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WORKING PAPER

Climate Change War Game:
Major Findings and Background

By Sharon Burke and Christine Parthemore

Center for a
New American
Security

Acknowledgements

We would like to thank the Climate Change Consortium organizations that assisted in the development and execution of the war game: the Brookings Global Economy and Development Program; the Center for American Progress; CNA; the Heinrich Böll Foundation; the McKinsey Global Institute; the Pew Center on Global Climate Change; the Rockefeller Brothers Fund; the Sustainability Institute; and Woods Hole Oceanographic Institution. Oak Ridge National Laboratory provided scientific and technical expertise and generated new materials to enhance the game. ABC News followed the game as part of a forthcoming documentary on climate change futures. Of course, the participants themselves deserve much of the credit for their enthusiasm and willingness to play the game as designed. Finally, this three-day event was a full CNAS team effort, and we thank our colleagues for their hard work and intellectual support.

The participant briefing book and the materials generated from the game are also available at www.cnas.org.

Cover Image
Front cover graphic designed by Whitney Parker, CNAS

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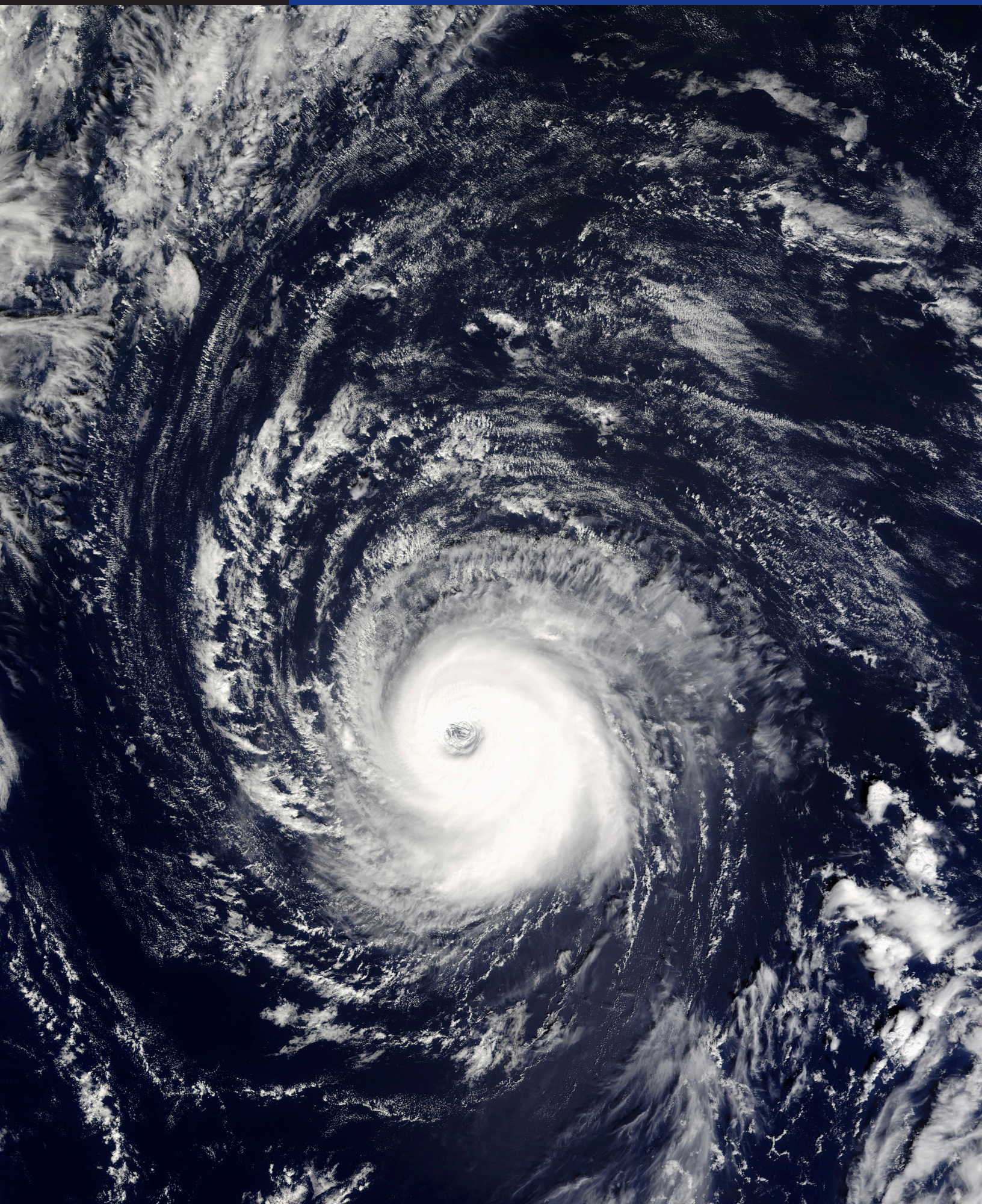

MAJOR FINDINGS: WHAT THE GAME SHOWED US

By Sharon Burke

Today, the majority of Americans accept that global climate change is an important challenge, but not necessarily a challenge with any urgency. Given that climate change has generally been viewed through the lens of scientific uncertainty, environmental activism, and economic costs, it is understandable that the public may not perceive climate change as a threat to the American way of life.

But there is little question that the consequences of global climate change pose many threats, particularly if greenhouse gas emissions continue to rise. The U.S. war with the Soviet Union shaped a half-century of international relations; it is ironic that the new Cold War for the 21st century may be a heat war, and not in a metaphoric sense. Over the next half century, the consequences of climate change may come to define life for people all over the world just as much as the war between the United States and Soviet Union did for the last generation.

From July 27-30, 2008, 45 scientists, national security strategists, and members of the business and policy communities from Asia, South Asia, Europe, and North America came together at the Newseum in Washington, D.C. to play a climate change war game. The game was conceived of, designed, and run by the Center for a New American Security (CNAS), a non-partisan, non-profit research organization based in Washington, D.C. CNAS was joined in this effort by a consortium of ten other supporting organizations, including: the Brookings Institution Global Economy and Development Program, the Center for American Progress, CNA, the Heinrich Böll Foundation, McKinsey Global Institute, Oak Ridge National Laboratory, the Pew Center on Global Climate Change, the Rockefeller Brothers Fund, the Sustainability Institute, and Woods Hole Oceanographic Institution.

This war game, or scenario planning exercise, was set in the year 2015, in a time of increasing weather

volatility and public concern about the consequences of global climate change. New information from the United Nations Intergovernmental Panel on Climate Change finds that the effects of climate change are likely to unfold faster and more dramatically than previously thought. Given that the agreement reached in Copenhagen in December 2009 did not materially affect greenhouse gas emissions by 2015 (with the accumulations of carbon dioxide in the atmosphere hitting about 407 ppm), a pattern of escalating changes is largely locked in until 2050. It is believed in 2015 that most nations in the world will have little choice but to adapt to sea level rises, more intense and volatile weather, floods, droughts, and other effects. Furthermore, if emissions continue to grow at the rate observed in 2015, the end of the century will see far more catastrophic climate change.

"…while the Climate Change War Game did not result in a fictitious international agreement that would cut greenhouse gases in China and transfer resources for adaptation from the United States to India, the debates and developments in the course of having such discussions were illuminating."

Participants were grouped into four teams – China, the European Union, India, and the United States – with the understanding that they represented the world's four largest emitters and had been brought together to reach an agreement on how to cooperate to adapt to climate change and cut greenhouse gas emissions. The teams were mixed in nationality: the China team, for example, included four Chinese nationals, five Americans, and two Europeans.

The United Nations Secretary General, played by Center for American Progress CEO John Podesta, asked the teams to consider new information about climate change, directing them to consider the following specific four challenges: mass migration; resource scarcity (specifically food and water); disasters; and emissions reductions. The teams were asked to reach a Framework Agreement on Managing Long-Term Climate Change over the course of three days. In the context of the game, the Agreement would be submitted subsequently for international negotiation, though players could consult with an International Team to get the perspectives of any other nation in the world, with the permission of game management.

The game was oriented around projections for 2050 and 2100, which were drawn from UN Intergovernmental Panel on Climate Change data (the "A1FI" model). Oak Ridge National Laboratory generated original analysis for the game on future climate effects and demographics, and players understood that the projections were not fictional. The Sustainability Institute also provided projections on greenhouse gas emissions and historical contributions.

The intent of the game was, at its simplest, to explore the national security consequences of climate change and raise the level of knowledge of a group of thought leaders. With many of the likely challenges the world faces, such as mass migration or increased incidence of intense storms,

there is a high risk of conflict and low capacity for cross-border cooperation. The game was meant to explore the possibilities for building cooperation and minimizing the risk of conflict. It also tested the abilities of different communities of interest, all relevant to addressing the challenge of global climate change, to collaborate. Finally, an underlying goal of the game was to examine the efficacy of American leadership in the international community on the issues surrounding climate change.

War game players often fight the scenario they are given to some degree. In this case, we found the players quickly embraced it. The European Union team did struggle with the notion that they had a collective identity and spent some time discussing whether they were really a "country" in the context of the negotiation. Two of the teams traded notes and conducted backroom barters in attempts to make a bilateral deal during full plenary proceedings, up until the very last moments of the game. Indeed, some players had trouble leaving the game – in the final session, game play ran over schedule as players argued that there was more they could accomplish. And in the wrap-up reflections at the end of the last day, some expressed disappointment that the game did not achieve better results, such as a breakthrough agreement or understanding of adaptation challenges, as if these considerations were actually being negotiated.

Key Findings

- National security is a viable framework for understanding climate change. Participants widely accepted and responded to the security framework for understanding the consequences of climate change. Participants, who had diverse backgrounds, raised their level of knowledge and their acceptance of the current state of knowledge, including the range of consequences, the plausible projections associated with global climate change, and the ways in which national and global security will be affected. Note that participants in this case did not equate "security" with "military" and in some cases noted that militaries were not the most important elements of national power in concerns about climate change.
- **It is important to leverage a diversity of disciplines and develop deeper understanding across nationalities.** Individuals from different communities of interest, such as military and science, were able to develop mutually intelligible positions and collaborate to develop a negotiating strategy. The internal dynamics of the teams showed that initially, non-citizens of the nations involved (i.e. the Americans on the Chinese team or the Europeans on the American team) had difficulty in role playing. But they appeared to more clearly understand the national point of view over the course of the game. This understanding of each nation's positions will be crucial to any future success in climate change negotiations.
- **Negotiators can accommodate some uncertainty, but will need better information about climate change consequences in order to actually plan and make tradeoffs.** While some players, particularly from China, questioned the validity of mathematical models used to make projections, most players accepted the projections and the range of uncertainty involved. They agreed, however, that nations and negotiators needed far better regional projections – even down to the municipal level – particularly of plausible consequences, such as flooding or drought.
- **Chinese leadership is as important as American leadership.** American leadership was important and a more favorable U.S. policy helped shape the game, but participants widely and explicitly recognized that Chinese leadership – or at least followership – would be even more important and possibly decisive. The shift in the U.S. position to one of leadership

and action on climate change just clarified the importance of China.

- **A focus on cutting greenhouse gas emissions runs the risk of crowding out full consideration of adaptation challenges.** Although the game was intentionally designed to be heavily biased toward challenges of adapting to climate change between 2015 and 2050, the negotiators focused on reducing greenhouse gas emissions. Players engaged on adaptation challenges as something that would be difficult but soluble and emissions reductions as something that would be nearly insoluble, certainly for developing nations if they act alone. It was the locus of the hardest questions and most important international tradeoffs. Players agreed that more information would be necessary on exactly what some of the projected, plausible adaptation challenges would entail – what would be the actual effects of a Category 5 hurricane on Miami, as the scenario posited? Are there credible projections for where mass migrations may occur and when? Game designers judged that the players would only have focused on adaptation in reaction to a specific crisis; it is possible that international cooperation can only be fully engaged in such crisis circumstances.
- **There is insufficient international capacity to deal with climate change issues.** The international community lacks the institutional structures to meet the challenges of global climate change; although the participants made some nibbles around the edges, they were unable to imagine alternative structures that could help with adaptation or emissions reductions. It is likely to be an ongoing and very difficult challenge to find ways of creating multilateral or international institutions capable of helping nations cooperate on these issues.
- **Russia will be an important player.** Game designers consciously excluded Russia given that the country is a major hydrocarbon supplier, with a pervasive public and elite belief that the country will benefit from climate change. Given that profile, Russia could be a spoiler in such negotiations. That is an important consideration, but would be a different game – to test the dynamics among these countries, especially between the United States and China, required excluding Russia. Participants in the game felt, however, that adding Russia into the mix is important and that there needs to be further exploration of how Russian interests and behaviors would affect such discussions and geopolitical relationships. They also felt there would be a benefit in educating Russian strategists and influential thinkers on these issues.
- **China and India are not necessarily going to be allies in climate change negotiations.** The Chinese and Indian teams initially considered an alliance with each other in their country deliberations, but each rejected such an alliance on the grounds that their interests were not sufficiently aligned. Both considered it more important to get cooperation or concessions from the United States and European Union, and while they did not consider cooperation with each other mutually exclusive with their other goals, they did not consider it necessary.
- **For India and China, it will come down to economic growth.** Throughout the game, both teams never wavered in their drive to balance any agreement with economic growth; future consequences of climate change were never truly factored in. The U.S. and EU teams likewise acknowledged the prominence of economic growth in their own domestic contexts, but acknowledged that they would have to transfer to or share technology with China and India. As the EU team noted at one point, this would not be a simple proposition: the team was not sanguine about creating a "world where China has a thriving economy that we

are paying to change into a green economy—essentially becoming the next superpower. We need to think about the consequences of paying for China to go green." The U.S. team voiced similar concerns.

- **Players had insufficient economic information.** Access to credible specific cost estimates of mitigation and adaptation (costs of dealing with both and a dollar figure for the benefits of doing so) made it difficult for players to entertain tradeoffs. In real life, this concern could be a problem as well.
- **China was unwilling to agree to specific terms but was willing to commit in principle to emissions reductions.** China did not want to agree to a proposal that it knew would be impossible for the rest of the world to accept, but affirmed that it wanted to be "part of the solution." As opposed to India's proposal, the Chinese proposal did not tie emissions reductions to a per capita clause, although China did begin with that premise. Ultimately, China conditioned its agreement on technology transfers and financial assistance.
- **First movers can skew such negotiations.** India was able to set the tone of the negotiations by being the first mover with a proposal that was ambitious on its face but not executable.
- **Implementation is more important than the actual agreements.** Participants felt that any agreement on cutting emissions would be welcome, but that the true work would have to take place on how to implement such an agreement. They were not optimistic that implementation would keep pace with any targets that might be reached in negotiations. So the follow-on work is arguably even more important than the agreement itself. At the end of the day, it was clear that changing the level of global greenhouse gas emissions would depend on money, and that the United States and European Union would be expected to finance global mitigation and adaptation. Nations such as India and China are unlikely to make any commitments until there is money on the table.

In general, the game suggested that reaching meaningful, multilateral agreements on climate change will be difficult. Even with a sense of urgency and more certainty about climate change, participants in the game were unable to make a communal agreement that included meaningful tradeoffs or binding commitments. In particular, participants were unable to reach any agreement about investments in research, development, and commercialization, despite heavy pressure to do so. In general, countries focused on easy agreements and parochial concerns.

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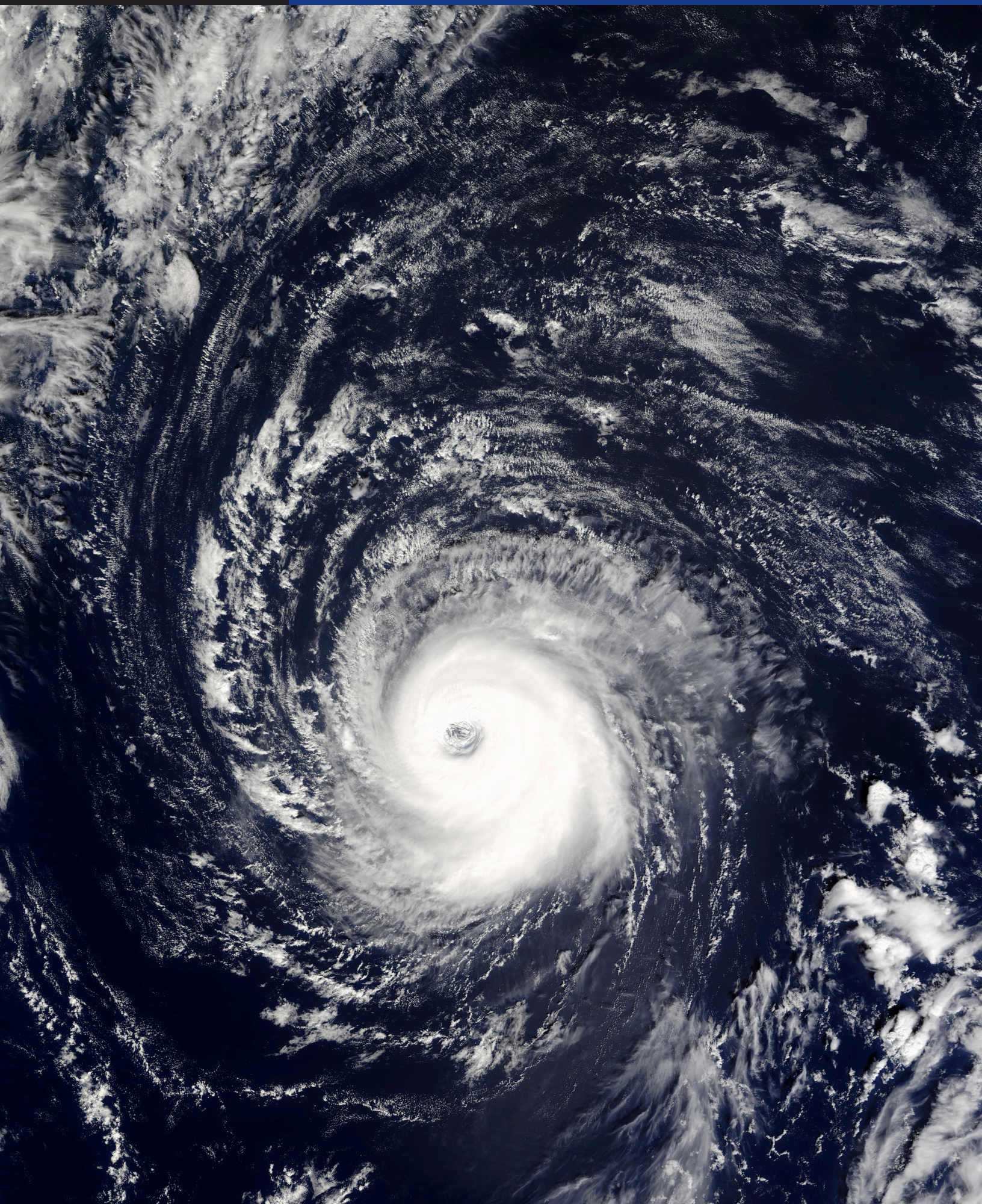

BACKGROUND: CREATING THE FUTURE

By Christine Parthemore

With the help of the project's Climate Change Consortium organizations, CNAS developed a "2015 World" in which game play would take place, including a timeline of key events that transpire in the intervening years. This future world is not a prediction, but rather it is based on a series of scenarios created through research and analysis of models and projections. All information provided and the scripts developed for the Secretary General's Team were sculpted to optimize game play and to drive at a more thorough understanding of the challenges the world faces from climate change; they did not necessarily represent recommendations or policy preferences of CNAS analysts or consortium partners.

The first step in developing the game's future world was to determine in what year or years game play should occur. After much debate and several early game design concepts, and initially looking out to the years 2050, 2040, or 2025 as possibilities, the consortium partners concluded that if the game were set too far in the future it could create a sense of disconnect between the events of the game and current challenges. To solidify the concerns of moving too far into the future, realistic projections in economics, politics, and military capabilities do not exist, lack detail, or are not fully believable the further into the future one looks. We also considered several variations of years elapsing between moves, but ran into the same concerns.

The consortium also hoped that a major outcome of this game would be for players to leave with a sense that action in the near term is necessary and possible, and therefore 2015 – just seven years into the future, and within the career timelines of most of the game's participants – best served the game's objectives.

To set up a future world in which participants could play, game materials had to provide enough information, the necessary information, and not too much information. The most important goal in

developing scenarios is that they are credible, and to ensure credibility the future scenarios endured many iterations and vetting by the climate change consortium science partners.

In planning the research for collecting and developing the 2015 scenarios, we first determined what types of information players would need or want in preparing for the game. Most important, players would need a rough sense of their nation's energy mix and both the levels and sources of their emissions in 2015, political constraints, military capabilities that would be called upon in adaptive situations, and a rough sense of their national priorities. Specifically, we focused the information to the four issue areas of disaster response, migration, emissions, and resource scarcity, with a focus on food and water. Based on what scientists can determine today, these issues are likely to be impacted by climatic changes, and these four issues are more likely than other effects to lead to conflict and instability. For example, 75 to 250 million Africans will endure increased water stress by 2015, growing to perhaps 350 to 600 million after 2050[1]; and the U.S. inability to close on emissions reduction protocol has damaged its reputation with foreign publics and reduced its clout with foreign governments. While CNAS conducted research on more narrow topics that players might choose to focus on, such as issues with civilian nuclear expansion and geoengineering, in the end we decided to withhold such topical research and hold the information provided to the players to the four broad issue areas rather than risk excessively steering the conversation toward specific solutions.

The research and analysis underpinning the 2015 scenarios was partially open-source material and partially based on climate modeling conducted by consortium partners, particularly Oak Ridge National Laboratory. CNAS began scenario development with open-source material such as government reports and white papers; news coverage of natural disasters and severe weather events, what occurs in their wake, and how populations react under various circumstances; academic and NGO studies, especially the work of the Intergovernmental Panel on Climate Change (IPCC); and historical and present-day accounts regarding the focus issues.

Based on this initial research, the scenarios included in various areas of China: water stress; increased droughts, flooding, or other severe events; increased coastal erosion and saltwater inundation; glacial melt in the Himalayas that could affect hundreds of millions; and shifting agricultural zones. These patterns could affect and be affected by migration within China, especially rural-to-urban migration. For the European Union, our research pointed to drought and heat waves increasing in southern Europe, changing crop patterns, and heavy migration from Africa, which, coupled with other challenges, contribute to political and social tensions. In the United States, drought as well as severe weather events in Mexico and Latin America drive increased migration into the United States, and a series of strong hurricanes hitting the southern United States strain the government's response capabilities. And the India scenario included changing monsoon patterns and increased extreme weather events; variously flooding and droughts in different areas of the country; lower crop yields in many areas, severe in some places; and migration of hundreds of thousands from Bangladesh. These events created a scenario in which the United Nations and most major international actors are greatly concerned about instability in strategic areas stemming from humanitarian crises, migration, rising food prices, and other effects in various regions.

Game materials highlighted specific events to walk players into the 2015 world and to provide context of what occurred since 2008, for example a general sense of the "current status" of relevant technologies. With a few exceptions, we took technology projections from the 2007 IPCC report,[2] which

some of the scientists in the consortium regarded as too conservative but which demonstrate the near-term limits of relying on technical solutions to climate change in the absence of major policy changes. Between 2005 and 2015, most potential cuts in carbon-based energy use and related emissions would be due to conservation, efficiency improvements, and fuel switching to natural gas, nuclear, and renewables. Without major near-term investment, carbon capture and storage (CCS) would be in use only at small scale. Some future trends beyond 2015 are also projectable based on current research and development, such as improved battery technologies coming to market, next-generation nuclear power plants coming online, growing application of CCS technologies, and improved scale for solar, tidal, and other renewable energy sources.

It was also critical to provide participants with information on the political realities of 2015, specifically what agreements the international community made after 2008 and the attitude of each team's government toward them. Throughout the development of the game, one of the most intense debates concerned a post-Kyoto emissions reduction agreement – both what was plausible for Copenhagen and what agreement participants would accept as having been agreed to. Real-life impasses in negotiating the 2009 Copenhagen Agreement at that time included whether nations would agree to binding targets, and if and how developing nations – even current major emitters such as China – should have a lesser burden given that cumulative emissions are largely the fault of developed nations. We decided to stipulate that the 2009 Copenhagen Agreement was developed, ratified, and went into effect in 2012. It included an aspirational (not binding) target of an 80 percent cut in global greenhouse gas emissions below 2005 levels by 2050, with interim national targets. One major lesson of a test game that the consortium held in advance of the actual game was that players needed to be given this detail or they would have the tendency to negotiate a new post-Kyoto treaty rather than 2015 issues.

Establishing the basic aspects of the Copenhagen Agreement naturally led to a question of why the Secretary General would need to call this ad hoc 2015 meeting of major emitters. We answered this by examining more current realities concerning the negotiations. Unfortunately the technology is not yet where it needs to be to make such an agreement successful earlier than 2015, and any changes to emissions a post-Kyoto agreement makes will likely just be starting to take effect by that time. To further push the timeline in ways anchored

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in current realities, the scenarios included the treaty's ratification occurring in 2012, as in reality individual governments will take some time in legislating and implementing policies to meet the agreements. The consortium's scientists provided a mock IPCC 5th Assessment Report for 2014 to bolster the need for new commitments to action after the Copenhagen Agreement, and the report makes clear that climate change is happening much faster and more dramatically than previous models projected.

"…while participants did for the most part act within the constraints of the future world provided to them, they retained their current biases and carried into the future the issues that negotiators and government leaders are most concerned about today."

Briefing materials also outlined specific climate-related events leading up to the 2015 world, which led to a kind of political tipping point on the urgency of action on climate change. For example, persistent heat waves and drought in the EU, especially along the Mediterranean region, ignite a competition for the allocation of water among agriculture, industry, and households in 2011. In 2013 a cyclone hits Bangladesh, killing 200,000 people and causing mass migration into and border tensions with India. Tensions increase as the United States and Mexico renew disputes over water rights of the Rio Grande in 2013. In 2014 late monsoon rains ruin India's wheat and rice harvests, and once rain arrives, extreme flooding overwhelms many Indian cities. The Indian Army is deployed to assist in relief efforts. In 2014 drought, food shortages, and political instability, especially in North Africa and the Sahel, trigger an influx of refugees to Europe. And in July 2015, a Category 5 hurricane hits Miami, flooding a majority of the city, damaging much of its infrastructure and tying up the National Guard to lead the disaster response.

Players were to take as fact that these events transpired before their 2015 meeting. All of these climate-related scenarios have strong implications for migration, political tensions and instability, and for civilian and military capacities.

Once CNAS developed these scenarios, the scientists in the consortium compared them to the models they used for game purposes[3] and against existing projections as a vetting process. At first, the reaction of some was that the climate scenarios seemed a bit dramatic; the events outlined were all plausible, but it seemed unlikely for so many things to occur in such rapid succession. As 2008 progressed, however, it became clear that the scenarios were not far-fetched, and indeed might trend conservative. Oil prices rose over $100 per barrel on January 2, 2008, and rose consistently to record highs to hit over $140 per barrel for the first time in late June 2008. In May 2008 Cyclone Nargis killed around 130,000 people in Myanmar, wiped out a large portion of the nation's agricultural capacity, and demonstrated the challenges of relief operations – particularly in unfriendly or unstable nations – and the fluid roles of the military and the international community in such situations. Rising food prices created a crisis that induced riots in at least 30 countries.[4] Severe drought prompted territorial discussions in a border region of Georgia

and Tennessee over a piece of the Tennessee River.[5] And the China earthquake, while not a climatic event, showed both the strain of military response capabilities that large-scale humanitarian disasters can cause and the potential for improving political and diplomatic relations in their wake.

After the consortium's scientists vetted and edited the scenarios, CNAS researchers analyzed the maps, projections, and descriptions of future climate change in a business-as-usual scenario in order to create briefings for the mock-Secretary General's team to deliver as a way to set the scene for game play. This included a threat assessment delivered by an Assistant Secretary General, an environmental briefing by the Secretary General's science advisor, and a speech by the Secretary General – played by John Podesta – that analyzed security and foreign policy implications of the available climate change projections.[6]

The overriding question concerning this research and preparation was whether participants would actually play in the 2015 world that we created. The general answer is that they did, although the timing of players lapsing into the world we established varied by team. The United States team, for example, spent a few hours thinking through the mechanics of the game and what they should do, while the India team jumped quickly into 2015 game play. A good indicator of success in establishing the 2015 world was that during the final plenary session, participants continued working to hammer out an agreement until the very end of the game and several expressed interest in continuing to negotiate further.

A solid vetting process aided in the 2015 world being believable and workable. The 2015 world also worked because the consortium took an early decision to be mostly optimistic in determining what occurred between 2008 and the time of game play. With many participants who are or were previously involved with international negotiations or domestic policymaking on climate change, the consortium agreed that players would push back and reject the premises of the 2015 world if it did not account for some technological and political progress in the interim period. For similar reasons, the non-scientific research and analysis trended quite conservative. We based energy projections, for example, on the reference scenario in the International Energy Agency's World Energy Outlook, which sticks to current and highly likely near-term policy, supply, and demand trends more closely than do many other projections.

And while participants did for the most part act within the constraints of the future world provided to them, they retained their current biases and carried into the future the issues that negotiators and government leaders are most concerned about today. This proved to be the case most starkly in the conversation being skewed more toward emissions mitigation than adaptation and response measures. However, as the Major Findings note, the game was a success in leading to new observations based on the ways in which the discussion skewed toward certain topics, and in illuminating the biases and opinions of the participants.

ENDNOTES

[1] Effects from M.L. Parry, O.F. Canziani, J.P. Palutikof and Co-authors, "Technical Summary," in ***Climate Change 2007: Impacts, Adaptation and Vulnerability***, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, eds., (Cambridge, UK: Cambridge University Press, 2007): 66-67; paired with date projections for temperature rise from the Sustainability Institute.

[2] IPCC, "Summary for Policymakers," ***Climate Change 2007: Synthesis Report*** (2007).

[3] The consortium scientists from Oak Ridge National Laboratory, the Pew Center on Global Climate Change, and Woods Hole Oceanographic Institute agreed to use the Intergovernmental Panel on Climate Change's A1FI data set.

[4] Colum Lynch, "Growing Food Crisis Strains U.N.; Haiti is Among Many Countries Where Hunger and Unrest Go Hand in Hand," ***The Washington Post*** (25 May 2008): A19.

[5] Shaila Dewan, "Georgia Claims a Sliver of the Tennessee River," ***The New York Times*** (22 February 2008).

[6] The Secretary General Team's briefings and remarks as prepared, Participant Briefing Books, and other game materials are all available at: http://www.cnas.org/node/956.

About the Center for a New American Security

The mission of the Center for a New American Security (CNAS) is to develop strong, pragmatic, and principled national security and defense policies that promote and protect American interests and values. Building on the expertise and experience of its staff and advisors, CNAS aims to engage policymakers, experts and the public with innovative fact-based research, ideas, and analysis to shape and elevate the national security debate. A key part of our mission is to help inform and prepare the national security leaders of today and tomorrow.

CNAS is located in Washington, DC, and was established in February 2007 by Co-founders Kurt Campbell and Michele Flournoy. CNAS is a 501c3 tax-exempt nonprofit organization. Its research is nonpartisan; CNAS does not take specific policy positions. Accordingly, all views, positions, and conclusions expressed in this publication should be understood to be solely those of the authors.

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