



COMBAT VS. CLIMATE

The Military and Climate Security Budgets Compared

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Executive Summary

In the fall of 2014, the United States is at a crossroads. Crises in the Middle East and Ukraine are triggering calls to reverse the drawdown of U.S. military spending that has followed more than a decade of war. In the midst of this debate, the United Nations will host a summit on international action to address a much bigger threat - climate change. Thousands of citizens from around the world are expected to demonstrate outside the UN to show concern about this impending threat.

Clearly another surge in Pentagon spending would come at the expense of investments at the level that a serious response to the threat of climate catastrophe will require.

The U.S. response to these challenges intersects in our federal budget: in the balance of resources allocated to traditional instruments of military force versus measures to prevent catastrophic climate change.

The military itself now recognizes climate change as a major security threat. The Chief of Naval Operations in the Pacific has characterized it as the “biggest long-term security threat” facing the Pacific region.¹ What he isn’t saying—what the military does not say—is that tackling this threat requires shifting the balance of resources from traditional instruments of military force to measures to prevent this threat from emerging.

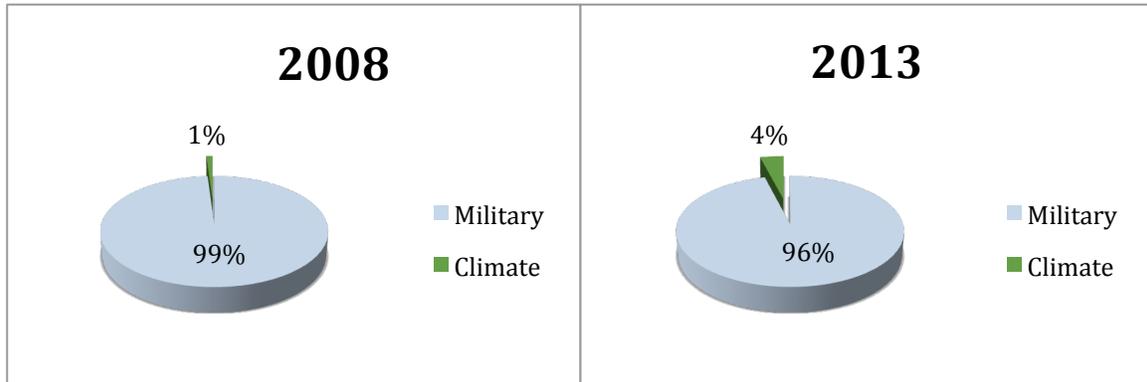
Since 2008 the Institute for Policy Studies has been tracking the progress toward a better balance between these accounts.¹

There is progress to report. In 2008 the U.S. spent \$88 on its military forces for every dollar it spent to reduce greenhouse gas emissions. By 2013 this gap between dollar amounts had narrowed dramatically: our budget allocated \$24 dollars last year to military force for every dollar spent on climate.

Year	Military Spending (\$billions)	Climate Spending (\$billions)	Ratio
2008	665.673	7.605	88:1
2011	686.411	18.666	37:1
2013	575.1795	24.1305	24:1

¹ We have used as our principal sources a conservative accounting of military spending—only including the base Pentagon budget plus the war spending account (“Overseas Contingency Operations”), rather than the National Defense (050) budget category—and the Federal Climate Change Expenditures report, prepared by the Office of Management and Budget—the best official source on climate spending government-wide (DATE. A new version is expected by the end of 2014.) Except as noted, figures are expressed in nominal terms, following their representation in the Federal Climate Change Expenditures report.

Yet the visual representation of this progress makes clear that the overall change in these proportions is barely perceptible. It is, in other words, modest progress indeed.



The Explanation:

The narrowed gap between spending on military and climate security (the term widely used to refer to this threat and the responses to it) is mostly due to the decline in the military budget, following its post-9-11 surge. Most of the reductions in military spending came from the 49.5 percent (53 percent in real terms)² decline in war spending as troops began to come home from Iraq and Afghanistan.ⁱⁱ

By 2013 the overall budget had declined by 16.4 percent in nominal terms (21.7 percent in real terms—2013 dollars) from its peak in 2010.ⁱⁱⁱ The Budget Control Act, mandating about \$540 billion in defense cuts over a ten-year period, had reduced the base budget by 6.6 percent (a mere 4.6 percent in real terms) from its peak in 2012.^{iv}

Spending on climate change has also increased modestly, contributing to the overall improved balance between the budgets for military and climate security.

Because the climate security budget is so small, gains look disproportionately large: for instance, adding \$8 billion dollars would have more than doubled the budget in 2008^v (halving the ratio of military-to-climate spending), whereas doubling the military budget would have required \$665 billion.^{vi} Thus, although the ratios have improved, in absolute terms the climate security gains hardly register.

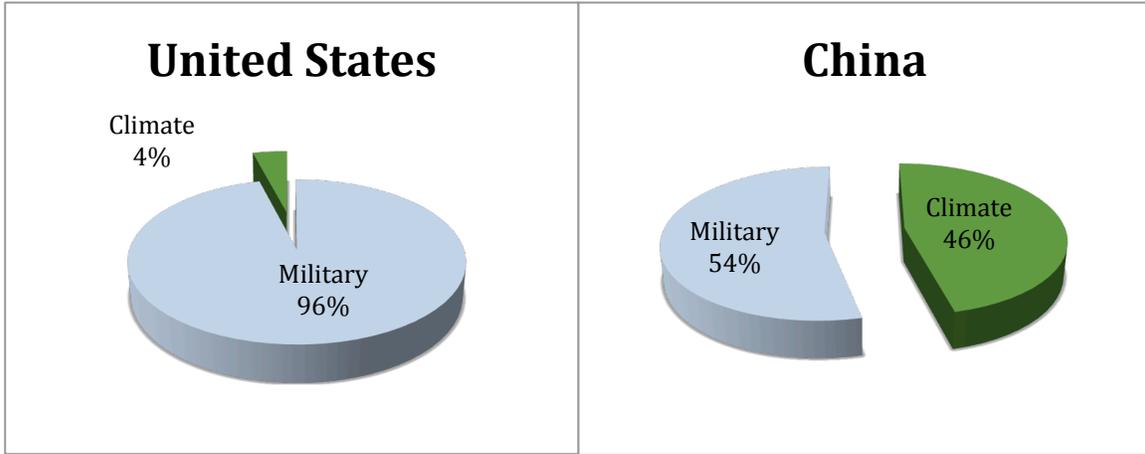
Needless to say, the change in the relative balance of spending on climate security as opposed to military security from 1 to 4 percent is hardly commensurate with a serious response to what the military itself considers a major security threat.

Other key findings in the report:

- The U.S. balance between military and climate security spending compares unfavorably to the record of our nearest “peer competitor.” China’s environmental record is certainly problematic. Yet according to the best available

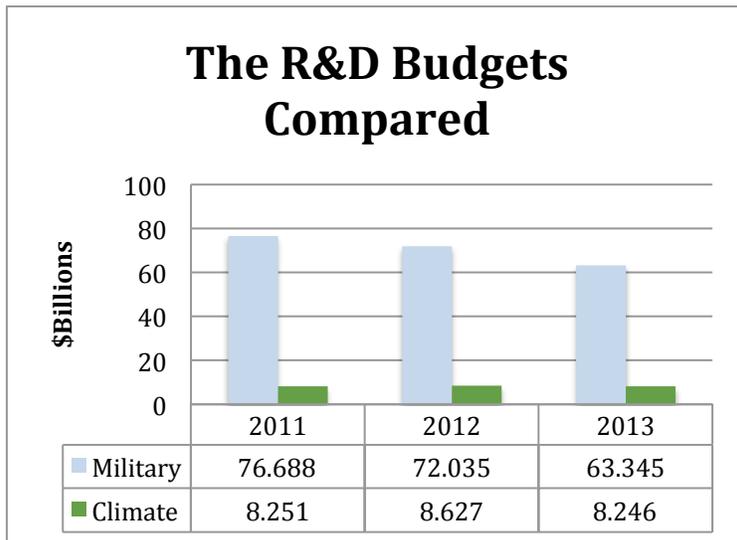
² Real terms calculated using the CPI inflation calculator from the Bureau of Labor Statistics: <http://data.bls.gov/cgi-bin/cpicalc.pl>

sources, it strikes a far better balance than does the U.S. in the allocation of its spending on its military and on climate change:

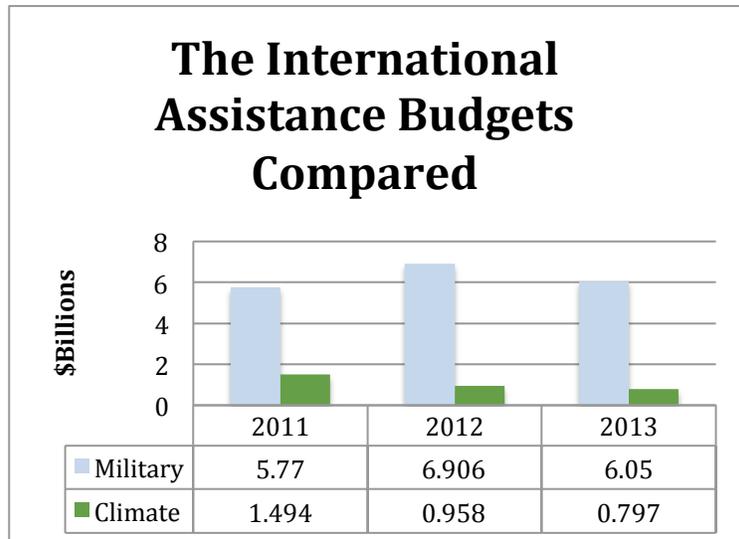


	(\$billions)	2011	2012	2013
China	Military ^{vii}	\$147.268	\$167.712	\$188.46
	Climate ^{viii}	\$97	\$134	\$162
United States	Military ^{ix}	\$686.411	\$643.592	\$575.1795
	Climate ^x	18.666	21.202	24.1305

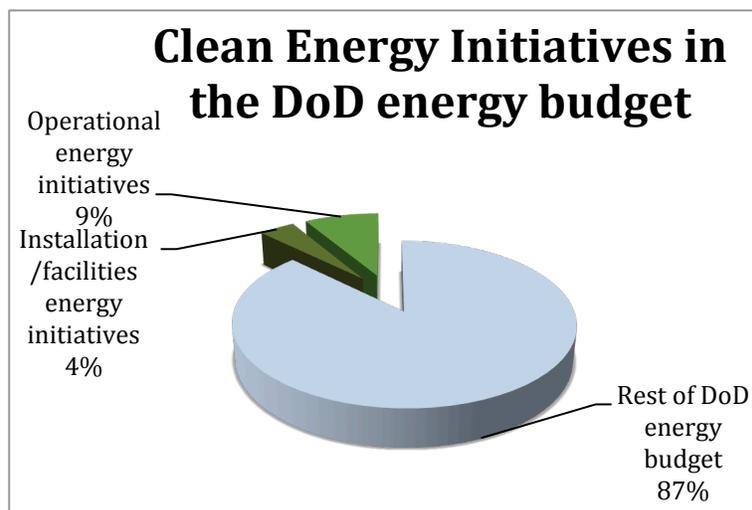
- The gap between the accounts for military and climate security has narrowed in the area of research and development^{xi}:



- The balance in the area of international assistance has not improved. The U.S. actually increased its military aid to other countries during this period, relative to the help it gave them to reduce their greenhouse gas emissions^{xii}:



- Military spending to reduce its own use of fossil fuels contributed substantially to the climate security spending account: The Department of Defense increased its budget for “clean energy initiatives” from \$267 million in 2008 to \$2.37 billion in 2013.^{3 xiii}
- Nevertheless, Defense Department spending on “clean energy initiatives” is still dwarfed by what DoD spends on fossil fuels:^{xiv}



³ Though this could be considered part of either the military or the climate security budgets, we have scored it as climate spending. Most of this spending—all but about \$437 million—was not included in OMB’s Federal Climate Change Expenditures report. It enlarged the climate security budget by nearly 10 percent.

Our report also offers a set of benchmarks for a shift of resources necessary to fund an adequate response to the threat of climate change.

And it illustrates the potential of a shift of resources by posing trade-offs like the following: **By retiring the cold-war era B-1 bomber, realizing savings of \$3.7 billion over five years, we could retrofit approximately 4.6 million homes to achieve 20% greater energy efficiency.**

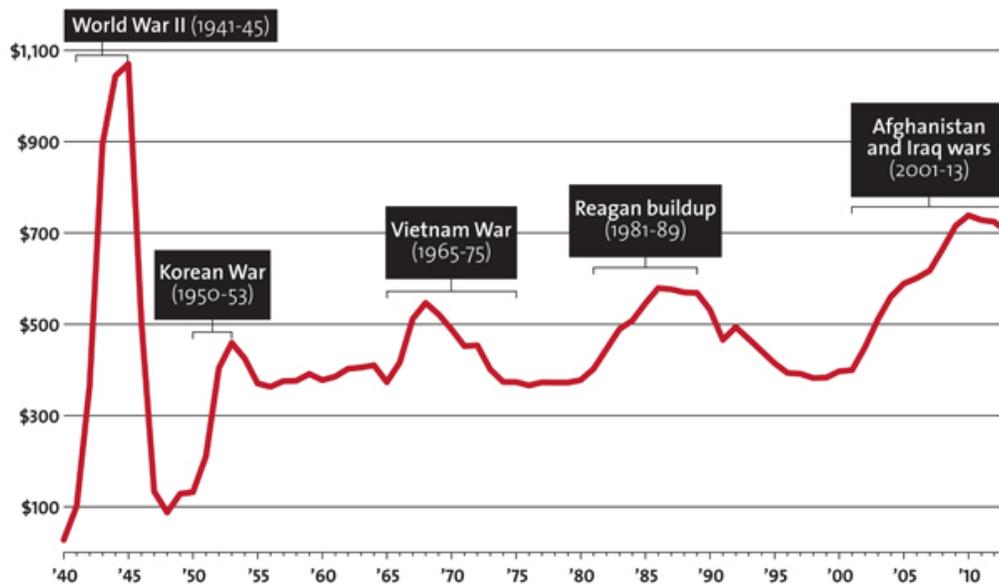
Progress threatened

The bottom line: the balance between U.S. spending on military as opposed to climate security has improved modestly since 2008.

Even this progress is threatened, however, as calls to resume the post-9-11 surge in military spending increase, and congressional opposition to greenhouse gas-reducing measures continues

Reversing this trend would be seriously misguided. Some reasons:

- Following 9-11, the Pentagon's base budget nearly doubled—even excluding the trillions spent thus far on the wars waged in response.^{xv} The cuts planned in the Budget Control Act (BCA) over ten years, including sequestration, would take us back to the spending level of 2006, when we were fully engaged in those wars. This would be the shallowest postwar defense drawdown since World War II.
- If the BCA path is preserved, the U.S. will be spending more, in real terms, than we were spending during all but the peak years of the cold war. Whatever the current threats we face, they are nothing like the existential nuclear and conventional threat we faced during the cold war period.^{xvi}



- The U.S. currently spends more on its military than the next seven countries combined.^{xvii} The disparity between U.S. military spending and the countries presumed to be threats to our security is even more extreme^{xviii}:



- While divided on how to respond to the current crisis in Iraq and Syria, the U.S. public is clearly opposed to the kind of long-term military engagement that would require increased military spending.
- In 2014, new reports from the International Panel on Climate Change and the U.S. National Climate Assessment demonstrate that the international and U.S. national scientific consensus on the need for urgent action on climate change has intensified.

The U.S. lost more than a decade of ground in the fight to prevent catastrophic climate change, as trillions were diverted to wars that did not make us safer. In recent years we have taken modest steps toward setting our sights where they belong. It is no time to turn back now.

Introduction

In July, the federal government classified 80 percent of California as suffering from “extreme drought.” Three months before, the figure was only 70 percent.^{xxix} Drought conditions have been strangling the U.S. southwest for the past four years,^{xx} and each year the most dramatic result is widespread wildfires. In July, fires forced the residents of 700 homes around Sacramento, California’s capital, to evacuate.^{xxi}

While dramatic and frightening, if not devastating to those residents, wildfires are not the worst of California’s drought-related problems. The state’s current drought is the third most severe on record, and according to a July study from the University of California at Davis, “responsible for the greatest water loss ever seen in California agriculture.”^{xxii} California supplies U.S. residents with nearly half of their domestically-grown fruits, nuts and vegetables. So far this year, only three percent of the state’s produce has been lost to drought. This is because, as reservoirs dry up, the state taps into more and more of its groundwater. Obviously, this strategy won’t work indefinitely. As it fails, food scarcity and rising prices will become a reality in a country that thought it was immune to such events.

The water California isn’t getting is being dumped on places like the Northeast, where according to the 2014 National Climate Assessment, precipitation has increased by 74% over the past half century.^{xxiii} Then there are places like Colorado, which are getting whipsawed by extreme drought following extreme flooding and back again.

Meanwhile other regions of the world have experienced the effects of weather extremes that make U.S. conditions seem mild:

- **In Africa:** Somalia has had seven consecutive poor harvests (due to drought and high temperatures), leading to food shortages, factional fighting and the displacement of 70,000 people^{xxiv}
- **In Asia:** Typhoon Haiyan, the most powerful storm ever to make landfall, killed over 4000 people and affected 13 million Filipinos in 2013^{xxv}
- **In Europe:** About 80,000 people died in a 2003 heat wave^{xxvi}
- **In the Middle East:** Lebanon is currently suffering a severe drought; the decline in the water level could lead to desertification by mid-century.^{xxvii}

Climate scientists agree that no particular flood, drought, or tornado can be definitively blamed on climate change. But they also agree that long-term trends – rising global temperatures and increasingly extreme weather – can be laid at the door of human activity, and that therefore major changes in human activity are necessary to stop it.

The evidence

IPCC and National Climate Assessment

While the evidence for this threat mounts every year, in 2014 two heavyweight sources weighed in with major new assessments. One articulated the international consensus, and the other the consensus among U.S. climate scientists.

The United Nations and the World Meteorological Organization (WMO) established the Intergovernmental Panel on Climate Change (IPCC) in 1988 to document climate change.^{xxviii} In its fifth report, released in 2014, the IPCC for the first time reached consensus at the level of “*Very high confidence*” that effects including heat waves, fires, increased food- and water-borne diseases, and a steady rise in sea levels can be attributed to climate change.^{xxix}

In September, the WMO revealed new, even more alarming findings: concentrations of nearly all greenhouse gases are greater now than ever before recorded, and are rising at an accelerating rate. They increased more in 2013 than in any previous year.^{xxx}

Those seeking action on climate change have a serious time-frame problem: most of those currently alive find it easy to ignore predictions of massive disruptions to life on earth a century from now. The most recent National Climate Assessment, reflecting the consensus of more than 300 U.S. scientists, confronts that problem by putting more emphasis on the effects people are feeling now. The assessment reports that the planet has warmed between 1.3 and 1.9 degrees Fahrenheit since records began in 1895. In the U.S. the period from 2001 to 2012 was warmer than any decade on record.^{xxxi}

Even if the U.S. undertakes bold action to reduce its greenhouse gas emissions, the report projects that temperatures will increase by a minimum of 5 degrees Fahrenheit, due to the delayed impact of emissions that are already in the Earth’s atmosphere. If limited action is taken, the temperature rise could be approximately 10 degrees.

Climate change and conflict

To the toll of human misery climate change is bringing and will bring must be added its potential as a precipitant of violent conflict. As far back as the 1990s the CIA’s Environmental Center was studying the effects of a degraded environment as a security threat. But these concerns have now come to occupy a more central role in U.S. security strategy.

Instrumental to this development has been the work of a group of retired generals and admirals who were convened by the Center for Naval Analyses (CNA). They examined this threat in five reports, beginning with the landmark study “National Security and the Threat of Climate Change” (2007)^{xxxii} and, most recently, “National Security and the Accelerating Risks of Climate Change” (2014).^{xxxiii} The CNA labels climate change a

“threat multiplier,” exacerbating already existing problems around the world. They cite drought and flooding in Africa, Asia and the Middle East as causing food shortages, population dislocation, and mass migrations. These in turn, they suggest, have destabilized national governments and started wars.

In 2007, the group pointed, for example, to the genocide in Darfur. They argued that extended drought reduced both grazing land and farmland, drawing herders and farmers into a fight for survival. The 2014 report, while recognizing that the Syrian conflict has many causes, makes the case that drastic reductions in winter precipitation levels helped drive massive population displacement and fuel the conflict.

In addition to focusing on climate change as a catalyst of violent conflict, the group has framed it as a challenge to U.S. military operations. Climate impacts, they observe, limit the military’s ability to respond to threats when they do occur. U.S. soldiers run the risk of being cut off from water in already dry areas. Military installations degrade more quickly – and have to be replaced more often, thus increasing costs. The storms that contribute to this degradation also impede operations. Rising sea levels could put some U.S. military bases under water.^{xxxiv}

The new CNA report finds that the risks of climate change are accelerating, advancing far faster than was predicted at the time of their first report, in 2007. Their conclusions echo the thrust of both the National Climate Assessment and the most recent findings of the UN’s World Meteorological Organization: that climate change can no longer be considered a future threat. It is rather a present danger which “serves as a catalyst of conflict in vulnerable parts of the world.”^{xxxv}

Climate change in U.S. security policy

U.S. security policy now recognizes climate change as a major security threat. The most recent Quadrennial Defense Review (2014) termed climate change effects “threat multipliers that will aggravate stressors abroad such as poverty, environmental degradation, political instability, and social tensions – conditions that can enable terrorist activity and other forms of violence.”^{xxxvi} The most recent National Security Strategy (2010) underscores this finding, concluding that, “Climate change and pandemic disease threaten the security of regions and the health and safety of the American people.”^{xxxvii}

Some military leaders present the threat in stronger terms: The head of the U.S. fleet in the Pacific has identified climate change as the “biggest long-term security threat” facing the region.^{xxxviii}

Based on assessments like these, the term “climate security” has acquired currency, referring to the threat of climate change as a precipitant of global conflict and the need to address it as a security measure.

Responses to the threat

Responses to the threat of climate change come in three forms: studying the problem, preventing or mitigating its effects, and adapting to those effects.

The truism “an ounce of prevention is worth a pound of cure” points strongly to the second strategy. U.S. security strategy foresees climate change putting pressure on vital resources, and creating conflict that will strain the capacity of the military to respond. The military has a demonstrably strong incentive to support a concerted prevention/mitigation strategy: If these threats can be reduced before they emerge, the military will have fewer problems requiring military cure.

So far they have not done so.

Governments have two major tools of prevention/mitigation. Regulation to reduce greenhouse gas emissions is the most important tool governments have to slow the progress of global climate change. Second in line is government spending on this purpose.

The major documents of U.S. security doctrine are broadly silent on both. The most recent Quadrennial Defense Review makes no mention of any concrete efforts to prevent climate change, while the current National Security Strategy focuses on enhancing international capacity to adapt to climate change. Though the National Security Strategy mentions the need to reduce dependence on fossil fuels, it does not lay out a roadmap for curbing emissions, nor recommend spending more money on doing so.

So far the military has not explicitly made the *opposite* case. Its budget justifications do not cite climate change as a reason to increase funding for traditional instruments of military force to combat its effects. But it seems unlikely that this reticence will continue much longer. The Navy’s emphasis on the new demands created by climate change to patrol the newly forming Arctic Ocean will, we can assume, eventually be accompanied by a budget for the ships it will need for this purpose.

Even the Center for Naval Analysis reports, which are focused on assessing the magnitude of this security threat, fall nearly silent in advising a mitigation strategy. Here are the principal recommendations from the most recent report:

Mitigation:

- Commit to a stronger national and international role, helping to stabilize climate changes at levels that will maintain global security

Adaptation:

- Take a global leadership role in preparing for the impacts of climate change
- Prepare for military operations in the Arctic (including becoming a signatory to UNCLOS)
- Help less developed nations build their ability to manage climate impacts
- Improve U.S. combat power by adopting more energy-efficient technologies and

processes

Research:

- Conduct an assessment of the impact of climate change impacts on U.S. military installations worldwide over the next 30 to 40 years
- Develop metrics for climate impacts and resilience

Comparing military and climate security spending

A national security strategy consistent with the magnitude of the threat of climate change, as our security doctrine assesses it, would prioritize investing resources in preventing that threat from developing.

This report examines the extent to which our security budget does so. It compares the relative balance of U.S. security spending allotted to traditional military forces (“military security”) and on climate change mitigation (“climate security”), which reduces the demands on those military forces.

This report is the fourth in a series comparing federal spending on military and on climate security, and reporting on recent trends in the spending balance.

Spending on military forces

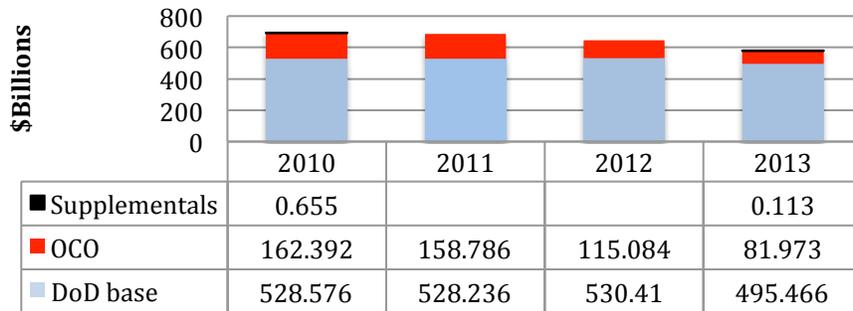
Accounting for U.S. spending on the traditional tools of military force is, relatively speaking, straightforward. The first category of the federal budget, “National Defense (050),” includes funding specifically for the Department of Defense (051), as well as the portions of the Department of Energy’s budget funding the nuclear weapons complex (053) and funding for defense-related activities such as the FBI (054). Some analysts argue that a full accounting of military spending should include all such operations, and such budget categories as veterans spending and interest on the federal debt incurred in war. However, we have chosen to use a more conservative accounting, which includes only what is indisputably military spending: namely, the Department of Defense base budget and the separate accounts funding war operations in Afghanistan and Iraq (known since 2009 as the Overseas Contingency Operations fund), along with supplementals.⁴

Here are the funding levels for U.S. military forces from 2010 to 2013. Complete data sets permitting the comparison of military and climate security spending are not yet available beyond 2013.^{5 xxxix}

⁴ In the Federal budget, the base budget, OCO and supplementals are collectively known as 051

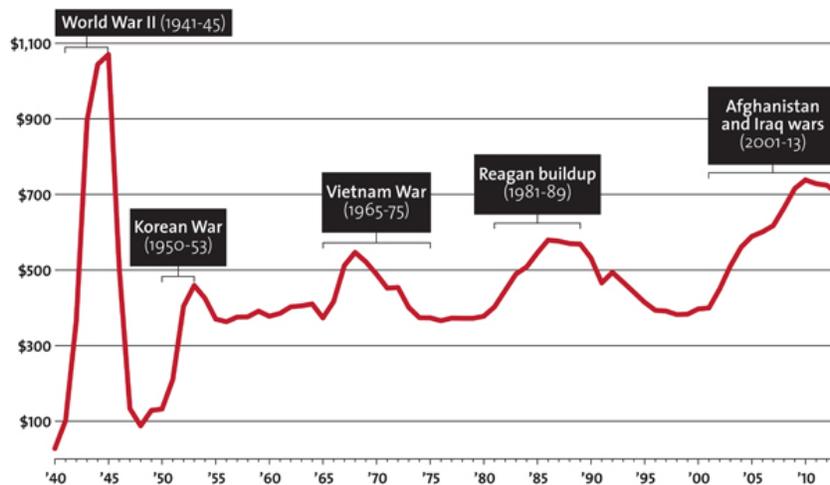
⁵ Throughout this report, dollar amounts are listed in current dollars, except as indicated, since current dollars were provided in the two principal sources: For military spending, the DoD Greenbook prepared by the Office of the Undersecretary of Defense (Comptroller), and for climate spending, the Federal Climate Change Expenditures report prepared by the Office of Management and Budget.

Defense Spending: DoD base and OCO



By 2013 the overall budget (base, OCO and supplementals⁶) had declined by 16.4 percent in nominal terms (21.7 percent in real terms)⁷ from its peak in 2010.^{xi} The decline has two sources. First, the U.S. ended military operations in Iraq and has begun the drawdown in Afghanistan. Most of the reductions in military spending came from the 49.5 percent (53 percent in real terms) decline in war spending.^{xii} And second, a series of deficit reduction measures reduced planned military spending. The Budget Control Act, mandating about \$540 billion in defense cuts over a ten-year period, had reduced the base budget by 6.6 percent—a mere 4.6 percent in real terms—from its peak in 2012.^{xliii}

Together these measures have begun the first postwar defense drawdown since the end of the cold war. Yet even if fully implemented as planned through 2023, it would be the shallowest postwar downsizing since World War II.^{xliiii xliv}



⁶ Supplementals refers to disaster relief, specifically following the Haitian earthquake (2010) and Hurricane Sandy (2013)

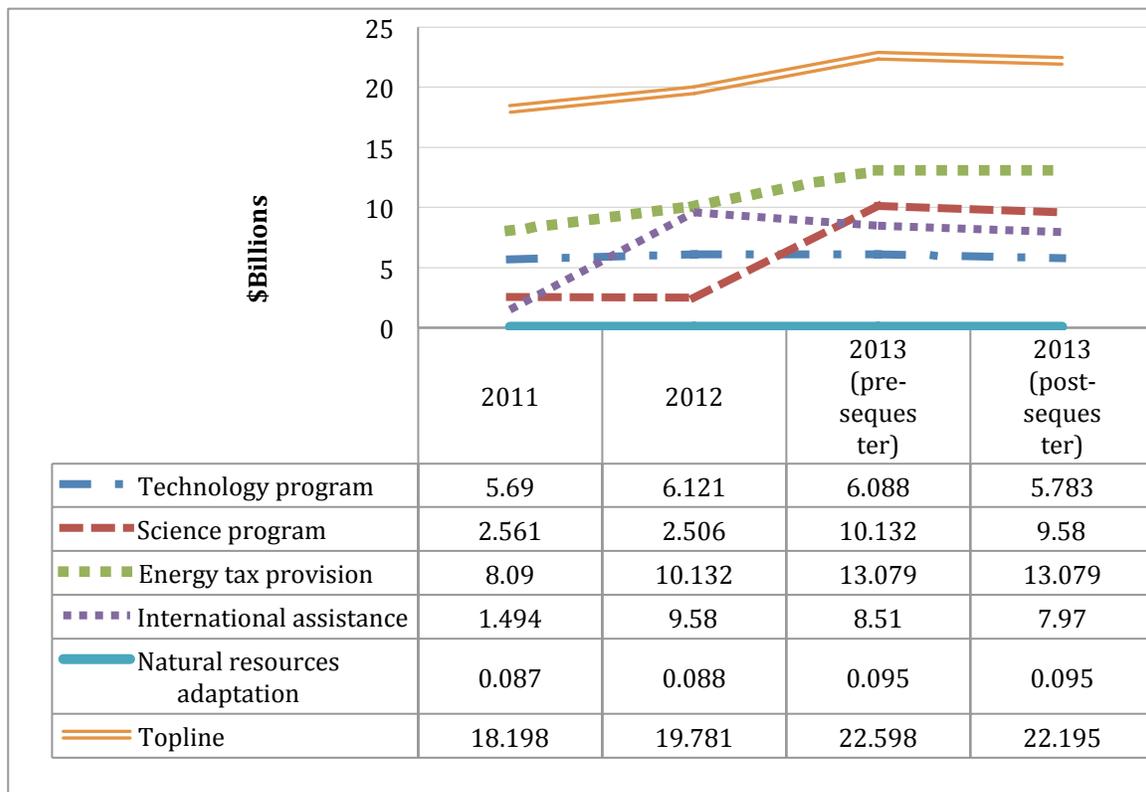
⁷ Nominal terms refer to numbers not adjusted for inflation. Real terms are adjusted for inflation. Real terms are in 2013 dollars, and are calculated using the CPI Inflation Calculator from the Bureau of Labor Statistics: <http://data.bls.gov/cgi-bin/cpicalc.pl>

Climate Change budget

Accounting for U.S. spending on climate change is less straightforward than accounting for military security. This spending is spread over a much broader set of federal agencies and departments, and is not consolidated and comprehensively presented within any one category of the budget. Congress has, however, required the Office of Management and Budget to produce an annual accounting of this spending, entitled, “Federal Climate Change Expenditures.”

The report groups climate change spending into five categories. The *technology program* involves research, development and deployment of clean energy technologies that will reduce greenhouse gas emissions. The *science program*, titled the U.S. Global Climate Research Program (USGCRP), funds research by 13 agencies, including NOAA and NASA, into understanding the science of climate change. *Energy tax provisions* create financial incentives for green initiatives, from increasing home energy efficiency to producing alternative energy. *International assistance* funding aims to combat climate change at a global level, assisting other countries in lowering their greenhouse gas emissions. Finally, *natural resources adaptation* funding serves to “reduce vulnerability and increase resilience”^{xlv} at home, responding to the impacts of climate change on wildlife, ecosystems and water supply.

The graph below shows FCCE climate change spending by category:



Source: Federal Climate Change Expenditures Report to Congress, June 2010 and August 2013

The technology program, science program, and natural resources adaptation have remained largely constant. International assistance jumped sharply in 2012, from around \$1.5 billion to over \$9.5 billion. The apparent decline in 2013 is primarily due to the absence of figures from the Millennium Challenge Corporation. However, the MCC expects to be supporting green projects in a number of developing countries, although the precise numbers are not yet known.

Meanwhile, the energy tax provision increased by roughly \$5 billion in 2013 from 2011 levels. After 2013, however, many of these provisions will expire or be scaled back.

The Intersection Budget: DoD's climate change spending

At the intersection of the budgets for military and climate security is the action taken by the Department of Defense to reduce its own greenhouse gas emissions. Each branch of the military has specific “green” benchmarks, as does the Defense Department as a whole. The Defense Department and the Army have both set an “energy conservation and security goal” of using 25 percent renewable energy to power their operations by 2025.^{xlvi} The Navy’s plans are arguably the most ambitious: Secretary of the Navy Ray Mabus “has made greening the Navy his signature issue.”^{xlvii} His goal is that by 2020, 50 percent of the Navy’s energy will come from renewable sources.^{8 xlviii}

Among the hundreds of clean energy initiatives across the military are:

- Using solar power in combat zones to reduce dependence on fossil fuels transported from unstable regions^{xlix}
- Fort Bliss: net-zero carbon emissions project to generate all the base’s energy from renewable sources^l
- Cape Cod Air Force Base: two new wind turbines, intended to save \$1 million in energy costs every year^{li}

These impressive plans need the context of three caveats.

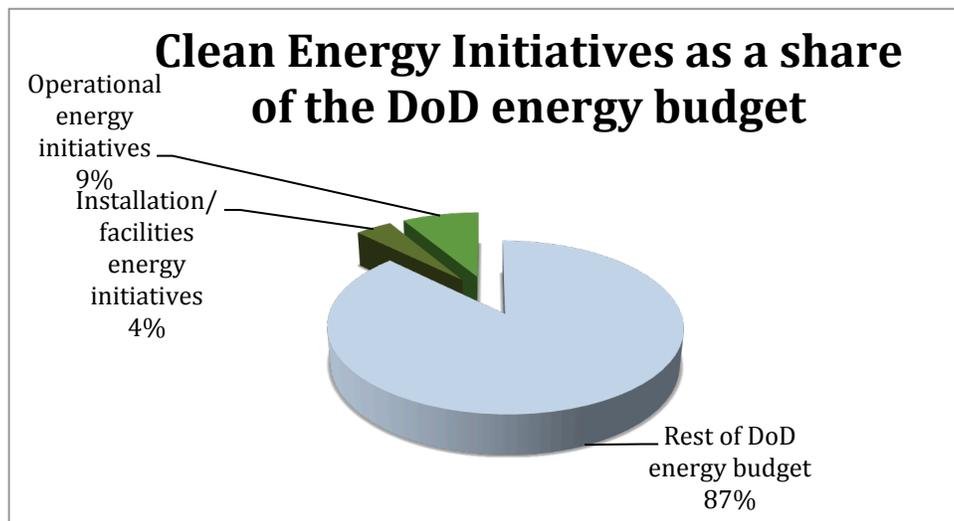
First caveat: The lion’s share of the Pentagon’s energy needs are supplied by fossil fuels. The Pentagon remains the largest institutional producer of greenhouse gases on the planet.

The DoD energy budget is divided into two parts: operational energy (the energy used for military operations and installation/facilities energy (used to power its bases and other domestic installations). In 2013, just \$2.37 billion – under 13 percent – of DoD’s \$18.9 billion energy budget was spent on clean energy:

⁸ Chief among the initiatives for achieving this is the Great Green Fleet - a carrier strike group that will run on biofuels and which the Navy plans to sail by 2016. The plan has been criticized, however, for its reliance on biofuels, which many see as expensive, unreliable and environmentally flawed. For instance, a 2010 MIT report found that while biofuels could reduce greenhouse gas emissions by up to 50 percent, producing them would put further pressure on freshwater supply and local infrastructure.

DoD Energy Budget \$18.9 bn	
Operational energy (for military operations) \$14.8 bn	Installation/facilities energy (powering bases) \$4.1 bn
Of which energy initiatives ("clean energy") \$1.6175 bn	Of which energy initiatives ("clean energy") \$0.775 bn
Total "clean energy" spending (= total "military greening" spending) \$2.3925 bn	
Total "clean energy" spending (= total "military greening" spending) as a proportion of total DoD energy spending \$2.3925 bn / \$18.9 bn = 12.65%	

Visually, DoD's "military greening" spending - as a proportion of their total energy spending - looks like this:



Sources: FY 13 Operational Energy Budget Certification Report and Annual Energy Management Report, FY 2013

Second caveat: DoD's primary purpose in lowering its emissions is not to mitigate climate change but to enhance warfighting capacity.

In certain settings, defense officials occasionally talk about their sense of environmental stewardship. Speaking to the Environmental Defense Fund in 2012 for example, former

Secretary of Defense Leon Panetta said, "As one of the largest landowners and energy consumers in the world, our drive is to be more efficient and environmentally sustainable."^{lii}

Yet overall the Defense Department has made clear that reducing emissions strengthens its capacity to apply military force. In 2012 Commander James Goudreau, the Navy’s director of the energy coordination office, said: “Alternative fuels for the Navy is not about being green, it’s about combat capability ... “Our job is not to save the world, it is to protect the nation.”^{liii}

Nevertheless DoD has shifted resources toward emissions-reducing initiatives⁹:

<i>(in billions USD)</i>	2012	2013
Operational energy initiatives	\$0.904	\$1.6175
Facilities energy initiatives	\$0.998	\$0.755
Total	\$1.902	\$2.3725
DoD energy budget	\$20.4	\$18.9
Proportion of DoD Energy budget	9.32%	12.55%
Total DoD budget	\$645.494	\$577.552
Proportion of total DoD budget	0.29%	0.41%

Whatever DoD’s *intent*, the *effect* must be credited as a significant increase in spending on climate.

Third caveat: DoD’s spending to reduce its emissions is dwarfed by what it spends on the traditional instruments of military force.

In 2013, DoD’s “energy initiatives” (its term for its measures to reduce its greenhouse gas emissions) made up less than one percent of its spending on military force: 0.41%.

The 2014 pricetag for one weapon system—the F-35 Joint Strike Fighter—by one military department—the Air Force—was \$3.3 billion.^{liv} The Defense Department thus spent 137% of its green energy budget for 2013 on this single system.

⁹ Since the Office of the Assistant Secretary of Defense for Operational Energy did not exist when the 2011 budget was produced, there are no operational energy figures for FY 2011, hence the exclusion of 2011 from this section of the report

Military spending vs. overall climate spending

The Defense Department’s budget for reducing its own emissions is spending both on military and on climate security. To avoid inflating the disparity between the two accounts, we have apportioned this Defense Department account to the category of climate spending.

We believe that the \$437 million in DoD research and development (RDT&E) funding contained in the FCCE budget is already accounted for under clean energy initiatives in the DoD operational energy and installation energy budgets, and so have removed it from our final tally to avoid double-counting. As such, the number listed here for the FCCE budget is slightly less than that listed in the August 2013 FCCE report.

The result: The U.S. spends 24 times as much on the traditional instruments of military force as on measures to prevent or mitigate climate change.

<i>(in billions USD)</i>	Military v. Climate Spending, 2013¹⁰
FCCE budget	\$21.758
Energy initiatives	\$2.3725
Total climate spending	\$24.1305
Military budget (excluding energy initiatives)	\$575.1795
Ratio of climate spending to military spending	approx. 1: 24

This proportion, while extreme, is actually a significant improvement over previous years. We published the first accounting of this comparison in 2008. At that time the ration of military to climate spending was 88:1.¹¹ By 2011 it had narrowed to 41:1.¹² This positive trend has continued:^{12 13}

Year	Military Spending (\$billions)	Climate Spending (\$billions)	Ratio
2008	665.673	7.605	88:1
2011	686.411	18.666	37:1
2013	575.1795	24.1305	24:1

¹⁰ Using actual (post-sequester) numbers from the FCCE report

¹¹ We have used a more narrow accounting of military spending in this report, hence the slight discrepancy between the ratio mentioned here and the one cited in previous reports.

¹² It is unclear whether operational energy initiatives are included in DoD’s clean energy spending for 2008, and the 2011 figures include only installation energy initiatives, so the precise figures may be subtly different than calculated here

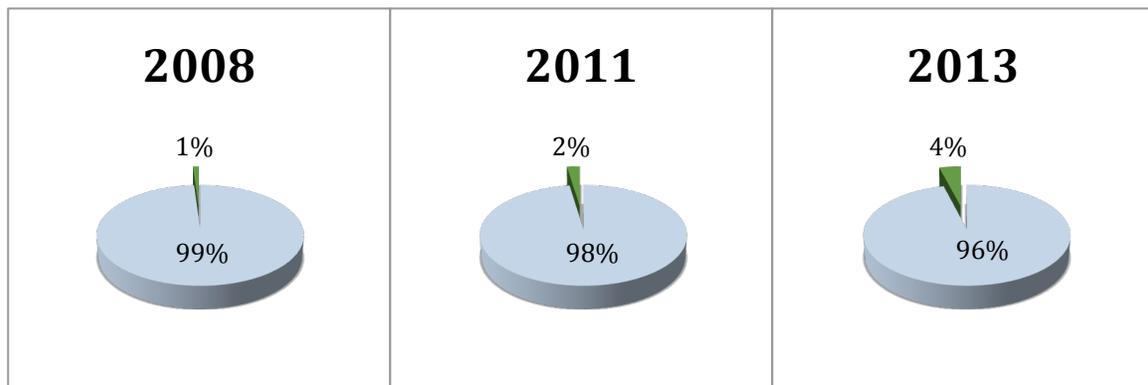
¹³ For more details on these calculations, see Appendix II

Why?

Principally, the narrowed gap between spending on military and climate security is due to the decline in the defense budget, following its post-9-11 surge. Most of this decline has come from the decline in the war budget, and a smaller portion from the declines to the base budget mandated in the Budget Control Act.

The Obama administration has programmed budget increases for the climate change budget. While the Budget Control Act pared these back, some of the agencies included in the Federal Climate Change Expenditures report chose to prioritize this spending by means of reprogramming from other areas of their budget. In addition, the climate change account has been increased by our decision to credit the military's "energy initiatives" as climate change spending. The net effect is a climate change account that gained ground during a period that the military budget has declined modestly.

Yet this visual representation shows that this progress in narrowing the gap between the two budgets is modest indeed:



Sources: FCCE Report to Congress, May 2007; FCCE Report to Congress, June 2010; FCCE Report to Congress, August 2013; FY 15 DoD Greenbook; DoD Annual Energy Management Report, FY 2008; DoD Annual Energy Management Report, FY 2011; DoD Annual Energy Management Report, FY 2013; Fiscal Year 2013 Operational Energy Budget Certification Report

Total U.S. spending on climate has increased from 1 percent of military spending in 2008 to just over 4 percent in 2013. This is improvement, though hardly commensurate with what would be needed to take seriously what our National Security Strategy believes threatens "the security of regions and the health and safety of the American people."^{lvi}

International comparison

How does the U.S. balance of spending between military and climate security compare to the record of other countries? According to the best available sources, here are the numbers for the U.S. and China—often designated as our "peer competitor":

	(\$billions)	2011	2012	2013
China	Military	\$147.268	\$167.712	\$188.46
	Climate	\$97	\$134	\$162
United States	Military	\$686.411	\$643.592	\$575.1795
	Climate*	18.666	21.202	24.1305

*Adjusted for military spending on climate

Some perspective: The figures on China’s military spending need to be considered order-of-magnitude estimates, since China is insufficiently transparent about its expenditures. These figures come from the Stockholm International Peace Research Institute, one of the most respected sources on world military expenditures.

On China’s spending on climate: China’s environmental record is certainly problematic. It has passed the U.S. as the greatest annual emitter of greenhouse gases. Only three of 74 major cities in the nation met national air quality standards in 2013; the citizens of Beijing had fewer than 140 days of good air quality during the entire year.^{lvii}

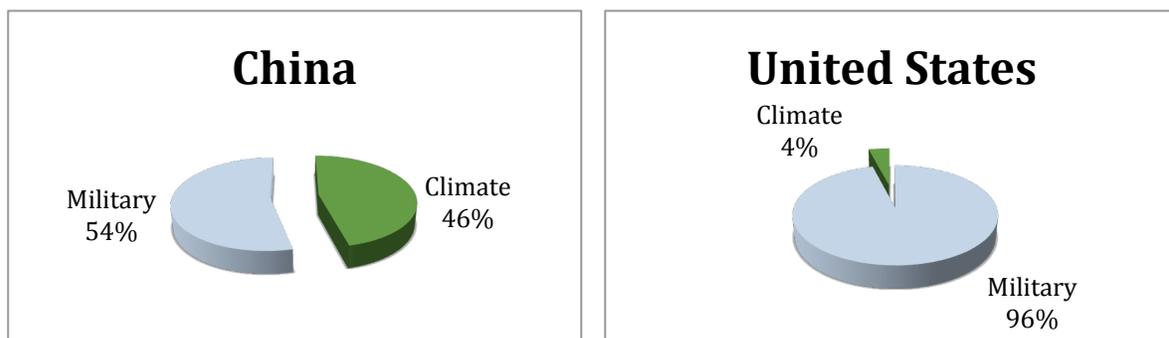
Yet China is also the world leader in green jobs, largely due to investment in solar manufacturing and installation. Chinese exports of solar panels to the U.S. totaled more than \$2 billion in 2012, according to the Commerce Department.^{lviii}

China doubled its rate of solar installations in 2013, installing a record 12GW of solar power. This is more than has ever been installed by any country in a single year.^{lix}

And with respect to the comparison of military and climate spending: with its investment of about 1 trillion yuan (\$162 billion)^{lx} on environmental protection in 2013, Chinese climate spending is roughly equal to its military spending (46% to 54%).

Though Chinese military spending has been increasing, climate spending has also increased dramatically, up from \$97 billion in 2011. This represents an improvement over the findings of our previous report, in which the ratio of military to climate spending was estimated at 2 or 3 to 1. Thus, China is spending about one-third as much on the military, and more than eight times as much on climate security, as is the U.S.

In sum, by proportion international spending looks like this:



Sources: SIPRI Military Expenditures Database; The Climate Group; German Climate Finance; FY 15 DoD Greenbook, Table 2-1

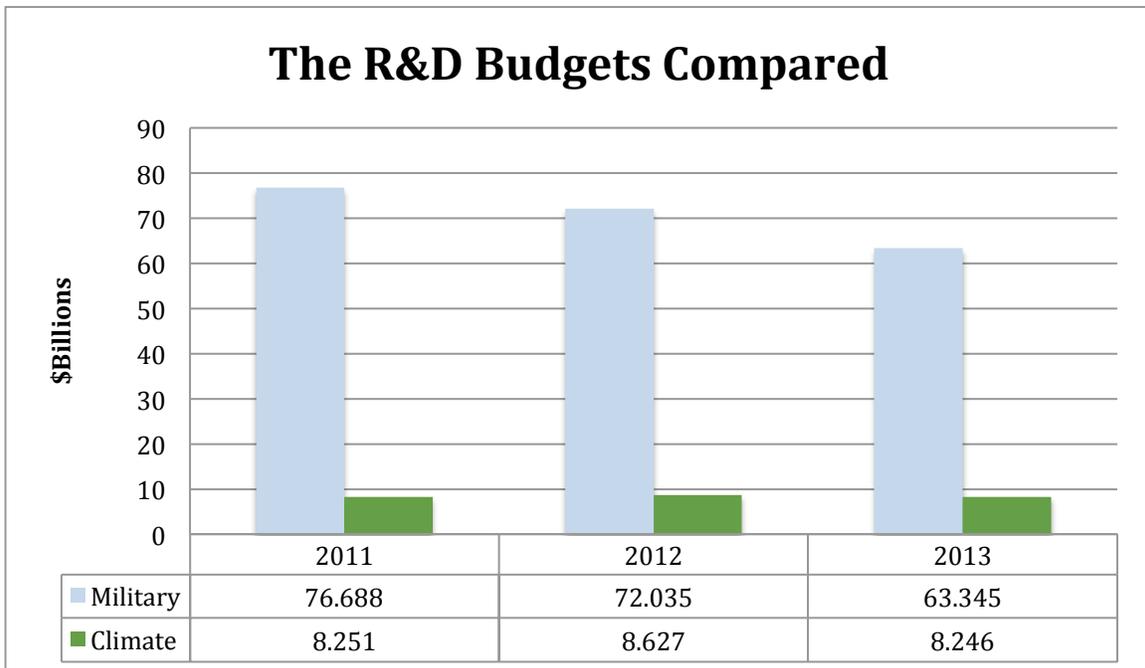
Of the ways to compare the behavior of the U.S. and China, this one can be added in the security realm: China currently shows a far better balance between its investments in traditional instruments of military force vs. its investment in reducing the threat of climate change.

Specific U.S. budget category comparisons

While the U.S.’ “peer competitor” strikes a far better balance in allocating its resources to military and climate security, the U.S. has improved in recent years. Improvement is also evident in some specific comparable categories within the two budgets, though not in all. The gap has narrowed for research and development funding. It has widened in the domain of international assistance (that is, U.S. spending to supply foreign militaries compared with U.S. support for international reduction of greenhouse gas emissions).

The military and climate budgets compared: research and development

The Research, Development Testing and Evaluation (RDT&E) account funds military research and development. Comparable federal spending on climate combines the accounts categorized by the Federal Climate Change Expenditures as the US Global Change Research Program (USGCRP) and Clean Energy Technologies.



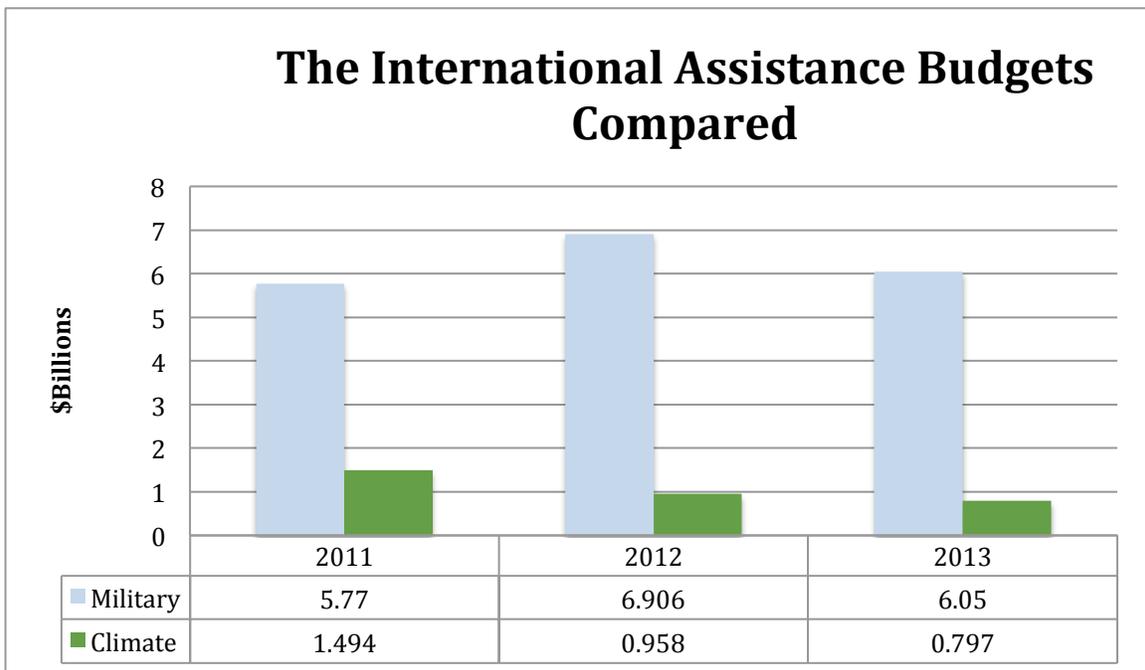
The disparity between research and development on military and on climate change-mitigating technology narrowed from 9.2:1 in 2011 to 7.7:1 by 2013.

The military and climate budgets compared: international assistance

The military has three major programs for assisting foreign militaries:

- Foreign Military Financing Program (FMF)^{lxi} provides grants and loans primarily for purchases of U.S. weapon systems
- Peacekeeping Operations (PKO)^{lxii} funds international peacekeeping missions
- International Military Education and Training (IMET)^{lxiii} funds training for foreign troops.

The Federal Climate Change Expenditures report subsumes U.S. programs assisting other countries in their efforts to mitigate climate change under the heading of “international assistance.”^{lxiv}



While the gap between military and climate international assistance was only 3.9:1 in 2011, by 2013 it had grown to 7.6:1.

On average, between 2011 and 2013, the U.S. government spent nearly six times as much on military programs - arming foreign countries - as it did helping them mitigate and adapt to the impacts of climate change. This is particularly startling in light of the fact that the CNA reports, among others, have pointed out that the need for military intervention will increase as climate change puts pressure on resources, catalyzing conflict between populations. In other words, increasing spending on climate security would diminish the need for spending on conventional military security.

Looking forward

Progress threatened

Despite regression in the gap between military and climate international assistance, the U.S.' overall performance has undeniably improved. The gap between its investments in military v. climate security overall has narrowed since 2008. Military spending has declined modestly, and climate spending has ticked up, especially if the accounting of the latter incorporates the military's on spending on climate.

This progress is under threat, however.

On the military side:

The renewed pressure for military involvement in Iraq and Syria has been accompanied by new calls to jettison the Budget Control Act's constraints on the military budget. Those who wanted to maintain the post-9/11 surge in military spending indefinitely, by exempting the military budget from the framework of the Budget Control Act, are now seeing an opening to break the agreement and push through a new surge in military spending. A congressional vote on authorizing the use of force in Iraq or Syria could be tied to a measure removing those constraints. Defense Secretary Chuck Hagel has warned that the administration might revise its 2015 defense budget request upward. Alternatively, or even in addition, the "OCO" war budget might be frozen or tapped to fund operations against the radical Islamic state in Iraq and Syria.

On the climate side:

The Obama administration has used both regulatory and fiscal measures to tackle the threat of climate change. Its 2013 Climate Action Plan set new fuel efficiency standards for trucks and federal buildings, for example. In June of this year it set ground-breaking rules to curtail carbon emissions from new and existing power plants.^{lxv} Its economic stimulus package in response to the 2008 financial crisis included \$80 billion in clean energy and efficiency investments.

But federal action that is commensurate with the magnitude of the threat has been blocked. Following passage of the 2009 Recovery Act, Congress has rejected all new proposals for stimulus investment, while floating numerous proposals to prevent federal agencies, particularly the Environmental Protection Agency, from acting to limit greenhouse gas emissions. During the 113th Congress the House passed three climate-related bills; all of them put limits instead on the executive branch's ability to regulate carbon.^{lxvi}

The military's efforts to green itself are also facing political pushback. In 2012 Republicans on the House Armed Services Committee "decided that the military's push for clean, renewable energy [had] gone far enough, and...proposed for next year's budget that the Pentagon not spend a dime on renewable energy sources that cost more than

traditional dirty energy.”^{lxvii} Their Senate counterpart followed by preventing DoD from helping build biofuel refineries unless “specifically authorized by law.”^{lxviii} The bill was ultimately amended to delete these provisions, but the opposition continues. Contention also exists within the military itself - the Air Force’s Deputy Assistant Secretary for Energy sees the Navy’s investment in biofuels as meddling in a commodity market.^{lxix}

The trend in the military v. climate security spending balance must continue

Current foreign challenges must not be allowed to derail the progress made during the past five years in ending the period of unrestrained military spending following 9-11 and shifting the balance of security resources from traditional military tools to address the threat of climate change.

A short list of reasons:

On the military side:

- Following 9-11, U.S. military spending nearly doubled. The cuts planned in the Budget Control Act over ten years, including sequestration, would take us back to the spending level of 2006, when we were fully engaged in two wars. This would be the shallowest postwar defense drawdown since World War II.
- If the BCA path is preserved, the U.S. will be spending more, in real terms, than we were spending during all but the peak years of the cold war. Whatever the current threats we face, they are nothing like the existential nuclear and conventional threat we faced during the cold war period.^{lxx}
- The U.S. currently spends more on its military than the next seven countries combined. The disparity between U.S. military spending and the countries presumed to be threats to our security is even more extreme.^{lxxi}



- While divided on the right way to respond to the current crisis in Iraq and Syria, the U.S. public is clearly wary of committing to the kind of long-term military engagement that would require increased military spending.

On the climate side:

- In 2014, new reports from the International Panel on Climate Change and the U.S. National Climate Assessment demonstrate that the international and U.S. national scientific consensus on the need for urgent action on climate change has intensified.
- Also in 2014, the chorus of voices urging immediate action to reduce carbon emissions widened to include groups focused on averting the economic impacts of climate change, such as the bi-partisan “Risky Business Project” which included current Wall Street executives and former Treasury Secretaries Robert Rubin and Henry Paulson.^{lxxii}
- New figures released ahead of the U.N. summit from the World Meteorological Organization found that concentrations of nearly all greenhouse gases are greater than ever before recorded, and increased more in 2013 than in any previous year.

Therefore: The U.S. must maintain the trend toward shifting the balance of spending on military v. climate security.

Indeed the consensus among climate scientists is that this trend needs to be substantially accelerated, if irreversible, life-threatening planetary changes are to be avoided.

How much acceleration—what measures, at what cost, to whom—will be enough? A consensus on this point does not exist.

The International Energy Agency estimates that it will take a “clean trillion” - or a trillion dollars of investment in combating climate change - each year between now and 2050 to keep the world livable.^{lxxiii} Currently, \$250 billion annually is being pumped into climate security efforts worldwide.^{lxxiv} The shortfall, then, is \$750 billion. How much should the U.S. pay?

The answer can be framed according to the United States’ *responsibility for* the problem or *capacity to address* the problem. In the first case, since the emission of greenhouse gases is causing climate change, countries’ contributions to the “clean trillion” should be proportionate to their historical emissions. The U.S. is responsible for 18.6% of greenhouse gas emissions since the beginning of the industrial age,^{lxxv} and should therefore pay 18.6% of the necessary \$750 billion, i.e. \$139.5 billion per year.¹⁴ The

¹⁴ It would also be possible to weight this, putting a higher price on methane emissions, for instance.

question of capacity to act could be assessed according to Gross Domestic Product (GDP). As of 2013, U.S. GDP accounted for 19.31% of world GDP.^{lxxvi} By this measure the U.S. has the economic capacity to be responsible for 19.31% of the \$750 billion “clean trillion” shortfall: \$144.8 billion.

Both measures produce a similar figure, in a range of \$140-145 billion per year.

How much of this should come from the military budget?

Here are a few ways to look at this question:

First, while traditional military forces are entirely funded by public spending, i.e. by taxpayers, spending to reduce the threat of climate change comes from a mixture of public and private resources, influenced by regulation.

Therefore a shift of spending from the military to the federal climate change budget will leverage benefits for climate security that extend beyond government funding.

The consensus is strong, however, including within the U.S. military, that climate change poses a major security threat to the U.S. Could military resources fund the investments needed to address the threat?

Whether you use a “responsibility” accounting or a “capacity” accounting, roughly the same proportion of U.S. military spending results: 24.14% based on historical emissions and 25.07% based on GDP.

A 25% cut in defense spending as of 2013 (base plus OCO) would yield a military budget of approximately \$433 billion. This was the size of our military budget in 2003, the year it had been increased by nearly \$100 billion—nearly a third—following 9-11. The military has said that the most challenging part of maintaining force readiness under sequestration is the uncertainty. If the military knew that spending on traditional military security would be cut to this level, it would be able to prepare to defend our nation with a smaller budget, as they were doing in 2003.

Yet smaller Pentagon spending reductions, even those on the order of those planned in current law, could achieve the greenhouse gas-reducing investment targets set by the IEA. The key is to agree on those targets, and combine military cuts with other revenue measures. Those most commonly considered include shifting subsidies from fossil fuels to renewables, and applying a portion of the revenues from a small tax on financial transactions to this compelling public purpose.

Focusing on a reapportionment of our security resources between military and climate security will allow us to consider trade-offs such as the following:

Military	\$ billions	Climate
Maintain funding for all long-range nuclear missiles (ICBMs) and nuclear bombers (\$20 this year) ^{lxxvii}	\$19.3 over 10 years	Extend and expand the wind energy Production Tax Credit ^{lxxviii}
Purchase 4 more littoral combat ships this year (\$1.79) ^{lxxix}	\$1.82	Double 2013 DOE funding for energy efficiency and renewable energy ^{lxxx}
Fully fund all 11 of the Navy's aircraft carrier groups (\$50 through 2050, compared to retiring 2 of them) ^{lxxxii}	\$50.07	Provide 33 million households (28.6%) ^{lxxxiii} with renewable energy from solar power ^{lxxxiii}
Keep using the Cold War-era B-1 bomber (\$3.7 over 5 years) ^{lxxxiv}	\$3.7	Reduce energy use in 4.6 million homes by up to 20% ^{lxxxv}
Continue investing in the troubled V-22 Osprey tiltrotor (\$1.2 this year) ^{lxxxvi}	\$1.2	Install 320,000 fuel cell systems in cars ^{lxxxvii}

Conclusion

The first postwar defense downsizing since the end of the cold war is now in danger of disappearing. Defense hawks, continually on the lookout for a reason to repeal the defense budget restraint instituted by the Budget Control Act, think they have found one in the unrest in the Middle East.

Meanwhile the evidence for the urgent need to curb global greenhouse gas emissions continues to mount: In the acceleration of extreme weather events coming from news reports and from what is taking place before our own eyes, and in the growing consensus, within the scientific community and beyond, that less-than-concerted action will over the long term bring catastrophic, irreversible global effects.

As noted here, the U.S. military has identified climate change as one of the major long-term threats to U.S. and global security. What they are *not* saying is that therefore the U.S. should shift the balance of its security resources to invest more in preventing this threat from emerging.

The opposite argument is more likely. Military leaders have not, so far, explicitly cited climate change as a reason to add *more* money to their budgets for traditional instruments of military force. But it seems unlikely that when the Navy, for example, talks about the new demands created by climate change to patrol the newly forming Arctic Ocean, such references will not turn up in budget justifications for more ships that will need to be

deployed for this purpose. From a military that sells advanced weaponry overseas, and then uses the overseas presence of these weapons to justify more money to build *more* advanced models, we can expect no less.

The right path to climate security, though, is to invest in that ounce of prevention obviating the need for a military cure. Policymakers will need to be induced to make such common sense actually line up with budgetary reality.

Appendix I: Less generous accountings of the military-climate ratio

As explained in the report, we chose to describe military spending as only base spending, Overseas Combat Operations (OCO) and supplemental funding for natural disasters. We also removed all military spending on energy efficiency and renewable energy from the military budget, and added it to the budget for climate security. In other words, we were as generous to the military as possible about the size of the military budget and the proportion of it directed towards “greening” activities.

The ratios of military to climate spending for the years 2011 – 2013 therefore look like this (in billions USD):

Year	Military Budget	Climate Budget	Ratio
2011	686.411	18.666	37:1
2012	643.592	21.202	30:1
2013	575.1795	24.1305	24:1

There are a number of other ways of comparing military and climate spending, and we have broken out some of them below. All dollar amounts are in billions USD.

First of all, you could leave military spending on energy efficiency and renewable energy in the military budget, and compare this to spending on climate security listed in the FCCE report. To avoid double-counting, we have removed the DoD research and development funding listed in the FCCE report from the climate security number.

Year	Military Budget	Climate Budget	Ratio
2011	687.022	18.198 – 0.143 = 18.055	38:1
2012	645.494	19.781 – 0.481 = 19.3	33:1
2013	577.552	22.195 – 0.437 = 21.758	27:1

The difference in the 2011 ratio is quite small, since DoD’s climate spending was only a tiny proportion of overall climate spending. However, it makes more of a difference as DoD energy efficiency/renewable energy spending increases. In 2012, the ratio went from 30:1 to 33:1, and in 2013, from 24:1 to 27:1.

The accounting above may be too harsh, as it doesn’t consider the positive effects of DoD’s clean energy investments on the climate. Since we don’t know how effective DoD’s energy efficiency and renewable energy investments are, in terms of their greenhouse gas reductions, we may not be comfortable describing all of them as climate security spending.

In which case, we could split “green” military spending evenly between the military budget and the climate budget. This uses the same climate number as above (to avoid double-counting), then subtracts half the “greening” spending from the military budget and adds it to the climate side.

Year	Military Budget	Climate Budget	Ratio
2011	687.022 – 0.3055 =686.7165	18.055 + 0.3055 = 18.3605	37:1
2012	645.494 - 0.951 = 644.543	19.3 + 0.951 = 20.251	32:1
2013	577.552 - 1.18625 = 576.36575	21.758 +1.18625 =22.94425	25:1

This accounting may represent the amount of effective funding for energy efficiency and renewable energy currently being invested by the United States. It produces ratios that fall halfway between the previous two sets of numbers.

A third way of comparing military and climate spending would be to use the entire 050 budget (all defense-related spending), rather than just base, OCO and supplementals. In this accounting, military spending on energy efficiency and renewable energy is not included in the climate budget, and DoD research and development spending has been removed from the climate security budget to avoid double-counting.

Year	Military Budget¹⁵	Climate Budget	Ratio
2011	730.839	18.198 – 0.143 = 18.055	40:1
2012	727.65	19.781 – 0.481 = 19.3	38:1
2013	701.767	22.195 – 0.437 = 21.758	32:1

These ratios are the most dramatic, since the military budget is over a hundred billion dollars greater here than in any of the previous accountings. When compared to the smallest possible climate number, which does not take DoD efforts into account, it produces a significant disparity. However, not only does this method lowball the climate number, but it also includes programs not generally seen as part of the military, such as the FBI.

Finally, it is possible to use this larger military number, but account for DoD spending on energy efficiency and renewable energy (using the climate numbers from the first table:

¹⁵ Using FY 13 constant dollars, from http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2013/FY13_Green_Book.pdf Table 1-1

Year	Military Budget¹⁶	Climate Budget	Ratio
2011	730.839 – 0.611 = 730.228	18.666	39:1
2012	727.65 – 1.902 = 725.748	21.202	34:1
2013	701.767 – 2.3725 = 699.3945	24.1305	29:1

Even given the expanded size of the military budget, such a shift has an impressive impact as military spending on climate security increases in 2012 and 2013.

As you can see, there are a number of ways of placing a numerical value on the military-climate ratio, and we have chosen the one which seems to be the most accepting of the energy efficiency and renewable energy efforts of DoD.

¹⁶ Using FY 13 constant dollars, from http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2013/FY13_Green_Book.pdf Table 1-1

Appendix II: More detailed accounting of the historical military-climate ratio

In the Executive Summary and on page 17 of the report, a condensed version of this table appears. The complete table is included here, showing our accounting of the military-climate ratio. Energy initiatives were subtracted from the military budget and added to the climate budget.

	2008	2011	2013
Military (minus energy initiatives)	665.94bn - 0.267 = 665.673	687.022 - 0.611 = 686.411	577.552 (DoD) - 2.3725 =575.1795
Climate (military en. initiatives + FCCE)	0.267bn 7.371bn -0.033bn (not clear whether operational energy initiatives included) = 7.605bn	\$0.611bn (installation energy initiatives only) 18.198 -0.143 bn = \$18.666bn	24.1305
Ratio	87.5309665:1 = 88:1	36.7733312 = 37:1	23.8362031 = 24:1

ⁱ Boston Globe, “Chief of US armed forces calls climate biggest worry,” <http://www.bostonglobe.com/news/nation/2013/03/09/admiral-samuel-locklear-commander-pacific-forces-warns-that-climate-change-top-threat/BHdPVCLrWEMxRe9IXJZcHL/story.html>

ⁱⁱ Change in OCO spending, 2010 (peak) to 2013. FY15 DoD Greenbook, Table 2-1, http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2015/FY15_Green_Book.pdf

ⁱⁱⁱ FY15 DoD Greenbook, Table 2-1, http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2015/FY15_Green_Book.pdf

^{iv} FY15 DoD Greenbook, Table 2-1, http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2015/FY15_Green_Book.pdf

^v Office of Management and Budget, “Federal Climate Change Expenditures Report to Congress,” May 2007, Table 1, http://www.whitehouse.gov/sites/default/files/omb/legislative/fy08_climate_change.pdf

^{vi} FY15 DoD Greenbook, Table 2-1, http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2015/FY15_Green_Book.pdf

^{vii} Stockholm International Peace Research Institute, SIPRI Military Expenditure Database, http://www.sipri.org/research/armaments/milex/milex_database

^{viii} The Climate Group, “China on track to spend \$817 billion in environmental protection,” <http://www.theclimategroup.org/what-we-do/news-and-blogs/china-announces-us-817-billion-investment-in/>

^{ix} FY15 DoD Greenbook, Table 2-1, http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2015/FY15_Green_Book.pdf

^x Office of Management and Budget, “Federal Climate Change Expenditures Report To Congress,” August 2013, http://www.whitehouse.gov/sites/default/files/omb/assets/legislative_reports/fcce-report-to-

congress.pdf; Department of Defense, “Energy Investments for Military Operations: For Fiscal Year 2013,” http://energy.defense.gov/Portals/25/Documents/Reports/20120815_FY13_OE_Budget_Cert_Report.pdf

^{xi} Office of Management and Budget, “Federal Climate Change Expenditures Report To Congress,” August 2013, Table 2, http://www.whitehouse.gov/sites/default/files/omb/assets/legislative_reports/fcce-report-to-congress.pdf; Office of Management and Budget, “Federal Climate Change Expenditures Report To Congress,” June 2010, Table 2, http://www.whitehouse.gov/sites/default/files/omb/assets/legislative_reports/FY2011_Climate_Change.pdf; FY15 DoD Greenbook, Table 6-8, http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2015/FY15_Green_Book.pdf

^{xii} Office of Management and Budget, “Federal Climate Change Expenditures Report To Congress,” August 2013, Table 4, http://www.whitehouse.gov/sites/default/files/omb/assets/legislative_reports/fcce-report-to-congress.pdf; Office of Management and Budget, “Federal Climate Change Expenditures Report To Congress,” June 2010, Table 4, http://www.whitehouse.gov/sites/default/files/omb/assets/legislative_reports/FY2011_Climate_Change.pdf; U.S. Department of State, Congressional Budget Justification, Vol. 2: Foreign Operations, FY 2013, pp. 144-149, <http://www.state.gov/documents/organization.185014.pdf>

^{xiii} Department of Defense, “Energy Investments for Military Operations: Fiscal Year 2013,” June 2012, http://energy.defense.gov/Portals/25/Documents/Reports/20120815_FY13_OE_Budget_Cert_Report.pdf; Department of Defense, “Annual Energy Management Report, Fiscal Year 2008,” January 2009, <http://www.acq.osd.mil/ie/energy/library/DoDenenergymgmt08.pdf>; Department of Defense, “Annual Energy Management Report, Fiscal Year 2013,” June 2014, http://www.acq.osd.mil/ie/energy/energymgmt_report/FY%202013%20AEMR.pdf

^{xiv} Department of Defense, “Energy Investments for Military Operations: Fiscal Year 2013,” June 2012, http://energy.defense.gov/Portals/25/Documents/Reports/20120815_FY13_OE_Budget_Cert_Report.pdf; Department of Defense, “Annual Energy Management Report, Fiscal Year 2013,” June 2014, http://www.acq.osd.mil/ie/energy/energymgmt_report/FY%202013%20AEMR.pdf

^{xv} DoD Greenbook, Table 6-8, http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2015/FY15_Green_Book.pdf

^{xvi} Mother Jones, “Can’t Touch This,” <http://www.motherjones.com/politics/2013/12/pentagon-budget-deal-charts-cuts>

^{xvii} Stockholm International Peace Research Institute, SIPRI Military Expenditure Database, http://www.sipri.org/research/armaments/milex/milex_database

^{xviii} Adapted from Winslow Wheeler, Center for International Policy, <http://www.pogo.org/blog/2014/04/an-inadequate-defense-budget.html>

^{xix} United States Drought Monitor, Tabular Data Archive, <http://droughtmonitor.unl.edu/MapsAndData/DataTables.aspx?CA>

^{xx} CBS Local, “Monsoon Helps Ease Drought In Southwest States,” <http://denver.cbslocal.com/2014/08/07/monsoon-helps-ease-drought-in-southwest-states/>

^{xxi} USA Today, “California wildfire spurs evacuation of more than 500 homes,” <http://www.usatoday.com/story/news/nation/2014/07/26/california-wildfire-spurs-evacuation-of-700-homes/13228457/>

^{xxii} Richard Howitt, Josué Medellín-Azuara, Duncan MacEwan, Jay Lund, Daniel Sumner, “Economic Analysis of the 2014 Drought for California Agriculture,” Center for Watershed Sciences, University of California, Davis, July 15, 2014

^{xxiii} National Climate Assessment, Full Report, <http://nca2014.globalchange.gov/node/1961>

^{xxiv} Food and Agriculture Organization of the United Nations, “Drought and civil war create food crisis in sub-Saharan Africa,” <http://www.fao.org/english/newsroom/global/GW9915-e.htm>

^{xxv} NBC News, “Typhoon Haiyan: A crisis by the numbers,” <http://www.nbcnews.com/news/other/typhoon-haiyan-crisis-numbers-f2D11609327>

^{xxvi} http://ec.europa.eu/health/ph_projects/2005/action1/docs/action1_2005_a2_15_en.pdf

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