

Opening Remarks of
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- Good afternoon and many thanks to Ralph Cicerone and Lauren Alexander Augustine for inviting me to address you today, and to the National Academy of Sciences and its co-sponsors for supporting this meeting.
- Looking at the list of co-sponsors of this event brings to mind something I've heard the President say on a number of occasions: Our challenges are so big, and our resources so limited, that cooperation – across agencies, branches and levels of government, sectors, and nations – is absolutely indispensable if we are to succeed. I'm grateful, and the President is grateful, to all of the sponsors and to the extraordinary array of participants in this room for your commitment to addressing the challenge of managing of extreme events.
- Certainly the recent pace of such events -- including an unusual earthquake here in the Washington DC region, a major hurricane whose impacts are still being felt up and down the East Coast, and the flooding going around us as we meet today -- make it unnecessary for me to spend a lot of time justifying our focus here. But even without those most recent events, it had already been an extraordinary year for natural disasters.
- With the major earthquake and tsunami in Japan, another major earthquake in New Zealand, extreme tornado flurries, wildfires, and flooding in the United States, more flooding in Australia and New Zealand, terrible droughts in the Horn of Africa and in Texas, among much more, 2011 will be the most expensive year since records have been kept on the costs of these kinds of events.

These of course were not all extreme-weather events, but the apparently rising incidence of those and the plausible correlation of some kinds of them with anthropogenic climate change does give particular cause for concern.

Consider that:

- Last year appears to have been was the wettest year on Earth at least since 1990.

- Over the past 100 years, sea level has steadily risen, and since 1993 it's been rising at a rate of over 3 millimeters per year – about an inch every eight years—even as the number of people and the value of property along our coasts have also been climbing.
(For those of you thinking about buying shoreline property, I have some advice that runs exactly counter to what you always hear about the stock market. When it comes to property near the coasts, you want to buy high and sell low.)
- Further, as everyone in the Southwest knows, the fire season has been arriving earlier and ending later, and the average annual area burned has been increasing drastically.
- Of course, weather-related disasters, whether abetted by anthropogenic climate change or not, are a product of the interaction of what the weather does and what societal systems are in the way. That interaction of environment and society also characterizes many disease threats, which arise not just from natural genetic and environmental forces but from the interaction of these with societal characteristics and anthropogenic environmental transformations.
- That is also true of the risks from so-called space weather -- geomagnetic storms generated by the sun, which pose a constant threat to the global grid and to satellite networks but which may be especially problematic in the coming year or so, the peak of an approximately 11-year solar storm cycle.
- Recall that in March 1989, a geomagnetic storm made the 19-hour journey from Sun to Earth and caused Canada's Hydro-Quebec power grid to collapse within 90 seconds of arrival, leaving millions of people in darkness for up to nine hours. And in 2003, two intense storms caused a blackout in Sweden and affected satellites, broadcast communications, airlines, and navigation over a wide region.
- But there is also, of course, a category of disasters that are nearly entirely our own fault.
- Technological failings, for example, such as the DeepWater Horizon disaster, which has racked up costs in the tens of billions of dollars; or the 1986 Chernobyl disaster, whose cost has been estimated at more than \$200 billion.
- And, as the 10th anniversary of 9-11 approaches, we can hardly forget the continuing danger of intentional disasters—terrorist attacks that may include the use of biological, chemical, or radiological materials, as well as cyber-attacks that can have enormous financial consequences without any physical impacts on people or infrastructure. Such attacks have already wreaked enormous havoc in the world, and seem entirely likely to continue at larger scales in the future.
- Now I'd like to turn away from this litany of gloom and doom and ask you to use your imaginations and wonder "What if?"

- What if we could transform today's most vulnerable communities into tomorrow's most resilient and sustainable ones?
- What if we could lead the world to a safer and more secure future, all while initiating new economic growth and leadership opportunities and actually building the futuristic model cities we once dreamed about as children?
- What if we could grow our economy by supporting these communities, by focusing on the development of new technologies and new materials and by putting together the many advances of recent years in the physical and social sciences, engineering, natural resources, and advanced manufacturing so we can engineer new preventives and new solutions to potential crises?
- These “What ifs” are at the heart of this Administration’s many creative, ambitious, and—most important—science- and evidence-based efforts in the arena of disaster prevention and response. Many of them are not widely advertised, but together they comprise a major movement that stands to make our Nation not only safer and more resilient but also more economically vibrant and secure.
- Let me mention, briefly, a few of the things that we are doing to prevent or minimize the impacts of some of the disasters I’ve just mentioned, and to speed recovery from those we can’t avoid.
- In line with the National Response Framework developed by the Department of Homeland Security and, more recently, Presidential Policy Directive 8, which was released in March of this year and is focused on National Preparedness, we have been shifting increasingly to an “all-hazards” approach, which calls for the development of response capabilities that can be applied as needed to virtually any disaster at hand.
- A related example of our evolving thinking in this area is FEMA’s “Whole of Community” planning initiative, which recognizes that:
 - a) when disaster strikes we must do a better job of providing services for the entire community, regardless of age, economics, or accessibility needs; and
 - b) even with the best of planning, the needs of survivors are likely to outweigh the collective resources and capabilities of government, hence there is a need to engage with other segments of society—including volunteer, faith, and community-based organizations; the private sector; and the public, including survivors themselves—and leverage those diverse resources for the good of the community at large.
- In short, the most resilient communities are built with the support of engaged citizens helping themselves and others.

- With regard to disaster recovery, as many of you know, President Obama announced in Fall 2009 an effort to examine lessons learned from previous disaster recovery efforts, with a focus on improved collaboration between Federal agencies and state and local governments and other stakeholders.
- As part of that effort, and at the President's request, the Secretaries of Homeland Security and Housing and Urban Development are co-chairing a Long-Term Disaster Recovery Working Group composed of the Secretaries and Administrators of more than 20 departments, agencies, and offices. This high-level, strategic initiative is already providing operational guidance for recovery organizations and will be making additional recommendations to the President.
- Another area of progress in this domain is the Federal government's annual National Level Exercise to prepare and coordinate multi-jurisdictional, integrated responses to national catastrophic events. In the latest such endeavor, in May of this year, thousands of people across the United States received notification of a simulated catastrophic earthquake in the New Madrid Seismic Zone, launching an exercise that involved Federal, state, regional, local, international, non-governmental, and private-sector partners.
- I want to mention, as well, some of the relevant activities in which the Office of Science and Technology Policy and the interagency National Science and Technology Council, which operates under OSTP, have been involved.
- Just last week, OSTP—in conjunction with the Departments of Homeland Security and the Commerce—released a *National Strategy for Chemical, Biological, Radiological, Nuclear, and Explosive Standards*, which describes how the Federal government will coordinate, prioritize, establish, and implement technical standards for equipment that is designed to either detect chemical, biological, radiological, nuclear, and explosive weapons or decontaminate areas affected by such weapons.
- To some, the development of a strategy for implementing technical standards may seem like an arcane matter, but I think it is obvious to this group that if Federal, state, and local jurisdictions are going to work together to prevent and respond to CBRNE disasters, then our equipment needs to be both reliable and interoperable.
- That report was produced by a committee of the National Science and Technology Council or NSTC, which my office oversees, and which sponsors as well a Subcommittee on Disaster Reduction that, among other activities, has been:
 - Establishing clear national goals for Federal science and technology investments in disaster reduction;
 - Promoting interagency cooperation for natural and technological hazards and disaster planning; and

- Facilitating interagency approaches to identifying and assessing and reducing disaster-related risks.
- By the way, this subcommittee will be teaming up with the US Global Change Research Program in the coming weeks to conduct a careful, line-by-line review of the penultimate draft of the International Panel on Climate Change's Special Report on Managing Extreme Events and Disasters to Advance Climate Change Adaptation, soon to be released.
- A different NSTC subcommittee is focused on protecting physical infrastructure in the event of a disaster, and has done excellent work to create an inventory of current resilience-related research efforts as well as an agenda for further research needs.
- Much of that agenda focuses on technology and processes that could be applied to existing infrastructure to ensure maximum possible function after an extreme event.
- Last let me mention just one other interagency effort, the National Earthquake Hazards Reduction Program, more commonly known by its acronym of NEHRP – “Nee-Herp”. Although NEHRP has been around since 1977, combining the expertise of scientists and others in FEMA, NIST, the NSF, and the USGS, it has grown far more sophisticated over the years as earthquake detection and response technologies have improved.
- Through its work helping to shape building codes and other endeavors, it has proven to be an invaluable national asset as the Federal government works to prioritize approaches to reducing the risks to life and property from future earthquakes.
- In closing, I want to remind everyone that the scale of the disasters we are talking about today is typically amplified by the social and political impacts that so often follow these events. History has repeatedly demonstrated that effective management—or mismanagement—of extreme events can have huge influences on subsequent political and economic outcomes.
- That is just one reason why it is so important that we continue to expand our focus beyond old-fashioned “response after the event” – saving victims and limiting further damage—toward a new emphasis on “preparedness and protection before the event,” to minimize casualties and interruption of commerce and other activities of everyday life.
- This is the very definition of resilience. And it is one reason why just last week, on August 31st, President Obama declared September—the month of the tenth anniversary of the 9/11 attacks—to be National Preparedness Month.
- In that proclamation he said: “Preparedness is a shared responsibility. ... Although we cannot always know when and where a disaster will hit, we can ensure we are ready to respond. Together,” the

President said in his proclamation, “we can equip our families and communities to be resilient through times of hardship and to respond to adversity in the same way America always has -- by picking ourselves up and continuing the task of keeping our country strong and safe.”

- I don't think I could say it any better than that. So thank you again for inviting me. I'd be happy to take questions in the time we have left.