

**July 21, 2009**

**Senate Committee on Foreign Relations**

Mr. Chairman, Senator Lugar, on behalf of my colleagues at the Center for a New American Security, I thank you for this opportunity to testify on the threats, opportunities, and geostrategic challenges of global climate change. My organization, the Center for a New American Security, has made it part of our mission from our inception to look at the ways in which energy and climate change affect national security, and how to best integrate such concerns into the national security community. So while it is certainly my honor to be here today in such company, I and my colleagues are also greatly encouraged in our work by this hearing. We consider this an important demonstration of the fact that global climate change is now taken seriously as a strategic challenge for the nation by both political parties and by key military and civilian defense leaders.

Indeed, my testimony today will focus on why it is so important to characterize climate change as a pressing national security challenge. First, the choices we make today, particularly the amount of energy we choose to consume, will determine the climate consequences we will face in the future, so this is very much about our actions right now. Second, national security capabilities can take decades to build: we need to design the ideas and equipment and recruit and train the personnel to protect and defend the nation ten to forty years in the future, and it is clear that climate change will shape our future.

There is no question, of course, that climate change is not solely a security issue – there are driving economic, environmental, and public health concerns associated with climate change, as well, and all of these concerns need to be addressed in tandem. There are compelling reasons, however to focus on the intersection of national security and climate change, which I will discuss today.

- First, the global strategic environment is changing in ways that have broad implications for U.S. security and stability, and natural resources are an increasingly important driver in that change. I will therefore begin my remarks by talking about the importance of what the Center for a New American Security calls “natural security.”
- Second, in addition to the overall strategic climate, climate change is directly a military problem in that it will affect the operating environment, geostrategic landscape, and future military missions.

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- Finally, there are ways in which the national security community will play an important part in addressing global climate change.

**The Changing Global Strategic Environment: The Case for “Natural Security”<sup>1</sup>**

Over the last two years, CNAS has developed a body of work on the highly intertwined national security and foreign policy implications of energy and climate change. Indeed, as CNAS examined these questions, we came to understand that not only are energy and climate change inextricably linked, they are connected to challenges associated with other natural resources, most notably non-fuel mineral supplies, water, land use/food supply, and biodiversity.

Consider, for example, that as the United States attempts to address the inherent geostrategic weakness of its reliance on oil (and the role the U.S. military, as a significant consumer of hydrocarbons, plays in that vulnerability), some of the proposed solutions may just swap in other dependencies, also with security consequences. There are those who suggest we substitute coal for imported oil, and the United States does have relatively abundant supplies of coal. Absent a major breakthrough in carbon capture and sequestration technologies, however, such a switch would greatly exacerbate global climate change and the related security concerns. Another solution the nation has invested in, corn-based ethanol, can have implications for global food prices, which provoked unrest in some 40 countries in the last three years. Transportation, as the heart of U.S. oil supply dependency, merits special attention, and proposed solutions include increased reliance on plug in electric or hybrid vehicles. Currently, such vehicles depend on minerals such as lithium for their batteries, and these resources are sometimes as highly concentrated as is oil (Bolivia, for example, has more than 50 percent of global reserves of lithium). Solar photovoltaic panels require a range of materials and minerals, such as gallium, for which the United States is 99 percent reliant on imports, and for which there is no information about the global reserves-to-production ratio. And though we do not know how much gallium exists in the world, we do know that China supplies almost 40 percent of U.S. consumption.<sup>2</sup>

At the same time, there are ways in which conservation, water rights negotiations, and other environmental strategies can complement and enhance national security strategies, and ways in which national security strategies are unlikely to succeed without addressing such concerns. For example, President Obama has stated repeatedly that peace in Afghanistan will be contingent on economic, civic, and political development as much as military successes. A 2009 UNEP report found, however, that most of Afghanistan’s natural resources are severely degraded and that any recovery would depend on restoration of these resources.<sup>3</sup> Achieving

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U.S. goals in the region may well depend on our ability to tie natural resources into national security. For that matter, negotiations about climate change will be central to the relationship between the United States and China going forward.

In the 21st century, the security of nations will increasingly depend on the security of natural resources, or “natural security.” The modern global economy depends on access to energy, minerals, potable water, and arable land to meet the rising expectations of a growing world population, and that access is by no means assured. At the same time, increasing consumption of these resources has consequences, such as climate change and biodiversity loss, which will challenge the security of the United States and nations all over the world. Natural security ultimately means sufficient, reliable, affordable, and sustainable supplies of natural resources for the modern global economy. This will require the United States to both shape and respond to emerging natural resources challenges in a changing strategic environment.

These concerns are not necessarily new, even in the context of war – access to resources has always been a concern. In World War II, for example, American civilians contributed their pots, pans and car tires to help the war effort, while both Allied and Axis forces struggled with oil shortages. Today, however, strategic concerns surrounding natural resources are set in a different context, because the global strategic environment is increasingly different. Russia, China, and other emerging (or re-emerging) states are part of an extraordinary rebalancing of global wealth and power, which will characterize the 21st century, according to the National Intelligence Council (NIC). These shifts are already evident: more people in more places in the world are seeing improved living standards, with access to modern technologies. More than half the world’s population, for example, now has access to a cell phone. Cell phones may displace or supplement land lines in many parts of the world, but for millions of people, it is the first time they have had telephone service; this represents a wholly new and unprecedented demand for services and materials. According to the NIC, such global shifts, taken together, mean that by 2025 “unprecedented economic growth, coupled with 1.5 billion more people, will put pressure on resources—particularly energy, food, and water—raising the specter of scarcities emerging as demand outstrips supply.”<sup>4</sup>

In this new strategic environment, how nations actually define and achieve security is changing. Indeed, there has been some concern, in both the environmental and defense communities, about the appropriateness of “securitizing” natural resources challenges such as climate change (i.e., overusing the security framework to understand challenges that are not at their heart about security), but that concern is misguided. The concern, more appropriately, should be about “militarizing” such challenges. Climate change, for example, may not be a threat that soldiers can attack and defeat but it is likely to affect the safety and

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prosperity of every American, both through its effects on global stability and on our local environments.

It follows, then, that if security threats are not always military in nature that military means are not the only way to achieve security, a point Secretary of Defense Robert Gates has made repeatedly (including explicitly about natural resources). “The challenges confronting our nation cannot be dealt with by military means alone,” Gates noted in May of 2009. “They require instead whole-of-government approaches.”<sup>5</sup> So security itself and how the nation achieves security are being redefined.

As part of this redefinition, it is worth considering the ways in which “natural security” will shape the strategic environment and affect U.S. foreign policy, economic, and military goals.<sup>6</sup> First, nations that consume imports of natural resources may be vulnerable to disruptions of supplies, with broad economic and security consequences. The United States, for example, depends on imports of many strategic commodities, particularly oil and non-fuel minerals, for a range of economic and defense uses. This import dependence is not in and of itself necessarily a threat or even a challenge, and ideally is a force for great global prosperity and stability for nations on either end of the transaction.

Import dependence can become a strategic liability, however, when the sources are highly concentrated, demand is rising, or substitutes for the commodities are limited. In such circumstances, such as the Arab oil embargo of 1973, the political and geostrategic motives or stability of the suppliers can become a significant problem. In other cases, countries with ample supplies can affect market dynamics and drive out other producers; the United States, for example, has not mined tungsten since 1995, even though the United States has 5 percent of global tungsten reserves and imported about 10,000 metric tons in 2007. Tungsten is used in a range of applications, including important defense applications (steel hardening and toughening). One reason for U.S. import dependence is that the United States simply cannot compete on pricing with China, which possesses two-thirds of the world’s tungsten reserves.<sup>7</sup> In other cases, resource rich nations may choose to use their wealth as a tool of economic and political power; Russia, for example, has used natural gas exports to influence Ukraine, but also Turkmenistan, Iran, Turkey, and all of western and Eastern Europe. The presidents of both Venezuela and Iran have explicitly linked energy wealth to their ability to counter U.S. foreign policy goals.

A complicating factor for import dependence is the lack of information about global supply chains. Lack of reliable data on reserves-to-production ratios for oil or natural gas can directly affect the market. For example, markets played an amplifying role in the oil price shock of 2007-2008; at the time, it was unclear why prices were escalating so much, so fast. In

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retrospect, oil production had stagnated in the face of sharply growing Chinese demand, but it is still unclear why production stagnated.<sup>8</sup> Sharply rising oil prices certainly played a part, and perhaps a dominant part, in the ongoing global economic crisis, with pervasive security and stability implications.<sup>9</sup> In the case of minerals, there is uncertainty about global supply chains. The United States, and this includes for militarily significant systems, does not actually know if we are vulnerable to supply disruptions of some strategically important minerals.<sup>10</sup> Planning for and managing such uncertainty can be a security challenge. Note also that supply chains are physically vulnerable: the entire energy supply and distribution infrastructure – from pipelines to shipping chokepoints to the vast domestic electric grid – is highly vulnerable to sabotage, natural disasters, and disrepair.

Concentration of supply can also be a problem for the supplier nations, leading to instability in a variety of ways, including conflict over land use between pastoralists and farmers in Darfur or tensions over water rights in the Levant. But there is a more fundamental way in which resources can be destabilizing, variously described as the “resource curse,” the “paradox of plenty,” and other terms. While commodities, such as oil and critical minerals, can bring in significant funds, in many parts of the world these proceeds come through state-owned companies and go directly into state coffers. This has a tendency to promote corruption, undermine accountability, increase vulnerability to market forces outside the country’s control, spur tension, and, in some cases, depress long-term growth. It can even facilitate armed rebellion: as one economist has noted, “where natural resources abound in rural areas they are uniquely vulnerable because they are difficult to defend, lucrative, and immobile,”<sup>11</sup> thus attracting rogue groups and vigilantes. Even when commodity prices are low, the “resource curse” can be tremendously destabilizing, as seen with the prospects of civil unrest in Zambia in early 2009, stemming from sharply falling copper prices.<sup>12</sup>

In addition to these vulnerabilities of supply, high consumption rates are creating other weaknesses. More countries are competing for the same strategic resources, at a time when access to those resources increasingly will be compromised by climate change and loss of biodiversity. This has the potential to directly promote tension, mass migration, and even interstate conflict, as well as more natural and humanitarian disasters, such as last year’s devastating cyclone in Burma and the collapse of food supplies in Haiti, which led to the fall of the government. As disaster rates rise, the U.S. military and civilian assistance agencies are likely to be called upon increasingly to conduct and support humanitarian and disaster relief operations, similar to Operation UNIFIED ASSISTANCE, which responded to the Indian Ocean Tsunami. These disasters will vary in scale and location and the United States and other developed nations will be unable to bring relief in all cases. Social unrest and state instability may result, which will likely increase and contribute to supply disruptions and influence U.S. strategic priorities.

Finally, while these issues – from natural disasters to geopolitical tensions – demonstrate the importance of natural security to the future of the nation, climate change in particular is what CNA has called a “threat multiplier,”<sup>13</sup> and so warrants today’s focus on how climate change is a national security problem – and as a challenge with national security solutions.

### **Why Climate Change is a National Security Problem**

Climate change may well be a predominant national security challenge of the 21st century, posing a range of threats to U.S. and international security. There will be, for example, direct threats to the lives and property of Americans from wildfires, droughts, flooding, severe storms, and other climate-related events. Evidence suggests there will also be less direct, second-order effects, such as the spread of various water- and vector-borne diseases into areas where they do not currently flourish. At the same time, there will be pervasive new challenges, such as that of mass migrations of threatened populations within or into the United States as coastal regions flood and agricultural breadbaskets shift or even disappear. Climate-induced disasters in other parts of the world, such as East Asia or Europe, may affect everything from crucial trade relationships to the safety of U.S. troops and their dependents based in those regions. Indeed, the direct effects on the military may include challenges to infrastructure (i.e., military installations affected by droughts, wildfires, floods, sea level rise, and cyclonic storms), the need to adjust or adapt to changing conditions, such as longer and more pronounced heatwaves, more pervasive and stronger storms at sea, changing undersea conditions, and supply chain challenges for food, fuel, and water, and the rise in climate-related missions, such as humanitarian and disaster relief.

Promoting a better understanding among military leaders of the causes and consequences of climate change is an essential first step for anticipating and responding to these challenges. There is still some skepticism within the community on the definition of “climate change,” and no clear picture of the defense community’s role in dealing with these issues. At the same time, many military personnel remain ambivalent regarding the relative importance of climate change. Some officers do perceive the security risks, or see synergies with combating terrorism and improving the U.S. ability to project soft power. From this perspective, American efforts to limit climate change will engender positive benefits in terms of other U.S. national security objectives. Other defense experts worry that increasing defense efforts regarding climate change will lead to underfunding of other priorities. More broadly, many feel that while climate change is a serious danger to the United States and our global interests, it is not primarily a military threat that can be met with military means. In this view, insufficient civilian capacity is the major problem.

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Compounding the multiplicity of these views, the way in which the scientific community expresses “scientific uncertainty” can complicate the military’s response to this threat. While there are certainly many valid and important debates about the consequences of climate change, the way these debates translate to a military community is that now is not the time to plan or respond, but rather to wait until the scientists figure out whether there are near-term or long-term consequences. There is an urgent need to communicate the science in terms of risk management and plausible scenarios; the defense community, after all, has spent billions of dollars building weapons and training personnel to deal with risks and plausible threats in the future.

By law, the Department of Defense is required to incorporate climate change into all major assessments and planning processes, and while this has helped create a new community of interest and expertise, not all elements of the defense community seem equally prepared to execute this requirement. For example, the June 2008 National Defense Strategy offers a fairly perfunctory albeit helpful statement that climate change and energy security need to be incorporated into planning scenarios, but the recent Joint Operating Environment casts doubt on whether climate change itself is real. There are regional combatant commanders (generally those not currently engaged in combat operations) who have begun to address climate change issues directly, as well, but more as a platform for engagement with regional militaries than as a national security challenge. There is no intra-military consensus on the future role the U.S. armed forces must play in preparing for the national security implications of climate change, and whether, or to what extent, this should affect future force structure decisions.

**Why Climate Change has National Security Solutions**

As climate change manifests, the United States is likely to come under pressure from the international community in two key ways. First, as a major, historic contributor to climate change, the United States will be expected to take action to cut emissions. Second, nations around the world will look to the United States for help in responding to natural disasters, if for no other reason than that the United States is now and is likely to remain the only nation with sufficient capability to respond to major humanitarian and natural disasters. The national security community will have a crucial role to play in both areas.

First, as the United States struggles with how to cut emissions of greenhouse gases 80 percent by 2050, the defense community will be crucial. DOD is the single largest energy consumer in the nation, accounting for 110 million barrels of oil and 3.8 billion kWh of

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electricity in 2006, at a cost of \$13.6 billion. Although there is no single measure of the Department of Defense's "carbon footprint," there is no question it is one of the world's single largest emitters. Also, the size of the Department's budget and extensive needs for fuels to support military missions can create a significant "demand pull" that can drive the research and response regarding climate change.

The U.S. national security community will also be important in dealing with the consequences of climate change, bringing valuable resources and capabilities (e.g., intelligence, medical, strategic lift, and other transport) to efforts to manage the consequences of climate change, particularly humanitarian and disaster relief missions. The United States generally has a range of capabilities that most other nations do not have, and no other nation has in sufficient quantities for the contingencies currently anticipated by climate models. Within that U.S. capability, the U.S. Department of Defense is better resourced than any civilian agencies and more equipped to operate in unstable or challenging environments. The 2004 tsunami that devastated Indonesia provides a sense of the response a single disaster can entail: DOD logged more than 10,000 flight hours and transported more than 24 million pounds of relief supplies and equipment to the devastated area. Men and women from every service – the Navy, Marines, the Army, the Air Force, and the Coast Guard – participated in the relief effort.<sup>14</sup>

Climate change missions may go beyond humanitarian and disaster relief, as well, with Somalia as a case in point. Climate-related stresses, such as drought and famine, have played a part in the disintegration of Somalia into anarchy. As part of the resulting chaos, U.S. forces have been attacking terrorist positions within the country, including al Qaeda affiliates, escorting humanitarian relief convoys, countering piracy off the coast, and assisting regional neighbors in dealing with the destabilizing effects of refugees and arms trafficking.

Indeed, the global consequences of climate change are likely to entail hard choices for the United States in how and where and when to respond with humanitarian assistance, military assets, and aid to promote resilience. Indeed, as Hurricanes Katrina, Rita, and Ike and recent flooding and wildfire responses have demonstrated, some of these choices will be on the home front and will engage the National Guard, Reserves, and Active Duty forces. At some point, likely in the near future, the nation is going to need guidance from the Commander in Chief as to which contingencies will require or warrant a U.S. response, or investment in preparedness and resilience.

In the meantime, there are a number of actions the civilian and military leadership of the Department of Defense can take to prepare the nation for a climate challenged future.

- The U.S. military, according to annual polls, is the single most trusted institution in

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the country. Public recognition of the threat that climate change – and other resource challenges – presents will help Americans more properly understand the nature of the challenge.

- The types of information the military needs in order to plan and budget for future contingencies – such as vulnerability assessments that layer climate projections, demographic changes, and state fragility – may not currently exist. The raw data may actually be available, but to date there has not been sufficient demand for such information. The U.S. national security community can provide a powerful demand pull in academia, national assets, and private research institutions for such information.
- One of the key ways to address global climate change will be through innovation, including a transformation in how the nation uses energy. How to stimulate such significant innovation is an open question, however, with answers likely to involve extensive public-private cooperation. The Department of Defense can play an important part in this process by stimulating and spurring innovation, although it should be clear that this is not a question of applying defense dollars against civilian needs, but rather solving military challenges. The cost of fuel, the vulnerability of supply chains, and the geostrategic realities of global energy supplies are all valid military concerns.
- Emphasize the need to invest in prevention, preparedness, and resilience. Military responses, whether to disasters or state failure such as that in Somalia, are expensive and put lives at risk. To the extent that investments in state stability and infrastructure (such as flood control or improved irrigation) can lessen future military contingencies, DoD leadership should advocate for and make such investments.
- The national security community should participate in and push for a refinement in the whole-of-government preparation for and response to global climate change. For the nation to deal adequately with this challenge, there will need to be strong executive leadership, bipartisan cooperation, and a unifying national strategy. Moreover, this strategy must not only look at energy and climate change, mitigation and adaptation, but also at how all these issues link together.

Focus on issues of natural resources and security has waxed and waned for several decades, but given the global development and modern economic trends apparent today, it is a critical time for the U.S. security community to deepen its understanding of the intersection of

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natural resources and security and the connections among the various issues involved. Climate change is vital starting point.

<sup>1</sup> This section is drawn from the Center for a New American Security publication, *Natural Security*, published in June 2009, which can be retrieved at <http://www.cnas.org/node/2712>.

<sup>2</sup> National Research Council, *Minerals, Critical Minerals, and the U.S. Economy*, Committee on Critical Mineral Impacts of the U.S. Economy (Washington, D.C.: The National Academies Press, 2008).

<sup>3</sup> Silja Halle, ed., *From Conflict to Peacebuilding: The Role of Natural Resources and the Environment*, United Nations Environment Programme (February 2009).

<sup>4</sup> C. Thomas Fingar, NIC Chairman, *Global Trends 2025: A Transformed World*, National Intelligence Council (November 2008).

<sup>5</sup> Secretary of Defense Robert M. Gates, "Opening Statement to the Senate Appropriations Committee," (30 April 2009).

<sup>6</sup> There has long been a serious debate about the depletion of natural resources, and the ways in which "peak oil" and other absolute scarcity may drive security concerns in the future and even cause wars – or whether the adaptability of human society will render such concerns moot. Yet that particular debate hits only one aspect of the problem. CNAS believes that long before the debate about absolute, geological scarcity and human adaptability is settled, there are likely to be urgent strategic concerns about natural security. See John Tierney, "Betting the Planet," *The New York Times Magazine* (2 December 1990).

<sup>7</sup> U.S. Department of Defense, "Reconfiguration of the National Defense Stockpile Report to Congress," (April 2009).

<sup>8</sup> James D. Hamilton, "Causes and Consequences of the Oil Shock of 2007-2008," *Brookings Papers on Economic Activity* (Washington, D.C.: The Brookings Institution, Spring 2009).

<sup>9</sup> See Hamilton (2009) and Blair (25 February 2009).

<sup>10</sup> National Research Council, *Managing Materials for a Twenty First Century Military*, (Washington, D.C.: The National Academies Press, 2008).

<sup>11</sup> Paul Collier, "Natural Resources, Development and Conflict: Channels of Causation and Policy Interventions," *Oxford University and the World Bank* (28 April 2003): 5-6.

<sup>12</sup> Karin Brulliard, "Zambia's Copperbelt Reels From Global Crisis: Downturn in Commodities Trade Leads to Devastating Mine Closures," *The Washington Post* (25 March 2009): A1.

<sup>13</sup> The CNA Corporation, *National Security and the Threat of Climate Change*, 2007, <http://securityandclimate.cna.org/>.

<sup>14</sup> U.S. Pacific Command, "DOD Relief Efforts Factsheet Summary," as of February 14, 2005. Available at <http://www.pacom.mil/special/0412asia/factsheet.html>.

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Sharon Burke is a Vice President at the Center for a New American Security (CNAS), where she directs the Center’s work on the national security implications of global natural resources challenges. The program looks at the ways in which international demand for water, energy, land, and minerals can affect security, as well as the consequences of high consumption of these resources, such as climate change and biodiversity loss. Ms. Burke’s work at CNAS has included an energy security strategy exercise, the development of futures scenarios focused on global climate change, an international climate change war game, and the effort to map how the U.S. government makes energy security policy. Prior to joining CNAS, she was the Director of the National Security Project at Third Way, where she advised candidates for office and members of Congress on the full range of national security issues, including terrorism and America’s role in the 21st century world. Previously, she served in the U.S. government as a member of the Policy Planning Staff at the Department of State, a Country Director in the Department of Defense’s Office of Near Eastern and South Asian Affairs, and a speechwriter to Deputy Secretary of State Richard Armitage and Secretary of Defense William Cohen. She also worked in the Energy and Materials program of the U.S. Office of Technology Assessment, helping to produce a multi-year study of energy in developing countries. Ms. Burke received medals for Exceptional Public Service from the Department of Defense and the Superior Honor Award from the Department of State. She served on the Leadership Team of the American Assembly’s Next Generation Project, served as the Middle East Advocacy Director at Amnesty International USA, and is the author of numerous reports, including *A Strategy for American Power: Energy, Climate, and National Security*. Ms. Burke graduated from Williams College and Columbia University’s School of International and Public Affairs, where she focused on international energy policy and earned a Certificate of Middle Eastern Studies. At Columbia, she also was a Zuckerman Fellow, an International Fellow, and a recipient of a Foreign Language and Areas Studies grant for Arabic.