Prepared Testimony of
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Submitted to the
Committee on the Budget
United States Senate
The Costs of Inaction:
The Economic and Budgetary Consequences of Climate Change
July 29, 2014

Chairman Murray, Ranking Member Sessions and Members of the Committee:

Introduction:

I am honored by your invitation to testify on this very important topic. I am an economist and Senior Vice President at NERA Economic Consulting. I have worked on climate change issues and policy since 1988, when I was Assistant Director for Natural Resources and Commerce at the Congressional Budget Office and led CBO's study of the economic impacts of a carbon tax. Prior to that I was chief economist in the Office of Program Analysis and Evaluation in the Office of the Secretary of Defense and headed energy modeling and forecasting activities in the Energy Information Administration.

After leaving government service, I continued to concentrate on climate policy for most of the last 25 years. I served as a Principal Lead Author of the IPCC's Second Assessment Report and as a Peer Reviewer of subsequent reports including the most recent. I have led numerous studies in which I and my colleagues at NERA used our economic models to estimate the costs and emission reductions of proposed climate policies including those included in the President's Climate Action Plan. I have published many articles on these topics in refereed professional journals, and had the privilege of contributing a chapter on black carbon mitigation to a volume on climate change edited by Professor Lomborg a few years ago.[1]

[1] "Black Carbon Mitigation." With R. Baron and S. Tuladhar. Chapter 4 in Smart Solutions to Climate Change – Comparing Costs and Benefits, Bjorn Lomborg (ed.), Cambridge University Press, 2010.

In the past few years I have taken a particular interest in the relative merits of mitigation and adaptation as responses to climate change risks, and in particular in the role of political and economic freedom in making it possible for poor countries to grow economically and at the same time to reduce their carbon intensity and become more resilient in adapting to climate change.

I am testifying on my own behalf today, and statements in this testimony represent my own opinions and conclusions and do not necessarily represent opinions of any other consultant at NERA or any of its clients.

Summary

Today's hearing centers on the potential damage that climate change could cause and how that possible damage could affect the economy and the Federal budget. This is a very broad topic, and the questions that it raises cover nearly every aspect of our knowledge about climate change:

- How imminent and likely is damage from global warming?
- What is the government's role in reducing the potential damage from climate change?
- How much should be spent on public investments to "protect people" from climate risks?
- How much damage can be avoided by reducing greenhouse gas emissions?
- What will it cost the Federal budget and the U.S. economy to reduce emissions?
- How confident can we be that spending more now will reduce the likelihood or magnitude of future costs enough to justify the expenditure?

It is far from clear that recent weather events are anything more than normal variability in storm frequency and intensity, and the nature, timing and extent of damage from climate change remains highly uncertain. This does not imply that no action is justified, but it does imply that costs and avoided risks must be balanced carefully.

Unlike reducing greenhouse gas emissions, for which there are not adequate private incentives in the absence of government policies, there are quite sufficient incentives for private households and businesses to pay attention to risks of climate change. The role of government should be limited to revising priorities for public investments in light of climate risks, and reforming existing policies and programs that distort incentives for risk minimization, such as subsidized flood insurance.

Since the public investments that could be justified as a defense against climate change will be under the jurisdiction of the same Congressional committees and executive agencies now dealing with similar activities, there will be natural incentives in Congress and the agencies to propose increases in spending beyond what a critical evaluation of costs and risk reduction would justify. Expanding the role of government into activities that could be done perfectly well by the private sector will not save budgetary resources, nor will overinvestment in areas where government does have a responsibility. There are also questions of timing. At a time when we face threats around the world, national security might be better served by reversing planned reductions in military manpower and force structure than by increasing funding for climate related activities in DOD. Thus critical evaluation of such budget proposals will be very important.

Policies to reduce greenhouse gas emissions, such as the Administration's Climate Action Plan (CAP), have also been rationalized on the grounds that spending now will avoid higher costs later. I have used our N_{ew}ERA model of the U.S. economy to estimate the economic cost and budgetary impact of policies sufficient to achieve the CAP goal of reducing emissions to 17% below 2005 levels by 2020. The regulatory policies favored by the Administration would be likely to reduce the average household's disposable income by about $1000 in 2020, reduce Federal revenues by over $150 billion due to reduced economic growth, and cause electricity prices to rise by about 7%.

Holding U.S. emissions at 17% below 2005 levels all the way to 2040 would reduce cumulative global emissions over that period by less than 2%, because of the declining share of the U.S. in global emissions. That would take as little as three-hundredths of a

degree and no more than one ten-tenth of a degree off the rise in global average temperatures that might occur otherwise. Damages to the U.S. would probably be reduced by about the same 2 percent.

This leaves the question of whether there is a national security interest in climate change due to its likelihood of increasing conflicts or effects on U.S readiness. It is true that most of the damage from climate change will not occur in the U.S. but rather in poor countries in equatorial regions -- in other words, in regions where failed states, rapacious dictators, and ethnic and religious violence are endemic. The paltry difference in global warming that the US can make by reducing emissions will not help those countries. I believe that we have both a national interest and moral obligation to provide effective, community based aid to those countries to assist them in adaptation. The overwhelming evidence, however, is that resilience to climate change -- that is, ability to adapt -- is greatest in countries whose open political systems and free market economies provide both the incentives and the stability for private investments in adaptation, and impossible to achieve in others. Thus it would be far better to concentrate on ways to bring about open political and economic systems in these poor countries than to engage in more of the planned, top down aid that has failed to alleviate poverty or violence up to now. Absent such changes, providing adequate budgets for national defense to deal with threats from those regions will remain the same high priority no matter how they are affected by climate change.

Budget Impacts Come from Policy Choices

Climate analysts use the word "mitigation" to describe actions intended to reduce greenhouse gas emissions or their effects on global temperature, and "adaptation" to describe human responses that can lessen the damage from higher temperatures. It is convenient to put policy choices into one or the other of these categories. Mitigation policies are intended to avoid future damage from climate change by reducing greenhouse gas emissions and limiting the range of likely increases in global average temperatures. Adaptation policies are intended to reduce the damage from climate

change if and when it does occur. Both types of policies can have effects on the economy and the budget, but they differ greatly in their cost-effectiveness in reducing risks.

Possible climate impacts form the basis for either mitigation or adaptation. For example, the President's Climate Action Plan states that " we are already feeling [climate] impacts across the country and the world." In this, the President goes well beyond what the IPCC has stated. We have indeed experienced weather events that might in the future be made worse by rising global temperatures, but the evidence that any recent events are caused by global warming is not convincing even to the IPCC.[2] The events are well within normal variability of the weather system, do not need a driver of rising global temperature to happen. Most of record damage due to storms is clearly attributable to greater development in areas known to be vulnerable and not to an increase of the hazard. Fixing the incentives to locate in locations at risk is far more cost-effective than encouraging and then protecting unwise investments through mitigation or adaptation.

Although it is true that demanding certainty before acting is rarely a good risk management strategy, always assuming the worst and acting as if it is sure to happen without immediate action is equally bad risk management. So is insisting on doing something even though it is too late or too little to matter.

A prudent balancing of costs and risks is necessary, and that is very hard to do given the present lack of quantification and high uncertainty about what the effects of climate change will be. The range of temperature increases predicted as a result of a doubling of greenhouse gas concentrations is wider in the most recent IPCC Fifth Assessment Report than it was in the Fourth, from 1.5 to 4.5 degrees Celsius, and global temperature increase has stalled for the past 15 years. If the cause is that uncertain, the effects cannot be any less uncertain. Although studies of the potential damages of events hypothesized to be caused by climate change, known as "effects research," have proliferated, integrated assessment modelers have not yet succeeded in extending their models that predict

[2] For example, in its Fifth Assessment Report (FAR) the IPCC states that " Economic losses due to extreme weather events have increased globally, mostly due to increase in wealth and exposure, with a possible influence of climate change (low confidence in attribution to climate change)."

temperature change to generate estimates of the effects of temperature increase and the damages that they would cause.[3] Moreover, the effects of temperature increase are likely to be so localized and model results are so inconsistent about global effects that global or national planning is most likely to do the wrong thing in the wrong place.[4] Reduction of greenhouse gas emissions from the United States faces the high likelihood that the countries that will emit the most emissions over the next decade, including China, India and Russia, will do nothing to reduce their emissions, leaving climate risks about the same no matter what the U.S. does.

Mitigation Policy

Thus the first questions about mitigation policy have to be about its present economic costs and budgetary effects and its possible future benefits. Implementation of the President's Climate Action Plan in particular would have significant effects on revenues and outlays as well as negative impacts on the economy as a whole.

Economic and Revenue Impacts of Mitigation Policy

In order to assess the consequences of the Climate Action Plan, my colleagues and I used NERA's N_{ew}ERA model of the U.S. economy. N_{ew}ERA is a computable general equilibrium model of the U.S. economy that has been used by a wide range of clients for assessments of energy and environmental policies, including the U.S. Department of Energy in its evaluation of the public interest in allowing natural gas exports.[5] For this study, we used a version of the model that has a baseline for taxes and expenditures based on CBO's long term budget outlook and a detailed representation of income taxes and drivers of spending.

[3] Again the FAR states "In recent decades, climate change has likely contributed to human ill-health although the present world-wide burden of ill-health from climate change is relatively small compared with effects of other stressors and is not well quantified."
[4] Robert Mendelsohn, op cit.
[5] For a description of the model and how we represent policies like the CAP in it, see Sugandha D. Tuladhar, Sebastian Mankowski, and Paul Bernstein. The Interaction Effects of Market-Based and Command-and-Control Policies. Energy Journal, Vol. 35, No. SI1.

Economic Impacts

We took the Climate Action Plan goal of a 17% reduction in greenhouse gas emissions below 2005 level by 2020, and assumed the same cap would remain in place thereafter. We found that is the goal were achieved in the most cost-effective possible way, by achieving an equal marginal abatement cost across all possible ways of reducing emissions, there would still be impacts on energy prices, GDP, and federal, state and local tax revenues:

- Energy prices: 7% higher residential electricity prices in 2020, 23 cent per gallon or higher gasoline prices, and about a 10 cent per million BTU increase in natural gas prices due to increased demand for natural gas for power generation.
- Real disposable income: Less by over $200 per household in 2020
- Tax revenue: Federal revenue down by $40 billion in 2020 and State and local revenue by $4 billion.

Energy prices occur because limiting greenhouse gas emissions requires moving to higher cost sources of energy, and abandoning capital investments that rely on coal or oil to replace them with more costly sources of energy. These costs are all passed on to consumers in the form of higher prices. These cost increases and the demand for resources to replace existing capital prematurely ripple through the economy and reduce wages, returns to capital and GDP. Higher prices and lower wages and returns on investment lead to lower disposable income for households and to a shrinking of the tax base that reduces Federal and state revenues.

Costs would be higher with actual policies that leave some sectors out and drive others too far. The CAP is not a broad and uniform policy that puts a uniform price on carbon dioxide emissions wherever they occur in the economy, that would concentrate effort on reducing emissions where it is most cost-effective. Instead, the Climate Action Plan lists a series of regulatory measures to force electric utilities, consumers and motorists to switch fuels and use less energy. The stated components of the CAP include

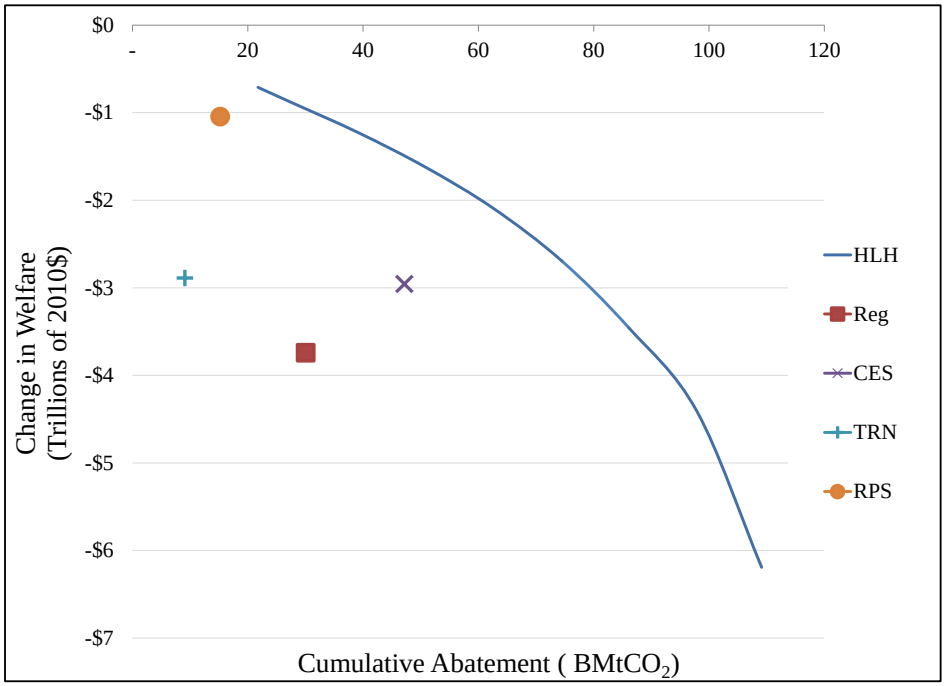
- EPA's CO2 emission standards for new and existing powerplants
- Tightening new car fuel economy standards
- More strict appliance efficiency standards

It is dubious that these specific measures alone[6] could achieve the stated goal, but they do identify a regulatory approach to climate policy that would be much more costly than the estimates I gave for a minimum cost approach if it were expanded sufficiently to achieve the 17% reduction. In a paper published last year in the Energy Journal, my colleagues compared the cost a policy that achieved emission reductions at least cost to the cost of various regulatory policies that achieved the same goal.[7]

The key figure from their paper is reproduced below. The horizontal axis measures cumulative emission reductions from 2010 - 2050 in millions of metric tons, and the vertical axis measures costs in net present value over the same time period, in trillions of dollars. The curved line represents the minimum cost, with ideal policies, at which emission reductions could achieved. Any point below the line represents a policy that achieves the same emission reduction at higher cost. The policies labeled TRN includes transportation measures such as fuel economy standards and renewable fuel standards. The policy labeled CES is a policy that requires utilities to source progressively larger percentages of their generation from "clean" sources including natural gas and renewables. The point labeled RPS is a more conventional renewable portfolio standard for electricity generators. The policy labeled REG contains all of the above plus tightened energy efficiency standards. Thus REG contains the same regulatory elements as the Climate Action Plan, and applies them to the electricity generation sector, transportation sector, and household sector with sufficient severity to lead to cumulative emission reductions of about 30 million metric tons between 2010 and 2050.

[6] THE PRESIDENT'S CLIMATE ACTION PLAN Executive Office of the President June 2013. pages 6 - 9.
[7] Tuladhar et. al.

Changes in Discounted PV of Welfare from 2010-2050 for Regulatory Mandates Compared to Efficient Frontier (Trillions of 2010$)



If the goal of the Climate Action Plan is to reduce emissions to 17% below 2005 levels by 2020 were met, and emissions were held at this level from 2020 to 2050, we estimate that cumulative emissions would be reduced by about the same 30 million metric tonnes as the REG policy in our study. Thus the REG policy in the figure above gives a good indicator of what the cost would be if the Administration's regulatory approach were made sufficiently stringent to actually achieve its stated goal.

The picture reveals that taking a regulatory approach, with CO2 emission regulations, requirements for generation of electricity from "renewable" sources, new car fuel economy standards and "renewable" fuel standards together with even tighter efficiency standards on appliances and other consumer durables would cost about 4 times as much as a least cost policy.

That implies a cost by 2020 of about $1000 per household and, if budgetary impacts of the regulatory policy are proportional to its other impacts, a loss of over $150 billion in revenue in FY 2020.

Revenue Impacts

Impacts on GDP and personal income translate into lower tax revenues. Our analysis has shown that even an ideal carbon tax would have to devote up to 40% of its revenues to make up for lost revenues elsewhere in the economy due to drag on the economy. Regulatory measures that provide no revenue offset and lead to greater losses in GDP would have even larger effects on revenues.[8]

Thus the mitigation policy approach of this Administration will unambiguously reduce revenues, probably on the order of $150 billion by FY2020.

Outlays for Mitigation

These would not be the only effects of mitigation policies on the budget. There are many proposals mentioned in the CAP and proposed policies that also increase the budget deficit from the outlay side. These include:

- Extended tax preferences for solar, wind, and other renewables. These subsidies hide the higher cost of renewables relative to fossil fuels and shift both that cost and windfalls to economic renewables onto the taxpayer. But those costs do not go away. The impacts of using such measures to achieve CAP goals were not included in my estimates of lost revenue, and would make revenue losses even larger if they were extended.
- Loan guarantees are likely to have adverse consequences for the budget as well. They contain a built-in bias toward failure. Providing an upfront credit subsidy will not keep a project in business if it cannot cover its operating costs, as recent failures in battery and solar technology prove. Even the requirement for a loan

[8] This is a standard finding in the literature on the "double dividend" literature, see Lawrence H. Goulder, "Environmental taxation and the double dividend: A reader's guide" International Tax and Public Finance August 1995, Volume 2, Issue 2, pp 157-183

guarantee fee to cover expected losses leads to adverse selection, because the fee those with a worse than average probability of default will be most willing to pay it, and companies with better than average likelihood of success will not.[9]

- Demonstration projects are at the wrong end of the RDD&C spectrum for government to be involved. The appropriability of R&D increases as it comes closer to being commercial, and the need for government involvement disappears. Demonstration projects in practice have led to diversion of R&D funds from more fundamental research that could lead to real breakthroughs and cost reduction, and do not lead to adoption of the demonstrated technology when no long term incentives for replacing fossil fuels like carbon taxes are in place.[10]

These budgetary and economic impacts of tax subsidies and loan guarantees would increase the loss in revenue above $150 billion in 2020, and are additional to the revenue losses due to regulatory programs that divert productive investment and put a brake on economic growth. .

Possible Avoided Damages

There is very little policy or budget guidance to be found in discussions of the costs of unchecked climate change. The better question is what damage could be avoided if specific goals were achieved, and what the cost would be of policies that could realistically be expected to reach those goals.

[9] See my chapter in Pure Risk: Federal Clean Energy Loan Guarantees, Nonproliferation Policy Education Center Apr 2012

[10] See Kenneth J. Arrow, Linda Cohen, Paul A. David, Robert W. Hahn, Charles D. Kolstad, Lee Lane, W. David Montgomery, Richard R. Nelson, Roger G. Noll and Anne E. Smith. "A Statement on the Appropriate Role for Research and Development in Climate Policy" Economists Voice, February 2009. Lee Lane, W. D. Montgomery and A. Smith, "R&D Policy." in A Taxing Debate: Climate Policy Beyond Copenhagen. Growth No. 61, Committee for Economic Development of Australia, August 2009.

This is pretty much basic environmental economics. The next point is also pretty uncontroversial, that the avoided damages are much more uncertain than the costs. We can and do employ scenario analysis to provide an understanding of how the cost of achieving a specific reduction in emissions depends on uncertainties about future technology developments and about how much it will cost households and business to change behavior and investments in buildings and equipment. But for avoided damage the uncertainties are much wider.

It is, however, possible within these ranges to distinguish the difference between very big and very little. EIA projects that cumulative US emissions between 2015 and 2040 will be approximately 14% of cumulative global emissions. Using EIA's most recent projection of BAU US emissions, the goal of the Administrations Climate Action Plan to reduce emissions to 17% below 2005 by 2020 and assuming they are kept at that level would reduce global cumulative emissions from 2015 to 2040 by less than 2%. Thus whatever the range of global temperature increase is projected to be between now and 2040, the CAP would reduce that increase by less than 2%, and therefore would likely reduce avoided damages by a similar percentage. Thus if the range is 1.5 to 4.5 degrees C, the effect of the CAP would be to change the range to 1.5 to 4.4 degrees, if we stick to rounding to one decimal place. There is no climate model that can tell the difference in effects between those two ranges.

Thus mitigation in the U.S. alone is not likely to reduce U.S. contingent damages by as much as the policies cost, especially if stringent regulatory policies are adopted.

Adaptation Policy

If we accept that the Administration's policies will not affect damages to the U.S. or the rest of the world, adaptation becomes a high priority. In addition to its goal for reducing greenhouse gas emissions, the CAP states that "...we must also prepare for the impacts of a changing climate that are already being felt across the country [sic]. Moving forward, the Obama Administration will help state and local governments strengthen our roads,

bridges, and shorelines so we can better protect people's homes, businesses and way of life from severe weather."

It is good to focus on adaptation. The U.S. can be very resilient if we return to principles of free markets and private initiative. That is why most studies conclude that most of the damages from climate change will occur in poor equatorial countries. Most of the benefits of global reductions in greenhouse gas emissions would go to those countries. That is not a bad thing, but there are much more direct and potentially cost-effective ways to help those countries than costly and largely ineffective efforts to reduce emissions. Effective aid for local adaptation is one. For the U.S., all we really need to do is avoid damaging our built-in resilience through badly designed policies. As my friend and colleague put it in Forbes recently "... the main U.S. line of defense against the risks of climate change ... remains a free and productive economy."[11]

Economic Issues in Designing Adaptation Strategies

Economists who have studied climate change generally agree that rational adaptation can substantially reduce the potential damage from climate change,[12] and that in an institutional setting that does not distort the natural economic incentives to avoid risk, the private sector is quite capable of adopting many appropriate responses on its own. There are also public goods involved in adaptation, including the classic public goods of R&D, public health, roads, dams and flood protection. Resilience toward climate change is also a function of how well a system performs at providing public goods. Thus to me there are three fundamental requirements for effective adaptation policy in the United States:

- Understanding what types of adaptations should be left to the private sector and which are the responsibility of government. The criterion should not be "people's homes need protecting" but "there are systematic public goods involved that

[11] http://www.forbes.com/sites/realspin/2014/07/17/the-risky-business-of-a-carbon-tax/
[12] Robert Mendelsohn, "The Impact of Climate Change on Land," with commentary by W. David Montgomery in Climate Change and Land Policies, edited by Gregory K. Ingram and Yu-Hung Hong, Lincoln Institute for Land Policy, April 2011

justify public investment rather than relying on the clear private incentive to manage risks to ones own property."

- Maintaining the economic freedom and property rights that create appropriate incentives for private investment to avoid risks of climate change. Unlike many countries of the world, our system of private property and free enterprise provides a framework for appropriate incentives and has led to successful adaptation to all sorts of changes affecting the economy. But these incentives can be diluted or distorted by government programs that provide free insurance before or after the fact or otherwise subsidize development in vulnerable areas.
- Limiting public policy toward adaptation to a. elimination of subsidies and other distortions that reduce private adaptation incentives by creating moral hazards b. investments in true public goods that have an acceptable balance of cost and climate risk reduction.

Poor countries face much greater challenges than these in achieving any kind of adaptation. Where our problem is adapting sensibly and cost-effectively, their problem is adapting at all. Many studies have shown why it is that poor countries, especially in equatorial regions where the potential effects of climate change would be the largest, are not likely to be able to adapt effectively. These include violence and insecurity that makes any investment questionable, rulers who keep their people in poverty while appropriating any economic surplus or foreign aid for their own benefit, and lack of secure property rights and land tenure that are fundamental to incentives to invest.[13] They also include closed political systems that exclude most of their population from meaningful participation and carry out public works projects to benefit their narrow base of supporters and not the country as a whole.

Countries like Botswana that have achieved free market and political systems have already been successful in mitigating the risk of weather events and instability of agricultural prices, and many Central African countries will remain poor and vulnerable

[13] See, for example, Paul Collier, The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About It and William Easterly The Tyranny of Experts: Economists, Dictators, and the Forgotten Rights of the Poor.

as long as violence is a more attractive option than participation in the political system.[14] I am firmly convinced that moving a country from a political order like that in, for example, the Sudan, to a political order like that in Botswana would improve its standard of living and reduce the potential for conflict and damage from climate change more than would any conceivable action to reduce global greenhouse emissions.

Potential Pitfalls in Adaptation Policy

Nor is the United States immune to distorted incentives and government policies that frustrate or misdirect adaptation. Our current policies already distort incentives in a way that increases vulnerability to extreme weather events and inflates estimates of the need for public investment to protect socially unwise private investments. The principle one is subsidized flood insurance, that encourages people to build in areas known to be vulnerable. A more hidden incentive is provided by Federal funding for reconstruction after a disaster hits; although solidarity with those who have been harmed justifies aid, providing the aid by rebuilding the areas that were damaged just reinforces the incentive to downplay risks. Most of record damage due to storms is clearly attributable to greater development in areas known to be vulnerable and not to an increase of the hazard. Fixing the incentives to locate in locations at risk is far more cost-effective than encouraging and then protecting unwise investments. Agricultural disaster assistance can have the same effect. The moral hazard that future policies could create must be looked at carefully if private adaptation is to play the full role that it can.

In terms of the design of public investment programs, I see three counterproductive dynamics at work, that if left unchecked are likely to greatly increase budgetary demands and reduce the effectiveness of adaptation measures. They are:

- Scientifically unjustified attribution of current weather events to climate change
- Using adaptation as a convenient rationale for pork barrel projects

[14] Robert Bates, When Things Fell Apart: State Failure in Late-Century Africa (Cambridge Studies in Comparative Politics) 2008.

- Making climate change an excuse for extension of agency missions and larger budgets

The first of these is a simple error, though it many cases it is indulged in by those who do know better.[15] The other two are consequences of a dysfunctional system in which policies are pursued for the benefit of incumbents and their constituencies rather than for broader national objectives.[16]

Even in cases when certain activities are clearly the responsibility of government, distinguishing the wheat from the chaff in proposed investments in adaptation is more difficult than it might appear. Not one of potential public investments in adaptation is unique to climate change. Public health, public buildings, roads, dams, levees, fire and flood protection have well organized constituencies and agencies that promote, build and oversee them. These are also (with the exception of public health) the areas in which pork barrel politics was invented. Thus the natural Congressional and bureaucratic incentives line up to encourage unnecessary spending on adaptation, and a critical attitude toward any such plans is warranted.

The Budget Committee has always tried to resist these tendencies. Two things that the Committee can do in the case of adaptation is to consider the proper role for government and scrutinize specific funding requests to ensure they represent cost-effective solutions to problems within government role

[15] For example, the late Stephen Schneider characterized some climate scientists as taking a "sound-byte" approach that he found reprehensible but understandable: "And like most people we'd like to see the world a better place, which in this context translates into our working to reduce the risk of potentially disastrous climatic change. To do that we need to get some broad based support, to capture the public's imagination. That, of course, entails getting loads of media coverage. So we have to offer up scary scenarios, make simplified, dramatic statements, and make little mention of any doubts we might have." See American Physical Society, APS News, August/September 1996, p. 5. Nevertheless, the practice has continued.

[16] See Morris Fiorina, Congress: Keystone of the Washington Establishment, Revised Edition, 1989 and Lee Lane and W. David Montgomery, "Political Institutions and Greenhouse Gas Controls." AEI Center for Regulatory and Market Studies, Related Publication 08-09. Revised August 2010.

Although it is true that demanding certainty before acting is rarely a good risk management strategy, always assuming the worst and acting as if it is sure to happen without immediate action is equally bad risk management. So is insisting on doing something even though it is too late or too little to matter.

A prudent balancing of costs and risks is necessary, and that is very hard to do given the present lack of quantification and high uncertainty about what the effects of climate change will be. The range of temperature increases predicted as a result of a doubling of greenhouse gas concentrations is as wide in the most recent IPCC Fifth Assessment Report as it was in the first. If the cause is that uncertain, the effects cannot be any less uncertain. Although studies of the potential damages of events hypothesized to be caused by climate change, known as "effects research," have proliferated, integrated assessment modelers have not yet succeeded in extending their models that predict temperature change to generate estimates of the effects of temperature increase and the damages that they would cause. Moreover, the effects of temperature increase are likely to be so localized and model results are so inconsistent about global effects that global or national planning is most likely to do the wrong thing in the wrong place.[17]

Where Adaptation Is Most Necessary

Despite all this, I agree that "To lower our national security risks, the United States should take a global leadership role in preparing for the projected impacts of climate change."[18] But I recommend a very specific type of response. because I am convinced that most assessments of what can be done are so blinded by political correctness and diplomacy that they will not properly attribute the cause of vulnerability to failed states, rapacious ruling elites, and systems that fail to provide either economic or political freedom. They also continue the error of recommending top down planned solutions

[17] Montgomery, Lincoln Institute, op cit.
[18] National Security and the Accelerating Risks of Climate Change May 2014 CNA Military Advisory Board, p. 5

rather than recognizing that effective adaptation, like effective poverty reduction and wildlife conservation, must occur at the community level.[19]

In the past decade, Botswana has experienced a surge of economic growth and reduction in poverty, as well as implementing systems that have substantially reduced risks of drought and price fluctuations for the agricultural sector. At the same time, Zimbabwe has continued its process of expropriation of white farmers and assignment of those lands to cronies of dictator Mugabe, with the result that agricultural production has collapsed, poverty and hunger have increased, and vulnerability to climate change greatly increased.

Regimes reap the harvest from any the seeds of conflict that might be planted by adverse environmental conditions, and conditions that may lead to conflict in a closed political and economic society are much less likely to in an open society. Indeed, discovery of sufficient wealth in a country to make fighting over who will control it has triggered conflict where poverty was long tolerated. Nor is environmental degradation new as a cause of conflict. Before their war with white settlers, the cattle-raising Zulu warriors moved south into lands settled by other tribes, took them over and slaughtered the population to provide room for their herds as they depleted northern grazing lands. These conditions may be made worse by climate change, but the small difference that unilateral U.S. action can make to global warming in the current international setting will have no noticeable effect on the risks. To the extent that these conflicts affect U.S. national interests, a much wiser investment would be in a sufficiently strong military to deal with threats to us and humanitarian interventions around the world.

If we really want to help globally, there is clear evidence that most can be accomplished through effective support at a community level for locally-designed and implemented adaptation measures in Africa and poor Asian countries where the real vulnerability exists, not nugatory mitigation that helps no one.

This concludes my prepared testimony and I look forward to your questions.

[19] Easterly, op cit.