CLIMATE COLLATERAL

How military spending accelerates climate breakdown

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CONTENTS

EXECUTIVE SUMMARY

As the world's climate negotiators gather for their annual summit (COP27) in Egypt, military spending is unlikely to be on the official agenda. Yet, as this report shows, military spending and arms sales have a deep and lasting impact on the capacity to address the climate crisis, let alone in a way that promotes justice. Every dollar spent on the military not only increases greenhouse gas (GHG) emissions, but also diverts financial resources, skills and attention away from tackling one of the greatest existential threats humanity has ever experienced. Moreover, the steady increase in weapons and arms worldwide is also adding fuel to the climate fire, stoking violence and conflict, and compounding the suffering for those communities most vulnerable to climate breakdown.

The trajectory of military spending and GHG emissions are on the same steep upward curve. Global military spending has been rising since the late 1990s, surging since 2014 and reaching a record $2,000bn in 2021. Yet the same countries most responsible for large military expenditure are unable to find even a fraction of the resources or commitment to tackle global heating.

Our research reveals the following:

The richest countries most responsible for the climate crisis are spending more on the military than on climate finance

- **The richest countries** (categorised as Annex II in the UN climate talks) **are spending 30 times as much on their armed forces as they spend on providing climate finance** for the world's most vulnerable countries, which they are legally bound to do.
- **Seven of the top ten historical emitters are also among the top ten global military spenders:** in order of magnitude the United States spends by far the most, followed by China, Russia, the United Kingdom, France, Japan and Germany. The other three of the top ten military spenders – Saudi Arabia, India and South Korea – are also high GHG emitters.
- **Between 2013 and 2021, the richest (Annex II) countries spent $9.45 trillion on the military,** 56.3% of total global military spending ($16.8 trillion) compared to an estimated $243.9 billion on additional climate finance. Military spending has increased by 21.3% since 2013.

Military spending increases GHG emissions

- A 2020 report by Tipping Point North South estimated that **the carbon footprint of the global militaries** and associated arms industries **was around 5% of the total global GHG emissions** in 2017. By way of comparison, civil aviation accounts for 2% of global GHG emissions.
- In terms of fuel consumption, if the **world's armed forces were ranked together** as a single country, they would be the **world's 29th biggest oil consumer,** just ahead of Belgium and South Africa.
- Other estimates by CEOBS and Scientists for Global Responsibility (SGR) put the annual military carbon footprint at **205 million tonnes for the US** and **11 million tonnes for the UK of carbon dioxide equivalent,** with France accounting for about a third of the European Union's estimated 24.8 million tonnes.

There is no evidence that the military can be green

The armed forces of the richest countries increasingly boast of their efforts to address climate change, pointing to the installation of solar panels on bases, preparation of sea-level defences, and replacement of fossil fuels in certain military hardware. A closer look, however, suggests this is more hype than substance:

- **In most national military climate strategies, reduction targets are vague and undefined.** The UK's 2021 Defence Climate Change and Sustainability Strategic Approach, for example, sets no reduction targets apart from 'contributing to the achievement of the UK legal commitment to reach net zero emissions by 2050'.
- **The military has been unable to find adequate fuel alternatives for the transport and equipment used in operations and exercises** – which make up 75% of military energy consumption. Jet fuel alone accounts for 70% of the fuel used by the military, followed by naval propulsion and, to a lesser extent, land-based vehicles. The military faces the same challenges as the civilian aviation sector – alternative fuels are still too expensive, limited in availability and unsustainable.
- **Most of the stated goals of 'net zero' are based on false assumptions** – reliant on technologies such as carbon capture, that as yet do not exist at scale, or dependent on alternative fuels that have serious social and environmental costs.
- **Meanwhile the military keeps developing new weapon systems that pollute even more.** For example, F-35A fighters consume about 5,600 litres of oil per hour compared to 3,500 for the F-16 fighters that they are replacing. As military systems have a lifetime span of 30 to 40 years, this means locking-in highly polluting systems for many years to come.

Moreover, military alliances like NATO have been clear that they will not compromise military dominance in order to tackle climate change. Climate change, in different national security plans, remains as much a call for increased military spending to deal with this 'threat', rather than a challenge to reduce or rethink their operations.

Russia's invasion of Ukraine has super-charged military spending and emissions

Russia's invasion of Ukraine in 2014, and especially the huge escalation since February 2022, has been used to approve major increases in military spending (and, therefore, GHG emissions), with no signs that either Russia or the 30-strong NATO alliance have even considered the climate impacts.

- The **European Commission anticipates a spending boost by its member states of at least €200bn,** based on combining ad hoc extra funds and longer-term structural increases. The **US has approved a record $840bn** military budget for 2023, and Canada in 2022 announced an extra $8bn for the next five years. Russia has approved a 27% increase in military spending since 2021, which will bring budgets to a total of $83.5bn in 2023. **Climate goals have been quickly thrown out of the window** when it comes to military objectives. In 2022 alone, 476 of the most gas-guzzling fighter jets, the F-35, have been ordered – 24 for the Czech Republic, 35 for Germany, 36 for Switzerland, six extra for the Netherlands on top of prior orders, and 375 for the US.
- **The war is already diverting resources from climate finance to military spending.** In June 2022, the UK shifted money from its climate finance budget to partially finance a £1bn military support package for Ukraine. The Norwegian government has paused all disbursements of development aid, including climate finance, to get an 'overview' of the potential consequences of the war in Ukraine.

The biggest winner of this military spending bonanza is the arms industry

The arms industry has boomed from the global increases in military spending, as well as from diversifying into sectors such as border control and immigration management. The European Defence Agency (EDA) reported in 2021 that 'the procurement of new equipment has benefitted most strongly from the overall increase in defence investments' in recent years. After Russia's full-scale invasion of Ukraine, and in particular the German announcement of €100bn extra spending, share prices of large arms companies have skyrocketed.

The richest countries are exporting arms to the most climate-vulnerable countries, fuelling conflict and war amid climate breakdown.

- **The richest (Annex II) countries accounted for 64.6% of the total value of international arms transfers** (2013–2021).
- **Annex II countries have exported arms to all 40 of the most climate-vulnerable countries.** Thirteen of these countries are involved in armed conflicts, 20 have authoritarian regimes and 25 are among the countries with the lowest levels of human development. Some of them are also subject to UN and/or EU arms embargoes (Afghanistan, Central African Republic, Myanmar, Somalia, Sudan, Yemen, and Zimbabwe).
- Russia and China, the second and fourth biggest arms exporters, also export to climate-vulnerable countries and are known for ignoring international arms embargoes. Between 2013 and 2021, **China has exported to 21 and Russia to 13 of the world's most climate-vulnerable countries.**

These arms exports not only divert money that is needed to instead mitigate and adapt to climate change, but also run the risk of fuelling conflicts, repression, and human rights abuses for populations on the frontlines of climate change. This is a form of climate maladaptation.

Egypt is one of the many countries supported with arms deals rather than climate action

Egypt will host the UN climate talks, COP27, in November 2022, but it is much better known for its military spending than for its climate action.

- **Between 2017 and 2021, Egypt has been one of the top five arms-importing countries, receiving 5.7% of global imports. Its main suppliers are Russia (41%), France (21%) and Italy (15%).** It also receives support for its police and border guards from EU member states, particularly Germany.
- **Yet Egypt has entered into deals for fossil fuels worth $74bn since 2014,** including with US companies like ExxonMobil and Chevron, has failed to develop effective climate adaptation plans, and is actively repressing climate and democracy activists in the country, including in the run-up to COP27.

Military spending could pay for a global Green New Deal

The richest countries have consistently failed to meet their promises to provide an insufficient $100bn a year in climate finance to the world's most climate-vulnerable countries. And they refuse to make any concrete commitments to pay for mounting loss and damage, such as the floods in in Pakistan and the drought in the Horn of Africa in 2022.

- **One year's military spending by the top 10 military spenders would pay for promised international climate finance for 15 years** (at $100bn a year).
- **$70bn of climate adaptation could be paid with just 4% of what the top 10** (USA, China, India, UK, Russia, France, Germany, Saudi Arabia, Japan and South Korea) **spend annually** on the military (a ratio of 1:23) and 3% of annual global military spending (1:30).
- Together with other proposals for financing – such as an end of fossil-fuel subsidies, disbursement of Special Drawing Rights (SDRs), new taxes on fossil-fuel extraction, financial transactions, aviation and shipping – there is more than enough money to fund mitigation, adaptation, and loss and damage.

Faced with the climate crisis and the signs of reaching dangerous planetary tipping points, there is an overriding imperative to prioritise climate action and international cooperation to protect those who will be most affected. Yet in 2022, an arms race is exacerbating the climate crisis and preventing its resolution. It could not come at a worse time. To tackle the biggest threat to human security, the climate emergency, we need *all* countries – NATO members as well as Permanent UN Security Council members Russia and China – to work together to prioritise climate over militarism. There is no secure nation without a climate-secure planet.

INTRODUCTION

US army troops driving humvee during floods in North Dakota. Credit: US Army photo/Senior Master Sgt. David H. Lipp

After years of warning about an impending climate emergency, 2022 has made it clear that this is now a reality. Temperature records have been smashed in China, Europe, Latin America and the US, unimaginable floods left swathes of Pakistan under water, and drought means that 22 million people are at risk of starvation in the Horn of Africa. Millions have been displaced by these events, whose economic and social impacts will be felt for decades among the families and communities whose lives have been disrupted. These are all happening after a 1.3°C increase in average global temperatures over 1850 levels, yet we continue on track to an anticipated 3°C rise, which would make 2022's extreme weather events seem mild.

In April 2022, the UN Secretary-General António Guterres was unequivocal: 'We are on a fast track to climate disaster. And the results will be catastrophic. This is a climate emergency'.[1] He also noted that 'high-emitting Governments and corporations are not just turning a blind eye, they are adding fuel to the flames'. Indeed, despite 26 years of climate talks, global greenhouse gas (GHG) emissions were still rising in 2021, and COP27 at the end of 2022 will almost certainly not agree on the binding action we need.

It is interesting to compare this to Russia's full-scale invasion of Ukraine in 2022 which has led to the mobilisation of more than $85.8 billion in foreign aid,[2] the welcoming of 7.5 million refugees across Europe, unprecedented sanctions on the aggressor, but most interestingly of all from a climate perspective, a major reorganisation of Europe's energy systems with significant economic costs for many countries and their citizens.

The global response to the invasion of Ukraine shows that this war has proved far more effective as a means to mobilise action than other emergencies. As wars continue to rage in other parts of the world (Yemen, Myanmar, and many other countries), it also suggests that the current geopolitical order prioritises some victims – think white European – over others. While the Ukrainian people strongly need international solidarity and support, it is noteworthy that the international community has failed to mobilise any comparable concerted political action to respond to a climate emergency that poses an existential threat to every nation.

The war in Ukraine – and the massive boost in military spending and arms sales that it has prompted – is sadly also exacerbating the climate emergency. It is increasing military GHG emissions when they need to be radically reduced. It is diverting money from investment in climate action towards military spending and turning political attention away from the need to prioritise the climate crisis and fund a just transition.

This recent surge in militarism comes on top of a longer-term trend that has seen military spending more than double since the end of the Cold War at the end of 1991. It has made the 'Military Industrial Complex' a powerful actor in the US, Europe and elsewhere, which has sought to maximise current tensions for their own immediate profits and long-term economic success.

It is critical as war dominates the political debate, particularly in Europe and the US, to examine more deeply the connections between the military and climate. Military spending and GHG emissions have been largely missing from the political debate. The US Pentagon alone has been the single largest institutional emitter of GHGs for several decades, yet military emissions are still not fully counted under the United Nations Framework Convention on Climate Change (UNFCCC). The constant expansion of the military and defence industry also has far-reaching implications for both the availability of finance for climate action, as well as the infrastructure to respond to climate instability.

This briefing explores some of the connections, and show why military spending and the arms trade should matter to all those who fight for climate justice and desire a *peaceful* and just transition.

BIGGEST MILITARY SPENDERS ARE LARGEST EMITTERS

There is a strong correlation between military spending and GHG emissions. The world's largest military spenders are also the main historical and current emitters. Their military GHG emissions are substantial, contributing to exacerbating the climate crisis.

The top ten historical GHG emitters[3] are shown in Table 1, showing the US as being responsible for an estimated 33.3% of GHG emissions between 1850 and 2025), followed by China (11.7%), Russia, Germany, Japan, the UK, Canada, France, Australia and Brazil. Seven of these are also among the top ten global military spenders, namely the US, China, Russia, the UK, France, Japan and Germany.[4] The other three among the top ten military spenders – Saudi Arabia, India and South Korea – are also high GHG emitters.

TABLE 1. Historical emissions of largest emitters compared with global military spending (2013–2021)

Rank in GHG emissions[5]	Country	GHG emissions (%)	Military spending (in $ billions 2013–2021)	Rank in military spending (2013–2021)
1	United States	33.3	6,243.36	1
2	China	11.7	1,975.89	2
3	Russia	5.8	630.06	3
4	Germany	4.8	413.80	9
5	Japan	4.3	435.16	8
6	United Kingdom	4.2	537.36	6
7	Canada	2.6	189.21	14
8	France	2.5	458.27	7
9	Australia	1.9	240.70	12
10	Brazil	1.8	236.50	13
Others				
13–14	Saudi Arabia	1.3	629.14	4
13–14	South Korea	1.3	367.20	10
25–29	India	0.5	558.07	5

Sources: Climate Equity Calculator, SIPRI military expenditure database

This briefing focuses particularly on the what are known as the Annex II countries,[6] the wealthy countries that according to UN agreements bear particular (and historical) responsibility for their role in causing climate change through decades of high levels of GHG emissions. Under the UNFCCC framework, these countries have committed to playing a greater role in mitigating their own emissions, and providing low-income countries with the financial support and technical expertise to help them mitigate and adapt to climate change ('climate finance'). This briefing examines those commitments and compares them with the investments in military spending.

China and Russia are not among the Annex II countries and as such are not bound to these commitments, but they are notably second and third in ranking for both military expenditure and historical responsibility for greenhouse gas emissions. While their paths of economic development, lower historical responsibilities and per capita emissions indeed set them somewhat aside from other wealthy countries, their current emissions do not relieve them of growing responsibilities and capacities to do more in terms of climate finance.

By 2025, the Annex II countries combined will have been responsible for 60.9% of the world's total GHG emissions since 1850, with the US, the UK and the 27 member states of the EU jointly accounting for 53.7%. Of the ten largest historical emitters seven are Annex II countries, with China, Russia and Brazil being the exceptions. For the period 2013 to 2021, these same Annex II countries combined account for $9.45tn, 56.3% of world total global military spending ($16.8 trillion). Their spending increased by 21.3% since 2013, slightly above the 20.3% average growth of global military spending. Five of the ten largest spenders are Annex II countries, while China, Russia, Saudi Arabia, India and South Korea take the remaining spots accounting for $4.16 trillion in spending (see Table 2).

TABLE 2. Military spending 2013–2021 (in current US$ billion)

Rank	Country	Spending
1	United States	6,243.36
2	China (non-Annex II)	1,975.89
3	Russia (non-Annex II)	630.06
4	Saudi Arabia (non-Annex II)	629.14
5	India (non-Annex II)	558.07
6	United Kingdom	537.36
7	France	458.27
8	Japan	435.16
9	Germany	413.80
10	South Korea (non-Annex II)	367.20
Annex II countries:		
11	Italy	247.05
12	Australia	240.70
14	Canada	189.21
17	Spain	151.66
20	Netherlands	97.88
28	Norway	64.00
33	Sweden	55.16
34	Greece	50.67
36	Switzerland	45.25
37	Belgium	44.70
39	Denmark	38.48
40	Portugal	37.97
45	Finland	35.77
50	Austria	29.29
55	New Zealand	22.65
66	Ireland	10.04
100	Luxembourg	2.90
	Iceland7	0
Annex II countries total		9,451.34
World total		**16,779.13**

Military emissions

As stated earlier, military expenditure also causes GHG emissions, as it includes military infrastructure, equipment, transport and conflicts that are highly dependent on fossil fuels.

There is no obligation for countries to report military emissions, as a result of an exemption lobbied for by the Pentagon during negotiations for the 1997 Kyoto Protocol. This exemption remains, although the 2015 Paris Agreement allowed for all countries to report on their military emissions on a voluntary basis. Most Annex II countries do publish some information, but as the website 'Military Emissions Gap' (a project of Conflict Environment Observatory (CEOBS) and Concrete Impacts) concludes, access to data remains poor and involves 'very significant under-reporting' of actual emissions.

A 2020 report by Tipping Point North South's Transform Defence project estimated that the carbon footprint of the global militaries and associated arms industries was around 5% of the total global greenhouse gas emissions in 2017. By comparison, civil aviation accounts for only 2% of global GHG emissions. In terms of fuel consumption, if the world's militaries were ranked together as a single country, they would be the 29th biggest oil consumer in the world, just ahead of Belgium and South Africa.

Research by CEOBS and Scientists for Global Responsibility (SGR) confirms that Annex II countries are among the largest emitters, with large military spenders such as the US and the UK standing out. Initial estimates by SGR put the annual military carbon footprint at 205 million tonnes for the US and 11 million tonnes for the UK of CO_2 equivalent, with France accounting for about a third of the EU member states' estimated 24.8 million tonnes. According to Neta C. Crawford, professor in International Relations at the University of Oxford and co-director of the Costs of War project, between 2001 and 2018 the US military emitted an estimated 1,267 billion tonnes of GHGs. About 40% of these emissions are attributed to the 'war on terror' and major military interventions in Afghanistan and Iraq.

As points of comparison, SGR and CEOBS research showed that the 27 EU member states' military carbon footprint is equivalent to nearly the emissions of 14 million cars, and that the UK's carbon footprint is equivalent to six million UK cars.

There are no estimates yet of the emissions of Chinese and Russian military. Russia and China have reported some emissions to the to the UNFCC in 2021 under category 1A5 which includes military fuel use, saying they were responsible for 108 and 27.9 million tonnes CO2 respectively. However CEOBS which has studied these figures has said they are poor and insufficient and do not reflect actual emissions.

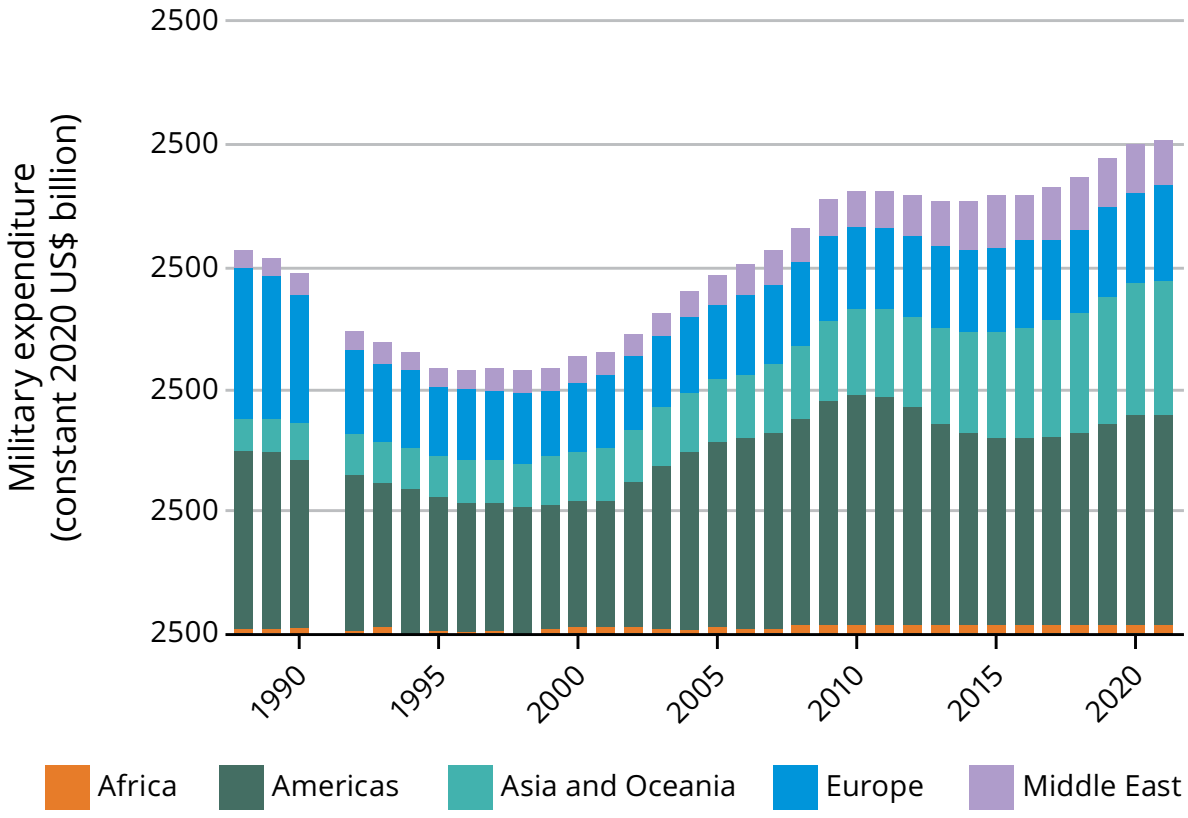
War significantly increases emissions. According to the Perspectives Climate Group and Tipping Point North South, 'emissions from the destruction of natural or man-made carbon stocks during wars can reach hundreds of million of tonnes CO_2 (t CO_2), as was the case with forest destruction in Vietnam and the burning of oil wells in Kuwait. Burning down a large city can emit up to 10 million t CO_2.' There are also indirect emissions that can result, including the rebuilding of infrastructure and cities that 'can easily exceed 100 million t CO_2' as well as changes to energy systems, market forces or policies in conflict-affected countries. 'A large conflict like the war in Ukraine is likely to be relevant in the short term, as the transition from domestically available fossil fuels will be

slowed down. In the medium term, the use of distributed renewables is likely to be accelerated, but large-scale international collaboration to develop large scale renewable sources in remote locations can suffer.'

Military spending since the Russian invasion of Ukraine

Global military spending has seen a steady upwards trend since the late 1990s, with a more recent surge since 2014, when Russia first invaded Ukraine (see Figure 1). In 2021, for the first time it passed $2 trillion ($2,000 bn). Spending levels are far higher than at the height of the Cold War. In the wake of Russia's full-scale invasion of Ukraine since February 2022, everything points to further sharp increases in the coming years.

Figure 1. Global military spending (1988–2021)



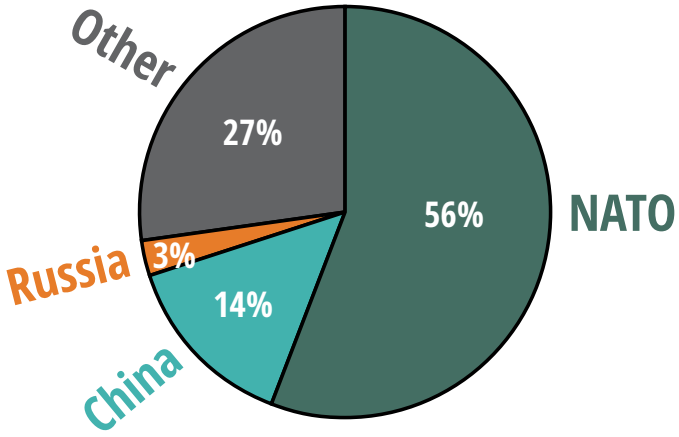
Source: SIPRI 2021

Russia's invasion of Ukraine and annexation of parts of its territory has prompted many Annex II countries to announce major increases in their military spending. Current NATO members, as well as aspiring members Sweden and Finland, renewed pledges to meet the NATO goal of military spending at least 2% of their Gross Domestic Product (GDP). The European Commission expects a spending boost by its 27 member states of at least €200bn, based on combining ad hoc extra funds and longer-term structural increases.[8] Germany is responsible for a major part of this increase, with a €100bn military investment, but other Annex II countries such as Belgium, France, Italy, the Netherlands and Spain have also announced billions of euros a year in additional military spending, as did the UK.[9]

The US has its highest military budget ever. In July 2022 the House of Representatives approved a $840bn bill for fiscal year 2023, which at the time of writing is awaiting debate in the Senate.[10] In April 2022, Canada announced the equivalent of an $8bn spending boost for the next five years.[11] The Japanese government pointed to the Russian invasion as well as to perceived threats from China and North Korea to argue for a sharp increase in military spending,[12] while the Government of Australia also made a decision to increase military spending, pushing it above 2% of GDP for the 2022–2023 financial year.[13] Though the government cited the war in Ukraine, this rise appears to be more influenced by geopolitical concerns about China.[14]

Russia's military budget has also sharply increased in the context of the war from $65.9 billion in 2021 to a planned $83.5 billion in 2023.[15] China announced a 7.1% increase military spending in March 2022, but this was planned prior to the full-scale invasion of Ukraine.[16] Still amid talk by Chinese leaders of needing to update equipment and with rising tension with the US in East Asia, military spending is likely to accelerate.[17]

Figure 2. World military expenditure (2021)

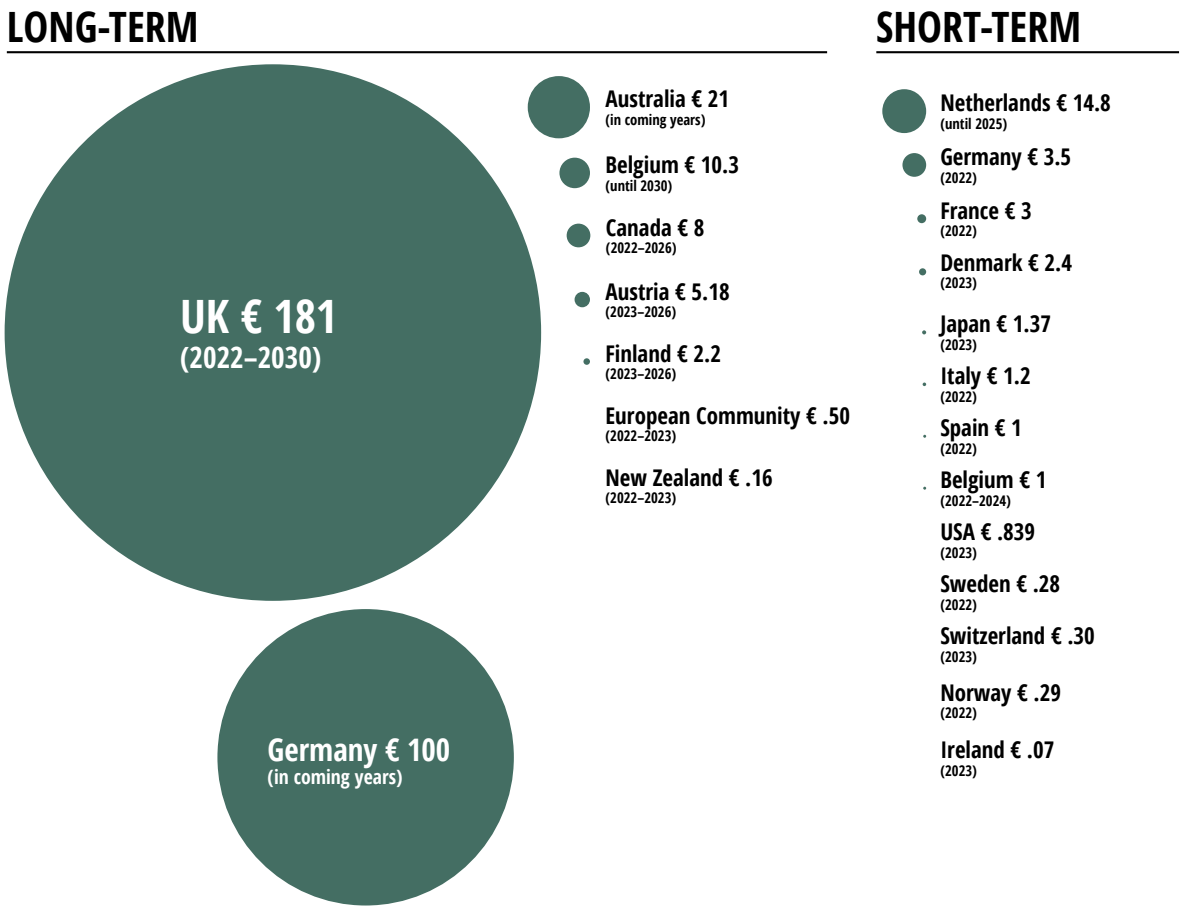


Source: SIPRI, Military expenditure database

In many cases the huge increases in military spending have been adopted with relatively little parliamentary or public debate. Governments generally provided little reason beyond citing Russia or NATO as a threat and claiming years of underspending, pointing to the agreement made at the 2014 NATO Summit by its member states to spend at least 2% of GDP. The increases have also taken place in a context where many governments are cutting back on other areas, including social spending as they recover from high spending commitments due to the pandemic and in the face of a growing economic crisis.

Even before Russia's invasion of Ukraine, the combined military expenditure of the 30 NATO member countries was 17 times more than Russia's (55.7%). US spending comprises 38% of global spending while the 27 EU countries combined spend almost four times as much as Russia, and the UK alone spending slightly more than Russia.[18] Militarily NATO is also far superior to Russia in terms of equipment and infrastructure.[19] Even if Russia were to align militarily with China, their combined military expenditure of 17% of the world total would still amount to less than half that of NATO's.[20] Were a determined effort by Russia to increase military spending it would take decades to equal the combined military might of the 30 NATO countries or even that of the US, by far the most significant member of the alliance.[21]

Figure 3. Announced extra military spending in billions of euros since the start of the Ukraine War (Annex II countries)



Source: upcoming report on military spending by TNI and Stop Wapenhandel

The big winner of this military spending bonanza is the arms industry. This was true before Russia's the invasion of Ukraine. The European Defence Agency (EDA) was reporting in 2021 that 'the procurement of new equipment has benefited most strongly from the overall increase in defence investments' in recent years.[22] SIPRI noted that 'the acquisition of new weapons systems' in the aftermath of the Ukraine war 'will probably be at the centre of these new spending plans'.[23]

After the 2022 intensification of Russia's invasion, and in particular the German announcement of €100bn extra spending, the share prices of large arms companies skyrocketed.[24] Apart from the additional expenditure, the war comes at exactly the right time to enable the military industry to place itself in a positive light in ongoing debates, pushing for and bringing in more money, fewer restrictions on arms exports and access to both private finance and raw materials. Arms companies are increasingly regarded as partners by governments and militaries, often giving their representatives a seat at the policy table.[25] At the same time, according to research by Scientists for Global Responsibility, 'the military technology industry in itself contributes considerably to the climate emergency'.[26]

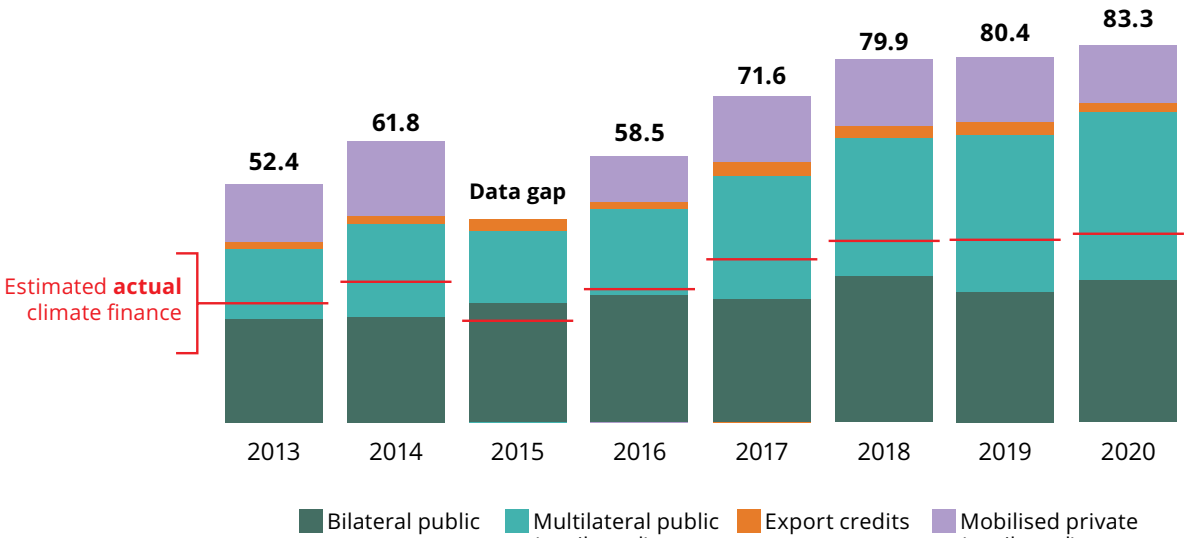
The increased expenditure will have major repercussions on GHG emissions, which will rise as more infrastructure and weapons are built and troops mobilised. Given the long life of much of this equipment, it will lock in carbon emissions just when the world needs to rapidly decarbonise. It may also divert funding from social spending, in particular climate finance, as the next section explores.

CLIMATE FINANCE VERSUS MILITARY SPENDING

Central to the UNFCCC Paris Agreement in 2015 was a promise by the richest countries first made in 2009 – the Annex II countries – to provide $100bn each year in climate finance to help the most affected countries mitigate and adapt to climate change. This promise has yet to be met.

Reported climate finance

Figure 4. Climate Finance 2013–2021



Source: OECD[27].

Estimated actual climate finance based on Oxfam International's Shadow Reports on Climate finance should have reached $100bn a year by 2020, but actual figures show a shortfall of $17.7bn and slow progress towards the target. While the UK presidency at COP26 in 2021 argued that the summit made 'significant progress towards the $100 billion goal', Donor Tracker said there were 'no major breakthroughs on the US$100 billion question' and that donors were 'unable to confidently assure low- and middle-income countries of their ability to fulfill the long-awaited US$100 billion commitment'.[28]

Actual climate finance

Worse still, almost half of the proposed climate finance is largely illusory. Oxfam International's examination of reported climate finance has found that much of it takes the form of loans rather than grants, adding to poorer countries' debt burdens.[29] Oxfam International's Shadow Reports on Climate Finance have shown a continuous trend of over-reporting for the years 2013–2019:

- 2013/14: 'Oxfam estimates the grant equivalent of this reported finance to be between $13–21bn. This means reported numbers may be up to three times higher than their net assistance value.'[30]

- 2015/16: 'Oxfam estimates the grant equivalent of reported public climate finance in 2015–16 at between $25bn and $26bn (annual average), which comes down to 50%–54% of reported finance.'[31]
- 2017/18: 'The net financial value of climate finance to developing countries – the grant equivalent – may be less than half of what is reported by developed countries.'[32]
- 2019: '70 percent of public climate finance was given out as loans instead of grants. This seems set to continue through to 2025 which will push developing countries into more debt.'[33]

Based on this, less than half of reported climate finance can actually be considered additional climate finance.

Moreover, research by CARE, a humanitarian non-government organisation (NGO), concluded that 'most of the public climate finance reported by rich countries is taken directly from development aid budgets. [...] By assessing the most up-to-date data reported to the UNFCCC, only 6 per cent of the climate finance provided from 2011 to 2018 is seen to be new and additional to rich countries' official development assistance commitments', contradicting agreements that climate financing should be additional and not at the costs of the Sustainable Development Goals (SDGs). CARE also warned that the share of reported climate finance being 'new and additional' is decreasing.[34]

Climate finance versus military spending

Because of the lag and some other gaps in reporting on climate finance, it is difficult to compare it with military spending for the whole of the period since 2013. Based on officially reported climate finance, military spending by Annex II countries on average was 14.9 times as high. There is no clear trend regarding this ratio, but for 2017 to 2020 it has fluctuated between 13 and 14 times.

TABLE 3. Reported climate finance versus military spending by Annex II countries (2013–2020) in $ billion

	2013	2014	2015	2016	2017	2018	2019	2020	Total*
Military spending	1,038.9	1,006.7	948.7	961.8	981.1	1,040.0	1,094.1	1,159.3	7,281.9
Reported climate finance	52.4	61.8	n/a	58.5	71.6	79.9	80.4	83.3	487.9
Ratio	19.8:1	16.3:1	n/a	16.4:1	13.7:1	13.0:1	13.6:1	13.9:1	14.9:1
Estimated real climate finance**	26.2	30.9	n/a	29.3	35.8	39.9	40.2	41.6	243.9
Ratio	39.7:1	32.6:1	n/a	32.8:1	27.4:1	26.1:1	27.2:1	27.9:1	29.9:1

** 2015 not included – sources: OECD, SIPRI, Oxfam International*
*** Based on average of 50%*

This does not give a picture of real climate finance, which according to Oxfam International adds up on average to less than half of what is reported. This means that a more realistic evaluation is that military spending by Annex II countries is at least 30 times as high as their actual spending on climate finance.

In the most optimistic scenario, as promoted by the UK government after COP26, the $100bn target will be reached in 2023 and then keep increasing so that it will even out at a total of $500bn for 2021–2025. Again, Oxfam International predicts a more realistic scenario, where reported climate finance will not surpass $95bn per year by 2025 and a shortfall of at least $75bn can be expected for 2020–2025.[35] There is no reason to assume that the difference between reported and actual climate finance has changed since 2020 or will do so in the coming years, which would leave climate finance at about half of the reported figures, so a maximum of $47.5bn by 2025.

Military spending by Annex II countries has, however, continued to grow since 2020, with sharp increases announced for 2022 and 2023 in the wake of the intensification of Russia's invasion of Ukraine. While it seems very likely that this trend will continue after 2023, it can also be expected that the curve will flatten somewhat, though geopolitical developments, such as increasing rivalry between China and the US, could spur even greater increases.

Given these two scenarios it seems likely that the average ratio between actual climate finance and military spending by Annex II countries will remain at around 1:30 for the foreseeable future, and that there is more chance of it going up rather than down. This also means that the nominal gap between military spending and climate finance will widen further. The spending increase of €100bn announced by the German government alone is already higher than the annual climate finance provided by all Annex II countries combined.

Will increases in military spending affect climate finance?

Several development aid and environmental civil society organisations (CSOs) have warned that the rapid increases in military spending may be at the expense of already insufficient climate finance. Vitalice Meja from Reality of Aid Africa has said: 'Donors must allocate additional resources towards Ukraine and not simply by militarising aid or shifting budget items and priorities from other global development challenges in response the War in Ukraine. […] They must secure sustainable climate finance and development resources to address the rising cases of inequality, extreme hunger and poverty'.[36] Nisreen Elsaim, chair of the UN Secretary General's youth advisory group on climate change, was very critical of governments prioritising military support to Ukraine over climate finance: 'Of course climate finance will be impacted and this is a huge mistake because while the Ukrainian war is happening, climate change is also happening. Climate change doesn't stop just because there's a war here or there's a conflict there'.[37]

The impact of increased military spending on climate finance needs to be assessed over a longer period. In the UK it is already happening: in June 2022 the government announced that it would shift underspending from its climate finance budget to partially finance a £1bn military support package for Ukraine.[38] The Norwegian government has suspended all development cooperation payments, including climate finance, to get an 'overview' of the potential consequences of the war in Ukraine'.[39] The Dutch government made cuts from its own climate funds – not including climate finance – to pay for new increases in military spending.[40]

Experts on military emissions have pointed out that '[t]he combination of the upward trend in military expenditure to reach the NATO target of 2% of GDP, technology modernisation programmes, and NATO/ EU deployments outside of Europe all risk fuelling an increase in emissions'.[41]

Arms exports and military assistance

While climate finance falls short of promises, and more still of what is actually needed, Annex II countries apparently see no problem in flooding the world with arms. They make up the majority of the top 10 largest arms exporters for the 2013–2021 period, and all but a few are listed in the top 50 (see Table 4).

TABLE 4. Top arms exporters (2013–2021)

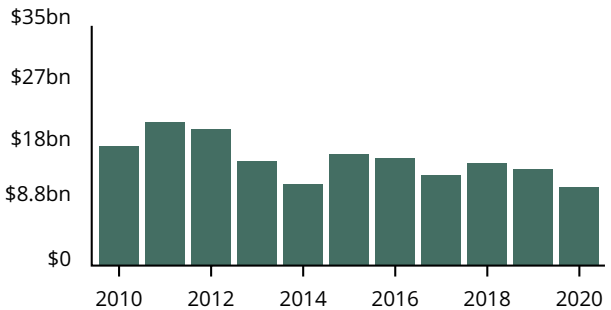
Rank	Country	% of global total of arms transfers
1	United States	35.7
2	Russia (non-Annex II)	20.5
3	France	8.9
4	China (non-Annex II)	5.5
5	Germany	5.2
6	United Kingdom	3.9
7	Italy	2.8
8	Israel (non-Annex II)	2.6
9	Spain	2.5
10	South Korea (non-Annex II)	2.0
Annex II countries:		
11-20	Netherlands, Sweden, Switzerland, Canada, Australia, Norway	0.4–1/8
21-30	Finland, Portugal, Belgium	0.1–0.2
30-40	Denmark, Austria	<0.1
40-50	Ireland, Greece	<0.1
>50	New Zealand, Japan	<0.1
No major arms transfers: Iceland, Luxembourg		

Source: SIPRI, Arms Transfers Database

The US is by far the world's largest arms exporter, while the 27 EU countries combined can be ranked second. Annex II countries accounted for 64.6% of the total value of international arms transfers (2013–2021). Their many clients include many low- and middle-income countries (L&MICs).[42] As well as facilitating arms sales, Annex II governments also donate money, arms and security equipment to L&MICs, as well as other forms of military and security cooperation, including training and consultancy firms.

The US Foreign Military Financing (FMF) is the largest military assistance programme, mostly used to fund arms transfers. Major recipients since 2013 include Egypt, Israel and Pakistan. Afghanistan and Iraq receive funding through separate programmes.

Figure 5: US Foreign Military Financing (FMF): 2010–2020



Calculated in constant dollars. Source: https://foreignassistance.gov/aid-trends

The EU and its member states are also expanding funding, donations of military equipment and military and police cooperation agreements with neighbouring countries, to help further border externalisation and migration control and for counter-terrorism operations. During the current EU budget cycle – the Multiannual Financial Framework (2021–2027) – for the first time the EU can fund the donation of arms to non-EU-countries, under the off-budget European Peace Facility (EPF).[43] In 2022, most of its budget has been used to arm Ukraine, but its initial focus was primarily on countries in Africa.[44] NGOs have been very critical of the EPF, warning that '[e]vidence from the recent past shows that the military and security assistance measures foreseen to be funded by the EPF are likely to contribute to the escalation of conflict, in particular in fragile and conflict-affected settings' and that '[t]he type of weapons most likely to be transferred under the new instrument – including small arms, light weapons and ammunition – are also at greatest risk of misuse and diversion"[45]

Russia and China are the most significant non-Annex II arms exporters, making up 20.5% and 5.5% of global arms exports respectively.

Each of these sales of arms and equipment has its own carbon cost, from the extraction of raw materials, through to production by arms companies, their use by armed forces, decommissioning and end-of-life disposal.

Arms sales to climate-vulnerable countries

Annex II countries export arms to countries worldwide, including the most vulnerable to climate change. Many of the 40 most vulnerable countries, according to the ranking of the Notre Dame Global Adaptation Initiative (ND-GAIN),[46] are smaller and impoverished countries, but the list also includes large arms purchasers, such as Pakistan and Bangladesh. All of these countries have bought arms from Annex II countries in the 2013–2021 period, even if some are the target of UN and/or EU arms embargoes (currently Afghanistan, Central African Republic, Myanmar, Somalia, Sudan, Yemen and Zimbabwe).[47]

Russia and China, the second and fourth biggest arms exporters, also export to climate vulnerable countries and are notorious for ignoring international arms embargoes. Between 2013 and 2021, China has exported to 21 and Russia to 13 of the world's most climate vulnerable countries.[48]

This not only diverts resources that are needed to mitigate and adapt to the consequences of climate change, such arms exports also run the risk of fuelling conflicts, repression and human rights violations for populations most affected by climate change. Many of the most vulnerable countries are involved in armed conflicts or are governed by authoritarian regimes. While existing evidence shows no causal link between climate impacts and conflicts, the likelihood is much greater if the response to extreme weather events and their social impacts is militarised and repressive.[49] An EU-funded study of conflicts in the Mediterranean, Middle East and Sahel showed, for example, that the principal causes of conflict across these regions were not hydro-climatic conditions, but rather democratic deficits, distorted and unjust economic development and poor efforts to adapt to climate change that exacerbated the situation.[50] Arms sales contribute to worsening these trends, strengthening repressive regimes, undermining democratic unaccountability, and fuelling conflicts.

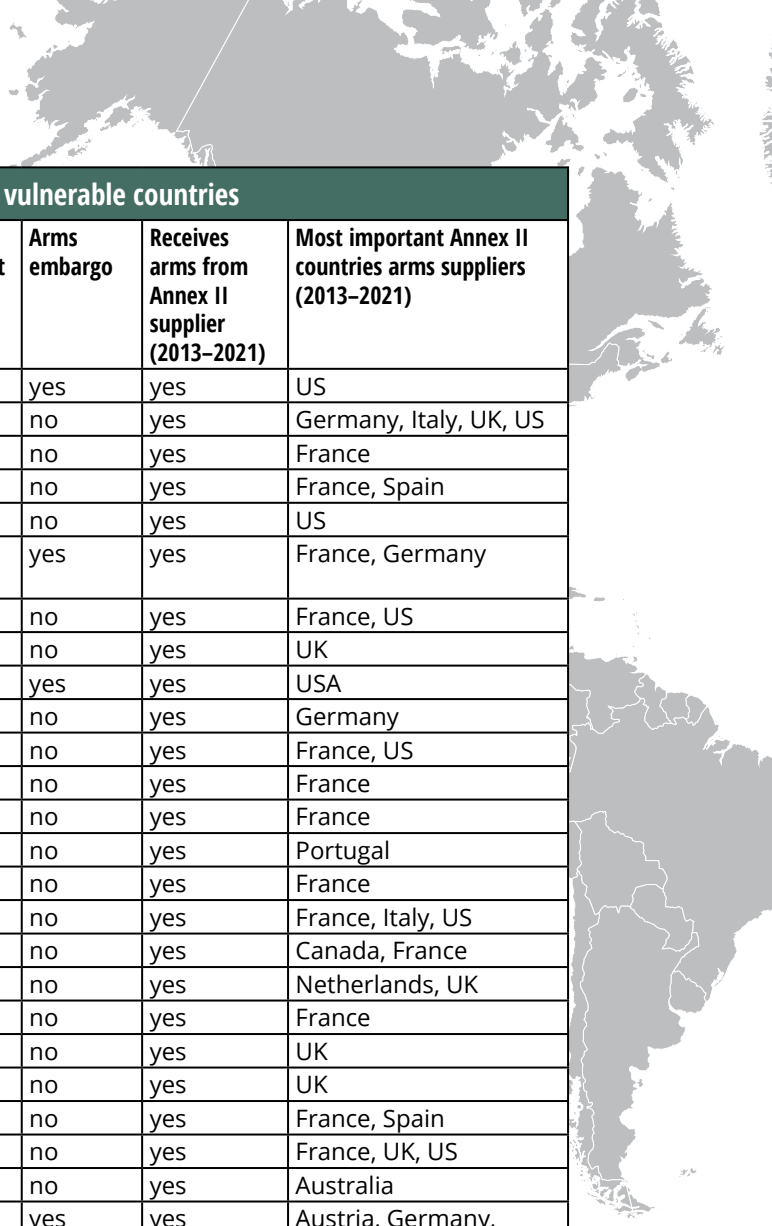
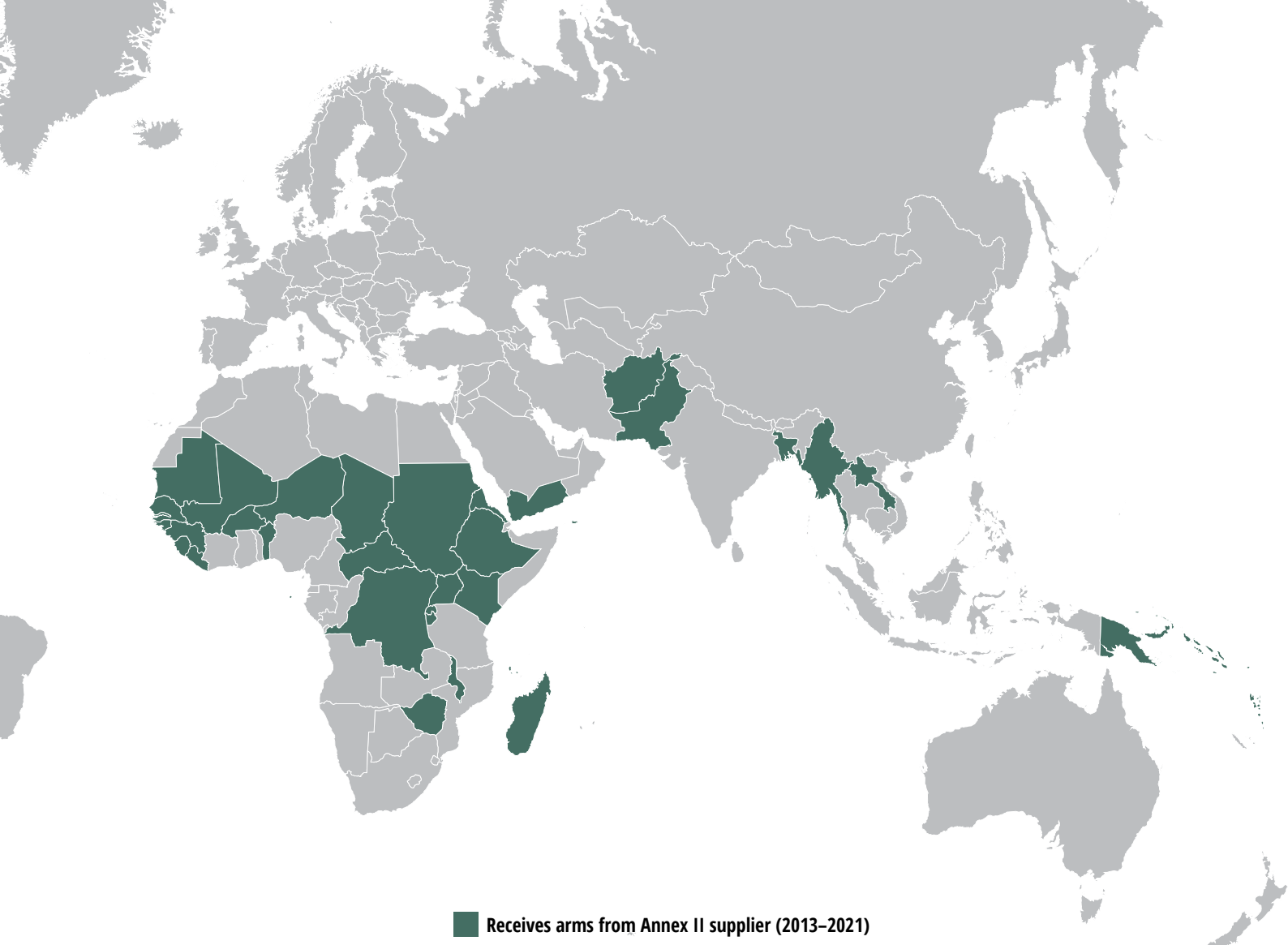


TABLE 5. Annex II countries arms exports to the most vulnerable countries

Country	Armed conflict	Democracy Index	Human Development Index	Arms embargo	Receives arms from Annex II supplier (2013–2021)	Most important Annex II countries arms suppliers (2013–2021)
Afghanistan	yes	authoritarian	low	yes	yes	US
Bangladesh	no	hybrid regime	medium	no	yes	Germany, Italy, UK, US
Benin	no	hybrid regime	low	no	yes	France
Burkina Faso	yes	authoritarian	low	no	yes	France, Spain
Burundi	no	authoritarian	low	no	yes	US
Central African Republic	yes	authoritarian	low	yes	yes	France, Germany
Chad	no	authoritarian	low	no	yes	France, US
Comoros	no	authoritarian	medium	no	yes	UK
DR Congo	yes	authoritarian	low	yes	yes	USA
Eritrea	no	authoritarian	low	no	yes	Germany
Ethiopia	yes	authoritarian	low	no	yes	France, US
Gambia	no	hybrid regime	low	no	yes	France
Guinea	no	authoritarian	low	no	yes	France
Guinea-Bissau	no	authoritarian	low	no	yes	Portugal
Haiti	no	authoritarian	low	no	yes	France
Kenya	yes	hybrid regime	medium	no	yes	France, Italy, US
Laos	no	authoritarian	medium	no	yes	Canada, France
Liberia	no	hybrid regime	low	no	yes	Netherlands, UK
Madagascar	no	hybrid regime	low	no	yes	France
Malawi	no	hybrid regime	low	no	yes	UK
Maldives	no	n/a	high	no	yes	UK
Mali	yes	authoritarian	low	no	yes	France, Spain
Mauritania	no	hybrid regime	medium	no	yes	France, UK, US
Micronesia	no	n/a	medium	no	yes	Australia
Myanmar	yes	authoritarian	medium	yes	yes	Austria, Germany, Netherlands
Niger	no	authoritarian	low	no	yes	France, US
Pakistan	yes	hybrid regime	low	no	yes	France, Germany, Italy, UK, US
Papua New Guinea	no	flawed democracy	medium	no	yes	Australia
Rwanda	no	authoritarian	low	no	yes	UK, USA
São Tome & Principe	no	n/a	medium	no	yes	Portugal
Senegal	yes	hybrid regime	low	no	yes	France, Italy, Sweden, US
Sierra Leone	no	hybrid regime	low	no	yes	France, UK
Solomon Islands	no	n/a	medium	no	yes	Australia
Somalia	yes	n/a	n/a	yes	yes	Germany, UK
Sudan	yes	authoritarian	low	yes	yes	Germany
Tonga	no	n/a	high	no	yes	Australia
Uganda	no	hybrid regime	low	no	yes	France, US
Vanuatu	no	n/a	medium	no	yes	Australia
Yemen	yes	authoritarian	low	yes	yes	USA
Zimbabwe	no	authoritarian	medium	yes	yes	UK

Sources: Geneva Academy of International Humanitarian Law and Human Rights – Rule of Law in Armed Conflicts (RULAC) portal (https://www.rulac.org/); EIU – Democracy Index 2021 (https://www.eiu.com/n/campaigns/democracy-index-2021/); UNDP – Human Development Index 2021/2022 (https://hdr.undp.org/system/files/documents/global-report-document/hdr2021-22overviewenpdf.pdf); SIPRI arms embargoes database (https://www.sipri.org/databases/embargoes); SIPRI arms transfers database (https://sipri.org/databases/armstransfers); EEAS – arms exports database (https://webgate.ec.europa.eu/eeasqap/sense/app/75fd8e6e-68ac-42dd-a078-f616633118bb/sheet/74299ecd-7a90-4b89-a509-92c9b96b86ba/state/analysis)



Annex II countries have sold to all 40 of the most climate-vulnerable countries since 2013, of which 13 are involved in armed conflicts, 20 have authoritarian regimes and 25 are among the countries with the lowest levels of human development. It appears that although the richest countries fail to address climate change and falter in providing climate finance, they have no problem with fuelling future conflicts that may result from increased climate instability.

CASE STUDY
Egypt and COP27: greenwashing a military state

Egyptian military police in Cairo streets. Credit: Gigi Ibrahim/Flickr (CC by 2.0)

Egypt is a revealing and symbolic case study of how military interests dominate over climate action. It is certainly telling that at a time when climate action requires popular participation, equity and justice, the UNFCCC has allowed a repressive military regime to host COP27 in November 2022.

Egypt has spent nearly $50bn on purchasing weapons since 2014, soon after the military returned to power in a coup that crushed the 2011 popular revolution. Since 2017, it has been one of the top five arms-importing countries, receiving 5.7% of global arms imports between 2017 and 2021.[51] Marketing its role in border control, the fight against terrorism, energy provision and its significance in the global shipping economy, sales of arms to Egypt increased after the coup (between 2016 and 2020) by 225% compared to the years 2011 to 2013. Between 2017 and 2021, Russia has been the largest seller to Egypt (41% of major arms sales), followed by France (21%) and then Italy (15%). The USA, which was Egypt's largest arms supplier between 1977 and 2016, in the last four years accounted for only 6.5% of Egyptian arms imports, making it the fifth largest supplier of major arms to Egypt.[52]

Other significant European players include Germany, which exported arms worth €4.33 bn[53] in 2021, making Egypt its largest arms market. These deals have included significant deliveries of equipment as well as training. Egypt is also an important partner for Germany in police and security cooperation.

Arms sales to Egypt by Annex 2 countries plus Russia

France: In two major deals, Egypt paid €5.2bn (2015) and €4.2bn (2021) to French arms companies for the following: a Mistral helicopter carrier, two FREMM frigates, four GOWIND corvettes (two of the ships were assembled in a shipyard in Alexandria), 24 Rafale fighter planes (Dassault, so far partially delivered), missiles, and spy software (Amesys) to Egyptian security agencies.[54]

Germany: In 2021 alone, Egypt bought German weapons worth €4.33bn, 45% of total German arms sales that year. Purchases included four submarines (three of which had been delivered by November 2019), two MEKO-200 frigates (ThyssenKrupp Marine Systems) and missiles (Diehl Defense). [55]

Italy: Sold 4 FRAME frigates, 20 coastal multi-mission ships, 24 Eurofighter Typhoon fighters, 24 Aermacchi M346 light combat and training aircraft, and a satellite for reconnaissance and radar imaging, as part of a procurement deal worth more than € 9–12 billion.[56]

Russia: Provided MiG-29 fighters, K52 Alligator helicopters, 124 attack helicopters, giant IL-67 aircraft and various air defence systems, in addition to more than 20 Su-35 fighters in a deal worth $ 2 bn. [57]

US: Since 1978 the US has provided Egypt over $50bn in military assistance.[58] This has both helped pay for equipment and encouraged purchases. During 2022 alone, three huge arms deals, including American F47 Chinook helicopters, were announced worth a total value of nearly $6 bn. [59]

According to SIPRI, the arms deals are typically paid with a 50% down payment and rest paid over five years, with some also supported by military aid.[60] This has significantly added to Egypt's annual debt payments of $1.6bn.[61]

In 2022, the arms sales have continued, despite coinciding with global inflation, currency devaluation, the rise in the price of bread and fuel, and further cuts in government subsidies.

Some of the equipment and training provided by France, Germany and Italy is tied to border security objectives, which the EU has increasingly prioritised with other countries across the Mediterranean. A TNI and StopWapenhandel report, Expanding the Fortress, revealed that the EU has prioritised agreements with 35 countries in recent decades, more than half of them run by governments which are authoritarian, known for human rights abuses and with poor human development indicators.[62] Egypt has been prioritised for funding as European member states

regard it as a 'back door' to Europe for migrants from Somalia, Sudan and Ethiopia. Egyptian security forces have not hesitated to kill migrants trying to cross its borders, but this has not stopped cooperation despite the EU's professed support for human rights.[63]

In 2019, the EU border protection authority Frontex intensified its cooperation with Egypt,[64] receiving €4 million under the Instrument contributing to Stability and Peace/DG DEVCO and a further €4 million from EU4BorderSecurity, a project which seeks to enhance border security in North Africa and the Levant.[65] In September 2022, after an increase in sea crossings from Egypt to Italy, the European Commission announced that €23 million would be allocated in 2022 and €57 million in 2023 to provide equipment and services to Egyptian authorities for 'search and rescue and border surveillance at land and sea borders'.[66]

None of these agreements or negotiations with Egypt is transparent or democratically accountable. For example, in 2016, Egypt signed agreements with Germany to collaborate on economic, development, enhance security cooperation and police training, and develop strategies to militarise its borders, all described as 'immigration management'. Details were only revealed in April 2017 once they had been adopted by the German Bundestag and so became public.[67]

The strengthening of Egypt's military and security forces will almost certainly worsen the repression of civil society. Since taking office in 2013, Sisi's regime has relentlessly silenced dissenters and clamped down on independent organisations.[68] Travel bans and asset freezes are regularly used to stifle the activities of human rights activists as well as mass arrests, detentions and prison sentences.[69]

It has also strengthened a state and economy that is increasingly shaped and controlled at every level by the military, which not only permeates every levels of state bureaucracy, but also controls large sectors of the economy. This was already the case under Egypt's former president Mubarak but was intensified by Al-Sisi who made the Ministry of Military Production a prominent pillar of the Egyptian military economy, involved in both military and civilian industries and supported through state-owned banks and public procurement.[70] Military enterprises use poorly paid conscript labour (on $17–28 a month) and do not pay taxes, thus allowing them to undercut private-sector firms, and even state-run enterprises.[71] The armed forces also have de facto control over all undeveloped non-agricultural land in Egypt, or about 87% of the country.[72] One of these tracts is a 4.5 million m2 area in Cairo, which is being turned into an exclusive luxury housing-golf-mall complex, funded with Gulf money.[73] 'We're dealing with a brand-new economy that's now run by "Military Inc."', according to Joshua Stacher at Kent State University who has studied Egypt's military economy.[74]

Moreover, Egypt has increasingly become a node in the widespread circulation of small arms in the region.[75] Not only is it a country where European arms get re-routed, Egypt also has its own established defence industry that produces a range of products from small arms to armoured vehicles and naval vessels. This includes the licensing and co-production of certain arms in collaboration with other countries, including the US.[76] Egyptian weapons are therefore part of the illegal arms trade in Libya. There are also numerous reports of international arms trafficking originating from, or transiting through, Egypt, such as the seizure of ammunition and weapons on a North Korean ship that docked in the Egyptian port of Sokhna in August 2016. The final

destination for these weapons was not clear, but Egypt is close to a number of regional conflict hot spots that could have been the intended destination.[77]

The militarisation and secularisation of Egyptian society is the backdrop for COP27, where civil society will be heavily monitored, and Egyptian activists effectively excluded. UN-appointed experts criticised the Egyptian government for imposing a wave of restrictions that jeopardise the 'safety and full participation' of individuals and organisations wishing to attend the international climate summit in Nonmember 2022.[78]

The government certainly cannot boast about its own climate credentials, given its responsibility for a host of environmental violations including the removal and destruction of public parks, urban encroachment on large areas of agricultural land, oil leaks on the coasts, systematic uprooting of trees in old neighbourhoods of Cairo and other cities, and construction near the shore in Alexandria.[79] Egypt is also scrambling to attract foreign investment in oil and gas production, and has entered into deals for fossil fuels worth $74bn since 2014, including with US companies like ExxonMobil and Chevron.[80] In 2019, thanks largely to the 2015 discovery of large offshore gas deposits, Egypt became a net energy exporter,[81] and the country is now jockeying for position in the global race to supply liquified natural gas to Europe.[82]

Similarly, while Egypt is among the countries most affected by climate change, the state has failed to develop effective climate adaptation plans. Egypt faces reduced crop yields, food insecurity, and water stress, with rising sea levels also threatening coastal populations and those living in the Nile Delta.[83]

Given a major global major shift to military spending and military infrastructure, Egypt looks increasingly as though it is in a dystopian endgame. A highly repressive militarised security state, serving a few powerful interests, treating climate as a PR exercise and where those most vulnerable receive little support to cope with an escalating climate crisis.

CAN THE MILITARY GO GREEN?

In recent years, the world's most powerful armed forces have increasingly claimed their commitment to climate action. Since 2008, many Annex II countries have announced climate security plans, stating how their military seeks to reduce GHG emissions and prepare for climate instability.[84] Seventeen of the 24 Annex II countries are members of NATO, which was the latest to announce its Climate Action and Security Plan in 2021. The plan called climate change 'one of the defining challenges of our times' and promised 'sustained political ambition' to address it.[85] Many of these plans are also being used to justify increased military spending, arguing that it is necessary to address the new 'security' challenges posed by climate instability. NATO states that it intends to reduce its high levels of GHG emissions without compromising on its military effectiveness.

TABLE 6. Correlation of NATO and Annex II countries

Annex II	NATO	Annex II	NATO
Austria	–	Switzerland	–
Australia	–	United Kingdom	+
Belgium	+	United States	+
Canada	+	Albania	+
Denmark	+	Bulgaria	+
Finland	–	Croatia	+
France	+	Czech Republic	+
Germany	+	Estonia	+
Greece	+	Hungary	+
Ireland	–	Iceland	+
Italy	+	Latvia	+
Japan	–	Lithuania	+
Luxembourg	+	Montenegro	+
Netherlands	+	North Macedonia	+
New Zealand	–	Poland	+
Norway	+	Romania	+
Portugal	+	Slovakia	+
Spain	+	Slovenia	+
Sweden	–	Turkey	+

So far, however, there is very little transparency regarding existing military GHG emissions, let alone clarity on how they seek to reduce emissions. Researchers at CEOBS and Concrete Impacts – published at militaryemissions.org – have found little publicly available data and significant under-reporting of emissions.

NATO Secretary General Stoltenberg announced GHG emission-reduction targets of 45% by 2030 and 'net zero' in 2050.[86] This applies only to NATO as such, as emission-reduction targets for the armed forces of its 30 (soon to be 32) member states fall within their national competence. NATO says it has developed a methodology to measure its emissions, but has kept it secret, saying that transparent military emission figures would reveal strategic information.[87]

In most national military climate-related strategies, reduction targets are vague and undefined. France claims to have reduced its military bases' consumption of fossil fuel by 22% since 2010 and commits to further reductions of 30%.[88] But no targets are set for its operational fuel consumption, which is assumed to cover 75% of military energy consumption. The UK's 2021 Defence Climate

Change and Sustainability Strategic Approach sets no reduction targets apart from 'contributing to the achievement of the UK legal commitment to reach net zero emissions by 2050'.[89] In late 2021, the Royal Air Force (RAF) announced a 'NetZero ambition' by 2040 for its GHG emissions, including measures to reduce emissions and to offset them – but no further details have been published on how this would be achieved.

The US military, which as we have noted is the world's largest institutional GHG emitter, has developed adaptation plans for its facilities, infrastructure and workforce allowing for different scenarios including a rise in sea level of up to 2.5 metres by 2100.[90] The US Army, Navy and Air Force have published climate action plans to meet the government's 'Net Zero by 2050' target.[91] It remains to be seen if these will be included in an anticipated comprehensive climate mitigation and sustainability plan expected from the Department of Defense in late 2022.

The US Army, Navy and Air Force plans primarily set targets to adapt facilities and reduce emissions for non-combat and smaller military platform systems, to be achieved through hybridization and electrification and alternative lower-carbon fuels. However for the bigger military platforms, the backbone of US global military dominance, plans are vague, with the Navy committing only to 'explore options' for lower-emission propulsion and the Air Force seeking to use 10% of 'sustainable' aviation fuel blends, but only if it is available at the same or less cost than traditional aviation fuel. Also lacking are standardisation agreements (STANAGs) on common technical and operational procedures and equipment aimed at emission reduction. This creates problems because if different member countries develop 'cleaner' systems based on different technologies, this would impair NATO's standardisation efforts. All this suggests that low-emission mobility and equipment is not yet taken seriously.

Beyond ill-defined emission targets on fuel and energy use, there is no evidence that any military forces are adequately examining emissions through the whole military establishment. Researchers at the universities of Durham and Lancaster have noted that a true picture of military emissions needs to go far beyond fuel use to include the whole military chain from arms production to logistical supply chains to post-war recovery.[92]

Obstacles to reduction of emissions

The frequent references to 'net zero' emissions raise alarm bells about whether the military can really reduce emissions at the same time as budgets rise. As many climate scientists have noted, 'net zero' plans are based on flawed assumptions that emissions in one area – in this case, say, fighter jets' vast use of petrol – can be balanced out through carbon sinks, such as forests or carbon-capture projects. But the technologies for carbon capture do not exist at scale, and the land required for carbon sinks would require up to 80% of cultivated land, which at a time of food shortages is clearly untenable. As three prominent climate scientists have argued, 'net zero' is based on a 'fantasy' to avoid difficult decisions about reducing carbon emissions, 'driven by a need to protect business as usual, not the climate'.[93]

Most military announcements on climate action cite examples of replacing fossil fuels on military bases by implementing energy efficiency measures, electrification and on-site renewable power generation. On-site nuclear production is also proposed, based on small-modular reactors, known

as SMRs, especially for military bases on remote locations.[94] These could, however, produce as much as 30 times more waste than conventional atomic power plants, making them costlier and creating storage and nuclear proliferation problems.[95]

F35-A fighter jet consumes about 5,600 litres of oil per hour of flight. Credit: Airwolfhound/Flickr (CC BY-SA 2.0)

Emission-reduction measures on military installations and bases are comparatively easy actions. The major obstacle to a 'real zero' target is that most of military emissions come from mobility and equipment used in operations and exercises, which in some cases accounts for up to 75% of all of military energy consumption[96], about 70% of which consists of jet fuel, followed by naval propulsion fuel and, to a lesser extent, land-based vehicles.[97] New generations of weapon systems are even more polluting, such as the F-35A fighter jets which consume about 5,600 litres of oil per hour of flight, compared to 3,500 litres for the F-16 engine.[98] As military systems have a lifetime span of 30 to 40 years, this means locking-in very polluting systems for many years to come.

The military and civilian sectors face the same problems: alternatives to propulsion fossil fuels are limited, expensive, or unsustainable,[99] and many also require major changes to infrastructure and equipment. Moreover, liquid fossil fuels, such as diesel and gasoline, have a high energy density, which means a lot of energy in relation to volume and weight. Other fuel sources might need compromises in military platforms and weapon systems on speed, agility, or space for personnel and armaments.[100]

There are attempts to look for different fuel sources, such as alternative liquid fuels, biofuel or synthetic fuel, which would not require entirely new engines or refuelling systems. The problem is availability; production is still limited and civilian demand is also increasing. Moreover, large-scale plantation-based production of biofuel is far from sustainable. It is harmful to biodiversity, has been associated with displacement and violence in many regions, threatens local livelihoods,

and competes with the cultivation of food crops.[101] Hydrogen is another potential source of energy, but is only sustainable when generated from renewable sources and has considerable environmental costs such as very high use of water.[102]

Electrification is also being explored. At the 2022 Eurosatory arms fair, for example, several hybrid or electric armoured personnel carriers were on show based on civilian car technology.[103] But difficulties in recharging during operations will probably mean hybrid systems or the use of hydrogen. Again the military is competing with civilian demand. For the foreseeable future (i.e. the short time available to keep the planet below the agreed 1.5°C rise) there might not be enough renewable electricity to meet all civilian and military demands.

Reduction of GHG emissions sufficient to keep the planet safe will require reduction in energy demand, particularly among the richest nations, and the provision of accessible renewable energy to the those who lack it – something rising military spending will not achieve.

Military goals above climate goals

Despite its climate announcements, NATO remains a military alliance and therefore openly prioritises military interests over climate goals. For NATO, *national* strategic security interests are paramount even in the face of a *global* climate emergency. 'We cannot compromise our military effectiveness', says NATO Secretary General Jan Stoltenberg. 'NATO is about preserving peace through a credible deterrence and defence. Nothing is more important. If we fail to preserve peace, we will also fail to fight climate change.'[104] His comments were echoed by US Secretary of the Air Force Frank Kendall at the presentation of the Air Force climate action plan in October 2022: 'Make no mistake – the department's mission remains to fly, fight, and win, anytime and anywhere. We are focused on modernization and improving our operational posture relative to our pacing challenge: China. We remain ready to respond and achieve air and space dominance when and where the nation needs us'.[105]

Indeed, the subservience of climate to military goals was made very clear, when in December 2021 the Biden Administration issued an executive order mandating federal agencies to be 'leading the Nation on a firm path to net-zero emissions by 2050', yet exempted national security agencies. Specifically, the order stated, 'To the maximum extent practicable and without compromising national security, each agency shall strive to comply with the purposes, goals, and implementation steps in this order.'[106]

As a result, much of the military's 'green' efforts remain centred on improving military effectiveness. Reducing fossil-fuel use is primarily driven by reducing armed forces' vulnerability to dependence on fuel as it is addressing climate change. Between 2003 and 2007, an estimated 3,000 US soldiers were killed or wounded in attacks on fuel-supply convoys to remote bases in Afghanistan and Iraq.[107] Russia's intensified invasion of Ukraine in 2022 similarly discovered the costs of fuel dependence, when its march to Kyiv was stalled in part by hampered fuel supply.

The war on Ukraine has shown that climate goals are quickly abandoned in the face of military objectives. Military spending and weapon sales have boomed, with no regard to climate costs.[108] In 2022 alone, 476 of the most gas-guzzling fighter jets, the F-35, have been ordered – 24 for

the Czech Republic, six more for the Netherlands on top of prior orders, 35 for Germany, 36 for Switzerland and 375 for the US. A June 2022 European Parliament response to the EEAS climate change and defence roadmap is wishful thinking when it '[u]nderlines that an increase in defence expenditure should, while bearing in mind the necessity to maintain the level of ambition of our armies, not lead to an increase in emissions (...)'.[109]

In the wider context, it is impossible to disentangle the world's most powerful armed forces from their role at the heart of the current fossil-fuel economy and more broadly an unsustainable system of production and consumption, nor from imperial objectives of maintaining dominance over regions of the globe. Since colonial times, the primary role of the military in some European nations and the US besides defence has been to secure or maintain access to key raw materials and to control sea and supply routes, by force or the threat of force. Examples from post-war history include the 1953 US and British-sponsored overthrow of the democratically elected government of Mosaddeq in Iran after it nationalised the Anglo-Iranian Oil Company and the 2003 overthrow and summary execution of Iraqi dictator Saddam Hussein.

Protection of western interests is also outsourced to the armed forces of third-country governments by supplying them with weapons. Arms sales guarantee long-time loyalty as they create dependencies for upgrades, spare parts and training. An additional advantage is that western governments can 'plough back' their expenses on fossil fuels with the profits from arms exports.[110] Oil-rich Saudi Arabia, the United Arab Emirates and Algeria are high on the client list of western arms-exporting countries, as is Egypt which controls the Suez Canal, the quickest sea route between Asia and Europe, through which about 15% of global shipping traffic moves.[111] For decades Egypt has been one of the largest recipients of US Foreign Military Financing (FMF), receiving $1.3bn a year between 1987 and 2019 approximately 25% of all US annual FMF worldwide.[112] Egypt is among the top 10 importers of arms, with a total of $22bn worth bought between 2010 and 2020.[113] *See case study on Egypt on page 20.*

Despite the recent attention to climate issues, it is noteworthy that NATO's 2022 Strategic Concept's main ambition is not to respond to the climate crisis, but rather to maintain US-led hegemony.[114] It refers to countering Russia, the 'most significant and direct threat to Allies' security and to peace and stability in the Euro-Atlantic area' and China, a 'systemic competitor' which 'seeks to control key technological and industrial sectors, critical infrastructure, and strategic materials and supply chains'. NATO's description of China echoes its own stated goals in its 2010 Strategic Concept to 'develop the capacity to contribute to energy security, including protection of critical energy infrastructure and transit areas and lines, cooperation with partners, and consultations among Allies on the basis of strategic assessments and contingency planning'.[115] Only in the case of NATO it is called 'protection' and 'security' whereas China wants to 'control'.

Climate security, where it is mentioned, is similarly pitched in terms of strategic control, a 'threat multiplier' that will affect national security interests. Indeed, much of the climate-related military planning by NATO allies is concerned with ensuring their forces can operate amidst sea-level rise and extreme weather events. NATO needs better understanding of and adaptation to climate change, according to Stoltenberg because it 'deeply affects the environment in which our women and men operate'.[116]

Adaptation for NATO also means seizing opportunity: it is extending its military presence in the Arctic, where the melting ice cap opens new options for raw material and rare earth elements mining. Military forces are also playing an increasing role in disaster relief after floods and storms, militarising tasks that could carried out by civilian authorities. Combined with an increasing militarisation of borders,[117] this creates the risk of armed forces being involved increasingly in managing populations as climate disasters escalate.

All of this points to NATO's military forces increasing their carbon bootprint, in terms of spending, infrastructure and emissions. It also suggests an increasing militarisation of the world and inter-state rivalry at a time when the climate crisis demands global cooperation. As Lindsay Koshgarian, programme director at the National Priorities Project, remarked: 'There is no such thing as sustainable global military hegemony'.[118]

HOW DIVERTED MILITARY SPENDING COULD BENEFIT THE MOST CLIMATE-VULNERABLE COUNTRIES

While military spending booms at the same time as the richest countries continue to stall on climate finance, the poorest countries are left ill-resourced to face the harshest impacts of climate change. Again, Russia's war against Ukraine has made this situation worse. Rises in food and energy prices as well as increased interest rates on top of the legacy of pandemic have pushed many L&MICs into severe debt difficulties. A survey of 55 of the most climate-vulnerable countries had already seen debts rise from $464bn in 2015 to $570bn in 2018 and $686bn in 2020.[119] This will only worsen as the war drags on. Jubilee Debt Campaign warned in January 2022 that 14 countries are at risk of both a public and private debt crisis, 22 of a private-sector debt crisis, and 21 of a public-sector debt crisis.[120]

Meanwhile the impacts of climate-change fuelled catastrophes are already wreaking severe economic and social costs. In August 2022, Pakistan suffered unprecedented floods that affected more than 33 million people, destroyed 1.7 million homes and wiped out harvests. Models developed by the World Weather Attribution initiative suggest that climate change may have may have increased the intensity of rainfall by up to 50%.[121] Pakistan is responsible for around 0.6% of the world's CO2 emissions.[122] The country's planning minister said initially that the cost of recovery would be at least $10 bn[123] – almost 4% of the country's GDP – but more recent estimates calculate the damage at $30 bn.[124] Yet by 21 September 2022, only $60 million had been pledged in response to a UN appeal, a tiny fraction of what the country will need.[125]

Floods in Pakistan have devastated lives and could cost the country $30 billion to recover. Credit: Ali Hyder Junejo (CC by 2.0)

Broken promises, insufficient funds

Pakistan's experience is one example of the richest countries' failure to compensate the poorest countries for the impact of a climate crisis created largely by their historical and/or current GHG emissions. The projected economic costs of loss and damage by 2030 are estimated to be between $290bn and $580bn per year in L&MICs.[126] To date, however, the richest countries have made no binding commitments. The Warsaw International Mechanism for Loss and Damage, which was created in 2013, agrees to 'enhancing knowledge and understanding', 'strengthening dialogue, coordination, coherence and synergies among relevant stakeholders';[127] but in 2015 as a result of intense pressure by the US and other rich nations explicitly stated that it 'does not involve or provide a basis for any liability or compensation'.[128]

The UN Paris Agreement did commit finance for mitigation and adaptation to climate change to the poorest countries – the headline $100bn a year figure discussed earlier in this briefing which has yet to be delivered. Even if met, the figure is far below what it would really cost the poorest nations to mitigate and adapt to climate change. Annual adaptation costs in L&MICs are estimated at $70bn. This figure is expected to reach $140–300 billion in 2030 and $280–500 billion in 2050.[129] The *UNEP Adaptation Gap Report 2020* says this lack of finance means that although most countries have plans, they have not been able to implement adaptation projects to bring real protection against climate-related impacts such as droughts, floods and sea-level rise.[130] The costs of mitigating climate change are harder to estimate. McKinsey pegs the global cost of transitioning energy and other sectors to net-zero emissions by 2050 at $9.2tn a year.[131] This is a big sum, but failure to mitigate would be far more costly.

Diverted military spending could help fill the financing gap

These costs are also small compared to what is spent by the biggest military spenders: the top 10 alone account for 75% of the global total of $2.1 trillion. Paying $70bn of climate adaptation costs, for example, is equivalent to 4% of what the top 10 (USA, China, India, UK, Russia, France, Germany, Saudi Arabia, Japan and South Korea) spend annually on the military (a ratio of 1:23) and 3% of annual global military spending (1:30). In other words, a mere 5 per cent cut to the annual military spending of the top 10 spenders would be enough by itself to pay for global climate adaptation costs in full. Even for the major and costly $9 trillion challenge of stopping worsening climate change, the biggest existential threat humanity has faced, military spending would contribute a fifth of its costs.

To focus on the US – as we have repeatedly noted, the biggest historical GHG emitter and the top military spender – shows the cost opportunities that are lost by excessive military spending. The recent Biden Inflation Reduction Act, the main focus for its climate action efforts, is worth $37bn per year over 10 years. Yet this is just 4% of the annual $850 bn Pentagon budget (for 2023) and half of the increase from 2022 budget ($778bn).[132] As US Representatives Barbara Lee and Mark Pocan proposed, an annual cut of only $100bn to the Pentagon budget would not mean changing current US national security strategy and would pay for the installation of solar energy in every household.[133]

There are also historical lessons. As the Cold War was ending, the Soviet Union under Mikhail Gorbachev made unilateral cuts of 14% in 1989/90.[134] Similarly, US President Clinton reduced military budgets by more than $200bn, from the peak of nearly $700 bn to the low of $460bn, while promoting prosperity and without undermining national security.[135] These moves may seem inconceivable given the current levels of hostility between Russia and NATO member countries, but at some point, negotiations will have to begin and cannot ignore issues of military spending as they are also factors contributing to the current conflict. As noted, the 30 NATO members collectively spend 17 times what Russia spends on the military. There is plenty of scope for reductions in military spending, and with effective diplomacy and negotiations such reductions can also be key to building a longer-term sustainable peace.

Together with other proposals for financing – such as an end of subsidies on fossil fuels, disbursement of Special Drawing Rights (SDRs) and new taxes on fossil-fuel extraction, financial transactions, aviation and shipping – there is more than enough money to fund mitigation, adaptation and loss and damage given sufficient political will.[136]

What one year's military spending by the top 10 military spenders would pay for[137]

- **Promised international climate finance for 15 years**
  (15 times $100 billion/year) or
- **UN disaster response costs for the next 315 years**
  ($5 billion/year) or
- **Global biodiversity conservation for 15 years**
  (estimated at $100 billion/year – currently only $4 billion to $10 billion spent)

If the top ten nations were to cut annual military spending by 5 per cent, $79 bn would be made available to pay for tackling climate change. Moreover, if global militaries all cut 5% of their annual military spending, $106 bn could be immediately diverted without any significant impact on national security. There is a great deal of waste in the military, and scope for cuts in expensive weapon systems, the most obvious example being nuclear weapons.

The International Campaign to Abolish Nuclear Weapons (ICAN) notes that within this global total of military spending, just nine nations spent $82bn on their nuclear arsenals in 2020, an additional $5bn since 2019. This spending alone would cover 80% of annual promised climate finance.

Building a just transition

There have been various global initiatives in response to the need for an ecological transition and systemic-level change, sometimes called a 'Green New Deal'[138],'Eco Social Pact'[139] or 'Just Transition'.[140] These programmes vary but usually advocate for ambitious government-funded social and economic reforms and public works projects based on renewable energy, resource efficiency and decarbonisation. Most, however, do not closely consider the role of the world's militaries despite being the world's major users of oil and embedded in the fossil-fuel economy. It is critical to include the global military and defence industry in thinking and planning on the Green New Deal or Just Transition in order to achieve not just green prosperity, but *peaceful* green prosperity.[141]

Consideration of the military in climate mitigation and adaptation planning is critical, not just because it could help reinvest the capital spent on defence to fund the transition, but because there is expertise among workers in the military and arms industry that could help in moving towards a renewable transition. The US military industry, for example directly employs nearly 1 million people, accounting for around 15% of all employees in the US manufacturing sector.[142] In addition, another 3 million are employed by the U.S. Department of Defense, either as active service personnel or civilian support staff, which makes the Pentagon world's largest employer, second only to the People's Liberation Army of China.[143] All of these workers will need to be at the forefront of a just climate transition, and whose skills and knowledge would play a valuable role.

The US-based National Priorities project mapped out a Just Transition route for Defence Workers.[144] Drawing on learning from different experiences of closure of coal mines and coal-fired power plants in the US, it sought to draw out lessons for a transition from a military-based economy. These include preemptive plans, short- and long-term support for workers, involvement of local workers and frontline communities in transition plans, and informed consent and ongoing consultation throughout. Glasgow University's 'Decarbonising and diversifying defence in the US and the UK: A workers' enquiry for a Just Transition' project interviewed military industry workers and union representatives in both the US and UK and showed there is support for change:[145] as one industry worker in the US explained, 'I would be happy to lose this job and find another. And, if it was in a renewable resource, research or job, that would be fantastic. …I would feel better about my life if I did that. …I feel that it's important that I do my job properly in order to keep people safe. … Would I prefer to do something that was more relevant for the world? Absolutely!'.

Further research shows that if the same amount of state investment that currently goes towards military industry workers was instead invested in renewable and other sectors would create more jobs. A study by the Watson Institute, Brown University, shows that for the same volume of public spending, 40% more jobs would be created in infrastructure or the clean energy industry, 100% more jobs in health and 120% more jobs in education.[146]

A Green New Deal that actively cut and diverted military spending to climate spending,[147] while supporting military industry workers to work in a thriving sustainable low-carbon economy,[148] would be a win-win situation for workers and climate.

CONCLUSION

This report has shown that all possible resources and capacity need to be thrown into defence – the defence of the planet and of every living being as we stand on the precipice of catastrophic climate change.

It has also shown that the world's major polluting nations are not prioritising climate action, nor dedicating the resources needed to help the poorest countries adapt to adverse climate impacts. Rather, they are investing in an accelerated arms race that is spewing even more GHGs into the atmosphere and diverting resources and capacity from tackling the climate crisis. The current year – 2022 – has seen a peak in military spending, with a crescendo of calls for more. This could not come at a worse time, when climate scientists are warning that there is a small and shrinking window of time to act decisively.

Worse still, the largest military powers are also adding fuel to the fire by selling weapons to the governments of many impoverished countries that are most affected by climate change. Instead of providing finance to the poorest communities to adapt and cope with the negative consequences of climate change, the richest countries are striking arms deals that stoke divisions, provoke violence and enable repression by military and security forces. Militarisation of climate-affected communities is the worst form of climate maladaptation.

This path of militarisation and international division is not inevitable. It is the result of political choices. The end of the Cold War in the early 1990s showed that it is possible for major warring powers to negotiate and agree to reduce military spending, increase collaboration, and invest in peace. That moment was lost, and now seems further away than ever.

It is imperative for everyone's sake to recapture that opportunity and for all civil society to join together to demand it. The fact that climate change knows no national borders underlines the need to unite across countries and states to find effective solutions to a global crisis. It is also an opportunity to establish common ground. Joining forces across borders to confront the biggest threat to our shared planet is the best and only way to build a secure and peaceful future.

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