



House of Commons
Defence Committee

**Defence and
Climate Change**

Eighth Report of Session 2022–23

*Report, together with formal minutes relating
to the report*

*Ordered by the House of Commons
to be printed 4 July 2023*

HC 179

Published on 18 August 2023
by authority of the House of Commons

The Defence Committee

The Defence Committee is appointed by the House of Commons to examine the expenditure, administration, and policy of the Ministry of Defence and its associated public bodies.

Current membership

[Tobias Ellwood MP](#) (*Conservative, Bournemouth East*) (Chair)

[Sarah Atherton MP](#) (*Conservative, Wrexham*)

[Robert Courts MP](#) (*Conservative, Witney*)

[Dave Doogan MP](#) (*Scottish National Party, Angus*)

[Richard Drax MP](#) (*Conservative, South Dorset*)

[Mark Francois MP](#) (*Conservative, Rayleigh and Wickford*)

[Kevan Jones MP](#) (*Labour, North Durham*)

[Emma Lewell-Buck MP](#) (*Labour, South Shields*)

[Gavin Robinson MP](#) (*Democratic Unionist Party, Belfast East*)

[John Spellar MP](#) (*Labour, Warley*)

[Derek Twigg MP](#) (*Labour, Halton*)

Powers

The committee is one of the departmental select committees, the powers of which are set out in House of Commons Standing Orders, principally in SO No 152. These are available on the Internet via www.parliament.uk.

Publications

© Parliamentary Copyright House of Commons 2023. This publication may be reproduced under the terms of the Open Parliament Licence, which is published at www.parliament.uk/copyright.

Committee reports are published on the Committee's website at www.parliament.uk/defcom and in print by Order of the House.

Committee staff

Masrur Ahmed (Second Clerk), Steven Mark (Clerk), Lucy Petrie (Committee Specialist), Sascha Sajjad (Committee Operations Officer), Eleanor Fairhurst (Committee Specialist), Ian Thomson (Committee Specialist), Nigel Vinson (Committee Specialist) and Sarah Williams (Committee Operations Manager).

Contacts

All correspondence should be addressed to the Clerk of the Defence Committee, House of Commons, London SW1A 0AA. The telephone number for general enquiries is 020 7219 6168 / 3113; the Committee's email address is defcom@parliament.uk. Media inquiries should be addressed to Toni McAndrew-Noon on 075 6243 5286.

You can follow the Committee on Twitter using [@CommonsDefence](https://twitter.com/CommonsDefence).

Contents

Summary	3
1 Context of the Inquiry	4
Our Inquiry	4
2 The climate change threat to global security and Defence's response	7
The threat of climate change to defence and security	7
Adapting the Armed Forces to maintain effectiveness	9
A tale of two Poles	11
Future low-carbon technologies for military advantage	12
Reducing emissions and building energy resilience in the UK	13
Reducing emissions across the defence rural estate	14
Improving the defence built estate	15
Provision of Military Aid to Civil Authorities	16
3 Defence as a global leader for tackling climate change	18
The international agenda	19
The military emissions gap	20
The loss of Defence annual reports on climate change and sustainability	21
4 Defence's contribution to 'net zero'	23
Protecting military effectiveness while contributing to the net zero agenda	23
Measuring and reporting Defence's climate change emissions	23
Limitations of the GGC targets and Ministry of Defence carbon reporting	26
Carbon reduction targets across the Commands	29
The role of the Ministry of Defence's climate change director	29

Conclusions and recommendations	31
Annex 1	34
Annex 2	35
Annex 3	36
Annex 4	37
Annex 5	38
Formal minutes	39
Witnesses	40
Published written evidence	41
List of Reports from the Committee during the current Parliament	42

Summary

In January 2023 the World Economic Forum listed climate change as the cause of the top six most severe risks to the planet over the coming decade. This directly matters to defence. John Kerry, the US Special Presidential Envoy for Climate, told us during the inquiry leading to this Report that if the world does not respond adequately we will see “the undermining of the common principles around which we have organised our defence and security communities”.

The Ministry of Defence is contributing to the achievement of the Government’s legal commitment to reach net zero emissions by 2050. However, we find in this Report that Defence can do much more to measure and reduce its carbon emissions — without eroding military capability. The Armed Forces, defence acquisition and the defence estate — both at home and abroad — will also need to adapt to respond to the impacts of climate change over the coming decades, with consequences for geostrategy, defence readiness, resilience and the effective delivery of military effect.

1 Context of the Inquiry

Our Inquiry

1. The World Economic Forum's Global Risks Report 2023 ranked the top 32 most severe risks to the planet over the next ten years (Figure 1).¹ The direct or indirect impacts of climate change ranked as the top six of those 32 risks. The report also noted that the "Cost of living dominates global risks in the next two years while climate action failure dominates the next decade."²

Figure 1: Global Risks ranked by severity over 2 years and 10 years



Source: World Economic Forum [Global Risks Report 2023: Insight Report](#) January 2023, p. 6.

2. Domestically, in June 2019, Parliament passed legislation requiring the Government to reduce the UK's net emissions of greenhouse gases by 100% relative to 1990 levels by 2050,³ intended to make the UK a 'net zero' carbon emitter.⁴ More specifically, from a foreign policy and defence perspective, the 2021 Integrated Review of Security, Defence,

1 The World Economic Forum, [The Global Risks Report 2023: Insight Report](#) January 2023, risk assessments based on consulting 1,200 experts across academia, business, government, the international community and civil society.

2 Ibid p.7.

3 The National Archives, [The Climate Change Act 2008 \(2050 Target Amendment\) Order 2019](#) accessed 14 June 2023.

4 Net zero refers to achieving a balance between the amount of greenhouse gas emissions produced and the amount removed from the atmosphere. There are two different routes to achieving net zero, which can work in tandem: reducing existing emissions and/or actively removing greenhouse gases.

Development and Foreign Policy ('The Integrated Review'), tackling climate change and biodiversity loss was identified as the Government's number one international priority,⁵ although this may be revised following the invasion of Ukraine.

3. This inquiry examines the impact of climate change on our Armed Forces and assesses the contribution Defence is making towards the United Kingdom's legally binding commitment to achieve net zero carbon emissions by 2050 (see Annex 1 for other Government environmental targets that have an impact on Defence).

4. The Ministry of Defence's approach to combatting climate change is set out in its 2021 Climate Change and Sustainability Strategic Approach.⁶ This identified Defence's 'strategic ambition' for 2050 across three strands, namely:

- Defence has adapted to be able to fight and win in ever more hostile and unforgiving physical environments.
- Defence acts and is recognised as a global leader in response to the emerging geopolitical and conflict-related threats that are exacerbated by climate change.
- Defence has reduced its emissions and increased its sustainability activity and as a department is contributing to the achievement of the UK legal commitment to reach net zero emissions by 2050.

5. The chapters of this report broadly track this 'strategic ambition' — examining Defence's response to climate change by adapting the Armed Forces to operate in more unforgiving physical environments and reducing carbon emissions to help combat climate change (Chapter 2); acting as a global leader for defence and climate change (Chapter 3); and contributing to achieving the UK's target of net zero emissions by 2050 by accurately measuring and reporting reductions in carbon emissions (Chapter 4).

6. We launched our inquiry into Defence & Climate Change on 12 May 2022. The terms of reference welcomed written evidence on the following points:

- What needs to be done to achieve the Integrated Review of Security, Defence, Development and Foreign Policy's number one international priority of meeting climate change and biodiversity loss commitments over the next decade?
- What will be the impacts of climate change on future conflict and how are UK Armed Forces adapting to them?
- Are UK Armed Forces prepared for the probable increase in requests for Military Aid to the Civil Authorities (MACA) tasks as a result of more extreme weather conditions in the UK, and the increased risk of flooding and rising sea levels?
- With defence alone accounting for half of central government's greenhouse gas emissions, what should be the MOD's contribution towards achieving the UK's net zero target by 2050?

5 HM Government, [Global Britain in a Competitive Age: The Integrated Review of Security, Defence, Development and Foreign Policy](#) CP403, March 2021, p.4.

6 Ministry of Defence, [Climate Change and Sustainability Strategic Approach](#). March 2021, p.6.

7. We thank all those who contributed to our inquiry. The witnesses were:
 - Tuesday, 22 November 2022, Lieutenant-General (Retired) Richard Nugee, Lead, Ministry of Defence's 2021 Climate Change and Sustainability Strategic Approach Review, and non-executive director for climate change and sustainability in the Ministry of Defence.
 - Tuesday, 24 January 2023, Dr Stuart Parkinson, Executive Director, Scientists for Global Responsibility; and Linsey Cottrell, Environmental Policy Officer, Conflict and Environment Observatory.
 - Tuesday, 28 February 2023, Dr Tim Clack, Co-director, Climate Change and (In) Security Project, University of Oxford; and Major-General (Retired) Dr Andrew Sharpe, The Centre for Historical analysis and Conflict Research.
 - Monday, 6 March 2023, David Beasley, Executive Director of the United Nations' World Food Programme.
 - Tuesday, 21 March 2023, Baroness Goldie, Minister of State, Ministry of Defence; James Clare, Director, Levelling Up, The Union, Climate Change and Sustainability Ministry of Defence; Lieutenant-General Richard Wardlaw OBE MSc BEng MInstRE, Chief of Defence Logistics and Support, Ministry of Defence; Major-General Robert Walton-Knight, Director of Strategy and Plans, Defence Infrastructure Organisation, Ministry of Defence.
 - Tuesday, 23 May 2023, John Kerry, United States Special Presidential Envoy for Climate, Executive Office of the President of the United States.
8. We received and have published 16 pieces of written evidence.⁷ As part of our work, we visited RAF Marham on 18 January 2023.
9. There is a consolidated list of our conclusions and recommendations at the end of the report. We will publish the Government's response when we receive it, normally within two months.

7 Defence Committee, [Defence and Climate Change: Written evidence](#), accessed 13 June 2023.

2 The climate change threat to global security and Defence's response

The threat of climate change to defence and security

10. In an effort to reduce the impacts of climate change nearly 200 nations have adopted the 2015 Paris Agreement, creating international consensus to keep global warming 'well below 2°C above pre-industrial levels' while 'pursuing efforts to limit the temperature increase to 1.5°C'.⁸ This was not because 1.5°C was some magic number, but because analysis suggested that beyond the 1.1°C of warming experienced to date further warming would make it more likely dangerous climatic tipping points would be crossed. These could include rapid, large, and irreversible rises in sea-levels and slowing or even shutdown of key parts of the ocean's system for circulating heat.⁹ Even before tipping points are reached, global impacts on food supply and more frequent extreme weather events are among the more serious effects.

11. However, the March 2023 Intergovernmental Panel on Climate Change indicated that it was '... likely that warming will exceed 1.5°C during the 21st century and make it harder to limit warming below 2°C'.¹⁰ In terms of the tangible impact of climate change on the planet, Dr Tim Clack, Co-director, Climate Change and (In)Security Project, University of Oxford, told us that:

Climate change is a truly international challenge ... so national borders are a little bit irrelevant in some ways. What happens in one area will then have impacts in other areas ... A range of climate scenarios have been forecast, but common to all of them is a rise in sea level; increased frequency and scale of extreme weather events, such as typhoons, monsoons and tidal surges; more droughts; more floods; the melting of ice caps and the melting of permafrost. Then there are effects in the ocean, such as acidification and deoxygenation.¹¹

12. Approximately 3.3–3.6 billion people live in environments that are highly vulnerable to climate change.¹² It has been estimated that 1.2 billion people will be at risk of migration caused by climate change by 2050, with many internally displaced but some moving internationally, all of which creates regional and global instability and tension.¹³ A number of countries on the World Bank's most 'fragile and conflict-affected' states (highlighted on Figure 2) are also highly vulnerable to climate change (i.e. having the lowest 'Rank' numbers on Figure 2). David Beasley, Executive Director of the United Nations World Food Programme, told us of the relationship between climate change, food shortages and mass migration:

Climate today is critically important. Some 80% of our operations are in war zones. Of the 20 areas of conflict that we are in, 14 are overlaid with

8 United Nations [The Paris Agreement text English](#) 2015.

9 National Centre for Science Education, [1.5°C May Not Seem Like Much, But It's a Really Big Deal](#) 22 March 2022

10 Intergovernmental Panel on Climate Change, [AR6 Synthesis Report: Climate Change 2023](#) March 2023 paragraph A4.

11 Oral evidence: Defence & Climate Change, HC 179, Tuesday 28 February 2023, Q101.

12 [IPCC_AR6_SYR_SPM.pdf](#)

13 Institute for Economics and Peace (IEP), [Ecological Threat Register 2020](#) September 2020.

climate impact, so you can imagine how that escalates the issues of concern. That escalates not just the question of famine or starvation, but the issue of mass migration and destabilisation ... For every 1 degree in food pricing, although I cannot remember the exact number, there is a 2% increase—double that—in migration.¹⁴

Figure 2: Many states vulnerable to climate change are also fragile or conflict-affected

Rank	Country	Income Group
161	Ethiopia	Low
161	Guinea	Low
163	Benin	Low
164	Vanuatu	Low
165	Madagascar	Low
165	Mauritania	Lower middle
167	Burundi	N/A
168	Sierra Leone	Low
169	Dem. Rep. of the Congo	Low
170	Marshall Islands	Lower middle
171	Nauru	Lower middle
171	Uganda	Low
173	Central African Rep.	Low
174	Afghanistan	Low
175	Mali	Low
176	Solomon Islands	Low
177	Liberia	Low
178	Sudan	Low
179	Eritrea	Low
179	Tonga	Lower middle
181	Micronesia	Low
182	Guinea-Bissau	Low
183	Niger	Low
184	Chad	Low
185	Somalia	Low

Note: The cells highlighted show countries that feature on World Bank's 'FY24 List of Fragile and Conflict-affected Situations', published in July 2023. See: [The World Bank: Fragile and Conflict-Affected Situations](#)

Source: The Notre-Dame [GAIN vulnerability index score](#) and the World Bank's [Classification of Fragile and Conflict-Affected Situations](#).

13. Although the effects of climate change are likely to be felt globally, Dr Clack identified a 2021 assessment by the US National Intelligence Council, which:

... identified 11 countries of great concern¹⁵ ... both vulnerable to the physical effects of climate change and to lack the capacity to do the necessary adaption... They are also, in many cases, countries of strategic importance. They are countries that, in some cases, have seen recent western military intervention. Some countries have nuclear weapon capabilities. Some are theatres where insurgent and terrorist groups are present, and ... have the intent and capability to attack western interests, so there are lots of reasons why the UK defence and security apparatuses should take note.¹⁶

14. To underline the risk climate change poses to global defence and security John Kerry, United States Special Presidential Envoy for Climate, Executive Office of the President of the United States, explained to the committee that:

If we don't respond adequately, I think we will see an undermining of the common principles around which we have organised our defence and security communities. They will be undermined in ways that will challenge why it is that we have not implemented the precautionary principle of governance, which is that when you see a threat coming and know that there are things that are existential, responsible people are supposed to respond. In much of the world today, there is not an adequate response to the cause ...¹⁷

Adapting the Armed Forces to maintain effectiveness

15. Given the severity of the challenge, the Government's March 2021 Integrated Review put tackling climate change and biodiversity loss as the UK's foremost international priority.¹⁸

16. To successfully respond to that global challenge, Defence will need to adapt to operate across increasingly demanding climatic conditions — otherwise the capabilities of our Armed Forces will be eroded. This adaptability will need to take place across all the Defence Lines of Development (DLODs) that come together to generate military capability.¹⁹ For example, military vehicles usually designed for temperatures up to 45°C have had to operate in Iraq and Afghanistan at well over 50°C. Lieutenant-General Nugee (retd), non-executive director for climate change and sustainability in the Ministry of Defence, explained that warships, which have traditionally used the cooling effect of the seas to ensure engines operate effectively are finding that the thermal blanketing effect

15 The countries were: India, Pakistan, North Korea, Afghanistan, Iraq, Burma, Colombia, Guatemala, Haiti, Honduras and Nicaragua.

16 Office of the Director for National Intelligence, [National Intelligence Estimate on Climate Change](#) 21 October 2021, p.11–13.

17 Oral evidence: Defence & Climate Change, HC 179, Tuesday 23 May 2023, Q204.

18 HM Government, [Global Britain in a competitive age: The integrated review of Security, Defence, Development and Foreign Policy](#) March 2021, p.4.

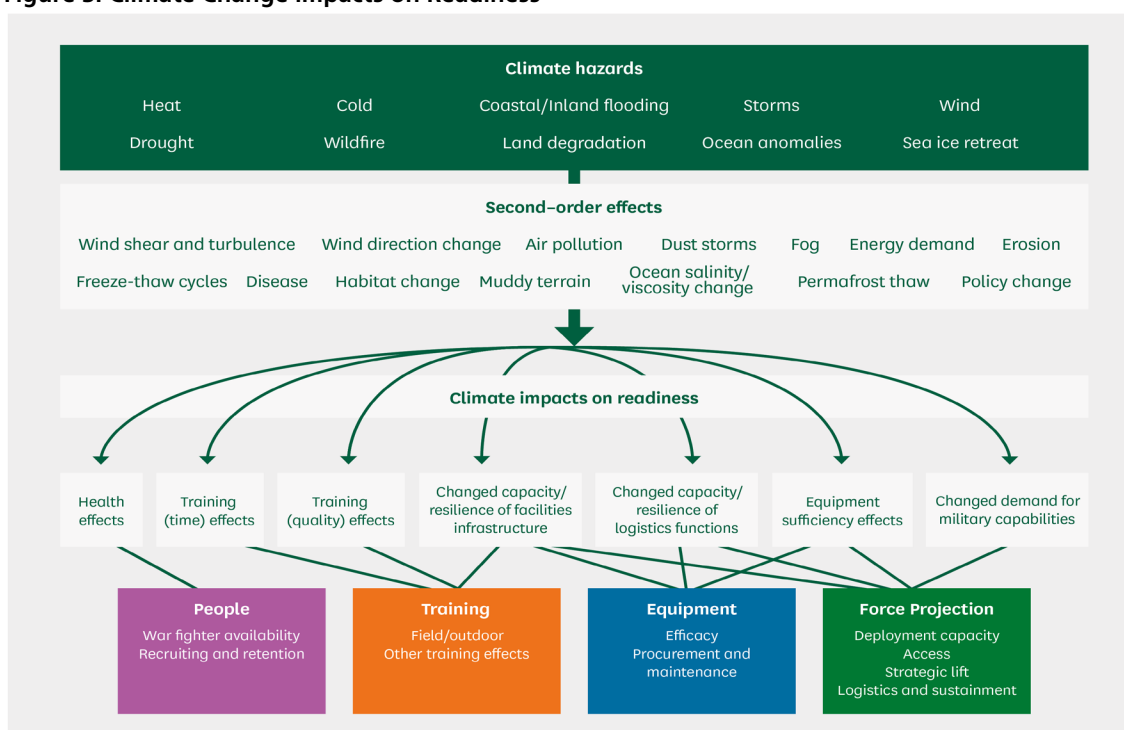
19 The Defence Lines of Development are: Training; Equipment; Personnel; Information; Concepts & Doctrine; Organisation, Infrastructure and Logistics.

of rising sea temperatures in the Persian Gulf is eroding the efficiency of existing naval engines.²⁰ It is surprising this was not factored into the engine specification issued by the Royal Navy or raised by the engine designers and manufacturers.

17. The effect of extreme temperatures on personnel, whether on exercises or operationally deployed, will also be increasingly important to manage alongside other impacts (see Figure 3), otherwise it risks eroding the readiness of our Armed Forces to respond effectively. Lieutenant-General Nugee (ret'd) told us:

... the Met(eorological) Office predicted that by 2040-odd, the heat of the training areas would be beyond the limits that we are currently allowed to use for training, which would effectively make Cyprus unable to be trained in for certain months of the year.²¹

Figure 3: Climate Change impacts on Readiness



Source: RAND, [Climate and Readiness: Understanding Climate Vulnerability of U.S. Joint Force Readiness 2023](#), p.22.

18. Defence already provides acclimatisation and familiarisation training for the Armed Forces in advance of pre-planned deployment to specific regional theatres. For example, the Royal Marines specialise in providing mountain and cold-weather warfare training to the Commandos and other forces for deployment in Norway and the High North region. Similarly, the British Army Training Unit Kenya (BATUK) and the Jungle Warfare Division in Brunei deliver training to allow UK forces to operate in more inhospitable climatic conditions. Given rising temperatures generally, however, it may well be necessary to expand environmental training for more personnel, including those based for extended periods overseas, such as in Cyprus or the Middle East.

20 Oral evidence: Defence & Climate Change, HC 179, Tuesday 22 November 2022, Q5.

21 Oral evidence: Defence & Climate Change, HC 179, Tuesday 22 November 2022, Q46.

A tale of two Poles

19. A particular concern for military planners is the melting of the ice caps. Lieutenant-General Nugee (ret'd) told us that scientists predict that in 15–20 years the Arctic will be open water in the summer. Countries have already begun exploring the Arctic for critical minerals, and the world in 2040 is expected to need four times as many of these for clean energy technologies as it does today.²² Former National Security Advisor, Lord Sedwill, has noted that “critical minerals, semiconductors and data are the oil, steel and electricity of the 21st century.”²³

20. The Arctic will also be used increasingly as a route for international trade, but Russia has declared its intent to treat the region as its own internal sea, potentially restricting access. There is also concern that the current ban on exploiting the resources of the Antarctic could be under threat, driving future competition and potential conflict. Lieutenant-General Nugee (ret'd) said:

I think the figure is that 79% of the glaciers are melting²⁴ down in the Antarctic and melting at a speed that is being accelerated by hot water coming in under the glaciers and undermining the ice shelves. Antarctica is, if you like, governed by the 1960s treaty,²⁵ which does not allow any military capability on the Antarctic. There is some evidence that some countries are showing some interest in the raw minerals in Antarctica.²⁶

21. In the Arctic, between the frozen winter seas and the open water in the summer there is a period when the ice is not thick enough to require an icebreaker but is too thick for the very thin hulls of warships. Lieutenant-General Nugee (ret'd) told us that he understood the Russians, Chinese and the Canadians were hardening some of their ships' hulls to operate in this 'disruptive ice'.²⁷

22. Retrofitting existing ships to operate in disruptive ice would be expensive, and it is probably too late to fit strengthened bows to the much-delayed—but yet to be built—Batch 2, Type 26 City-class frigates. Design of the future Type 83 destroyers—planned replacements in the late 2030s for the existing Type 45s—is still at a very early stage and it would be possible to scope in that requirement. The challenge will be to ensure the UK retains a fleet that is truly global—able to operate in the polar regions but also in the increasingly hot waters nearer the Equator—without a repeat of the propulsion difficulties that have dogged the Type 45 fleet to date.²⁸

22 International Energy Agency [The Role of Critical Minerals in Clean Energy Transitions](#) May 2021.

23 The United Nations Economic Commission for Europe (UNECE) [Future-proofing Supply of Critical Minerals for Net-Zero](#) November 2021.

24 In fact, 87% of the Antarctic glaciers are receding. See: [Glaciers and climate change - Antarctic Glaciers](#) accessed 14 June 2023.

25 The treaty was signed in 1959.

26 Oral evidence: Defence & Climate Change, HC 179, Tuesday 22 November 2022, Q50.

27 Oral evidence: Defence & Climate Change, HC 179, Tuesday 22 November 2022, Q49.

28 Navy Lookout [The Power Improvement Project for the Royal Navy's Type 45 destroyers](#) 10 October 2022.

23. Closer cooperation with regional allies and partners will also be beneficial. The UK's leadership of the Joint Expeditionary Force (JEF) provides an excellent example in the so-called 'High North' region.²⁹ The JEF might have wider applicability for security outside of the High North, or other partner groupings might be appropriate to enhance operational effectiveness across other demanding climatic conditions, such as in Africa.

24. **The increasing exploitation of the Arctic for international trade and exploration for critical minerals gives greater importance to the role of the Joint Expeditionary Force (JEF) as a security alliance in the 'High North'. The Ministry of Defence should assess how the JEF might need to be adapted in the face of climate-change induced developments in the Arctic and beyond.**

Future low-carbon technologies for military advantage

25. Over the next decade or so, innovation largely from the commercial sector is expected to make available in greater quantities other low carbon technologies, such as modular nuclear reactors and electric and hybrid-drive vehicles. Defence could exploit these technologies, particularly on deployed operations and within overseas bases. For example, it has been estimated that between 2,000 and 3,000 US personnel were killed or injured protecting resupply missions in Iraq and Afghanistan between 2003–2007³⁰—convoys that could be dramatically reduced if deployed forces were able to use a range of solar, electric-drive and micro-nuclear technologies to generate and/or reduce their own hydrocarbon-fuelled power requirements.

26. The view of the Ministry of Defence to these technologies is one of 'fast follower'—leaving industry to innovate and then adopting the best technical solutions as they mature.³¹ The Ministry of Defence told us it is intending to electrify its 15,000 strong 'white fleet' (non-military vehicles) by 2027,³² and the RAF is looking at alternative fuels for its 'yellow fleet' refuelling vehicles.³³ By 2025, the Army expects to complete hybrid electric drive experiments with technology retrofitted to a Support Vehicle truck, Foxhound and Jackal vehicles following a £9 million investment.³⁴

27. These technologies also offer military benefits, including silent surveillance without a noisy engine running, a degree of silent mobility, and increased on-board power for more complex electrical systems and to support dismounted operations. And future plans involve robotics, artificial intelligence and hybrid-power technology as part of an acquisition process dubbed Mercury.³⁵

28. However, it will take a long time for the Armed Forces to fully re-quip with adapted technology. Over the next few years, the Army is expecting to receive more than 1,000 Challenger 3, Ajax and Boxer armoured vehicles, all equipped with conventional diesel engines—many of which are still expected to be in service after the 2050 net zero target, along with some equipment already in service such as the aircraft carriers. Rear Admiral

29 The JEF consists of: Denmark; Estonia; Finland; Iceland; Lithuania; Latvia; Norway; Sweden; The Netherlands, and the United Kingdom. See: [Ready to Respond: What is the JEF? - Strategic Command](#) 11 May 2021.

30 Oral evidence: Defence & Climate Change, HC 179, Tuesday 22 November 2022, Q31.

31 Oral evidence: Defence & Climate Change, HC 179, Tuesday 21 March 2023, Q193.

32 Oral evidence: Defence & Climate Change, HC 179, Tuesday 21 March 2023, Q175.

33 Oral evidence: Defence & Climate Change, HC 179, Tuesday 22 November 2022, Q38.

34 Royal United Services Institute, [Greening Defence: The British Army's Bet on Electrification](#) 22 March 2022.

35 Defense News, [UK's future force to lean heavily into robotics, AI and hybrid power](#) 16 September 2021.

Paul Beattie, Director Naval Staff, recently noted that the Royal Navy was in the final stages of ship designs that will be built in the 2030s but will still be in service in the 2080s.³⁶ ‘Fast follower’ may not, therefore, be fast enough to ensure Defence can fully contribute to the 2050 net zero target.

29. Military equipment will need to be adapted to operate effectively under the more extreme temperature ranges that are predicted, as well to help reduce emissions, although this should be achieved without compromising military capability. This process cannot be delayed; more than a 1,000 new tanks and other armoured vehicles with conventional diesel engines will enter service in the next few years and will still be in service after the 2050 net zero target. Armed Forces training will also need to be adapted in the face of rising global temperatures, so military readiness to respond to crises is not eroded.

30. *Defence should undertake research and assess best practice from academia, industry, allies and partners on operating in demanding environments and ensure all Defence Lines of Development are suitably adapted to continue to allow UK Armed Forces to operate effectively across more extreme climatic conditions over the coming decades. It should also push hard to reduce carbon emissions from its equipment, without eroding military capability.*

Reducing emissions and building energy resilience in the UK

31. As well as adapting the Armed Forces in response to climate change, Defence also needs to respond to the Government’s challenge to reduce the UK’s carbon emissions to net zero by 2050. James Clare, Director, Levelling Up, The Union, Climate Change and Sustainability at the Ministry of Defence, set out Defence’s underlying principle in terms of climate change and reducing carbon emissions, which is to:

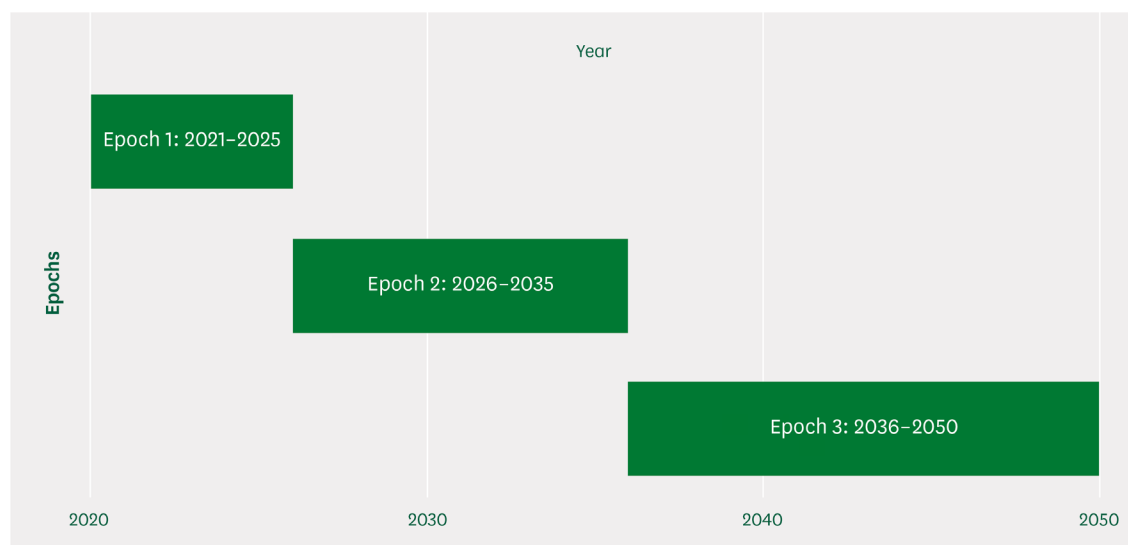
contribute fully to the UK’s net zero commitment, while preserving our (military) capabilities.³⁷

32. Lieutenant-General Nugee (retd) described how he, as the review lead for the 2021 Strategic Approach document, set out an incremental approach (known as ‘Epochs’) to achieving the 2050 net zero goal (see Figure 4).³⁸

36 Royal United Services Institute, [Episode 6: Readyng the Royal Navy for Climate Change-Affected Seas](#) 20 October 2022.

37 Oral evidence: Defence & Climate Change, HC 179, Tuesday 21 March 2023, Q155.

38 Oral evidence: Defence & Climate Change, HC 179, Tuesday 22 November 2022, Q17.

Figure 4: Defence's Epoch approach to tackling climate change

Note: The Ministry of Defence defines the three Epochs as follows:

"Epoch 1 – setting the foundations – 2021-2025: Defence will deliver a step change in the projects that are already planned; initially, most of these will be opportunities on the estate. The first epoch will include working with suppliers to identify ways to reduce emissions in the supply chain through the equipment we use and contract conditions we set. We will create the skills base to be able to better apportion carbon targets and develop a fuller cross Departmental understanding of sustainability in the broadest sense. A comprehensive baseline and database will be built to allow decisions on a detailed plan for all themes in epochs two and three. Carbon targets as well as wider sustainability and GGC targets will run through the yearly Defence Plans. These will be disaggregated across Defence's organisations."

"Epoch 2 – minimising and fitting for the future – 2026-2035: Building on the successes from epoch one, in the subsequent years Defence will look to reduce emissions significantly using existing and emerging technology, maximise opportunity to enhance the global response to the threat that climate change poses to current and future operational capability and build further resilience into the estate, supply chain and future equipment. Defence should be committing exploitation, development and innovation funding through the next Defence/Spending Review, to determine how to use emerging technologies for its benefit."

"Epoch 3 – harnessing the future – 2036-2050: In the final 15 year period, Defence must be doing everything it can to harness novel technologies which further build resilience and further reduce emissions. We will deliver on any successor to the UN Sustainable Development Goals. Efficiency and operational effectiveness will depend on the innovation and foresight of previous epochs."

Source: Figure based on evidence provided by the Ministry of Defence

33. In the first five years (2021–2025) the initial aims would be to catalogue emissions and identify reduction targets, with a particular focus on the defence estate. He noted that:

The first (epoch) was for five years, the second was for 10 years and the third was for 15 years after that, which took us to 2050. The whole intent of the first epoch was to get after the technology that already exists. That is primarily on the estate, so solar panels and things like that. Most importantly, it was to try to embed in Defence an approach around sustainability, climate change, waste and so on.³⁹

Reducing emissions across the defence rural estate

34. Therefore, adapting the defence estate to reduce carbon emissions will help contribute to achieving the Government's 2050 net zero target. The main carbon emission targets Defence is currently being assessed against are the Greening Government Commitments (see Chapter 4 for a more detailed assessment). These target carbon reductions from military bases and infrastructure and do not erode military capability as they do not measure emissions from warfighting equipment such as tanks, ships and aircraft.

35. Defence has access to around 1.8% of the UK land mass, owns or controls 225,800 hectares, and has access rights to a further 206,700 hectares.⁴⁰ Reducing emissions can cost-effectively and rapidly be achieved in the short term by accelerating the fitting of existing low carbon technologies—solar, wind, heat pumps and improved building insulation—across the defence estate.⁴¹

36. The British Army has already invested £200 million in Project Prometheus, which estimates savings of 2,000 tCO₂e (tonnes of carbon dioxide equivalent) annually across four sites.⁴² Lieutenant-General Wardlaw, Chief of Defence Logistics and Support, Ministry of Defence, stated that if 650 hectares—the size of Hyde Park—of solar farms were built it would represent something like 0.2% of the defence estate and service 15% of the Army’s energy needs through the summer.⁴³ By that logic the equivalent of 100% of the Army’s energy needs during the summer could be met by putting solar panels on 1.3% of the defence estate.

Improving the defence built estate

37. Defence spends around 12% of the Defence budget on the estate. The Ministry of Defence has noted that, as pressures on the budget have increased, funding allocated to the estate has reduced, and it recognises that much of its built estate is “... old, poor quality and expensive to run. Around 40% of its estate assets are more than 50 years old.”⁴⁴ The built estate consists of around 96,000 buildings, providing around 100,000 bedspaces and 49,500 homes for personnel and their families.⁴⁵

38. Unsurprisingly, satisfaction with the accommodation has fallen significantly over the past decade. The most recent Armed Forces Continuous Attitude Survey found that Service Family Accommodation (SFA) satisfaction with the ‘responses to request for repairs’ fell from 46% in 2014 to 19% in 2023, and satisfaction with the ‘quality of that work’ fell from 40% to 19%. Levels of satisfaction with responses to, and quality of repair work, for Single Living Accommodation (SLA) were 27% and 29%, in the most recent survey, respectively.⁴⁶

39. Accelerating the fitting of better insulation and low-carbon measures to the built estate would require greater up-front investment but should reduce whole-life costs and help reduce Defence’s carbon emissions. Applying these measures to refurbished SFA and SLA accommodation would also increase satisfaction levels and could help improve retention of Service personnel. In a more recent update to the 2021 Climate Change and Sustainability Strategic Approach document the Ministry of Defence said that it has updated its built estate policy for new builds to a higher standard of energy efficiency to “... mitigat(e) future energy cost and resulting in lower carbon emissions”, although this will not mitigate the existing housing stock.⁴⁷ We anticipate looking at Service accommodation in greater detail later this year.

40 Ministry of Defence, [Strategy for Defence Infrastructure](#) 27 January 2022.

41 Ministry of Defence, [MOD Land Holdings: 2000 to 2022](#) 26 May 2022.

42 RUSI [Greening Defence: The UK Armed Forces Strategic Approach to Climate Change](#) 4 March 2022.

43 Oral evidence: Defence & Climate Change, HC 179, Tuesday 21 March 2023, Q177.

44 Ministry of Defence, [Strategy for Defence Infrastructure](#) 27 January 2022, p.11.

45 Ministry of Defence, [Strategy for Defence Infrastructure](#) 27 January 2022, p.22.

46 Ministry of Defence, [Armed Forces Continuous Attitude Survey 2023 Main Report](#) 1 June 2023, p.19.

47 [Written statements - Written questions, answers and statements - UK Parliament](#)

40. One lesson from the conflict in Ukraine is that national infrastructure, such as communications and transportation nodes, government buildings and energy facilities, are vulnerable to physical and/or cyber-attack. Fitting more low-carbon energy generating capacity across the estate would also provide Defence with greater resilience in case of future energy shocks and potentially allow it to sell excess energy back to the wider electricity grid. The RAF already has a commitment to make its bases net zero by 2030.⁴⁸

41. Defence also operates several overseas bases and using solar and other low-carbon technologies at these locations should enhance their resilience and reduce carbon emissions. Some of these bases, such as Gibraltar and Diego Garcia, are very low-lying and particularly vulnerable to rising sea levels, so direct action will be required to ensure they remain functioning bases over the coming decades.

42. The Ministry of Defence should set out the balance of investment opportunities around accelerating the fitting of low-carbon energy sources to the defence estate in the UK and abroad to achieve 'estate net zero' by 2030. Although this will require additional initial capital outlay, it should reduce whole-life costs and carbon emissions and increase Defence's energy resilience and self-sufficiency.

43. This balance of investment analysis should also be applied to the housing stock as, in conjunction with wider upgrades, it could enhance the living conditions of Service personnel and their families, thereby improving retention.

Provision of Military Aid to Civil Authorities

44. Flooding is expected to be the most prominent climate change risk in the UK over the next five years. For example, by 2050, the UK population living in areas that are at risk of flooding has been projected to increase from 1.8 million to between 2.6 and 3.3 million.

45. It is likely, therefore, that Defence will be called out more often for Military Aid to Civil Authorities' (MACA) tasks, and the Secretary of State for Defence told Parliament in 2021 that:

More widely and reflecting climate change as an acknowledged amplifier of global in security, Defence is seeking to adapt to the strategic implications, including recognising that Defence will play an increased role in Humanitarian Assistance and Disaster Relief operations in a climate change world.⁴⁹

46. Conversely, figures received from the Ministry of Defence of MACA requests that were accepted by the Department do not indicate any trend (see Figure 5) and the impact of the Covid-19 pandemic impacted considerably on the statistics.

48 Chief of the Air Staff, [CAS RAF NetZero ambition](#) 24 November 2021.

49 CCG005, committees.parliament.uk/writtenevidence/37857/pdf/

Figure 5: The number of Military Aid to the Civil Authorities requests undertaken - 2019–2022

Year	Total MACAs
2019	194
2020	606
2021	320
2022	101

Source: Ministry of Defence evidence supplied to the House of Commons Defence Committee

47. We are concerned that continued reductions in the overall size of the Armed Forces will result in the Ministry of Defence accepting fewer tasks—at the very time over the coming decades when MACA requests from Government are likely to increase. While this will not necessarily directly impact on military capability, it will erode the resilience of the wider emergency services to respond to future environmental and other large-scale emergencies, or Government must devise alternative approaches to its response to civil emergencies.

48. *The Ministry of Defence should assess whether continued reductions in the size of the Armed Forces will likely result in Defence accepting fewer MACA tasks requested by Government over the coming decades, and if so should ensure wider Government is fully aware of the implications of this, including the need for alternative non-regular-forces capacity.*

3 Defence as a global leader for tackling climate change

49. The Government's 2021 Integrated Review set out a role for the United Kingdom to be a 'world leader' on climate change and sustainability action.⁵⁰ Reflecting this, the Ministry of Defence's 2021 Climate Change and Sustainability Strategic Approach document noted that the United Kingdom's commitment to tackling climate change required Defence's full involvement.

50. Therefore, alongside adapting the Armed Forces to fight in ever more hostile and unforgiving physical environments and reducing carbon emissions, the second strand of Defence's 'strategic ambition' for climate change was that "Defence acts and is recognised as a global leader in response to the emerging geopolitical and conflict-related threats that are exacerbated by climate change".⁵¹

51. Lieutenant-General Nugee (ret'd), non-executive director for climate change and sustainability in the Ministry of Defence, set out all three strands (see paragraph 4) and noted that "... perhaps the one that I feel most strongly about, is that Defence's ambition is to be the global leader in understanding the security implications of climate change." Lieutenant-General Nugee (ret'd) told us:

The UK is often looked to as the thought leader in this area, and we need to ensure that we remain the thought leader. When the Pentagon—President Biden and the Defence Secretary—published their strategy at the beginning of last year, it quoted only four documents, one of which was ours. They have looked to us for some thought leadership, and other countries are looking to us for thought leadership ... We need to be a global leader, and to lead the world in understanding what we can do about it.⁵²

52. More specifically, Defence has set out three ways to influence other nations around the consequences of climate change and the impact on international security and defence — and thereby demonstrate its global leadership:⁵³

- a) **Allies and partners:** The UK will aim to set a pragmatic but stretching bar for allies' and partners' ambition, supporting all to be involved and play their part. We believe that now is the time to make sure that the impacts of climate change are centred in the allies' and partners' plans.
- b) **The UN and International forums:** Defence will act in tandem with our partners in the rest of government. Defence's role will be to support wider UK objectives by leading the debate in militaries about climate change and security, and by securing momentum.
- c) **Horizon-scanning:** We will build on our understanding of how climate change, security and other threats coalesce, in partnership with academia and

50 HM Government, [Global Britain in a competitive age: The Integrated Review of Security, Defence, Development and Foreign Policy](#) March 2021.

51 Ministry of Defence, [Climate Change and Sustainability Strategic Approach](#) 30 March 2021, p.10.

52 Oral evidence: Defence & Climate Change, HC 179, Tuesday 22 November 2022, Q7.

53 Ministry of Defence, [Climate Change and Sustainability Strategic Approach](#) 30 March 2021, p.17.

technology partners. A climate threat horizon-scanning capability would reveal potential risks and prompt questions for decision makers. Once this capability is developed, it should be used as an asset internationally for building capacity in others and for supporting Defence engagement through UK expertise.

The international agenda

53. The Ministry of Defence can do more to directly influence other organisations and armed forces — particularly across NATO and in Europe — to accelerate carbon reduction. One way to achieve this is to ensure the measuring, reporting and target-setting of UK defence emissions is effective.

54. Only some NATO members, such as the United States, have in part set emissions goals for their armed forces linked to national 2050 net zero targets. The Ministry of Defence has a mixed picture regarding milestones and targets. The RAF has set itself a stretching target of a ‘Carbon Net Balanced Service by 2040’ — a decade ahead of the Government’s net zero target. Moreover, it has interim milestones — a net zero airbase by 2025 and a net zero estate by 2030,⁵⁴ however it is unclear as to how they propose to achieve this without impacting on military capability. There is a mixed picture among other Top-Level Budget holders (TLBs) across Defence. Linsey Cottrell, Environmental Policy Officer, Conflict and Environment Observatory, told us that the Ministry of Defence as a whole did not have a 2050 net zero target and was not aware the Army had a net zero target either.⁵⁵

55. It was recently asserted during one of the excellent RUSI Greening Defence podcasts that the Royal Navy is further ahead of the other Services, but the Service does not appear to have publicly disclosed a 2050 net zero target.⁵⁶ No mention is made in either the Sustainable Support Strategy 2022 or the Defence Supply Chain Strategy 2022 of a net zero target for Strategic Command.⁵⁷ Defence Equipment & Support have a net zero target across their operations and infrastructure by 2040, but for ‘capabilities’ (i.e. building military equipment) it is only committed to ‘... reduc(ing) the carbon footprint of the capabilities we deliver and support by 2050.’⁵⁸

56. As regards the defence estate, the 2022 Strategy for Defence Infrastructure talks about ‘A net zero and climate resilient infrastructure—designed, constructed and operated now to enable decarbonisation by 2050.’⁵⁹ This implies it is the defence estate that is decarbonising by 2050, but it might be referring to the Government’s overall target for the UK. Crucially, as milestones and targets for the TLBs are not publicly disclosed it is extremely difficult to measure progress below departmental level. A summary of TLB progress against these targets is provided in Annex 2.

57. Internationally, NATO recently announced a cut in headquarters emissions of at least 45% by 2030, and net zero by 2050, but has not set out the methodology by which this will be achieved.⁶⁰ Similarly, the Intergovernmental Panel on Climate Change has

54 Chief of the Air Staff, [CAS RAF NetZero ambition](#) 24 November 2021.

55 Oral evidence: Defence & Climate Change, HC 179, Tuesday 24 January 2023, Q69.

56 Royal United Services Institute, [Episode 6: Readyng the Royal Navy for Climate Change-Affected Seas](#) 20 October 2022.

57 The [Sustainable Support Strategy 2022](#) and the [Defence Supply Chain Strategy 2022](#)

58 Defence Equipment & Support, [DES 2025 Strategy](#) 13 May 2021.

59 Ministry of Defence, [Strategy for Defence Infrastructure](#) 27 January 2022, p.24.

60 North Atlantic Treaty Organisation, [Opening speech by NATO Secretary General Jens Stoltenberg at the High-Level Dialogue on Climate and Security](#) 22 July 2022.

yet to publish any estimates of military greenhouse gas emissions. Likewise, the National Inventory Reports complied through the United Nations Framework Convention on Climate Change do not report emissions arising from military fuel use and other military activities in a transparent, consistent and robust format.⁶¹ Dr Stuart Parkinson, Executive Director, Scientists for Global Responsibility, told us that:

... we need more openness at the UN level so that we can see much more of the data that militaries are responsible for internationally. Some push on this from the UK Government and UK military, through either the Intergovernmental Panel on Climate Change or the Conference of the Parties systems, would be very helpful.⁶²

The military emissions gap

58. Comparing one country or its armed forces with another is challenging, as it is unlikely to provide an exact comparison. However, certain deductions can be drawn to identify how effectively Defence is acting as a global leader for climate change. Dr Stuart Parkinson told us:

It is very difficult to provide a ranking when there is such poor data out there. For example, the US military has published strategy reports in open literature for its air force, navy and army. They include a set of plans and a set of targets. We think the targets are quite weak and have various loopholes, but at least they are there. You can see what they are, what was agreed and committed to, what is being done and where flaws might be. In the UK, we have not done that yet. It would be good to see that.⁶³

59. Regarding information on the UK's military measuring and reporting of carbon emissions, Linsey Cottrell told us that the Ministry of Defence is publishing more than most other countries,⁶⁴ but there was a "military emissions gap" between the information the United Nations voluntarily requests countries to submit on military emissions and what many countries are providing. For example, the Ministry of Defence publishes information on military fuel use along with fewer than half of the 40 industrialised countries required to submit data annually on fuel use.⁶⁵

60. Undertaking the role of global leader is not easy. Rear Admiral Paul Beattie, Director Naval Staff, Royal Navy, recently described the measures necessary for climate change adaption in the military as the "... biggest change programme in defence".⁶⁶ He noted that, unusually for technology, countries "can't look to the US" for global leadership and that some were therefore looking to the UK. However, such a role requires considerable resources, and time, so was not a decision to be taken lightly. Influencing with UK partners through international organisations such as NATO and the UN could provide a helpful approach.

61 National Inventory Reports contain greenhouse gas emission estimates for countries, as part of the 2015 Paris Agreement reporting rules.

62 Oral evidence: Defence & Climate Change, HC 179, Tuesday 24 January 2023, Q64.

63 Oral evidence: Defence & Climate Change, HC 179, Tuesday 24 January 2023, Q73.

64 Oral evidence: Defence & Climate Change, HC 179, Tuesday 24 January 2023, Q65.

65 Oral evidence: Defence & Climate Change, HC 179, Tuesday 24 January 2023, Q66.

66 Royal United Services Institute, [Episode 6: Readyng the Royal Navy for Climate Change-Affected Seas](#) 20 October 2022.

61. *The Ministry of Defence should work with other UK government partners to encourage the United Nations Framework Convention on Climate Change and the Intergovernmental Panel on Climate Change to update their reporting framework so emissions from military fuel use and other activities are set out in National Inventory Reports. The Ministry of Defence should also urge NATO to increase its transparency and publish its methodology for accounting for greenhouse gas emissions.*

The loss of Defence annual reports on climate change and sustainability

62. Although the Ministry of Defence appears to produce more climate change information than most other nations' armed forces, it has stopped providing the annual stand-alone progress report that it produced between 2010 and 2018.⁶⁷ Some of this information is now reported as part of the Ministry of Defence's higher-profile Annual Report & Accounts, although the latter has six pages of environmental information compared to the 64-page Sustainable MOD Annual Report in 2018.⁶⁸

63. What has been lost is the underpinning detail, which makes external validation of the Ministry of Defence's evidence more difficult. For example, in the Ministry of Defence's most recent Annual Report and Accounts, published in July 2022,⁶⁹ the reported 'overall emissions' (i.e. emissions from running the defence estate) for financial years 2019–20 and 2020–21 are over 40% higher than quoted in previous annual reports,⁷⁰ but no explanation has been given for this and no evidence is available to explain this apparent discrepancy.

64. The inclusion of the 'Defence Carbon Footprint' in the Annual Report & Accounts 2021–22 was a welcome development.⁷¹ This revealed total measured emissions for defence at around three-and-a-half times the level of those emissions reported as part of central government's Greening Government Commitments (GGC) targets — 0.96 million tonnes of CO₂ equivalent (tCO₂e) compared to 3.34M tCO₂e. However, even this figure for total measured emissions fails to come close to an estimated total for overall UK defence emissions. In 2020 Dr Stuart Parkinson used the methodology of Professor Mike Berners-Lee of Lancaster University to estimate total emissions (referred to as the 'carbon footprint') from UK defence at around 13 million tonnes of CO₂ equivalent (tCO₂e).⁷²

65. This broader figure is more challenging to calculate accurately, but the Ministry of Defence could commission work to estimate it better, and ensure it is independently verified. For example, the University of Leeds provided expertise to assist DEFRA in its work of calculating the United Kingdom's total carbon footprint as part of the 2050 net zero target.

66. **Measuring and reporting against the total defence carbon emission figure would support both the Government's agenda of reducing emissions to net zero by 2050, but also provide a gold standard of military emissions reporting for other countries to emulate. Good practice would be to ensure these figures are independently verified.**

67. Links to the annual reports: www.gov.uk/government/collections/sustainable-development-mod

68. Ministry of Defence, [Sustainable MOD annual report 2017 to 2018](#) 6 November 2018.

69. Ministry of Defence, [Annual Report and Accounts 2021–22](#) 14 July 2022, p.56.

70. Ministry of Defence, [Annual Report and Accounts 2020–21](#) 20 January 2022, p.267.

71. Ministry of Defence, [Annual Report and Accounts 2021–22](#) 14 July 2022, p.59.

72. [The carbon boot-print of the military | SGR: Responsible Science](#) 8 January 2020.

67. The Ministry of Defence should return to publishing a more in-depth, stand-alone annual review of its climate and sustainability performance, with independent verification of emissions measuring and reporting. It should commission work to better understand total defence carbon emissions. It should also explain the apparent discrepancy in reporting overall emission figures in 2019–20 and again in 2020–21, and then reporting those same (now historic) figures again in the 2021–22 Annual Report but with values that have increased by over 40%.

4 Defence's contribution to 'net zero'

68. The third strand of the Ministry of Defence's 'strategic ambition' for tackling climate change, as set out in the 2021 Climate Change and Sustainability Strategic Approach (the Strategic Approach document), was committing Defence to the target of "... contribut(ing) to the achievement of the UK legal commitment to reach net zero emissions by 2050."⁷³

Protecting military effectiveness while contributing to the net zero agenda

69. One of the challenges faced by Defence is to contribute to the UK's goal of becoming net zero by 2050 without eroding military capability. Lieutenant-General Nugee (retd), non-executive director for climate change and sustainability in the Ministry of Defence, told the Committee that:

I personally believe that we can get to net zero, but we are not going to get to zero. We will not have electric tanks, with current technology, and we still need tanks, as has been proved in Ukraine. There is only so far that we can go. We will therefore have to make it net zero and try to do our best to get to net zero rather than zero. We must reduce our emissions where we can.⁷⁴

70. Given the unpredictability of the UK's Armed Forces operational profile—and therefore in the unpredictability of associated carbon emissions—it would be inappropriate for the Ministry of Defence to follow a rigid carbon reduction plan across all its activities. Baroness Goldie, Minister of State, Ministry of Defence, told us that 'capability emissions (ie fuel)' were not included in the Ministry's carbon reduction targets "because we would not wish to restrict our licence to operate and prejudge operational tempo levels."⁷⁵

Measuring and reporting Defence's climate change emissions

71. Conversely, part of MoD's contribution "to the achievement of the UK ... commitment to reach net zero emissions by 2050" will require it to be able to measure and report all of its emissions accurately so the rest of Government knows what additional adjustments are required to reach the 2050 net zero target.

72. Witnesses told us that the key to achieving any target is initially to understand the challenge, and then measure progress towards achieving that goal in an accurate and timely manner. Linsey Cottrell told the committee:

You need to know what the problem is to sort out the solution. You need to know how big the problem is. You need to start measuring and reporting properly now, so that you can scale as to where you are above or below that target. It may be an unachievable target, but you will know where you are with it, and you can make that informed decision of where you want to be.⁷⁶

73 Ministry of Defence, [Climate Change and Sustainability Strategic Approach](#) March 2021.

74 Oral evidence: Defence & Climate Change, HC 179, Tuesday 22 November 2022, Q7.

75 Oral evidence: Defence & Climate Change, HC 179, Tuesday 21 March 2023, Q155.

76 Q79 committees.parliament.uk/oralevidence/12580/pdf/

73. Currently, during Epoch 1 (see paragraph 32) the most measurable carbon emissions targets for Defence to achieve are the Greening Government Commitments (GGC).⁷⁷ These work towards the overall 2050 net-zero target by focusing on reducing emissions from the estates and operations activities of central government departments. It is notable and appropriate that these targets relate to activities without any direct impact on military operations.

74. As part of the Greening Government Commitment, Government sets individual departments their own targets, and the Ministry of Defence is no different. Against a 2017–18 baseline, Defence is required to reduce its ‘overall carbon emissions’ (from the estate and civilian operations) by 30% and its ‘direct emissions’ from those areas by 10% — both by 2025. Two sub-targets are also measured: reduce overall travel by 30% and reduce emissions from domestic business flights by at least 30% — again by 2025.⁷⁸ Again, there seems to be no clear detailed route as to how this is to be achieved.

75. Examining Figure 6, it would appear the Ministry of Defence is progressing well against the two principal, and two subsidiary targets. Evidence from the Department’s Annual Report and Accounts 2021–22 shows their overall carbon emissions (‘CO₂ Emissions Estate’) reductions had achieved 29% by 2021–22. Against their 10% direct emissions target (‘CO₂ Emissions Direct Estate’) they had achieved 8% by 2021–22. Against the ‘overall travel’ and ‘business flights’ (Domestic Flights) targets (both 30% reduction by 2025) they had reduced emissions by 27% and 62% respectively.⁷⁹

Figure 6: Defence emissions against the Greening Government Commitments targets

Greening Government Commitment	Baseline	Past year		Current year		GGC 2025 Targets
	2017–18	2019–20	2020–21	2021–22	Performance against baseline (%)	
MOD Committed Target						
CO ₂ Emissions (Millions of tonnes) Estate	1.26	1.02	0.99	*0.90	(29%)	(30%)
CO ₂ Emissions (Millions of tonnes) Direct Estate	0.57	0.55	0.60	*0.52	(8%)	(10%)
CO ₂ Emissions (Millions of tonnes) Travel	0.08	0.08	0.05	0.06	(27%)	(30%)
CO ₂ Emissions (Thousands of tonnes) Domestic Flights	6.53	8.09	0.81	2.46	(62%)	(30%)

Source: Ministry of Defence [Annual Report and Accounts 2021–22](#) p.56

77 HM Government, [Greening Government Commitments 2021 to 2025](#) October 2021. As GGC targets focus on central government departments they do not apply to bodies such as the National Health Service.

78 ‘Overall emissions’ are: Estate Fuels (minus Capability Energy i.e. military fuel) plus electricity (Scopes 1 & 2 and ‘Duty Travel’ from Scope 3); ‘Direct emissions’ are: the estate and operations (Scope 1 minus Capability Energy). For a more detailed explanation of Scopes 1, 2 and 3/3+ see Annex 4.

79 Ministry of Defence, [Annual Report and Accounts 2021–22](#) July 2022.

76. However, compared to other central government departments, the Ministry of Defence has the least demanding ‘direct emissions’ target of 10% (compared to an average of 25% for all departments) and the second-least demanding ‘overall emissions reduction target’ of 30% (compared to the average of 49%) (Figure 7). This, despite the Ministry of Defence admitting that it produces half of all central government’s carbon emissions, based on the GGC criteria.⁸⁰

Figure 7: Individual departmental Greening Government Commitment emissions targets

Department	Overall Emission Reduction Target	Direct Emission Reduction Target
AGO	49%	25%
BEIS	62%	30%
CO	52%	20%
DCMS	58%	33%
DEFRA	50%	15%
DFE	56%	36%
DFT	62%	19%
DHSC	44%	20%
DIT	48%	20%
DWP	45%	17%
FCDO	56%	30%
FSA	27%	21%
HMRC	60%	40%
HMT/UKEF	69%	25%
HO	44%	25%
DLUHC	47%	25%
MOD	30%	10%
MOJ	41%	23%
NCA	43%	15%
ONS	38%	43%
Average percentage	49%	25%

Source: [Greening Government Commitments 2021 to 2025](#) Annex A.

77. In fact, according to Dr Stuart Parkinson, Executive Director, Scientists for Global Responsibility, the target for reducing carbon emissions “... has been set so lax that it would be met even if the MOD took no action to reduce emissions before 2025.”⁸¹ This is because the two principal GGC targets focus on emissions across the defence estate, much of which emanate from energy supplied by the National Grid. The Grid has been decarbonising and expanding its use of low-carbon energy sources — especially wind power — thereby reducing the emissions of any users of that energy. Consequently, Dr Stuart Parkinson’s analysis suggests that, against Defence’s GGC ‘overall emissions’

80 Ministry of Defence, [Climate Change and Sustainability Strategic Approach](#), March 2021 p6.

81 Scientists for Global Responsibility, [UK military GHG emissions and the Greening Government Commitments](#) 31 May 2023.

(i.e. the defence estate and civilian operations) target of 30% by 2025, emissions will reduce by 32% purely through the work of the National Grid, without the Department having to take any action whatsoever (see Annex 3 for a detailed calculation).

78. The Ministry of Defence is in line to achieve its Greening Government Commitments' carbon reduction targets early, but these are insufficiently demanding. It appears that the Ministry can meet its targets entirely by taking advantage of the decarbonisation of the National Grid. Targets are hardly stretching if they can be met without any effort, especially for a department that produces half of all central government emissions. *For the next round of Greening Government Commitments from 2025–2030, Defence should ensure its targets are more demanding and accompanied by plans to achieve them.*

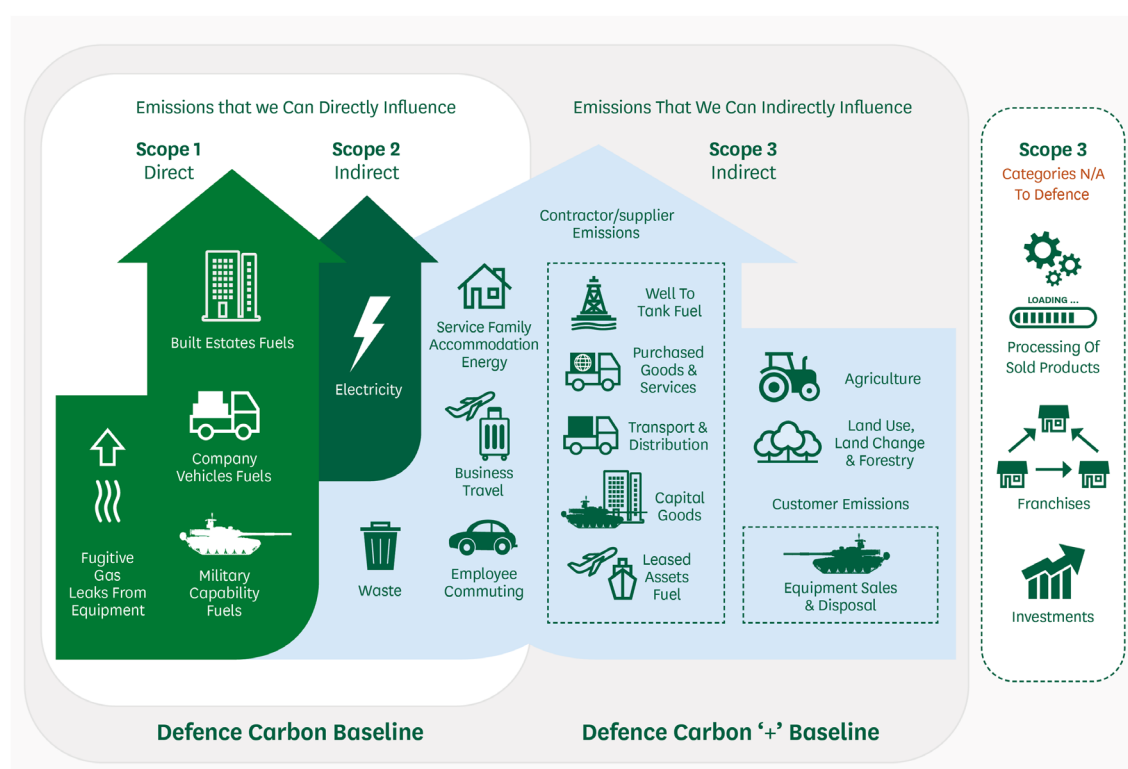
Limitations of the GGC targets and Ministry of Defence carbon reporting

79. The GGC targets only measure a very limited subsection of Defence carbon emissions. Stuart Parkinson told the committee:

Those (GGC) targets are very narrow ... The greening government targets apply only to the (defence) estate; they do not apply to capability emissions, and that is two-thirds of what is called scope 1 and scope 2 emissions, which are the core emissions.⁸²

80. Briefly, 'scope 1' emissions are those generated directly by Defence, which largely includes the defence estate—but not Service Family Accommodation—and 'capability emissions' (i.e. fuel) used by the Services. Electricity supplied to Defence from the National Grid is covered by 'scope 2'. However, as noted in the quote above, two-thirds of scope 1 and 2 emissions are not measured by the GGC targets (see Figure 8). See Annex 4 for more details on Scope 1, 2 and 3 emissions.

Figure 8: Definitions of scope 1, 2 and 3 emissions.



Source: Ministry of Defence [Annual Report and Accounts 2021–22](#) p.56

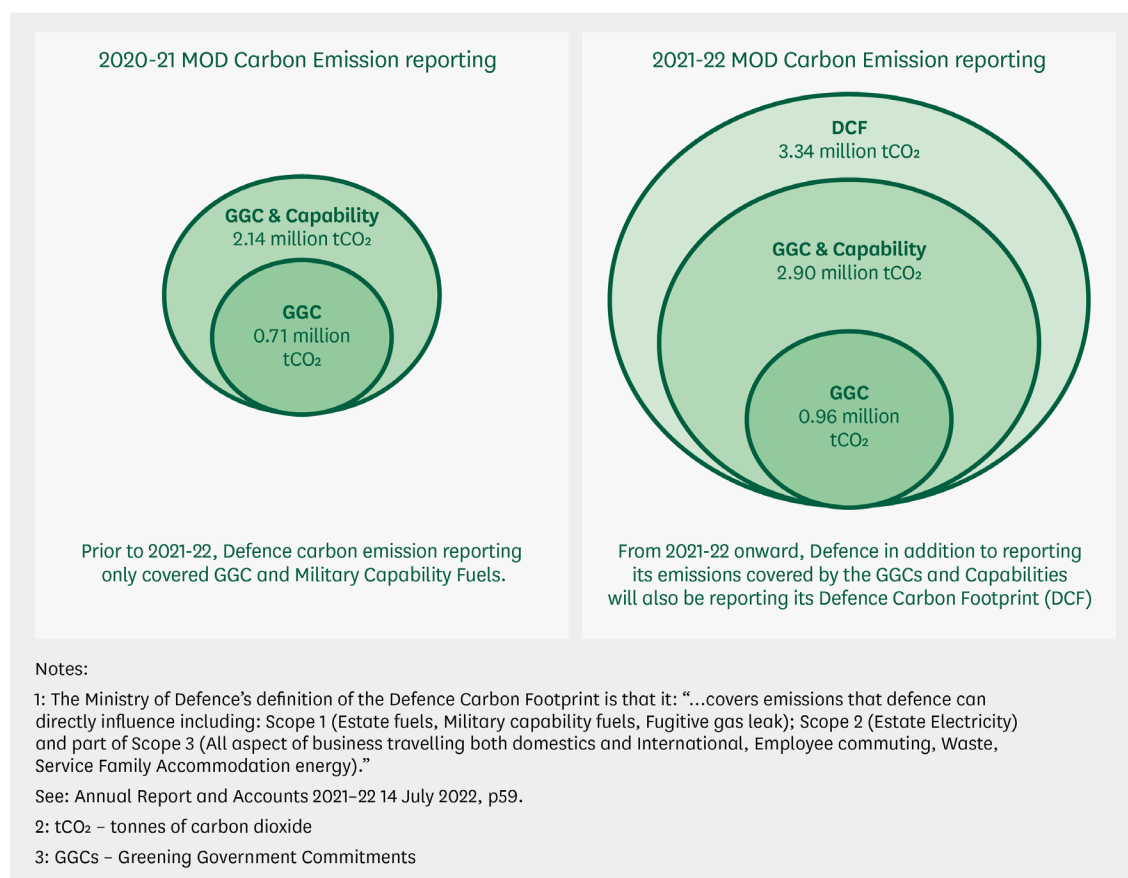
81. The Ministry of Defence currently measure Scope 1 and 2 emissions, focused on the defence estate, and some but not all of Scope 3, such as Service Families accommodation and capital goods.⁸³ Lieutenant-General Wardlaw, Chief of Defence Logistics and Support, Ministry of Defence, told us that:

It is not easy, across a very complex enterprise like defence, to baseline our scope 1 and 2 emissions, which are our direct emissions. It is even harder to baseline our scope 3 emissions—those that are produced indirectly by our suppliers. The fact is that within the last two years we have developed a good understanding of our scope 1 and 2 emissions, and we have commissioned work to get after the scope 3 emissions around my area, the support enterprise—logistics and enabling. We are now commissioning work to understand, by platform, the emissions that we expect of both in-service and future platforms.⁸⁴

82. The Ministry of Defence has made progress in reporting some of this information. In its Annual Report & Accounts 2020–21 it reported against the mandated GGC targets, as well as military capability fuels. For the Annual Report & Accounts 2021–22 the Ministry of Defence increased coverage with the Defence Carbon Footprint (DCF). This covers everything the Ministry of Defence accepts it can currently measure, adding parts of scope 3 emissions — domestic and international business travel, employee commuting, waste, and Service Family accommodation energy. See Figure 9.

83 See Annex 1 for a more detailed explanation of scope 1, 2 and 3/3+ emissions.

84 Oral evidence: Defence & Climate Change, HC 179, Tuesday 21 March 2023, Q158.

Figure 9: Evolution in reporting Defence carbon emissions

Source: Ministry of Defence [Annual Report and Accounts 2021-22](#) p.59.

83. Figure 9 shows that currently targeted GGC emissions cover 0.96 million tonnes of CO₂ equivalent (tCO₂e) which cover the defence estate, and these represent around 50% of central government emissions targeted using the GGC methodology.⁸⁵ Overall measured defence emissions, known as the Defence Carbon Footprint, are 3.34M tCO₂e — including 2M tCO₂e of fuel (referred to in Figure 9 as 'Capability').

84. In addition to what is currently measured by Figure 9, however, total annual carbon emissions (i.e. Defence's 'carbon footprint') covering the whole of the Defence enterprise have been estimated at around 13 million tCO₂e.⁸⁶ Understanding and reporting total emissions will be essential for Defence to accurately calculate total UK emissions as well as to measure its contribution to reducing those emissions to net zero by 2050. Expanding this coverage will also allow Defence to better hold its suppliers to account and set out their own carbon reduction plans to reduce overall emissions.

85. As Lieutenant-General Wardlaw told the committee, the Science-Based Targets initiatives (SBTi) are seen as best-practice tools necessary to ensure that climate action at all levels can be properly measured and reported in verifiable ways, helping establish Defence's baseline carbon emissions.⁸⁷

85 Ministry of Defence, [Climate Change and Sustainability Strategic Approach](#) 30 March 2021, p.6.

86 [The carbon boot-print of the military | SGR: Responsible Science](#) 8 January 2020.

87 Oral evidence: Defence & Climate Change, HC 179, Tuesday 21 March 2023, Q158.

86. We welcome the Ministry of Defence's efforts to expand coverage of carbon emissions, but more needs to be achieved to ensure all Defence emissions are measured. Best commercial practice for promoting emissions reductions and net-zero targets are the Science Based Targets initiatives (SBTi), which can also apply to major suppliers along with carbon reduction plans. *The Ministry of Defence, therefore, should look to adopt Science-Based Targets initiative-approved measures for Defence and major suppliers, and develop carbon reduction plans for major suppliers.*

Carbon reduction targets across the Commands

87. Although Defence has made progress with measuring and reporting emissions, the individual Top-Level Budget holders⁸⁸ do not yet report their emissions separately or have their own milestones and targets — even within the limited Greening Government Commitments (GGCs). The RAF has both milestones and a demanding 2040 net zero target, but there do not appear to be publicly reported and consistent milestones and 2050 targets across the other Commands (see paragraphs 54–56). In terms of contributing to the UK's 2050 net zero target, Baroness Goldie told us:

I am satisfied that the three Services understand what they are doing. I think the RAF has set an ambitious target ... They will quickly work out whether they are making it or whether they are slipping. We need that honesty of information. The Army and the Navy are working within the 2050 targets. They have different and perhaps more challenging emission ranges to deal with.⁸⁹

88. We note with interest the RAF setting itself a demanding target for reducing carbon emissions—a decade ahead of the Government's 2050 goal—and look forward to examining the detailed plan for how it will be achieved. The RAF has also set out clear milestones towards achieving its 2040 ambition, aiming for a net zero airbase by 2025 and a net zero RAF estate by 2030, but milestones are not plans and programmes. We have not seen similar plans setting out milestones and targets for all other Top-Level Budget holders and enabling organisations to achieve net zero by 2050.

89. Nor do the various organisations within Defence separately report their emissions publicly, so gauging progress towards their targets is not yet possible. *Top-Level Budget holders and other significant enabling organisations should report their emissions separately starting with the 2023–24 Annual Report & Accounts, with emission reduction targets ideally set over 5-year periods to match the GGC plan.*

The role of the Ministry of Defence's climate change director

90. As part of the Ministry of Defence's delegated model of activity, we heard that the individual Military Commands and other Defence organisations take responsibility for tackling climate change within their realms. The director responsible for coordinating this climate change activity in the centre of the Ministry of Defence gave evidence to the

88 The Top-Level Budgets in the Ministry of Defence are Navy Command; Army Command; Air Command; Strategic Command; Defence Nuclear Organisation; Defence Infrastructure Organisation; Head office and Corporate Services. and a range of Enabling Organisations that provide supporting services to the whole of Defence, such as the Defence Logistics Organisation (DLO) and the Defence Infrastructure Organisation (DIO). Ministry of Defence, [How Defence Works](#) September 2020, p4.

89 Oral evidence: Defence & Climate Change, HC 179, Tuesday 21 March 2023, Q158.

committee. As a likely consequence of the delegated model, as well as being director for climate change, he is also the director responsible for Levelling Up and The Union in the Ministry of Defence.⁹⁰

91. These are all important topics, and it may well have been appropriate to bring these three topics together, based on the ‘strategic ambition’ set out for Epoch 1 in the Climate Change and Strategic Approach document back in 2021.⁹¹ It may not be appropriate now, however, given the pressing need for reductions in carbon emissions.

92. John Kerry, United States Special Presidential Envoy for Climate, Executive Office of the President of the United States, told us that:

We have to reduce emissions, but we are not reducing them at the rate that has been prescribed in order to hold on to that target figure of a 1.5° limit on warming. That will have profound implications—in the trillions of pounds, dollars, yen or whatever currency you want to apply. The world is going to be enormously impacted by the increased costs ... It is far, far more expensive to respond later, rather than sooner—now.⁹²

93. **Given increasing scientific concerns around failing to hold to the 1.5° limit on warming and the need for Defence to transition from establishing a comprehensive baseline of carbon emissions in Epoch 1 to significantly reducing emissions in Epoch 2, having the climate change director also responsible for the Union and Levelling-Up in the Ministry of Defence may be too distracting for the important work that needs to be achieved at pace.**

94. *The Ministry of Defence should appoint a dedicated climate change director who would be able to fully focus on coordinating carbon reductions across the whole of Defence, including holding separate commands and organisations to account for progress in reducing emissions against their individual goals and measuring and reporting that progress in a timely manner.*

90 Director, Levelling Up, The Union, Climate Change and Sustainability (D LUCCS). See Annex 5 for a detailed organisational structure for climate change and sustainability governance in the Ministry of Defence.

91 Ministry of Defence, [Climate Change and Sustainability Strategic Approach](#) March 2021.

92 Oral evidence: Defence & Climate Change, HC 179, Tuesday 23 May 2023, Q204.

Conclusions and recommendations

The climate change threat to global security and Defence's response

1. The increasing exploitation of the Arctic for international trade and exploration for critical minerals gives greater importance to the role of the Joint Expeditionary Force (JEF) as a security alliance in the 'High North'. *The Ministry of Defence should assess how the JEF might need to be adapted in the face of climate-change induced developments in the Arctic and beyond.* (Paragraph 24)
2. Military equipment will need to be adapted to operate effectively under the more extreme temperature ranges that are predicted, as well to help reduce emissions, although this should be achieved without compromising military capability. This process cannot be delayed; more than a 1,000 new tanks and other armoured vehicles with conventional diesel engines will enter service in the next few years and will still be in service after the 2050 net zero target. Armed Forces training will also need to be adapted in the face of rising global temperatures, so military readiness to respond to crises is not eroded. (Paragraph 29)
3. *Defence should undertake research and assess best practice from academia, industry, allies and partners on operating in demanding environments and ensure all Defence Lines of Development are suitably adapted to continue to allow UK Armed Forces to operate effectively across more extreme climatic conditions over the coming decades. It should also push hard to reduce carbon emissions from its equipment, without eroding military capability.* (Paragraph 30)
4. *The Ministry of Defence should set out the balance of investment opportunities around accelerating the fitting of low-carbon energy sources to the defence estate in the UK and abroad to achieve 'estate net zero' by 2030. Although this will require additional initial capital outlay, it should reduce whole-life costs and carbon emissions and increase Defence's energy resilience and self-sufficiency.* (Paragraph 42)
5. *This balance of investment analysis should also be applied to the housing stock as, in conjunction with wider upgrades, it could enhance the living conditions of Service personnel and their families, thereby improving retention.* (Paragraph 43)
6. *The Ministry of Defence should assess whether continued reductions in the size of the Armed Forces will likely result in Defence accepting fewer MACA tasks requested by Government over the coming decades, and if so should ensure wider Government is fully aware of the implications of this, including the need for alternative non-regular-forces capacity.* (Paragraph 48)

Defence as a global leader for tackling climate change

7. Undertaking the role of global leader is not easy. Rear Admiral Paul Beattie, Director Naval Staff, Royal Navy, recently described the measures necessary for climate change adaption in the military as the "... biggest change programme in defence". He noted that, unusually for technology, countries "can't look to the US" for global leadership and that some were therefore looking to the UK. However, such a role

requires considerable resources, and time, so was not a decision to be taken lightly. Influencing with UK partners through international organisations such as NATO and the UN could provide a helpful approach. (Paragraph 60)

8. *The Ministry of Defence should work with other UK government partners to encourage the United Nations Framework Convention on Climate Change and the Intergovernmental Panel on Climate Change to update their reporting framework so emissions from military fuel use and other activities are set out in National Inventory Reports. The Ministry of Defence should also urge NATO to increase its transparency and publish its methodology for accounting for greenhouse gas emissions.* (Paragraph 61)
9. Measuring and reporting against the total defence carbon emission figure would support both the Government's agenda of reducing emissions to net zero by 2050, but also provide a gold standard of military emissions reporting for other countries to emulate. Good practice would be to ensure these figures are independently verified. (Paragraph 66)
10. *The Ministry of Defence should return to publishing a more in-depth, stand-alone annual review of its climate and sustainability performance, with independent verification of emissions measuring and reporting. It should commission work to better understand total defence carbon emissions. It should also explain the apparent discrepancy in reporting overall emission figures in 2019–20 and again in 2020–21, and then reporting those same (now historic) figures again in the 2021–22 Annual Report but with values that have increased by over 40%.* (Paragraph 67)

Defence's contribution to 'net zero'

11. The Ministry of Defence is in line to achieve its Greening Government Commitments' carbon reduction targets early, but these are insufficiently demanding. It appears that the Ministry can meet its targets entirely by taking advantage of the decarbonisation of the National Grid. Targets are hardly stretching if they can be met without any effort, especially for a department that produces half of all central government emissions. *For the next round of Greening Government Commitments from 2025–2030, Defence should ensure its targets are more demanding and accompanied by plans to achieve them.* (Paragraph 78)
12. We welcome the Ministry of Defence's efforts to expand coverage of carbon emissions, but more needs to be achieved to ensure all Defence emissions are measured. Best commercial practice for promoting emissions reductions and net-zero targets are the Science Based Targets initiatives (SBTi), which can also apply to major suppliers along with carbon reduction plans. *The Ministry of Defence, therefore, should look to adopt Science-Based Targets initiative-approved measures for Defence and major suppliers, and develop carbon reduction plans for major suppliers.* (Paragraph 86)
13. We note with interest the RAF setting itself a demanding target for reducing carbon emissions—a decade ahead of the Government's 2050 goal—and look forward to examining the detailed plan for how it will be achieved. The RAF has also set out clear milestones towards achieving its 2040 ambition, aiming for a net zero airbase by 2025 and a net zero RAF estate by 2030, but milestones are not plans and

programmes. We have not seen similar plans setting out milestones and targets for all other Top-Level Budget holders and enabling organisations to achieve net zero by 2050. (Paragraph 88)

14. *Nor do the various organisations within Defence separately report their emissions publicly, so gauging progress towards their targets is not yet possible. Top-Level Budget holders and other significant enabling organisations should report their emissions separately starting with the 2023–24 Annual Report & Accounts, with emission reduction targets ideally set over 5-year periods to match the GGC plan.* (Paragraph 89)
15. Given increasing scientific concerns around failing to hold to the 1.5° limit on warming and the need for Defence to transition from establishing a comprehensive baseline of carbon emissions in Epoch 1 to significantly reducing emissions in Epoch 2, having the climate change director also responsible for the Union and Levelling-Up in the Ministry of Defence may be too distracting for the important work that needs to be achieved at pace. (Paragraph 93)
16. *The Ministry of Defence should appoint a dedicated climate change director who would be able to fully focus on coordinating carbon reductions across the whole of Defence, including holding separate commands and organisations to account for progress in reducing emissions against their individual goals and measuring and reporting that progress in a timely manner.* (Paragraph 94)

Annex 1

In terms of environmental goals that impact on Defence, the Ministry of Defence provided the Defence Committee with the following information:

‘The GGC Headline overall and direct emissions targets are the only specific MOD targets (non-statutory). The rest of GGC are whole central Government targets which we contribute towards achieving. Hence our specific targets are:

- MOD Greening Government Commitments 2021 to 2025 targets are to reduce the overall greenhouse gas emissions by 30% from a 2017 to 2018 baseline and also reduce direct greenhouse gas emissions from estate and business travel by 10% from a 2017 to 2018 baseline. MOD is on track to meet these targets.
- MOD will contribute to the achievement of the UK legal commitment reach net zero by 2050.
- MOD will also contribute to reducing greenhouse gas emissions from public sector building by 50% by 2032 and 75% by 2037.

It should also be noted that the MOD is no different than other central government departments it is only our scale and size that set us apart.

On Net Zero there is no defence sector in the UK Net Zero Strategy although we have emissions in almost every sector—so we will be affected by the implementation of sector specific strategies and policies. Hence, the need for us to contribute to the delivery of these strategies—shown by the recent publication of the Defence Net Zero Aviation Strategy.

Relevant extracts:

Extract from GGC gov.uk page [Greening Government Commitments 2021 to 2025 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/commitments/greening-government-commitments-2021-to-2025) ‘With the exception of greenhouse gas emissions, the targets are aggregate central government targets and not bespoke minimum performance targets for individual departments. They should, nonetheless, act as a guide for departments to work to.’

Extract from UK Net Zero Strategy [net-zero-strategy-beis.pdf \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/91251/net-zero-strategy-beis.pdf): Investing a further £1.425 billion in the Public Sector Decarbonisation Scheme, with the aim of reducing direct emissions from public sector buildings by 75% by 2037.

The 50% by 2032 is an older Government commitment: [Defence Aviation Net Zero Strategy - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/commitments/defence-aviation-net-zero-strategy)

Annex 2

Table comparing carbon emission commitments across the Top-Level Budget holders (TLBs).

TLB	Stated 2050 Ambition	Source	Notes
Ministry of Defence	N/A	N/A	Linsey Cottrell told the Committee she did not believe the Ministry of Defence had a net zero target. See Q69.
Royal Navy	N/A	N/A	It was recently asserted that the Royal Navy is further ahead of the other Services Episode 6: Readyng the Royal Navy for Climate Change-Affected Seas
Army	N/A	N/A	Linsey Cottrell told the Committee she did not believe the Army had a net zero target. See Q69.
Royal Air Force	By 2040 has a 'Carbon Net Balanced Service' target — a decade ahead of the Government's 2050 net zero target.	CAS RAF NetZero ambition	The RAF has interim milestones to the 2040 'Carbon Net Balanced' — a net zero airbase by 2025 and a net zero estate by 2030
Strategic Command	N/A	N/A	No net zero strategy for Strategic Command found in either the Sustainable Support Strategy 2022 or the Defence Supply Chain Strategy 2022 .
Defence Equipment & Support	Have a net zero target across their operations and infrastructure by 2040, but for 'capabilities' (i.e. building military equipment) it is only committed to '... reduc(ing) the carbon footprint of the capabilities we deliver and support by 2050.'	DES 2025 Strategy	
Defence Estate	A net zero and climate resilient infrastructure—designed, constructed and operated now to enable decarbonisation by 2050	Strategy for Defence Infrastructure	This implies it is the defence estate that is decarbonising by 2050, but it might be referring to the Government's overall target for the UK.

Annex 3

Analysis of Defence's Greening Government Commitment 'overall emissions' target (i.e. defence estate and civilian operations) of 30% by 2025. According to research by Dt Stuart Parkinson, Defence emissions will reduce by 32% purely through the work of the National Grid without the Department having to take any action whatsoever. For a detailed explanation of the calculation, see: [UK military GHG emissions and the Greening Government Commitments](#).

Greening Government Commitments (GGCs) for MOD - technical paper

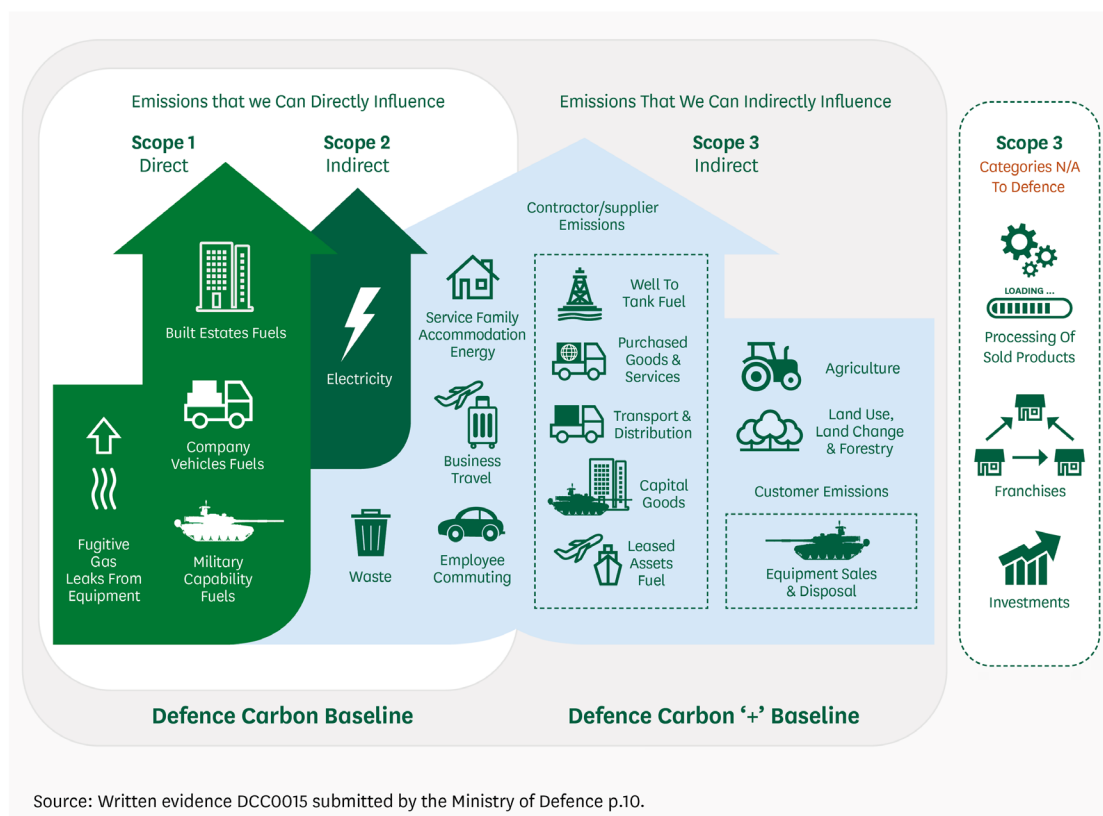
	CO ₂ emissions (MtCO ₂)		% fall from base year	Estate - scope 1+2	% fall from base year	Travel - scope 1	% fall from base year	Domestic flights - scope 1	% fall from base year	Notes	Fall in scope 2 due to grid decarb	Fall in scopes 1+2 due to grid decarb	Fraction of total that is scope 2	Fall in scopes 1+2 due to grid decarb + low ambition gas proj	Fall in scopes 1+2 due to grid decarb + high ambition gas proj
	Estate - Scope 1	% fall from base year													
2017-18	0.57			1.26		0.08		0.00653		Base year			55%		
2019-20	0.55	3.0%		1.02	19%	0.08	0%	0.00809	-24%		27%	15%			
2020-21	0.60	-4.7%		0.99	21%	0.05	38%	0.00081	88%		34%	19%			
2021-22	0.52	8.4%		0.90	29%	0.06	25%	0.00246	62%		40%	22%		26%	26%
2025-26											58%	32%		38%	43%
2025-26											66%	36%		43%	47%
2025-26 target		10%	30%		30%				30%						
2030-31											79%	43%		43%	62%
2030-31											100%	55%		55%	74%

Annex 4

Definitions of Scope 1, 2 and 3 emissions. Together Scope 1 & 2 can be referred to as ‘core emissions’ as opposed to scope 3 emissions which can be referred to as ‘upstream supply chain emissions’:

- a) Scope 1 emissions: These are core carbon emissions, covering direct emissions from owned or controlled sources, so ‘Estates and operations’ (Defence excludes military fuels).
- b) Scope 2 emissions: Covers indirect emissions from the purchase and use of electricity, steam, heating and cooling. In Defence’s case this is largely electricity provided by the National Grid.
- c) Scope 3 emissions: All aspect of business travel (domestic and International) Employee commuting, Waste, Service Family Accommodation energy; Capital goods; Leased assets fuel; Well to tank fuel; Purchased goods and services; Transport and distribution; Agriculture; Land use, land change, forestry, Equipment sales and disposal.
- d) Less formally, a further ‘Scope 3+ category’ referred to by [The Conflict and Environment Observatory](#) are the ‘impacts of war’ defence emissions. These are usually from conflict — for example, urban fires, damage to ecosystems, post-conflict reconstruction. Some of these might also be outside of conflict — for example, large wildfires caused by accidentally setting fire to exercise training areas such as Salisbury Plain Training Area or in Kenya.

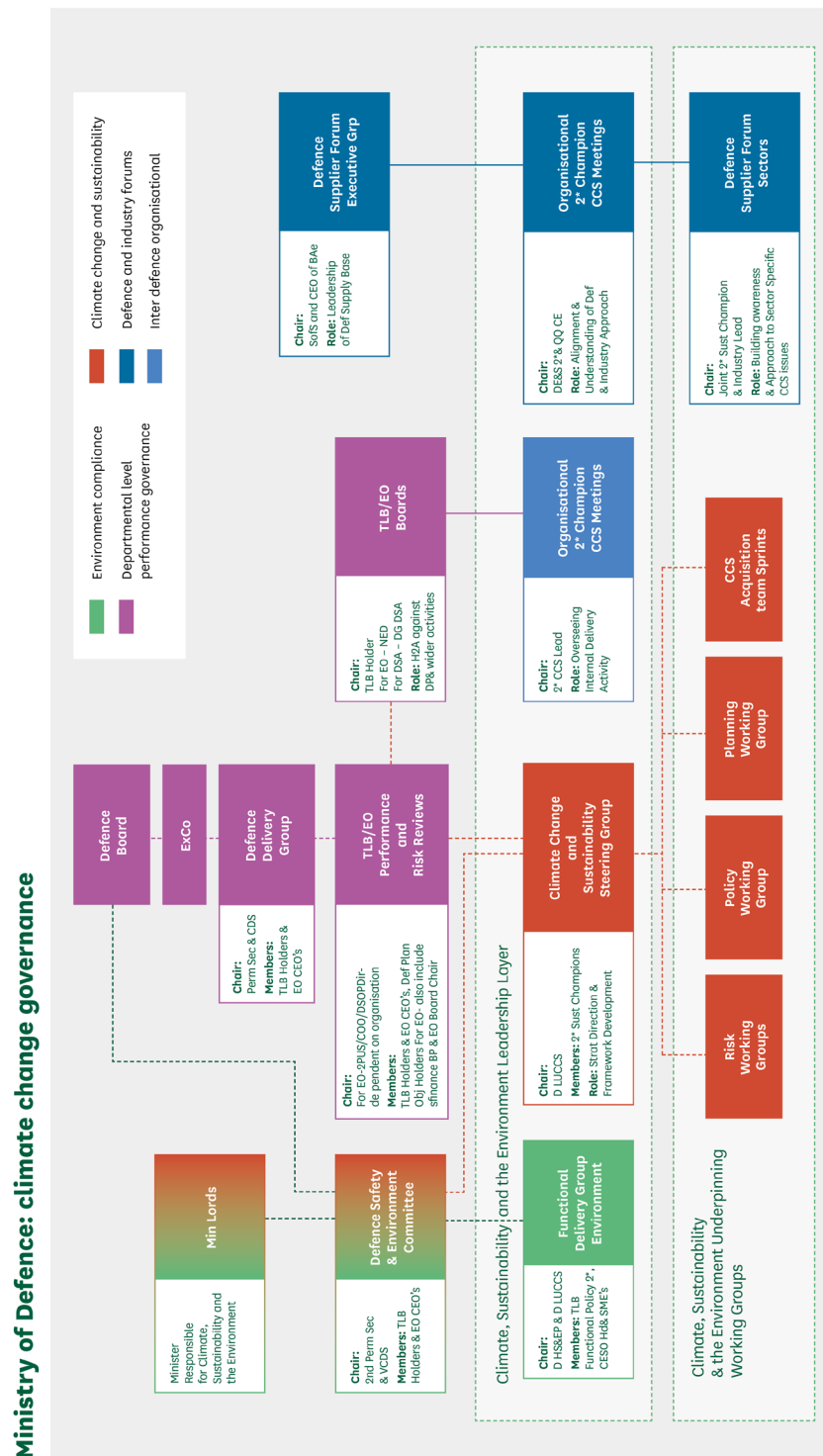
Scopes 1, 2 and 3 emissions



Annex 5

Organisational structure for climate change and sustainability governance in the Ministry of Defence, including the role of the Director, Levelling Up, The Union, Climate Change and Sustainability (D LUCCS).

Ministry of Defence climate change organisational chart



Source: [Ministry of Defence DCC0017](#)

Formal minutes

Tuesday 4 July 2023

Members present

Tobias Ellwood, in the Chair

Sarah Atherton

Robert Courts

Dave Doogan

Richard Drax

Mark Francois

Kevan Jones

Gavin Robinson

John Spellar

Defence and Climate Change

Draft Report (*Defence and Climate Change*), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 94 read and agreed to.

Annexes and Summary agreed to.

Resolved, That the Report be the Eighth Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available (Standing Order No. 134).

Adjournment

Adjourned till Tuesday 4 July 2023 at 2.55pm.

Witnesses

The following witnesses gave evidence. Transcripts can be viewed on the [inquiry publications page](#) of the Committee's website.

Tuesday 22 November 2022

Lt. Gen. Richard Nugee (Rtd), Lead of Ministry of Defence's 2021 Climate Change and Sustainability Review

[Q1–55](#)

Tuesday 24 January 2023

Linsey Cottrell, Environmental Policy Officer, The Conflict and Environment Observatory; **Dr Stuart Parkinson**, Executive Director, Scientists for Global Responsibility (SGR)

[Q56–99](#)

Tuesday 28 February 2023

Dr Tim Clack, Co-director, Climate Change and (In)security Project; **Maj. Gen. (Rtd) Dr Andrew Sharpe**, Director, Centre for Historical Analysis and Conflict Research (CHACR)

[Q100–133](#)

Monday 06 March 2023

David Beasley, Executive Director, UN World Food Programme

[Q134–153](#)

Tuesday 21 March 2023

Baroness Annabel Goldie, Minister of State, Ministry of Defence; **James Clare**, Director of Levelling Up, The Union, Climate Change and Sustainability, Ministry of Defence; **Lt. Gen. Richard Wardlaw OBE**, Chief of Defence Logistics and Support, Ministry of Defence; **Major General Robert Walton-Knight**, Director Strategy and Plans, Defence Infrastructure Organisation, Ministry of Defence

[Q154–203](#)

Tuesday 23 May 2023

John Kerry, United States Special Presidential Envoy for Climate, Executive Office of the President of the United States

[Q204–218](#)

Published written evidence

The following written evidence was received and can be viewed on the [inquiry publications page](#) of the Committee's website.

DCC numbers are generated by the evidence processing system and so may not be complete.

- 1 ADS Group Ltd ([DCC0011](#))
- 2 Boeing ([DCC0004](#))
- 3 Community Windpower Limited ([DCC0009](#))
- 4 Fleury, Mrs Saphia (Postgraduate Researcher, University of Hull) ([DCC0001](#))
- 5 Harrington, Dr Alexandra (Lecturer in Law (Environment), Lancaster University Law School) ([DCC0005](#))
- 6 Jalili, Dr Duraid (Lecturer, King's College London) ([DCC0006](#))
- 7 Kertysova, Katarina (Policy Fellow, European Leadership Network (ELN)) ([DCC0012](#))
- 8 Ministry of Defence ([DCC0015](#), [DCC0017](#))
- 9 Mitie ([DCC0010](#))
- 10 RAND Europe ([DCC0007](#))
- 11 Rolls Royce ([DCC0016](#))
- 12 Sainsbury, Mr Jeremy (Director, Natural Power Consultant) ([DCC0008](#))
- 13 Scientists for Global Responsibility (SGR) ([DCC0002](#))
- 14 The Conflict and Environment Observatory ([DCC0014](#))
- 15 World Food Programme ([DCC0003](#))

List of Reports from the Committee during the current Parliament

All publications from the Committee are available on the [publications page](#) of the Committee's website.

Session 2022–23

Number	Title	Reference
1st	The Treatment of Contracted Staff for The MoD's Ancillary Services	HC 187
2nd	The Integrated Review, Defence in a Competitive Age and the Defence and Security Industrial Strategy	HC 180
3rd	Defence Space: through adversity to the stars?	HC 182
4th	Developments in UK Strategic Export Controls	HC 282
5th	Withdrawal from Afghanistan	HC 725
6th	Special Relationships? US, UK and NATO	HC 184
7th	Defence Diplomacy: A softer side of UK Defence	HC 792
8th	Defence and Climate Change	HC 179
9th	It is broke - and it's time to fix it: The UK's defence procurement system	HC 1099
1st Special	Operation Isotrope: the use of the military to counter migrant crossings: Government response to the Committee's fourth report of Session 2021–22	HC 267
2nd Special	The Treatment of Contracted Staff for the MOD's Ancillary Services: Government Response to the Committee's First Report	HC 702
3rd Special	The Integrated Review, Defence in a Competitive Age and the Defence and Security Industrial Strategy: Government Response to the Committee's Second Report	HC 865
4th Special	Defence Space: through adversity to the stars? Government Response to the Committee's Third Report	HC 1031
5th Special	Withdrawal from Afghanistan: Government Reponse to the Committee's Fifth Report	HC 1316

Session 2021–22

Number	Title	Reference
1st	Russia and Ukraine border tensions	HC 167
2nd	Women in the Armed Forces	HC 154
3rd	"We're going to need a bigger Navy"	HC 168
4th	Operation Isotrope: the use of the military to counter migrant crossings	HC 1069

Number	Title	Reference
1st Special	Obsolescent and outgunned: the British Army's armoured vehicle capability: Government Response to the Committee's Fifth Report of Session 2019–21	HC 221
2nd Special	Manpower or mindset: Defence's contribution to the UK's pandemic response: Government Response to the Committee's Sixth Report of Session 2019–21	HC 552
3rd Special	Russia and Ukraine border tensions: Government Response to the Committee's First Report	HC 725
4th Special	Protecting those who protect us: Women in the Armed Forces from Recruitment to Civilian Life: Government Response to the Committee's Second Report	HC 904
5th Special	"We're going to need a bigger Navy": Government Response to the Committee's Third Report	HC 1160

Session 2019–21

Number	Title	Reference
1st	In Search of Strategy—The 2020 Integrated Review	HC 165
2nd	The Security of 5G	HC 201
3rd	Pre-appointment hearing for the Service Complaints Ombudsman	HC 989
4th	Foreign Involvement in the Defence Supply Chain	HC 699
5th	Obsolescent and outgunned: the British Army's armoured vehicle capability	HC 659
6th	Manpower or mindset: Defence's contribution to the UK's pandemic response	HC 357
1st Special	Armed Forces Covenant Annual Report 2018: Government Response to the Committee's Eighteenth Report of Session 2017–19	HC 162
2nd Special	Drawing a Line: Protecting Veterans by a Statute of Limitations: Government Response to the Defence Committee's Seventeenth Report of Session 2017–19	HC 325
3rd Special	In Search of Strategy—The 2020 Integrated Review: Government Response to the Committee's First Report	HC 910
4th Special	The Security of 5G: Government Response to the Committee's Second Report	HC 1091
5th Special	Foreign Involvement in the Defence Supply Chain: Government Response to the Committee's Fourth Report	HC 1380