

# Does war cause climate change?

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

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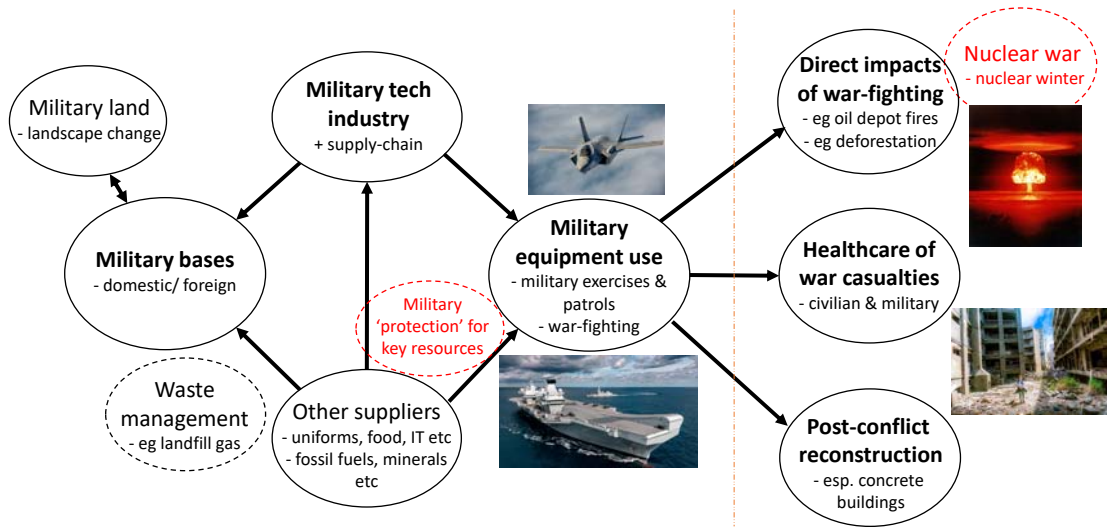
## How big is the military carbon footprint?



Using a range of SGR/ other NGO/ academic/ military reports, chiefly:  
SGR (2020); SGR/ CEOBS (2021); Brown University (2019); MOD (2020)

*[Image: Clker-Free-Vector-Images]*

## Military carbon footprint: key components

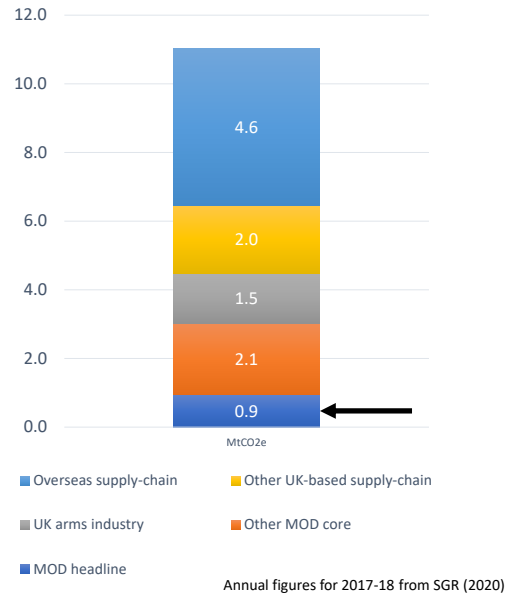


- Carbon footprint covers (black) items to the left of dotted line – and is comparable with civilian sectors
- Carbon ‘bootprint’ is broader and also includes the items to the right of dotted line
- For more analysis, see (e.g.) SGR (2020).

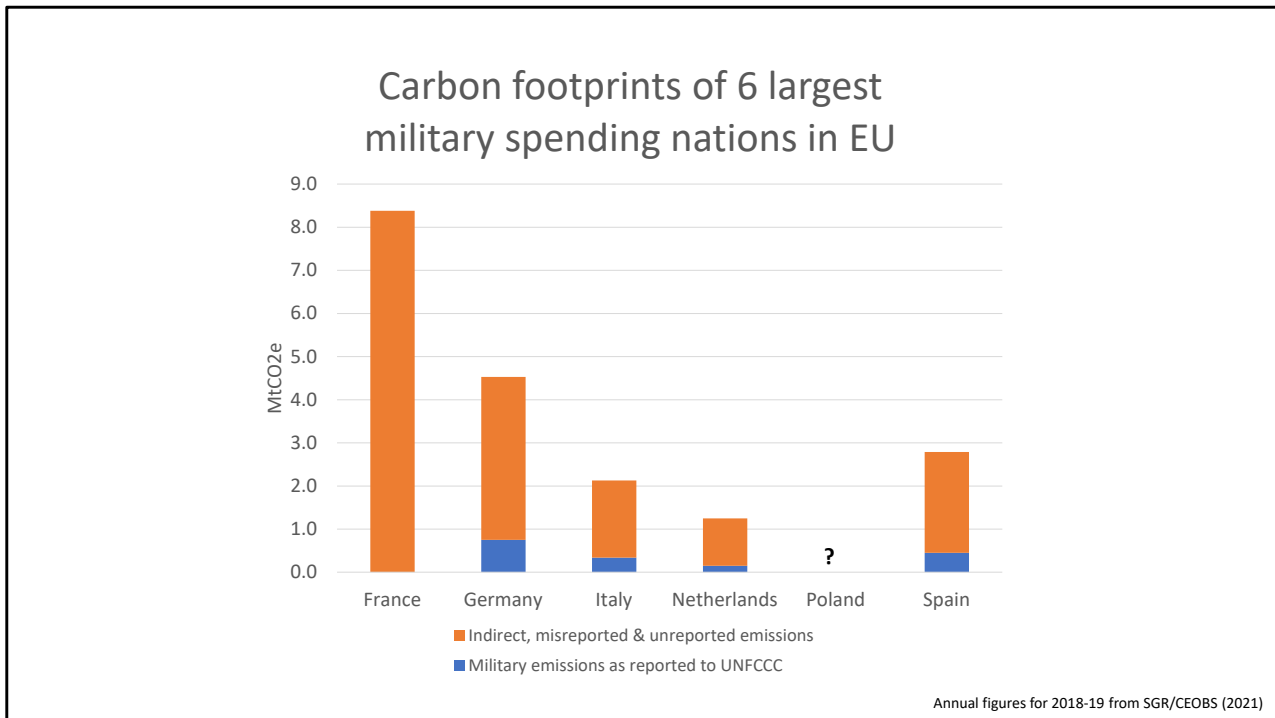
[image credits: MOD; Gerd Altmann; Free Photos]

## Example: UK military carbon footprint

- Total: 11 million tonnes
  - carbon dioxide equivalent
- Ministry of Defence 'headline figure' is 0.9 million tonnes
  - Only includes (most) military bases
- MOD total is 3 million tonnes
  - Also includes: air-force, navy, army operations
- UK arms industry: 1.5 million tonnes
- NB Does **not** include impacts of war-fighting
- Total is equivalent to **6 million cars**



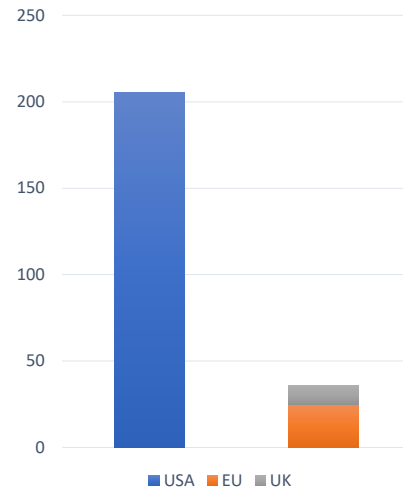
- Arrow indicates Ministry of Defence (MOD) 'headline figure' from its annual report – less than 1/3 of total for MOD and less than 1/10 of total footprint
- Total UK military carbon footprint is approx. equivalent to direct carbon emissions of 6 million average cars
- Figures do not include additional atmospheric heating effects due to high altitude flying ('uplift factor') – which could add a further 10%
- No figures for total 'bootprint' – could be significantly higher
- Data from: SGR (2020); MOD (2020)



- Data from SGR/ CEOBS (2021) – United Nations Framework Convention on Climate Change (UNFCCC) figures from 2018; total estimates based on 2019 data
- Some reasons for national differences:
  - Level of military spending – France and Germany especially high
  - Numbers of high-consumption vehicles, especially planes & ships – France especially high
  - Size of military technology industries – France especially high
  - Level of overseas military operations – France especially high
- UK military carbon footprint higher than all other EU/ European NATO nations – both in absolute terms and per head of population

## Comparing US/ European military carbon footprints

- US total: 205 million tonnes
  - SGR estimate
- DOD is 56 million tonnes
  - i.e. armed forces
- Official figures minimal
- US footprint
  - nearly 6 times EU+UK
- **Global military carbon footprint**
  - Several % of all carbon emissions
  - Equivalent to large European nation
- *NB All estimates conservative!*



Sources: Brown University (2019); SGR (2020); SGR/CEOBS (2021)

- US military carbon footprint estimated based on US figure (2018) for Dept of Defense (DOD) emissions (56Mt) and scaled up assuming the ratio is the same as for UK military situation (3.7)
- Estimate for global military carbon footprint – based on USA/EU/UK data, bearing in mind that the rest of the world’s militaries are likely to be more carbon intensive (e.g. in China, Russia, India, Saudi Arabia, Japan)
- Data sources: USA: Brown University (2019); UK: SGR (2020); EU: SGR/CEOBS (2021)
- Carbon footprint data for nations: Wikipedia (2021)
- Minimal reporting requirements for militaries – due to historical exemptions – see eg SGR (2020)

## Nuclear war and climate change



*[Image credit: Gerd Altmann]*

## Nuclear war can cause extreme climatic change

- World rightly concerned about global climate change due to **carbon emissions**
- Few people aware of threat from global climate change due to **nuclear war**
- Recent academic research shows impacts to be high, even from 'regional' nuclear war
- Key differences:
  - Direction – nuclear war would cause global **cooling**
  - Speed – nuclear war would cause **much more rapid** changes
  - Magnitude – nuclear war can cause **larger** changes



- *Image credit: AlexAntropov86 via Pixabay*

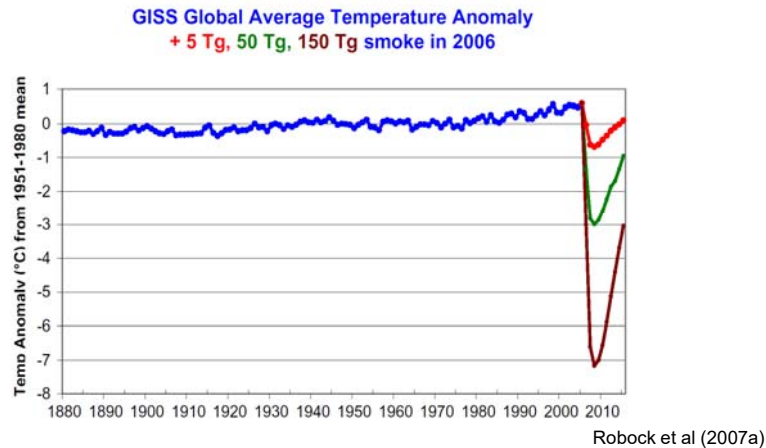


## Nuclear winter: the key steps



*Image credit: Alicja via Pixabay*

## 'Boot-print' of nuclear war

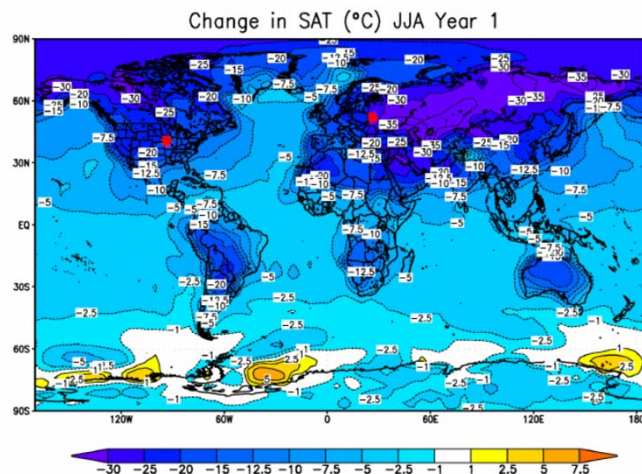


- Scenario 1 (Red) – 'regional' nuclear war, e.g. India-Pakistan, UK arsenal
- Scenario 2 (Green) – 'global-low' nuclear war, e.g. all current US-Russian nuclear weapons
- Scenario 3 (Brown) – 'global-high' nuclear war, e.g. expansion of arsenals to mid-2000 levels

- 3 nuclear war scenarios and the resultant 'global cooling'
  1. 5 million tonnes (Mt) of black carbon (soot) injected into stratosphere
  2. 50 Mt of black carbon
  3. 150 Mt of black carbon
- From research led by Prof Alan Robock, Rutgers University, USA (Robock et al, 2007a)
- Blue line is measured global temperature change 1880-2006 (relative to 1951-1980 average level)
- For UK nuclear scenarios, see: SGR (2015)

## Nuclear winter scenarios

- Global-high scenario:



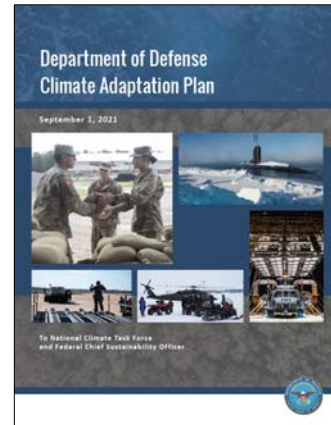
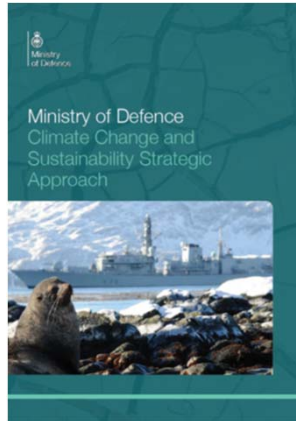
- Graph: Surface air temperature changes (degrees Celsius) for the '150 Tg case' – i.e. a major nuclear war between USA and Russia leading to emissions of 150 million tonnes of black carbon into the upper atmosphere, mainly in the form of smoke – averaged for June, July, and August of the year of smoke injection and the next year. Effects are largest over land, but there is substantial cooling over oceans, too. The warming over Antarctica in Year 0 is for a small area, is part of normal winter interannual variability, and is not significant. Also shown as red bursts are two example locations for nuclear weapon explosions.
- Robock et al (2007b)

## Reducing the military carbon footprint



*[Image: Clker-Free-Vector-Images]*

## New military reports on climate



- In the run-up to COP26, UK, US and NATO published military climate reports – but none included rigorous strategies for reducing carbon emissions

- Sources: MOD (2021); DOD (2021); NATO (2021)

## Military approaches to tackling climate change

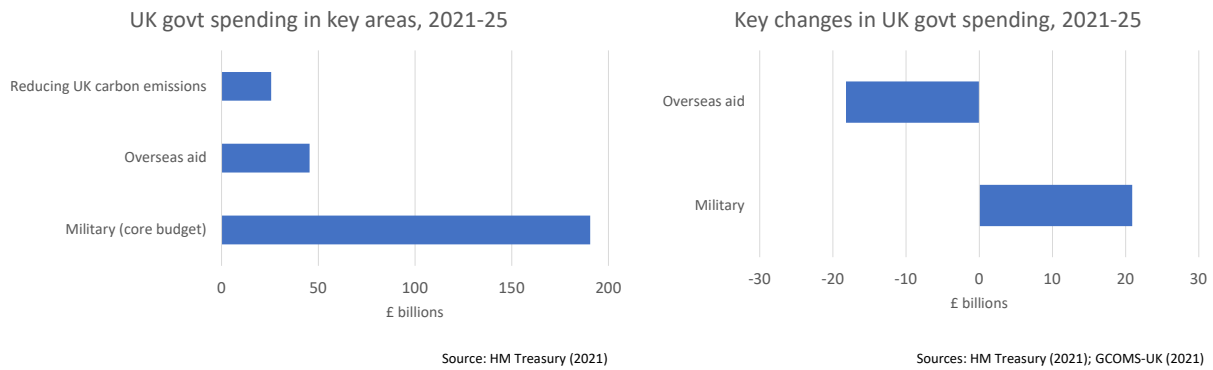
- UK Ministry of Defence climate document
  - Aim: “seek to use the green transition to add to capabilities”
  - Aim: “fight and win in ever more hostile and unforgiving physical environments”
- Reducing carbon emissions
  - Many key proposals problematic
  - Use of biofuels/ synthetic fuels especially in military planes
  - More drones/ robotic/ cyber tech
  - More nuclear power in warships/ at bases
  - Use of offsetting – e.g. more trees on military land
- No consideration of alternative approaches to improving security
- No mention of climatic threat from nuclear weapons

Report of the  
Defense Science Board Task Force  
on  
DoD Energy Strategy  
“More Fight – Less Fuel”



- Quotes and info from (e.g.) MOD (2021)
- Title of US DoD report shows the main motivation for energy saving measures - from: Lorincz (2015)
- Problems with proposals include:
  - Fuelling arms races and risk of war
  - Radioactive waste (nuclear tech)
  - Competition with land for food (biofuels)
  - Irreversibility and unreliability of carbon offsets
  - Use of speculative tech that may not delivery emission reductions (synthetic fuels)

## Comparing military and climate spending



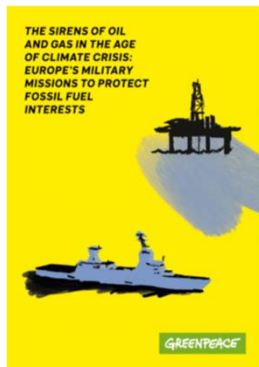
- NATO targets fuelling military spending increases - which often fuels carbon emission rises
- Global military spending nearly **\$2,000,000,000,000** per year – money needed elsewhere

- This imbalance in military v climate v aid spending is even worse in many other wealthy nations
- UK govt spending
  - Data analysis summarised in GCOMS-UK (2021) based on data from HM Treasury (2021)
  - Military total does not include Trident contingency fund, military pensions etc
  - ‘Reducing UK carbon emissions’ covers spending commitments in the UK’s new Net-Zero Strategy
  - Calculations on reductions in UK aid budget are based on the reduction from 0.7% to 0.5% of Gross National Income
- Global military spending figures from SIPRI (2021)

# Are militaries being used to help preserve global inequalities?

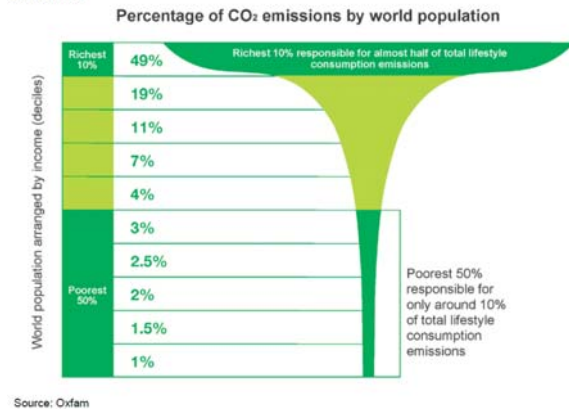
Militaries used to secure (e.g.):

- access to limited oil resources
- ability of wealthy to overconsume



“Almost two thirds of EU military missions are linked to fossil fuels”

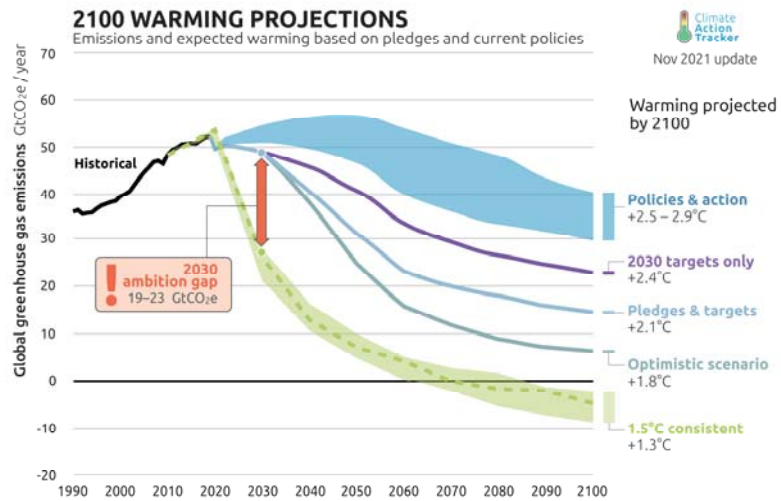
Figure 1: Global income deciles and associated lifestyle consumption emissions



- Analysis of EU military missions from Greenpeace (2021)
- Carbon emissions inequality
  - ‘Champagne glass’ graph from: Oxfam (2015)
  - This research has just been updated - Oxfam (2021). Their projections, based on existing international policies, show this inequality will persist to at least 2030 – with richest 1% share increasing to 16% of carbon emission by then.



# COP26 agreements: how far do they get us?



Climate Action Tracker (2021)

## How does the Russia-Ukraine war affect things?

- Large rise in military carbon emissions of Russia and Ukraine
  - Also future large emissions due to post-war reconstruction
- Large rise in international military spending will lead to large rise in other military carbon emissions
  - Efforts to reduce military carbon emissions will probably be side-lined
- Attention being distracted from efforts to reach climate targets
  - Major progress needed \*this year\* to keep open possibility of hitting 1.5C global temperature target



- On necessary efforts to reach 1.5C target, see: Anderson et al (2020)

## Glimmers of hope...

- More nations now looking to reduce fossil fuel use faster
  - 'Get out of Russian gas & oil'
  - For 'energy security' as well as for climate change
- Energy conservation generally cheaper than new power stations
  - e.g. home insulation, heat pumps
  - Helps tackle 'cost of living' crisis and fuel poverty
- Costs of renewable energy & energy storage falling fast
  - Especially electricity from solar and wind
  - Batteries and 'green' hydrogen
- Behaviour change can reduce carbon emissions very fast
  - Especially richer households
- Climate protestors very visible at COP26 etc
  - Especially young people

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