Military climate strategies: are they effective?

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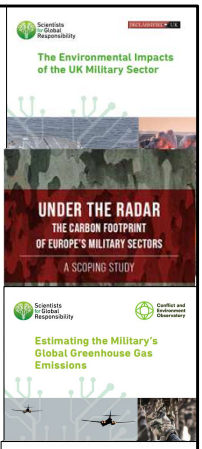
Scientists for Global Responsibility

These slides will be made available at: https://www.sgr.org.uk/

Presentation on 18th September 2026 at 'The environmental politics of war' conference at Warwick University, UK.
References are given in the final slide.
NB The slides have undergone very minor updates since the presentation was delivered.

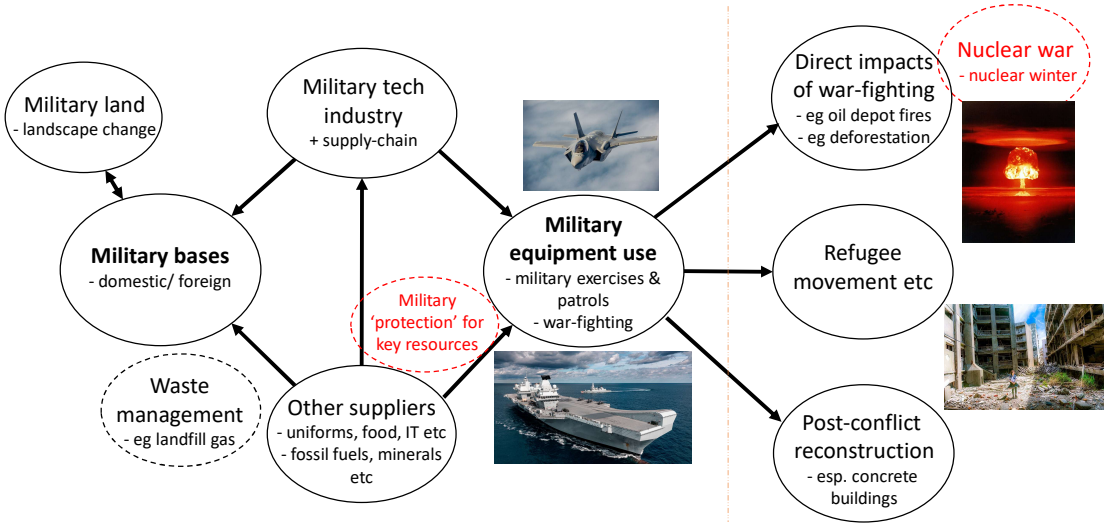
About Scientists for Global Responsibility

- UK research/ advocacy organisation
- Membership includes hundreds of scientists & engineers
- Concerns include:
  - climate change and the military
- Numerous reports, articles etc, some co-published with other organisations



- Collaborators include Conflict and Environment Observatory (CEOBS)
- For more details, see: https://www.sgr.org.uk/

Military carbon bootprint: key components



- 'Core' carbon emissions highlighted in bold
- 'Carbon footprint' covers (black) items to the left of dotted line – and is comparable with impacts seen in civilian sectors
- 'Carbon bootprint' is broader and also includes the items to the right of dotted line
- Data quality is poor
- For more analysis, see (e.g.) SGR (2020).

[image credits: MOD; Gerd Altmann; Free Photos]

Key terminology

- **Core** carbon emissions
  - *Mobile*
    - direct fuel use of military aircraft, ships, land vehicles
  - *Stationary*
    - Direct fuel use of military bases, e.g. heating
    - Electricity use of military activities
- Carbon **footprint**
  - Core emissions plus supply chains, logistics etc
- Carbon **bootprint**
  - Carbon footprint plus impacts of war-fighting
- *'Carbon emissions', 'greenhouse gas emissions' and 'GHG emissions' widely used interchangeably*

- GHG – greenhouse gas
- Core carbon emissions known as 'organisational' or 'operational' or 'scope 1 & 2' emissions
- Supply chain includes military tech manufacture, component manufacture, raw material extraction, and all military supplies – known as 'scope 3'
- Impacts of war-fighting includes urban fires, damage of ecosystems, healthcare of survivors, refugee movement, post-conflict reconstruction – known as 'scope 3+'
- For more details, see: SGR (2025a)

[Image: Clker-Free-Vector-Images]

Military climate strategies

- 3 main components of military climate strategies
  - Adaptation
    - Modifying military equipment/ facilities etc to deal with more hostile climate
  - Humanitarian assistance
    - Helping respond to climate-related disasters
  - Mitigation
    - Reducing military GHG emissions
- Mitigation tends to be lowest priority
- Of the world's top 15 military spending nations, only 4 currently have targets to reduce military GHG emissions
  - Germany, UK, France, Japan

- Top 15 military spending nations in 2025: USA, China, Russia, Germany, India, UK, Ukraine, Saudi Arabia, France, Japan, Israel, Italy, South Korea, Poland, Spain.
- These nations make up 80% of global military spending. (SIPRI, 2026)

SGR review of military climate strategies

- 26 national militaries
  - 20 in NATO (top 15 spenders + 5 others)
    - USA, Germany, UK, France, Poland, Italy, Canada, Türkiye, Spain, Netherlands, Sweden, Norway, Denmark, Romania, Belgium, Greece, Portugal, Estonia, Luxembourg, Slovenia
  - 6 others
    - Japan, Australia, New Zealand, Switzerland, Austria, Ireland
- NATO 'enterprise'
- General finding
  - Almost all military efforts to reduce GHG emissions are either very limited or at an early stage

SGR (2026)

Militaries with near-term emission targets

Nation	Target period	Official target for emissions	% core emissions covered	Effective target for core emissions	Standardised target per year	Effective year for reaching net zero core emissions (best case)
Germany	1990-2030	-65%	50%	-33%	-0.8%	2113
UK	2017-2025	-30%	42%	-13%	-1.6%	2081
France	2010-2030	-50%	17%	-9%	-0.4%	2245
Japan	2013-2030	-50%	unknown	unknown	unknown	unknown
Australia	2006-2030	-43%	100%	-43%	-1.8%	2062
Canada	2005-2025	-40%	55%	-22%	-1.1%	2096
Norway	2019-2030	-20%	92%	-18%	-1.7%	2079
Switzerland	2001-2030	-40%	100%	-40%	-1.4%	2074
Ireland	2016/18-2030	-51%	100%	-51%	-3.9%	2042
Slovenia	2022-2035	-46%	100%	-46%	-3.5%	2051

SGR (2026)

- Data from Table 3 from: SGR (2026)
- Effective year for reaching net zero core emissions is ‘best case’, i.e. decarbonisation rate planned for target period continues until net zero reached. Early decarbonisation is based on ‘easier’ action, including building energy efficiency improvements, decarbonisation of national electricity grid, onsite renewable energy at military bases, closure of obsolete bases

Other significant military targets

Abandoned US targets

Branch	Pre-2035 target period	Official target for emissions	% core emissions covered	Effective target for core emissions	Standardised target per year	Effective year for reaching net zero core emissions (best case)
Dept of Defense (overall)	2008-2030	-65%	35%	-23%	-1.0%	2105
Air Force	2008-2033	-50%	29%	-15%	-0.6%	2180
Navy	2008-2030	-65%	23%	-15%	-0.7%	2155
Army	2005-2030	-50%	58%	-29%	-1.2%	2091

SGR (2026)

NATO 'enterprise' targets

- 2019-2030: -45%; 2019-2050: -100%; all core emissions
- No data published; possibly abandoned

- Data from Tables 4 and 5 from: SGR (2026)

Progress against targets

- Only 7 militaries currently publicly reporting GHG emissions
- Examples:
  - Switzerland
    - Target for core emissions: -40%; 2001-2030
    - Progress: -43% by 2024 (stationary: -67%; mobile: -32%)
    - Main reasons: military base decarbonisation; reduction in flight hours
  - Germany
    - Target for stationary emissions: -65%; 1990-2030
    - Progress: -82% by 2023
    - Main reasons: post-Cold War base closures; national grid decarbonisation
- Only Swiss & Irish militaries are currently on a path to *net zero core* emissions by mid-century

SGR (2026)

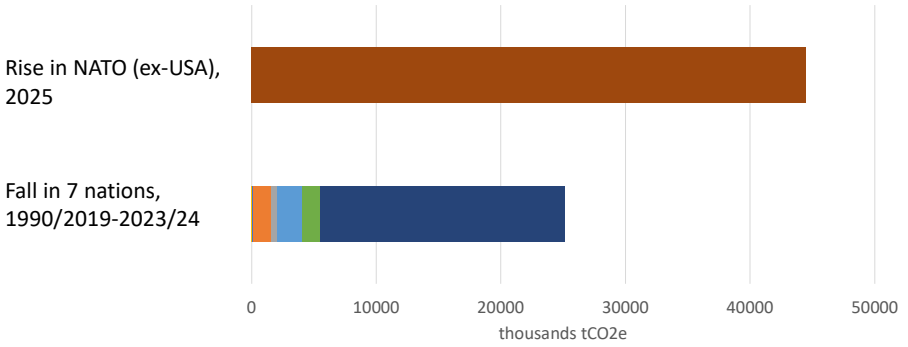
But progress is actually worse…

- Most emissions are not measured
  - *SGR review of military GHG reporting*
  - Data from Norway and UK suggests core emissions make up *less than 20%* of military carbon footprint
  - Rest is supply-chain/ Scope 3
  - No military reports GHG emissions due to war-fighting impacts
- Emissions are rising with rearmament
  - *SGR review of 11 studies on links between military spending and military emissions*
  - For every $100bn increase in military spending, emissions increase by about 32 million tonnes carbon dioxide equivalent (range: 4 to 59 million tCO2e)

- Data from SGR review of military GHG reporting: section 3.2 of: SGR (2025a)
- SGR review of 11 studies on links between military spending and military emissions: SGR (2025b)

Comparing falls and rises in military carbon footprints

- Falls in 7 nations over 5y-33y: approx. 25 million tCO2e
  - Nearly 80% of total occurred in Germany, 1990-2023
- Rise in 31 NATO nations in *one year*: nearly 45 million tCO2e



Parkinson (2026)

- Figures include estimated supply-chain emissions (Parkinson, 2026)

Will these options reduce mobile military GHGs?

Option	Key obstacles	Timescale	Chance of success by 2040s
Fuel efficiency	Rebound	Ongoing	Limited
Biofuels	Sustainable resource already used; land use/ technical limits	Near term	Very limited/ negative
More drones, AI etc	High failure rate; data centre expansion; rebound; human rights impacts	Near/ medium term	Limited/ negative
Synthetic fuels	Immature tech; low conversion efficiency; high costs	Medium term	Limited/ negative
Nuclear power	High radiation risks in battle-space; nuclear proliferation risks; high costs	Medium term	Limited/ negative
Carbon offsets	Major loopholes	Ongoing	Negative
Forestry on military land	Vulnerable to climate impacts	Ongoing	Reversible

- Military tech overlaps with 'hard to abate' civilian sectors: aviation; shipping; heavy-duty road freight; iron & steel; synthetic chemicals
- Any improvements will not reduce environmental impacts of weapons use
- SGR research in this area is ongoing

Summary of findings

- No credible obstacles to military reporting of core emissions
- Military reporting of supply-chain emissions needs to be pursued quickly
- Ambitious targets needed for both core stationary emissions and supply-chain emissions
  - Arms industry objections should be resisted
- Reduction of core mobile emissions unlikely in near-term without change in security priorities
- Rearmament already seems to be overwhelming attempts to reduce military GHG emissions
  - Open debate on military strategy needed

Final thoughts…

- Climate change impacts on Europe this summer comparable to a war?
  - Initial estimates of death toll due to heatwaves at least 35,000
  - 7.6 million hectares burnt by wildfires by late August
- Carbon budget for keeping below 1.5C target in Paris Agreement almost exhausted
  - Irreversible, more rapid climate change much more likely
- Is NATO target of spending of 5% GDP on military and military-related activities therefore justifiable? Especially when it results in:
  - Major increases in GHG emissions
  - Major cuts to international development and climate budgets

- Initial estimates of death toll from European heatwaves: The Guardian (2026).
- Area burnt by wildfires in Europe up to 23 August: Our World in Data (2026); also see: Euro News (2026)

References

- Euro News (2026). Wildfires in Europe: Is 2026 already the worst year on record? 12 August. https://www.euronews.com/business/2026/08/13/wildfires-in-europe-is-2026-already-the-worst-year-on-record
- The Guardian (2026). At least 35,000 excess deaths recorded in Europe's back-to-back heatwaves. 25 August. https://www.theguardian.com/environment/2026/aug/25/at-least-35000-excess-deaths-europe-back-to-back-heatwaves
- Our World in Data (2026). Wildfires. https://ourworldindata.org/wildfires [accessed 10/9/26]
- Parkinson S (2026). Military Climate Action Swamped by Spending Rises. Rethinking Security. July. https://rethinkingsecurity.org.uk/2026/07/17/military-climate-action-swamped-by-spending-rises/
- SGR (2025a). Military greenhouse gas emissions reporting: how reliable is it? November. https://www.sgr.org.uk/publications/military-greenhouse-gas-emissions-reporting-how-reliable-it
- SGR (2025b). Military spending rises and greenhouse gas emissions: what does the research say? September. https://www.sgr.org.uk/publications/military-spending-rises-and-greenhouse-gas-emissions-what-does-research-say
- SGR (2026). Military climate strategies: are they just greenwash? July. https://www.sgr.org.uk/publications/military-climate-strategies-are-they-just-greenwash
- SIPRI (2026). Trends in World Military Expenditure, 2025. April. https://www.sipri.org/publications/2026/sipri-fact-sheets/trends-world-military-expenditure-2025