United States basically formed the organizational structure of the climate security strategy. In 2009, Obama administration Navy Secretary Ray Mabus proposed the plan to promote half of the U.S. Navy's energy use to be supplied by non-fossil fuel sources by 2020, and half of the Navy's onshore installations to have net-zero carbon emission.[86] During Trump's first term, the U.S. Department of Defence continued to focus on climate security issues, emphasizing that its military facilities are facing climate change-related security threats such as floods, droughts and wildfires.[87] During the Biden administration, the United States has identified climate change as a priority in its foreign policy and national security agenda. It has not only accelerated the appointment of senior leaders and inter-departmental coordination related to climate and energy security within the Department of Defence and intelligence agencies, but also stepped-up military planning and strategy formulation as well as troop capacity building under the climate crisis. Especially, the U.S. National Intelligence Council pointed out that climate change will have a negative impact on energy systems and prices, and security forces readiness and infrastructure, etc, and the limited understanding of insufficient contribution to

[85] Charles Mead and Annie Snider, "Why the CIA Is Spying on a Changing Climate," *Jerusalem Post*, January 16, 201 1, https://www.jpost.com/features/in-thespotlight/why-the-cia-is-spying-on-the-changing-climate.

[86] Brenda Shaffer, "Militaries Can't Transition to Renewable Energy," *Foreign Policy*, July 26, 2024, https://foreignpolicy.com/2024/07/26/military-energy-defense-renewable-oil-gas-transition-weapons/#:~:text=In%202009%2C%20Obama%20administration%20Navy,have%20net%2Dzero%20carbon%20emissions.

[87] Li Xinlei, "Climate Security and Hegemonic Maintenance: Global Promotion of the US Climate Security Strategy," *Journal of International Security Studies* 41, no. 2 (2023): 94.

greenhouse gas emission reduction will greatly aggravate regional and global geopolitical tensions and become a major risk threatening the U.S. national security interests before 2040.[88] Biden's senior climate appointee at the Pentagon, Joe Bryan, advocated for cancelling the military's national security exemption for emission reduction.[89] In this context, the United States has become the main promoter of NATO's climate security framework and military emission reduction actions. The Climate Change and Security Plan (CCSA), launched in June 2021, explicitly proposes to incorporate climate change factors into the alliance's work in defence planning, assets and facilities, training and exercises, and seeks to develop greenhouse gas emission reduction methods for military facilities and their related interactions.[90]

France believes that "climate security" involves all issues related to the impact of climate change on the strategic environment, geopolitical balance, the mission of the armed forces and their means of implementation. It emphasizes that the armed forces must promote energy transition through energy conservation and innovation while protecting France's national interests and freedoms. France actively supports the energy transition and green defence plans of the EU and NATO and contributes to the achievement of relevant climate goals by formulating supporting national strategies. Since 2007, the French Ministry for the Armed Forces has long adhered to the concept of "green defence", committed to protecting the environment and promoting energy transition, and carried out actions based on the requirements of sustainable development, with special attention to controlling and reducing the negative impact of the defence and military departments and operations on the environment. Specifically, the French Ministry for the Armed Forces focuses on collaborating with think tanks such as the French Social Science Research centres and other public institutions to support strategic research on energy transition, assesses the vulnerability of defence infrastructure based on the method developed by Defence and Climate Observatory researchers, and improves water resource utilization and expands the use of renewable energy through Eco-Camp Projects.[91] The French Ministry for the Armed Forces

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[88] "National Intelligence Estimate: Climate change and International Responses Increasing Challenges to US National Security Through 2040," Office of Director of National Intelligence, achieved October 2021, accessed April 13, 2025, https://www.dni.gov/files/ODNI/documents/assessments/NIE_Climate_Change_and_National_Security.pdf.

[89] Brenda Shaffer, "Militaries Can't Transition to Renewable Energy," *Foreign Policy*, July 26, 2024, https://foreignpolicy.com/2024/07/26/military-energy-defense-renewable-oil-gas-transition-weapons/#:~:text=In%202009%2C%20Obama%20administration%20Navy,have%20net%2Dzero%20carbon%20emissions.

[90] "NATO Climate Change and Security Action Plan," NATO, achieved June 2021, accessed April 13, 2025, https://www.nato.int/cps/uk/natohq/official_texts_185174.htm#:~:text=It%20provides%20a%20360%2Ddegree,defence%20posture%20and%20upholding%20the.

[91] "Stratégie Défense durable: 2024-2030," Ministère Des Armées, achieved Septembre 2024, accessed April 26, 2025,

issued the Energy Efficiency Strategy in 2012 and the Defence Energy Strategy in 2020[92], respectively, and is committed to contributing to the realization of national emission reduction targets by protecting the biodiversity and promoting sustainable development of military lands and participating in environmental protection actions such as industrial soil decontamination operations. This contributed a lot to the implementation of the EU's goals on energy transition and sustainable development, such as the 2012 EU Energy Efficiency Directive. With the continuous efforts, it is expected that by 2030, France's military energy consumption will be reduced by 30% compared to 2010.[93] In November 2021, the French Ministry for the Armed Forces launched the "Climate Change and Armed Forces" initiative at the Paris Peace Forum, dedicated to predicting climate security risks, enhancing the resilience of the armed forces, reducing environmental footprint of defence institutions and strengthening international cooperation. It has currently received the support and participation of 26 countries, including most of the major European countries.[94]

Germany began to pay attention to climate security issues in the 1970s, and gradually formed a relatively systematic climate security cognition and policy system after the 1990s. Among all the climate security issues, Germany believes the climate change threatens the core mission of Bundeswehr tasks, including credible deterrence and effective defence of Germany and its allies as well as contribution to the Federal Government's international crisis management. According to this, the Germany armed forces have continuously reduced their greenhouse gas emission over the past 30 years, and the Bundeswehr underlines the importance of developing synthetic fuels or other alternative energy sources to ensure the battlefield mobility and military facilities stability. From 2005 to 2019, the annual CO2 emission in Germany military mobility fell from 1.18 million tonnes to 0.63 million tonnes, and the Bundeswehr had installed 162 electric charging stations in its properties.[95] Besides, Germany pays attention to the technological progress, which is essential to ensure the operational readiness of armed forces, increase sustainability and reduce dependency on increasingly scarce resources. Not only Defence Research and Technology (R&T), but also the geoscientific departmental research and academic research at the two universities of the

https://www.defense.gouv.fr/sites/default/files/sga/SGA_2024_Strat-Defense-Durable_v4%20%281%29.pdf.

[92] "Defence Energy Strategy," Ministry for the Armed Forces, achieved 2020, accessed April 26, 2025, https://www.defense.gouv.fr/sites/default/files/ministere-armees/Defense%20energy%20strategy.pdf.

[93] "Integrated National Energy and Climate Plan for France," European Council, achieved March 2020, accessed April 26, 2025, https://energy.ec.europa.eu/system/files/2022-08/fr_final_necp_main_en.pdf.

[94] "Impact of climate change on defence-related critical energy infrastructure," European Defence Agency, achieved 2023, accessed April 26, 2025, https://eda.europa.eu/docs/default-source/brochures/climate-report.pdf.

[95] "Climate Change and the Defence Sector—Survey Report," EUROMIL, achieved January 2022, accessed April 27, 2025, https://euromil.org/wp-content/uploads/2022/01/2201_Climate_Survey_Report.pdf.

Bundeswehr have contributed to the relevant technological innovation. [96] On this basis, Germany has actively participated in the cooperation and synergies of addressing negative climate impact on military operations and key energy infrastructures within the EU and NATO.

The United Kingdom is not only the first country in the world to enact climate legislation to limit carbon emission, but also one of the first countries to incorporate climate change into its national security strategy.[97] In 2008, the United Kingdom not only listed climate change as the second most important security issue after terrorism in its newly released national security strategy, but also proposed to build a "partner-type" civil-military integrated security system based on multiple subjects such as the state, enterprises and individuals.[98] It also legislated to ensure that greenhouse gas emission reduction targets were implemented in an orderly and timely manner and became one of the first countries to establish a Ministry of Energy and Climate Change. In the following years, the British government established the Climate Change Committee and the "Special Envoy for Climate and Energy Security of the Ministry of Defence, the Ministry of Foreign Affairs and the Ministry of Energy and Climate Change" in 2009 and 2010,[99] laying the governance mechanism foundation for implementing national defence emission reduction and energy transition. In 2020, the UK GCHQ-commission clearly stated that climate security risks can be divided into three categories: physical risks, human mobility and social cohesion risks, and transition risks. Among them, physical risks emphasize the security challenges that climate change and the catastrophic events it brings to critical infrastructure,[100] therefore, ensuring the security and stability of critical energy infrastructure in the battlefields is of great importance. On this basis, the Ministry of Defence's Climate Change and Sustainability Strategic Approach (CCSSA) amplified existing declaration that UK forces must reduce its dependence on fossil fuels, and the Defence Strategic Fuels Authority changed the MoD's

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[96] "Strategy on Defence and Climate Change," Bundesministerium der Verteidigung, achieved March 2024, accessed April 26, 2025, https://www.bmvg.de/resource/blob/5759520/5308c4904ff6fc0780061b6e424fc27e/strategy-on-defence-and-climate-change-data.pdf.

[97] Li Jingkun, "The UK Climate Change Policy in the Perspective of National Security," *Chinese Journal of European Studies* 33, no.5 (2015): 1.

[98] "The National Security Strategy of the United Kingdom: Security in an Interdependent World," Cabinet Office, achieved March 2008, accessed April 13, 2025, https://assets.publishing.service.gov.uk/media/5a7c68abed915d696ccfc92a/7291.pdf.

[99] Li Jingkun, "The UK Climate Change Policy in the Perspective of National Security," *Chinese Journal of European Studies* 33, no.5 (2015): 10.

[100] Malliaraki, E. et al., "Climate Aware and Resilient National Security: Challenges for the 21st Century," The Alan Turing Institute, achieved August 2020, accessed April 13, 2025, https://www.turing.ac.uk/sites/default/files/2020-12/august_2020_climate_aware_and_resilient_national_security_turing_designed.pdf.

aviation fuel standards to allow for sustainable fuel blends of up to 50%.[101] Thus, since it is also one of the best track records in reporting its military carbon emission, the United Kingdom has continued to support and contribute to the EU net-zero strategy across all industries as well as NATO green defence project through implementing positive actions and providing high-quality data.

2.1.2 Organizational Strategy Approach And Results in The United States, France, Germany And The United Kingdom

The United States is generally open to keep the communication and coordination between NATO and the EU on sustainable development of defence, especially the clean energy innovation and application, attaches geopolitical value to the relevant cooperation for the development of transatlantic partnership. Since the Biden administration, the U.S. climate security think tanks have worked together with think tanks from multiple European countries to promote NATO to enhance its awareness and capabilities of energy transition of defence. During the Munich Security Conference in 2023, the IMCCS, composed of the U.S. Climate and Security Centre, the French Institute for International and Strategic Affairs (IRIS), the Hague Centre for Strategic Studies (HCSS) of the Netherlands, and others, discussed with specific ways for NATO military to achieve clean energy transition, and is committed to promote NATO to address climate security risks and adapt to climate change by improving energy efficiency and accelerating the application of clean technologies.[102] The United States regards the EU as strategic partners in achieving net zero emission by 2050, and has committed to work jointly to keep a 1.5 degrees Celsius limit in global temperature rise within reach as well as pursue a just and inclusive energy transition. Since February 2022, they have further agreed on the geopolitical significance of energy transition across all fields including the armed forces, aiming to prevent the potential security risks from Russia by eliminating the EU's reliance on Russia fossil fuels. Besides, the United States and the EU have decided to diversify and secure the supply chains for critical materials and raw materials necessary for the energy transition of defence in transparent and mutual manner,[103] which has

[101] Marju Kõrts, "Climate change mitigation in the Armed Forces: greenhouse gas emission and reduction—challenges and opportunities for Green Defence," NATO, achieved December 2023, accessed April 27, 2025, https://www.enseccoe.org/wp-content/uploads/2023/12/Climate-change-mitigation-in-the-Armed-Forces.pdf.

[102] Zhang Leran and Zhang Xinzhi, "The Institutional Evolution, Risk Perception, and Influence of US Climate Security Think Tanks," Think Tank: Theory and Practice 9, no.4 (2024): 157.

[103] "Joint Statement by the EU and the US following the 10th EU-US Energy Council," European Commission, achieved April 4, 2024, accessed May 9, 2025, https://ec.europa.eu/commission/presscorner/detail/en/statement_23_2121.

also gradually become a common understanding between the EU and NATO after they both published their quite similar lists of critical raw materials.[104]

France has long been actively involved in EU and NATO discussions and actions on military energy transition and sustainable development, believes that the two organizations both play essential role in this field and can contribute to the European clean energy transition and the development of green defence together. On one hand, the French Ministry for the Armed Forces has been participating in the CF SEDSS funded by the European Commission and managed by the European Defence Agency since 2014, improving energy management, increasing energy efficiency and enhancing the resilience of defence infrastructure by sharing information, know-how and best practices.[105] The Energy Self-Sufficiency and Resilient Military Bases (ENSSURE Project) in which France Ministry for the Armed Forces proposed in the CF SEDSS is dedicated to improving the military facilities performance and renewable energy generation and storage, it is supported by EU funding and EDA's technical assistance and a great number of EU member states have participated.[106] On the other hand, the French Ministry for the Armed Forces actively participates in military emission reduction operations under the NATO framework, focusing on developing a methodology for evaluating greenhouse gas emission suitable for the armed forces with its allies. It believes that relevant cooperation will promote knowledge sharing on military greenhouse gas emission and encourage all actors to clarify possible action levers for different types of emission as soon as possible.[107] On this basis, France regards military energy transition as a key focus for strengthening climate security cooperation between the EU and NATO and has participated in and promoted projects aimed at improving interoperability in the field of camp energy and pooling collective purchases for the development of a European biofuel sector.

Germany has attached great importance to enhance EU and NATO's awareness of climate security challenges and strengthen their response to climate change for a long time,

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[104] "NATO releases list of 12 dance-critical raw materials," NATO, achieved December 16, 2024, accessed May 9, 2025, https://www.nato.int/cps/en/natohq/news_231765.htm; Inês Trindade Pereira, "Which critical raw materials are used in Europe's defence sector?" *euronews*, April 11, 2025, https://www.euronews.com/my-europe/2025/04/11/which-critical-raw-materials-are-used-in-europes-defence-sector.

[105] "Consultation Forum for Sustainable Energy in the Defence and Security Sector," European Defence Agency, achieved October 24, 2017, accessed April 27, 2025, https://eda.europa.eu/docs/default-source/events/eden/phase-i/final-report/consultation-forum-for-sustainable-energy-in-the-defence-and-security-sector---final-report.pdf.

[106] "New Energy Consultation Forum project to promote carbon military camps," European Defence Agency, achieved February 17, 2022, accessed April 27, 2025, https://eda.europa.eu/news-and-events/news/2022/02/17/new-energy-consultation-forum-project-to-promote-low-carbon-military-camps#.

[107] "Climate & Defence Strategy," Ministère Des Armées, achieved April 2022, accessed April 27, 2025, https://www.defense.gouv.fr/sites/default/files/ministere-armees/Presentation%20Climate%20ans%20defence%20strategy.pdf.

thus it has actively participated in the green technology and clean energy infrastructure projects within two organizations. On the one hand, Germany actively promotes the EU to pay attention and discuss on climate security issues and is committed to working with other active member states such as the UK to promote EU climate security legislation and policy formulation. In 2007, Germany pushed climate security onto the EU agenda during its presidency of the EU and provided strong support for the EU to establish a steering committee on climate change and international security and to take relevant actions.[108] The German Federal Environment Ministry and the British Foreign Office have been discussing climate security issues together since 2001, and in 2008 the two countries jointly called for European cooperation to address the security challenges of climate change.[109] The German Federal Ministry of Defence actively participates in the EU "Climate and Defence Network" and uses it as a core platform for member states to exchange issues related to climate change and military security. On the other hand, The German Federal Ministry of Defence focuses on in-depth participation in the NATO Climate Change and Security Centre of Excellence and the NATO Energy Security Centre of Excellence. Within these frameworks, the German Federal Ministry of Defence has kept observing and evaluating green technologies within the field of military research with the help of specialists and made efforts to form distinct energy supply concepts based on the evaluation of clean energy potential on military installations.[110]

The United Kingdom acknowledges the important role of both the EU and NATO in addressing climate security risks, it has been committed to promoting EU and NATO to discuss climate security issues and developing targeted collective actions on energy management and transition of armed forces. On one hand, Tom Spencer, Chairman of the Foreign, Security and Defence Policy Committee of the United Kingdom, promoted the European Parliament to discuss climate security issues and formed a final report aimed at paying attention to and strengthening the response to climate security risks in 1999.[111] The British company has also contracted for EDA projects such as Smart Camp Technical Demonstrator to improve energy efficiency of the military camps, the data collected in the

[108] "Climate Change and International Security: Paper from the Representative and the European Commission to the European Council," European Commission, achieved March 14, 2008, accessed April 13, 2025, https://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/reports/99387.pdf.

[109] "Europe has to rise to the security challenges of climate change," Climate Diplomacy, achieved March 13, 2008, accessed April 13, 2025, https://climate-diplomacy.org/magazine/europe-has-rise-security-challenges-climate-change.

[110] "NATO Climate Change and Security Action Plan: Compendium of Best Practice," NATO, achieved July 10, 2023, accessed April 27, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2023/7/pdf/230710-climate-change-best-practices.pdf.

[111] "Report on the Environment, Security and Foreign Policy," European Parliament, achieved January 14, 1999, accessed April 13, 2025, https://www.europarl.europa.eu/doceo/document/A-4-1999-0005_EN.html.

project also contributed to planning support tools for CSDP operations.[112] On the other hand, the United Kingdom has actively supported NATO's military reduction goals through accelerating clean energy application in armed forces. The UK Ministry of Defence has engaged with NATO Energy Security Centre of Excellence to develop its Defence Operational Energy Strategy, focusing on ensuring close collaboration with Allies to maintain interoperability and interchangeability by developing Energy Insight function, enhancing energy management and data capture, investing in innovation and experimentation, etc. The UK Ministry of Defence has also declared that all its aircraft platforms to use up to 50% SAF and plan to look at clearance of greater levels, and the Chief of Air Staff has committed to achieving Net Zero aviation by 2040.[113]

2.2 The Impact of The Overlap of Crisis Management Functions on The Interaction in Military Emission Reduction And Energy Transition

The EU aims to promote peace, its values and the well-being of its peoples,[114] and the EU's comprehensive approach towards crisis management is an important tool to achieve that.[115] NATO's essential and enduring purpose is to safeguard the peace and security in Europe and North America based on the principle of collective defence, crisis prevention and management is an essential organizational task to achieve regional and international peace and stability.[116] With climate security risks continuing to rise, climate change has gradually become a new object of crisis management of both organizations. As one of the demonstrations of climate crisis, the instability of critical energy infrastructure caused by climate change has threatened the military training and operations and challenged the organizational goals of two organizations. Thus, both the EU and NATO regard improving the resilience of critical energy infrastructure and developing sustainable energy solution to manage potential climate crisis. Although the two organizations have common sense in monitoring armed forces carbon footprints, developing green technologies and sustainable solutions, improving energy efficiency, etc., they have tensions over the allocation of defence

[112] "Sustaining Europe's Armed Forces," European Defence Agency, accessed April 27, 2025, https://eda.europa.eu/webzine/issue11/in-the-field/sustaining-europe-s-armed-forces#:~:text=BAE%20Systems%20(UK)%20are%20the,in%20their%20national%20deployed%20camps.

[113] "NATO Climate Change and Security Action Plan: Compendium of Best Practice," NATO, achieved July 10, 2023, accessed April 27, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2023/7/pdf/230710-climate-change-best-practices.pdf.

[114] "Consolidated Versions of The Treaty on European Union and The Treaty On The Functioning Of The European Union," Official Journal of the European Union, achieved June 7, 2016, accessed April 27, 2025, https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12016ME/TXT&from=EN.

[115] "Missions and Operations," EEAS, achieved January 30, 2025, accessed April 27, 2025, https://www.eeas.europa.eu/eeas/missions-and-operations_en.

[116] "NATO's purpose," NATO, achieved May 29, 2024, accessed April 27, 2025, https://www.nato.int/cps/en/natohq/topics_68144.htm.

budget, the implementation of parallel projects, etc., which makes the EU and NATO cooperate as well as compete in this field.

2.2.1 Normative Interaction And The Interaction in Military Emission Reduction And Energy Transition Among Organizations

Both the EU and NATO has been working on the mitigation measures especially in monitoring and reducing military emission as well as protecting and improving critical energy infrastructure and regards the communication and knowledge sharing related to those as essential way to improve organizational capability of crisis management.

The EU and NATO both believe that member states bear the primary responsibility for protecting critical energy infrastructure as well as reducing emission of armed forces, but the transnational nature of energy infrastructure construction and the regional nature of the negative impacts of energy infrastructure destruction urge the two organizations to participate in the protection of critical energy infrastructure from top to bottom,[117] they are also responsible for setting goals or providing suggestions of military emission reduction, giving guidance for member states to develop green defence. As for the military emission reduction, NATO focuses on reducing the carbon footprint of armed forces through enhancing energy efficiency, it has set out the goals that reduce its carbon emission by 45 percent by 2030 and to net zero by 2050.[118] NATO's goals are quite consistent with those of the EU, which aims to reduce net greenhouse gas emission by at least 55% by 2030 and to be climate-neutral by 2050.[119] On this basis, EDA has built mature links to NATO and its Energy Security Centre of Excellence based on CF SEDSS, aiming to establishing sustainable energy projects collectively and efficiently,[120] and NATO staff regularly brief the EDA Energy and Environment Working Group. As for the critical energy infrastructure, the EU and NATO have continuously strengthened division of labour and coordination based on the Task Force on resilience of critical energy infrastructure and are committed to ensuring European energy security and citizen welfare through complementary cooperation. Specifically, the two sides ensure rapid engagement between senior EU and NATO officials when critical infrastructure

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[117] "Energy security," NATO, achieved January 11, 2024, accessed April 7, 2025, https://www.nato.int/cps/en/natohq/topics_49208.htm; "Consultation Forum for Sustainable Energy in the Defence and Security Sector (CF SEDSS) –Phase III, Factsheets," European Defence Agency, achieved 2020, accessed April 7, 2025, https://eda.europa.eu/docs/default-source/events/eden/phase-iii/factsheets/cf-sedss-iii-factsheet.pdf.

[118] "NATO 2022 Strategic Concept," NATO, achieved June 29, 2022, accessed April 12, 2025, https://www.act.nato.int/wp-content/uploads/2023/05/290622-strategic-concept.pdf.

[119] "Climate strategies & targets," European Commission, accessed April 29, 2025, https://climate.ec.europa.eu/eu-action/climate-strategies-targets_en.

[120] "Consultation Forum for Sustainable Energy in the Defence and Security Sector—Final Report by the European Defence Agency to the European Commission: Directorate General Energy," European Defence Agency, October 24, 2017, 7-43.

is found to be at risk of significant harm or when the security environment has changed significantly, make full use of synergies between the respective processes of policies and programs of the EU and NATO critical infrastructure, promote cooperation among diversified actors on the security design of critical infrastructure, and identify synergies and potential areas of cooperation in security research activities related to critical infrastructure.[121]

For a long time, the institutes and departments of the EU and NATO have kept discussion, research, sharing and other kinds of coordination on green technology innovation and clean energy transition in terms of armed forces. The EU Hybrid Fusion Cell, the NATO Hybrid Analysis Branch and the Hybrid CoE have maintained close contact, focusing on cooperating in assessing threats in areas such as energy security and developing specific response measures.[122] Meanwhile, NATO STO has carried out scientific and technological cooperation with the European External Action Service and the European Commission in areas such as climate change and energy security. It has also discussed the feasibility and specific methods of applying clean energy technologies with the European Commission's Joint Research Centre (JRC). The EDA and NATO Innovation Hub in Allied Command Transformation (ACT) further explored the development direction of technology-related policies and possible ways of collaboration.[123] All these greatly enhancing the dialogue between the EU and NATO in areas such as protecting the critical energy infrastructure and promoting energy transition.[124]

2.2.2 Resource Interaction And The Interaction in Military Emission Reduction And Energy Transition Among Organizations

Although the normative cooperation especially at the staff-to staff working level between EU and NATO has been in full swing, they have tension even competition on defence capabilities development and defence industry, mainly manifested in struggling for defence funds and promoting inefficient parallel projects in terms of military emission reduction and energy transition of armed forces. The EU and NATO have a lot of policy

[121] "EU-NATO Task Force: Final assessment repot on strengthening our resilience and protection of critical infrastructure," European Commission, achieved June 29, 2023, accessed April 7, 2025, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3564.

[122] "Third progress report on the implementation of the common set of proposals endorsed by EU and NATO Councils on 6 December 2016 and 5 December 2017," European Council, achieved May 31, 2018, accessed April 3, 2025, https://www.consilium.europa.eu/media/35578/third-report-ue-nato-layout-en.pdf.

[123] "Sixth progress report on the implementation of the common set of proposals endorsed by EU and NATO Councils on 6 December 2016 and 5 December 2017," NATO, achieved June 3, 2021, accessed April 3, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2021/6/pdf/210603-progress-report-nr6-EU-NATO-eng.pdf.

[124] "Sixth progress report on the implementation of the common set of proposals endorsed by EU and NATO Councils on 6 December 2016 and 5 December 2017," NATO, achieved June 3, 2021, accessed April 3, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2021/6/pdf/210603-progress-report-nr6-EU-NATO-eng.pdf.

initiatives that overlap in relation to green procurement practices and partnerships with the defence industry,[125] which may lead to obstacles or dilemma of European green defence development and cooperation.

As for the competition of fund and defence budget, although all European states are boosting defence budgets in recent decades, most of the spending are national and only a minority on collaborative European projects and purchases from European suppliers.[126] With the limited defence budgets for regional defence cooperation, both the EU and NATO still requires member states to provide financial support separately, further accelerating the tension on money between the two organizations in all fields including emission reduction and energy transition. For example, as an essential supporter for green technology development of defence, the NATO's Innovation Fund and Defence Innovation Accelerator is quite similar at least in intent with the EU's European Defence Fund and its corollary defence innovation scheme, of which one reason to establish was preventing exclusion of US and UK from EU's initiatives.[127] Thus, dual defence spending in the same working field has increased the burden on the member states and also increases competition for resources between organizations.

As for the parallel projects' tension, since the EU began to develop its own defence capability, the organizational defence projects of the EU has been gradually overlapped with NATO. This has led to the coordination between the EU and NATO on Interoperability and interchangeability, however, there's still long way to go and the project competition has been more and more intense so far because of the continued squabbles between Atlanticists and Europeanists,[128] which leads to the disagreement on how two overlapping projects work together and inefficient coordination, and the projects concerning military emission reduction and clean energy development are faced with the same challenges. Take the sustainable energy transition as an example, the working group 3 of CF SEDSS event 3 in November 2016 discussed the applicability of the renewable energy to the European Defence sector, proposed that the significant challenges still existed with biofuel sourcing, production, logistics and operation in the military context, and to be specific, it was of little utility in an

[125] "NATO Climate Change and Security Action Plan," NATO, achieved July 10, 2021, accessed April 11, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2023/7/pdf/230710-climate-change-best-practices.pdf.

[126] Paul Taylor, "Time for a new deal between the EU and NATO," *EPC*, November 4, 2024, https://www.epc.eu/en/publications/-New-deal-EU-NATO~5ee304.

[127] Dylan Macchiarini Crosson, "EU-NATO relations—somewhere between dancing with two left feet and seamless tango," *CEPS*, June 25, 2024, https://www.ceps.eu/eu-nato-relations-somewhere-between-dancing-with-two-left-feet-and-seamless-tango/.

[128] Dylan Macchiarini Crosson, "EU-NATO relations—somewhere between dancing with two left feet and seamless tango," *CEPS*, June 25, 2024, https://www.ceps.eu/eu-nato-relations-somewhere-between-dancing-with-two-left-feet-and-seamless-tango/.

EU alternative fuels group working in parallel to the longstanding arrangement already in place within NATO.[129]

2.3 The Impact of The Overlapping Membership on The Interaction in Military Emission Reduction And Energy Transition

The increase of common member states will improve the alignment of interests of the two organizations, and the common member states generally prefer to adopt the organizational integration strategy, which will further promote the cooperation between two organizations. Since both the EU and NATO started to focus on climate security issues after 1990, it's reasonable to pick up the new member states accessing to the two organizations during the same period as the cases to study, which is the CEE countries and Northern European countries. In terms of military emission reduction and energy transition, all these member states believe the EU and NATO have respective leverage on participation and it's necessary for them to join both set of actions for the national security and economic prosperity. They have also contributed to cooperation between the EU and NATO in related field but in different way: the CEE member states act as "gradual active responders" while the Northern European member states work as "actual model demonstrators and contributors". These member states' different positivity has kept the green defence agenda of the EU and NATO developing more steadily and reflecting the interests of as many member states as possible respectively, and their own consistent position in both organizations creates cornerstone and opportunities for policy and action alignment between the two organizations by keeping them on the same floor.

2.3.1 The Process Of "Double Eastward Enlargement" And The Interaction in Military Emission Reduction And Energy Transition Among Organizations

The CEE countries have higher threat perceptions surrounding environmental issues but are less willing to make contribution for climate security governance, which makes them be defined as climate change laggards,[130] who produce 5% more per capita Green House Gas emission than Western Europe on average.[131] Most CEE countries promote conservative

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[129] "Consultation Forum for Sustainable Energy in the Defence and Security Sector—Final Report by the European De fence Agency to the European Commission: Directorate General Energy," European Defence Agency, October 24, 2017, 38.

[130] Stefan Ć etković and Aron Buzogá ny, "Between Markets, Politics and Path-Dependence: Explaining the growth of solar and wind power in six Central and Eastern European countries," *Energy Policy* 139 (2020): 1–9, 10.1016/j.enpol.20 20.111325; Wurzel, Rüdiger K.W., Duncan Liefferink, and Maurizio Di Lullo, "The European Council, the Council and the Member States: Changing Environmental Leadership Dynamics in the European Union," *Environmental Politics* 28, no.2 (2 019): 248–70. doi:10.1080/09644016.2019.1549783.

[131] Alena Drieschova, "The North-South divide and everything that gets left out in-between: conceptualizing Central a nd Eastern Europe to explain its positioning on climate change," *International Relations* 38, no.3 (2024): 294, https://doi.org

approach in energy transition across all sectors including defence not only because their bad overall environmental condition, but also due to that their natural renewable energy sources are underutilized. On this basis, the CEE member states are more responders of the EU and NATO green defence policies instead of proposers, and mainly participate in the relevant cooperation between the two organizations to make the goals of military emission reduction and energy transition does not go too far.

As for the military emission reduction, the CEE member states have supported the net zero goals of the EU and NATO concerning the defence sector and the inter-organizational coordination by reporting military emission data on time and setting national mitigation schedule for armed forces, but the ambition of their measures is significantly lower than that of other countries. The Ministry of Defence of Czech Republic has provided data on emission to the overall reports it processes for Eurostat. The Polish Air Force had already replaced 90% of its aircraft ground equipment and reduced about 60% of air pollution compared to previous period by 2022 and plans to make most of ground support equipment fleet powered by zero or low-emission technologies by 2060. Ministry of Defence of the Slovak Republic has set the goals that the CO2 emission produced by the non-tactical vehicle fleet should be reduced by 55% by 2030 compared to 2021, and the buildings should use 50% less energy for heating and cooling by 2030 compared to 2021.[132]

As for the energy transition of defence sector, some CEE member states have not only participated but tried to lead the regional projects and cooperation platforms under the EU and NATO framework, but the projects started relatively late and relies heavily on help from other countries and organizations. The polish armed forces has focused on investing in renewable energy, not only a pilot farm called Powidz, equipped with 2 energy storages 4.8 kw and 6.4 kw and led by Military Inspection of Energy Economy, is under construction, but more large installations are considered to be implemented.[133] Slovenia has led the “Defence RESilience Hub Network in Europe” (RESHUB) project based on the CF SEDSS, which has received technical support from SRSP and aimed at improving the reliable and sustainable energy supply in the defence sector at the regional level.[134] The Ministry of Defence of the

/10.1177/00471178241268255.

[132] “NATO Climate Change and Security Action Plan: Compendium of Best Practice,” NATO, achieved July 10, 2023, accessed April 27, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2023/7/pdf/230710-climate-change-best-practices.pdf.

[133] “NATO Climate Change and Security Action Plan: Compendium of Best Practice,” NATO, achieved July 10, 2023, accessed April 27, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2023/7/pdf/230710-climate-change-best-practices.pdf.

[134] “First Energy Consultation Forum project to receive EU funding,” European Defence Agency, achieved March 10, 2020, accessed April 29, 2025, https://eda.europa.eu/news-and-events/news/2020/03/10/first-energy-consultation-forum-proj

Republic of Slovenia has also participated in the Hybrid Drive Train Demonstrator project of EDA to identify the field of application for electric storage, conversion and propulsion components for a specific range of military vehicles,[135] as well as in the Fuel cell system operating with standardized military fuel project of EDA to develop a silent auxiliary power unit with a low thermal footprint.[136]

2.3.2 The Process Of "Double Northward Enlargement" And The Interaction in Military Emission Reduction And Energy Transition Among Organizations

Among the Northern European countries, the Finland and Sweden have played an especially essential role in the interaction between the EU and NATO as the common member states or close partners. As Nordic countries and high-income democracies, both Finland and Sweden are exposed to relatively severe climate security risks but have strong capacity to adapt to new environmental conditions. Sweden has long insisted that it would continue its efforts to ensure that climate and security are high on the agenda of the EU. However, as for Finland, climate change is considered as something that can be taken into account if it suits other objectives, not as a critical factor of its own.[137] On this basis, the Finland and Sweden has supported the EU and NATO to continuously focus on the military emission reduction and energy transition of armed forces more through intention expression than actual action, their different preference for topic ranking as well as governance measures have also provided diverse reference for the EU and NATO in promoting green defence development and cooperation.

As for the military emission reduction, Finland has a clearer and more targeted agenda and schedule for decarbonized defence as well as the closer coordination with the EU and NATO than Sweden. Sweden proposed climate policy framework and 2045 net zero goals in 2017, declared that the national emission was to be 63 per cent lower than 1990 by 2030 and 75 per cent lower by 2040.[138] However, it hasn't set up the specific emission reduction goals

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ect-to-receive-eu-funding.

[135] "EDA project on hybrid drive trains for military vehicles concludes second phase," European Defence Agency, achieved December 11, 2024, accessed April 30, 2025, https://eda.europa.eu/news-and-events/news/2024/12/11/eda-project-on-hybrid-drive-trains-for-military-vehicles-concludes-second-phase-readies-next-steps.

[136] "IAPUNIT II - New EDA research & technology project on innovative auxiliary power unit based on fuel cell," European Defence Agency, achieved September 16, 2024, accessed April 30, 2025, https://eda.europa.eu/news-and-events/news/2024/09/16/iapunit-ii---new-eda-research-technology-project-on-innovative-auxiliary-power-unit-based-on-fuel-cell.

[137] Hakala, Emma, Ville Lähde, Antti Majava, Tero Toivanen, Tere Vadén, Paavo Järvensivu, and Jussi T. Eronen, "A Lot of Talk, But Little Action—The Blind Spots of Nordic Environmental Security Policy," *Sustainability* 11, no. 8 (2019): 2379, https://doi.org/10.3390/su11082379.

[138] "Sweden's Climate Act and Climate Policy Framework," NATUR VARDS VERKET, accessed April 30, 2025, https://www.naturvardsverket.se/en/topics/climate-transition/sveriges-klimatarbete/swedens-climate-act-and-climate-policy-framework/.

for defence sector, only left the relevant work within the Effort Sharing Regulation in a more general way, as a demonstration of its appliance of regional mitigation goals purposed by the EU and NATO. The climate strategy of the Finnish Defence has responded to the objectives of the EU Strategic Compass for Security and Defence as well as the NATO Climate Change and Security Action Plan, the Ministry of Defence of Finland has proposed to reduced 50% GHG emission of army and navy vehicles from the 2020 level by 2030, the GHG emission from the maintenance of properties will be reduced by 75% from the 2020 level by 2025 and achieve carbon neutrality by 2030.[139] Based on this, Finland has declared the support for NATO's aim of becoming a leading international organization in adapting to the security impacts of climate change while contributed to the EU green defence development.

As for the energy transition of defence sector, both Finland and Sweden regard the restructuring of the energy sector as important tool in mitigation to climate change and essential part of security and foreign policy, although the former prefers to increase energy independence and the latter prefers to produce more renewable energy, both of them has contributed to the regional energy transition of defence with their unique knowledge and experience.[140] Sweden has the highest share of renewable energy in the EU and almost entirely decarbonised electricity and heat systems, its successful energy transition experience has long been or is being valuable lessons for the EU and NATO and their member states concerning all sector's efforts including defence.[141] Sweden itself is also considering and discussing with other countries on a more balanced measure to promote green defence after 2022 based on the two organizations' platforms. The Finland government has proposed that the energy transition towards a fossil-free energy system and better energy efficiency are important factors in defence energy security, and also vital way to achieve better military performance at lower cost.[142] On this basis, Finland regards the long-term voluntary actions supported by the EDA and EU Commission as essential methods to increase the share of renewable energy in the defence sector at the international level, and actively participated in the collective projects concerning research and innovation between the two organizations.

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[139] Climate Strategy of the Finnish Defence," Ministry of Defence of Finland, achieved 2024, accessed April 30, 2025, https://www.defmin.fi/files/6009/Climate_Strategy_of_the_Finnish_Defence_2024.pdf.

[140] Hakala, Emma, Ville Lähde, Antti Majava, Tero Toivanen, Tere Vadén, Paavo Järvensivu, and Jussi T. Eronen, "A Lot of Talk, But Little Action—The Blind Spots of Nordic Environmental Security Policy," *Sustainability* 11, no. 8 (2019): 2379, https://doi.org/10.3390/su11082379.

[141] "The Swedish energy transition: A race far from won," *Jacques Delors Institute*, September 5, 2022, https://institutdelors.eu/wp-content/uploads/2022/09/PB_220905_The-Swedish-energy-transition_Thalberg_EN.pdf.

[142] "Climate Strategy of the Finnish Defence," Ministry of Defence of Finland, achieved 2024, accessed April 30, 2025, https://www.defmin.fi/files/6009/Climate_Strategy_of_the_Finnish_Defence_2024.pdf.

Chapter 3 The EU-NATO Climate Security Interaction in Climate Conflict Warning And Crisis Prevention

Climate change may exacerbate regional conflicts and violence by triggering large-scale population movements and disrupting global supply chains, thereby posing serious political and social security challenges to countries.[143] Climate conflict warning and crisis prevention are essential methods to adapt climate change, especially concerning preparing for the potential climate migration and related security challenges. In this context, strengthening civil preparedness and disaster resistance has become an increasingly important area of security operations for the EU and NATO. Among them, improving the construction of climate conflict early warning and crisis prevention systems is a key measure for the two organizations to respond to climate security challenges and interact in this policy area.

3.1 The Impact of The Alignment of Interests Among Major Member States on The Interaction in Climate Conflict Warning And Crisis Prevention

Climate-driven migration and displacement has gradually become an essential security concern and likely to grow, the global warming in the coming decades is expected to lead to climate migration and displacement by 2050 range from hundreds of millions to more than a billion people, and mostly within and between climate vulnerable countries of the Global South.[144] The increasing climate-driven migration mainly from Global South has exacerbated the worries of the United States and European countries towards their potential negative impact on political, economic and social stability, and aroused the necessity to further communicate and coordinate strategies and policies of climate conflict warning and crisis prevention at the regional and international level. Against this background, the United States, France, Germany and the United Kingdom focus on strengthening not only the national capacity but collective capability of the EU and NATO concerning mapping the potential climate conflict, building comprehensive early warning systems, ensuring information exchange and enhance the operational flexibility of civil defence and disaster relief personnel.

3.1.1 Organizational Goal Approach And Results of The United States, France, Germany And The United Kingdom

[143] "NATO Climate Change and Security Impact Assessment," NATO, achieved July 2024, accessed April 13, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2024/7/pdf/240709-Climate-Security-Impact.pdf.

[144] Tom Ellison, "The Security Problem with Climate Migration isn't Migration," *Just Security*, January 2, 2024, https://www.justsecurity.org/90864/the-security-problem-with-climate-migration-isnt-the-migration/.

The United States identified climate change as a "threat multiplier" for national security and social conflicts, the U.S. Department of Defence and intelligence agencies paid more attention to the impact of climate change on military deployment and worked to build military emergency response capabilities through the development of regional climate models and forecasting tools.[145] Since 2016, cooperation concerning climate crisis prevention and management among federal, state, local and territorial government officials has proceeded under the Regional Resiliency Assessment Program (RRAP), aiming at evaluating climate impact and provide methodologies to enable effective regional climate change adaptation planning.[146] According to the 2021 National Intelligence Estimate report, the United States views climate change as a major threat to irregular cross-border migration and forced displacement, pointing out that climate change will exacerbate the disputes over international migration and refugee management and governance, and emphasizing that climate change will have a negative impact on humanitarian assistance and disaster and emergency preparedness, response and recovery.[147] Against this background, the Federal Emergency Management Agency of U.S. Department of Homeland Security has worked with partners to develop the Recovery and Resilience Resource Library to help vulnerable groups to find federal disaster recovery resources which can make a difference in pre-disaster recovery planning. The U.S. Coast Guard has also prioritized incident command system qualifications and disaster response training, and coordinate with partners to expand emergency management and planning.[148] Thus, The United States led the role to promote the NATO to include the capability building of early warning and crisis prevention into its climate change and security agenda as well as the action plan and made it a main task of NATO's climate policies.

The French Ministry of the Armed Forces, in view of the increasing demand for disaster relief operations and humanitarian assistance caused by climate change and the extreme

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[145] "Quadrennial Defense Review Report," Office of the Secretary of Defense, achieved February 2010, accessed April 13, 2025, https://history.defense.gov/Portals/70/Documents/quadrennial/QDR2010.pdf?ver=vVJYRVwNdnGb_00ixF0UfQ%3d%3d; Caitlin Werrell and Francesco Femla, "Climate Change and National Security in the 2014 Quadrennial Defense Review," *The Center for Climate and Security*, March 2014, https://climateandsecurity.org/2014/03/climate-change-and-national-security-in-the-2014-quadrennial-defense-review/.

[146] "Regional Resiliency Assessment Program," America's Cyber Defence Agency, accessed April 30, 2025, https://www.cisa.gov/resources-tools/programs/regional-resiliency-assessment-program.

[147] "National Intelligence Estimate: Climate change and International Responses Increasing Challenges to US National Security Through 2040," Office of Director of National Intelligence, achieved October 2021, accessed April 13, 2025, https://www.dni.gov/files/ODNI/documents/assessments/NIE_Climate_Change_and_National_Security.pdf.

[148] "NATO Climate Change and Security Action Plan: Compendium of Best Practice," NATO, achieved July 10, 2023, accessed April 27, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2023/7/pdf/230710-climate-change-best-practices.pdf.

weather events it triggers, regards the climate change as a risk or hazard multiplier rather than a threat multiplier,[149] and emphasizes strengthening the armed forces' ability to participate in disaster relief operations based on an interdepartmental framework as well as contribute to the regional and international knowledge sharing and action coordination under the EU and NATO's framework. The French Ministry of the Armed Forces established the Defence and Climate Observatory in 2016,[150] which has contributed a lot in warning the potential climate crisis and proposing related suggestions on prevention. Since then, The French Ministry of the Armed Forces has kept it core to map climate risks at the national and regional levels for the purpose of anticipating the potential crisis and conflicts led or exacerbated by climate change. The Defence Staff and the French defence procurement agency DGA have also been building the capability to ensure the performance and dependability of military equipment in their whole life cycle against the increasing climate risks. France has seen the importance of interministerial cooperation in providing humanitarian assistance and disaster relief operations, in which the military personnel such as the Paris Fire Brigade, the Marseille marine firefighter squadron and the military civil protection formations play the unique role.[151]

Since 2007, German has regarded climate change and violent conflict as closely related issues,[152] and the Climate Security Expert Network, funded by the German Foreign Ministry, has long been committed to providing advice on enhancing the ability to respond to climate security risks, making important contributions to global climate security knowledge sharing.[153] At the same time, Germany has worked hard to promote the EU and NATO to include the issue of climate, peace and security in their organizational frameworks and discuss it regularly based on its best domestic practices. For example, the Federal Ministry of Defence and the Bundeswehr regard the geoinformation, early warning and foresight as one of the action fields in addressing the impact of climate change on security and defence. On one hand, the Bundeswehr Geoinformation Service, which aims to provide authoritative advice on identifying and analysing the interaction between geofacts and German security

[149] "Revue Stratégique De Défense Et De Sécurité Nationale," Ministry of Armed Forces, achieved 2017, accessed May 5, 2025, https://www.diplomatie.gouv.fr/IMG/pdf/2017-revue_strategique_dsn_cle4b3beb.pdf.

[150] "Impact of climate change on defence-related critical energy infrastructure," European Defence Agency, achieved 2023, accessed April 26, 2025, https://eda.europa.eu/docs/default-source/brochures/climate-report.pdf.

[151] "Climate & Defence Strategy," Ministère Des Armées, achieved April 2022, accessed April 27, 2025, https://www.defense.gouv.fr/sites/default/files/ministere-armees/Presentation%20Climate%20ans%20defence%20strategy.pdf.

[152] "World in Transition: Climate Change as a Security Risk," German Advisory Council on Global Change, achieved May 2007, accessed April 13, 2025, https://www.wbgu.de/fileadmin/user_upload/wbgu/publikationen/hauptgutachten/hg2007/pdf/wbgu_hg2007_engl.pdf.

[153] Zhou Yijiang, "Eine Analyse der deutschen Strategic und Motivation zur Vesicherheitlichung des Klimawandels," *Deutshland Studien* 36, no.3 (2021): 12.

and defence policy, has designed an internal "Defence and Climate Change" information portal. On the other hand, the Federal Ministry of Defence and the Federal Foreign Office have commissioned leading scientific institutes and Federal Intelligence to investigate the implications of climate change for national defence, and further identify possible new mission areas, any increase in conflict potential or specific implications for operational scenarios of the Bundeswehr based on that by diversified tools such as early warning, strategic foresight and future analysis. Besides, the Bundeswehr also focuses on reducing logistic dependencies, minimise the ecological footprint as well as strengthening operational resilience in international crisis management operations.[154]

The United Kingdom has long acknowledged the importance of strengthening the military capability for responding disasters and supporting civilian authorities, aimed at setting pragmatic but stretching bar concerning the climate early warning and crisis prevention for allies within the EU and NATO to enhance its leadership, and supported all partners to be involved and play their part in relevant regional actions between the two organizations to improve the action effectiveness. On this basis, the United Kingdom has insisted leading by example, believing that the credibility and possibility of leadership on climate crisis prevention could only be achieved through demonstrable and effective activities and models.[155] The British government established the first worldwide research institution – UK Climate Change Programme – based on the University of Oxford to explore the impacts of adaptation to climate change, mainly focusing on climate science, vulnerability, knowledge sharing and training in 1997.[156] The government further stressed that climate change and the catastrophic weather events it brings could escalate violence and conflict and lead to changes in migration patterns, exacerbating risks to population mobility and social cohesion in 2020.[157] Among them, long-term climate events such as droughts may lead to permanent migration, while short-term climate events such as floods may lead to temporary displacement,[158] therefore the Ministry of Defence would formulate specific solutions based

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[154] Strategy on Defence and Climate Change," Bundesministerium der Verteidigung, achieved March 2024, accessed April 26, 2025, https://www.bmvg.de/resource/blob/5759520/5308c4904ff6fc0780061b6e424fc27e/strategy-on-defence-and-climate-change-data.pdf.

[155] "Ministry of Defence: Climate Change and Sustainability Strategic Approach," Ministry of Defence, achieved March 30, 2021, accessed April 30, 2025, https://assets.publishing.service.gov.uk/media/605ddbbe8fa8f5047d3a851e/20210326_Climate_Change_Sust_Strategy_v1.pdf.

[156] David Demeritt and DianaLangdon, "The UK Climate Change Programme and communication with local authorities," *Global Environmental Change* 14, no.4 (2004): 330, https://doi.org/10.1016/j.gloenvcha.2004.06.003.

[157] Malliaraki, E. et al., "Climate Aware and Resilient National Security: Challenges for the 21st Century," The Alan Turing Institute, achieved August 2020, accessed April 13, 2025, https://www.turing.ac.uk/sites/default/files/2020-12/august_2020_climate_aware_and_resilient_national_security_turing_designed.pdf.

[158] Malliaraki, E. et al., "Climate Aware and Resilient National Security: Challenges for the 21st Century," The Alan T

on different situations. In 2023, the British government announced an investment of 20 million pounds to establish an early warning system to help vulnerable groups adapt to climate change.[159]

3.1.2 Organizational Strategy Approach And Results in The United States, France, Germany And The United Kingdom

The United States has gradually noticed the comparative advantages of the EU crisis management system towards NATO and recognizes the complementary role of the EU and NATO in preventing and managing climate crisis, mainly by qualifiedly embracing the EU's operational contributions to international crises such as natural disasters.[160] The EU crisis management system has implemented the integrated approach and emphasized the importance of sustainability for a long time, aiming to achieve the relevant goals including environmental-friendly object through the mix between targeted civilian and military actions.[161] On this basis, the US has worked together with the EU in various crisis management projects, such as the work plan on increased cooperation in crisis management and conflict prevention as well as the information sharing arrangements envisaged by the EU for non-EU NATO member states, aiming to clarify the labour division and build strategic trust among the EU and NATO member states on relevant issues. These projects are mainly targeted at civilian aspects of crisis management, which climate change and the natural disasters it brought influence most, and therefore laid the cornerstone for the cooperation between the EU and NATO in climate crisis prevention and management.[162]

As one of the few member states to have a defence instrument that covers the entire spectrum, France has insisted to maintain and update the relevant defence tool consistent with the objectives approved by NATO and the EU at the same time, worked hard to shape the similar agenda of the EU and NATO in the field of climate crisis prevention and humanitarian assistance.[163] France has insisted to ensure the humanitarian crisis response to

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uring Institute, achieved August 2020, accessed April 13, 2025, https://www.turing.ac.uk/sites/default/files/2020-12/august_2020_climate_aware_and_resilient_national_security_turing_designed.pdf.

[159] "100 million for vulnerable countries tackling climate change," UK Government, achieved December 2, 2023, accessed April 13, 2025, https://www.gov.uk/government/news/100m-for-vulnerable-countries-tackling-climate-change.

[160] Rafał Domisiewicz and Eva Gross, "Breaking new ground: EU-US cooperation in crisis management," European Union Institute for Secuirity Studies, achieved May 2014, accessed May 11, 2025, https://www.files.ethz.ch/isn/182348/Brief_15_EU_US_cooperation_in_crisis_management.pdf.

[161] Martin Svárovský, "US-EU complementarity. Chance for EU Crisis management ?" *On War On Peace*, May 7, 2018, https://www.onwar.eu/2018/05/07/us-eu-complementarity-chance-for-eu-crisis-management/.

[162] Rafał Domisiewicz and Eva Gross, "Breaking new ground: EU-US cooperation in crisis management," European Union Institute for Secuirity Studies, achieved May 2014, accessed May 11, 2025, https://www.files.ethz.ch/isn/182348/Brief_15_EU_US_cooperation_in_crisis_management.pdf.

[163] "France and NATO: France's role in the North Atlantic Treaty Organization (NATO)," Ministère De L'Europe Et d

strengthen the resilience and crisis response capacity of other countries and limit the negative impact of humanitarian aid on climate and environment, which contributes to mitigation and adaptation of climate change at the same time. On this basis, France has actively supported the commitments of the Humanitarian Aid Donors' Declaration on Climate and Environment signed by most of the EU and NATO member states through expanding its capacity to provide green emergency assistance, proposed the joint exercise to quantify greenhouse gas emission resulting from humanitarian aid at the European level which requires the collectively participation of regional organizations such as the EU and NATO. Besides, France has stressed to promote the humanitarian issues remain a priority in all European dialogue including the ones between the EU and NATO and contribute to ensure the climate and environmental issues remain at the top of the European humanitarian agenda.[164]

Germany has insisted a firmly European and multilateral climate foreign policy, aiming to ensure all international organizations including the EU and NATO to focus more on climate security and foster climate resilience through the projects in the fields of humanitarian assistance and stabilisation cooperation. Germany has called for the EU and NATO to consider the climate security as a cross-cutting issue and an essential cooperation field, strengthening the organizational and inter-organizational capacity of climate crisis management to ensure the European stability. On one hand, the German Federal Government has contributed to enrich the climate security expertise in civilian missions of the EU CSDP by sending experts, has supported climate and security modules in European Defence College and the EU Centre of Excellence for Civilian Crisis Management to strengthen the capacities of personnel in peace missions and actively spread such modules to the security and military advanced training courses of NATO.[165] On the other hand, the German Ministry of Foreign Affairs and Ministry of Defence has actively supported the NATO CCASCOE by providing substantive contributions, aiming to promoting NATO and its allies such as the EU in adapting to the negative consequences of climate change and improving resilience.[166] On this basis, Germany has provided various resources for the EU and NATO in improving the

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es Affaires Étrangères, accessed May 8, 2025, https://www.diplomatie.gouv.fr/en/french-foreign-policy/security-disarmament-and-non-proliferation/our-alliances-and-cooperations/france-and-nato/.

[164] "France's 2023-2027 Humanitarian Strategy," French Ministry for Europe and Foreign Affairs, accessed May 11, 2025, https://www.diplomatie.gouv.fr/IMG/pdf/strategie-humanitaire-ang-online12.08.2024_cle02bf63.pdf.

[165] "Strategy on Climate Foreign Policy of the Government of Federal Republic of Germany," The Federal Government, achieved December 2023, accessed May 12, 2025, https://www.auswaertiges-amt.de/resource/blob/2633116/a4e03e8283b9479559ef2dc3b741624a/kap-strategie-en-data.pdf.

[166] "NATO Climate Change and Security Action Plan: Compendium of Best Practice," NATO, achieved July 10, 2023, accessed April 27, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2023/7/pdf/230710-climate-change-best-practices.pdf.

climate crisis management, thus created the potential space for the inter-organizational coordination on relevant issues.

The United Kingdom has recognized the climate security crisis as a cross-border problem which requires the mutual support among its international allies and partners as well as the collective action by like-minded countries, focusing on strengthening the bilateral and multilateral cooperation among the EU and NATO member states in building climate resilience capacity through its expertise of Emergency Planning College and military.[167] The United Kingdom has proposed the Climate Change and Sustainability Strategic Approach which set a three-steps schedule for leading the regional and global coordination on strengthening capacity for preventing and managing climate crises and conflicts, including promoting the communication between the EU and NATO in relevant issues. For one thing, the United Kingdom is continuously playing the leading role in establishing and developing the NATO Climate Change and Security Centre of Excellence and has shared its methodologies and exchanged key artefacts concerning the best practice on operating in demanding environments with NATO and its key member states such as the US and France.[168] For another, the United Kingdom has recognized the need to respond the climate crisis collectively with other EU member states in any political role (whether as a member state or an "outsider"), and preferred the beyond-bilateral mechanisms such as the channels between the EU and NATO instead of the bilateral coordination to some extent when it comes to the structural climate cooperation between the EU and UK after Brexit,[169] which brings more opportunities for the collective projects and actions for climate crisis prevention and management between the EU and NATO.

3.2 The Impact of Overlap in Crisis Management Functions on The Interaction in Climate Conflict Warning And Crisis Prevention

NATO has insisted to prevent and manage crisis through a comprehensive political, civilian and military approach since it was established in the early 1950s, its capacity to conduct crisis prevention and management covering collective defence and disaster relief operations,[170] which has been increasingly affected by global warming, and humanitarian

[167] "The UK Government Resilience Framework," HM Government, achieved December 2022, accessed May 12, 2025, https://assets.publishing.service.gov.uk/media/63cff056e90e071ba7b41d54/UKG_Resilience_Framework_FINAL_v2.pdf.

[168] "First Special Report: Defence and Climate Change," the Defence Committee of the House of Commons, achieved November 8, 2023, accessed May 12, 2025, https://committees.parliament.uk/publications/41948/documents/209651/default/.

[169] Jannike Wachowiak, "EU-UK Climate Cooperation post-Brexit: A case for optimism?" *EPC*, June 28, 2021, https://www.epc.eu/content/PDF/2021/EU-UK_Climate_cooperation_PB.pdf.

[170] "Crisis management," NATO, achieved April 30, 2025, accessed April 30, 2025, https://www.nato.int/cps/en/natoh

operations are essential measures to deal with climate-driven conflict and migration. The EU has committed to improve cross-sectoral and cross-border crisis management to enhance its resilience to future challenges, especially to climate change, aiming at building the capability not only for withstanding and coping with challenges but for undergoing transitions in a sustainable manner, and has acknowledged to strengthen its crisis response in an all-hazards approach.[171] On this basis, the EU and NATO have a common understanding of the necessity of supporting situational awareness towards climate disasters, providing better early warning for climate crises and keeping real-time information exchange. However, based on the "Berlin Plus" arrangements and distinct organizational nature, they have been faced with tension in the exchange of sensitive information as well as departmental and official docking, which complicates the interaction between the two organizations in this area.

3.2.1 Normative Interaction And The Interaction in Climate Conflict Warning And Crisis Prevention Among Organizations

Generally, both the EU CSDP and NATO have regarded or gradually acknowledged to use crisis management and control to respond to "hybrid threats", such as climate change, that are intertwined with internal and external security,[172] focusing on including climate factors into their own agenda as well as collective activities in crisis management, such as building high quality early warning system targeted at climate change and providing sustainable humanitarian assistance.

The EU have been working on connecting climate security with early warning systems, humanitarian action, crisis response and knowledge development. On one hand, it has updated its Early Warning System with climate-relevant indicators including the risk of violent conflict breaking out and making climate change and environment part of its crisis response toolbox. On the other hand, it has managed to green the humanitarian field, such as setting out a minimum set of environ mental requirements for EU-funded humanitarian projects and incorporating climate security into the field of disarmament, demobilization and reintegration (DDR) and civil protection and security sector reform (SSR).[173] As for NATO, it has integrated climate change considerations into resilience assessments and civil advice on

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q/topics_49192.htm.

[171] "How the EU responds to crises and builds resilience," European Council, accessed May 1, 2025, https://www.consilium.europa.eu/en/policies/eu-crisis-response-resilience/.

[172] Zhao Huaipu, "The trend of "alliance" emerges: New changes in the relationship between the EU and NATO under strategic autonomy," *Contemporary World*, no. 6 (2024): 28.

[173] "Joint Progress Report on Climate Change, Defence and Security (2020–2022)," Council of the European Union, achieved November 16, 2022, accessed April 11, 2025, https://www.eeas.europa.eu/sites/default/files/documents/progress%20report%20public.pdf.

the security situation in regions of key interest, and positively participated in coordinating civil preparedness and civil emergency response to natural disasters or other risks brought or exacerbated by climate change. To achieve the relevant goals, NATO has organized several consultations and scenario-building exercises involving military and civilian experts for better understanding of military role in disaster relief in the future,[174] creating valuable knowledge and best practice for member states and other partners in preventing climate crises and conflicts.

With the above common recognition and interests, the EU and NATO have built inter-institutes channels regarding crisis prevention and capacity building towards natural disasters and potential conflicts exacerbated by climate change directly or indirectly. The Euro-Atlantic Disaster Response Coordination Centre (EADRCC) and the EU Emergency Response Coordination Centre (ERCC) are the main cooperation platforms for the EU and NATO to strengthen civil emergency response, on which they have long coordinated their response work on climate crises and conflicts. The communication and coordination channels between the two centres have largely avoided the duplication of relief efforts and improved the efficiency of humanitarian assistance. To be specific, the EU and NATO have exchanged experiences and shared knowledge on climate security risk responses through regular Crisis Management Exercises (CMX) and workshops,[175] enhancing the official experience and preparing for the best solutions in advance. In the second half of 2020, NATO staff began to participate in international cooperation under the EU's Rapid Alert System (RAS), marking the strengthening of direct exchanges between the EU institutions, EU member states and third partners such as NATO in areas such as climate crisis early warning.[176]

3.2.2 Resource Interaction And The Interaction in Climate Conflict Warning And Crisis Prevention Among Organizations

In preventing and addressing climate crises and conflicts, the EU and NATO each has special resources and means. The EU's comparative advantages lie in its broad policy portfolio, financial resources and legislative power, while NATO has more experience and professional knowledge in security and defence.[177] However, the main role of member states

[174] "Environment, climate change and security," NATO, achieved July 18, 2024, accessed May 1, 2025, https://www.nato.int/cps/en/natohq/topics_91048.htm.

[175] "Seventh progress report on the implementation of the common set of proposals endorsed by EU and NATO Councils on 6 December 2016 and 5 December 2017," NATO, achieved June 20, 2022, accessed April 13, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/220620-progress-report-nr7-EU-NATO-eng.pdf.

[176] "Sixth progress report on the implementation of the common set of proposals endorsed by EU and NATO Councils on 6 December 2016 and 5 December 2017," NATO, achieved June 3, 2021, accessed April 13, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2021/6/pdf/210603-progress-report-nr6-EU-NATO-eng.pdf.

[177] Tuomas Iso-Markku, "EU-NATO Relations in a New Threat Environment: Significant complementarity but a lack

in relevant decision making as well as the insufficient inter-department channels prevent the synergy of measures originally complementary, and the dispute within each organization further increases the harmful duplication even competition in strengthening climate conflict warning and crisis prevention.

In terms of the exchange of sensitive information, accurate and correct data and information is the foundation of the early warning and crisis prevention, but this seems hard to fully achieve not only within but between the EU and NATO due to security consideration. The EU and NATO member states generally reluctant to share information regarding sensitive aspects of national security systems,[178] different member states have different preference for defining and sharing the so-called "sensitive" emission statistics or other environmental data with the EU and NATO, and sometimes provide climate data from different sources with different organizations considering the national security, which brings barriers for the EU and NATO to identify urgent climate crises and design the appropriate solutions collectively. Take the Czech Republic as an example, its Ministry of Defence only provides data on emission to the overall reports it processes for Eurostat, data for the Czech Republic reported to NATO are compiled by the Czech Hydrometeorological Institute,[179] which may lead to potential mistakes and mismatch in the following inter-organizational operation.

In terms of the departmental and official docking, the department overlap within the organization always causes the waste of resources and low efficient activities, the problem will become bigger if the two organization, which both have internal overlapped departments and overlapped task forces between them, start to interact with each other. Since not only the adaptation of climate change but also crisis management are handled by many ministries and departments at both the national and organizational level, it has been a long-lasting problem that the defence spending on climate conflicting warning and crisis prevention may be easily "parked" across these ministries or departments within the EU and NATO,[180] which leads to the inefficient and ineffective resource allocation of the EU and NATO in the field of crisis

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of strategic cooperation," *FIIA*, January 2024, https://fiia.fi/wp-content/uploads/2024/01/bp380_eu-nato-relations-in-a-new-threat-environment.pdf.

[178] Łukasz Maślanka Piotr Szymański, "The resilience of the European Union and NATO in an era of multiple crises," *OSW*, February 28, 2025, https://www.osw.waw.pl/en/publikacje/osw-commentary/2025-02-28/resilience-european-union-and-nato-era-multiple-crises.

[179] NATO Climate Change and Security Action Plan: Compendium of Best Practice," NATO, achieved July 10, 2023, accessed April 27, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2023/7/pdf/230710-climate-change-best-practices.pdf.

[180] Łukasz Maślanka Piotr Szymański, "The resilience of the European Union and NATO in an era of multiple crises," OSW, February 28, 2025, https://www.osw.waw.pl/en/publikacje/osw-commentary/2025-02-28/resilience-european-union-and-nato-era-multiple-crises.

management towards climate change. However, when it comes to the coordinated projects and operation between the EU and NATO for climate crisis prevention, the mismatch of departments handling the targeted issues brought by the distinct nature of the two organizations further increases the potential number of departments participating in the specific collective activities, exacerbating the possibility of the waste of money and the competition for defence budget.[181]

3.3 The Impact of The Overlapping Membership on The Interaction in Climate Conflict Warning And Crisis Prevention

South-East Europe is one of the most climate-vulnerable regions of the European Continent, its temperature is rising twice as fast as globally, leading to greater threats of natural disasters and other humanitarian crises and the need for multi-hazard early warning services.[182] The long history of neutrality and nonalignment makes Finland and Sweden keep the relevant value in the centre of their participation in CSDP as well as military cooperation with NATO, mainly manifested as focusing on peacekeeping, civilian crisis management and humanitarian assistance, which has become effective means to respond climate security risks in recent decades.[183] The CEE member states and Northern European member states have opposite topic ranking towards addressing climate security risks: the former pays more attention to adaptation measure rather than mitigation actions while the latter gives more priority to mitigation compared to adaptation in terms of the political mandate of the coordinating ministry as well as the level of funding.[184] But all these member states support the EU and NATO's efforts in climate crisis management, and have contributed to the inter-organizational coordination and operation concerning early warning and crisis prevention in their own way.

3.3.1 The Process of "Double Eastward Enlargement" And The Interaction in Climate Conflict Warning And Crisis Prevention Among Organizations

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[181] "Improving the quality of European defence spending," European Parliament, achieved November 2024, accessed May 1, 2025, https://www.europarl.europa.eu/RegData/etudes/STUD/2024/762855/EPRS_STU(2024)762855_EN.pdf.

[182] "Southeast Europe strengthens collaboration on climate adaptation," World Meteorological Organization, achieved February 7, 2025, accessed May 2, 2025, https://wmo.int/media/news/southeast-europe-strengthens-collaboration-climate-adaptation.

[183] Howorth, Jolyon, and Anand Menon, "Still Not Pushing Back: Why the European Union Is Not Balancing the United States," *The Journal of Conflict Resolution* 53, no. 5 (2009): 727–44, http://www.jstor.org/stable/20684612.

[184] Gram Hanssen, I., Aall, C., Drews, M., Juhola, S., Jurgilevich, A., Klein, R. J. T., Mikaelsson, M. A., & Lyngtorp Mik-Myer, V, "Comparison and analysis of national adaptation policies in the Nordic region," Nordic Council of Ministers, achieved August 21, 2023, accessed May 2, 2025, https://www.norden.org/en/publication/comparison-and-analysis-national-climate-change-adaptation-policies-nordic-region.

Since the security challenges brought by climate change are beyond the capabilities of most countries within the region, the CEE countries underline the essential role of the regional organizations such as the EU and NATO in adapting to the climate change and helping member states to build relevant capabilities. On this basis, they prefer to make full use of the support of the EU and NATO to strengthen their capacity for preventing and addressing climate crises and potential conflicts, strengthening the sub-regional and regional concerning the exchange of data, knowledge and experience of climate crisis prevention as well as the development of early warning systems.[185]

The CEE member states developed their own adaptation strategies or policies relatively late in general but have the similar understanding of preventing and managing climate crises with the EU and NATO, they have benefited more than contributed from the discussion platforms and collective actions concerning related topic between the two organizations. So far, many CEE member states as well as quasi-members such as Albania and Montenegro (which are the NATO members and the EU candidate members) have received the financial and humanitarian support from the EADRCC and the ERCC in responding to the climate disasters, including the wildfires in Albania and Montenegro in 2017 as well as the floods in Czech Republic and Poland in 2024.[186] Besides, some CEE member states have actively built national capacity for preventing the climate crisis which complements the organizational strengths as well, and led as well as promoted sub-regional cooperation in line with the requirements of the EU and NATO and contributing to the goals of the two organizations. The Ministry of Defence of Czech Republic has integrated the climate change factors into the training and exercises as well as disaster response mechanisms, its armed forces have been included in the integrated rescue system and has aiding in cases of climate disasters. The Ministry of Defence of the Republic of Slovenia has implemented a study called "PamPIK" to find solutions of developing smart deployable infrastructure capacities for Slovenian Armed Forces, the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief and itself, helping to prevent from the climate impacts and other threats from natural disasters.[187] The Slovenia's Ministry of the Environment, Climate and Energy hosted

[185] "Southeast Europe strengthens collaboration on climate adaptation," World Meteorological Organization, achieved February 7, 2025, accessed May 2, 2025, https://wmo.int/media/news/southeast-europe-strengthens-collaboration-climate-adaptation.

[186] "10 years of the Emergency Response Coordination Centre (ERCC)," European Commission, accessed May 2, 2025, https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/emergency-response-coordination-centre-ercc/10-years-emergency-response-coordination-centre-ercc_en?pk_source=website&pk_medium=advert&pk_campaign=news_ticker.

[187] "Smart Energy Efficient Camps (SmartEEC) – the feasibility study," Si EnE, accessed April 30, 2025, https://www.

the sub-regional conference concerning strengthen collective capability to adapt to climate change, proposed to develop the South-East European Multi-Hazards Early Warning System, which plays an important role in localizing the EU and NATO measures of climate crisis prevention.[188]

3.3.2 The Process of "Double Northward Enlargement" And The Interaction in Climate Conflict Warning And Crisis Prevention Among Organizations

The integration process of Finland and Sweden into NATO demonstrates their further integration in the European security and defence system in fact.[189] Both Finland and Sweden has long acknowledged the essential role of the EU and NATO in capability development, countering hybrid threats and crisis management, which has been further underlined after they joined NATO recently, and have stressed the potential climate security risks such as unexpected migration flows, greater global uncertainty and conflicts, which require the two organizations to address collectively.[190]

Finland and Sweden have insisted the necessity of regional and international cooperation to prevent and respond to cross-border crisis such as climate change,[191] their community-centred and comprehensive crisis prevention and management approaches provide the EU and NATO with better practice for early warning and crisis response, and further promote the information exchange and operation coordination between the two organizations at multiply levels. The two countries consider climate change as an engine for immigration, and believe it would put a strain on their social security services and increase pressure on facilitating integration into the society.[192] The Finnish Red Cross and the Finnish Meteorological Institute supported to build the national early warning system and integrate improved forecast with a multi-hazard approach, aiming at ensuring the accessible forecasts and warnings as

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siene.si/en/pampik.

[188] "Southeast Europe strengthens collaboration on climate adaptation," World Meteorological Organization, achieved February 7, 2025, accessed May 2, 2025, https://wmo.int/media/news/southeast-europe-strengthens-collaboration-climate-adaptation.

[189] Migliorati, Marta, "New Nordic Pathways? Explaining Nordic Countries' Defence Policy Choices in the Wake of the Ukrainian War," *Journal of European Public Policy* 31, no.10 (2024): 3249–74, doi:10.1080/13501763.2024.2314247.

[190] Mikael Hildén et., "Ilmastonmuutoksen Heijastevaikutukset Suomeen," Prime Minister's Office, achieved December 2016, accessed April 21, 2025, https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/79783/Ilmastomuutoksen%20heijastevaikutukset%20Suomeen.pdf.

[191] Gunvor Kronman and Fredrik Bynander, "Finland and Sweden able to contribute to the civil preparedness capabilities of NATO and the EU," Encompass, achieved August 2022, accessed May 2, 2025, https://encompass-europe.com/comment/finland-and-sweden-able-to-contribute-to-the-civil-preparedness-capabilities-of-nato-and-the-eu.

[192] Hakala, Emma, Ville Lähde, Antti Majava, Tero Toivanen, Tere Vadén, Paavo Järvensivu, and Jussi T. Eronen, "Northern Warning Lights: Ambiguities of Environmental Security in Finland and Sweden," *Sustainability* 11, no. 8 (2019): 2228, https://doi.org/10.3390/su11082228.

well as feasible decisions and actions based on them.[193] The Finnish Defence Forces has also contributed in managing disruptions caused by natural disasters based on requests and its own resources at that time according to the national legislation.[194] Since the frequency and length of the so-called high-risk periods continuously increase with climate change and the high-cost of natural disasters such as wildfires and floods, Sweden also pays more and more attention to building the early warning systems and the crisis prevention mechanism involving multiply social actors.[195] In August 2021, Finland and Sweden proposed a new bilateral crisis preparedness training programme called "the Hanaholmen Initiative", aiming at strengthening bilateral cooperation before and during civilian emergencies like fires and floods and including the baseline requirements for national resilience of NATO. This programme also plans to establish a joint strategic early warning system which applies to climate and hybrid threats as well as other civilian crises,[196] setting a feasible template for both the EU and NATO to strengthen the member states and organization's capacity of crisis prevention as well as laying the cornerstone for further inter-organizational collective actions concerning relevant issues.

[193] "Advancing Early Warning and Early Action: A Community-centred Approach by the Finnish Red Cross," accessed May 2, 2025, https://redcross.eu/projects/advancing-early-warning-and-early-action-a-community-centred-approach-by-the-finnish-red-cross.

[194] "NATO Climate Change and Security Action Plan: Compendium of Best Practice," NATO, achieved July 10, 2023, accessed April 27, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2023/7/pdf/230710-climate-change-best-practices.pdf.

[195] "Managing the increasing risk of wildfires in a changing climate, Sweden," Climate ADAPT, accessed May 2, 2025, https://climate-adapt.eea.europa.eu/en/metadata/case-studies/managing-the-increasing-risk-of-wildfires-in-a-changing-climate-sweden.

[196] Gunvor Kronman and Fredrik Bynander, "Finland and Sweden able to contribute to the civil preparedness capabilities of NATO and the EU," Encompass, achieved August 2022, accessed May 2, 2025, https://encompass-europe.com/comment/finland-and-sweden-able-to-contribute-to-the-civil-preparedness-capabilities-of-nato-and-the-eu.

Chapter 4 The EU-NATO Climate Security Interaction in Climate Security Concepts And Standards Setting

As the security impacts of climate change have attracted widespread attention from the international community, climate security concepts and standards setting are gradually becoming an important way for countries and international organizations to enhance their international influence. Climate security concepts and standards setting refers to securitize the climate change issues at the international level and promote as many countries and other political entities as possible to accept and use the climate security standards or governance procedures under multilateral cooperation framework. The EU and NATO have been seeking to promote its own climate security governance mechanism with neighbouring countries and at the United Nations level, particularly focusing on issues that are consistent with their democratic values and have geostrategic significance to them, such as WPS and Arctic governance against the background of climate change. The alignment of the values, rules, measures and operations of the two organizations concerning the above issues has a profound impact on their climate security interaction.

4.1 The Impact of The Alignment of Interests Among Major Member States on The Interaction in Climate Security Concepts And Standards Setting

The climate change and the related global warming has promoted the transition of international natural environment, which has also further impacted the international political power and shaped the global governance with new topics and forced the EU and NATO as well as their member states to work harder on not only strengthening climate security assistance to neighbouring countries, but leading and participating in the UN CSM. Among them, the United States, France, Germany, and the United Kingdom have played the main role in designing the agendas and measures for the EU and NATO to participate in neighbouring and international climate security governance. These countries seek to enhance their influence in the multilateral climate security framework and strive to promote their own preferred and differentiated principles and standards for climate security governance, which greatly shapes the relevant operation of and interaction between the EU and NATO in participating in the regional and international climate security framework.

4.1.1 Organizational Goal Approach And Results of The United States, France, Germany And The United Kingdom

The United States attaches great importance to maintaining its competitiveness in the new geopolitical field and its voice in the new governance field. It has insisted to use the American principles and measures to shape the global climate governance system especially under the UN framework and paid special attention to enhancing its strategic influence in the Arctic region against the changing environmental background. The United States focuses on incorporating the climate security agenda into international multilateral mechanisms such as the UN and has long participated in multilateral UN climate conferences and cooperation goal setting. By the time of the Biden administration, the United States has explicitly proposed to promote climate security as a priority for the UN and strive to incorporate the U.S.-led climate security mechanisms and norms into the existing UN CSM. On one hand, the United States seeks to build an "intergovernmental climate security coordination mechanism" (CSCM) to communicate international climate change governance and security governance and strengthen "military-civilian cooperation" in the field of climate security. On the other hand, the United States proposed that international climate security governance should follow the principle of "responsibility for preparation and prevention" (R2P2) to interfere in more diverse geopolitical affairs in the name of climate security.[197] In addition, as one of the most climate-vulnerable regions, the Arctic is regarded as having more and more strategic value in military security as the ice sheet and permafrost melt, and the United States seeks to strengthen its military deployment and specific technology research and development in the region. To be specific, the United States has not only actively assessed the impact of Arctic glacier melting on the combat readiness of its troops, but also focused on improving the climate change adaptability of its own military facilities and personnel conducting operations in the Arctic. It has also established a National Arctic Security Council to formulate relevant policies based on principles of the climate and geography.[198] Against this background, the United States has actively promoted NATO's participation in the multilateral climate assistance and climate crisis prevention for vulnerable neighbouring countries and regions as well as the security governance in the Arctic region, especially in jointly formulating methods and standards for the use of the expanding Arctic shipping routes

[197] Caitlin E. Werrel and Franceco Femia, "The Responsibility to Prepare and Prevent: A Climate Security Governance Framwork for the 21st Century", *The Centre for Climate and Security*, October 2019, https://climateandsecurity.org/wp-content/uploads/2019/10/the-responsibility-to-prepare-and-prevent_a-climate-security-governance-framework-for-the-21st-century_2019_10.pdf.

[198] Li Xinlei, "Climate Security and Hegemonic Maintenance: Global Promotion of the US Climate Security Strategy," *Journal of International Security Studies* 41, no. 2 (2023): 99.

in peacetime and wartime as the sea ice melts, to maintain the rules-based international order such as freedom of navigation.[199]

France aims to become the first major industrial country to wean itself off fossil fuels and has led and contributed to setting the goals for global mitigation and adaption to climate change at the UN level, it has also paid great attention to the geopolitical impact of climate change in other regions due to its wide territory around the world as well as the ambition of being the global leading power. From 2007 to 2020, France has long been one of the driving forces of the climate security debate within the UNSC.[200] The 2015 Paris Agreement, which proposed to limit the increase in global average temperature to well below 2°C above pre-industrial levels and strive to limit the temperature increase to 1.5°C above pre-industrial levels, is regarded as valuable national achievement by French government. France has made these goals a priority in its domestic and foreign policies, and the French Development Agency is the first development bank to set an objective of 100% alignment with the Paris Agreement as well as promote the same approach among the International Development Finance Club (IDFC) and other multilateral organizations. Besides, France has proposed the Climate Risk Early Warning Systems (CREWS) with many other European Countries such as Germany, Luxembourg and Netherlands as well as the U.S., focusing on strengthening the capacity of LDC and SIDS for climate crisis prevention.[201] As for other regions, France has insisted the importance of the EU's participation in the mitigation and adaptation actions of other vulnerable countries. France has initiated the Adapt'Action Programme which aims to assist 15 countries fulfil the objectives of the 2015 Paris Agreement in 2017, it has further promoted the revision of the EU Adaptation Strategy which emphases the necessity of the collective foreign assistance of European countries in addressing the transborder climate risks in 2018 based on that.[202] Also,the former Minister of the Armed Forces, Florence Parly, once

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[199] "'NATO will defend Allied interests in the Arctic' says Chair of NATO Military Committee," NATO, achieved Oct ober 19, 2024, accessed April 13, 2025, https://www.nato.int/cps/en/natohq/news_229940.htm.

[200] Estève, A., "Preventing and Managing Climate Risks: France's Approach to Climate Security," In *Climate Security in the Anthropocene. The Anthropocene: Politik—Economics—Society—Science* 33, Springer (2023), https://doi.org/10.1007/978-3-031-26014-8_6.

[201] "France's action in climate negotiations," Ministère De L'Europe Et Des Affaires Étrangères, accessed May 5, 2025, https://www.diplomatie.gouv.fr/en/french-foreign-policy/climate-and-environment/the-fight-against-climate-change/international-climate-change/article/france-s-action-in-climate-negotiations#:~:text=In%20order%20to%20help%20raise,nationally%20determined%20contributions%20(NDCs).

[202] Estève, A., "Preventing and Managing Climate Risks: France's Approach to Climate Security," In *Climate Security in the Anthropocene. The Anthropocene: Politik—Economics—Society—Science* 33, Springer (2023), https://doi.org/10.1007/978-3-031-26014-8_6.

underlined the security impact of climate change in the Arctic and the related strategic equilibrium in the region during the meeting with the European Defence Ministers in 2019.[203]

Germany has long considered climate security issues as its priority in the United Nations and is one of the main countries participating in the discussion of climate change within the Security Council, it has also actively promoted the coordination of climate diplomacy and crisis management within the EU and NATO and strengthened the two organizations cooperation with other multilateral institutions based on that. As the member of the "Group of Friends for leading on environmental management in the field" and "Action for Peacekeeping", Germany supports the adaptation of the UN Peace Operations and Troop Contributing Countries to the impacts of climate change.[204] It particularly emphasizes that climate change, as a driver of conflict, requires major countries to strengthen defence and military investment at the international level to cooperate in response. In 2011, Germany led the second debate on climate change in the Security Council, specifically pointing out that climate change is a major factor affecting global violence and conflict.[205] In 2019, Michaela Spaeth, head of energy and climate policy at the German Foreign Ministry, made it clear that Germany's main task during its term as a non-permanent member of the UN Security Council is to promote climate security as a mainstream issue in Security Council resolutions.[206] All these attitude and efforts have also largely influenced the EU's position and operation within the UN framework for climate governance. In October 2022, Germany launched the Group of Friends on Ambitious Climate Diplomacy with Demark, and Finland, France, Ireland, Latvia, Luxembourg, Netherland, Spain and Sweden joined in the following years. This group is aimed to enhance the nexus between climate and security within EU foreign policy,[207] creating new opportunity for the EU to promote climate security concept and standards in one voice, which demonstrates Germany's leading role in coordinating the EU's climate

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[203] "Implications of Climate Change on Defence and Security in the South Pacific by 2030," Ministry of Armed Forces, achieved May 2019, accessed May 5, 2025, https://archives.defense.gouv.fr/content/download/558233/9668077/OBS_Climat%20et%20d%C3%A9fense_201905-RE-Implications%20of%20Climate%20Change%20in%20the%20South%20Pacific%20by%202030%20-%20SPDMM%20Report.pdf.

[204] "Strategy on Defence and Climate Change," Bundesministerium der Verteidigung, achieved March 2024, accessed April 26, 2025, https://www.bmvg.de/resource/blob/5759520/5308c4904ff6fc0780061b6e424fc27e/strategy-on-defence-and-climate-change-data.pdf.

[205] "6587th Meeting, S/PV. 6587," UNSC, achieved July 20, 2011, accessed April 13, 2025, https://www.securitycouncilreport.org/atf/cf/%7B65BFCF9B-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/s_pv_6587.pdf.

[206] Raquel Munayer, "'We will address climate-related security risks in the Security Council' – Interview with German Diplomat Michaela Spaeth," *Climate Diplomacy*, April 15, 2019, https://climate-diplomacy.org/magazine/cooperation/we-will-address-climate-related-security-risks-security-council-interview.

[207] "Launch of the Group of Friends for an Ambitious EU Climate Diplomacy," Germany Federal Foreign Office, achieved October 17, 2022, accessed April 11, 2025, https://www.auswaertiges-amt.de/en/newsroom/news/group-of-friends-eu-climate-2558706#:~:text=On%2017%20October%202022%2C%20EU,defining%20challenge%20of%20our%20time.

diplomacy and lays the solid cornerstone for the regional organizations represented by the EU to work better in global climate governance and international climate assistance.

The United Kingdom has long been committed to shaping the common understanding of the international community on climate security, it is not only a pioneer in promoting discussions on climate change at the UN Security Council, but also a major partner in addressing security risks of climate change in neighbouring countries and regions such as the Arctic. In 2007, the United Kingdom attempted to discuss the security impact of climate change at the UN Security Council level, arguing that climate change could lead to border disputes, immigration issues, energy and other resource shortages, social pressures and humanitarian crises, thus threatening global security and human security.[208] In this way, it successfully promoted an open debate at the Security Council on the relationship between energy, security and climate change. In 2012, the United Kingdom further held the "21st Century Climate and Energy Security Dialogue", inviting climate and military science experts from various countries to discuss multi-level climate security policy cooperation to overcome the new risks brought by climate change to global security and prosperity,[209] demonstrating its leading role in multilateral climate governance. On the other hand, the United Kingdom believes that the climate change in Arctic will lead to more extreme weather events domestically and insists to maintain the Arctic region as one of high cooperation and low tension[210] and has underlined the necessity of cooperation for exploring the potential climate risks and forming reliable collective solutions towards climate change with other member states of the EU and NATO. The United Kingdom has the world-class scientific expertise of the Arctic research community, which has long contributed to the regional climate adaptation actions with comprehensive data and scientific measures. The UK Parliament proposed to set a code of conduct for sustainable businesses of British and other countries companies in Arctic, and promote the IMO to adopt the ban on heavy fuel oil in the Arctic as soon as possible.[211] The UK Government has also stressed to support NATO to take

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[208] Emyr Jones Parry, "The Greatest Threat to Global Security: Climate Change is Not Merely an Environmental Problem," United Nations, achieved June 1, 2007, accessed April 13, 2025, https://www.un.org/en/chronicle/article/greatest-threat-global-security-climate-change-not-merely-environmental-problem.

[209] "Meeting the Climate Security Challenge," Foreign and Commonwealth Office, achieved March 23, 2012, accessed April 13, 2025, https://www.gov.uk/government/news/meeting-the-climate-security-challenge.

[210] "Looking North: The UK and the Arctic. The United Kingdom's Arctic Policy Framework," UK Government, achieved February 9, 2023, accessed May 5, 2025, https://www.gov.uk/government/publications/looking-north-the-uk-and-the-arctic/looking-north-the-uk-and-the-arctic-the-united-kingdoms-arctic-policy-framework#:~:text=The%202021%20Integrated%20Review%20confirmed,the%20implications%20of%20climate%20change.

[211] "The UK and the Arctic Environment-Report Summary," UK Parliament, achieved October 13, 2023, accessed May 5, 2025, https://publications.parliament.uk/pa/cm5803/cmselect/cmenvaud/1141/summary.html.

a more proactive long-term approach to the Arctic and acknowledge the leadership and expertise of the Arctic Allies in terms of climate security governance.[212]

4.1.2 Organizational Strategy Approach And Results in The United States, France, Germany And The United Kingdom

The United States has basically welcomed and supported the collective efforts of the EU and NATO to integrate the climate factors into the UN WPS projects and played main role in the two organizations' climate security interaction in the Arctic. In general, the United States underlines the leading role of Arctic countries in the Arctic governance including climate security issues, believes both NATO and the EU's engagement in the Arctic climate governance should base on the bilateral or multilateral cooperation with the eight Arctic countries. The United States has acknowledged the importance of the EU as an active partner in addressing climate security risks in the Arctic but preferred to keep its engagement to the minimum possible,[213] and sought to cooperate with the EU through existing international forums and legal frameworks. It not only aligns itself with the position of the EU in terms of the Northwest Passage but regards the EU's engagement in the Arctic as an added value to build partnership with the EU on climate security issues.[214] Besides, The United States has insisted that NATO plays an essential role in responding to the complex security impact of climate change in the Arctic, such as the changing environment of submarine operations, boreal wildfire, environmental degradation brought by environmental catastrophes and human-made disasters. However, the United States has failed to lead NATO to propose an Arctic strategy which clarifies NATO's climate security goals and missions within the region, and this leads to the overlap among existing national and organizational command structures which does harm to the efficient participation of NATO in the Arctic.[215]

France has long worked as a leading member state within the EU and NATO's actions to address climate security risks from the gender perspective under the UN WPS project and aimed to further expand its engagement in the Arctic climate security governance as a

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[212] "Looking North: The UK and the Arctic. The United Kingdom's Arctic Policy Framework," UK Government, achieved February 9, 2023, accessed May 5, 2025, https://www.gov.uk/government/publications/looking-north-the-uk-and-the-arctic/looking-north-the-uk-and-the-arctic-the-united-kingdoms-arctic-policy-framework#:~:text=The%202021%20Integrated%20Review%20confirmed,the%20implications%20of%20climate%20change.

[213] Wegge, Njord. "The EU and the Arctic: European Foreign Policy in the Making." *Arctic Review on Law and Politics* 3, no. 1 (2012): 28. https://www.jstor.org/stable/48710161.

[214] Piotr Kobza, "Civilian Power Europe in the Arctic: How Far can the European Union go North," *EU Diplomacy Paper 1* (2015), https://www.coleurope.eu/sites/default/files/research-paper/edp_2015_1_kobza_0.pdf.

[215] Mathieu Boulègue, Minna Ålander, Charlotta Collén, Edward Lucas, Catherine Sendak, and Krista Viksnins, "Up North: Confronting Arctic Insecurity Implications for the United States and NATO," *CEPA*, December 5, 2024, https://cepa.org/comprehensive-reports/up-north-confronting-arctic-insecurity-implications-for-the-united-states-and-nato/.

member state of the EU and NATO, which in turn promote the cooperate between the two organizations on relevant issues. The International Military Council on Climate Security (IMCCS) proposed by the French think tanks and partners from the U.S. and Netherland aims at exploring the high-order security risks and geopolitical impacts of climate change as well as its impact on military and defence,[216] contributing to the climate projects design and standards setting of the EU and NATO at the international level. France has long holden the observer seat on the Arctic Council and insisted to reduce fossil energy development and use in the Arctic as well as protect the Arctic from climate change consequences.[217] France's strategic objectives in the Arctic includes establishing its influence in a competitive area reshaped by climate change, which requires multilateral cooperation under major regional mechanisms such as the EU and NATO. The French military has participated in exercise with Arctic countries in extreme-cold conditions for several times and contributed to the EU and NATO's inclusion and cooperation with its discourse and rich tools as it was the second-largest non-Arctic participant in the Arctic Challenge 2019 exercise.[218] The French Government also organized the One Polar Summit in 2023 which aims mitigate the disastrous climate change consequences in the polar regions with multilateral efforts,[219] attracting most of the EU and NATO member states to participate and largely shaping the common position of the two organizations on relevant issues.

Germany has insisted the policy of Integrated Security which stresses that its security is indivisible from that of its European partners and allies, focused on including the collective capabilities of crisis prevention and conflict management in the EU and NATO's climate security action at international and multilateral levels, and holden a climate diplomacy in line with the feminist principles which contributes to the EU and NATO's engagement in UN WPS project. The Germany Federal Government declares to increase the impact of women in policymaking of climate diplomacy, committing to finding solutions that strongly consider the needs and rights of women at the international level, such as supporting the EU and

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[216] Estève, A., "Preventing and Managing Climate Risks: France's Approach to Climate Security," In *Climate Security in the Anthropocene. The Anthropocene: Politik—Economics—Society—Science* 33, Springer (2023), https://doi.org/10.1007/978-3-031-26014-8_6.

[217] Alix Renaudin, "France's Strategic Role in NATO's Arctic Ambitions: A Non-Arctic Power's Perspective," *The Arctic Institute*, November 12, 2024, https://www.thearcticinstitute.org/frances-strategic-role-natos-arctic-ambitions-non-arctic-powers-perspective/.

[218] Marie Jourdain, "Climate security can help bring the US and France together once again," *Atlantic Council*, November 19, 2021, https://www.atlanticcouncil.org/blogs/new-atlanticist/climate-security-can-help-bring-the-us-and-france-together-once-again/.

[219] Alix Renaudin, "France's Strategic Role in NATO's Arctic Ambitions: A Non-Arctic Power's Perspective," *The Arctic Institute*, November 12, 2024, https://www.thearcticinstitute.org/frances-strategic-role-natos-arctic-ambitions-non-arctic-powers-perspective/.

NATO's efforts in WPS project.[220] As a leading power, the Bundeswehr would use resources and capabilities that are available to provide support as part of administrative assistance in the event of natural disasters or other grave incidents caused by climate change abroad, and the internation civil-military cooperation with the UN Office for the UN OCHA, the UNCT, NATO's Euro-Atlantic Disaster Response Coordination Centre and the EU's Emergency Response Coordination Centre is especially important.[221] As for the Arctic climate security governance, the Germany Federal Government has supported its EU and NATO partners in the region in defending shared climate security interests, focusing on implementing systematic climate and environmental protection policy in the Arctic and aiming to developing the highest environmental and safety standards in all economic activities in the Arctic's sensitive ecosystem. Germany is also actively promoting the international collective actions including the cooperation between the EU and NATO to develop a binding disaster response mechanism for the Arctic Ocean, further improving the early warning system and strengthening prevention and elimination of damage.[222]

The United Kingdom has long worked actively to support the discussion and cooperation on climate security concepts and standards between the EU and NATO based on the platforms it provides and has supported the EU and NATO's climate security concepts and standards setting through diverse mechanisms. It has not only given weight to the Arctic and maritime issues on the international climate change conferences it holds but strengthened the bilateral and multilateral communication on climate security with the EU and NATO's Arctic member states. During the COP26 held in Glasgow, the United Kingdom made the climate security fully included in the agenda at COP and promoted NATO to be present at the COP for the first time.[223] It worked hard to let the Arctic countries and communities' voice heard by the whole world, promoted the developed courtiers which are mainly the EU and NATO member states to agree to double support for vulnerable countries' action on adapting to climate change by 2025, and integrated the ocean issues into the work of all relevant parts of the UN climate change convention which were also supported by NATO and the EU.

[220] "National Security Strategy: Rubust, Resilient, Sustainable-Integrated Security for Germany," The Federal Government, achieved June 2023, accessed May 8, 2025, https://www.nationalesicherheitsstrategie.de/National-Security-Strategy-EN.pdf.

[221] "Strategy on Defence and Climate Change," Bundesministerium der Verteidigung, achieved March 2024, accessed April 26, 2025, https://www.bmvg.de/resource/blob/5759520/5308c4904ff6fc0780061b6e424fc27e/strategy-on-defence-and-climate-change-data.pdf.

[222] "Germany's Arctic Policy Guidelines: Germany and the Arctic in the context of the climate crisis and the Zeitenwende," The Federal Government, achieved September 2024, accessed May 8, 2025, https://www.auswaertiges-amt.de/resource/blob/2676060/5496910022404f7cf68049f1b10e4d5a/arktis-leitlinien-data.pdf.

[223] "Remarks," NATO, achieved November 5, 2021, accessed May 9, 2025, https://www.nato.int/cps/en/natohq/opinions_188262.htm.

Besides, since the EU ana NATO's engagement in the Arctic climate security governance largely depends on the interaction between their member states, the United Kingdom has worked closely with Finland, Sweden and the United States on the knowledge sharing, scientific research, early warning system as well as disaster relief in the Arctic,[224] which in turn created the coordination space for the two organizations within this region.

4.2 The Impact of Overlap in Crisis Management Functions on The Interaction in Climate Security Concepts And Standards Setting

The climate diplomacy refers to the use of diplomatic tools to support the achievement of the international climate goals and reduce the negative impacts of climate change on peace, stability and prosperity,[225] which stresses the importance of cooperation with global partners in addressing climate security risks. The EU and NATO have common understanding in promoting democratic values through climate security diplomacy but weigh the significance of climate security diplomacy differently. The former emphasises the importance of vulnerability reduction outside its own territory and has been working on funding mitigation and adaption projects outside of the union, while the latter pays more attention on the importance of adapting its internal military actions to climate change impacts. At the same time, the two organizations have complementary resources in dealing with climate security risks, the EU has the advantages in the finance, delegations and its programming especially in fragile and conflict-affected countries while NATO works better on the standardization and benchmarking of the relevant issues, such as proposing methodology for mapping emission.[226] On this basis, the EU and NATO prefer to cooperate rather than compete in promoting their climate security concepts and standards at the international level with their respective resources, focusing on coordinating policies and actions concerning UN WPS project, the climate assistance towards the neighbouring countries as well as the Arctic governance in the context of climate change.

4.2.1 Normative Interaction And The Interaction in Climate Security Concepts And Standards Setting Among Organizations

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[224] "Looking North: The UK and the Arctic—The United Kingdom's Arctic Policy Framework," UK Government, achieved February 9, 2023, accessed May 9, 2025, https://www.gov.uk/government/publications/looking-north-the-uk-and-the-arctic/looking-north-the-uk-and-the-arctic-the-united-kingdoms-arctic-policy-framework#:~:text=The%202021%20Integrated%20Review%20confirmed,the%20implications%20of%20climate%20change.

[225] "Climate diplomacy can also be used to shape our external relations," European Economic and Social Committee, achieved June 16, 2023, accessed May 6, 2025, https://www.eesc.europa.eu/en/news-media/news/climate-diplomacy-can-also-be-used-shape-our-external-relations.

[226] Anniek Barnhoorn, "Comparing responses to climate-related security risks among the EU, NATO and the OSCE," Stockholm International Peace Research Institute, April 2023, 34.

With their similar core values and different region focuses, the EU and NATO have actively promoted the integration of gender perspective into climate security issue at the UN as well as other multilateral frameworks level, generally acknowledged the leadership of each other in climate security projects targeted at specific areas and participated in the discussion to share and learn knowledge and best practices from each other.

As for the gender and climate security, the EU and NATO have underlined the importance of exploring the relationship between gender and climate security issues in their own climate strategies as well as climate diplomacy and have worked together within the UN framework to evaluate the climate vulnerability and find sustainable solutions from the perspective of gender. Since women and girls tend to be disproportionately vulnerable to negative effects of climate change, the EU stresses the significance of the systematic inclusion of a gender perspective of its approach within the climate security nexus,[227] and has long made the WPS agenda a core principle of the CFSP.[228] NATO also aims to enhance research on how gender impacts the vulnerabilities to climate security risks and regards it a goal of establishing the annual impact assessment,[229] and integrated the WPS agenda across its core tasks including deterrence and defence, crisis prevention and management and cooperative security in the 2022 Strategic Concept. On this basis, the cooperation between the EU and NATO is an essential part of their WPS works from the start, mainly manifesting in learning from and building on each other's experiences at bilateral and multilateral levels.[230] The EU and NATO have been actively exchanging experiences in integrating a gender perspective into climate security issues based on the UN WPS project, with relevant cooperation led by the NATO International Military System and the EU Mission.[231]

As for the climate security assistance towards neighbouring countries, the NATO's leadership in European and the EU's leadership in Africa and other regions have been acknowledged by each other, and the two organizations have also stayed in touch and stressed the necessity of keeping coordination based on multilateral platforms. The EU has cooperated with the African Union and the League of Arab States and is considering

[227] "Concept for An Integrated Approach on Climate Change and Security," Council of the European Union, achieved October 5, 2021, accessed April 12, 2025, https://data.consilium.europa.eu/doc/document/ST-12537-2021-INIT/en/pdf.

[228] "Implementing the Women, Peace and Security agenda," EEAS, achieved November 7, 2024, accessed May 6, 2025, https://www.eeas.europa.eu/eeas/implementing-women-peace-and-security-agenda_en.

[229] "Climate Change and Security Action Plan," NATO, achieved June 14, 2021, accessed April 12, 2025, https://www.nato.int/cps/uk/natohq/official_texts_185174.htm.

[230] "Women, Peace and Security," NATO, achieved October 31, 2024, accessed May 6, 2025, https://www.nato.int/cps/en/natohq/topics_91091.htm?

[231] "Eighth progress report on the implementation of the common set of proposals endorsed by EU and NATO Councils on 6 December 2016 and 5 December 2017," NATO, achieved June 16, 2023, accessed April 13, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2023/6/pdf/230616-progress-report-nr8-EU-NATO.pdf.

cooperation with the Association of Southeast Asian Nations in dealing with climate security risks, while NATO discussed with its allies and partners at the Istanbul Cooperation Initiative Regional Centre in Kuwait to address climate security risks and promote potential cooperation. NATO has also supported the project "Strengthening Responses to Security Risks from Climate Change in Southeastern Europe, Eastern Europe, the South Caucasus and Central Asia", focusing on raising awareness, developing capacities and sharing knowledge among the regions and promoting climate change adaptation measures in the most vulnerable geographic areas with all partners such as the EU.[232] On this basis, The EU and NATO focus on strengthening cooperation in supporting the defence and security capacity building of partner countries such as Bosnia and Herzegovina, Georgia, Jordan, Moldova, Tunisia, Ukraine and Mauritania against the background of climate change. They have not only discussed and coordinated energy and environmental assistance initiatives under the European Peace Fund and NATO's comprehensive assistance plan to Ukraine,[233] but also plan to strengthen the potential synergy between the two sides in supporting Mauritania to build its climate security response capabilities.[234]

4.2.2 Resource Interaction And The Interaction in Climate Security Concepts And Standards Setting Among Organizations

When it comes to the climate security concepts and standards setting at the international level, the EU and NATO often work better on leveraging their complementary resources such as delegation and standardization. Compared to the EU, NATO has a more task-driven instead of a comprehensive relationship with the UN, such us the NATO Civilian Liaison Officer to the UN, the NATO Military Liaison Officer to the UN and mechanism for the NATO Secretary-General to regularly report to the UN Secretary-General. Meanwhile,[235] NATO does better in the standardization and interoperability of security actions based on its rich experience and knowledge and due to the fragmented EU defence system. Thus, the EU

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[232] "NATO Climate Change and Security Action Plan: Compendium of Best Practice," NATO, achieved July 10, 2023, accessed April 27, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2023/7/pdf/230710-climate-change-best-practices.pdf.

[233] "Seventh progress report on the implementation of the common set of proposals endorsed by EU and NATO Councils on 6 December 2016 and 5 December 2017," NATO, achieved June 20, 2022, accessed April 13, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/220620-progress-report-nr7-EU-NATO-eng.pdf.

[234] "Ninth progress report on the implementation of the common set of proposals endorsed by EU and NATO Councils on 6 December 2016 and 5 December 2017," NATO, achieved June 13, 2024, accessed April 13, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/2024/6/pdf/240613-progress-report-nr9-EU-NATO.pdf.

[235] "Relations with the United Nations," NATO, achieved July 25, 2023, accessed May 6, 2025, https://www.nato.int/cps/en/natohq/topics_50321.htm#:~:text=Practical%20cooperation%20between%20NATO%20and,)%3B%20arms%20control%20and%20non%2D.

and NATO basically learn from each other to play a more effective role in providing climate assistance and disaster relief for neighbouring countries as well as proposing initiatives and projects within the UN.

In terms of the interaction of their representatives to the UN, the task-driven relationship between NATO and the UN and the comprehensive and high-level participation of the EU in the UN framework gives the EU and NATO different scope and effectiveness for action within the UN and brings more space for organizational cooperation to achieve collective climate security goals. The EU has a dedicated delegation to the UN which can not only actively present common positions, make interventions, present proposals and participate in the general debate in the General Assembly.[236] However, NATO can mainly interact with the UN through joint statements and doesn't have a delegation or envoy representing the organization as a whole.[237] Lack of the collective representation makes it difficult for NATO to take the initiative in leading the projects or actions under the UN framework except responding to the UN demands concerning defence and security and leaving the EU a stronger organization to propose multilateral climate security agenda and proceed following work more effectively with NATO's participation and assistance. Given the voluntary nature of most climate security governance initiatives, the impact of the asymmetric representation of NATO and the EU in international multilateral mechanisms such as the UN is especially significant, prompting NATO to cooperate with the EU to play a role in broader climate security issues.

In terms of the standardized measures and tools towards the neighbouring countries, the EU's defence and security systems and relevant standards are largely established following the footsteps of NATO but still facing huge challenges of the fragmentation of defence base such as budget, procurement and tools,[238] making it hard for EU to compete with NATO in operating high-standard collective climate security actions especially towards the neighbouring countries and regions. Interchangeability and interoperability are the key issues for the EU and NATO to strengthen the internal coordination concerning crisis management, including the prevention of climate crises and potential conflicts. For a long time, the EU and

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[236] "The European Union and the United Nations," EEAS, achieved December 30, 2024, accessed May 6, 2025, https://www.eeas.europa.eu/un-new-york/european-union-and-united-nations_en?s=63#:~:text=The%20General%20Assembly%20is%20the,the%20general%20debate%20each%20September.

[237] "Relations with the United Nations," NATO, achieved July 25, 2023, accessed May 6, 2025, https://www.nato.int/cps/en/natohq/topics_50321.htm#:~:text=Practical%20cooperation%20between%20NATO%20and,)%3B%20arms%20control%20and%20non%2D.

[238] "No more 'national preference': fragmentation is threat to security, EDA tells EESC forum," The European Economic and Social Committee, achieved February 12, 2025, accessed May 6, 2025, https://www.eesc.europa.eu/en/news-media/news/no-more-national-preference-fragmentation-threat-security-eda-tells-eesc-forum.

NATO have attached importance to improving the interoperability of their projects and operations by strengthening standardization. Both the NATO Committee for Standardization and the European Defence Standardization Group have actively invited each other to participate in relevant meetings and activities to improve transparency and collaboration by strengthening information sharing, and the EU has recognized NATO's leading role in military security standards based on Standardisation Agreements (STANAG). Among them, climate change and its risk response have increasingly become important topics.[239] NATO has the dedicated groups, the EPWG and STEEEP, to make environmental protection standards and promote relevant cooperation with partners. The STANAGs reached by NATO and its partners including the EU cover a huge range of technical specifications for equipment and common practices such as the specifications to make national communications systems compatible and formats to facilitate sharing intelligence and other information, which are essential for the climate crisis prevention and potential conflicts management.[240] On this basis, the above standards and practices has provided the EU and NATO with interchangeable and interoperate resources in the operational, procedural, material and administrative fields in supporting capacity building of the neighbouring countries for dealing with climate security risks.

4.3 The Impact of The Overlapping Membership on The Interaction in Climate Security Concepts And Standards Setting

Since the foreign policy is the continuation of the domestic politics, the climate diplomacy is also largely determined by the national climate strategy and policy. Based on the completely different attitude to and capacity of dealing with climate security risks, the CEE member states and the Northern European member states generally shows diverse proactivity in supporting the EU and NATO's efforts to spread their climate security concepts and standards within the UN and the neighbouring countries or regions. The former lack the willingness to lead or propose climate security initiatives under the UN framework and lack the extra resources and capacity to provide climate assistance for other neighbouring countries, it may support the EU and NATO's relevant efforts through strengthening multilateral climate security communication with neighbouring countries, but the process is

[239] "Fourth progress report on the implementation of the common set of proposals endorsed by NATO and EU Councils on 6 December 2016 and 5 December 2017," NATO, achieved June 17, 2019, accessed April 13, 2025, https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2019_06/190617-4th-Joint-progress-report-EU-NATO-eng.pdf.

[240] "Standardization," NATO, achieved October 14, 2022, accessed May 6, 2025, https://www.nato.int/cps/en/natohq/topics_69269.htm.

relatively slow, and the outcomes remain to see. The latter works as the climate progressive actors, not only actively leads and promotes the climate security projects at the UN level and support the two organizations' cooperation based on that but also would play special role in strengthening the EU and NATO's coordination in Arctic governance in the context of climate change.

4.3.1 The Process of "Double Eastward Enlargement" And The Interaction in Climate Security Concepts And Standards Setting Among Organizations

Not only the CEE member states' access to the EU and NATO shows the coordination of the two organizations' concepts and standards at the external and national level, but the CEE member states' efforts to support the sub-regional climate security governance with non-member regional countries based on their learnt concepts and standards promotes the further cooperation between the EU and NATO in spreading climate governance rules and measures to neighbouring countries.

In general, the CEE member states' climate security strategy aligns with the EU and NATO standards, is more a result of mandated planning and stepping forward according to the EU and NATO's expectations,[241] but these countries have also gradually become the supporting power of the EU and NATO's cooperation in promoting climate security concepts and standards to neighbouring countries through sub-regional and inter-regional platforms or mechanisms. During the pre-accession period, the CEE candidates (or aspirant countries) must conduct related political, economic and military reforms according to the EU and NATO's principles of treaty respectively, which largely overlap in terms of climate security and green defence, such as having the sustainable ability to make contribution to collective defence and making commitment to peaceful resolution of climate crisis and conflicts.[242]These process led to the proposal of climate strategy of the CEE member states, such as Czechia and Hungary in 2017, committing to prioritize reducing fossil fuel consumption and energy intensity and increasing the proportion of renewable energy sources across all areas, and most CEE member states have formulated the climate targets in national security documents which reflects the EU and NATO's climate agenda. [243] Besides, as one of

[241] András Donát Kovács, Jenő Zsolt Farkas, Gábor László Vasárus, Dániel Balla, Emőke Kiss, "Climate policy contra dictions in light of the policy paradigms - the case of the Visegrád Countries," *Environmental Science & Policy 154* (2024): 9, https://doi.org/10.1016/j.envsci.2024.103689.

[242] "Enlargement and Article 10," NATO, achieved October 3, 2024, accessed May 7, 2025, https://www.nato.int/cps/en/natohq/topics_49212.htm.

[243] András Donát Kovács, Jenő Zsolt Farkas, Gábor László Vasárus, Dániel Balla, Emőke Kiss, "Climate policy contra dictions in light of the policy paradigms - the case of the Visegrád Countries," *Environmental Science & Policy 154* (2024):

leaders in climate security governance among CEE member states, Slovenia held the high-level Conference on the Challenges of Climate Change in South-Eastern Europe, calling for strengthening early warning systems and advancing sustainable climate adaptation across the whole region,[244] which contributes to the implementation of the EU and NATO's climate security goals. However, with the ongoing doubts and counter interests surround climate thinking and activity as well as the institutional barriers in the CEE member states especially the Visegrád Countries, their effect in the interaction between the EU and NATO in spreading climate security concepts and standards is relatively limited, if not negative.

4.3.2 The Process of "Double Northward Enlargement" And The Interaction in Climate Security Concepts And Standards Setting Among Organizations

As global leaders of climate governance, the Nordic countries has long focused on the climate security diplomacy at the UN level and has actively supported the EU and NATO to collectively contribute to the relevant projects and mechanisms. Besides, since the global warming in the Arctic is progressing nearly four times faster than the global average and causes huge impacts across the Arctic as well as in lower latitudes,[245] both the EU and NATO have paid more and more attention to the climate security governance in the Arctic, and they play effective role in this region mainly through their member states. As common members of the Arctic Council, the EU and NATO, Finland and Sweden have contributed to the EU and NATO's participation in the Arctic governance and may further promote the coordination between the EU and NATO in climate security concepts and standards setting in the region.

At the UN and international level, Sweden has been a climate security leader for several years, especially since its membership in the UNSC in 2017-2018. It not only initiated one debate in UNSC in July 2018, but also proposed the establishment of a Climate Security Mechanism aiming to find specific solutions to the climate security risks in the United Nations Department of Political and Peacebuilding Affairs (DPPA) in 2018. Besides, Sweden formed the Stockholm climate security Hub in 2018, focusing on researching and analysing climate security issues, and has contributed to building the global evidence base on climate security risks and responses as well as mainstreaming these into the work of international organizations such as the EU. On this basis, since Swedish policymakers are experienced in

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3, https://doi.org/10.1016/j.envsci.2024.103689.

[244] "High-Level Conference on Climate Challenges in Southeastern Europe Reinforces Regional Cooperation," World Meteorological Organization, achieved February 7, 2025, accessed May 7, 2025, https://community.wmo.int/en/news/high-level-conference-climate-challenges-south-eastern-europe-reinforces-regional-cooperation.

[245] Rantanen, M., Karpechko, A.Y., Lipponen, A. et al, "The Arctic has warmed nearly four times faster than the globe since 1979," *Commun Earth Environ* **3**, no. 168 (2022), https://doi.org/10.1038/s43247-022-00498-3.

turning the analysis into action on international arenas, the Swedish climate security is essential resource for NATO and the EU to participate in the UN climate security projects,[246] and Sweden itself can be the bridge for the coordination between the two organizations on relevant issues. At the regional level, both Finland and Sweden have the most balanced environmental policies towards the Arctic among the Nordic countries, stressing to achieve circular economy and Just Transition in the Arctic,[247] and welcome the EU and NATO's contribution under the regional coordination frameworks. Finland regards the climate change as an opportunity for its regional policy with new transportation routes and available natural resources,[248] as well as a geopolitical risk because of the increased activity and interest of other countries in this region,[249] therefore underlines the importance of climate security governance in the Arctic with other international partners. The Finnish model of integrated security provides insights for climate security work within NATO, mainly applied to NATO's resilience and preparedness activities across the Europe and neighbouring countries.[250] Finland has also participated in EU research project called "CAScading Climate risks: towards ADaptive and resilient European Societies" (CASCADES), one of which aimed at evaluating the climate change related ice retreat in the Arctic and the potential security concerns for environmental protection and safety.[251] Thus, Finland has promoted the participation of the EU and NATO as well as their coordination in the climate security governance of the Arctic with its rich knowledge and experience, which may further expand the two organizations common interest and cooperation space.

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[246] Emma Hakala, "NATO and climate security: Potential for a leading role for Finland and Sweden," *Nordic Review of International Studies*, no.1 (2023), 4-6, https://nris.journal.fi/article/view/125899/78986.

[247] "Arctic Policies of the Nordic Countries: Insights into Global and Regional Priorities," Arctic Portal, achieved November 8, 2024, accessed May 7, 2025, https://arcticportal.org/ap-library/news/3632-arctic-policies-of-the-nordic-countries-insights-into-global-and-regional-priorities.

[248] Mikael Hildén et., "Ilmastonmuutoksen Heijastevaikutukset Suomeen," Prime Minister's Office, achieved December 2016, accessed April 21, 2025, https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/79783/Ilmastomuutoksen%20heijastevaikutukset%20Suomeen.pdf.

[249] Käpylä, J., Mikkola, H., "The promise of the geoeconomic Arctic: a critical analysis," *Asia Eur J* **14** (2016): 203–220, https://doi.org/10.1007/s10308-015-0447-5.

[250] Emma Hakala, "NATO and climate security: Potential for a leading role for Finland and Sweden," *Nordic Review of International Studies*, no.1 (2023), 4, https://nris.journal.fi/article/view/125899/78986.

[251] "Cascading Climate risks: towards Adaptive and resilient European Societies (CASCADES)," Climate ADAPT, achieved 2020, accessed April 30, 2025, https://climate-adapt.eea.europa.eu/en/metadata/projects/cascading-climate-risks-towards-adaptive-and-resilient-european-societies.

CONCLUSION

Climate change is one of the essential sources of global instability, influencing the rise and fall of states and societies by driving conflict, collapse, expansion and reorganization. Successful mitigation and adaptation to climate change is especially important in avoiding instability in a warming world, but there may be the risk that the consequences of climate change can frustrate international collective ability to tackle the causes of climate change. Take the fragile states as an example, they have been increasingly locked in a spiral of responding to the last climate disaster at the cost of being better prepared for the next due to the "climate-debt doom loop".[252] Since the international security threat posed by fragile states is well known, it is the interest of the developed countries such as the United States and the European countries to respond to the global warming as well as cushion the impact in fragile states where climate change will increase those security threats, providing climate assistance to the people and states in need is also vital to reduce the total cost of global climate governance.[253] On this basis, there are both necessity and benefit for the European countries and the United States, as well as the EU and NATO, to take collective measures to deal with climate security risks for the purpose of avoiding instability worldwide.

Overall, the relationship between military and the ecological environment is complicated, military not only can cause ecological damages and acerbate climate change as major GHG emitter, but contribute to global climate governance by implementing environmental-friendly strategies and adapting its capacity to better navigate the effects of climate change.[254] As global military spending grows year on year and EU member states' military spending reaches a record high of 326 billion euros in 2024, the national and international climate action has been drowning in rising tide of militarism.[255] According to the research on green peace dividend, 1% rise in military spending by share of GDP increase national GHG emission by up to 2%, and the increasing military spending crowds-out green investment and

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[252] Laurie Laybourn and James Dyke, "A 'doom loop' of climate change and geopolitical instability is beginning", *The Conversation*, December 9, 2024, https://theconversation.com/a-doom-loop-of-climate-change-and-geopolitical-instability-is-beginning-244705.

[253] Jeffrey Mazo, "Chapter Four: Conflict, Instability and State Failure: The Climate Factor." *The Adelphi Papers* 49, no. 409 (2009): 87–118, doi:10.1080/19445571003755553.

[254] Dhanasree Jayaram and Anselm Vogler, "Climate Change and the Military: Discourses and Practices", *Oxford Research Encyclopedia of International Studies,* 19 Mar. 2025, https://oxfordre.com/internationalstudies/view/10.1093/acrefore/9780190846626.001.0001/acrefore-9780190846626-e-890.

[255] Ellie Kinney, "Military climate action has never been more urgent, here's why", Conflict and Environment Observatory, achieved March 25, 2025, accessed May 25, 2025, https://ceobs.org/military-climate-action-has-never-been-more-urgent-heres-why/.

innovation as well.[256] Since the EU leaders have agreed to an 800 billion euros boost to defence spending, the military climate action is becoming more urgent and important than ever. It calls for the EU and NATO, as major international organizations of large GHG emitters and global security powers, to implement green defence strategies and policies respectively as well as improve climate security interaction in the past, present and future.

Against the background we discussed above and considering the special nature of international organizations, there are both member state and organizational factors that influence the interaction between the EU and NATO on climate security, mainly manifested in the fact that the EU and NATO play an important role in setting ambitious collective goals, and member states hold the main power in promoting the implementation of relevant actions. These factors collectively determine the nature of the EU-NATO climate security interaction, which further lays the cornerstone for evaluating the impact of such interaction on the transatlantic relationship. According to the research framework we mentioned before, "Low-Competitive Cooperation" means that the interests of major countries coincide with each other, leading to the consistency of the goals of international organizations, and major countries tend to adopt organizational integration strategies. But as for the overlapping functions, there is either the "resource competition and consistent rule" or "complementary resource and different rule" between the two organizations, their interaction doesn't directly lead to a decline in the legitimacy of each other and the result depends on the balance of tensions between resource interaction and rule interaction. Besides, "Low-Competitive Cooperation" is among the relationship types that can improve the cooperation between two organizations, therefore when the interaction between two organizations in certain policy field is a "Low-Competitive Cooperation", we can say that such interaction would have positive impact on the relationship between the two organizations, mainly by improving their cooperation with each other.

The research questions we would like to answer in this dissertation are 1) why is the EU-NATO climate security interaction both cooperative and competitive? 2) how do national-level and organizational-level factors affect the EU-NATO climate security interaction? 3) Can climate security issues enhance cooperation between the EU and NATO? After the in-depth analysis of all the mechanisms based on the research framework proposed in this dissertation, the answer is as follows: the EU-NATO climate security interaction has been and will remain a "low-competitive cooperation", and there are generally more

[256] Balázs Markó, "The Green Peace Dividend: the Effects of Militarization on Emissions and the Green Transition", A RXIV, achieved October 2024, accessed May 25, 2025, https://arxiv.org/html/2408.16419v3#S5.

communication and discussion such as seminars than collective policies and actions between the two organizations in the field of climate security. The alignment of major member states' national interests with the organizational goals of the EU and NATO and the organizational integration strategy of these member states, the similar norms and values of the two organizations, the overlapping membership of the EU and NATO and these common member states' need for both organizations are main cooperative factors, while the inefficiency and ineffective in resources distribution and utilization between the EU and NATO hinders the collective efforts of the two organizations. Overall, the forces of cooperation are generally greater than that of competition in the field of climate security, which demonstrates that the EU-NATO climate security interaction has the potential to improve the inter-organizational as well as the transatlantic relationship under the objective of enhancing the Western world's climate security governance capabilities and influence.

To be specific, in terms of the impact of major member states on the EU-NATO climate security interaction, the United States, France, Germany and the United Kingdom has all proposed the national climate security strategies or agenda and attached great value to the climate diplomacy, not only set goals for GHG emission reduction or energy transition of defence largely in line with the EU and NATO, but contributed substantially to the organizational or inter-organizational projects concerning climate adaptation such as early warning system and humanitarian assistance, and worked hard to lead the regional and international climate security governance and support the collective climate security actions between the EU and NATO at multilateral level based on the European core values such as gender equality.

In terms of the impact of overlapping function on the EU-NATO climate security interaction, the common organizational function in the crisis management brings complementary benefits as well as inefficient repetition and resources waste. In general, the EU and NATO's organizational resources such as finance, delegation and standardization as well as organizational concepts and norms in improving the resilience of critical energy infrastructure, developing sustainable energy solution, strengthening situational awareness towards climate disasters, providing better early warning for climate crises, keeping real-time information exchange and promoting democratic values through climate security diplomacy, are quite same and complementary, which promotes the positive communication and coordination between the two organizations. However, they are faced with challenges in the allocation of defence budget, the implementation of parallel projects, the exchange of

sensitive information and the departmental and official docking, which impedes the effective and efficient coordination of the two organizations in the field of climate security.

In terms of the impact of overlapping membership on the EU-NATO climate security interaction, the new common member states such as the Northern European countries and the CEE countries due to the enlargement of the EU and NATO have improved the alignment of interests and the coordination of the two organizations based on their national interests for security and prosperity. As for the CEE member states, they have largely shaped the climate security agenda of both the EU and NATO as well as their coordination fields through their conservative position and passively response to the EU and NATO's climate policies in military emission reduction and energy transition, emphasis on climate adaptation and climate crisis prevention, and focus on climate security cooperation with neighbouring countries at the regional level. As for the Finland and Sweden, they have contributed greatly to the EU and NATO's climate security ambition and the inter-organizational coordinative measures through their leading role in military emission reduction and energy transition, advanced knowledge and models for climate crisis prevention and management, and special role in climate security governance at the UN and Arctic level.

Looking ahead, with Trump's victory in the election in 2024 and the new Trump administration's policy shifts on a range of issues such as NATO, defense, and climate change in early 2025, the U.S. strategic adjustment will have an important impact on the climate security actions of NATO in the future. However, the core goals of the U.S. energy strategy, market consensus and inertia of industrial activities, and the firm willingness of European countries to implement a green transition of defense will prompt NATO to continue to attach importance to climate security strategy and basically adhere to related actions in the short and mid-term. The rebalancing of power among European and American countries based on defense spending and willingness to participate may promote the stable development of EU-NATO climate security cooperation, or at least prevent it from disappearing completely.

On one hand, although the Trump administration has significantly weakened the United States' direct policy support for climate security actions of NATO through a series of reforms, the long-term plans of military-industrial enterprises to implement green transition and the collective actions of European countries to accelerate the decarbonization of defense will offset the adverse effects of Trump administration's new policies to a certain extent, thereby maintaining the overall stability of climate security strategy of NATO in the short and medium term. Since taking office, President Trump has strongly supported fossil fuels

extraction and electricity generation based on traditional energy, drastically laid off staff at major environmental agencies, and halted the social science research projects related to climate change of the Department of Defense, thereby threatening the United States' policy support for climate security planning and related actions of NATO. First, the Trump administration has made "making America energy dominant" its core energy policy goal, seeking to expand oil and gas exploration and production on federal lands and waters, relax LNG export approvals, and restart coal-fired power plants, which has greatly squeezed the development space for the clean energy industry. Second, the "wave of layoffs" brought by Trump administration which aimed at cutting federal spending has included core climate agencies such as the Environmental Protection Agency, the National Oceanic and Atmospheric Administration, and the Department of the Interior, directly threatening the United States' national ability to mitigate and adapt to climate change. Third, the U.S. Department of Defense announced that it would cancel 91 social science research projects involving topics such as the impact of climate change on social development trends,[257] delete the climate portal from its website and remove a back catalogue of U.S. military emission reporting,[258] thus to some extent weakening its long-standing positive role in the climate security strategies of the United States and NATO. However, the existing energy structure and industrial inertia will drive the continued development of the U.S. green transition from the bottom up. The declining total coal consumption and the proportion of coal-fired power[259] will be further impacted by the already launched renewable energy projects such as solar energy[260] and wind power[261], which will offset the negative effects of the new energy policy of the Trump administration to a certain extent. In addition, while expanding defense investment, European countries will continue to adhere to decarbonization goals and accelerate the green transition of heavy industries such as defense, which will greatly inject vitality into climate security operations of NATO. In March 2025, the EU released the "White Paper for European Defence", "the ReArm Europe Plan/Readiness 2030", and the "Action Plan on Steel and Metals" to respond to the challenges of U.S. security policy and

[257] Idrees Ali and Phil Stewart, "US military cancels climate change studies that Pentagon chief calls 'crap'," *Reuters*, March 10, 2025, https://www.reuters.com/world/us/us-military-cancels-climate-change-studies-that-pentagon-chief-calls-crap-2025-03-10/.

[258] Oliver Milman, "Scientists brace 'for the worst' as Trump purges climate mentions from websites", February 4, 2025, https://www.theguardian.com/us-news/2025/feb/04/trump-climate-change-federal-websites.

[259] "Coal 2024: Analysis and forecast to 2027," IEA, accessed May 12, 2025, https://iea.blob.core.windows.net/assets/a1ee7b75-d555-49b6-b580-17d64ccc8365/Coal2024.pdf.

[260] "Solar, battery storage to lead new US generating capacity additions in 2025," US Energy Information Administration, achieved February 24, 2025, accessed May 12, 2025, https://www.eia.gov/todayinenergy/detail.php?id=64586.

[261] "US offshore wind farms in service, in construction and under development," *Reuters*, January 21, 2025, https://www.reuters.com/business/energy/us-offshore-wind-farms-service-construction-under-development-2025-01-21/.

achieve green transition. Among them, the "White Paper for European Defence" seeks to invest heavily in the defense industry within the region and encourages joint procurement to enhance the defense capabilities of Europe,[262] while the "Action Plan on Steel and Metals" focuses on clean and affordable energy supply and green development of the defense industry. Specifically, the EU hopes to ensure the greenness of the production process and raw materials used for tanks, self-propelled artillery, fighter jets and other weapons and equipment in the future by promoting the recycling of metal resources, and on this basis enhance the defense technology and industrial base of Europe and ensure its internal security.[263]

On the other hand, given that the U.S. Department of Defense is adjusting the global strategic deployment of the U.S. military through downsizing and restructuring, and European countries are seeking to strengthen their defense autonomy and assume more financial and military responsibilities for NATO, the rebalancing of power among European and American countries regarding NATO's leadership may increase the influence of European values on NATO, thereby safeguarding the long-term climate security planning of NATO and EU-NATO climate security coordination. In response to President Trump's call for military spending cuts, the U.S. Department of Defense is considering a reorganization that may include abandoning the post of Supreme Allied Commander Europe of NATO and merging the European Command (EUCOM) and the African Command (AFRICOM).[264] As the military command body of NATO, the European Allied Command has long been led by the Commander of the United States European Command and is responsible for the organization and command of NATO allied military operations. At the same time, the integration of EUCOM and AFRICOM could deprive the United States of access to key naval and air bases in Italy, Germany, Poland, and Spain, thereby weakening the U.S. military operations capabilities in the Europe. Therefore, the above reorganization signals may seriously impact European countries' trust in the U.S. security commitments and further weaken the U.S. influence within NATO. Faced with the U.S. strategic retreat in defending Europe, major European military powers are stepping up efforts to plan a "defense awakening" and strive for greater voice in NATO to reduce the negative impact of the United

[262] "Commission unveils the White Paper for European Defence and the ReArm Europe Plan/Readiness 2030," Europe an Commission, achieved March 19, 2025, accessed May 12, 2025, https://ec.europa.eu/commission/presscorner/detail/en/ip_25_793.

[263] "Commission's Action Plan to secure a competitive and decarbonized steel and metals industry in Europe," Europe an Commission, achieved March 19, 2025, accessed May 12, 2025, https://ec.europa.eu/commission/presscorner/detail/en/ip_25_805.

[264] Natasha Bertrand, "Pentagon weighs major cuts to top of US military," *CNN*, March 19, 2025, https://edition.cnn.com/2025/03/19/politics/pentagon-cuts-top-military/index.html.

States abandoning its security obligations to Europe. Recently, the European Union has gradually become the main promoter of the unification of the U.S.'s traditional allies, actively inviting NATO members Canada and Turkey, and NATO's Asia-Pacific partner Australia to participate in discussions on European security cooperation. At the same time, Britain, France, Germany and some Nordic countries are holding informal discussions to guard against the potential risk of the United States unilaterally withdrawing from NATO. They plan to increase defense spending and assume more NATO military obligations in the next 5-10 years,[265] thereby replacing most of the U.S. military capabilities in Europe. The relevant report is expected to be reported to the United States before NATO summit of this year. Against this background, the rebalancing of power among major European and American countries within NATO may profoundly change the formulation and implementation of the military security strategy and related actions of NATO. The increase in the financial and military responsibilities of European member states may correspondingly raise the priority of development issues that Europe attaches importance to, such as climate change and green transition, in NATO's agenda, thereby promoting the continued implementation of the climate security strategy and related policies of NATO.

It is worth noting that there are still shortcomings of the research and analysis in this dissertation, mainly due to the limitations of the theoretical framework. As mentioned in the literature review, integrated governance is becoming an important means for international organizations to address climate security risks, which requires the researchers to pay attention to the impact of multiply actors or international community on the climate security interaction between international organizations, such as the influential individuals, enterprises, universities and think tanks, the NGOs, etc. However, due to the length of the dissertation and the priority of multiply actors' role, this dissertation mainly focuses on the impact of governments and institutions on the inter-organizational goals and standards setting, policies and strategies forming as well as actions implementing between the EU and NATO in climate security. Thus, the following research need to take these multiply actors into consideration, further discusses 1) whether they have an essential impact on the EU-NATO climate security interaction; 2) how they influence the climate security interaction between the EU and NATO.

[265] "European military powers work on 5-to-10-year plan to replace US in NATO, FT reports," *Reuters*, March 20, 2025, https://www.reuters.com/world/european-military-powers-work-5-to-10-year-plan-replace-us-nato-ft-reports-2025-03-20/.

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[5] Anand Menon, “Why ESDF is Misguided and Dangerous for the Alliance,” in *Defending Europe: the EU, NATO and the Quest for European Autonomy*, ed. Jolyon Howorth and John T.S. Keeler, Palgrave Macmillan, 2003, pp203-217.

[6] András Donát Kovács, Jenő Zsolt Farkas, Gábor László Vasárus, Dániel Balla, Emőke Kiss, “Climate policy contradictions in light of the policy paradigms - the case of the Visegrád Countries,” *Environmental Science & Policy*, no. 154, 2024, https://doi.org/10.1016/j.envsci.2024.103689.

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[21] Council of the European Union, “EU-NATO Joint Declaration”, July 8, 2016, https://www.consilium.europa.eu/media/21481/nato-eu-declaration-8-july-en-final.pdf.
[22] Council of the European Union, “EU-NATO Joint Declaration”, July 10, 2018, https://www.consilium.europa.eu/media/36096/nato_eu_final_eng.pdf.
[23] Council of the European Union, “Joint Progress Report on Climate Change, Defence and Security (2020–2022),” November 16, 2022, https://www.eeas.europa.eu/sites/default/files/documents/progress%20report%20public.pdf.
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[27] EEAS, “EU-NATO COOPERATION”, March 2022, https://www.eeas.europa.eu/sites/d efault/files/documents/2022-03-24-EU-NATO-COOPERATION-NewLayout.pdf.
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[29] EEAS, “Implementing the Women, Peace and Security agenda,” November 7, 2024, http s://www.eeas.europa.eu/eeas/implementing-women-peace-and-security-agenda_en.
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