

The U.S. Military and Climate Change

Pat Elder, World BEYOND War
July 1, 2019



Four American A-10 jets and two AC-130 gunships struck hundreds of trucks used to transport oil in eastern Syria in this 2015 photo. - Daily Caller News Foundation

Oil is the lifeblood coursing through U.S. foreign policy, a policy based on maintaining superpower status and confronting those whom the U.S. perceives as challenging American military and economic interests.

Who didn't know that?

Current U.S. strategic thinking has developed from the 1980 Carter Doctrine, which stated that the United States would use military force to defend its national interests in the Persian Gulf.



President Jimmy Carter, the “human rights” president with the Shah of Iran.

According to Pat Hynes, a retired environmental engineer and Professor of Environmental Health at Boston University School of Public Health, “Since the late 1970s, the [U.S. has spent \\$8 Trillion](#) protecting oil cargoes in the Persian Gulf region through ongoing military patrols.”

That’s more than twice the German Gross Domestic Product, (GDP).

Keeping oil and gas supply sea lanes in the South China Sea open, in the face of China's rightful place there, is also crucially important to American war planners.

Sustaining American military dominance is reliant on oil, the lifeblood of war. Human, animal, and vegetative life are much less significant. Respect for the environment and human rights is not part of the mission, although they say it is.

The Americans consider themselves peacemakers, following in the philosophical tradition of Carl von Clausewitz. “To secure peace is to prepare for war.” War is part of the American psyche; It is a great sport for many.

Last year, an estimated \$1 trillion was allocated toward the military. That includes the Pentagon’s budget, maintaining a militarized security state, veterans, and debt from recent wars. Just a few billion US tax dollars were allocated to research and devel-

opment for energy efficiency and renewable energy technologies - and those dollars are in jeopardy.

Burning oil, finding oil, processing oil, shipping oil, storing oil, defending oil, and fighting for oil is much more profitable to thousands of politically connected American corporations than developing renewable energy sources, especially when the federal government is generally unsupportive.

Militarism is the most oil-intensive activity on the planet while the U.S. has been the number one warmaker in the modern era. Zoltan Grossman with Evergreen University has developed a list of 87 U.S. military interventions since 1945. War fighting uses a lot of oil.

Barry Sanders, in his book, *The Green Zone* (2009) figured the US military consumes as much as one million barrels of oil per day and contributes 5 percent of current global warming CO2 emissions. But Pat Hynes says jet fuel emissions are likely to be three times higher per gallon than those from diesel and oil. Further, Hynes writes, "Aircraft exhaust has unique polluting effects that result in greater warming effect by per unit of fuel used. Radiative effects from jet exhaust, including nitrous oxide, sulphur dioxide, soot, and water vapor exacerbate the warming effect of the CO2 exhaust emissions." Because military jets fly at much higher altitudes than commercial jets, they use additives to ensure that the fuel lines do not freeze.

Hynes says the U.S. expends 37 percent of the global military budget and its military is estimated to contribute 5 percent of climate change emissions. She asks, "Can we not, then, assume that the rest of world's military spending, weapons manufacturing, military exercises, and conflict combine to bring military-related fossil fuel emissions to near 15 percent of global climate change pollution?"

U.S. armed forces have more than two million people, 11 nuclear aircraft carriers, and the most advanced military aircraft. Further, the US has been continuously at war since late 2001, with the US military and State Department currently engaged in more than 80 countries in counterterror operations. All this capacity for and use of military force requires a great deal of energy, most of it in the form of fossil fuel.

[A paper published in June, 2019 by Neta Crawford](#) of Boston University examines military fuel usage for the US post-9/11 wars and the impact of that fuel usage on greenhouse gases emissions. The best estimate of US military greenhouse gas emissions from 2001, when the wars began with the US invasion of Afghanistan, through 2017, is that the US military has emitted 1,212 million metric tons of greenhouse gases (measured in CO2equivalent, or CO2e). Between 2010 and 2015, the armed services purchased an average of 102 million barrels of fuel per year from the DOD

In the most recent year for which statistics are available, total greenhouse gas emissions by the DOD for FY2017 were about 58.4 million metric tons of CO2 equivalent. Now, I realize these numbers come across as being pretty abstract, so I will try

to make some sense of them using the Environmental Protection Agency's (EPA's) [Greenhouse Gases Equivalencies Calculator](#)



High Mobility Multipurpose Wheeled Vehicles (HUMVEES) parked at the U.S. military's Camp Liberty in Baghdad in 2011. Thousands of Humvees were commandeered by ISIS militants when they overran Mosul in 2014. Photo: Reuters/Mohammed Ameen

The 60,000 Humvees in the US Army each get, on average, about 2.5 kilometers per liter and - we'll say - they each are driven 16,000 kilometers in a year.

Each Humvee would burn 10,000 miles divided by 6 gallons or 1,666 gallons. Multiply that by 60,000 Humvees and that comes to 99,960,000 gallons. **(378,000,000 liters.)** Now we'll go to the calculator:

If You Have Energy Data	If You Have Emissions Data
<input type="text" value="99,960,000"/>	<input type="text" value="gallons of gasoline"/>
<input type="button" value="Calculate"/>	

Equivalency Results

The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. **This is equivalent to 888,345 Metric Tons of Greenhouse gas emissions.**

888,345 Metric Tons of Greenhouse gas is also released into the Earth's environment by these activities:



188,608 Passenger vehicles driven for one year

-or-



3,475,186,385 Kilometers driven by an average passenger vehicle

-or-



440 million kilos of coal burned

-or-



11,760 tanker trucks' worth of gasoline

-or-



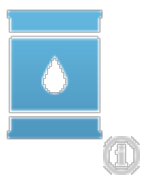
106,376 homes' energy use for one year

-or-



4,847 railcars' worth of coal burned

-or-



2,056,705 barrels of oil consumed

-or-



.228 coal-fired power plants in one year

-or-



113 Billion smartphones charged

Greenhouse gas emissions avoided by not having those Humvees:



281 Million Kilotons of waste recycled instead of landfilled

-or-



38,760,178 trash bags of waste recycled instead of landfilled

-or-



188 Wind turbines running for a year

-or-



33,742,717 Incandescent lamps switched to LEDs

Note: *Carbon sequestration is the process involved in carbon capture and the long-term storage of atmospheric carbon dioxide to mitigate global warming. It is a way to slow the atmospheric accumulation of greenhouse gases, which are released by burning fossil fuels.*

Carbon sequestration required to recapture 888,345 Metric Tons of Greenhouse gas emissions:



14,688,965 tree seedlings grown for 10 years

-or-



422,000 hectares of forests in one year

-or-



Nearly 3,000 hectares of forests preserved from conversion to cropland in one year

Carbon emissions per barrel of oil are 0.43 metric tons. The Humvees burned the equivalent to 888,345 Metric Tons of Greenhouse gas emissions. This is equivalent to 2,056,705 barrels of oil.

Table 1. Examples of US Military Aircraft Jet Fuel Consumption and CO2 Emissions³⁶

<i>Aircraft</i>	<i>Mission</i>	<i>Internal Fuel Capacity pounds and in gallons³⁷</i>	<i>Range in nautical miles on internal fuel</i>	<i>Fuel consumption, gallons per nautical mile</i>	<i>Metric Tons of CO2e Emissions, without aerial refueling.³⁸</i>
B-2	Bomber	167,000 lbs/ 25,692 gal	6,000	4.28 gallons/mile	251.4 Metric Tons
F-35A (CTOL)	Fighter bomber	18,499 lbs/ 2,846 gal	1,199	2.37 gallons/mile	27.8 Metric Tons
A-10	Close Air Support	11,000 lbs/ 1,692 gal	500	3.38 gallons/mile	17.5 Metric Tons
KC-135R	Refueling Tanker	50,000 lbs/ 7,692 gal	1,500 (loaded with 150,000 lbs of transfer fuel)	4.9 gallons/mile	75.3 Metric Tons
KC-46A ³⁹	Refueling Tanker and Cargo	<i>Estimated 16,000 gal</i>	6,385 (loaded with 210,000 lbs of transfer fuel)	<i>Estimated 2.9 gallons/mile</i>	156.5 Metric Tons

*From “Pentagon Fuel Use, Climate Change, and the Costs of War “
- Neta C. Crawford, Boston University June 12, 2019*

My friend and colleague [David Swanson reports](#) that the U.S. conducted 29,200 air strikes during the invasion of Iraq in 2003. U.S. air forces conducted at least another 3,900 air strikes in Iraq over the next eight years. In the meantime, the U.S. has flown at least 38,100 air strikes in Afghanistan since 2002.

The following exercise will attempt to measure the carbon footprint of *one mission* involving 17 planes that attacked Libya in 2017.



*Fox News image of a B-2 bomber over Libya on January 19, 2017 -
President Obama's last day in office.*

On 18 January 2017, two B-2 bombers, accompanied by fifteen KC-135 refueling tankers made a 30-hour round-trip mission from Whiteman Air Force Base to Sirte, Libya to drop bombs on ISIS targets in Libya.

5,615 mi

Distance from Whiteman AFB to
Tripoli



5,615 miles = 9,000 Kilometers

Let's use the [Greenhouse Gases Equivalencies Calculator](#) for this *one mission* involving 17 planes.

- A B-2 Bomber gets 4.28 gallons of jet fuel per mile. So, each plane burns 24,032 gallons of jet fuel. ($5,615 \times 4.28$)
- A gallon of jet fuel produces roughly three times the CO₂ emissions than a gallon of gasoline. $24,032 \times 3 = 72,096$.
- $72,096 \times 2$ B-2's = 144,193 gallons of gasoline equivalent.
- And another 144,193 gallons of gasoline because they all made it back to Missouri.
- Total - 288,383 gallons gasoline equivalent for the B-2's
- Total – 1.09 million liters of gasoline equivalent for the B-2's

Now, we'll look at the refueling tankers.

- A KC-135 uses 4.9 gallons per mile.
- Each KC-135 used 27,513.5 gallons of gasoline equivalent.
- $27,513.5 \times 15 = 412,702$
- Times 2 because they all came back = 825,405 gallons of gasoline equivalent for the tankers.
- That's 3.1 million Liters of gasoline equivalent

Now we'll add the B-2's and the tankers together:

- **The B-2's and the KC-135's burned 1,113,788 gallons of gasoline equivalent for this mission. That's 4.2 Million Liters of gasoline equivalent.**

And all of that comes to 9,898 Metric Tons of greenhouse gas emissions.

We'll have to plant 163,669 tree seedlings and wait ten years to pull that much carbon out of the air.



The B-2 carries eighty (230 kg) Mk 82 JDAM Global Positioning System-guided bombs.

The Mk 82 bomb contains 87-89 kg of high explosives. It produces a lethal area of blast and shrapnel 240 m by 80 m. It's tough to determine the carbon footprint of these bombs considering the environmental disaster of the explosion and the biological life that is destroyed, further depleting the forces of sequestration.

Let's look at the bigger picture.



***How important is the Persian Gulf to the U.S. now that the Americans are using less oil?
The U.S. military uses massive amounts of fuel to protect access to Persian Gulf oil.***

Neta Crawford argues in her influential June, 2019 piece that the Pentagon has become increasingly concerned that climate change poses threats and challenges to military installations and operations. This is coupled with a concern that fuel dependency makes the US military vulnerable.

Crawford explains the world's greatest dilemma, "The DOD assumes that climate change will be a disaster for the institution and the planet no matter what they do, even as they believe that they must continue to protect access to Persian Gulf oil so that the US and the rest of the world can burn as much oil as it wants at as low a price per barrel as possible."

The Pentagon is oblivious to reality. The institution is so large it is not entirely cognizant of what all its parts are doing, and it certainly cannot understand how they operate together.

Crawford's paper is rich with data. "The installation tail that supports US operations and power projection capability includes more than 560,000 buildings at about 500 installations, located on over 27 million acres of land in the US and across the globe. In FY2017, the DOD spent \$3.5 billion to heat, cool, and provide electricity to its fa-

cilities, down from the previous year, when it spent \$3.7 billion. Each installation, of course, can produce greenhouse gas emissions. The Pentagon building itself emitted 24,620.55 metric tons of CO₂e in 2013.”



The Pentagon’s overall trend in installation consumption of energy over the last ten years has been downward. The US has reduced fuel consumption so that it is less dependent on fossil fuel.

Operational energy use, defined as the energy “required for training, moving, and sustaining military forces and weapons platforms” accounts for 70 percent of DOD energy consumption. Most operational energy consumed is in the form of “bulk fuel” purchases of jet (JP-8 and JP-5) and diesel fuel.

In 2014 the DOD consumed 87.4 million barrels of petroleum. Jet fuel consumption by all the armed services accounted for more than 70 percent of operational energy use that year.

The US Navy uses more than 180 nuclear reactors to power over 140 submarines and surface ships including all 11 US aircraft carriers and 70 submarines.

Although nuclear power reactors do not produce direct carbon dioxide emissions, the processes for mining and refining uranium ore and making reactor fuel all require massive amounts of energy. Nuclear subs and ships have a mighty carbon footprint, worthy of study and scorn.

In any one year, the Pentagon's emissions are greater than many smaller countries total greenhouse gas emissions. For example, in 2017, US DOD greenhouse gas emissions were 59 million metric tons (not including biogenic emissions) of CO₂e. In that same year, Pentagon emissions were greater than Finland, which emitted 46.8 million metric tons, Sweden which emitted 50.8 million metric tons, and Denmark which emitted 33.5 million metric tons of CO₂e.

Crawford estimates the share of US greenhouse gas emissions from US based military industry to be about 15 percent of total US industrial greenhouse gas emissions.

She writes, "If half of those military related emissions are attributable to the post-9/11 wars, then US war manufacturing has emitted about 2,600 million megatons of CO₂ equivalent greenhouse gas from 2001 to 2017, averaging 153 million metric tons of CO₂e each year."

Targeting Oil



NATO convoy attacked in Pakistan in 2015 - Photo AFP: Banaras Khan

Combatants have been igniting enemy oil for many years. Now, we understand it is a crime against people and the planet.

Between 2008 and 2014 convoys carrying oil were attacked on their way through Pakistan to NATO bases in Afghanistan 485 times. In 1991 the Iraqi Army set oil pro-

duction facilities in Kuwait aflame as it retreated. In April and May 1991, an estimated 3 million barrels of oil were burned every day. If so, that would amount to roughly 180 million barrels. We've seen that carbon emissions per barrel of oil are 0.43 metric tons - so 77.4 million metric tons of CO₂ were released. This has the same carbon impact as 8.7 Billion gallons of gasoline or enough to heat 10,000,000 homes for a year.

Looking at it the other way, we'd have to plant nearly 1.3 billion seedlings to hope to recapture the carbon in ten years. War is a crime, an environmental crime against humanity and the planet.

In the 2003 invasion of Iraq, oil wells were set afire by the Iraqi military and burned for several months. Starting in September 2014 the US targeted tanker trucks, and oil refinery and storage sites controlled by ISIS as a means of cutting off their revenue stream. Oil infrastructure was targeted again in 2015, when the US bombed ISIS oil infrastructure. And when ISIS retreated, it set oil wells and pipelines on fire in Iraq and Syria. The skies turned black for weeks.

Deforestation



The “Mother of All Bombs,” the GBU-43/B Massive Air Blast, is the most powerful non-nuclear weapon in America’s arsenal with an 11-ton TNT wield. Here, it is tested at Eglin Air Force Base, Florida. (Hiroshima = 15,000 tons TNT)

War and training for war wipes out forests so we must calculate the loss of actual and future carbon sequestration due to deforestation. In Afghanistan, war caused migration which exacerbated illegal logging. In the Sahel region of Africa, war has also brought massive migration, leading to clearing of lands for firewood, etc.

And climate change contributes to war. For instance, drought in Syria from 2007 to 2010 helped to trigger mass migration to cities, creating conditions that contributed to the emergence of the civil war in 2011.

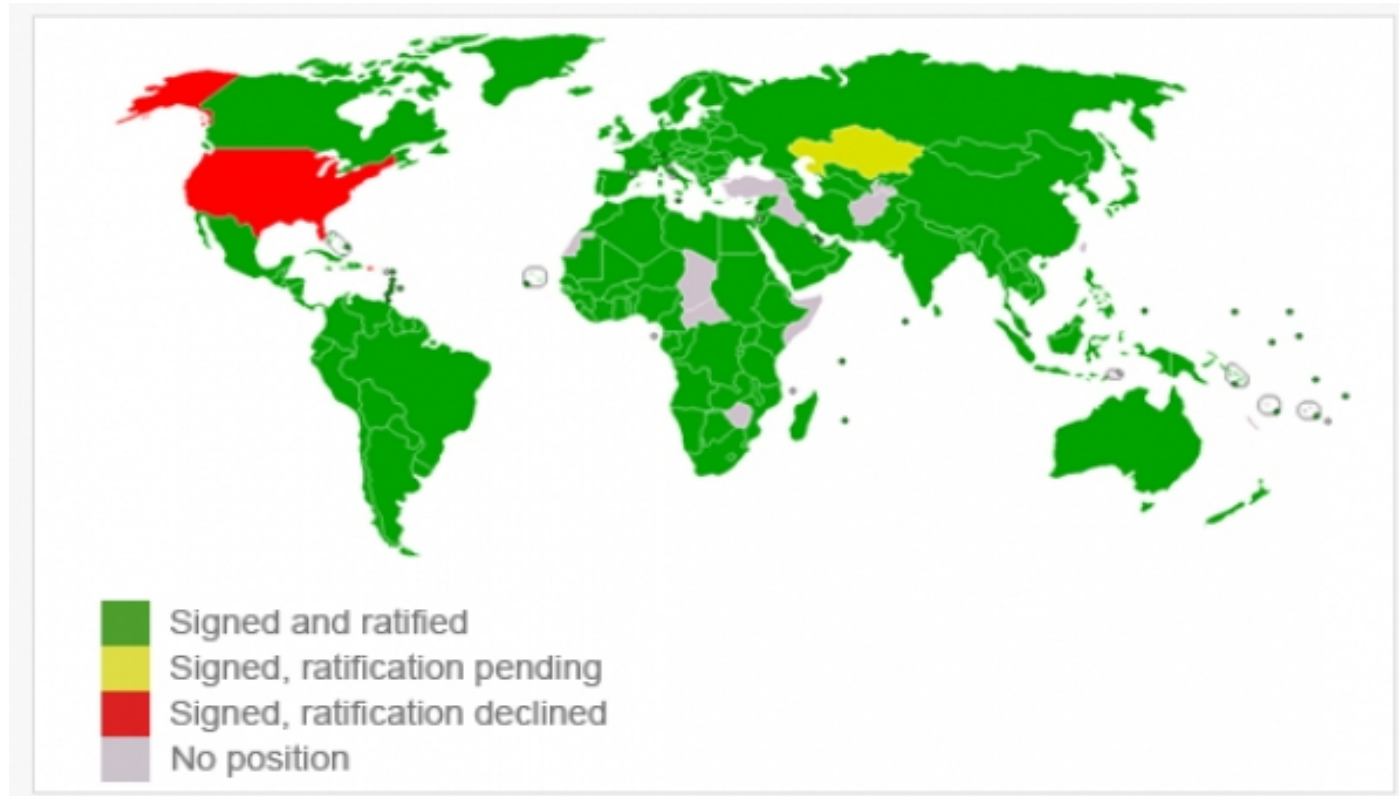
Pat Hynes summarizes the issue this way:

The entire Middle East inexorably faces a hotter, drier climate from climate change that will further stress water resources, agriculture, food prices and existing conflicts. Thus, the seeds of future conflicts in authoritarian and unequal societies may also include scarce water resources as farmers and thirsty people, opportunistic politicians and powerful corporations contend for that diminishing resource.

The UN's Intergovernmental Panel on Climate Change has been consistently warning the world that water and its availability and potability will be among the most critical issues facing societies while the climate is assaulted and the earth chokes on carbon emissions. As the availability of water diminishes, it is also becoming less safe to drink due to an onslaught of military and industrial contamination.

It should be noted that re-building Syrian (and Iraqi, Afghan, Yemeni, Pakistani, Somali, Libyan..) schools, homes, businesses, bridges, roads, and hospitals reduced to rubble by war will require millions of tons of cement, the most fossil fuel intensive of all manufacturing industries.

Kyoto Protocol Participation



Kyoto Protocol Participation - Loyola University, Chicago, 2019

Neta Crawford points out that, as part of the Kyoto Protocol, signed in December 1997, the US insisted that fuel sold to ships and aircraft for international transport and for multilateral military operations, “bunker fuels” should not be counted against a country’s total emissions. As the US Undersecretary of State Stuart Eizenstat said in testimony to Congress:

“The Kyoto Protocol did not limit the US: We took special pains, working with the Defense Department and with our uniformed military, both before and in Kyoto, to fully protect the unique position of the United States as the world's only superpower with global military responsibilities.”

Department of Defense
Climate-Related Risk to DoD Infrastructure
Initial Vulnerability Assessment Survey
(SLVAS) Report



January 2018

Office of the Under Secretary of Defense
for Acquisition, Technology, and Logistics

The 2018 Screening Level Vulnerability Assessment Survey (SLVAS) of DoD sites worldwide provided a tool to begin to qualitatively understand climate-related military vulnerabilities. Of the 1,531 **Air Force** sites 60% reported having experienced some effects resulting from past flooding, extreme temperature, drought, wildfire or wind events. In very few cases did data show effects to be so extreme as to cripple the operational mission of a Base. The single most prevalent factor was drought which accounted for 42% of all reported effects, followed by non-storm surge flooding and wind at 19% each.

Of the 761 **Navy** sites surveyed in SLVAS, 73% indicated some sort of effect from past flooding, extreme temperatures, drought, wildfire or wind events. The most prevalent factor was wind events, followed by non-storm surge flooding and flooding

due to storm surge. Of the 292 Navy sites surveyed that are located within 2km of the coastline, 45% of the sites indicated some sort of effect from storm surge and non-storm surge flooding. Neither the Marine Corps nor the Army provided statistics like the other branches, although they passed on scant anecdotal evidence of climate-caused destruction.



This submarine drydock in Norfolk, Virginia is usually.. dry.



The Missouri River floods the runway at Offutt AFB in Nebraska. Flooding also tends to spread carcinogens like PFAS and TCE from bases.

Although President Trump publicly denies that global warming is a problem, the American military intelligentsia knows otherwise. Earlier this year Daniel R. Coats, Director of National Intelligence told the Senate Select Committee on Intelligence:

“Global environmental and ecological degradation, as well as climate change, are likely to fuel competition for resources, economic distress, and social discontent through 2019 and beyond. Climate hazards such as extreme weather, higher temperatures, droughts, floods, wildfires, storms, sea level rise, soil degradation, and acidifying oceans are intensifying, threatening infrastructure, health, and water and food security. Irreversible damage to ecosystems and habitats will undermine the economic benefits they provide, worsened by air, soil, water, and marine pollution.”

But we have Trump.



**President Trump is the chief fossil fuel advocate of U.S. industry
and the commander in chief of U.S. military forces.**

The Pentagon's overall trend in installation consumption of energy over the last ten years has been downward, but the military's push to reduce energy consumption is not being championed by the Trump administration.

Despite Trump's Neanderthal stance, the military is making modest investments in solar generation and other renewable energy, although switching to renewable sources has yielded the savings in emissions offsets of less of than 1 percent of US DOD Greenhouse Gas emissions, according to Crawford.



The U.S. Marines have constructed some solar panels in Afghanistan to supply electricity.

In June of 2019 the EPA replaced Obama's Clean Power Plan for reducing carbon pollution with the so-called Affordable Clean Energy rule. Generally, the new rule will do nothing to regulate dangerous greenhouse gas emissions from coal-burning power plants.

According to an analysis from Resources for the Future, a nonpartisan think tank, the Affordable Clean Energy rule would lead to a 28 percent increase in CO2 emissions by 2030.

War planning is driving the coal train. Here's what Trump had to say to his base in coal-rich West Virginia, while announcing relaxed environmental standards:

"You know coal is indestructible stuff. In times of war, in times of conflict, you can blow up those windmills. They fall down real quick... You can do a lot of things to those solar panels. But you know what you can't hurt? Coal."

Certainly, this is twisted thinking, but so is the focus of Pentagon planning, which is to safeguard the flow of cheap oil, further exacerbating climate catastrophe while jeopardizing U.S. bases and fomenting political, social, and economic instability around the world.

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Reducing military fuel use would lessen the primary *casus belli* on the planet today. The U.S. military should stand down from its current threatening posture, allowing the world to catch its breath. The resulting reductions in greenhouse gases would give the planet a chance to recover while a drastically downsized military footprint would let trees grow where bases lie, creating a boost for carbon sequestration.

Aging peace activists and youthful environmentalists are coming together to open a new front in the war against fossil fuels. This mission targets the U.S. military where it is most vulnerable.