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Military greenhouse gas emissions reporting:

How reliable is it?



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Written by: Dr Stuart Parkinson

Funded by: Marmot Charitable Trust

ABOUT THE AUTHOR

Dr Stuart Parkinson is executive director of SGR, a post he has held for over 20 years, where he has co-ordinated research, education and campaigning on ethical issues across science and technology. He holds a PhD in climate change science and a bachelor's degree in physics and engineering from Lancaster University. He was a post-doctoral research fellow at the Centre for Environmental Strategy, University of Surrey, for five years, and has also worked in industry – including on military technology projects – and for environmental non-governmental organisations. He has also been an expert reviewer for the Intergovernmental Panel on Climate Change. He has authored/co-authored numerous reports, academic papers and popular science articles, including several influential reports specifically focused on military greenhouse gas emissions.

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Scientists for Global Responsibility, PO Box 943, Lancaster LA1 9NZ

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Acronyms

CEOBS	Conflict and Environment Observatory
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
MEG	Military Emissions Gap
NATO	North Atlantic Treaty Organisation
NIR	National Inventory Report
SGR	Scientists for Global Responsibility
UNFCCC	United Nations Framework Convention on Climate Change

Executive summary

Global military spending is soaring, while efforts to reduce greenhouse gas (GHG) emissions are stalling. Militaries are major polluters, but international reporting of their GHG emissions is generally poor. If military emissions are to be controlled, accurate reporting is a key first step.

Previous research has pointed out that only about half of 70 leading nations reported any military emissions at all, even under the UN Framework Convention on Climate Change (UNFCCC). In national emission inventories, reporting flexibilities mean that military emissions can be included unlabelled in broader categories or, if they occur in international waters or airspace, not reported at all.

The latest data from the UNFCCC shows that some of the world's leading military spenders do not currently report their military emissions, including China, India, Saudi Arabia, and Israel. Russia's data reporting is unclear and, as of 2025, the USA has ended its previous practice of reporting its military emissions.

This report has analysed the key national military GHG data that *has* been reported to date. The findings reveal many further causes for concern.

- For five of the world's top military spenders – USA, UK, Germany, Australia, and Canada – data on direct military GHG emissions submitted under the UNFCCC was compared with that published by national defence ministries in their own reports. It was found that the data in the defence ministry reports was, on average, 95% higher. In other words, the figures reported to the UNFCCC should be roughly doubled in order to provide a more accurate estimate for direct military emissions.
- On reporting of indirect military GHG emissions, the situation was even worse. Data was examined from five nations with world-leading practices on military emissions reporting – Australia, Germany, Norway, Switzerland, and the UK. Of these, only Norway had a well-developed system for reporting 'Scope 3' emissions, including those from supply-chains.
- On reporting of the military carbon footprint – including Scope 1, 2 and 3 emissions – data was examined from the top 12 military spending nations in NATO. The choice of NATO was because it has adopted a 'Climate Change and Security Action Plan', including emission reporting guidelines. Again, only Norway published in-depth estimates for its carbon footprint. Of particular concern is that publicly available data for core military emissions (Scope 1 and 2) could only be found for seven of the 12 nations.
- Extrapolating from the Norwegian data, the report suggests that if military data submitted under the UNFCCC is multiplied by a factor of between 10 and 14, it would provide an initial approximation for national military carbon footprints. In other words, less than 10% of military carbon footprints routinely appear in UNFCCC data.
- No nation has started to report on their conflict-related or 'Scope 3+' emissions, although the Ukrainian government has input into research efforts related to its war against Russia.
- Two significant examples of greenwashing by the UK military were highlighted in the report. In frequent reporting of the proportion of central government Scope 1 and 2 emissions due to the military, this was claimed to be only 50% when the real figure was 75%. Also, the Ministry of

Defence reports figures for its 'Defence Carbon Footprint' but this only includes a small fraction of the likely Scope 3 emissions necessary to justify the label.

This report makes several recommendations on military GHG emissions reporting:

- The UNFCCC should implement, as a matter of urgency, mandatory and explicit military emissions reporting within National Inventory Reports, based on updated IPCC guidance covering the full scope of military activity, including emissions from war-fighting where relevant. Until this is implemented, national governments should take the initiative by pro-actively submitting more explicit military data in their National Inventory Reports.
- Defence ministries, especially those with large budgets in global terms, should annually publish robust data on national military GHG emissions. This data should be made publicly available. The existing reporting of military emissions – including by nations at war, such as Ukraine – demonstrates that there are no convincing national security arguments to prevent this practice. At minimum, data on Scope 1 and 2 emissions should be published, but this should be quickly expanded to include extensive Scope 3 reporting and, eventually, Scope 3+. Quality assurance should be an integral element of practices.
- Militaries should cease exaggerating or misrepresenting the data on their emissions.



Less than 10% of military carbon footprints routinely appear in UN data.

1. Introduction

Global military spending is soaring. In 2024, it stood at \$2.7 trillion, up 9% from the previous year – reaching its highest level since at least the end of the Cold War.¹ Meanwhile efforts to reduce greenhouse gas (GHG) emissions remain grossly inadequate to reach the Paris climate targets.² The world's militaries are estimated to be responsible for between 3.3% and 7.0% of global greenhouse gas (GHG) emissions, through a combination of direct and indirect activities.³ The size of these figures illustrates the scale of the environmental problem, but the wide uncertainty highlights the difficulty in quantifying it. In short, data on military GHGs is generally of low quality, and has numerous reporting gaps.

Historically, militaries have given little attention to the environmental impacts of their activities. Some, however, especially in democratic nations, have recently taken steps to reduce these impacts and even draw up sustainability strategies. Within these have been early efforts to reduce GHG emissions.

The first stage of any effective climate strategy should be the measurement and reporting of GHG emissions.⁴ It is obviously difficult to create a robust strategy for reducing emissions if these are not accurately reported in the first place.

However, in the military sector, even when there is a genuine desire to report and reduce

emissions, there are numerous obstacles. These include:

- Multiple, complex organisational structures (e.g. 'areas of command');
- Large and complex supply chains;
- Competing priorities (including maintaining defensive capabilities), resource constraints, and clarity of responsibilities;
- Potential conflicts between transparency and national security; and
- Limited external scrutiny, due to exemptions from civilian environmental regulations.

While some of these obstacles also apply in civilian sectors, some obviously do not.

To illustrate the scale of the reporting problem in this sector, a useful starting point is the data on direct military GHG emissions reported by nations under the United Nations Framework Convention on Climate Change (UNFCCC). The Military Emissions Gap (MEG) has pointed out that, of 70 leading nations, only 38 of them reported *any* military data for 2022 and only 37 in 2023 – slightly more than half. Some of the largest reported no data at all.⁵

1 SIPRI. (2025). *Trends in World Military Expenditure, 2024*. <https://www.sipri.org/publications/2025/sipri-fact-sheets/trends-world-military-expenditure-2024>

2 Climate Change Tracker. (2025). *Progress of Global Climate Change: Key Messages*. <https://climatechangetracker.org/climate-change-progress#key-messages>

3 Parkinson, S. & Cottrell, L. (2022). *Estimating the Military's Global Greenhouse Gas Emissions*. Scientists for Global Responsibility/Conflict and Environment Observatory. <https://www.sgr.org.uk/publications/estimating-military-s-global-greenhouse-gas-emissions>

4 ISO. (2022). *Net Zero Guidelines*. <https://www.iso.org/netzero>

5 The 70 nations included the top 60 in terms of military spending and a further 10 smaller 'Annex I' industrialised nations. MEG. (2025). View your government's military emissions data: Download the data. <https://militaryemissions.org/> MEG is a project run by the Conflict and Environment Observatory together with three UK universities.



Of 70 leading nations, only 37 of them reported any military data to the UN for 2023.

Given these problems – together with the urgent need to reduce GHG emissions from all sectors, including the military – this report examines the degree to which militaries which do report their GHG emissions, under-report them. The analysis is based on assessment of the following data and sources:

- direct emissions reported to the secretariat of the UNFCCC;
- direct emissions published in publicly available defence ministry reports; and
- indirect emissions published in publicly available defence ministry reports.

As well as under-reporting, this study also highlights some examples of mislabelling of data by militaries. Part of the analysis includes consideration of ‘greenwashing’, where organisations misrepresent their environmental activities to give the impression that action is greater than it really is.⁶

To help with the discussion, Box 1 lists the main terminology used in these report.

6 For example, see: Planet Tracker (2023). The Greenwashing Hydra. <https://planet-tracker.org/the-greenwashing-hydra/>

BOX 1. SUMMARY OF MILITARY GHG EMISSIONS TERMINOLOGY

The terminology used to describe military GHG emissions is quite extensive, and there has often been inconsistency between different studies. Here is a summary of the main terms used in this report, based on methodologies recommended by the GHG Protocolⁱ and the Conflict and Environmental Observatory (CEOBS).ⁱⁱ

Scope 1/ direct emissions.

These are due to activities carried out using equipment, buildings etc owned by the specific organisation under study. These activities most commonly include fossil fuel combustion by aircraft, naval craft, and land vehicles, and for the heating of buildings.

Scope 2 emissions.

These are most commonly due to electricity use by a specific organisation, where the electricity is produced by a third-party energy utility burning fossil fuels. Emissions due to utility-owned district heating networks are also included in this category.

Core emissions.

The total of Scope 1 and 2 emissions. These are commonly reported by many major organisations.

Scope 3/ supply-chain emissions.

These result from activities in the upstream or downstream supply-chain of an organisation, for example, in the production of goods and services. For a military, the overwhelming majority of Scope 3 emissions are upstream.

Indirect emissions.

The total of Scope 2 and 3 emissions.

Carbon footprint.

The total of Scope 1, 2, and 3 emissions for a specific organisation.

Carbon toeprint.

A partial carbon footprint, including the total of Scope 1, 2, and some Scope 3 emissions. The term has been recently coined by Prof Mike Berners-Lee of Lancaster University.ⁱⁱⁱ

Scope 3+/ war impact emissions.

A recently defined category including additional emissions due to the impacts of armed conflict. Included within this category is: the destruction of carbon reservoirs such as fossil fuel storage facilities or forests; transport of refugees; and post-conflict reconstruction.

Carbon bootprint.

The total of Scope 1, 2, 3, and 3+ emissions for a specific military.

Conflict emissions.

An alternative, but overlapping, accounting system using a specific war/ armed conflict as the basis for assessment. It includes Scope 1, 2, 3, and 3+ emissions specifically related to that conflict.

All figures in this report for GHG emissions are given in tonnes of carbon dioxide equivalent (tCO₂e).

ⁱ GHG Protocol (2004). The GHG Protocol: A Corporate Accounting and Reporting Standard: Revised Edition. <https://ghgprotocol.org/corporate-standard>

ⁱⁱ CEOBS (2022). A framework for military greenhouse gas emissions reporting. <https://ceobs.org/report-a-framework-for-military-greenhouse-gas-emissions-reporting/>

ⁱⁱⁱ See, for example, pp.8–9 of: Berners-Lee, M. (2020). *How bad are bananas? The carbon footprint of everything*. Profile Books.

2. Direct GHG emissions

The starting point for the analysis in this report is ‘direct’ or ‘Scope 1’ emissions. In theory, the measurement and reporting of these emissions should be relatively straightforward given that there are well-established methodologies for these practices. However, as Tables 1a & 1b show, for the military sector, there are serious problems. The first is that inconsistent reporting of military emissions is common, with much data often not reported at all. The tables show official data on direct military emissions for the 15 nations with the world’s highest military spending for the years 2021 and 2022.⁷ There are many gaps and inconsistencies.

This data is obtained from two types of sources. The first are the National Inventory Reports (NIRs) which governments submit regularly to the secretariat of the UNFCCC.⁸ These include in-depth data on all GHG emissions that occur within national boundaries, and are compiled according to guidelines drawn up by the UN’s advisory body on climate science, the Intergovernmental Panel on Climate Change (IPCC).⁹ As discussed earlier, MEG regularly summarises the annual data on direct military emissions contained within the NIRs to improve its accessibility.¹⁰ The second set of sources are national reports and online datasheets published separately in the public domain by defence ministries, often in association with a climate strategy.

As Tables 1a and 1b show, five of the 15 nations in 2021 (India, Saudi Arabia, Japan, Iran, and Israel) and five nations in 2022 (China, India, Saudi Arabia, Japan, and Israel) published no military data at all in their NIRs. One reason for Japan not specifying any military emissions is due to their ‘self-defence forces’ not being classified as a military under their national constitution.¹¹ Two nations (China in 2021 and Russia in both 2021 and 2022) published obscured data in their NIRs, by including large civilian sources in the same reporting category, without disaggregation of this data. The other nations published military data to some extent, but in all cases there were further problems. For example, for France, South Korea, and Ukraine, there was a lack of clarity over which military sources were or were not included.

For the five nations which provided the largest amount of data – USA, UK, Germany, Australia, and Canada – there were significant differences between the data in the NIRs and that in the defence ministry reports, with the latter all reporting higher levels. Table 2 summarises how much larger the figures reported by those five militaries were, when compared with those reported to the UNFCCC. The lowest difference was Australia in 2021, whose military reported a total 12% higher than that reported to the UN, while the highest difference was Canada in 2021, whose military reported emissions that were

7 2022 data was the most recent available at the time this analysis was carried out. As this report went to press, data for 2023 was published.

8 A further difficulty with scrutinising recent data contained within the NIRs is that the ‘quick search’ function for national GHG inventories had, at the time of writing, not been updated with data from 2021 onwards. UNFCCC (2021). GHG Inventory Data: Detailed Data by Party. https://di.unfccc.int/detailed_data_by_party

9 For example: IPCC. (2006). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. <https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>

10 MEG. (2025). *Op. cit.*

11 Cottrell, L. (2025). Personal communication, 26 October. Japan’s Ministry of Defence has published partial data for the year 2019 in its GHG emissions reduction plan. See: Japanese Ministry of Defence (2022). *Plan Establishing Measures to be Implemented by the Ministry of Defence Concerning its Administrative Affairs and Operations for the Reduction of Greenhouse Gas Emissions*. pp.13–35. https://www.mod.go.jp/j/approach/chouwa/kankyo_taisaku/pdf/gasu.pdf

254% higher. The average across the five nations for the two years studied was 95%. In short, the figures reported to the UNFCCC

should be roughly doubled in order to provide a more accurate estimate for direct military GHG emissions.

Table 1a. Available data on military GHG emissions (direct/ 'Scope 1') for the top 15 military spending nations, 2021

Military spending ranking	Nation	Military spending (\$bn)	Military GHG emissions		Main data problems
			UNFCCC submission (million tCO ₂ e)	National reporting (million tCO ₂ e)	
1	United States	801	17.87	39.04	UNFCCC data does not include overseas operations
2	China	293	108.04	na	UNFCCC data includes civilian sources; no national reporting
3	India	77	na	na	No published data
4	United Kingdom	68	1.58	2.50	UNFCCC data does not include military bases or army (land) vehicles
5	Russia	66	20.79	na	UNFCCC data includes civilian sources; no national reporting
6	France	57	2.14	na	Lack of clarity over reported data
7	Germany	56	0.99	1.31	UNFCCC data does not include overseas operations; national data unclear on Scope 2
8	Saudi Arabia	56	na	na	No published data
9	Japan	54	na	na	No published data (see main text)
10	South Korea	50	3.10	na	Lack of clarity over reported data
11	Italy	32	0.31	na	Lack of clarity over reported data
12	Australia	32	0.82	0.92	UNFCCC data does not include military bases or overseas operations
13	Canada	26	0.28	0.99	UNFCCC data does not include overseas operations, bases, or land vehicles
14	Iran	25	na	na	No published data
15	Israel	24	na	na	No published data

Notes: Direct military GHG emissions include Scope 1 only (see main text).

The UNFCCC data is the sum of 'mobile' and 'stationary' sources for all military categories (see main text).

UNFCCC data is for calendar year 2021 for the USA, the UK, Russia, France, Germany, Italy, Australia, and Canada; 2014 for China; and 2018 for South Korea. National reporting is for financial year 2020–21 for the USA, financial year 2021–22 for the UK, Australia, and Canada, and calendar year 2021 for Germany.

UNFCCC data is reported by governments in National Inventory Reports (NIRs). Data from NIRs for all nations has been compiled by MEG (2025). <https://militaryemissions.org>

Nationally reported data has been compiled from the following sources:

USA: Dept of Energy (2024). Federal Energy Management Program: Comprehensive Annual Energy Data (FY21; Dept of Defense). <https://ctsedwebweb.ee.doe.gov/Annual/Report/ComprehensiveGreenhouseGasGHGInventoriesByAgencyAndFiscalYear.aspx>

UK: p.227 of: Ministry of Defence (2022). Annual Report and Accounts 2021–22. <https://www.gov.uk/government/collections/mod-annual-reports>

Germany: our calculations based on data from pp.30–31 of: Federal Ministry of Defence (BMVG) (2022). Nachhaltigkeitsbericht 2022 (German). <https://www.bmvg.de/resource/blob/5561086/9aac6bb5bcd64e90a0552a3705878987/download-nachhaltigkeitsbericht-2022-data.pdf> and pp.31–32 & pp.50–51 of: Federal Ministry of Defence (BMVG) (2024). Nachhaltigkeitsbericht 2024 (German). <https://www.bundesregierung.de/resource/blob/975274/2324394/a39a7ea33fddb9151c2524523d54d354/2024-12-09-nachhaltigkeitsbericht-verteidigung-data.pdf>

Australia: our calculations based on data for 2020–21 (p.28 of: Dept of Defence (2022). Defence Future Energy Strategy. <https://www.defence.gov.au/about/strategic-planning/defence-future-energy-strategy>) and 2022–23 (p.141 of: Dept of Defence (2022). Defence Annual Report 2021–22. <https://www.defence.gov.au/about/accessing-information/annual-reports>)

Canada: Government of Canada (2024). Greenhouse Gas Emissions Inventory: Open Govt Portal (Items 1 & 6). <https://open.canada.ca/data/en/dataset/6bed41cd-9816-4912-a2b8-b0b224909396>

Military spending figures are expressed in US dollars at current prices. SIPRI (2022). Trends in World Military Expenditure, 2021. <https://www.sipri.org/publications/2022/sipri-fact-sheets/trends-world-military-expenditure-2021>

Table 1b. Available data on military GHG emissions (direct/ 'Scope 1') for the top 15 military spending nations, 2022

Military spending ranking	Nation	Military spending (\$bn)	Military GHG emissions		Main data problems
			UNFCCC submission (million tCO ₂ e)	National reporting (million tCO ₂ e)	
1	United States	877	17.30	37.19	UNFCCC data includes some civilian sources, and does not include overseas operations
2	China	292	na	na	No published data
3	Russia	86	15.58	na	UNFCCC data includes civilian sources; no national reporting
4	India	81	na	na	No published data
5	Saudi Arabia	75	na	na	No published data
6	United Kingdom	69	1.51	2.28	UNFCCC data does not include military bases or army (land) vehicles
7	Germany	56	0.85	1.19	UNFCCC data does not include overseas operations; national data unclear on Scope 2
8	France	54	1.98	na	Lack of clarity over reported data
9	South Korea	46	3.10	na	Lack of clarity over reported data
10	Japan	46	na	na	No published data
11	Ukraine	44	0.87	na	Lack of clarity over reported data
12	Italy	34	0.52	na	Lack of clarity over reported data
13	Australia	32	0.73	1.13	UNFCCC data does not include military bases or overseas operations
14	Canada	27	0.31	0.96	UNFCCC data does not include overseas operations, bases, or land vehicles
15	Israel	23	na	na	No published data

Notes:

Direct military GHG emissions include Scope 1 only (see main text).

The UNFCCC data is the sum of 'mobile' and 'stationary' sources for all military categories (see main text).

UNFCCC data is for calendar year 2022 for the USA, Russia, the UK, Germany, France, Ukraine, Italy, Australia, and Canada; and 2018 for South Korea. National reporting is for financial year 2021-22 for the USA and the financial year 2022-23 for the UK, Australia, and Canada, and calendar year 2022 for Germany.

UNFCCC data is reported by governments in National Inventory Reports (NIRs). Data from NIRs for all nations has been compiled by MEG (2025). <https://militaryemissions.org/>

Nationally reported data has been compiled from the following sources:

USA: Dept of Energy (2024). Federal Energy Management Program: Comprehensive Annual Energy Data (FY22; Dept of Defense).

<https://ctswebweb.ee.doe.gov/Annual/Report/ComprehensiveGreenhouseGasGHGInventoriesByAgencyAndFiscalYear.aspx>

UK: Ministry of Defence (2023). *Annual Report and Accounts 2022-23*. p.204. <https://www.gov.uk/government/collections/mod-annual-reports>

Germany: our calculations based on pp.31-32 & pp.50-51 of: Federal Ministry of Defence (BMVG) (2024). *Nachhaltigkeitsbericht 2024* (German). <https://www.bundesregierung.de/resource/blob/975274/2324394/a39a7ea33fddb9151c2524523d54d354/2024-12-09-nachhaltigkeitsbericht-verteidigung-data.pdf>

Australia: Dept of Defence (2023). *Defence Annual Report 2022-23*. p.141. <https://www.defence.gov.au/about/accessing-information/annual-reports>

Canada: Government of Canada (2024). Greenhouse Gas Emissions Inventory: Open Govt Portal (Items 1 & 6). <https://open.canada.ca/data/en/dataset/6bed41cd-9816-4912-a2b8-b0b224909396>

Military spending figures are expressed in US dollars at current prices. SIPRI (2023). *Trends in World Military Expenditure, 2022*. <https://www.sipri.org/publications/2023/sipri-fact-sheets/trends-world-military-expenditure-2022>

Table 2. How much larger are direct military GHGs compared with those reported to the UNFCCC?

Nation	2021	2022
USA	118%	115%
UK	58%	51%
Germany	32%	40%
Australia	12%	55%
Canada	254%	210%
Average (mean)	95%	94%

What were the reasons for the discrepancies? In the American and German cases, the main problem seemed to be that overseas operations were not declared as military sources in the NIR data. In the British and Australian cases, the main discrepancy was that emissions from military bases were not included in the NIR's military categories.¹² For Canada, the main problem appeared to be that both these activity classes – overseas operations and bases – were excluded from the military categories.

Why is the UN data so poor? One key factor is that a significant proportion of military emissions take place in international waters or airspace. Guidelines under the UNFCCC mean that international aviation and shipping emissions – including both military and civilian sources – do not need to be reported within NIRs.¹³ However, military activities have further exemptions. The roots of this problem go back to 1997 and the negotiation of the Kyoto Protocol, which was the first international treaty that specified national targets for GHG emissions. During these negotiations, the USA successfully argued for an opt-out on reporting and reducing military

emissions for international/ multilateral operations.¹⁴ Other leading military nations were also supportive. This meant that emissions from additional international military activities, including foreign bases, do not need to be included within NIRs. As the data in Tables 1a & 1b and the earlier discussions show, these exemptions explain a significant part of the problem.

However, the situation has been compounded within other guidelines for national GHG inventories.¹⁵ This allows for further flexibilities, without mandatory reporting requirements, which have obscured the role of the military emissions even further. In these guidelines, it is recommended that military emissions due to fuel combustion are reported in a category labelled '1.A.5 Other – Not specified elsewhere'.¹⁶ However, this category can also include some civilian emissions, such as waste incineration. Explicit disaggregation of this data is not always carried out. Furthermore, military fuel emissions can also be reported elsewhere within the national inventory, without being labelled as such. So, for example, military aviation and shipping emissions can be

12 Further analysis of the British case (for 2019) can be found in: Parkinson, S. (2022). *Comparing official UK statistics for military greenhouse gas emissions*. SGR. <https://www.sgr.org.uk/publications/comparing-official-uk-statistics-military-greenhouse-gas-emissions>

13 For example: IPCC. (2006). *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. <https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>

14 Crawford, N. (2022). *The Pentagon, Climate Change and War: Charting the rise and fall of US military emissions*. Chapter 3. MIT Press.

15 IPCC. (2006). Volume 2 (Energy). *Op. cit.*

16 There are two sub-categories: '1.A.5a' covers 'stationary' sources (mainly military buildings) and '1.A.5b' covers 'mobile' sources (mainly military aircraft, ships, and land vehicles).



There are numerous exemptions for reporting military emissions to the UN.

reported anonymously under ‘1.A.3 Transport’, while energy use at national military bases can be reported anonymously under ‘1.A.4 Other sectors’. In addition, militaries can be responsible for non-fuel GHG emissions, in particular, sulphur hexafluoride and perfluorocarbons. These can be reported separately under category ‘2.G.2a’,¹⁷ but this is rarely carried out. Indeed, there is limited understanding of these emissions within militaries, so they are seldom included even in defence ministry reports.¹⁸ Furthermore, emissions arising at foreign military bases can also be reported in the inventory of the host nation. In practice, the loopholes are numerous and have yet to be addressed in updates to the guidelines.¹⁹

Then there is one further problem: reporting requirements for ‘Non-Annex I’ nations are less strict.²⁰ This classification under the UNFCCC covers what are commonly known

as ‘developing countries’, but it includes major military spenders such as China, India, Saudi Arabia, South Korea, and Israel.²¹ The reporting requirements for these nations is being transitioned to the Enhanced Transparency Framework,²² established under the Paris Agreement, but there remains no explicit requirement to include and identify military activities in national reporting.

These issues go a long way to explaining the earlier figures published by MEG – that only 38 out of 70 countries reported any military data for 2022 and only 37 in 2023.²³

So, while in theory, reporting of direct GHG emissions from military activities could be relatively straightforward, in practice, it is confounded by numerous obstacles, some created at the behest of military organisations themselves.

17 See chapter 8 of IPCC. (2019). *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*. <https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/>

18 For example, this is a problem for the British military. See: p.3.4 of: Defence Safety Authority. (2024). Annual Assurance Report: April 2023 to March 2024. https://assets.publishing.service.gov.uk/media/67d04bcd5520788b54eef02/DSA_annual_assurance_report_April_2023_to_March_2024.pdf

19 For example: IPCC. (2019). *Op. cit.*

20 For example, Non-Annex I countries are permitted to submit national GHG emissions data less frequently to the UNFCCC secretariat.

21 UNFCCC. (2025a). Parties to the United Nations Framework Convention on Climate Change. <https://unfccc.int/process/parties-non-party-stakeholders/parties-convention-and-observer-states>

22 UNFCCC. (2025b). FAQ – Implementing the Enhanced Transparency Framework. <https://unfccc.int/FAQ-moving-towards-the-ETF>

23 MEG. (2025). *Op. Cit.*

3. Indirect GHG emissions

The under-reporting of direct GHG emissions highlighted in the previous section is only the first of the problems with military data. In this section, the focus shifts to indirect emissions.

3.1 Definitions, Scope 2, and core emissions

While sources for direct military emissions are relatively straightforward to identify, defining and measuring the numerous indirect sources paid for by military budgets is more complex. Indirect sources include:

- Use of electricity and heating at military facilities supplied by offsite plants not owned by the military;
- Military equipment industries;
- Military contractors, including private security companies;
- Military-owned accommodation provided for families of serving personnel;
- Other military suppliers, including for IT equipment, uniforms, food etc;
- Production of components and raw materials in the supply chains;
- Land-use change on military-owned or -leased land;
- Indirect atmospheric heating effects from military aircraft operating in the stratosphere; and

- Impacts of armed conflict, including damage to ecosystems and infrastructure, refugee movements, medical care for survivors, and post-conflict reconstruction.

As introduced in section 1, for organisations reporting their GHG emissions, a tailored set of standards has been drawn up by the GHG Protocol,²⁴ defining three categories or ‘Scopes’ for emissions:

- Scope 1 – direct emissions;
- Scope 2 – indirect emissions from energy production, e.g. item 1 from the list above; and
- Scope 3 – other indirect emissions, e.g. items 2–8 from the list above.

In addition, CEOBS has proposed a further category – ‘Scope 3+’ – to cover conflict impacts such as those listed in item 9 above.²⁵

Together with reporting of Scope 1 emissions, some militaries have started to compile and publish data for Scope 2. In this report, the total of Scope 1 and 2 is called ‘core’ emissions. For national military data, Scope 2 varies between about 2% – for Switzerland²⁶ – and 36% – for Australia²⁷ – of core emissions. The main factor affecting this percentage is the carbon intensity of the national electricity supply. So, in Switzerland, where fossil fuel use in power generation has been virtually eliminated, it is very low, but in Australia, which still has a heavy reliance on coal, it is high.

24 GHG Protocol. (2015). *Op. cit.*

25 CEOBS. (2022). *Op. cit.*

26 Calculated from data on p.8 of Eidgenössisches Departement für Verteidigung, Bevölkerungsschutz und Sport (VBS) (2024). *Klimapaket Bundesverwaltung: Bericht 2024 Zur Umsetzung im VBS*. <https://www.vbs.admin.ch/de/aktionsplan-energie-klima>

27 Calculated from data on p.153 of Australian Government Defence. (2024). *Defence Annual Report 2023–24*. <https://www.defence.gov.au/about/accessing-information/annual-reports>

Even with this limited level of disclosure, the data can be misrepresented in official publications. For example, let's compare some data published by the US and British militaries in the early 2020s (before the Trump administration abandoned US military climate policies in early 2025). The US Department of Defense (US DOD) stated that its "total Scope 1 and Scope 2 GHG emissions in 2021 are about 76% of total Federal Government Emissions".²⁸ Meanwhile, the UK Ministry of Defence (UK MOD) stated in 2021 that "Defence accounts for 50% of the UK central Government's emissions".²⁹ This figure has been widely repeated. So this data implied that the US military's emissions were a far greater proportion of central government's than in the UK. However, a detailed comparison of the GHG statistics for UK central government³⁰ and those for the whole British military³¹ reveal that the figure of 50% only included Scope 1 and 2 emissions from military bases and, unlike the US, excluded those from military operations and combat vehicles. If total core military emissions (i.e. all of Scope 1 and 2) had been included, the proportion for the UK would have been 75%, virtually identical to the US figure.³²

Another factor to be aware of is the inexperience of militaries in measuring their

Scope 1 and 2 emissions. Those few that are currently doing this have only been doing so for a few years, and the complexities of this undertaking are still being grappled with. One example helps to demonstrate the concern. The UK military has been measuring and reporting its Scope 1 and 2 emissions since 2011,³³ one of the longest periods for a national military. However, in 2022, it revised its energy and environmental data collection practices in order to improve their quality and coverage.³⁴ This led to a revision in its GHG data: Scope 1 and 2 emissions for military bases were revised upwards by at least 40% – correcting a major error.³⁵

3.2 Scope 3 emissions

The situation, however, is much worse for Scope 3 emissions, with only a handful of militaries publishing any data. Table 3 demonstrates the situation for five nations who currently publish some of this data – three among the top 15 spenders: Australia; Germany; and the UK – and two others: Norway and Switzerland.³⁶ The table indicates the Scope 3 sub-categories that these nations report on, and how this increases their total reported emissions for all three Scopes. Germany just reports its business travel emissions, i.e. travel using non-

28 US DOD. (2023). Department of Defense Plan to Reduce Greenhouse Gas Emissions. p.3. [Accessed 31/1/25]. <https://media.defense.gov/2023/Jun/16/2003243454/-1/-1/1/2023-DOD-PLAN-TO-REDUCE-GREENHOUSE-GAS-EMISSIONS.PDF>

29 UK MOD. (2021). *Ministry of Defence Climate Change and Sustainability Strategic Approach*. p.6. <https://www.gov.uk/government/publications/ministry-of-defence-climate-change-and-sustainability-strategic-approach>

30 UK Defra. (2025). Greening Government Commitments April 2021 to March 2024 report. Department for Environment, Food & Rural Affairs. Section A (data table). <https://www.gov.uk/government/publications/greening-government-commitments-april-2021-to-march-2024-report/greening-government-commitments-april-2021-to-march-2024-report>

31 UK MOD (2024). *Annual Report and Accounts 2023–24*. Annex D. <https://www.gov.uk/government/collections/mod-annual-reports>

32 Calculations based on data in notes 10 (UK Defra, 2025) and 11 (UK MOD, 2024).

33 UK MOD. (2024). Sustainability and Climate Change: MOD. <https://www.gov.uk/government/collections/sustainable-development-mod>

34 UK MOD (2022). *Annual Report and Accounts 2021–22*. pp.56, 59 and 227 <https://www.gov.uk/government/publications/ministry-of-defence-annual-report-and-accounts-2021-to-2022>

35 Parkinson, S. (2023). UK military carbon emissions: assessing the latest data. Presentation at Military Emissions Gap conference, Oxford. September. <https://www.sgr.org.uk/resources/uk-military-carbon-emissions-assessing-latest-data>

36 It should be noted that the USA also reported some military Scope 3 emissions between 2008 and 2016, but this practice was ended by the first Trump administration. Typically these emissions added about 10% to the US total, but did not include the upstream supply-chain. US Department of Energy (2024). Federal Energy Management Program: Comprehensive Annual Energy Data: Dept of Defense. [Accessed 31/1/25]. <https://ctsedsweb.ee.doe.gov/Annual/Report/ComprehensiveGreenhouseGasGHGInventoriesByAgencyAndFiscalYear.aspx>

Table 3. Military GHG reporting under Scope 3: selected examples from 2023

Scope 3 categories	Australia	Germany	Norway	Switzerland	UK
Business travel	✓	✓	✓	✓	✓
Employee commuting				✓	✓
Waste disposal	✓		✓		✓
Service family accommodation					✓
Upstream supply-chain			✓ (3 types)		
Other	✓				
Ratio of total GHGs (Scopes 1+2+3) to Scopes 1+2 only	1.30	1.04	5.22	1.10	1.16

Notes:

Data for the calendar year 2023 (Germany, Norway, Switzerland) or the financial year 2023-24 (Australia, UK). Two-thirds of Australia's Scope 3 GHGs are from other, unspecified energy sources.

Data sources:

Australia: p.153 of: Dept of Defence (2024). Defence Annual Report 2023–24. <https://www.defence.gov.au/about/accessing-information/annual-reports>

Germany: pp.50-51 of: Federal Ministry of Defence (BMVG) (2024). Nachhaltigkeitsbericht 2024 (German). <https://www.bundesregierung.de/resource/blob/975274/2324394/a39a7ea33fddb9151c2524523d54d354/2024-12-09-nachhaltigkeitsbericht-verteidigung-data.pdf>

Norway: pp.39-55 of: Norwegian Defence Research Establishment (FFI) (2024). Forsvarssektorens miljø- og klimaregnskap for 2023 (Norwegian). https://www.forsvaret.no/om-forsvaret/miljo/Forsvarssektorens%20klimaregnskap%20for%202023.pdf/_/attachment/inline/c1183920-f674-4c03-bf75-b821a40492ec:b7ad2b1ae98e5290f8e88a59799e40b8be9c5778/Forsvarssektorens%20klimaregnskap%20for%202023.pdf

Switzerland: pp.8-10 of: Federal Dept of Defence, Civil Protection, and Sport (VBS) (2024). Klimapaket Bundesverwaltung Bericht 2024 Zur Umsetzung im VBS (German). <https://www.vbs.admin.ch/dam/de/sd-web/PKGxwtXIGT-Q/Klimapaket-BV-Umsetzung-VBS-Bericht-2024-de.pdf>

UK: p.198 of Ministry of Defence (2024). Annual Report and Accounts 2023-24. <https://www.gov.uk/government/collections/mod-annual-reports>

military-owned vehicles (e.g. commercial planes) for work outside of military operations. The figures in the table shows this increased reported emissions by 4% in 2023. Switzerland goes further, reporting on commuter travel as well. The UK reports under four sub-categories, which leads to a total 16% higher than Scope 1 and 2 alone. Meanwhile, Australia's Scope 3 emissions lead to a 30% uplift. However, it is Norway which carries out the most extensive assessment of Scope 3 by estimating the upstream supply-chain emissions associated with the huge amount of goods (e.g. military equipment) and services (e.g. logistical assistance) that

a military buys in. This leads to an increase of 422% compared with Scopes 1 and 2 only, i.e. 5.22 times the size. This ratio may seem large, but it is comparable with the 5.80 estimated in a study on the GHG emissions of the world's militaries led by Scientists for Global Responsibility.³⁷ The latter figure was estimated using data on UK military emissions and from an 'environmentally-extended input-output' (EEIO) model. The Norwegian military has used a similar methodology, so the fact that both estimates are comparable is not a coincidence. This indicates that militaries need to include their upstream supply-chains if they are to produce

37 Parkinson, S. and Cottrell, L. (2022). *Estimating the Military's Global Greenhouse Gas Emissions*. SGR/Conflict and Environmental Observatory. <https://www.sgr.org.uk/publications/estimating-military-s-global-greenhouse-gas-emissions>

a reasonable estimate of their total carbon footprint. If data from an EEIO model is not available, then an alternative step would be to use emissions data directly collected from military suppliers. For example, some arms companies, mainly in Europe, have started to publish data on their Scope 1 and 2 emissions,³⁸ but their collection of Scope 3 data is much more limited, which is a major shortcoming of this option. Even so, we have yet to find any examples of militaries utilising supplier data in their GHG reporting.

Indeed, there are further reasons why the military's Scope 3 emissions could be even higher than the figures above suggest.

The first reason is that the data rarely includes the indirect heating effect of aviation emissions in stratosphere, including due to contrail formation. Recent research shows that this would multiply aviation carbon dioxide emissions by a factor of at least 1.7.³⁹

A further reason arises from regular data surveys of civilian companies which carry out comparable activities to militaries. For example, corporations in the civilian transport sectors – air, sea, and land – have some similarities with military operators of these technologies. In a 2024 survey, these transport operators reported total emissions (Scope 1, 2 and 3), i.e. their carbon footprint, on average to be *9 times the sum of their core (Scope 1 and 2) emissions*.⁴⁰ Meanwhile, civilian companies in the infrastructure sector have some similarities with military bases. These companies report the ratio of their carbon footprint to core emissions as being *20 times*.⁴¹ Care should be taken in simply extrapolating this data to militaries, especially due to the risk of double-counting. Nevertheless, these figures indicate that uncounted military Scope 3 emissions could be even larger than Norwegian data discussed above imply.

38 For up-to-date figures, see company data within the 'Aerospace and Defence' sector published by Science-Based Targets Initiative (2025). <https://sciencebasedtargets.org/target-dashboard>

39 Using the Global Warming Potential (GWP) for a 100-year timeframe means multiplying by a factor of 1.7, but using the GWP for a 20-year timeframe means using a factor of 4.0. Standard practice is to use the 100-year timeframe, but this has limitations when assessing the impact of short-term climate action. See Table 5 of: Lee, D.S. *et al.* (2021). The contribution of global aviation to anthropogenic climate forcing for 2000 to 2018. *Atmospheric Environment*, vol.244, pp.117834. <https://doi.org/10.1016/j.atmosenv.2020.117834>

40 CDP/BCG. (2024). *Scope 3 Upstream: Big Challenges, Simple Remedies*. p.8 <https://cdn.cdp.net/cdp-production/cms/reports/documents/000/007/834/original/Scope-3-Upstream-Report.pdf> NB. This report quotes the ratio between Scope 3 only and Scopes 1 plus 2. Hence its figures have been recalculated in our report so that they are directly comparable.

41 *Ibid.*

4. Military carbon footprints

The information in the previous two sections shows some key limitations in data collection for both direct and indirect GHG emissions of militaries. In this section, we bring these two sets of data together to explore military carbon footprints.

4.1 Carbon footprint data

To help emphasise the point, Table 4 provides the military emissions data for the top 12 NATO nations – by annual military expenditure – for core (Scope 1

Table 4. Military GHG emissions publicly reported by the 12 highest spending NATO countries, 2023

Nation	Core emissions (Scope 1+2) (million tCO ₂ e)	Carbon footprint (Scope 1+2+3) (million tCO ₂ e)
USA	47.6	na
Germany	1.70	1.77
UK	2.59	3.01
France	2.68	na
Poland	na	na
Italy	na	na
Canada	1.09	na
Türkiye	na	na
Netherlands	0.52	na
Spain	na	na
Sweden	na	na
Norway	0.25	1.29

Notes:

Data is from publicly available online sources only.

Data is for the calendar year 2023 (Germany, Norway), the financial year 2022–23 (USA), or the financial year 2023–24 (UK, Canada). The data for France is for the calendar year 2019, and for the Netherlands is the calendar year 2021.

Data sources:

USA: Dept of Energy (2024). Federal Energy Management Program: Comprehensive Annual Energy Data (FY23; Dept of Defense).

<https://ctsedweb.ee.doe.gov/Annual/Report/ComprehensiveGreenhouseGasGHGInventoriesByAgencyAndFiscalYear.aspx>

Germany: pp.50–51 of: Federal Ministry of Defence (BMVG) (2024). Nachhaltigkeitsbericht 2024 (German). <https://www.bundesregierung.de/resource/blob/975274/2324394/a39a7ea33fddb9151c2524523d54d354/2024-12-09-nachhaltigkeitsbericht-verteidigung-data.pdf>

UK: p.198 of: Ministry of Defence (2024). Annual Report and Accounts 2023–24. <https://www.gov.uk/government/collections/mod-annual-reports>

France: calculated using data from pp.16–17 of: Ministry of Armed Forces (MDA) (2020). Strategie Energetique de Defense: Rapport du groupe de travail energie (French). <https://www.actu-environnement.com/media/pdf/news-36184-strategie-energetique-defense.pdf>

Canada: Government of Canada (2024). Greenhouse Gas Emissions Inventory: Open Govt Portal (Items 1 & 6). <https://open.canada.ca/data/en/dataset/6bed41cd-9816-4912-a2b8-b0b224909396>

Netherlands: p.5 of: Ministry of Defence (2023). MVD: Uitvoeringsagenda Duurzaamheid (Letter) (Dutch). <https://open.overheid.nl/documenten/ronl-75f653ef44beede05553c6677ad670b09818b12e.pdf>

Norway: pp.39–55 of: Norwegian Defence Research Establishment (FFI) (2024). Forsvarssektorens miljø- og klimaregnskap for 2023 (Norwegian). https://www.forsvaret.no/om-forsvaret/miljo/Forsvarssektorens%20klimaregnskap%20for%202023.pdf/_/attachment/inline/c1183920-f674-4c03-bf75-b821a40492ec:b7ad2b1ae98e5290f8e88a59799e40b8be9c5778/Forsvarssektorens%20klimaregnskap%20for%202023.pdf

and 2) emissions, and carbon footprint (Scope 1, 2 and 3). The reason for focussing on NATO is that, in 2021, its member governments agreed a 'Climate Change and Security Action Plan' which was later followed by a 'Greenhouse Gases Emission Mapping and Analytical Methodology'.⁴² It is the first international military alliance to take these steps. The reason for choosing only the top 12 of the 32 member states is that these cover 95% of NATO's military spending.⁴³

The table shows that only seven of these 12 nations publicly published recent Scope 1 and 2 military data, with only three publishing any Scope 3 data. Of these three, only one – Norway – included major indirect sources such as supply chains (see previous section). Again, it is striking that even straightforward reporting of Scope 1 and 2 emissions is so limited. Of course, the situation has worsened considerably since early 2025 as the incoming Trump administration halted all US military climate programs, including reporting of military emissions.⁴⁴

The need for robust reporting of emissions has been highlighted by various military and security organisations, including the European Defence Agency.⁴⁵ The analysis presented here reinforces these concerns.

4.2 Carbon footprint, footprint or toeprint?

Given all the shortcomings with the Scope 3 reporting as currently carried out,

it is important that militaries and their allied researchers do not overstate the completeness of their data. Unfortunately, there are cases where this is already happening. For example, a widely-quoted 2023 study by a management consultancy concluded that the supply-chain was responsible for only 3% of the total military carbon footprint⁴⁶ – markedly lower than any of the in-depth studies quoted in this report. This problem is amplified by the use of the term 'carbon footprint'. This term is generally used to describe a comprehensive assessment of Scope 1, 2 and 3 emissions. However, because a formal definition has yet to be agreed by standards bodies, it is often used to describe emissions totals that only include some Scope 3 emissions. A leading expert in carbon accounting methodologies, Prof Mike Berners-Lee of Lancaster University, UK, has warned that this has led to the production of what he calls 'carbon toeprints', which are emissions estimates which do not include most of the relevant indirect emissions.⁴⁷ In our survey we have found that the British military⁴⁸ uses the term despite only estimating a small fraction of likely Scope 3 emissions. Interestingly, Norway does not use this term, despite carrying out a much more comprehensive assessment. In our view, the UK's use of term is a form of greenwashing.

Finally, it is important to consider the military carbon 'footprint' – the total including 'Scope 3+' emissions, i.e. those due to the impacts of war-fighting. The methodologies for determining Scope 3+ emissions are at an early stage of development, with initial

42 NATO. (2024a). Environment, climate change and security. https://www.nato.int/cps/en/natohq/topics_91048.htm

43 NATO. (2024b). Defence Expenditure of NATO Countries (2014–2024). https://www.nato.int/cps/en/natohq/news_226465.htm

44 US Dept of Defense. (2025). This Week: Defense Department Sharpens Standards, Flushes Climate Change Policies, Restarts Support of Ukraine. 14 March. <https://www.war.gov/News/News-Stories/Article/Article/4121054/this-week-defense-department-sharpens-standards-flushes-climate-change-policies/> NB The Dept of Defense has since been renamed the Dept of War.

45 For example: European Defence Agency. (2024). Shaping the Future: Energy Transition in the Defence Sector. <https://eda.europa.eu/docs/default-source/consultation-forum/eda-cf-sedss-publications/shaping-the-future---energy-transition-in-the-defence-sector.pdf>

46 Roland Berger (2023). Defence Zero: Volume 1: Military emissions and potential solutions. <https://www.rolandberger.com/en/Insights/Publications/Defence-Zero.html>

47 See, for example, pp.8–9 of: Berners-Lee M (2020). *Op. cit.*

48 UK Ministry of Defence (2024). *Annual report and accounts, 2023–24*. pp.45 & 198.

Table 5. Comparison of data submitted to the UNFCCC to carbon footprint data for the Norwegian military, 2021–22

	UNFCCC submission (million tCO ₂ e)	Carbon footprint (Scopes 1+2+3) (million tCO ₂ e)	Ration of carbon footprint to UNFCCC figure
2021	0.111	1.140	10.3
2022	0.091	1.198	13.2

Notes:

UNFCCC data from: MEG. (2025). <https://militaryemissions.org/>

Carbon footprint data from: Norwegian Defence Research Establishment (FFI). (2024). pp.39–55. Forsvarssektorens miljø- og klimaregnskap for 2023 (Norwegian). https://www.forsvaret.no/om-forsvaret/miljo/Forsvarssektorens%20klimaregnskap%20for%202023.pdf/_/attachment/inline/c1183920-f674-4c03-bf75-b821a40492ec:b7ad2b1ae98e5290f8e88a59799e40b8be9c5778/Forsvarssektorens%20klimaregnskap%20for%202023.pdf

estimates recently published for the wars in Ukraine⁴⁹ and Gaza.⁵⁰ The GHG emissions estimated for the Russia-Ukraine war in particular are considerable – approximately 173 million tCO₂e over the first three years of the conflict, with a further 64 million tCO₂e to come for post-war reconstruction. Significantly, the Ukrainian government has input to this assessment. Other governments could follow their lead as further work is urgently needed to develop standards for the measurement and reporting of these emissions.

In considering how to extrapolate this data to other militaries, care is needed not least as different nations include or exclude different sub-categories of military emissions from their UNFCCC data, as discussed in section 2. A further issue is the degree to which Norway is representative of other militaries. For example, its Scope 2 emissions are especially small – around 5% of its core emissions – due to its very low carbon electricity grid. If it were at the higher end of the range – for example, around 35% (see section 3.1) – the ratio would be between 11 and 14.⁵¹

4.3 Relationship between UNFCCC data and carbon footprint data

The data published by the Norwegian military (see sections 3.2 and 4.1) means that, for the first time, a direct comparison can be made between data submitted to the UNFCCC and carbon footprint data for a specific military. Table 5 shows these figures for the years 2021 and 2022. The ratio between the carbon footprint and the UNFCCC data varies between approximately 10 and 13.

49 Initiative on GHG Accounting of War. (2025). Climate damage caused by Russia’s war in Ukraine: 24 February 2022– 23 February 2025. https://en.ecoaction.org.ua/wp-content/uploads/2025/10/Climate-Damage-Caused-by-War-36-months_EN_compressed.pdf

50 Neimark, B. Otu-Larbi, F., Larbi, R., Bigger, P., Cottrell, L., de Klerk, L. and Shlapak, M. (2025). *War on the Climate: A Multitemporal Study of Greenhouse Gas Emissions of the Israel-Gaza Conflict*. Available at SSRN: <https://ssrn.com/abstract=5274707> or <http://dx.doi.org/10.2139/ssrn.5274707>

51 Calculated using data from pp.39–55 of: FFI (2024). *Op. cit.*

5. Conclusions and recommendations

International reporting of military GHG emissions is generally poor. Previous research has pointed out that, of 70 leading nations, only 38 of them reported any military data for 2022 and only 37 in 2023 – slightly more than half.⁵² Reporting flexibilities in national emission inventories under the UNFCCC mean that military emissions can be included unlabelled in broader categories or, if they occur in international waters or airspace, not reported at all.

Countries which did not report any military emissions in 2022 or 2023 included some of the top spenders such as China, India, Saudi Arabia, and Israel. Russia's reporting was so unclear, no meaningful information could be derived. And of course, the USA under the Trump administration has ended its explicit reporting of military emissions.

This report has analysed some of the latest national military GHG data that has been publicly published. The findings reveal many further causes for concern.

- For five of the world's top military spenders – USA, UK, Germany, Australia, and Canada – data on direct military GHG emissions submitted under the UNFCCC was compared with that published by national defence ministries in their own reports. It was found that the data in the defence ministry reports was, on average, 95% higher. In other words, the figures reported to the UNFCCC should be roughly doubled in order to provide a more accurate estimate for direct military emissions.
- On reporting of indirect military GHG emissions, the situation was even worse.



The UN should implement, as a matter of urgency, mandatory and explicit military emissions reporting.

⁵² MEG. (2025). *Op. cit.*

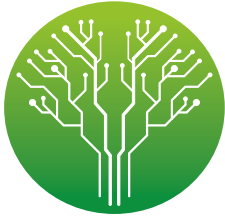
Data was examined from five nations with world-leading practices on military emissions reporting – Australia, Germany, Norway, Switzerland, and the UK. Of these, only Norway had a well-developed system for reporting ‘Scope 3’ emissions, including those from supply-chains.

- On reporting of the military carbon footprint – including Scope 1, 2 and 3 emissions – data was examined from the top 12 military spending nations in NATO. The choice of NATO was because it has adopted a ‘Climate Change and Security Action Plan’, including emission reporting guidelines. Again, only Norway published in-depth estimates for its carbon footprint. Of particular concern was that publicly available data for core military emissions (Scope 1 and 2) could only be found for seven of the 12 nations.
- Extrapolating from the Norwegian data, the report suggests that if military data submitted under the UNFCCC is multiplied by a factor of between 10 and 14, it would provide an initial approximation for national military carbon footprints. In other words, less than 10% of military carbon footprints routinely appear in UNFCCC data.
- No nation has started to report on their conflict-related or ‘Scope 3+’ emissions, although the Ukrainian government has input into research efforts related to its war against Russia.
- Two significant examples of greenwashing by the UK military were highlighted in the report. In frequent reporting of the proportion of central government Scope 1 and 2 emissions due to the military, this

was claimed to be only 50% when the real figure was 75%. Also, the Ministry of Defence reports figures for its ‘Defence Carbon Footprint’ but this only includes a small fraction of the likely Scope 3 emissions necessary to justify the label.

This report makes several recommendations on military GHG emissions reporting:

- The UNFCCC should implement, as a matter of urgency, mandatory and explicit military emissions reporting within National Inventory Reports, based on updated IPCC guidance covering the full scope of military activity, including emissions from war-fighting where relevant. Until this is implemented, national governments should take the initiative by pro-actively submitting more explicit military data in their National Inventory Reports.
- Defence ministries, especially those with large budgets in global terms, should annually publish robust data on national military emissions. This data should be made publicly available. The existing reporting of military emissions – including by nations at war, such as Ukraine – demonstrates that there are no convincing national security arguments to prevent this practice. At minimum, data on Scope 1 and 2 emissions should be published, but this should be quickly expanded to include extensive Scope 3 reporting and, eventually, Scope 3+. Quality assurance should be an integral element of practices.
- Militaries should cease exaggerating or misrepresenting the data on their emissions.



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This report investigates the problem of underreporting of military greenhouse gas emissions. It shows how official data, especially on direct emissions reported to the United Nations and military carbon footprints, are commonly considerable underestimates (if they are reported at all). The report explains the reasons for the underreporting and makes recommendations on how to rectify it.

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