

## Comparing official UK statistics for military greenhouse gas emissions

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### *Executive summary*

There are serious concerns that the official data published by different government bodies for UK military greenhouse gas (GHG) emissions are neither consistent nor complete enough to adequately guide policy-making in this area.

This short technical paper analyses the main data sets published by the Ministry of Defence (MOD) and the Department for Business, Energy and Industrial Strategy (BEIS), and finds that there are major discrepancies between them, that none gives a complete picture of scope 1 and 2 GHG emissions, and that ‘headline’ figures presented from these data sets considerably understate emissions – by between 36% and 71%. If lifecycle emissions were included, that understatement would be considerably larger.

Recommendations are made for key steps to rectify these problems, thus making these statistics much more suited to guiding policy decisions.

### *Introduction*

This short technical paper examines and compares official data published by different government bodies for UK military greenhouse gas (GHG) emissions. This has been carried out due to two concerns: (i) that the different data sets appear not to be consistent; and (ii) that the headline figures from these data sets that are being used to guide policy decisions do not adequately reflect the situation on the ground.

The statistics we examine relate to activities in the calendar year 2019 or the financial year 2019/20. The bodies and publications we look at are:

1. Ministry of Defence: Annual report<sup>1</sup> (MOD-AR)
2. Department for Business, Energy & Industrial Strategy: Final UK greenhouse gas emissions national statistics<sup>2</sup> (BEIS-NS)
3. Department for Business, Energy & Industrial Strategy: United Kingdom National Inventory Report, as submitted to the United Nations Framework Convention on Climate Change Secretariat<sup>3</sup> (BEIS-UN)
4. Climate Change Committee: Progress report to parliament<sup>4</sup> (CCC-PR)

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<sup>1</sup> MOD (2020). Annual report and accounts 2019-20. <https://www.gov.uk/government/publications/ministry-of-defence-annual-report-and-accounts-2019-to-2020>

<sup>2</sup> BEIS (2021). Final UK greenhouse gas emissions national statistics: 1990 to 2019. Data tables. <https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2019>

<sup>3</sup> UN FCCC (2021). United Kingdom: 2021 National Inventory Report. <https://unfccc.int/documents/273439>

<sup>4</sup> CCC (2021). 2021 Progress Report to Parliament. <https://www.theccc.org.uk/publication/2021-progress-report-to-parliament/>

*Published military GHG emissions data*

Tables 1 to 3 set out UK military GHG emissions data as published in key official documents. Table 1 covers data published by the MOD, and tables 2 and 3 cover data published by BEIS. No explicit data is published by the Climate Change Committee (CCC) in their reports, but they do make policy recommendations which we assume must be drawn from the MOD or BEIS data, or both.

<i>Main categories</i>	<i>Further detail</i>	<i>Location in document</i>	<i>GHG emissions (ktCO<sub>2</sub>e)</i>
Estates	Military bases; Fuel and electricity use; Scopes 1, 2 and 3 <sup>5</sup> (business travel only)	Main text & annex ('Sustainable MOD'; Annex D)	783
Capability	Military vehicles: air, sea, land; Fuel use; Scopes 1, 2	Annex only (Annex D)	1,826
<i>Total</i>	<i>All of the above</i>	<i>Annex only (Annex D)</i>	<i>2,609</i>

**Table 1. GHG emissions reported in MOD-AR for 2019-20**

<i>Main categories</i>	<i>Further details</i>	<i>Location in document</i>	<i>GHG emissions (ktCO<sub>2</sub>e)</i>
Military aviation and shipping	Classified under 'Transport: Other mobile'; All GHGs	Main data tables (Table 1.2)	1,735
Public defence services	Classified under 'Public administration & defence'; (SIC group: O84.22); All GHGs	Annex data tables (Annex 2; Table 8.1)	1,968
Public defence services	Classified under 'Public administration & defence'; (SIC group: O84.22); SF6 only	Annex data tables (Annex 2; Table 8.7)	118
Manufacture of weapons and ammunition	Classified under 'Manufacturing' (SIC group: C25.4); All GHGs	Annex data tables (Annex 2; Table 8.1)	102
<i>Total</i>			<i>na</i>

**Table 2. GHG emissions reported in BEIS-NS for 2019**

<sup>5</sup> Scopes 1, 2 and 3 refer to different components of GHG emissions reporting – generally used for organisations. Scope 1 covers direct emissions; scope 2 covers indirect emissions from (e.g.) electricity; scope 3 covers wider indirect emissions, including (e.g.) lifecycle emissions. For full definitions, see: GHG Protocol (2021).

<https://ghgprotocol.org/>

<i>Main categories</i>	<i>Further details</i>	<i>Location in document</i>	<i>GHG emissions (ktCO<sub>2</sub>e)</i>
Other: stationary, including military (1A5a)	Classified under 'Energy: Fuel combustion activities'	na	Not specified
Other: mobile, including military (1A5b)	Classified under 'Energy: Fuel combustion activities'	Annexes (Annex 2, p767)	1,735
Military applications (2G2a)	Classified under 'SF6 and PFCs from Other Product Use'	unclear*	118
<i>Total</i>			<i>na</i>

**Table 3. GHG emissions reported in BEIS-UN for 2019**

\* The figure in this category was obtained from UNFCCC 'look-up' tables.<sup>6</sup>

### *Analysing published military GHG emissions data*

The most obvious item to note from inspecting tables 1 to 3 is the general lack of consistency, even taking into account the slightly different accounting periods – 2019-20 for table 1 and 2019 for tables 2 and 3. The following observations are of particular note:

- MOD-AR gives GHG emission figures for military bases (under 'Estates') while BEIS-NS and BEIS-UN do not.
- MOD-AR gives GHG emissions for all military vehicles (under 'Capability'), while BEIS-NS only gives figures for aviation and shipping. The corresponding figure in BEIS-UN is identical to that in BEIS-NS, indicating that it too only includes aviation and shipping, and not land transport.
- BEIS-NS and BEIS-UN provide some figures for SF6 emissions from military applications<sup>7</sup> whereas MOD-AR does not. The figure in BEIS-UN is, however, especially difficult to locate.
- BEIS-NS provides some GHG figures for the military technology industry, but only the small fraction directly related to weapons production.
- The figure in BEIS-NS for 'Public defence services; all GHGs' appears to include military aviation, shipping and land vehicles, as well as SF6 sources. This conclusion is based on an estimate of the emissions for land vehicles derived using fuel use data in MOD-AR.
- The 'headline' or most prominent figures provided in MOD-AR, BEIS-NS and BEIS-UN only give a partial picture of total military GHG emissions, not even providing a complete estimate of scope 1 and 2 emissions.

In table 4, we attempt to combine the key figures from tables 1 to 3 into a consistent format to try to give a 'best estimate' of the total military GHG emissions for scopes 1 and 2. For 'stationary/ estates' we use the MOD-AR figure minus the scope 3 business travel component, as inclusion of the latter would be double-counting in this context.<sup>8</sup> We also assume that the

<sup>6</sup> UN FCCC (2021). Greenhouse Gas Inventory Data - Detailed data by Party.

[https://di.unfccc.int/detailed\\_data\\_by\\_party](https://di.unfccc.int/detailed_data_by_party) (Search terms: United Kingdom; Base year, 1990 and last year; 2.G.2; Aggregate F-gases; ktCO<sub>2</sub>e)

<sup>7</sup> This is due to the military use of airborne radar.

<sup>8</sup> Figures for Scope 3 business travel are not given in MOD-AR, so we use a figure of 40 tCO<sub>2</sub>e derived from earlier MOD data – see: SGR (2020). The environmental impacts of the UK military sector.

<https://www.sgr.org.uk/publications/environmental-impacts-uk-military-sector>

energy consumption rates for 2019-20 are the same as for 2019. For ‘mobile/ capability’ we use the figure for ‘public defence services’ (all GHGs) from BEIS-NS.

<i>Main categories</i>	<i>Further detail</i>	<i>GHG emissions (ktCO<sub>2</sub>e)</i>
Stationary/ estates	Military bases; Fuel and electricity use	743
Mobile/ capability	Military vehicles: air, sea, land; Fuel use & SF6 emissions	1,968
<i>Total</i>		<i>2,711</i>

**Table 4. SGR estimates of military GHG emissions (scopes 1 & 2) for 2019**

In table 5, we compare the total from table 4 with the other ‘headline’ figures used in the official documents for UK military GHG emissions in tables 1 to 3.

<i>Source</i>	<i>Headline GHG emissions (ktCO<sub>2</sub>e)</i>	<i>Percentage difference from SGR estimate</i>
SGR estimate (from table 4)	2,711	na
MOD-AR: main text	783	-71%
BEIS-NS: main data tables	1,735	-36%
BEIS-UN: annexes*	1,735	-36%

**Table 5. Comparison of ‘headline’ estimates for military GHG emissions (scopes 1 & 2), 2019**

\* No figures were provided in the main text of BEIS-UN

It is striking just how much lower the ‘headline’ official figures are from our best estimate, which itself is based on the official data. The figure in main text of the MOD’s annual report is 71% lower, the figure in the main data tables of the BEIS national GHG statistics is 36% lower, and this latter figure is also the main one reported to the United Nations Framework Convention on Climate Change (UNFCCC). Only digging into technical annexes can we find more representative figures (also shown in tables 1 to 3), but the MOD’s total ignores ‘F’ gas emissions, while the BEIS sources claim there are no robust figures for estates/ stationary emissions<sup>9</sup> – this casting doubt on the reliability of those MOD figures. Indeed, in a previous report, SGR has pointed out how such figures could be significantly underestimated.<sup>10</sup>

These we view as serious anomalies, and are liable to significantly weaken policy responses in this area.

Furthermore, while the total figure in table 4 is probably the best estimate for military GHG emissions we are likely to derive from the current official data, a number of other factors should be borne in mind:

- Lifecycle GHG emissions are not included and these could be considerable. For example, in a previous report,<sup>11</sup> SGR estimated that total GHG emissions due to military spending

<sup>9</sup> See, for example: p.163 of UN FCCC (2021). *Op. cit.*

<sup>10</sup> SGR (2020). *Op. cit.*

<sup>11</sup> SGR (2020). *Op. cit.*

were about 3.7 times larger than scope 1 and 2 emissions alone. Other analysts have pointed out that this factor could be a lot higher.<sup>12</sup>

- GHG emissions due to the impacts of war-fighting are not included, and again these can be very significant.

### *Conclusions and recommendations*

No official government statistics adequately estimate the total direct GHG emissions of the UK military spending – with headline figures grossly underreporting the true scale, and indirect emissions going largely unreported. This is very likely to significantly weaken policy responses in this area.

To rectify this problem, we recommend:

- The MOD should annually publish headline figures for the UK military – in the main text of its annual reports – which include all scope 1 and 2 GHG emissions.
- The Office for National Statistics (ONS) should collaborate with the MOD to produce estimates of the GHG emissions of military bases (scopes 1 and 2) which are of sufficient quality to be labelled ‘national statistics’. These data should then be included in BEIS national inventories, including those submitted to the UN.
- The ONS and relevant academics should collaborate with the MOD to produce reliable estimates for lifecycle GHG emissions of UK military spending. These should be publicly published.
- GHG emission reduction plans for UK military spending should be drawn up based on these revised data. This process should include not just the MOD and the military technology industry, but also the CCC, BEIS, the Environmental Audit Committee of the House of Commons, and civil society organisations.

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#### *About the author:*

Dr Stuart Parkinson has been Executive Director of Scientists for Global Responsibility since 2003. He holds a PhD in climate science and has been an expert reviewer for the Intergovernmental Panel on Climate Change (IPCC). He has written widely on climate change and security issues, including being lead author of reports on UK and EU military carbon emissions.

#### *About Scientists for Global Responsibility (SGR):*

SGR is a UK-based membership organisation which promotes responsible science and technology. Its membership includes hundreds of natural scientists, social scientists, engineers and professionals in related areas. It carries out research, education, and advocacy work centred around science and technology for peace, social justice and environmental sustainability.

*This paper is available online at:*

<https://www.sgr.org.uk/projects/climate-change-military-main-outputs>

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<sup>12</sup> See, for example:

CDP (2021). Transparency to Transformation: A Chain Reaction. Global Supply Chain Report 2020.

<https://www.cdp.net/en/research/global-reports/transparency-to-transformation> ;

CEOBS (2021). Environmental CSR reporting by the arms industry. <https://ceobs.org/environmental-csr-reporting-by-the-arms-industry/>