The Carbon Boot-print of the Military

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Scientists for Global Responsibility

http://www.sgr.org.uk/

Basics

- Greenhouse gases (GHGs)
  - Heat-trapping gases in atmosphere
  - Human activities emit GHGs and cause global heating and climate disruption
  - Carbon dioxide (CO2) is most important GHG
  - CO2 emitted mainly by burning fossil fuels and deforestation
  - Emissions measured in ‘tonnes of carbon dioxide equivalent’ – tCO2e

Jargon

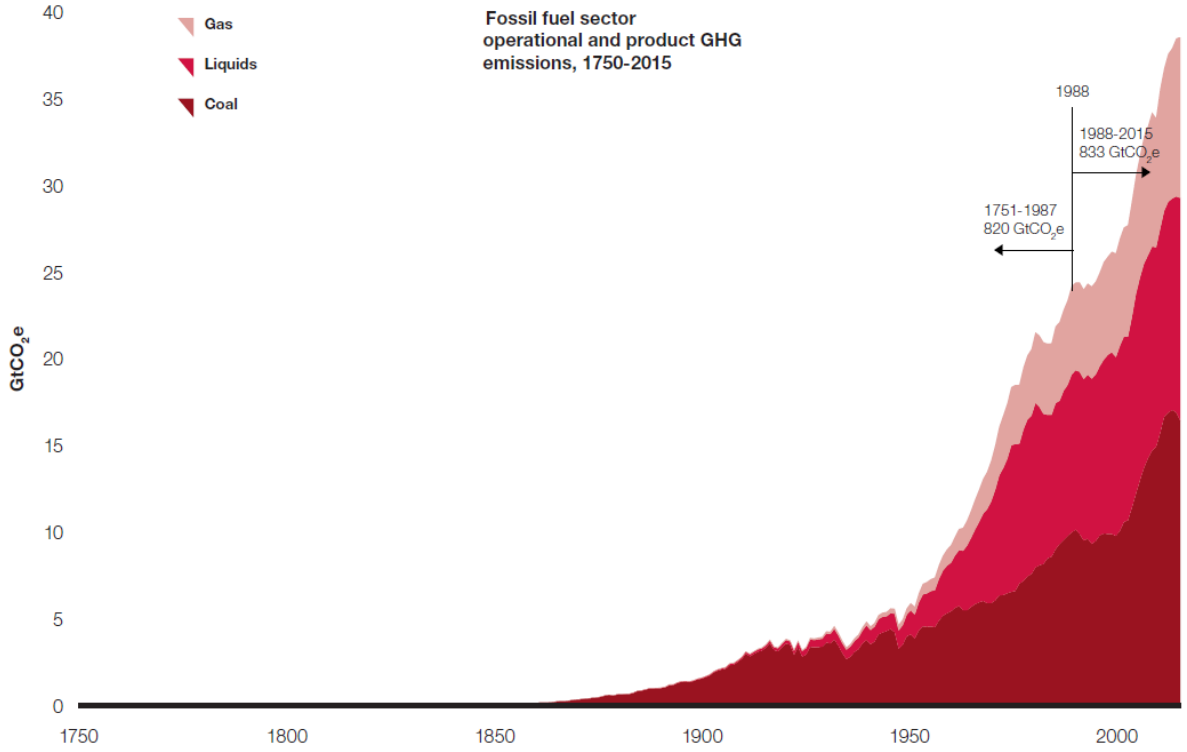
- Carbon emissions
  - Common term for GHG emissions
  - *Direct* emissions from human activity
    - e.g. burning fuel in building, vehicle or power station
  - Used in statistics at nation/ organisation level
- Carbon footprint
  - *Direct and indirect* emissions from human activity
    - Includes emissions from producing vehicle or building
  - Also called ‘lifecycle emissions’

Military ‘carbon boot-print’

Routine activities – domestic bases	Routine activities – foreign bases	War-fighting	War impacts (examples)
Production of military equipment 1. Raw materials 2. Supply chain 3. Final assembly			• Post-conflict reconstruction
Military bases etc 4. Energy use 5. Food 6. Waste management			• Health care for survivors (civilian/ military)
Vehicle use 7. Aircraft 8. Marine vessels 9. Land vehicles			• (Oil) fires caused by weapons-use • Deforestation during conflict

Limiting global temperature change

- Research points to limit of 1.5C
- At current global emissions level, ‘carbon budget’ will be breached in approx. 10y



CDP (2017)

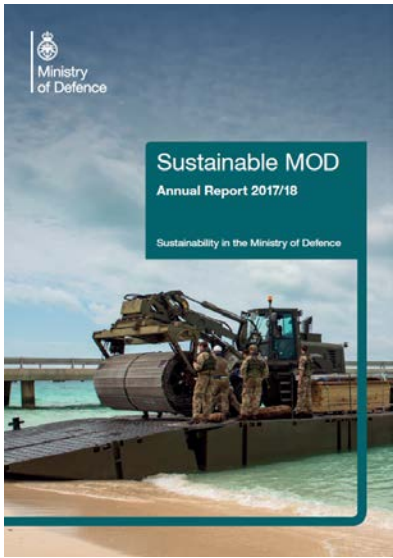
Military carbon emissions: key data

Military vehicles

- HUMVEE military transporter
  - 6 mpg
- F-35 fighter-bomber
  - 0.6 mpg;
  - 28 tonnes CO2e per mission
- B-2 long-range-bomber
  - 0.3 mpg;
  - 251 tonnes CO2e per mission

UK Ministry of Defence

- MOD publishes annual report on its contribution to sustainable development
- Includes environmental impacts from:
  - Estates – UK and overseas
  - Capability and equipment – incl. military ops.
- Environmental impacts reduced by:
  - Selling off buildings
  - Reducing military operations
  - Targeted programmes
    - e.g. energy efficiency



MOD carbon emissions

- SD report includes data on carbon emissions but no single ‘official’ total
- SGR calculation for 2016/17:

3.2 million tonnes CO2e

(Estates: 40%/ Capability: 60%)

- Higher than carbon emissions of Iceland
- 0.7% of UK carbon emissions
- Does not include:
  - Emissions of contractors or suppliers
  - Emissions of war-related fires, reconstruction etc

BAE Systems

- BAE publishes annual report on ‘corporate responsibility’
- Includes environmental impacts from its international operations
- Environmental impacts reduced by:
  - Energy efficiency programmes
  - Renewable energy installations

BAE carbon emissions

- CR report includes data on carbon emissions
- Total figure for all its sites internationally, 2017/18:

1.2 million tonnes CO2e

- UK operations about 40% of total
- Does not include:
  - Emissions of suppliers/ raw materials
  - Emissions from use of equipment etc

US Dept of Defense (Pentagon)

- DOD does *not* publish annual reports on sustainable development or similar – but…
- Runs programmes on energy efficiency, sustainable procurement
- Warns of security threats from climate change
- World largest institutional consumer of petroleum

DOD carbon emissions

- DOD does not publicly publish data on its carbon emissions
- Estimates by academics/ campaigners
  - Based on US gov energy data
- DOD emissions for 2017:

59 million tonnes CO2e

(Installations: 40%/ Operations: 60%)

- Higher than carbon emissions of Hungary
- 1.0% of US carbon emissions
- Previous caveats apply

US arms industry

- Estimate by Prof Neta Crawford
- US arms industry emissions for 2017:

  280 million tonnes CO2e

- Higher than carbon emissions of Egypt
- 4.8% of US carbon emissions
- Including emissions from supply-chain/ raw materials?

‘War on Terror’ carbon emissions

- Analysis by Prof Neta Crawford
- Estimate based on analysis of US DOD ‘Overseas Contingency Operations’ and equivalent section of US arms industry
- Total emissions in period, 2001-2017:

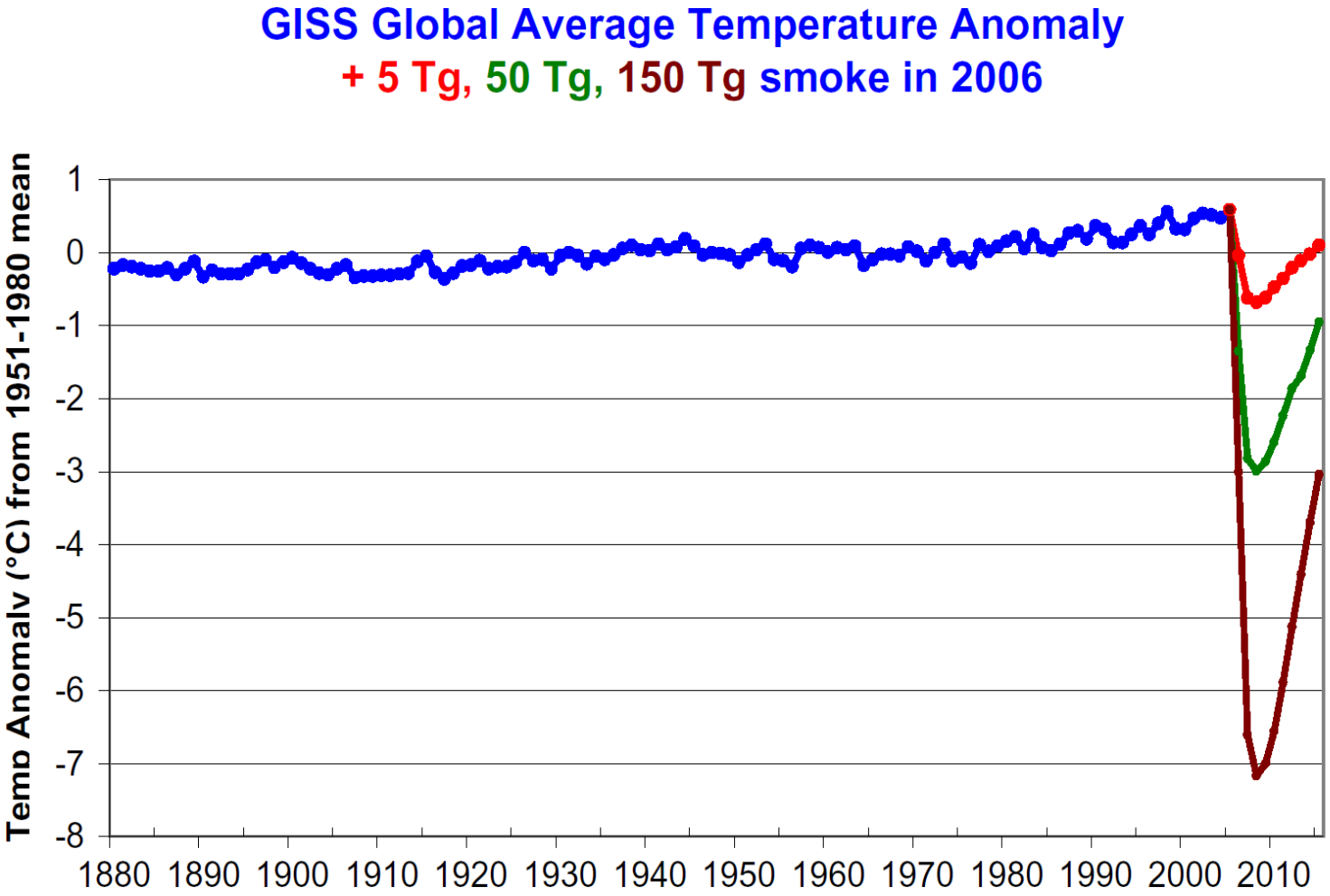
3,000 million tonnes CO2e

- Equivalent to total USA emissions for nearly 6 months

Military carbon boot-print

- Military-industrial complex is deeply embedded in many nations
- Estimates for military carbon footprint
  - UK: 13 million tonnes CO2e (3% national)
  - US: 339 million tonnes CO2e (6% national)
  - **Global: perhaps 5%?**
- Does not include war impacts
  - Maybe 1% more?

‘Boot-print’ of nuclear war



Reducing the military carbon boot-print

Reducing the boot-print

- Are military carbon emissions subject to national carbon targets?
- What are militaries doing to reduce their emissions?
- What can campaigners/ scientists do?

Military emissions and carbon targets

- US negotiators successfully argued for military carbon emissions to be excluded from targets under 1997 Kyoto Protocol
- 2015 Paris Agreement allows nations to take voluntary action
- US carbon emissions from ‘military bunker fuels’ excluded from national inventory
- UK includes some military categories in national inventory

U.S. Under Secretary and former Kyoto lead negotiator, Stuart Eizenstat, stated before the U.S. Senate in 1998:

"We took special pains, working with the Defense Department and with our uniformed military, both before and in Kyoto, to fully protect the unique position of the United States as the world's only super power with global military responsibilities. We achieved everything they outlined as necessary to protect military operations and our national security. At Kyoto, the parties, for example, took a decision to exempt key overseas military activities from any emissions targets, including exemptions for bunker fuels used in international aviation and maritime transport and from emissions resulting from multilateral operations."

What's counted by the UK?

Which UK military data is included in GHG inventories?

	Routine activities – national	Routine activities – foreign	War-fighting
Production of military equipment			
1. Raw materials	Some*^	Some^	Some^
2. Supply chain	Some*^	Some*^	Some*^
3. Final assembly	All*^	All*^	All*^
Military bases etc			
4. Energy use	All*	Most*	Most*
5. Food	Most*^	Some^	Some^
6. Waste management	All*	Some^	Some^
Vehicle use			
7. Aircraft	All*	Most*	Some*
8. Marine vessels	All*	Most*	Some*
9. Land vehicles	All*	Most*	Some*

* - UK inventory; ^ - foreign inventories

What's counted by the USA?

Which US military data is included in GHG inventories?

	Routine activities – national	Routine activities – foreign	War-fighting
Production of military equipment			
1. Raw materials	Some*^	Some^	Some*^
2. Supply chain	Most*^	Some*^	Most*^
3. Final assembly	All*^	All*^	All*^
Military bases etc			
4. Energy use	None	None	None
5. Food	Most*^	Some*^	None
6. Waste management	None	None	None
Vehicle use			
7. Aircraft	None	None	None
8. Marine vessels	None	None	None
9. Land vehicles	None	None	None

* - USA inventory; ^ - foreign inventories

What war impacts are counted?

- War impacts are not generally counted in the GHG inventories of the attacking countries, e.g.
  - (Oil) fires from weapons-use
  - Deforestation due to conflict
  - Post-conflict reconstruction
  - Civilian survivors' health-care
- Except veterans' health-care?

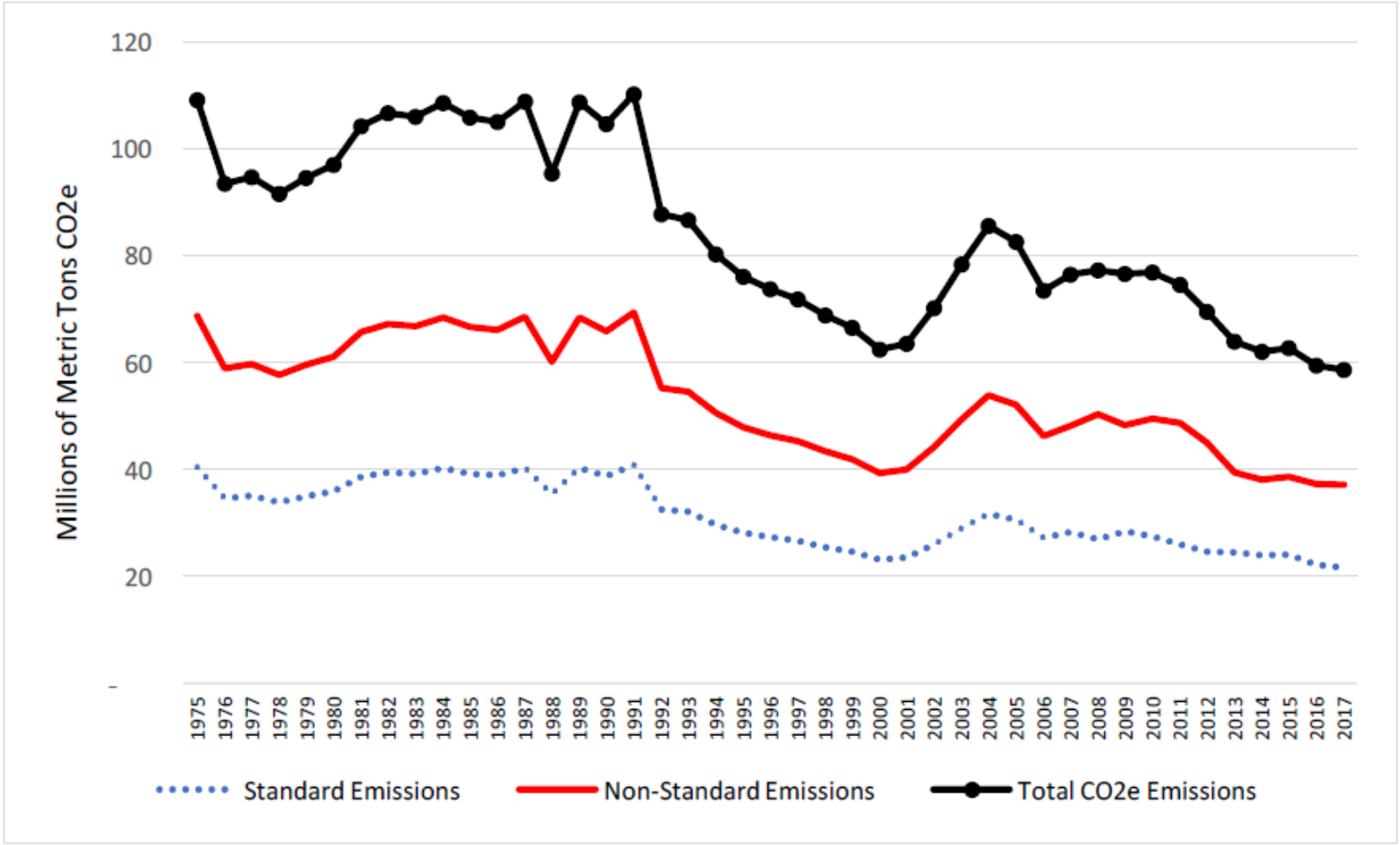
Military energy conservation

- Numerous energy efficiency and renewable energy programmes run by militaries, e.g.
  - Re-design of warships/ aircraft for fuel efficiency
  - Solar panels at military installations/ factories
- Creates military advantage
  - Increases vehicle range/ payload (e.g. bombs)
  - Reduces need for fuel transport to battlefield
- Saves money
- Reduces carbon emissions?

Report of the
Defense Science Board Task Force
on
DoD Energy Strategy

"More Fight – Less Fuel"

US military carbon emissions
1975-2017

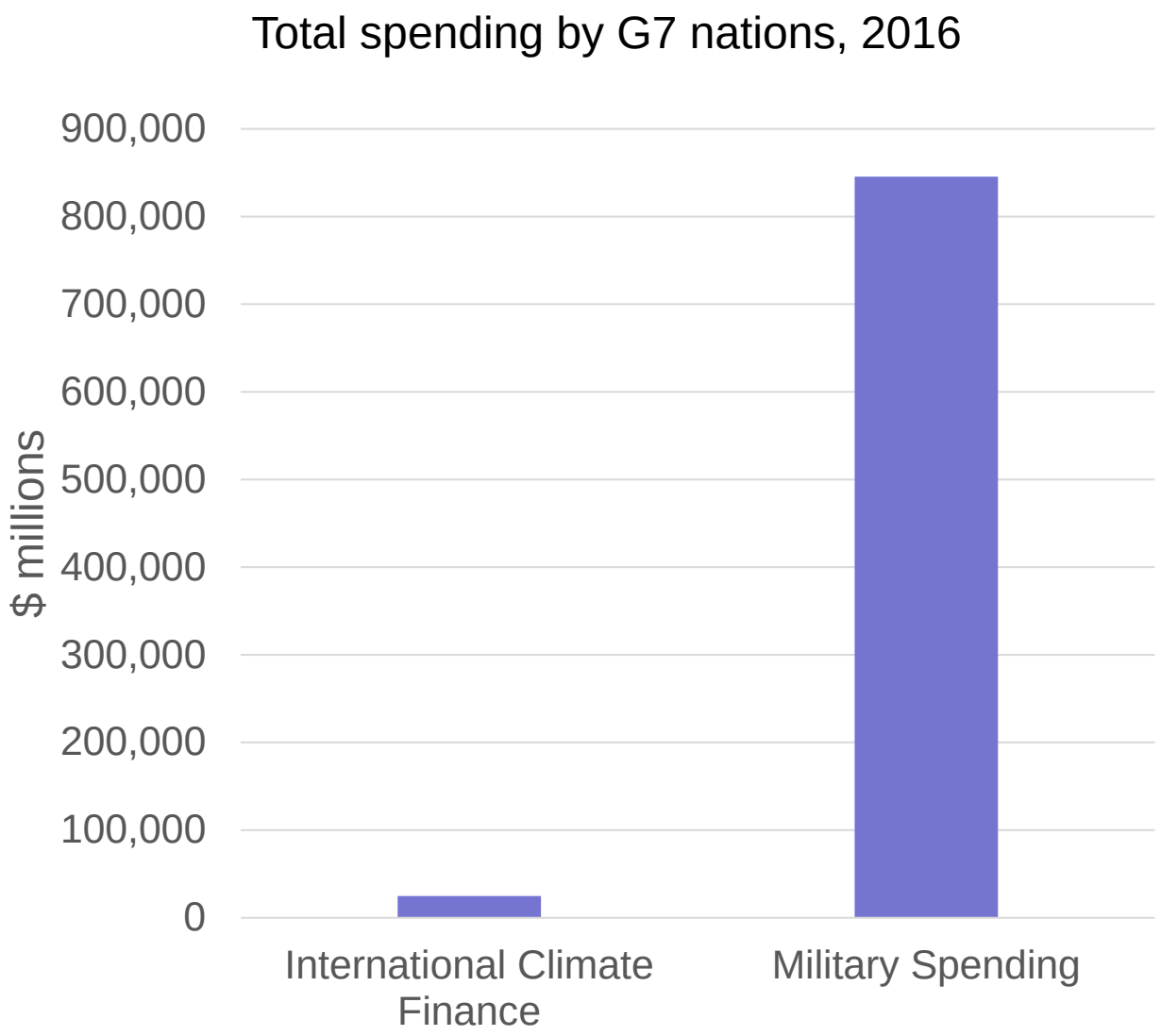


Crawford (2019)

Remote warfare and carbon emissions

- Rise of ‘Remote warfare’
  - Robotic/ autonomous weapons, e.g. drones
  - Cyber-warfare
  - Special forces
  - Private military and security corporations
- Use of smaller/ more energy efficient tech
- Helping to reduce carbon emissions?
- So could reduction targets for military carbon emissions be counter-productive?

Military v climate spending



ORG (2018)

Military v climate spending

Spending by G7 nations, 2016

	International Climate Finance (US$M)	Military Spending (US$M)	Climate Finance as % of Military Spending
Canada	230	15,157	1.5%
France	4,097	55,745	7.3%
Germany	9,117	41,067	22.2%
Italy	249	27,934	0.9%
Japan	8,466	46,126	18.4%
UK	1,495	48,253	3.1%
USA	1,244	611,186	0.2%

ORG (2018)

Climate change needs to be tackled…

- *“with a sense of urgency and shared resolve that has previously been seen only when nations have mobilized for war.”*

Al Gore, acceptance speech

2007 Nobel Peace Prize

Taking action

- Highlight the high military ‘carbon boot-print’
  - More academic studies/ IPCC special report?
- Highlight the huge imbalance between military and climate spending
- Point out security goals are better served by shift from military to climate spending
- Key target audiences:
  - Policy-makers (environment/ security)
  - Environmental campaigners
  - Climate scientists

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