

REVIEWS

Common Sense on Climate Change: Practical Solutions to Global Warming

by the Union of Concerned Scientists

<http://www.ucsusa.org/publications/ClimateSolutions.pdf>, 2002, pp. 14

The Union of Concerned Scientist (UCS) is a nonprofit organization that was founded in 1969 by faculty and students at the Massachusetts Institute of Technology. It has since grown to over 50,000 people and is primarily focused on utilizing rigorous scientific evidence to solve social and environmental problems. These problems include sustainable agriculture, nuclear arm reduction, and global warming. The topic of this review is a short booklet released by the UCS that is written to provide practical political and consumer solutions to reducing carbon dioxide emissions and thus alleviate global warming.

This booklet begins by outlining the major sources of U.S. carbon dioxide emission as electricity generation, transportation, and industry. It then outlines five “common sense” solutions that can be implemented at both the individual and nationwide levels:

1. Produce and purchase more fuel-efficient vehicles.
2. Modernize electricity generation to include renewable resources (wind, geothermal, solar, and biomass).
3. Increase energy efficiency in both homes and businesses.
4. Protect threatened tropical rainforests by purchasing sustainably harvested timber and planting trees.
5. Support research and development efforts to produce renewable energy sources and improve energy efficiency (e.g. hydrogen fuel cells).

The final portion of the booklet suggests practicing sustainable farming and working to get international cooperation to reduce other key greenhouse gases like methane and nitrous oxides. The report concludes with a one-page overview of the greenhouse effect, the resultant global warming, and possible impacts of this temperature increase.

Although this report provides many key facts concerning the sources of U.S. carbon dioxide emissions and possible methods of reducing such sources, it tends to be overly simplistic in citing its “practical” solutions. The prospect of increasing energy conservation and increasing funding for alternative energy resource programs is highly appealing, but the prospects of producing hybrid vehicles, switching to renewable energy sources, and protecting threatened forests need to be further addressed. For example, despite the recent decrease in renewable energy costs they are still considerably more expensive than fossil fuels. What will be the projected impact on the U.S. economy of switching to 20% renewable energy sources by the year 2020 as suggested by the UCS? How can we convince developing countries to switch to more expensive energy sources and stop deforestation? Likewise, one of the chief concerns many people harbor when deciding whether or not to purchase a lightweight hybrid vehicle or a large SUV is safety. Is there any evidence that light, fuel-efficient vehicles are comparably safe?

There are very strong responses to all of these queries supporting the suggestions put forth by the UCS and they should have been mentioned in this report. Despite this criticism, I would highly recommend reading this brief release.

As a parting thought, one should note that this report is not intended to justify the belief that global warming is occurring or that human activity is directly responsible for it. Fortunately, the UCS has other brief brochures that clarify these points and address many of the key criticisms, at <http://www.ucsusa.org/environment/0warming.html>.

Manish Gupta
Los Gatos Research
mglgr@mindspring.com

Making the Nation Safer; the Role of Science and Technology in Countering Terrorism.

National Academy Press, Washington D.C., 415 pages. Prepublication copy reviewed at <http://books.nap.edu/html/stct/index.html>

The terrorist attacks of 9/11 shocked a nation grown accustomed to being invulnerable to military action by foreign powers; not since Pearl Harbor has the United States been attacked on its home territory. The Pacific and Atlantic oceans had, throughout U.S. history, been a nearly perfect Maginot Line, protecting the country from attack.

It therefore is not a surprise that all sectors of the United States have been asked to respond and prepare for future possible attacks on U.S. soil. The scientific community, through the National Academy of Sciences (NAS), was asked to formulate recommendations to better prepare the nation against future terrorist attack. Making the Nation Safer; the Role of Science and Technology in Countering Terrorism is the result of 1.5 years of work by the NAS and is a compendium of 146 specific recommendations for the executive and legislative branches of government.

The book takes its cue from the greatest marriage of national security and science in the United States during WWII, the Manhattan Project. However, a more apt metaphor for the place of science in the "war on terrorism" may be found in the Cold War. The role of science in the Cold War was far more ambiguous than its role in creating the atomic bomb. The Cold War was not just a matter of discovering and applying physics -- it was also a political and economic struggle.

This book suffers from its rushed nature. The chapters are uneven in style and content. Chapter 2 ("Nuclear and Radiological Threats") provides little statistical background for its recommendations, while chapter 3 ("Human and Agricultural Health Systems") is far better at providing some statistics that lend context to the committee's recommendations. Chapter 6 is particularly repetitive in its discussion of Supervisory Control and Data Acquisition (SCADA) systems, managing to reiterate 9 times that commands to remote pipeline and electrical distribution systems are transmitted in the clear--without encryption--over the Internet. And one can only marvel at the statement that "the purpose of terrorism, of course, is to terrorize" that begins "The Response of People to Terrorism" (Chapter 9).

The unfortunate effect of the stylistic problems is to balkanize the book. Each chapter reads better as a memo to a specific government agency rather than a holistic look at the problems of defending a nation against terrorist acts.

Moreover, some of the chapters strike this reader as pseudo-scientific. For example in "Complex and Interdependent Systems" (Chapter 10), the argument is presented that the methodology of systems engineering can help delineate costs and risks associated with terrorist attacks. Yet the models that are presented, even if simplified, greatly trouble me. There is no discussion of how to verify the models of terrorist behavior that would be used in any risk assessment. Policy makers, at best, will fool themselves that this 'scientific' approach has given them an optimized set of parameters. At worst, the risk assessments will simply be pure delusion based on ad hoc models of 'terrorist' behavior.

The book properly notes that there is no magic bullet in the war against terrorists: "Overall, the committee believes that it has identified scientific and technological means by which the nation may reduce, but not eliminate, the vulnerabilities of society to catastrophic terrorist acts." One maxim of war is that "he who defends everything defends nothing." Many of the book's chapters repeatedly point out that an economy as vast and as large as the U.S. has many points of vulnerability.

Another consistent thread of the recommendations is that attribution of sources of all weapons (nuclear, biological, etc.) be made a priority. Nation states can be deterred against aiding or abetting a terrorist attack if there is a high probability of determining the source of the materials used by the attacker. On September 17, 2002, Secretary of Defense Donald Rumsfeld acknowledged this problem in an interview on the "Jim Lehrer News Hour." He said that we would have "no return address" if terrorists detonated a chemical or biological weapon on U.S. soil. Of course Mr. Rumsfeld did not mention that if nation states cooperate and share information, the problem of attribution can be solved to a great degree.

In contrast, the report is blunt that deterrence will not work against many terrorist groups. The financial and material support of nation states is no longer required to build any of a range of weapons of mass destruction (WMD). Repeatedly, the book points to the widespread dissemination of knowledge and that the dual use of many technologies in the nuclear, biological, chemical, or information sciences allow relatively small groups of motivated people to produce a WMD. The Tokyo subway attack by Aum Shinrikyo is cited as an example of this problem.

That the book calls for increased investment and research in a variety of fields is certainly expected. There is a very good case that fields such as vaccines, radiological detectors, and computer security are all seriously underfunded if the nation is serious about improving its ability to detect, defend and recover from a terrorist attack. The recommendations on improving inter-agency coordination are mother's milk. Increasing coordination and cooperation between agencies will, of course, increase the efficiency of the plans developed to fight terrorists.

All in all, if policy makers reading this book are sobered by the task at hand, this book will have served its purpose. Yet, even if all of the recommendations are accepted, our security would only be marginally improved. As Ellen Goodman argues in an article reprinted September 12 in the San Francisco Chronicle: "the pledge of absolute security now rings hollow." My overall impression is that the book does not spend enough time deflecting our policy makers to more fruitful discussions on how, just like the Cold War, political and

economic policies put forward by the U.S. are more likely to achieve a positive benefit than any equivalent effort expended by the scientific community.

Dr. Forest Rouse
ANSYS Inc.
rouse@icemcfd.com