Armament Industry European Research Group

GREENING DEFENCE: FRAMING THE STAKES FOR INDUSTRIAL AND MILITARY CAPABILITIES

Decarbonising Defence: Reconciling the Green Agenda with the Reindustrialisation of Europe's Defence Sector

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The Armament Industry European Research Group (Ares Group) was created in 2016 by The French Institute for International and Strategic Affairs (IRIS), who coordinates the Group. The aim of the Ares Group, a high-level network of security and defence specialists across Europe, is to provide a forum to the European armament community, bringing together top defence industrial policy specialists, to encourage fresh strategic thinking in the field, develop innovative policy proposals and conduct studies for public and private actors.

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ABSTRACT

This commentary explores the intersection between Europe's reindustrialisation of its defence sector and the European Union's (EU) decarbonisation agenda. Russia's invasion of Ukraine has accelerated efforts to strengthen Europe's defence technological and industrial base (EDTIB), yet this rearmament drive occurs alongside legally binding climate neutrality targets. The commentary examines whether these objectives are in tension or can be reconciled through innovation, regulatory adaptation and industrial transformation. It analyses evolving EU policies – such as the European Green Deal, the European Defence Industrial Strategy and the Draghi Report – highlighting emerging synergies between competitiveness and sustainability. By assessing the roles of the European Defence Fund, the European Defence Agency and NATO, the commentary identifies pathways for integrating energy efficiency, renewable energy, and circular economy principles into defence production. Ultimately, it argues that aligning defence revitalisation with the green transition is central to ensuring Europe's long-term strategic autonomy, resilience and technological leadership.

Keywords: Defence | Europe | Sustainability | Renewables | Innovation

INTRODUCTION

The war in Ukraine has profoundly reshaped Europe's security landscape, prompting a renewed focus on reindustrialising strategic sectors such as defence. This drive for reindustrialisation aims to enhance the European Union's (EU) strategic autonomy, economic competitiveness and response to the United States-China strategic rivalry. However, this imperative raises critical questions about the compatibility of rapid industrial expansion in defence with the EU's ambitious decarbonisation and sustainability commitments. Indeed, the increased use of materials such as metals and chemicals for the defence sector raises questions about the application of environmental standards. Likewise, increased defence production may certainly lead to greater emissions and pollution.

Alternatively, we should also ask whether existing EU decarbonisation and sustainability goals hinder or enhance Europe's defence production revival. Indeed, the military ramp-up in Europe may only ever contribute a relatively small share of the Union's overall carbon production, as the defence sector still only represents a limited portion of the EU's overall manufacturing output. The challenge for European defence, however, is to manage these relatively low levels of carbon emissions in a context where the public eye is increasingly focused on the sector. This commentary examines the tensions and synergies between the EU's defence and sustainability objectives, and explores how EU policies and legislation can facilitate a balanced approach to the dual challenge of defence revitalisation and climate change.

STEEL, STRATEGY AND SUSTAINABILITY: THE CHALLENGE OF RECONCILING EUROPE'S DEFENCE AND GREEN AGENDAS

Europe's defence sector is a core part of Europe's reindustrialisation and competitiveness agenda. The Draghi report on the future of European competitiveness[1] makes clear that defence is part of Europe's economic and strategic future and that intense market fragmentation hampers the Union's quest to become a genuine and autonomous defence actor. The EU's competitiveness agenda clearly sees defence as a priority, and the "Draghi report" has called for an aggregation of demand for defence equipment with more centralised procurement, more policy alignment for the defence sector with other economic domains and

[1] « The Draghi Report On EU Competitiveness » . s. d. European Commission. https://commission.europa.eu/topics/eu-competitiveness/draghi-report_en#paragraph_47059.

investment in innovation with a focus on disruptive technologies. The conclusions of the "Draghi report" are not exactly new, as the Strategic Compass before it (2022) and the European Defence Industrial Strategy (2024) make clear that the defence sector is vital to Europe's economic health, defence and strategic autonomy. What is more, the Versailles Declaration (2022), published by European leaders in the wake of Russia's invasion of Ukraine, provides a strong political signal and mandate to invest in the European Defence Technological and Industrial Base (EDTIB).

What is interesting about the findings of the "Draghi report" is that the defence sector, while unique, should play a more central role in Europe's economic competitiveness agenda. It is, perhaps, unsurprising to learn that defence investments under the next Multi-annual Financial Framework (MFF) will be housed within the new "European Competitiveness Fund". Indeed, the EU is now taking steps to reduce fragmentation in the European defence industry and decrease reliance on external suppliers, while boosting European defence innovation. As outlined in the 2025 EU White Paper for European Defence, these initiatives underscore the EU's commitment to building a robust and resilient defence industrial base capable of meeting current and future security challenges. Hence, new investment tools such as the Security Action for Europe (SAFE) loan facility – worth €150 billion –, a relaxation in the Stability and Growth Pact rules – potentially unlocking a further €650 billion –, plus a Commission request for €131 billion under the next MFF are being proposed.

At the same time, the EU's "Green Agenda" is evolving. While the EU is committed to achieving climate neutrality by 2050, as outlined in the "European Green Deal", there are growing concerns that such ambitions may negatively affect Europe's growth potential. Following the 2024 European parliamentary elections and under the push of the private sector's lobbying, the Commission was forced to consider a revision of emission rules and to deregulate or revise environmental and climate laws. Such an evolution in the European Parliament was not helped by the US' own shift on climate policy, with calls for Europe to give up on renewable energies. Still, the EU continues to implement decarbonisation and environmental regulations. This includes the European Climate Law, the Carbon Border Adjustment Mechanism, the Industrial Emissions Directive, the Circular Economy Action Plan, the REACH Regulation and more. These regulations aim to reduce industrial emissions, promote resource efficiency and minimise environmental impact across various sectors, including defence – albeit with certain exceptions (see *infra*).

The defence industry, as one of the sectors characterised by energy-intensive processes and complex supply chains, faces unique challenges in aligning with these evolving environmental standards and regulations. The production of defence materiel and equipment, such as steel and chemicals, contributes significantly to carbon emissions, raising concerns about the sector's environmental impact. For instance, the scaling up of steel production for defence applications may exacerbate the sector's carbon footprint, conflicting with the EU's decarbonisation targets. Moreover, the integration of circular economy principles into defence manufacturing processes remains challenging[2], hindering efforts to reduce waste and promote sustainability. For all of this, the defence sector globally contributes 1% [3]of global man-made greenhouse gas emissions per year, which compares to 12% from road transport, 2% from civil aviation and 2% from the maritime sector. Out of the global yearly 1%, the European defence sector is responsible for 6%[4] of emissions each year. While Europe's defence forces and militaries are consuming less electricity[5] each year, the continued use of fossil fuels poses cost and autonomy risks. Ascertaining what the entire European defence sector invests in decarbonisation efforts is unclear, however, because there is scant data available – having robust datasets for such efforts may indeed be very useful.

The accelerated defence industrial ramp-up in response to security threats poses potential conflicts with environmental objectives. Furthermore, the urgency of meeting more rapid defence production timelines can lead to lapses in environmental targets. One assessment already indicates[6] that greenhouse gases and defence expenditure may increase together by an average of 9% over the 2025-2028 period. While increased defence production is undoubtedly necessary to address immediate security needs, there is a risk that long-term sustainability goals are harder to achieve. However, we should note that the EU's competitiveness agenda is already moving towards a regulatory simplification process that is designed to cut the administrative burdens on European enterprises, including in the green and defence sectors. For example, the first "omnibus"[7] released by the EU focuses on corporate sustainability with steps to reduce the burdens and compliance costs flowing from

[2] Toeset, Célestin. 2024. « Sustainability And Security : A New Battlefield For The Defence Sector » . *CIL* (blog). 10 juillet 2024. https://www.circularinnovationlab.com/post/sustainability-and-security-a-new-battlefield-for-the-defence-sector.

[3] Aerospace, Security and Defence Industries Association of Europe (ASD). "Understanding Greenhouse Gas Emissions from Defence." Last modified 2025. Accessed November 10, 2025. https://www.asd-europe.org/focus-areas/innovate/sustainable-defence/understanding-greenhouse-gas-emissions-from-defence/

[4] Ibid.

[5] European Defence Agency, "Defence Energy Data 2016-2020," factsheet (Last updated 4 January 2024), accessed 10 November 2025, https://eda.europa.eu/docs/default-source/brochures/05-01-24-defence-energy-factsheet.pdf.

[6] ABN AMRO Bank. s. d. « Increasing Our Security Could Come At An Environmental Cost » . https://www.abnamro.com/research/en/our-research/esg-economist-increasing-our-security-could-come-at-an-environmental-cost.

[7] « Omnibus I » . s. d. European Commission. https://commission.europa.eu/publications/omnibus-i_en.

the Corporate Sustainability Reporting Directive and other legislation. Likewise, the fifth omnibus[8] on defence readiness seeks to simplify joint defence procurement and innovation, while also forwarding derogations for the defence sector related to environmental and chemicals legislation.

OPPORTUNITIES FOR SUSTAINABLE DEFENCE INDUSTRIALISATION

Of course, the shift in the EU's approach to the defence sector and the green agenda poses risks and opportunities. A relaxation of the Union's green regulations may be seen in the defence sector as a way to boost production efforts and to avoid the costs of compliance with environmental and climate rules. While there already exist exemptions for the defence sector under the EU's chemical regulation, REACH, the defence omnibus has widened the exemptions applicable to industry, which in turn allows member states to propose their own exemptions from the regulation where they are deemed to be in the interests of the defence sector. In this way, reduced burdens on chemical reporting or labelling should make defence production simpler and reduce administrative costs, especially for defence SMEs. While such simplification measures are designed to enhance the competitiveness of the European defence sector, we should not underestimate the extent to which defence firms in Europe have embraced the "Green Agenda".

In many respects, developing environmentally friendly processes and standards is a way to demonstrate a commitment to ESG (Environmental, Social and Governance), which can greatly enhance firms' reputations and help to unlock finance for innovation and production efforts. While ESG criteria can be viewed by the defence industry as a barrier to accessing finance and/or additional reporting bureaucracy for companies, several European defence firms have understood that "greening defence" can help with innovation and new industrial manufacturing processes and standards. They do this because of the long-term benefits, including how green innovation can enhance the efficiency of armed forces and help lower dependencies on third states for fossil fuels. Environmental constraints push the defence sector to develop products that are lighter and more sustainable in an operational sense, fostering structural changes that can help improve resilience, autonomy, efficiency and even

[8] « Defence Readiness Omnibus » . s. d. Defence Industry And Space. https://defence-industry-space.ec.europa.eu/eu-defence-industry/defence-readiness-omnibus_en.

performance. These additional benefits related to capabilities and operational aspects are indeed stated in the EU's Climate Change and Defence Roadmap[9].

Thus, the reindustrialisation of the defence sector presents opportunities to integrate sustainability into industrial practices. The EU's investment in green technologies, such as green steel production and renewable-powered chemical plants, offers pathways to decarbonise the defence industry. The European Defence Fund (EDF), operational since 2021, has supported collaborative research and development projects focused on enhancing defence capabilities while considering environmental impact. For example, the EDF has funded initiatives exploring clean energy technologies to lower the carbon footprint and decrease energy dependencies in the defence sector. One element of the EDF's work programme focuses on "Energy Resilience and Environmental Transition", which funds projects on hybrid propulsion and power systems, among other areas.

The European Defence Agency (EDA) is also assisting with efforts to green the defence sector. For example, the Consultation Forum for Sustainable Energy in the Defence and Security Sector (CF SEDSS) focuses on decarbonisation and the energy transition, and it brings together industry, defence ministries and other stakeholders to exchange knowledge, identify joint project ideas, and develop policy roadmaps on energy efficiency, renewables, electrification, energy security, and more. Interestingly, such efforts are increasingly focusing on the digital agenda and how integrated energy management and low-carbon technologies can be integrated into the defence sector. What is more, the EDA is helping to develop circular economy principles in defence and to enhance resource-use efficiencies, the management of raw materials, technology/product ecodesigns and more. Several EDA Energy and Environment CapTechs also advance renewable energy, energy storage, alternative fuels and smart energy management initiatives.

Despite these important EU initiatives, we should also acknowledge NATO's efforts in this domain. NATO has progressively elevated climate change to a central strategic concern, beginning with the Climate Change and Security Action Plan in 2021. This was reinforced by the Climate Change and Security Impact Assessment in 2022, offering the first alliance-wide evaluation of climate risks for operations, and by the NATO Green Defence Framework, updated in 2022 to promote energy efficiency and renewable energy use in military settings.

[9] European External Action Service (EEAS). "Climate Change and Defence Roadmap." Working document of the European External Action Service, 6 November 2020. Accessed 10 November 2025. https://data.consilium.europa.eu/doc/document/ST-12741-2020-INIT/en/pdf.

The 2022 Strategic Concept commits NATO to a 45% emissions cut by 2030 and net-zero emissions by 2050. Innovation programmes such as DIANA help consolidate NATO's efforts to integrate green technologies and climate adaptation into defence planning and capability development. NATO's efforts, however, are not helped by the current ideological stance of the United States government against climate change and renewables. This will mean that NATO will need to find new ways of tackling the question of renewables and climate change in new, less publicly overt ways.

Ultimately, however, the most effective adaptation of the defence sector to the green agenda is through industry. There are already examples of Rheinmetall[10] in Germany developing hydrogen and electrification projects in order to develop more efficient fuel cell components and technologies. The company is also increasingly developing renewable e-fuel sources[11] through solar and wind power so that Rheinmetall is less dependent on the German energy and electricity grids. MBDA has also undertaken to decarbonise its production of missile systems, with a specific investment of €2.4 billion[12] geared to reducing greenhouse gas emissions and improving energy use, waste and material sourcing across the entire group from 2024-2028. Naval Group is also investing in environmental transition with investments in new technologies, and it has demonstrated new naval vessel concepts[13] to reduce the use of fossil fuels and reduce acoustic pollution.

Yet, we should put such efforts into the global context. Regardless of how difficult it may be to calculate the climate adaptation costs the EU faces, some estimates[14] state that the Union would need to invest between €35 billion and €500 billion annually. Aside from a need to adhere to binding green regulations, the European defence sector's adaptation to the green agenda will also depend on defence firms seeing a continued commercial incentive in investing in renewable sources of energy and green, high-performing technologies. With the current major defence industrial ramp-up in Europe, there remains, however, a sensitive balance to be

[10] Rheinmetall AG. 2024. « Subsidies For Hydrogen And Electrification Projects » . Rheinmetall. 20 mai 2024. https://www.rheinmetall.com/en/media/news-watch/news/2024/05/2024-05-17-hydrogen-and-electrification-subsidies.

[11] « Arms Maker Rheinmetall Eyes Shift To E-fuels To Increase Military's Strategic Independence » . 2025. Clean Energy Wire. 23 mai 2025. https://www.cleanenergywire.org/news/arms-maker-rheinmetall-eyes-shift-e-fuels-increase-militarys-strategic-independence#:~:text=The%20e%2Dfuels%20should%20come,in%20emissions%20by%20the%20military.

[12] MBDA. *Sustainability Report 2024*. Published June 2025. Accessed 10 November 2025. https://www.mbda-systems.com/sites/mbda/files/2025-06/mbda_sustainability-report-2024_webfriendly.pdf

[13] Bahtić, Fatima. 2022. « Naval Group Unveils New High-tech, Eco-friendly Combat Ship Design - Naval Today » . Naval Today. 19 octobre 2022. https://www.navaltoday.com/2022/10/19/naval-group-unveils-new-high-tech-eco-friendly-combat-ship-design/.

[14] « An Investment Strategy To Keep The European Green Deal On Track » . 2025. Bruegel | The Brussels-Based Economic Think Tank. 29 septembre 2025. https://www.bruegel.org/policy-brief/investment-strategy-keep-european-green-deal-track.

struck between the pressing needs of defence and the green agenda. The issue of critical and strategic material supplies, for instance, constitutes a nodal point of this dual challenge, as these materials are essential to propel production and unroll the Green Agenda, yet they raise important security concerns related to Europe's dependence on competing powers such as China.

CONCLUSION

In conclusion, the war in Ukraine has underscored the dual challenge facing Europe: the urgent need to strengthen its defence industrial base while adhering to long-term decarbonisation and sustainability objectives. Europe's rearmament efforts offer pathways to enhance strategic autonomy and economic competitiveness. At the same time, these initiatives intersect with the EU's Green Agenda, necessitating a careful balance between accelerated production and environmental concerns. European defence firms demonstrate that sustainable practices can coexist with industrial expansion through initiatives focused on energy efficiency, renewable energy and circular economy principles. Ultimately, Europe's ability to reconcile these objectives is dependent on how the green agenda evolves more broadly. Steps are underway to revise green legislation and regulations to boost Europe's competitiveness, whereas defence has become a priority policy area for the EU. One logic is that the green agenda should not in any way hinder Europe's rearmament, as there are fears that the costs of red tape will slow down defence production.

Conversely, losing momentum on renewables and sustainability may hurt the European defence sector over the longer term, especially if it means avoiding a modernisation of defence manufacturing in Europe. This modernisation process includes a need for innovation and improved efficiency, both of which can help to decrease the costs associated with defence over the longer term and strengthen the sector's resilience and autonomy. This resilience is vital, as it is one method of ensuring Europe's strategic autonomy by helping to decrease harmful dependencies on external resources, fuels and/or technologies.

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