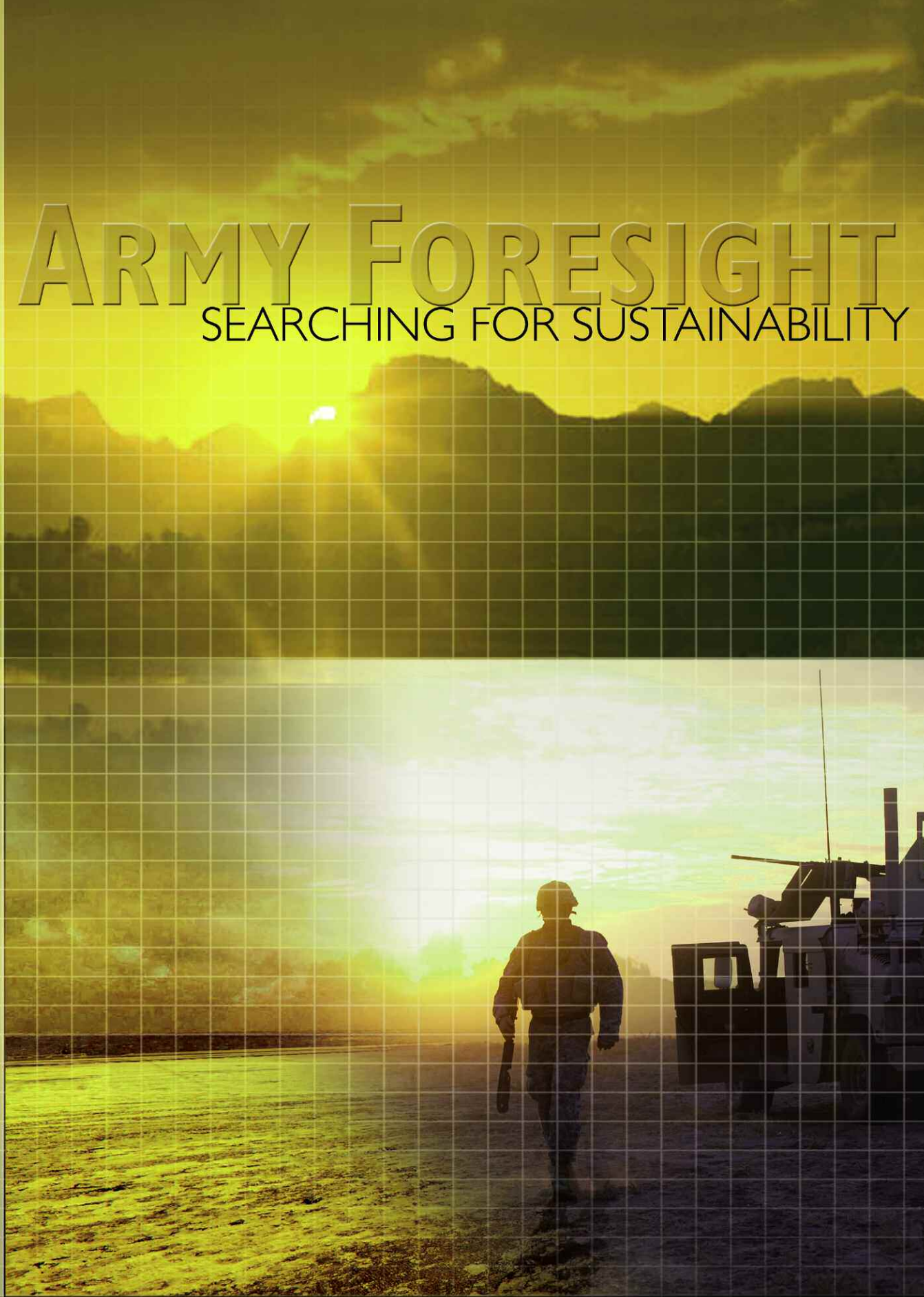


Army Foresight

Searching for Sustainability

July 07: Climate Change and Army Sustainability

EDITION 4.1

In this edition:
How will climate change impact Army sustainability?

Army Foresight
Searching for Sustainability

Introduction to Foresight Process

Welcome to the fourth edition of our Foresight series. In each edition, we focus on a topic on the Army Environmental Policy Institute's "radar screen" and present key points from our preliminary research in a short report. We introduce a specific topic, discuss why it is important to the Army, and present several key areas for further study.

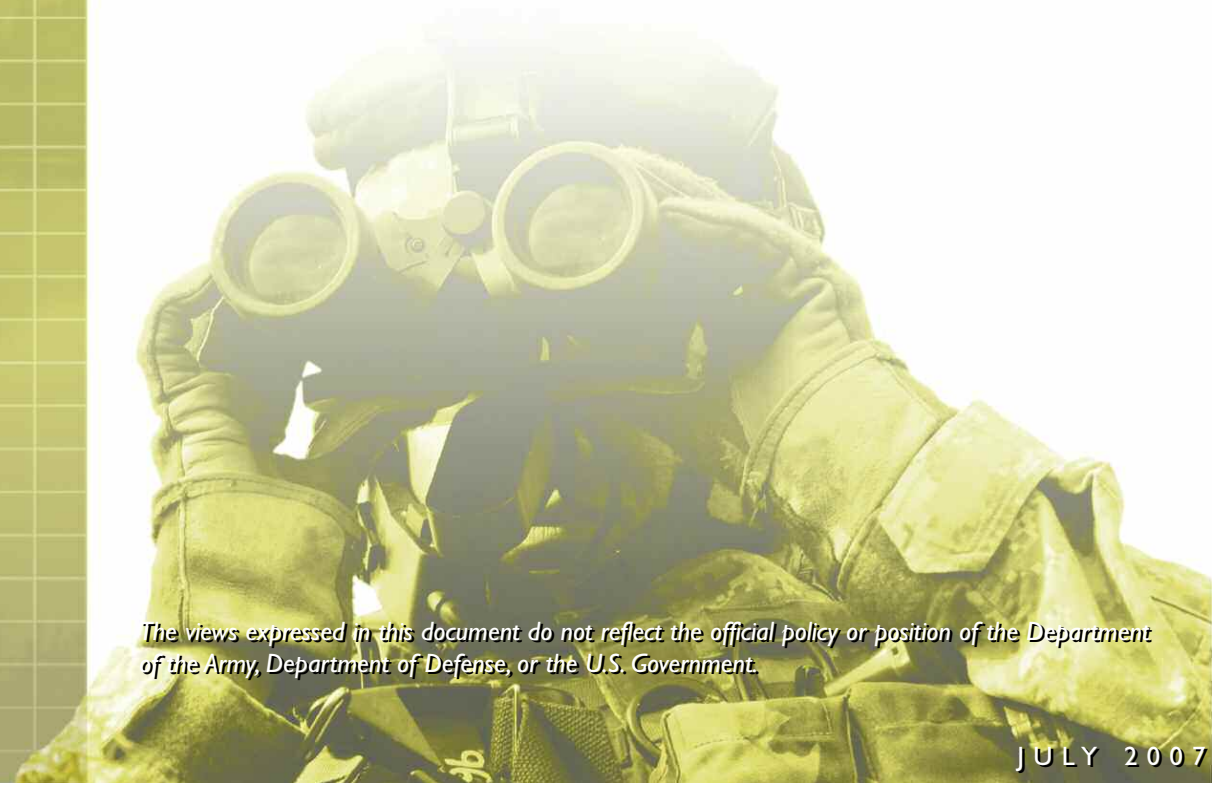
The AEPI's mission is to assist the Secretariat with the development of proactive policies and strategies to address environmental issues that may significantly impact the Army.

Foresight is the ability to look forward. We deliberately, methodically gather intelligence to follow trends and identify emerging issues. Foresight extends three years and more into the future—offering direction, not making predictions. The issues of concern have the potential to affect the Army's ability to achieve its mission and warrant further study and discussion.

Foresight helps achieve sustainability by improving policy today to prevent current undesirable trends from becoming future intractable issues. It includes three components: systematically scanning trends, encouraging participation and buy-in, and building vision to improve policy. Foresight is ongoing. Topical specialists continuously track issues and offer topics for discussion, recognizing the current and creatively considering the future.

Each brief report introduces a topic, discusses its significance to the Army, and delineates key areas for further study. We don't recommend specific policy or suggest that we know the final solution. We offer these reports to interested parties to solicit comment and encourage sharing. They are designed to generate discussion and invite collaboration with our military partners, as well as potential collaborators in science, academia, industry, and other organizations. The reports summarize the topics, but they contain hyperlinks to relevant publications with the details that facilitate further research.

We invite you to join us on our journey in the search to sustain the Army mission and secure the future. To register your comments on this issue, please contact Michael L. Cain, Director, AEPI at 703-604-2301 or michael.cain@hqda.army.mil.



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JULY 2007

THE ISSUE: CLIMATE CHANGE AND THE ARMY

Climate change is widely accepted by the world's scientific community. Numerous aspects of climate change remain under debate, but the basic premise—that the planet is warming due to increases in greenhouse gases in the planet's atmosphere—is widely supported.

A panel of retired General Officers reports that:

> "Carbon dioxide [CO2] levels in the atmosphere are greater now than at any time in the past 650,000 years, and average global temperature has continued a steady rise. This rise presents the prospect of significant climate change, and while uncertainty exists and debate continues regarding the science and future extent of projected climate changes, the trends are clear."[1]

The effects of climate change will present international, interdisciplinary, and intergovernmental challenges, many of which are likely to affect the Army, due to its worldwide distribution and the wide-reaching activities of our soldiers.

Army strategic planning takes into account most foreseeable events. Strategic planners should also consider the potential impacts of global climate change. As the *Army Strategy for the Environment* notes, our ability to secure the future depends on environmental stewardship to protect the precious resources needed to train for and carry out our mission.

SCIENTIFIC CONTEXT

The planet's climate system is complex, featuring many variables and interactions; any change may affect climate variability.[2] Some changes reflect natural variability, such as the periodic El Niño-Southern Oscillation phenomenon, but others reflect anthropogenic (produced by humans) causes, including deforestation and emission of CO_2 and other greenhouse gases.

Climate models are much more precise than they were in the 1970s, when the science was in its infancy.[3] Our understanding of the Earth's climate has grown quickly as a result of improved modeling, data collection techniques, and data availability. Over time, scientists have also had opportunities to improve and test their models. Ice core data have provided empirical evidence of historical atmospheric CO_2 concentrations, which support the claims that CO_2 levels have drastically risen in the past century.

On February 2, 2007, the IPCC released a summary for policy makers (SPM) of the first volume of Climate Change 2007. (The full synthesis report is expected November 2007.) The IPCC SPM is definitive in its conclusion that human emissions of greenhouse gases, along with other processes, have very likely been responsible for most of the warming observed in global average temperatures over the past half-century, calling this conclusion "unequivocal."

The IPCC report reflects a consensus perspective, the balance of opinion among the scientists who participate in its process. The focus on consensus inevitably means that some scientists will find fault with its conclusions. Some scientists believe that the IPCC overstates future climate change, while others worry that the IPCC understates it. Such conflicts are inevitably given voice in the loud political debate over climate change. Nonetheless, the IPCC report will almost certainly focus scientific input to policy discussions on climate change.

In 1998, the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP) formed the Intergovernmental Panel on Climate Change (IPCC), which has released four assessment reports (1990, 1995, 2001, and 2007). All panel publications are available at http://www.ipcc.ch.

[1] CNA Corporation, *National Security and the Threat of Climate Change*, April 2007.

[2] IPCC, *Climate Change 2001: The Scientific Basis*, 2001.

[3] Vicky Pope, *"Models: 'Key to Climate Forecasts.'"* BBC News, February 2, 2007.

The understanding of anthropogenic warming and cooling influences on climate has improved since the Third Assessment Report (TAR), leading to very high confidence that the globally averaged net effect of human activities since 1750 has been one of warming.
— IPCC, 2007

POLITICAL CONTEXT

As the scientific data and findings have grown increasingly certain, the issue of climate change mitigation has crept into the policy realm. The actions of the federal judicial, legislative, and executive branches, as well as the actions of state governments, may impact federal agencies and individual citizens. Acknowledgment is growing that reductions in CO_2 may be necessary to curb the effects of climate change, and policy actions may be the most effective means of accomplishing these reductions.

Judiciary

On April 2, 2007, the Supreme Court ruled that the Environmental Protection Agency has the authority to regulate the CO_2 emissions.[4] This outcome does not guarantee that such regulation will occur, but makes it more likely. It also increases the odds that Congress will act to regulate greenhouse gases in some manner.

Legislature

Congressional voting patterns provide us with insight into future regulations. Dr. Roger Pielke of the Center for Science and Technology Policy Research, University of Colorado, explains that recent National Journal polls show, "Even though there are strong partisan differences in the Senate, there are at least 57 members who believe that there is no "reasonable doubt" on the cause of global warming, and in the House this number is at least 258. These are strong majorities."[5]

Other polling results are as follows:

- Mandatory CO2 limits: House 243, Senate 54
- Carbon tax: House 123, Senate 27
- Cap and trade: House 290, Senate 65.

The apparent strong support for a cap-and-trade approach to climate policy suggests that any legislation on climate that passes the 110th Congress is likely to be of this type.

Executive

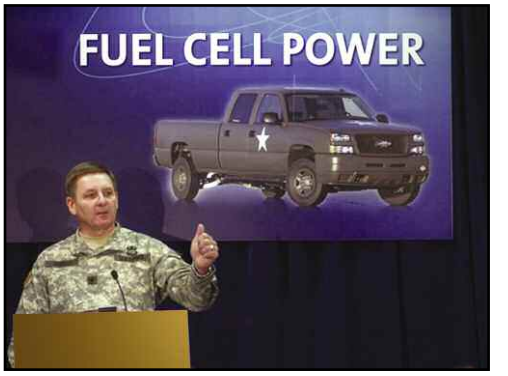
The White House released a formal letter on the President's position on climate change on February 7, 2007.[6] The letter explained that President Bush has acknowledged climate change since 2001 and is committed to reducing greenhouse gas emissions.

> "My Administration is committed to cutting our Nation's greenhouse gas intensity… by 18 percent over the next 10 years. This will set America on a path to slow the growth of our greenhouse gas emissions and, as science justifies, stop and then reverse the growth of emissions."

The president may call on federal agencies, including the U.S. Army, to take the lead in reducing CO_2 emissions.

SOCIAL CONTEXT

The media plays a major role in the public's perception of crisis. If public concern over climate change increases, the Army is likely to experience increased scrutiny regarding its carbon footprint. Since energy issues are often linked to climate change, pressure on all federal agencies to use renewable fuels will likely increase.



[4] *Massachusetts et al. v. Environmental Protection Agency et al,* Decided April 2, 2007.
[5] *National Journal,* "Congressional Insiders Poll," February 3, 2007.
[6] White House, *"Open Letter on the President's Position on Climate Change,"* February 7, 2002.

THE IMPACTS

Science suggests that climate change will exacerbate, change, and relocate problems in the world.

Creeping Effects

Many effects of climate change will surface slowly, and the tendency may be to wait to take action—but a wait-and-see approach could be devastating.

Army Coastal Installations

The IPCC estimates a 17-inch average sea level rise by 2100 (other relevant data and future research may increase this estimate substantially). In future decades, the impacts of the sea level rise could impact CONUS installations, as well as OCONUS installations, particularly those on islands or in low-lying locations. Because the sea level rise will depend on local factors, the Army should run scenarios at local and regional levels.

Army Resources

Many of the threats of climate change and policy responses to them may result in an overall strain on the Army's resources. Our Armed Forces are engaged in conflicts in Iraq and Afghanistan. Our dependence on foreign oil is increasing. As we face the monumental challenge of climate change, we also face significant monetary, security, and energy challenges. These challenges must be considered in concert with planning for the effects of climate change.

Human Health

Countries with existing sanitation and infectious disease problems may be the first countries severely impacted by the human health impacts of climate change. Since the Army operates worldwide, soldiers may encounter some human health related problems while in theater. From 2003 through 2004, 2,767 soldiers suffered heat injuries and 11 soldiers died from heat stroke and heat related causes.[7] If temperatures rise, heat related illness and injury may gradually rise as well.

Sudden Impacts

Climate change could have sudden and severe results. Debate continues on how much of an influence climate change has had on recent storm events.

Infrastructure

No conclusive evidence suggests that Hurricane Katrina was caused or made more likely by climate change. However, if the frequency of storms increases as projected, our country may witness more events like Hurricane Katrina, and our Army may be called upon to serve in the recovery efforts. The Army should plan for such events now. Even without such changes, more people and property in harm's way will mean ever more costly disasters in the United States and abroad.

Populations

Displaced populations may have an impact on the Army, directly and indirectly. Competition over resources and ethnic conflict may arise from large numbers of refugees relocating to other countries. There are currently efforts underway through the United Nations Environment Program (UNEP) to address "climate change refugees." The population of the island of Vanuatu is considered by the UNEP to represent the first "climate change refugees."[8] Issues of population displacement are complicated and location specific. The Army may be impacted by these events if a conflict arises or if they occur in areas of Army operation.

AEPI thanks Dr. Roger Pielke, Jr., Director of the Center for Science and Technology Policy Research, University of Colorado, for his thoughtful contribution to this bulletin.

[7] Department of the Army, *Memorandum: Heat Injury Prevention Program*, 8 April 2005.

[8] UNEP, *Pacific Island Villagers First Climate Change Refugees*, May 2006.

"Society must view the environment as a capital asset rather than continuing to depreciate that asset."

— Achim Steiner, Director, UNEP

Many actions that reduce carbon emissions can increase energy security and enhance force protection.

MILITARY IMPLICATIONS

Challenges presented by climate change may be predicted by scientific models and theories, but our human response to this global dilemma is yet to be determined.

NEW PERSPECTIVE

The Army is likely to encounter a strategic paradigm shift as environmental factors become critical. Historically, these factors were considered in isolation, addressed and managed independently. With increased understanding of climate change, individuals and institutions are beginning to grapple with the interconnectedness of the environment and human life. This shift in understanding our role as part of the earth's system may lead to strategic changes with regard to environmental issues.

COMMITMENT TO SUSTAINABILITY

In the next few years, policies mandating reductions of greenhouse gas emissions are likely, with subsequent impacts on U.S. military installations. In anticipation, the Army must proactively determine suitable approaches for achieving sustainability.

Strategies have been developed that may reduce the Army's contribution to climate change. *The Army Strategy for the Environment* and the *Army Energy Strategy for Installations* are existing strategies that seek to reconcile mission requirements and sustainability. The draft *Army Strategic Plan for Sustainability* sets forth aggressive goals, calling for phased reductions in fuel weight needed to support an Army unit.

Working toward reaching energy reduction targets is critical. Reducing greenhouse gases may reduce in-theater vulnerability and provide a return on Army investment.

Army units can become more mobile and self-sufficient by pursuing sustainable goals:

- Increasing fuel efficiency
- Reducing need for fossil fuel re-supply
- Employing modular construction that supports interoperability
- Reducing the need to manage, dispose of, or transport waste by-products

To reach these goals, the Army must fully integrate sustainability efforts into all planning and operations. Leadership must ensure adequate funding and technical support to develop options that reduce the Army's contribution to climate change.

CLIMATE CHANGE AND PLANNING

As it becomes increasingly clear that climate change will have strategic and tactical impacts on future operations and training, environmental considerations must be integrated into all phases of Army planning. In order to establish the Army as a leader and innovator, it must integrate climate change scenarios into war gaming, training, education, and planning processes. To begin planning for a changing world, the Army should use the best available science and decision-making tools.

Army leadership should integrate the most recent peer-reviewed scientific literature into planning, and consider that forecasts can be uncertain. The Army should work collaboratively with Department of State and other federal agencies, nongovernmental organizations, and other governments.

The Army should consider climate change in its acquisition activities. If the operating environment changes significantly, materiel may need adaptation to this evolving theater. When procuring items with expected service life of 30 years or more, the Army must consider how the climate may have changed in the future.

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