The Security Implications of Global Warming

by John Steinbruner and Tim Gulden

In considering the implications of global warming, it is important to understand the context in which the problem is arising. It is especially important to understand the historical legacy of the governments that will have to respond to it. In the case of the United States, the legacy was formed in the sequence of events that began with the Great Depression and ended with World War II. As a result of that sequence, the federal government became far more consequential domestically than it had ever been before, and the United States became far more consequential internationally. It was a moment of maturation brought about not merely by the passing of time but in response to momentous events. It gave the country an organizing and energizing focus.

For a half century after the war, a central feature of this experience was relived as the United States developed history's most capable military establishment in preparation for a perceived global confrontation with the Soviet Union, which was assumed to present a danger of imperial aggression comparable to the belligerent regimes of Germany and Japan. That assumption sustained the broadly accepted clarity of purpose that had been forged in the World War II experience. Clarity of purpose is essential for organizing coherent policy in a boisterous democracy.

However, that legacy focus was lost with the dissolution of the Soviet Union and its alliance system, and it is very unlikely that the current fixation on terrorism will prove to be an enduring substitute. The phenomenon of terrorism cannot be equated with massive imperial aggression and cannot be addressed in the same way. Nor can a "rising" China be plausibly cast in the global imperialist role. The United States is in serious need of an alternative formulation, as is the international community as a whole.

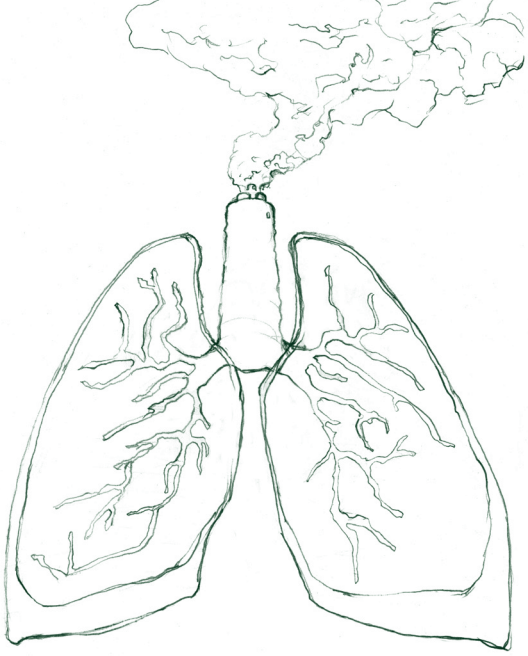
A valid, sustainable concept of interest capable of providing the organizing focus of policy is difficult to establish outside of the riveting context of active war. In the absence of a credible strategic enemy, it has been so far impossible to replace the now obviously outdated concept. The problem of global warming nonetheless looms as a possible candidate. It certainly promises to provide the momentous context necessary for a fundamental reformulation of purpose.

The intrinsic significance of anthropogenic climate change can be discerned from a few basic observations. We are in the midst of a surge in the size of total human population. Barring some unusual calamity, by 2025 six billion people will have been added to the two billion total of 1950 when the surge began. That has driven global economic growth, which has in turn intensified the accumulation of greenhouse gases in the atmosphere. It has been determined at a high level of scientific confidence that human-induced greenhouse gas concentrations will double over preindustrial (1750) levels by 2050 and that a significant rise in average surface temperature will result unless offset by some phenomenon not yet identified with anything like the same level of confidence. The amount of the increase is expected to fall in the range of 2 to 4 degrees Celsius with much larger local variations.

The geological record indicates that substantial changes in global climate patterns could result from average temperature increases in that range, but the magnitude, timing, probability, consequence and even the basic character of those changes cannot be determined with the same level of confidence. By the time such determinations could be made, it would be too late to prevent the more serious of the possibilities that might threaten human societies on a truly massive scale. To protect against calamity potentially greater than the worst of history's wars, prudence seems to require preventive efforts directed at energy production and use well before the exact dangers can be defined.

Tolerable preventive efforts must assure sufficient energy production, however, to enable rising standards of living among the poorest segments of the world where more than 95 percent of the population increase has been occurring. Since the globalizing economy has been concentrating wealth among the very rich, there is good reason to worry about the consequences for social coherence and for the incidence of civil violence and associated terrorism if the poor do not at least experience improvement. In addition to a shared commitment to prevent global destruction, concern for standards of equity creates a strong connection between global warming and security policy as do the potential means for transforming energy production.

In order to keep climate disruptions down to a level at which we can be reasonably confident that humanity can adapt, atmospheric



concentrations of greenhouse gases will have to be held at the doubling over pre-industrial levels that is already essentially unavoidable— that is, at about 500 parts per million. That in turn will require a transformation of the technical basis for energy generation from sources that emit greenhouse gasses (roughly 80 percent at the moment) to those that do not (currently 20 percent, much of which is hydropower that has limited potential for expansion). In order to assure some economic progress at all income and wealth levels as a basic standard of equity, this transformation will have to be accomplished as the overall level of energy production is increased by a factor of two to three and large efficiency gains are also achieved.

There are five technologies that can, in principle, enable such a transformation to be accomplished in the time required: wind, solar, biomass, nuclear fission and carbon sequestration. Of these, carbon sequestration is currently the most popular, but it is unlikely to be able to meet the burden of proof that will have to be imposed. Sequestration techniques must demonstrate to a high level of confidence that over the course of several centuries they will not generate slow leaks or sudden surges. If they did, extensive commitment to that technique would be disastrous. Of the other options, nuclear power generation is intrinsically the most promising but will have to meet its own burden of proof; namely, that utilization can be safely expanded by a factor of five to 10 without enabling a ruinous process of nuclear weapon proliferation.

The option of nuclear power generation cannot meet that burden of proof on the basis of current reactor designs, current fuel cycle management practices and current international security relationships among the critical participants—the United States, the European Union, Russia, China and India. But there are technically viable reactor designs, advanced explosive material management practices and revised security relationships that would be able to do so. With dedicated effort, nuclear power generation can be made a viable option, and it will be difficult to contain global warming without it. Wind, solar and biomass will all have to be developed and utilized as well, but they are unlikely to be alone sufficient.

The resulting incentive to master nuclear power is strong enough to provide the central purpose necessary to reformulate security policy. Most contemporary security problems have more to do with the common interest of all major states in controlling dangerous processes than competitive interest in responding to the violence generated. Prevention is essential because reaction is ineffective. It has become vitally important to understand that development. Global warming is the most consequential instance of a dangerous process, and collaboration to prevent it is becoming a global imperative. P

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