Global Warming Heats Up Global Conflict

Historically, the United States is the world's largest emitter of heat-trapping greenhouse gases. Yet our country will not feel the earliest or most dramatic effects of global warming. Instead, many less-developed nations, which are already struggling to overcome poverty, poor governance, fragile infrastructure, and, in some cases, ongoing conflict, will be hard hit by desertification, more extreme weather events, infectious diseases, rising sea levels, and changes in weather patterns and fresh water distribution that can reduce agricultural production.

Increased competition to secure resources and meet basic needs is likely to exacerbate societal or cross-border tensions and, in some cases, lead to violent conflict, threatening international and U.S. security. Already some small island nations are being forced to relocate their populations, and desertification is fueling deadly conflicts in places such as Sudan and Kenya.

U.S. policymakers are not blind to the threats posed by global warming. President Obama's first National Security Strategy, released on May 27, 2010, notes, "The change wrought by a warming planet will lead to new conflicts over refugees and resources; new suffering from drought and famine; catastrophic natural disasters; and the degradation of land across the globe."[1] Congress has held hearings on the relationship between the environment and national security, and the Pentagon has identified climate change caused by global warming as one of the greatest threats to U.S. security.[2] Yet, change in U.S. policy has not matched the pace of rising global temperatures.

The United States has both a moral responsibility and a national interest in planning for the effects of global warming, working urgently to reduce carbon emissions, and helping communities at home and abroad to mitigate and adapt to the negative effects of global warming. Through bold leadership toward a new clean energy future, the U.S. has an opportunity to help prevent violent conflict and forge a new era of environmental collaboration rather than resource competition among nations.

Ugandan girl searches for water. Increased population and a drier climate put pressure on resources. *IRIN*

This brief examines a number of key ways that the effects of global warming may exacerbate or fuel violent conflict. Specifically it addresses: U.S. energy dependence and the military's role in both protecting energy interests and fueling that dependence; the military's increased share of the humanitarian response burden; stresses on fragile governments from mass migration due to environmental changes; food insecurity; and dueling potential for violent conflict or cooperation between the United States and China. The brief concludes with suggestions for environmental peacebuilding and policy recommendations. The intention here is to provide a broad frame for understanding how the effects of global warming could affect peace and global security.

Key Policy Recommendations

- Congress should pass comprehensive climate legislation.
- The United States should meet its Copenhagen Accord commitment by contributing $25 billion annually to international adaptation.
- The United Nations Framework Convention on Climate Change should administer all international adaptation and mitigation funding.
- USAID should mainstream violence prevention and environmental adaptation throughout its programming.
- The U.S. Senate should ratify the U.N. Convention on the Law of the Sea.

See detailed recommendations on p. 9

The U.S. Military: Great Protector—and Consumer—of Fossil Fuels

The 2008 National Defense Authorization Act mandated that the Pentagon consider the effects of global warming on national security in the 2010 Quadrennial Defense Review (QDR). Released in February of 2010, the QDR finds that "climate change will contribute to food and water scarcity, will increase the spread of disease, and may spur or exacerbate mass migration. While climate change alone does not cause conflict, it may act as an accelerant of instability or conflict, placing a burden to respond on civilian institutions and militaries around the world."[3]

> *"We assess that climate change alone is unlikely to trigger state failure in any state out to 2030, but the impacts will worsen existing problems—such as poverty, social tensions, environmental degradation, ineffectual leadership, and weak political institutions. Climate change could threaten domestic stability in some states…particularly over access to increasingly scarce water resources. We judge that economic migrants will perceive additional reasons to migrate because of harsh climates, both within nations and from disadvantaged to richer countries."*[4]
>
> —Dr. Thomas Finger, Deputy Director of National Intelligence for Analysis, 2008.

The U.S. military clearly recognizes the threat that global warming poses to both domestic and international security. The U.S. military was called upon to respond in relief efforts during the 2004 tsunami in Indonesia, Hurricane Katrina in 2005, and most recently, in the devastating earthquake in Haiti in January 2010. Increased extreme weather events will likely require the U.S. military to respond to humanitarian disasters more often in the future, and global warming directly threatens military installations and the effectiveness of existing infrastructure.

Worse still, climate change caused by global warming will deeply affect the lives of people around the world and make more difficult governments' ability to meet the basic needs of their people, providing ripe conditions for violent conflict and increasing demands for U.S. military intervention in response. In turn, war devastates ecosystems and livelihoods, adding to the very poverty and instability that perpetuates a cycle of violent conflict.

Consequently, the Department of Defense has been one of the first U.S. government agencies to actively plan for the effects of global warming and to take concrete action to prepare for a changing security picture. The Pentagon has also begun investing part of its massive budget into research and development of alternative energy technologies and is making at least some efforts to try to "green" its own operations. Ironically, though, as one of the world's largest consumers of fossil fuels, the U.S. military is fueling the very threat it wants to mitigate.

The U.S. government as a whole is the fourth largest consumer of fossil fuels in the world; the military accounts for 80% of the U.S. government's energy consumption.[5] Maintaining over a thousand bases around the world and fighting wars in far away places requires vast amounts of fossil fuel.[6]

The "fully burdened cost of fuel"—how much it actually costs in personnel and operations to transport fuel to the battlefield—costs between 2 and 20 times the market price, depending on when and where it is needed. That can be as much as $400 per gallon. A huge portion of the $20 billion Pentagon energy budget is actually dedicated to getting the fuel to where it needs to go.[7]

Moreover, access to cheap fossil fuels drives U.S. foreign policy, entangling the country in a complex web of

Rescue helicopter. *IRIN*

dependence and military engagement that threatens international relationships and ultimately undermines U.S. and global security.

While policymakers see access to cheap fuel as an imperative to keep the U.S. economy running, the U.S. reliance on the military to protect oil interests sets up a devastating cycle in which the military has been used to defend U.S. oil interests even as it consumes a massive quantity of oil to maintain itself, and emits huge amounts of greenhouse gases in the process. Reliance on a large military presence around the world to protect U.S. energy dependence in turn exacerbates global warming, and contributes to the very problem the military identifies as one of the greatest threats to U.S. security. This pervasive global U.S. military presence also fuels anti-U.S. sentiment and increases the threat of direct violence against U.S. citizens and military personnel.

To their credit, some policy advisors within the U.S. military understand the dangers that U.S. energy dependence and global warming pose to troops and operations, as well as U.S. and global security. As Retired General Gordon R. Sullivan, member of the CNA Military Advisory Board[8] explained:

> "Energy security, economics, climate change—these things are connected…It's a system of systems. It's very complex….As with other interconnected systems, each of these areas affects one another and the stability of the global economy and national security…."[9]

Adding to the problem, over the past 60 years, Congress and the Executive branch have increasingly put their faith and resources into the military to act as the primary agent of U.S. foreign policy, while under-resourcing civilian agencies such as the State Department and United States Agency for International Development (USAID), which should be better equipped to deal with complex security threats like global warming that ultimately require civilian—not military—solutions. As global warming multiplies the threat of violent conflict worldwide and increases incidences of natural disasters, the military may be called upon even more to undertake what should be civilian tasks.

While new technologies and "greening" the Pentagon should be part of the solution in the short-term, a better long-term approach would be to reduce U.S. military engagement worldwide and invest in stronger civilian diplomacy and development to help mitigate the negative effects of global warming and to help prevent violent crises before they erupt.

A fuel supply convoy makes its way through the mountains of Afghanistan. *U.S. Army*

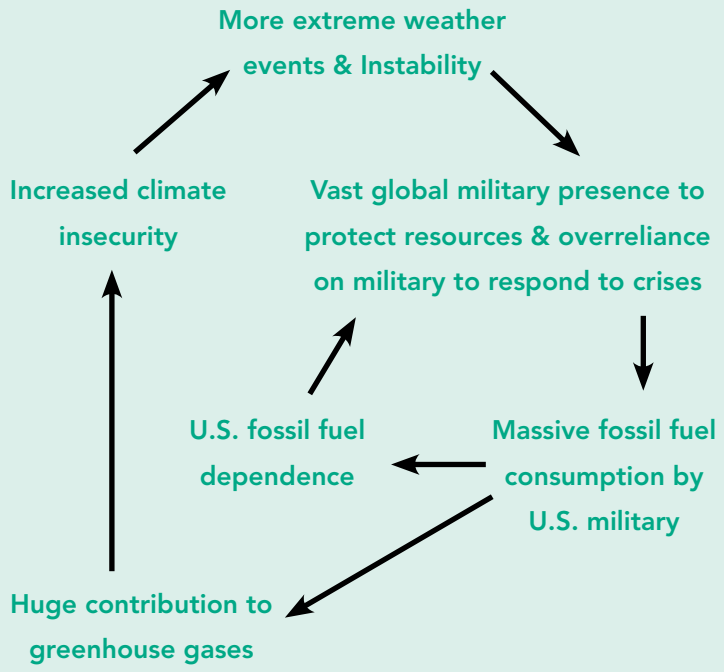
Although Secretary of Defense Robert Gates has been one of the most outspoken advocates for building up civilian agencies like the State Department and USAID, the Pentagon as a whole seems determined to maintain its dominant size, and Congress continues spending money on producing major weapons systems that even the military does not want.

Reducing the size of the military, cutting unneeded weapons systems, bringing troops home from Afghanistan and Iraq, and demilitarizing U.S. foreign policy would significantly reduce U.S. consumption of and dependence on fossil fuels. Investing a small portion of the resources saved in civilian-led mitigation and adaptation strategies could help prevent the worst environmental and conflict crises, while saving lives and treasure.

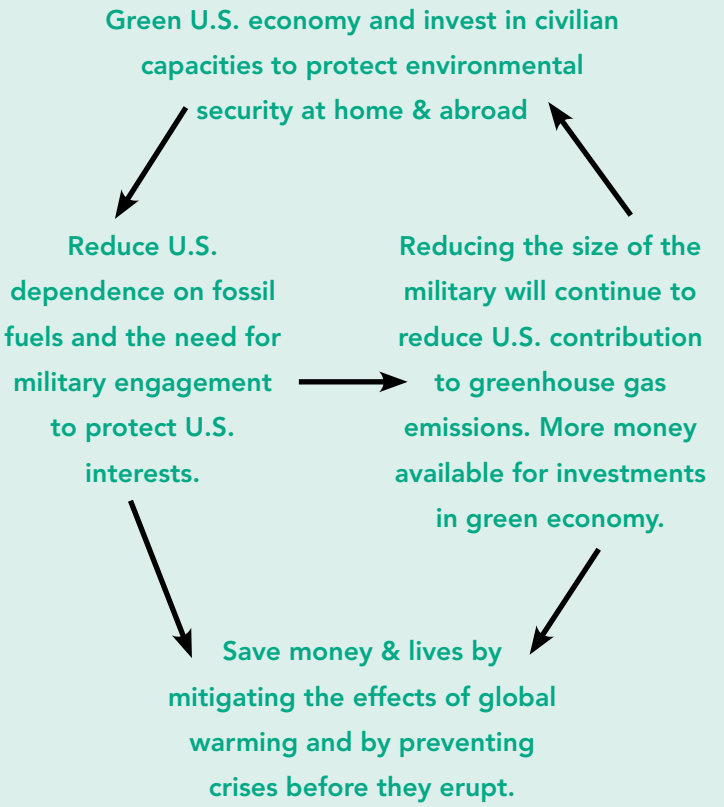
Bases, Bases Everywhere

The U.S military has a ubiquitous presence throughout the world with around 1000 military bases worldwide, almost five times the number of bases of all the other NATO countries put together.[10] Some of those bases cause irrevocable damage to the environments where they are located, as demonstrated by the base on the U.S. protectorate of Guam. The EPA rated the proposed expansion of the military base on Guam as "environmentally unsatisfactory," its worst rating. Their report cites violations to the Clean Water Act, the destruction of 71 acres of coral reef, and a lack of clean water and waste management infrastructure to support an increase of 80,000 military personnel to the island.[11] It is not only the Pentagon's energy consumption that endangers the environment; it is also the inevitable harm to local habitats and ecosystems caused by military installations and the infrastructure needed to support personnel and equipment.

Self Perpetuating Cycle of Climate Insecurity



To Break the Cycle:



People on the Move

Many factors contribute to migration, that is, the movement of people from one place to another within a country or across national borders. While a principal driver remains economic opportunity, the effects of global warming on local ecosystems and weather patterns is increasingly being recognized as one of the root causes that pushes people to migrate.

For agricultural communities in particular, changing global temperatures and an increase in extreme weather events can destroy livelihoods and leave families unable to provide for themselves. Migration specialists are now debating the extent to which environmental stresses have already influenced migration flows. As the effects of global warming are felt more broadly and more intensely in the years to come, migration will likely increase.

In many cases, people will move from rural to urban settings, leaving land that can no longer provide a living to seek opportunities in cities. For the first time in human history, the majority of the world's people now live in cities, and this trend is expected to continue over the coming decades. The United Nations estimates that by 2050, 67 percent of the population in developing nations will live in cities, a trend already seen in developed countries.[12] This type of migration, while often contained within the borders of a nation, can create new problems at both the local and global level.

Growing populations in cities strain government services and, without careful city planning, add to pollution and carbon emissions. Urbanization in developing countries has been characterized by a proliferation of slums on the outskirts of large cities that rarely have adequate sanitation, access to water, or structural integrity.

Additionally, according to a USAID report, "urban centers may be more prone to conflict and unrest, especially where pervasive poverty and the erosion of human security interact with a keener sense of relative deprivation and a greater capacity to mobilize and recruit large numbers of people."[13]

Increasing social, economic, and political tensions that arise from increased resource competition and a growing rural/urban divide can undermine stability within and across national borders.

While most migration will likely be intra-state, as environmental conditions worsen throughout already impoverished countries, people may also begin moving across borders as well. The United States has direct experience along its southwest border with the very real potential for social, political, and economic conflict related to migration.

While migration has the potential to disrupt the current geographical distribution of human communities and to fuel violent conflict if not handled with care, some academics, like Dr. Susan Martin of Georgetown University's School of Foreign Service, see migration as a positive adaptive response to the effects of global warming. In 2007, the International Monetary Fund estimated that migrant communities sent $336 billion back to their countries of origin. In fact, remittances account for a significant portion of gross domestic product (GDP) in some countries. In 2008, for example, an estimated 25% of Haiti's GDP came from remittances, and Haitians living abroad are playing an important role in reconstruction since the 2010 earthquake.[15]

If properly directed, Dr. Martin suggests that remittances could be a positive source of support to help communities adapt to the effects of global climate change. In some countries, remittances could far exceed the funds provided by either the government or international donors to provide for mitigation and adaptation. Currently remittances are not organized by communities on either the sending or receiving end and they support only individual family needs. Conceivably, however, with the right support, education, and coordination, remittances could also become a communal resource for adaptation.[16] Some portion of money sent back to home communities could be pooled and directed specifically toward sustainable development projects that would help meet both individual and community needs. In turn, migration itself could be reduced as communities become more able to withstand the effects of global warming and maintain viable economies. Remittances should in no way supplant the responsibility of developed countries to provide funding for international adaptation. They could, however, provide an additional resource to support communities and reduce widespread migration.

Traditional wooden boat floats on the Congo River in the Democratic Republic of Congo. A rare moment of peace in a country torn by war. *IRIN*

Withered bean plant. Farmers in Kenya and elsewhere experience more failed crops. *IRIN*

Environmental Conflict in Darfur

Water scarcity will likely be a common characteristic of future conflicts. The humanitarian crisis in Darfur, Sudan may be the canary in the coal mine for future conflicts sparked by competition for natural resources. Many people characterize the mass atrocities in Darfur as ethnic violence or genocide, but the conflict began over water. The Arab population of Southern Sudan was traditionally nomadic and for centuries coexisted with the Africans of South Sudan who were farmers. When desertification of the Sahel became more pronounced in recent decades, however, competition over scarce water and land led to rising conflict between the two groups. Without enough water to nourish the crops and the grasslands, neither group could survive. An abusive government was able to exploit this conflict, and, soon, the organized raids on villages began, escalating over the coming years into violence that has cost hundreds of thousands of lives and left millions displaced.[17] While the violence in Darfur has complex political, economic, social, and ethnic dynamics, environmental changes were a critical driver of the conflict.[18]

Woman at an internally displaced person's camp picks up her food ration. *IRIN*

Food Fights

Climate change due to global warming also threatens the supply of one of the most basic needs of human life: food. Currently, world hunger impacts more than one billion people, the highest number ever. Additionally, an estimated 1.7 billion farmers are highly vulnerable to the effects of global warming.[19] As water becomes more scarce, desertification becomes more pronounced, and salinization of water and soil increases, agricultural production will be negatively affected. Increased rural to urban migration spurred by global warming is already leading to the disappearance of some agricultural communities, their knowledge and traditions.

The confluence of these factors could seriously destabilize food security in much of the developing world. Many cities that depend on rural areas for food will face increasing populations and reduced food availability as rural to urban migration persists. Food insecurity from changing ecosystems and weather patterns, coupled with fluctuating oil prices that are likely to continue rising, may make food more expensive to produce and transport around the world. An increasing number of countries may not be able to feed their populations.

In a globalized world, disrupted food production anywhere can affect the availability and price of food throughout the world. The United States is not immune to the problem of food insecurity. While this country has a huge agricultural industry, much of the food that appears in supermarkets is still imported. As global warming affects food production around the world, it will also affect food prices in the United States.

The Conflict Management and Mitigation office at USAID has highlighted the importance of these connections in its work to mainstream conflict and environmental sensitivity throughout USAID's programming. In October 2009, USAID commissioned the report "Climate Change, Adaptation, and Conflict: A Preliminary Review of the Issues," written by staff at the Foundation for Environmental Security and Sustainability. The report provides a helpful overview of the issues facing development professionals as they continue to implement programs in communities that will be affected by global warming. The report does not offer any recommendations, however, which will be a necessary next step in applying this helpful research.

Heightened food insecurity caused by the effects of global warming may be another source of increasing competition, desperation, and potential conflict. The climate change, adaptation and conflict report commissioned by USAID states, "human insecurity is the necessary link between climate change and conflict. When human security is threatened, and especially when governance is weak or lacks legitimacy, there is

Jalozai refugee camp, Pakistan. *IRIN*

a heightened risk of the sorts of grievances that drive conflictive behavior."[20] As the global community plans for the future, policymakers will need to address the effects of global warming on the dynamic relationships between the movement of human populations, food security, state fragility, and the potential for violence.

A Word on U.S.–China Relations: Conflict or Cooperation?

The United States ascended to its position as the most powerful economic and military global actor through its reliance on cheap fossil fuels. Other countries that have only recently "benefited" from fossil fuel extraction and that strive to develop their economies to match the "American way of life" are now being asked to go green. Not surprisingly, some are resistant to do so—particularly when they are directly competing with the United States for global influence.

China now emits more greenhouse gases than the United States overall, but less per capita. As a growing economy and global power, China will play a critical role in addressing global warming and international peace and security. China will also be severely affected by global warming, a fact that the Chinese government understands well. Even as it tries to reduce its own carbon emissions at home by funding the research and development of clean energy technologies, China is aggressively pursuing its national interests in fossil fuels in Africa, Latin America, the South China Sea, and even in the Arctic by seeking direct alliances with some native peoples in Canada. This raises questions about sovereignty and resource extraction rights.

U.S. competition with China—for resource access as well as global influence—has increased over the past several years and has heightened the potential for significant conflict between the two global powers. It also complicates international efforts to resolve existing conflicts in places like Sudan, where both countries have strong interests. Congress has added to tensions by regularly passing anti-China resolutions.

As the world's two largest greenhouse gas emitters, the United States and China must both be engaged in any international solution to global warming. Reducing negative competition between the two powers could also help prevent potential proxy wars over resource access. The United States should seek ways to cooperatively engage with China as a partner—not a threat—in efforts to curb greenhouse gas emissions, advance alternative technology, and support international mitigation and adaptation.

Protecting Treasures Beneath the Ice

Changes in the Arctic are some of the most visible proof that the environment we live in is changing dramatically. Already the Arctic is more navigable to ships and the countries that border the newly opening seas have begun to posture over the presumed natural resources that lie below the ice.

Russia made a symbolic move to claim natural resource riches in the Arctic by planting a Russian flag at the bottom of the sea in 2007. While this fruitless act of nationalism does not afford Russia rights to drill in the Arctic, the event highlights the potential for conflict over territorial rights.

Russia, Canada, Norway, Denmark (through ownership of Greenland), and the United States, all claim rights to the Arctic for natural resource extraction, shipping routes, fishing, and military activity. In addition, global warming threatens the way of life of thousands of native people who live in the Arctic, as well as the unique ecological treasures that exist there.

As the ice becomes less of an obstacle to accessing resources, protecting the fragile Arctic environment and preventing violent conflict will be even more important than ever. The U.N. Convention on the Law of the Sea (an internationally recognized means of determining territorial boundaries) provides just such an international legal framework and includes 157 of the world's countries. Unfortunately, the United States has not yet acceded to the treaty.

Reasons for Hope

Global warming poses enormous risks to U.S national and global security. Issues as disparate as genocide prevention, sustainable energy policy, migration, food security, and extreme weather are all significant to this discussion. Equally important to remember, though, is that these issues can be positively addressed. The environments where communities reside are absolutely critical to livelihoods and human security. The interdependent relationship between people and the land calls for protecting the environment and working for peace. If taken together, these activities may unite historically contentious neighbors for powerful and effective action to address the threat of global warming. We might call this combined effort "environmental peacebuilding."

A Kenyan boy plants a flower after swimming in puddles left by rain in the Mathare slum. *IRIN*

A good example of this concept is the "Good Water Makes Good Neighbors" project launched by Friends of the Earth Middle East. This cooperative initiative seeks to unite Israelis, Palestinians, and Jordanians to advance an effort to preserve the fragile environment in the Jordan River Valley through water rights sharing.

The people of Israel, Jordan, Syria, and the Palestinian Territories rely on the Jordan River for fresh water, although agricultural diversions leave little for the communities living near the river. The "Good Water Makes Good Neighbors" project encourages mayors from communities within the affected countries to cooperate to conserve this vital resource. While those governments have serious grievances with each other, this project shows how local communities have been able to build peace and understanding around the shared goal of preserving access to clean water for the people of the Jordan River Valley.[21]

While global warming increases the risks of violent conflict, an equal and better opportunity exists for constructive projects to prevent potentially violent scenarios, if policymakers are willing to invest in such approaches now. Many of the worst case scenarios described in this brief can be avoided through environmentally-focused and conflict sensitive development projects, a commitment to diplomacy, and respected treaties that will provide a structure in which the global community can act appropriately.

Conclusion

Human caused global warming is one of the biggest challenges facing humanity today. Curbing greenhouse gas emissions and adapting to existing environmental and climatic changes will require a strong international commitment to diplomacy, development and international cooperation. If the world cannot find ways to cooperate to manage this threat to human security, the consequences will negatively affect communities everywhere and could worsen existing instability in many places.

As the largest historic greenhouse gas emitter and the biggest economy, the United States has a responsibility to lead this international effort. A good first step would be to reduce U.S. reliance on the military, one of the largest consumers of fossil fuels, as an immediate way to curb both spending and dependence on fossil fuels. Ultimately, the most important thing that the U.S. government can do to avert the dangers of instability due to global warming is to pass strong, comprehensive legislation that immediately begins to cap and reduce U.S. greenhouse gas emissions, prices carbon out of the marketplace, develops a sustainable energy strategy, and invests political energy and financial resources in effective adaptation and mitigation to assist the people of the most vulnerable nations. Specific policy recommendations toward these ends follow.

Displaced children in Afghanistan. *IRIN*

Recommendations

Comprehensive Climate Legislation

- Congress should pass comprehensive global warming legislation that quickly cuts U.S. greenhouse gas emissions and begins to mitigate the damage that pollution has already inflicted on environments around the world. The legislation should push U.S. industry to begin making the necessary shift to green technology and ensure that pollution reductions are not simply outsourced abroad.

International adaptation funding

- The U.S. should contribute $25 billion annually to international adaptation and mitigation funds. At the global climate talks in Copenhagen in December 2009, Secretary of State Hillary Clinton promised the world that the United States would help mobilize $100 billion a year by 2020 to finance adaptation and mitigation in developing countries. Based on the U.S. contribution to global greenhouse gases that cause climate change, its fair share of that total is approximately $25 billion each year.
- Congress should press the administration to work with the international community to create a Global Climate Fund fully accountable to the United Nations Framework Convention on Climate Change to provide funding for international adaptation and mitigation to developing countries. The Global Climate Fund should be independent in management from the World Bank or other multilateral development banks, must ensure the participation particularly of developing countries and affected community members, and must ensure transparency and accountability. The Global Climate Fund should be based on the successful models offered by the Global Fund to Fight AIDS, TB, and Malaria and the Multilateral Fund for the Implementation of the Montreal Protocol.
- Congress should think creatively about using a variety of mechanisms to raise $25 billion annually in public financing. For example, Congress could take advantage of public outrage at Wall Street and growing support for a "financial transaction tax." Such a tax could raise an estimated $176 billion per year in the United States alone. In addition, Congress could redirect subsidies away from fossil fuel producers; implement a levy on aviation and shipping fuels, known as bunker fuels; and employ other innovative mechanisms to raise climate finance for developing countries.

Reducing US Energy Dependence

- On June 11, 2010 Rep. Barney Frank (MA) released a report entitled "Debt, Deficits, and Defense: A Way Forward," which proposes cutting the military's budget by $100 billion per year for ten years without "compromising the essential security of the U.S."[22] Many of the recommendations in the report would also help reduce the Defense Department's carbon footprint by strategically shrinking the size and global presence of military personnel, cutting unnecessary and outdated weapons systems, and reforming the Defense Department's management processes. Congress should implement these cost cutting and carbon reducing recommendations.
- The Department of Defense has more funding for research and development than any other agency. For as long as this remains true, the Pentagon should direct a significant portion of its research and development activities to the development of alternative fuels and green technology. The Defense Department should also direct more funds to civilian sector research in these areas.

Smart and Sustainable Development Assistance

- In addition to dedicated adaptation funding, prevention of deadly conflict and an awareness of environmental concerns should be mainstreamed throughout U.S. foreign assistance programs. USAID has taken initial steps by conducting studies on violent conflict and environmental degradation, but these issues should be further addressed in the upcoming Quadrennial Diplomacy and Development Review. All development projects should be planned with an eye to their environmental sustainability and vulnerabilities to a changing climate.

International Law

- The U.S. Senate should ratify the United Nations Convention on the Law of the Sea, a document that groups as diverse as the U.S. Navy, big business, wildlife conservation and peace groups all support. Refusing to participate in the international process also prevents the U.S. from gaining a seat on the International Seabed Authority and forfeits negotiating rights.

Glossary of Terms

Climate change: FCNL prefers to use the term "global warming" when talking about the cause or problem and "climate change" to describe one of the effects or outcomes of global warming. The climate is changing due to an overall warming of the planet.

Desertification: The gradual transformation of habitable land into desert; is usually caused by global warming or by destructive use of the land.

Energy dependence: Overreliance on fossil fuels as the primary source of energy for the functioning of the United States such that its economy would collapse without ready alternatives.

Environmental peacebuilding: The potential to mediate and solve conflict through resource sharing or other conservation projects involving traditionally hostile parties.

Global warming: The process by which human activity causes the Earth's atmosphere to warm precipitously. The effects of this process are often called "climate change."

International adaptation: Strategies to help countries most vulnerable to the effects of climate change adapt in order to survive without moving.

Mitigation: Working to curb greenhouse gas emissions now in order to halt future effects of global warming beyond those already fixed in.

QDR: The Quadrennial Defense Review, a Pentagon policy document that sets strategy and policy for the military. This document is produced every four years and plans for short term, mid range, and longer-term scenarios.

Remittances: Money or goods sent from developed countries to less developed countries through informal personal networks.

Salinization: The process of accumulation of salts in soil.

United Nations Framework Convention on Climate Change (UNFCCC): The Convention on Climate Change sets an overall framework for intergovernmental efforts to reduce greenhouse gas emissions and strategizes coping mechanisms for unavoidable temperature increases.

July 2010

Endnotes

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