

March 2023

The Military Industrial Climate Innovation Complex

The latest IPCC report that the UN released earlier this week concludes (with high confidence) that emissions are unequivocally responsible for the rise in global surface temperature. This rise is causing rapid changes to occur in our planet's atmosphere, oceans, and the cryosphere & biosphere. This has led to widespread adverse impacts including loss and damage to both ecosystems and people. The risks will only increase with each incremental rise in temperature. This sentiment has also been echoed by almost half of all CEOs from around the world, who in a recent survey indicated that climate change is already having an impact on their business (or will in the next five years).

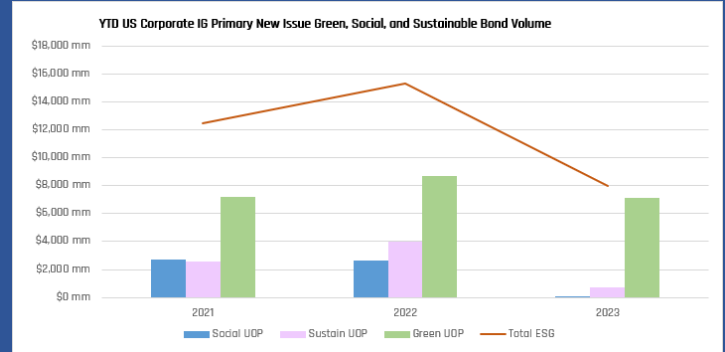
If we consider the urgency, then it's important to look at points of convergence and focus on where changes can occur that will have the greatest impact. Markets and corporate activities are good examples of convergence points, but there has been less discussion about the Department of Defense, which when considering its purchasing power, energy use, heavy equipment, workforce, and history of innovation makes it perhaps one of the chief points of convergence in the U.S. In this report (which is an update to our [November 2021](#) report), we look at how the military industrial complex (more specifically the Department of Defense) is incorporating climate change into its strategy and acting as a driver for industrial innovation.

Climate Action and Implementation Plans

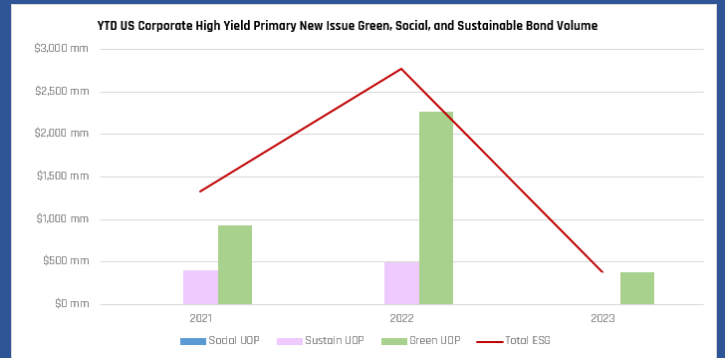
Last year, the Navy and Marine Corps, Airforce, Army, and Coast Guard all released their Climate Action Strategies & Implementation Plans. These plans flesh out each branch's respective climate adaptation and mitigation measures through 2027 and beyond. While each plan is unique to the specific branches, they all incorporate 3-5 similar lines of effort (LOEs) which link the multiple tasks needed to accomplish the mission at hand. In the case of climate adaptation, these LOEs include actions related to installation resilience & mitigation, acquisition, training & readiness, climate informed decision making, and supply chain resilience/innovation.

Many of the goals laid out by each branch are similar, but still unique. Overall, each organization touches on enhancing resiliency through its forces, systems, and facilities and reducing climate threats (via enhanced use of renewables and emissions reductions). For instance, the Army aims to achieve a 50% reduction in net GHG emissions compared to

2023 U.S. Green, Social, and Sustainable Debt Volume



Investment Grade: Despite market volatility, March saw 5 issuers price over \$2.7bn in U.S. IG Green, Social, and Sustainable labeled debt. Utilities made up the lion's share of issuance, including this month's only sustainability labeled bond. Source: Bloomberg.

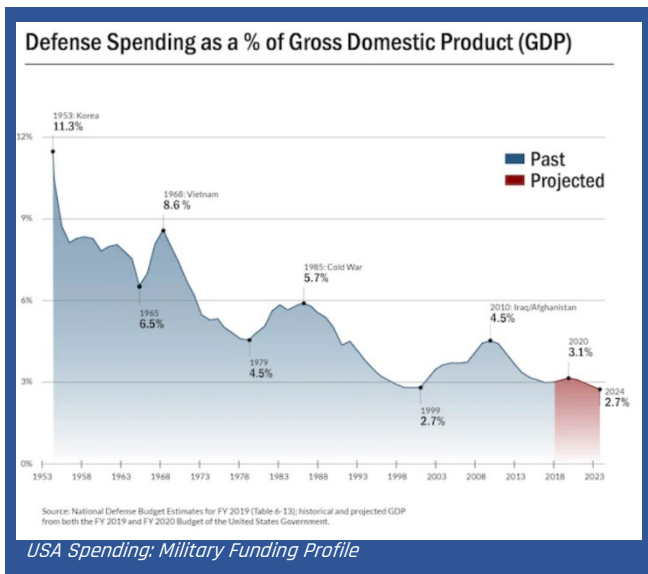


High Yield: U.S. high yield Green, Social, and Sustainable debt issuance remains muted as only one issuer came to market this year. Source: Bloomberg.

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2005 levels, while the Air Force is looking to improve its operational energy intensity (5% by 2027) and generate 100% carbon pollution-free electricity on a net-annual basis by 2030. The Air Force is also looking to invest up to \$100 million a year by 2027 into improving base resiliency.

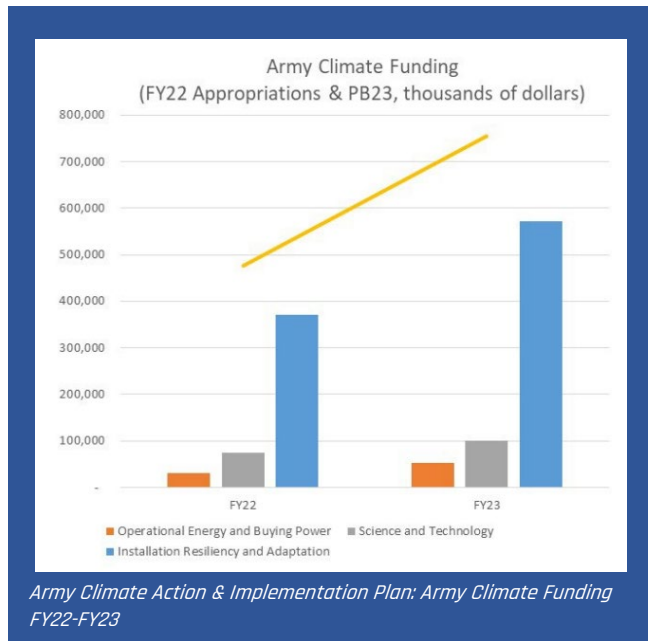
It remains to be determined how successful the U.S. military will be, but recent history has shown that the impacts of climate related investments have been helpful. For example, the Marine Corps (at Marine Corps Air Station Miramar) partnered with the city of San Diego to utilize biogas from an on-base landfill as an energy source, helping to reduce the base's reliance on the city's grid by 45%. Base commanders are also incentivized, as they can retain a portion of the money saved by these projects as part of the installation's future budget. As a result, the Navy has recovered over \$150 million from its reduced energy consumption.



Defense Purchasing Power

Historically, national security has been a massive economic driver and has at times comprised a substantial portion of U.S. GDP. While it currently makes up only about 3% of GDP, it has previously been as high as 11.3% of U.S. gross domestic product during the 1950s and over 5% throughout much of the 1980s.

Globally, the U.S. spends the most on defense, accounting for approximately 38% of global military spending. This year the majority of U.S. defense funding will be going to the U.S. Army & Airforce which combined will receive over \$600 billion of the \$1.7 trillion in available budgetary resources (followed by the U.S. Navy & Marines Corps). International Security Assistance and Foreign Military Sales receive far less, with combined budgetary resources of only \$5.6 billion. This spending, combined with the specific needs of the military, have resulted in fierce competition among corporations for U.S. military contracts and created a robust aerospace & defense industry that accounts for about 1-2% of total U.S. equity market capitalization.



This is important for market participants to keep in mind when considering industrial climate related innovation and investments, especially as the DoD (through its branches) executes the various Climate Action and Implementation Plans that it has in place. As geopolitical tensions (with China) and conflicts (like Russia & Ukraine) continue, there is a high likelihood that future DoD procurement will incorporate concerns like energy efficiency, water stress & management, and embedded carbon into their purchasing requirements.

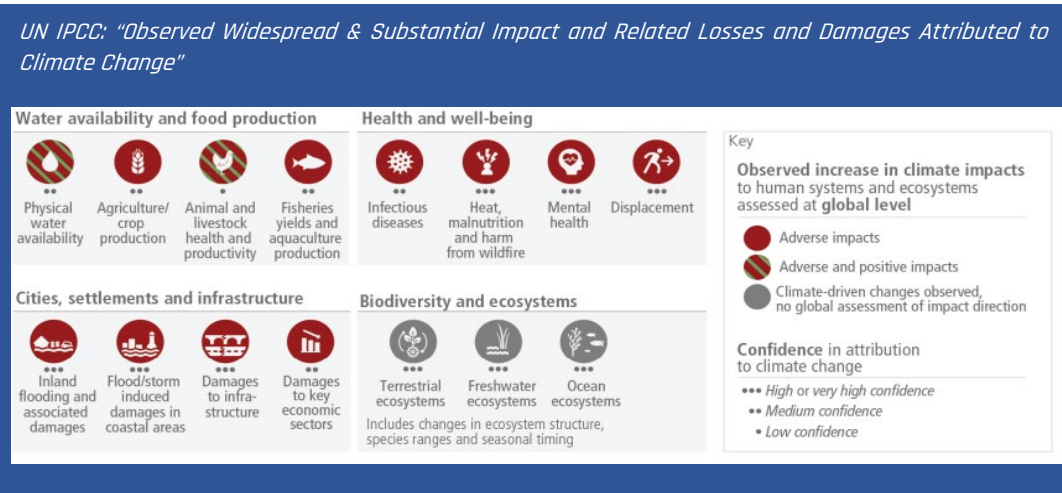
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Threat Multiplier

While there is still debate here in the U.S. on the long-term impacts of anthropogenic climate change, the U.S. DoD has been assessing how increased heat indexes, drought, and flooding (all related to climate change) contribute to conflict for over a decade. In short, the term “threat multiplier” refers to the tendency for increased extreme weather-related events to intensify existing security threats and geopolitical tensions (essentially making already volatile regions even more unstable). This will place further demand on the U.S. military. Although the term wasn’t coined until 2007, the DoD (since the 1990s) has been monitoring this as part of its environmental security concerns. This all started with a report from the Naval War College in 1990.

In January 2021, when the Biden administration released its Executive Order on Tackling the Climate Crisis at Home & Abroad, both the Secretary of Defense and the Joint Chiefs of Staff (along with others) were directed to consider the security implications of climate change in national defense strategies, planning, and programming documents.

Within 10 months of the order, the DoD released its Climate Action Plan laying out its framework and lines of efforts related to adaptation and resiliency efforts. By the end of 2022, every branch had also developed their own plans. The concept of climate risk as a threat multiplier is also prevalent across military leadership. The term not only frames how the risk interacts with and aggravates environmental, economic, social, and political stress, but also highlights the role of and implications for the military. It also recognizes it as a national security concern compared to just an environmental one.



The Military Drives Systemic Change

The military, via both its purchasing power and culture, has the capacity to drive systemic change. As we discussed earlier, U.S. defense spending has comprised a substantial portion of U.S. GDP. Its procurement needs drive innovation across sectors like aerospace, textiles, chemical production, mineral exploration, energy, and real estate. For instance, products like modern day duct tape, global positioning systems, the internet, and aviator sunglasses, were developed or brought to scale due to the needs of the military. Like service members, the broader U.S. population appreciates the convenience and ease of use that these products provide. We could very well see these efforts repeated with renewable energy generation, energy storage, EVs, carbon capture, and technology/services surrounding energy & water management.

Not only does the military drive innovation, but it also drives cultural change. The DoD employs over 3 million people, of which 1.3 million are service members. Through training, procurement, and operating procedures, knowledge and skill sets are imparted and retained by these veterans. Over the next decade or two, as the DoD executes its Climate

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Action Plan, we could see service members of the future exit the military and transition into careers that include the design of products and services that drive industrial climate related innovation.

Opportunities

- Given that the DoD is one of the largest consumers of energy (almost 200,000 BBTUs yearly) there will be a massive opportunity for both renewable energy generation and energy storage. For instance, the Army aims to have a micro-grid on every installation (800+) by 2035.
- Most of the DoD's energy usage is operational (planes, tanks, ships, etc.) which means that defense-industrial manufacturers will have to design equipment that is more efficient and less polluting which will possibly create a first mover advantage. The Navy has already launched its Great Green Fleet and has even greater ambitions for 100% zero-emissions vehicles by 2035 (including light duty vehicles by 2027).
- Data management and software solutions could be another area of opportunity, especially as the U.S. military looks to incorporate new systems and services into its energy transition. This will create enhanced needs for battery grid & battery management software (cyber- secure) on bases.

Further Resources

US Military Funding Profile: <https://www.usaspending.gov/agency/department-of-defense?fy=2023>

US Navy Marine Corps: <https://www.navy.mil/Portals/1/Documents/Department%20of%20the%20Navy%20Climate%20Action%202030.pdf>

US Army: https://www.army.mil/e2/downloads/rv7/about/2022_Army_Climate_Strategy_Implementation_Plan_FY23-FY27.pdf

US Air Force: <https://www.safie.hq.af.mil/Portals/78/documents/Climate/DAF%20Climate%20Action%20Plan%20Overview%20-%20FINAL%20Oct%202022.pdf?ver=hqfXCqFEt267Jzlr8Ntkmg%3d%3d>

Threat Multiplier: <https://councilonstrategicrisks.org/wp-content/uploads/2023/01/38-CCThreatMultiplier.pdf>

White House: <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/>

DoD: <https://media.defense.gov/2021/Oct/07/2002869699/-1/-1/0/DEPARTMENT-OF-DEFENSE-CLIMATE-ADAPTATION-PLAN-2.pdf>

UN IPCC March 2023 Report: https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_SPM.pdf

Conference Board: <https://www.conference-board.org/topics/c-suite-outlook/driving-growth-and-mitigating-risk-amid-extreme-volatility>

DoD AEMRR: <https://www.acq.osd.mil/eie/Downloads/IE/FY%202021%20AEMRR.pdf>

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