

BUILDING RESILIENT COMMUNITIES FOR AMERICA'S FUTURE

HEARING

BEFORE THE
SUBCOMMITTEE ON LEGISLATIVE AND
BUDGET PROCESS
OF THE
COMMITTEE ON RULES
HOUSE OF REPRESENTATIVES
ONE HUNDRED SIXTEENTH CONGRESS
FIRST SESSION

TUESDAY, SEPTEMBER 24, 2019



Available via <http://govinfo.gov>
Printed for the use of the Committee on Rules

U.S. GOVERNMENT PUBLISHING OFFICE

COMMITTEE ON RULES

JAMES P. MCGOVERN, Massachusetts, *Chairman*

ALCEE L. HASTINGS, Florida, <i>Vice Chair</i>	TOM COLE, Oklahoma, <i>Ranking Republican</i>
NORMA J. TORRES, California	ROB WOODALL, Georgia
ED PERLMUTTER, Colorado	MICHAEL C. BURGESS, Texas
JAMIE RASKIN, Maryland	DEBBIE LESKO, Arizona
MARY GAY SCANLON, Pennsylvania	
JOSEPH D. MORELLE, New York	
DONNA E. SHALALA, Florida	
MARK DeSAULNIER, California	

DON SISSON, *Staff Director*

KELLY DIXON, *Minority Staff Director*

SUBCOMMITTEE ON LEGISLATIVE AND BUDGET PROCESS

ALCEE L. HASTINGS, Florida, *Chairman*

JOSEPH D. MORELLE, New York, <i>Vice Chair</i>	ROB WOODALL, Georgia, <i>Ranking Republican</i>
MARY GAY SCANLON, Pennsylvania	MICHAEL C. BURGESS, Texas
DONNA E. SHALALA, Florida	
JAMES P. MCGOVERN, Massachusetts	

SUBCOMMITTEE ON RULES AND ORGANIZATION OF THE HOUSE

NORMA J. TORRES, California, *Chair*

ED PERLMUTTER, Colorado, <i>Vice Chair</i>	DEBBIE LESKO, Arizona, <i>Ranking Republican</i>
MARY GAY SCANLON, Pennsylvania	ROB WOODALL, Georgia
JOSEPH D. MORELLE, New York	
JAMES P. MCGOVERN, Massachusetts	

SUBCOMMITTEE ON EXPEDITED PROCEDURES

JAMIE RASKIN, Maryland, *Chair*

DONNA E. SHALALA, Florida, <i>Vice Chair</i>	MICHAEL C. BURGESS, Texas, <i>Ranking Republican</i>
NORMA J. TORRES, California	DEBBIE LESKO, Arizona
MARK DeSAULNIER, California	
JAMES P. MCGOVERN, Massachusetts	

CONTENTS

September 24, 2019

	Page
Opening Statements:	
Hon. Alcee L. Hastings, a Representative in Congress from the State of Florida and Chair of the Subcommittee on Legislative and Budget Process	1
Hon. Rob Woodall, a Representative in Congress from the State of Georgia and Ranking Member of the Subcommittee on Legislative and Budget Process	3
Witness Testimony:	
Mr. Bill Johnson, Director of Emergency Management in Palm Beach County	5
Prepared Statement	8
Mrs. Heather McTeer Toney, National Field Director, Moms Clean Air Force and former mayor, Greenville, Mississippi	12
Prepared Statement	14
Mr. John Piotti, President and CEO of American Farmland Trust	23
Prepared Statement	26
Ms. Katherine Hamilton, Executive Director, Advanced Energy Management Alliance	29
Prepared Statement	32
Dr. Marvin Phaup, Research Scholar and Professorial Lecturer, Trachtenberg School of Public Policy and Public Administration, George Washington University	40
Prepared Statement	42
Additional Materials Submitted for the Record:	
Statement from Ashley Daniels, Resident of Wilmington, North Carolina ..	64
Statement from David C. Brown, Senior Vice President, Federal Government Affairs & Public Policy, Exelon Corporation dated September 23, 2019	66
Statement from American Property Casualty Insurance Association dated September 24, 2019	81
Renewable Energy Jobs by State submitted by Ms. Scanlon	93
Curriculum Vitae and Truth in Testimony Forms for Witnesses Testifying Before the Committee	95

BUILDING RESILIENT COMMUNITIES FOR AMERICA'S FUTURE

TUESDAY, SEPTEMBER 24, 2019

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON LEGISLATIVE AND BUDGET PROCESS,
COMMITTEE ON RULES,
Washington, DC.

The subcommittee met, pursuant to call, at 2:46 p.m., in Room H-313, The Capitol, Hon. Alcee L. Hastings [chairman of the subcommittee] presiding.

Present: Representatives Hastings, Morelle, Scanlon, Shalala, McGovern, Woodall, and Burgess.

OPENING STATEMENTS

Mr. HASTINGS. The Subcommittee on Legislative and Budget Process of the Committee on Rules will come to order.

STATEMENT OF THE HONORABLE ALCEE L. HASTINGS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF FLORIDA AND CHAIR OF THE SUBCOMMITTEE ON LEGISLATIVE AND BUDGET PROCESS

I am pleased to welcome our witnesses and thank them for being here. Today marks the Subcommittee on Legislative and Budget Process' first hearing of the 116th Congress. This afternoon's hearing will focus on ways to increase community resilience and the impacts that natural disasters have on the budget process.

Since 1980, the United States has endured 250 weather-related disasters where the overall damages were at or above \$1 billion. In total, these catastrophes have resulted in over 13,200 deaths and an economic loss of over \$1.7 trillion.

However, the billion dollar disasters only tell one side of the story. This summer, and as late as last week, torrential downpours flooded huge swaths of the Midwest and southeast, triggering flash floods in Tennessee, Kentucky, and last week in Beaumont, Texas and Houston, Oklahoma, North Carolina, Illinois, and then as Bill Johnson knows in my home State of Florida. Beyond flash flooding, rising rivers in Iowa threatened local communities' drinking water. Wildfires and mudslides broke out in California, and there were droughts in the Dakotas.

Weeks and weeks of rain across the Great Plains in the Midwest have kept many farmers from planting crops. In Arkansas, just half of the State's soybean crop had been planted by early June, compared with 90 percent at the same time last year. By the end of June, the flooding was so intense and widespread that at least

11 States sought Federal disaster funds for more than 400 affected counties.

Events like these disrupt daily life, cause devastation and death, and generate billions of dollars in losses. But as policymakers, we sometimes fail to detail how disasters affect people's well-being, especially when we consider disadvantaged communities are usually among those who bear the brunt of natural disasters.

Disparities exist before disaster strikes and recovery plans rarely account for these inequities, which embeds these disparities further. Let me give you an example of that that is a tragedy that all of us are aware of. In Abaco, there was an area called Mud in Abaco. Interestingly, the inhabitants of that little part of Abaco came from Haiti that had fled the earthquake disaster and the disparities in the Bahamas allowed that they lived in Mud. And when the hurricane just came through—I see Bill nodding his head—the thought is that many of them were just washed out to sea. It was in an area where the disaster relief people couldn't get to it as quickly.

And that is an example of the disparity in another country. And I could do the same thing in Puerto Rico and several other places I could show you where that happened.

I personally have seen the frustration and despair that sets in for communities when the Federal Government's disaster response falls short, or takes too long, or is so convoluted that many families struggle to understand what benefits they might be eligible for.

Let me be clear, more extreme weather is going to come, whether we like it or not. And while we cannot stop natural disasters from hitting, we can control how we prepare and how we recover from them.

While the current disaster supplemental process helps communities rebuild following natural disasters, it rarely makes individuals and businesses whole. And it cannot take the place of proactive Federal Government programs specifically designed to prepare communities before the next natural disaster hits.

No region of our great country is immune to natural disasters. Therefore, I believe we must channel all of our energies into developing and implementing a national resiliency plan that empowers all of our communities to build a smarter and stronger future. This means not only unleashing the power of the Federal Government but also of cities, towns, urban, and rural, and suburban communities. It requires us to make the necessary investments in infrastructure and renewable energy to spur job creation in construction, manufacturing, and adaptation and mitigation technology. And failing to do so may very well cost us millions of jobs and trillions of dollars in the upcoming few years.

We have the power to move towards a more sustainable and equitable future for all. And it is my hope that this hearing will help us clarify these challenges and set us on the path of addressing them in a more comprehensive fashion.

I now recognize my good friend, the distinguished ranking member of the subcommittee, Mr. Woodall, for any opening statement he wishes to make.

STATEMENT OF THE HONORABLE ROB WOODALL, A REPRESENTATIVE FROM THE STATE OF GEORGIA AND RANKING MEMBER OF THE SUBCOMMITTEE ON LEGISLATIVE AND BUDGET PROCESS

Mr. WOODALL. Mr. Chairman, I very much appreciate that, and I appreciate you holding the hearing today. I wanted to be the first, given this panel of amazing folks that are here before us, to introduce one of the witnesses that our team has invited, and that is Dr. Marvin Phaup.

Dr. Phaup is the resident scholar professional lecturer at the Trachtenberg School of Public Policy and Public Administration at George Washington University, and specializes in teaching Federal budget concepts and policy. I would like to believe some of that is the result of work that he did here when he was the head of the financial studies and budget process group over at the Congressional Budget Office. And from there, he went on to be the director of Federal budget reform initiative with The Pew Charitable Trusts.

He has also served as a senior economist with the Federal Reserve Bank of Cleveland, a fellow at the National Academy of Public Administration, received the Kenneth Howard award for lifetime achievement in public budgeting and finance from the Association of Budgeting and Financial Management, and the national distinguished service award from the American Association of Budget and Program Analysis.

That is a long list of professional accomplishments, but I hope that we will dwarf those with testimony before the House Rules subcommittee here today.

Mr. Chairman, as the former chairman of this subcommittee, I know how much it takes to put a hearing together, and I want to thank you and your team for all the hard work. As you would expect, your staff has been incredibly gracious working with my staff. I know that comes from the top in the same way that you are very gracious working with each and every one of us. I want to thank you for the spirit with which you put this hearing together.

I remember one of the first issues I got to work on in the Budget Committee when I was elected back in 2011 was the Budget Control Act, which tried to do some of what we're talking about today. While it restrained discretionary spending across the board for the first time, it tried to forward fund disaster papers to say we know that we are going to have these challenges, let's go ahead and be honest about what that cost is going to be to the taxpayer.

Now, you are trying to take that one step further in these resiliency hearings, not to bail folks out on the back end, but what can we do to solve problems on the front end. I know other committees in the House are working on this. On the T&I Committee on which I serve, we marked up two bills last week, the Resilience Revolving Loan Fund Act and the PREPARED Act. We actually passed the PREPARED Act in this Congress last year as a part of H.R. 4, but it didn't make it across the finish line.

I happened to have googled House committees and resilience hearing before I came over today. We will see results from the Science Committee doing resilience hearings, the Budget Committee, the Oversight Committee, the Select Committee on Climate

Crisis, the Natural Resources Committee and more. That is just at the Federal level. Of course, we see even more going on at the State and local level.

This is the right time to have this conversation, Mr. Chairman. And while I would like to think you and I are both experts in congressional budget process, I know we are not yet experts in resiliency, funding, and financing predisaster mitigation techniques. And so I will take no more time so we can get on to the experts that you have here before us.

I'm grateful, again, for your friendship and your partnership. And I yield back.

Mr. HASTINGS. Thank you so very much. And thank you for bringing attention to the fact that staff has done an incredible job of getting these outstanding witnesses here, but talking with others around the country as well. Particularly in North Carolina, we paid a lot of attention to some of the concerns that we were able to get from their people.

I also am mindful, we are more East Coast oriented than we are West Coast on this hearing. But, hopefully, we will be able to follow through and take into consideration the concerns that they have in the Dakotas and in other—in California and other places.

Our witnesses today are experts in the field, all of them. And I want to welcome them and introduce four of them. And thank you for introducing the doctor, who has extraordinary credentials.

First, Bill Johnson, my friend. He and I have suffered hurricanes galore in our area. He serves as the director of Emergency Management in Palm Beach County. And Bill has guided Palm Beach in its response to several disaster incidents. He is a registered nurse, a certified paramedic, and certified emergency manager.

Next, we have Heather Toney, who served as the first African American, first female, and youngest mayor of Greenville, Mississippi. Heather also served as regional administrator for the Environmental Protection Agency's southeast region during the Obama administration. And she currently serves as the national field director for Moms Clean Air Force. That is something I want to hear more about. I see a couple of the ladies here as well.

Third, we have John Piotti, who is the current CEO and president of American Farmland Trust, an organization dedicated to protecting agricultural land, promoting environmentally friendly farming practices, and keeping farmers and ranchers on their land. And John has over 20 years of executive management and public policy experience.

And last but not least, we have Ms. Katherine Hamilton, who is executive director of Advanced Energy Management Alliance, an association of providers and supporters of distributed energy resources, including demand response and advanced energy management, united to overcome barriers to nationwide use of demand-side resources.

Bill, I would like if you would deliver your testimony first, and then we will go straight down the aisle.

**STATEMENT OF BILL JOHNSON, DIRECTOR OF EMERGENCY
MANAGEMENT, PALM BEACH COUNTY**

Mr. JOHNSON. Thank you, Congressman Hastings. Really appreciate it. And again, good to see you again. And thank you, everyone——

Mr. HASTINGS. Get your mike there if it is not on.

Mr. JOHNSON. Okay. You hear me now?

Mr. HASTINGS. Okay.

MR. JOHNSON. Again, thank you for the invitation today.

Desire to make our communities more disaster resilient is not new. Experiences repeatedly demonstrated that lives can be saved, damage to property can be reduced significantly, and economic recovery can be accelerated by consistently building safer and stronger buildings, strengthening existing infrastructures, enhancing building codes, and making the proper preparations before a disaster occurs.

Modern day mitigation has been evident since the late 1980s when the Stafford Act was passed. In 1990, the Community Rating System was established. And later, James Lee Witt, FEMA Administrator from 1993 to 2001, launched Project Impact, the program in 1997 to build community partnerships, identify community hazards and vulnerabilities, and prioritize risk-reduction strategies.

Giving out my age, but I witnessed firsthand the benefits of Project Impact. We elevated homes, we improved storm drainage systems, we fortified and relocated structures, and we hardened buildings and homes.

In 2005, we learned that for every dollar spent on mitigation results in a \$4 return on avoided future losses, and more recently, we are finding that that ratio was closer to 7 to 1. A dollar investment in mitigation can save an average of \$6 to \$7 in response and recovery spending.

It seems to me that the current Federal mitigation programs are built backwards, or at the least, upside down. Despite the plenty of evidence, the value and efficacy of mitigation strategies, funding for mitigation is a mere fraction of the funding for the after-the-fact post-disaster response. Instead of focusing its efforts on minimizing the impact of national disasters, FEMA is mired with cleaning up after them.

Representative Hastings, you talked about 250 weather disasters amounting to more than a billion dollars in damages. And again, in terms of disaster relief, we have seen that number go as high as \$140 billion.

In terms of mitigation, however, over its 12-year history, funding levels for predisaster mitigation program, or PDM, have risen and fallen anywhere between \$50 and \$150 million. Despite the success of the Project Impact program, mitigation funding has continued to be well below the need. In 2018, only \$235 million in PDM funds were appropriated; a drop in the bucket compared to the \$89 billion in supplemental appropriations alone for disaster response, also in 2018.

The Hazard Mitigation Grant Program (HMGP) aims to reduce loss of life and property from future natural disasters by providing funding to State and local governments for mitigation projects after a major disaster declaration. HMGP funds are by far the majority

of mitigation fund dollars appropriated by the Federal Government, and essentially, we must wait for a major disaster to be eligible for a great majority of mitigation dollars.

Another example, not related to hurricanes, but further emphasizes an all hazards rethink, and that is the Homeland Security Grant Program began in 2003 for the purpose of procuring surveillance equipment, weapons, and advanced training for local first responders in order to heighten our preparedness. We have purchased personal protected equipment, rescue equipment, communications equipment and more, all aimed at the immediate response to a terrorist incident. \$1 billion were allocated to HSGP in 2019.

Now, while I am absolutely committed to protecting our first responders and ensuring their safety, after 16 years, we have allocated billions of dollars focused purely on the first 7 minutes of a terrorist incident. However, we are learning from the post-incident analyses of terrorists and mass shooting events that recovery from these events is a prolonged process. After 7 minutes or less, nearly all incidents are over. But the hard work is just beginning, and that hard work lasts over 7 years. The trauma, medical care, physical rehab, economic recovery, and mental anguish will linger for years, only to resurface annually on the anniversary of that incident.

In Palm Beach County, we are using creative strategies to steer more funding toward recovery. We have drafted a family assistance and survivor care center plan and have exercised it twice and have plans to exercise it more. Addressing mental health and behavioral health symptoms immediately after a mass shooting event can help mitigate the long-term post-traumatic stress, depression, and suicides.

Our next phase for community resiliency centers will serve as an ongoing resource and referral center for those affected by such events.

Another example about mitigation. We all remember, it is in my mind permanently, the photo of the single home still standing, nearly unscathed, on Mexico Beach, Florida, after the entire neighborhood that was surrounding that home was annihilated by Hurricane Michael. The three-story home was built on 40-foot pilings, constructed of reinforced concrete, steel cables, and a metal roof. Estimates of the construction costs were only about 15 to 20 percent more than standards costs. This may sound expensive, but only the windows in one room, a set of stairs, and an air-conditioning unit were damaged by the storm; a far cry from the total rebuild costs throughout the catastrophic destruction done in the surrounding neighborhood.

Even the private sector is engaged in litigation. Florida Power & Light, the largest power company in the United States with over 5 million customers, has made over \$4 billion in investments. And I am here to prove, to say that over the last 3 years of storms, we have noticed that and have seen how our electrical grid system has remained more storm resilient.

The takeaway here, ladies and gentlemen, is building materials matter, building codes work, and mitigation works.

Let's talk just briefly about sustainability. Hurricane Hermine was the first hurricane to make landfall in Florida since Wilma in 2005. Emergency managers worked hard during that 11-year funding drought to keep our partners engaged, interested, and enthusiastic about mitigation. We shared best practices, success stories, and maintained our project priority list, which went unfunded for years. We put a lot of time and effort and resources into mitigation without any incentive.

Luckily, the Emergency Management Performance Grants, EMPG, they fund local emergency management programs to staff and promulgate those mitigated campaigns such as the local mitigation strategy. Local mitigation strategies are ongoing programs that need to survive, even during disaster droughts. However, local mitigation strategies must have the resources behind them to maintain them, to provide the mitigation projects, to facilitate them, and make sure that they are shovel ready. Further support of the EMPG program or at least maintenance of the EMPG program will assure that mitigation remains at the forefront of local preparedness programs nationwide.

Let me repeat, however, that when communities are trying to dig themselves out of a major disaster, it seems odd to me to throw millions of mitigation dollars at them at that time.

Let me conclude by recommending a rethink of the current mitigation programs and funding. Let's flip them over 180 degrees so they are right-side up. Let's change the focus to mitigation and less on cleaning up after the fact. As with Project Impact, let's showcase creative resiliency strategies, best practices, and let's celebrate success stories instead of incentivizing salvage operations. Finally, let's sustain local emergency management programs which are at the forefront of resiliency.

Thank you again.

[The statement of Mr. Johnson follows:]

Rules Subcommittee on Legislative & Budget Process Hearing Testimony

September 24, 2019, 2:30 p.m., United States Capitol

Good afternoon Chairman McGovern, Congressman Hastings, and Subcommittee members:

The desire to make our communities more disaster resilient is not new. Experience has repeatedly demonstrated that lives can be saved, damage to property can be reduced significantly, and economic recovery can be accelerated by consistently building safer and stronger buildings, strengthening existing infrastructures, enforcing building codes, and making the proper preparations BEFORE a disaster occurs. Modern-day mitigation has been evident since the late 1980's when the Stafford Disaster Relief & Emergency Assistance Act was passed. In 1990, the Community Rating System was establishedⁱ. Later, James Lee Witt, FEMA Administrator from 1993-2001, launched the Project Impact program in 1997 to build community partnerships, identify community hazards and vulnerabilities, and prioritize risk reduction strategies. I witnessed first-hand the benefits of Project Impact. We elevated homes, improved storm drainage systems, fortified or relocated structures, and hardened buildings and homes.

In 2005, we learned that every \$1 spent on mitigation results in a \$4 return of avoided future losses. More recently, we're learning that the ratio is closer to 7:1 – a dollar investment in mitigation can save an average of \$6 to \$7 in response and recovery spendingⁱⁱ.

It seems to me that current federal mitigation programs are built backwards, or at least, upside down. Despite plenty of evidence proving the value and efficacy of mitigation strategies, funding for mitigation is a mere fraction of the funding for after-the-fact, post-disaster response. Instead of focusing its efforts on minimizing the impacts of national disasters, FEMA is mired with cleaning up after them.

In the 1970s and 1980s, spending on the federal disaster relief averaged an annual \$1 billion in today's dollars. It soared to \$4 billion in the late 1990s, before nearly doubling again to \$8 billion in the two decades since. In 2017, funding was over \$140 billionⁱⁱⁱ.

In terms of mitigation however, over its 12-year history, funding levels for the Pre-disaster Mitigation Program (PDM) have risen and fallen, ranging between \$50 and \$150 million^{iv}. Despite the success of the Project Impact Program, mitigation funding has continued to be well below the need. In 2018, only \$235 million in PDM funds were appropriated; a drop in the bucket compared to the \$89 billion in supplemental appropriations alone for disaster response^v.

The Hazard Mitigation Grant Program aims to reduce loss of life and property damage from future natural disasters by providing funding to state and local governments for mitigation projects after a major disaster declaration. HMGP funds are by far the majority of mitigation dollars appropriated by the federal government today. Essentially, we must wait for a major disaster to be eligible for the great majority of mitigation funds.

Another example, not related to hurricanes, but it further emphasizes my point for a re-think. The Homeland Security Grant Program began in 2003 for the purpose of procuring surveillance equipment, weapons, and advanced training for local first responders in order to heighten our preparedness. We have purchased personal protective equipment, rescue equipment, communications systems, and more. All aimed at the immediate response to a terrorist incident. \$1 billion were allocated to HSGP for 2019^{vi}. Now while I am absolutely committed to protecting our first responders and ensuring their safety, after 16-years, we have allocated billions of dollars focused on the first seven (7) minutes of a terrorism incident. However, we are learning from our post-incident analyses of terrorist and mass shooting events, that recovery from these incidents is a prolonged process. After seven (7) minutes or less, nearly all incidents are over^{vii}, but the hard work lasting for more than seven (7) years, just begins. The trauma/medical care, physical rehabilitation, economic recovery, and mental anguish will linger for years. Only to resurface annually on the anniversary of the incident. Yet unfortunately, funding for the lengthy recovery period is essentially non-existent. In Palm Beach County, we are using creative strategies to steer more funding toward recovery. We have drafted a Family Assistance and Survivor Support Center plan and have exercised it twice. Addressing mental and behavioral health symptoms immediately after a mass shooting event can help mitigate the long-term post-traumatic stress, depression, and suicides^{viii}. Our next phase will plan for Community Resiliency Centers which will serve as an on-going resource and referral center for those affected by a terrorist and active shooter event.

Another example: we all remember the photo of the single home still standing, nearly unscathed, on Mexico Beach, Florida, after the entire neighborhood was annihilated by *Hurricane Michael*. The 3-story home, was built on 40-foot pilings, constructed of reinforced concrete, steel cables, and a metal roof. Estimates on the construction costs were only 15-20% above standard costs^{ix}. This may sound



Figure 1. Hurricane-resistant home still standing

expensive, but only the windows in one room, a set of stairs, and an air conditioning unit were damaged – a far cry from the total rebuild costs throughout the catastrophic destruction of the surrounding neighborhood.

Even the private sector is engaged in mitigation. For example, Florida Power & Light, the largest energy company in the U.S. with over 5 million customers, has made over \$4 billion in investments to install concrete poles and bury critical transmission lines to make their energy grid stronger and more storm-resilient^x.

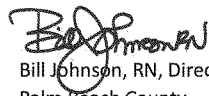
The take-away here is that building materials matter, building codes work, and mitigation works.

Let's talk about sustainability. *Hurricane Hermine* (2016) was the first hurricane to make landfall in Florida since *Wilma* (2005). Emergency managers worked hard during the 11 -year funding

drought to keep our partners engaged, interested, and enthusiastic about in mitigation. We shared best practices, success stories, and maintained our Project Priority Lists (PPLs), which went unfunded for years. We put a lot of time, effort, and resources into mitigation, without any incentive. Luckily, Emergency Management Performance Grants (EMPG) fund local emergency management programs to staff and promulgate mitigative campaigns such as the Local Mitigation Strategy. Local Mitigation Strategies are on-going programs that need to survive even during disaster droughts. However, Local Mitigation Strategies must have the resources behind them to maintain them – to prioritize mitigation projects, facilitate them, and make sure they are shovel ready. Further support of local EMPG, or at least maintenance of the EMPG program, assures that mitigation remains at the forefront of local preparedness programs, nationwide. Let me repeat, however, that when communities are trying to dig themselves out of a major disaster, it seems to be an odd time to throw mitigation dollars at them.

Let me conclude by recommending a rethink of current mitigation programs and funding. Let's flip them over 180° so they are right-side up. Let's change the focus to mitigation, and less on cleaning up after-the-fact. As done with Project Impact, let's showcase creative resiliency strategies, best practices, and let's celebrate success stories instead of incentivizing salvage operations. Finally, let's sustain local emergency management programs which are at the forefront of resiliency.

Thank you for your time and consideration.



Bill Johnson, RN, Director
Palm Beach County
Division of Emergency Management
20 So. Military Trail
West Palm Beach, FL 33415

Lesson:

*The take-away
here is that
building materials
matter,
building codes
work,
and mitigation
works*

Endnotes and references

-
- ⁱ Federal Emergency Management Agency (FEMA). (2017, June). Community Rating System Fact Sheet. <https://www.fema.gov>
- ⁱⁱ Lightbody, L., & Fuchs, M. (2018, January 11). Every \$1 Invested in Disaster Mitigation Saves \$6. *The PEW Charitable Trusts*. <http://www.pewtrusts.org> See also: Kelman, I. & C.M. Shreve (ed.). (2014). Disaster Mitigation Saves. Version 6, 13 November 2014 (Version 1 was 30 October 2002). <http://www.ilankelman.org/miscellany/MitigationSaves.doc>
- ⁱⁱⁱ Stein, J., & Van Dam, A. (2019, April 22). Taxpayer spending on U.S. disaster fund explodes amid climate change, population trends. *Washington Post*. <https://www.washingtonpost.com/us-policy/2019/04/22/taxpayer-spending-us-disaster-fund-explodes-amid-climate-change-population-trends/>
- ^{iv} McCarthy, F.X., & Keegan, N. (2009, July 10). FEMA's Pre-Disaster Mitigation Program: Overview and Issues. Congressional Research Service (CRS). <https://fas.org/sgp/crs/homsec/RL34537.pdf>
- ^v Supplemental Appropriations for Disaster Relief and Recovery. <https://www.appropriations.senate.gov>
- ^{vi} FEMA. (2019, August 2). DHS Announces Grant Allocations for Fiscal Year 2019 Preparedness Grants. <https://www.fema.gov/news-release/2019/08/02/dhs-announces-grant-allocations-fiscal-year-2019-preparedness-grants>
- ^{vii} Federal Bureau of Investigation (FBI), U.S. Department of Justice (DOJ). (2013, September 16). A Study of Active Shooter Incidents in the United States Between 2000 and 2013. <https://www.fbi.gov/file-repository/active-shooter-study-2000-2013-1.pdf>
- ^{viii} Substance Abuse and Mental Health Services (SAMHSA), U.S. Department of Health & Human Services (DHHS). (2017, September). Mass Violence and Behavioral Health. <https://www.samhsa.gov/sites/default/files/dtac/srb-mass-violence-behavioral-health.pdf>
- ^{ix} Fedschun, T. (2018, October 15). Beach house still standing after hurricane Michael devastates nearby homes. *Fox News*. <http://www.nypost.com/2018/10/15>
- ^x Florida Power & Light. (2019). Improving our Systems. <https://www.fpl.com/reliability/system-improvements.html>

Mr. HASTINGS. Thank you.
Ms. Toney.

**STATEMENT OF HEATHER MCTEER TONEY, NATIONAL FIELD
DIRECTOR, MOMS CLEAN AIR FORCE, AND FORMER MAYOR,
GREENVILLE, MISSISSIPPI**

Ms. TONEY. Thank you.

Chairman Hastings, Ranking Member Woodall, Chairman McGovern, thank you for being here, and members of the subcommittee. Thank you for the opportunity to testify about the role of resiliency in facing the impacts of natural disasters.

My name is Heather Toney. I proudly serve as national field director for Moms Clean Air Force. We are an organization of over 1.2 million moms, dads, grandmas, all kinds of folks that are united against air pollution and climate change for the sake of our children's health. Now, my road to this position came in travel through public service. I previously served as regional administrator for the Environmental Protection Agency's southeast region under President Obama. And before that, a former mayor of my hometown of Greenville, Mississippi, for two terms.

When our first major flood hit in 2008, I was beginning my second term and really focusing on infrastructure development in the city. I had spent my entire first term bringing the city back from the brinks of financial ruin, as we were heavily in debt and needed rebuilding badly.

So after carefully cutting and saving, we were excited to do things like street rebuilding and preparing our city's foundation for economic development. But when the northeast winter snow began melting and flowing downriver to our banks, we saw that the river was going to be high and higher than it was before. It reached flood stage and stayed there for over a month. Homes were flooded, fields were lost, water lines broke, sewer lines leaked.

What I was not prepared for was the impact that this would have on our city budget. See, cities are required to submit a balanced budget to the State no later than September 15, as the new budget year begins on October 1. For this reason, most cities begin budget sessions in late July to August, in order to adequately prepare, debate, and vote. When an extreme weather event such as a flood, hurricane, or storm hits during the spring or summer months, the city must allocate funds to address the need, without the assurance of money to replace the money that has been used.

For example, the money used for police and fire overtime due to a Federal emergency extreme weather crisis are not only not budgeted, they are not replaced in time for the current budget cycle due to the length of time it takes to receive a Federal declaration, assessment of damages, and then receipt of funds.

In 2011, when the crisis flood waters returned, I had learned a few lessons. Fellow mayors reached out to each other to provide immediate assistance. At the time, Harvey Johnson, mayor of Jackson, Mississippi, sent public work crews with concrete barriers to help us fill the gaps in our levee system. In turn, once we were secured, we sent our emergency management personnel to Vicksburg, Mississippi, to assist them in preparing for the flood waters headed their way.

Even though no one can budget for a storm, we saved as much as we could. We had to forego needed city assessment purchases like garbage trucks and things that citizens had prepared for. We worked with local churches to help prepare the community for the impending devastations. We relied on each other because each other was all that we had.

I recall my Facebook post to the community on May 22 of 2011, and it read: Toured Vicksburg's flooded area this morning with mayor Paul E. Winfield. He is doing a great job and is on top of the problem. Discuss next steps for our towns with respect to clean-up and restoration for residents and businesses. I worshipped with the good folks at Travelers Rest Worship Center. God is in control.

As I sit before you today, I still believe that God is in control, and he is trusting us to use the God-given good sense to trust the science all around us that tell us these storms will worsen it we don't act.

While I am no longer mayor today, my good friend and classmate Errick Simmons is mayor. And he was on MSNBC just last week sharing that the 2019 floods, which have come yet again, have assessed the municipal damages to the city of over \$4 million. In 2011, mine was simply \$600,000. With a city of a 38.6 percent poverty rate, making the necessary repairs with an annual street budget of only \$300,000, you can see that the burden lies heavily on poor people, and we are trying to figure out how to make sure we survive.

When we looked over the numbers for 2019, \$800,000 in damages to roads and bridges alone are what people are driving on and trying to get to work and get their children to school each and every day. The new budget session begins on October 1. Today is September 24. If we don't act, we continue to put poor people, families, and children in danger. This is not an opportunity for us to continue a debate; it is an opportunity for us to make a decision that saves lives.

And we have the tools, if we work together and use them. And I believe wholeheartedly that we can. And for that reason, I am happy to be here and answer any questions of this committee. Thank you.

[The statement of Ms. Toney follows:]

**Before the United States House of Representatives
Committee on Rules
Subcommittee on Legislative and Budget Process**

**“Examining Community Resilience & the Impacts of
Natural Disasters on the Budget Process”**

**Testimony of Heather McTeer Toney
National Field Director
Moms Clean Air Force
September 24, 2019**

Chairman Hastings, Ranking Member Woodall, and member of the Subcommittee, thank you for the opportunity to testify about the role of resiliency in facing the impacts of natural disasters.

My name is Heather Toney. I serve as National Field Director of Moms Clean Air Force, a community of over one million moms and dads united against air pollution and climate change for the sake of our children’s health. My road to this position traveled through public service: I previously served as Regional Administrator for the Environmental Protection Agency’s Southeast Region under President Barack Obama. I am also a former mayor, having served my hometown of Greenville, Mississippi, for two terms.

When our first major flood hit in 2008, I was beginning my 2nd term and really focusing on infrastructure development in the city. I’d spent my entire first term bringing the city back from the brinks of financial ruin as we were heavily in debt and needed rebuilding badly. After carefully cutting and saving, we were excited to continue street rebuilding and preparing our city’s foundation for economic development. When the northeast’s winter snow began melting and flowing downriver to our banks, we saw that the river was going to be high. It reached and stayed at flood stage for over month. Homes were flooded, fields were lost, waterlines broke, sewer lines leaked. What I was not prepared for was the impact this would place on our city budget.

Cities are required to submit a balanced budget to the state no later than September 15th as the new budget year begins on October 1st. For this reason, most cities begin budget sessions in late July to August in order to adequately prepare, debate and vote. When an extreme weather event such as a flood, hurricane or storm hits during the spring or summer months, the city must allocate funds to address the need without the assurance of money to replace the money used. For example, the money used for police and fire overtime due to a federal emergency extreme weather crisis are not only not budgeted, they are not replaced in time for the current budget cycle due to length of time it takes to receive a federal declaration, assessment of damages and receipt of funds.

In 2011 when the crisis flood waters returned, I'd learned a few lessons. Fellow mayors reached out to each other to provide immediate assistance. Harvey Johnson, Mayor of Jackson, MS, sent public works crews with concrete barriers to help us fill the gaps in our levee system. In turn, once we were secured we sent our emergency management personnel to Vicksburg, MS to assist them in preparing for the flood waters headed their way. Even though no one can budget for a storm, we saved as much as we could. We had to forgo needed city assessment purchases. We worked with local churches to help prepare the community for the impending devastations. We relied on each other because all we had was each other. My Facebook post to the community on May 22, 2011 read:

"Toured Vicksburg's flooded areas this morning with Mayor Paul E. Winfield. He's doing a great job and is on top of the problem. Discussed next steps for our towns with respect to clean up and restoration for residents and businesses. I worshipped with the good folks at Traveler's Rest Worship Center. God is in control."

As I sit before you today, I still believe that God is control, and he's trusting us to use the God given good sense to trust the science all around us that tells us these storms will worsen if we don't act. We have the tools if we will work together. We can.

I. INCREASINGLY SEVERE AND FREQUENT EXTREME WEATHER & NATURAL DISASTERS FUELED BY CLIMATE CHANGE

Climate Change is Leading to more Natural Disasters

The climate is changing at a rate unprecedented in the history of modern civilization. According to the 2018 National Climate Assessment (NCA), annual global temperatures have increased by 1.8 °F between 1901 and 2016, with most of this change (1.2 °F) occurring in the last 60 years. Sixteen of the last seventeen years have been the warmest on record – and this past July was the hottest month on the globe on record.

The impacts of global climate change are not something that will be experienced in a distant future; they are harming Americans across our nation as we speak. Climate change is leading to an increase in extreme weather events and natural disasters, the effects of which are already being felt, from intense heat waves, drought, and wildfires across the Western US, to devastating hurricanes and flooding along the Gulf Coast and Atlantic Coast. In 2015, California was in the fourth year of the most severe drought it had experienced in the last 165 years.ⁱ The land area burned by wildfires annually increased fourfold from 1985 to 2015, with more than 10.2 million acres burned nationwide in 2015.ⁱⁱ The 2017 Atlantic hurricane season tied the record for the most named storms, and the sustained intensity of these storms were unprecedented.

And the frequency and severity of these events is expected to continue increasing even more dramatically. According to a report by the Risky Business Projectⁱⁱⁱ, by mid-century, the average American will likely see 27 to 50 days over 95 °F each year, with those in the Southeast, Southwest, and upper Midwest likely to see several months over

95 °F. The annual area burned by wildfires is predicted to be 2-6 times higher than present by the same date.^{iv} Sea level rise of 1-4 feet is expected by 2100, with a sea level rise exceeding 8 feet possible in high-emissions scenarios.^v As extreme weather events increase in both intensity and frequency, so too will the number of Americans facing devastating damage and severe health threats in their everyday life.

Natural Disasters are Costly

Not only do natural disasters and extreme weather events pose a threat to human health and wellbeing, they are also incredibly costly. According to the NCA, over the last 40 years, the number of extreme weather-related events per year that cost more than \$1 billion per event has continued to increase. In total, these extreme weather events have cost the United States over \$1.1 trillion.^{vi} Rising sea levels and intensified flooding will likely raise the cost of coastal storms by \$2 to \$3.5 billion, and when changes in hurricane activity are taken into account the annual cost of coastal storms is brought up to \$35 billion.^{vii} By 2055, between \$66 billion and \$106 billion worth of existing coastal property nationwide will likely be below sea level.^{viii} The cost of fire suppression has increased consistently over the last 30 years, and this trend is likely to continue as wildfire frequency increases.^{ix} Extreme heat threatens labor productivity, energy systems, and agriculture. By 2100, some states in the Southeast and Midwest risk a 50% - 70% loss in annual crop yields.^x

The Southeast is Particularly Vulnerable

While the effects of climate change-driven extreme weather events are being felt across the United States, certain regions – specifically the Southeast – face especially severe impacts. Due to a variety of factors, cities in the Southeast are more vulnerable to climate change than cities in other regions.^{xi} Sixty-one percent of major cities in the Southeast are experiencing worsening heat waves (the highest percentage in the country).^{xii} High percentages of infrastructure in the region, particularly roads, bridges, urban drainage, and coastal property, are vulnerable to climate change; by 2050 the southeast is expected to have the most vulnerable bridges in the country.^{xiii} Charleston, SC is expected to face 180 annual tidal floods by 2045, compared to 11 in 2014.^{xiv} In South Florida, 590,000 people face extreme or high risk from sea level rise.^{xv}

These exacerbated climate impacts lead to great economic challenges. Rising temperatures will likely lead to an increase in electricity demand as well as a decrease in energy system efficiency, translating to a 4% to 12% increase in energy costs, which has serious implications for industry in the area.^{xvi} By 2050, \$48.2 billion to \$68.7 billion in existing coastal property in the Southeast will likely be below sea level. Average annual losses from storms in the region will likely increase by \$3.6 to \$6.8 billion.^{xvii}

II. CITIES AND MAYORS ARE ON THE FRONT LINES

Experience as a Mayor – Costs hitting mayors harder than ever before for extreme weather events

Every year mayors are faced with increasing cost of floods, hurricanes, tornadoes and other climate crises. In 2011, my city was hit with over \$600,000 in city assessed damages. (Damages to city streets, roads, and buildings.) This year, the city of Greenville is approaching \$4,000,000.00 in damages as a result of this year's flooding.

Mayors and Cities Recognize the Importance of Resilience

For years, and as Tropical Storm Imelda confirmed last week, Houston has experienced unprecedented amounts of rainfall and devastating, repeated impacts on people and businesses. Imelda brought more than 40 inches of rain over three days to Southeast Texas. That is a 1-in-1,000-year rainfall event, just two years after Hurricane Harvey, also a 1-in-1,000-year event, set all kinds of records by dumping trillions of gallons of water on Houston over a few days.

In a city without zoning, those who live in the places with the most perils — near oil refineries or in floodplains — are mostly people of color and low wealth. Hurricane Harvey brought startling high levels of E. coli, lead and arsenic to the flooded living rooms of a public-housing project along Buffalo Bayou, putting an already vulnerable community at greater risk for long-term health problems.

The people of color on the city's heavily industrial east side carried a disproportionate burden for the extra air pollution released from petrochemical plants because of Harvey. The storms like Harvey cause spills, flaring and major emissions events as plants shut down abruptly and start up again. The people living nearby simply want their neighborhoods to be safe, healthy and affordable.

With climate change, there will likely be more intense storms, with higher wind speeds and more precipitation. As Houston and other cities plot a sustainable path forward, it must be a fair and just one, too.

In 2016, the National League of Cities; the U.S. Conference of Mayors; and 54 Cities, Counties, and Mayors across the country submitted a legal brief^{xviii} to the D.C. Circuit, in defense of the Environmental Protection Agency's Clean Power Plan, that demonstrate that mayors and cities are working to address resiliency and adaptation issues in the face of extreme weather events and climate change. The brief included numerous examples of mayors and cities leading and recognizing resiliency challenges we are facing:

- p. 20: In 2013, **Baltimore** developed comprehensive responses—touching infrastructure, building codes, natural coastal barriers, and public services—to

threats from rising seas, heat waves, and storms. 27 City of Baltimore, Disaster Preparedness and Planning Project (Oct. 2013), bit.ly/1T3Soe3.

- p. 21: **Boulder County**'s 2012 Climate Change Preparedness Plan "focuses on four key sectors: water supply, emergency management[], public health, and agriculture and natural resources," and aims "to assist county and city departments that manage climate-sensitive resources and assets" by reorienting planning parameters to "the climate system of the future"—meaning a county beset by more, and more severe, floods, heat waves, droughts, wildfires, and vector-borne diseases. 31 Jason Vogel et al., Boulder County Climate Change Preparedness Plan (May 2012), bit.ly/1ZhBfg8.
- p. 21-22: **Dallas** has set out a list of objectives—relating to everything from transit to wastewater treatment—for improving air and water quality amid the growing stresses that a warming climate places on both. 33 City of Dallas, Sustainability Plan Progress Report (Mar. 2014), bit.ly/1SdolNa.
- p. 22-23: **Grand Rapids** has adopted a suite of measures—such as denser and greener development, and a halt to new road building—to respond to the warming temperatures and greater precipitation that threaten existing transportation infrastructure. 37 West Michigan Environmental Action Council, Grand Rapids Climate Resiliency Report (Dec. 2013), bit.ly/1XFZGSV.
- p. 25: **Pittsburgh**, which has lately seen colder winters, hotter summers, and more extreme precipitation and riverine floods, named a Chief Resilience Officer in June 2015 to coordinate, among other things, changes to the city's transportation networks that would make them more robust to extreme weather events. 46 Press Release, Mayor Peduto, Pittsburgh Sustainability Manager Grant Ervin Named Chief Resilience Officer, June 5, 2015, bit.ly/25gCbpi.
- p. 25: In 2014, **Portland, Maine** commissioned an investigation of what rising, warming, acidifying, and stormier seas would mean for its economy, which centers on port- and ocean-related industries like tourism, fishing, and marine services. 47 That investigation yielded a bevy of recommendations, ranging from practical near-term steps—protecting port facilities and energy and electricity infrastructure against storm surges—to longer-term ones—diversifying the port economy in anticipation of adverse climate change impacts on fisheries. 47 Waterfronts of Portland and South Portland Maine: Regional Strategies for Creating Resilient Waterfronts (May 11–16, 2014), 1.usa.gov/1Rvv9sy. 48 *Id.* at 16, 23–27.
- p. 26-27: **Salt Lake City**'s Sustainable Code Revision Project, which has proceeded incrementally since 2009, amounts to a rewaving of city ordinances and policies with an eye to greater sustainability and resilience to climate change impacts.⁵³ It builds in part on the city's examination of climate vulnerabilities and prioritization of issues such as water conservation and air quality maintenance. 53 Salt Lake City, Sustainable Code Revision Project, bit.ly/1SdJMOm (visited Mar. 21, 2016). 54 Salt Lake City, Sustainable Salt Lake – Plan 2015 (Dec. 2015), bit.ly/1UJBIab.

- p. 27: **Tucson**—no stranger to hot, dry weather—is working to respond to heat waves of unprecedented intensity and water supplies strained by recurrent drought and falling groundwater levels. 55 City of Tucson, Planning for Climate Change in the City of Tucson (Dec. 2012), bit.ly/1pY6hop

Houston example of rebuilding for resiliency

III. REBUILDING FOR RESILIENCE

The NCA notes that “current infrastructure and building design standards do not take future climate trends into account,” and that “investing in forward-looking design can help ensure that infrastructure performs acceptably under changing climate conditions.”^{xix} Extreme weather impacts from flooding, sea level rise, storm intensity, heat waves, and more threaten American cities and communities. Many cities, as illustrated above, are taking on these challenges in advance of and in the aftermath of extreme weather events and ensuring they are building and rebuilding for resiliency.

In Puerto Rico, after Hurricane Maria left thousands without power for a year, efforts continue to rebuild for resiliency. Communities, energy reform, technology and finance – all have a role to play in protecting the island from the next super storm, while improving the quality of life for all its residents and strengthening its economy long into the future. Projects are underway in Puerto Rico to deploy low-carbon microgrids, which can help keep the lights on during extreme weather events. Efforts to reform the energy system and planning are also a key to ensuring grid upgrades are done to ensure resiliency.

After restoring power to millions of New Yorkers in the wake of Superstorm Sandy, Governor Cuomo planted the seeds of overhauling the state’s electric system, which led to the Reforming the Energy Vision (REV) initiative, an effort to build a cleaner, more reliable, resilient, and affordable grid. REV looks to create effective market mechanisms that lead to long-lasting solutions for utilities, customers, and a carbon-free environment. REV will help enable a distributed, smarter, and more resilient grid that can help ensure reliably power, including following extreme weather events. Indeed, areas like Coop City and Goldman Sachs were able to keep their lights on even as the grid failed during Hurricane Sandy, demonstrating the power of smart, clean, distributed power to ensure resiliency.

Around 41 million people, more than one-in-eight Americans, live in the nation’s riverine and coastal floodplains, where critical energy, petrochemical refining, transportation, agriculture, and trade infrastructure is concentrated.^{xx} The nation’s coastal and inland waterways -- as gateways for agricultural, energy, and other exports - - produce \$4.6 trillion in annual economic output. America’s floodplains are vital to our country’s economy, identity, and well-being.

Our coasts are exposed to some of the most damaging effects of climate change as rising sea levels encroach and more intense storms damage and even destroy businesses, homes, and families. Communities along our rivers are already experiencing more intense, damaging flooding. Confronting those challenges will require significant investment and shrewd policy. Flooding of riverine and coastal floodplains impacts virtually all corners of the U.S. and should be a pressing concern as legislators at the federal, state and local level consider solutions to climate change and the ways America must prepare to manage its impacts.

Floods are already the most common of natural disasters in the U.S. and as discussed above, increased impacts are expected in the future due to climate change. Adjusted for inflation, the five costliest hurricanes experienced by the U.S. have occurred since 2005, 4 of them since 2012. In 2017 alone, Hurricanes Harvey, Maria, and Irma cost an estimated \$268 billion. That pattern is likely only to get worse. The unprecedented flooding in the Midwestern states experienced in Spring 2019 may soon become the new normal.

There are solutions at hand, however. We must begin to manage ahead of the floods by shifting federal, state and local policy from reactive to proactive and incorporating natural infrastructure into comprehensive strategies for managing water and coping better when flooding occurs. Doing so is common sense and will be economically beneficial to local communities, tax payers, and the federal purse. Based on history, it is estimated that \$1 spent before a flood disaster saves \$7 in property loss, business interruption, and death. Investing upfront will help mitigate the burden of catastrophic costs while better protecting entire communities and families from disaster fallout.

We must initiate solutions now. We can start by implementing community improvements such as resilient infrastructure, new zoning, and hazard informed-building codes to bring about both rapid and gradual changes needed to successfully cope with the realities that people face.

Pursuing natural infrastructure as a tool also can be effective as it can provide additional layers of protection that complement traditionally engineered structures, increasing security for businesses and families. Rather than allow coastal areas to fall prey to climate change, we should initiate proactive solutions that will allow coastal communities to flourish and safely weather any storms that may reach their shores in the future.

Communities rely greatly on federal funding to prepare for storms and mitigate risks as well as to offer support after disaster strikes. While disaster relief spending has become an annual debate in Congress, we can better protect vulnerable populations by taking active measures ahead of time, potentially lowering the costs of future weather events.

To adequately protect and bolster coastal and riparian communities, Congress should consider taking actions such as:

- Fund and engage communities in proactive, hazard-informed planning that builds consensus on acceptable risks, teaches communities how to cope with water, and secures rapid implementation
- Support data acquisition and modeling such as ocean, coastal and stream gauges to provide better information for better planning and management
- Invest in approaches that value and use natural infrastructure to complement traditional approaches to reduce flood hazard and vulnerability and maximize ecosystem and damage reduction benefits and sustainability
- Improve coordination and alignment of federal and state goals and actions for coastal regions to advance implementation of comprehensive plans that include natural infrastructure to meet the urgency of the need
- Increase pre-disaster funding for critical agencies such as FEMA and HUD

ⁱ Zamuda et al, 2018: Energy Supply, Delivery, and Demand. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*. U.S. Global Change Research Program, Washington, DC, USA, pp. 174–201. <https://nca2018.globalchange.gov/chapter/4/>

ⁱⁱ Vose et al, 2018: Forests. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*. U.S. Global Change Research Program, Washington, DC, USA, pp. 232–267. <https://nca2018.globalchange.gov/chapter/6/>

ⁱⁱⁱ An initiative founded by NYC Mayor Michael Bloomberg, former U.S. Secretary of the Treasury Hank Paulson, and business leader Tom Steyer to assess the economic risks to the US posed by climate change. <https://riskybusiness.org/>

^{iv} Vose et al, 2018: Forests. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*. U.S. Global Change Research Program, Washington, DC, USA, pp. 232–267. <https://nca2018.globalchange.gov/chapter/6/>

^v Hayhoe et al, 2018: Our Changing Climate. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*. U.S. Global Change Research Program, Washington, DC, USA, pp. 72–144. <https://nca2018.globalchange.gov/chapter/2/>

^{vi} Ibid.

^{vii} *The Economic Risks of Climate Change in the United States: A Climate Risk Assessment for the United States*. June 2014. Risky Business. <https://riskybusiness.org/report/national/>

^{viii} Ibid.

^{ix} Vose et al, 2018: Forests. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*. U.S. Global Change Research Program, Washington, DC, USA, pp. 232–267. <https://nca2018.globalchange.gov/chapter/6/>

^x *The Economic Risks of Climate Change in the United States: A Climate Risk Assessment for the United States*. June 2014. Risky Business. <https://riskybusiness.org/report/national/>

^{xi} Carter et al, 2018: Southeast. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*. U.S. Global Change Research Program, Washington, DC, USA, pp. 743–808. <https://nca2018.globalchange.gov/chapter/19/>

^{xii} Ibid.

^{xiii} Ibid.

^{xiv} Ibid.

^{xv} Ibid.

^{xvi} *Come Heat and High Water: Climate Risk in the Southeastern U.S. and Texas*. July 2015. Risky Business. <https://riskybusiness.org/report/come-heat-and-high-water-climate-risk-in-the-southeastern-u-s-and-texas/>

^{xvii} Ibid.

^{xviii} Brief of *Amici Curiae* the National League of Cities; the U.S. Conference of Mayors; and 54 Cities, Counties, and Mayors in Support of the U.S. Environmental Protection Agency, *West Virginia v. U.S. Evtl. Prot. Agency*, No. 15-1363 (D.C. Cir.) (April 1, 2016).

^{xix} Maxwell et al, 2018: Built Environment, Urban Systems, and Cities. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*. U.S. Global Change Research Program, Washington, DC, USA, pp. 438–478. <https://nca2018.globalchange.gov/chapter/11/>

^{xx} Wing et al. 2018, Estimates of present and future flood risk in the conterminous United States. *Environmental Research Letters* 13:3 <https://iopscience.iop.org/article/10.1088/1748-9326/aaac65>

Mr. HASTINGS. Thank you.
Mr. Piotti.

**STATEMENT OF JOHN PIOTTI, PRESIDENT AND CEO OF
AMERICAN FARMLAND TRUST**

Mr. PIOTTI. Chairman Hastings, Ranking Member Woodall, Chairman McGovern, it is a pleasure to be here today. Thanks for the opportunity to testify.

I applaud the committee for dealing with this issue of resiliency. It is critically important to our farmers and our rural communities, and your purpose aligns closely with the work of the organization I run, American Farmland Trust.

Since our founding in 1980, AFT has helped permanently protect 6.5 million acres of farmland with agricultural conservation easements, making sure that that land will forever be available, not only to grow food, but to provide a range of environmental services, including those that increase resiliency. At the same time, we have helped advance farming practices on millions of additional acres that have also enhanced resiliency. And we have promoted policies and provided services that have helped over a half million farmers stay in business.

AFT, for decades, has undertaken a combination of research and policy work and programming in multiple States, but my purpose today is not to recount any of that, but rather, to outline some of the issues that we see out in the field where it is essential to America's farmers and rural America that we take steps to enhance resiliency.

I am going highlight four areas. The first, how better farming practices boost resiliency. AFT has spent much of its history helping farmers improve soil health through practices that include reduced tillage, plowing up the ground less, and active use of cover crops and crop rotations. Building soil health has numerous benefits, including these:

Healthier soil soaks up more water and can store more of it. And this, by keeping water on the fields, reduces the runoff to streams and rivers, and thereby, reduces the severity of flooding.

And you can see this yourself if you go out and drive around in the community after a heavy rain. When there is bare ground, you see runoff. And when there is cover on the field, be it crop residue or cover crops, you don't see it. Everything seems much better.

The second point, maintaining fields with cover crops and perennials, or even with the residue from the last harvest of crops, keeps soil in place during periods of heavy flooding. And farms managed with these practices will be able to bounce back much more quickly after an extreme event.

Third, keeping soil on farm fields will also reduce recovery costs downstream, because there will be less sediment to clean up.

There are many examples of how this past spring's heavy rainfall has prevented farmers from planting or forced them to plant late. You heard Chairman Hastings mention a few at the outset. Yet AFT has heard from farmers who use practices like no till and cover crops that they were often able to farm much earlier than their neighbors. One of the most commonly heard comments was

that regardless of how much rainfall there was, farmers who had cover crops saw little soil erosion back on their field sooner.

The second point I want to make, agricultural conservation easements can help mitigate flooding. Farmland provides a natural means of tempering storm water and flood waters. It is often the development that could occur on farmland that funnels storm water in ways that exasperate the negative impacts. Hurricane Harvey, which hit Texas in 2017, as we will all remember, is a real example of this. So much farmland around Houston had been developed that the city no longer retained a natural resiliency. Sadly, this is happening in Houston right now again.

Another example of where development has led to increased flooding is in the pioneer valley of western Massachusetts. The devastation that occurred as a result of Hurricane Irene, that Chairman McGovern knows all of too well, many farms were under water. And sadly, a lot of soil washed down the Connecticut River into the ocean.

The irony is that the farms were hurt by the fact that there is less farmland in the area now than there once was. Development occurring on farmland puts remaining farmland at a higher risk. This doesn't need to be what happens. We can use agricultural conservation easements to mitigate potential flooding.

A few States are using the Federal Hazard Mitigation Grant Program to buy flood plain conservation easements. The first application that we are aware of occurred in the late 1990s in Illinois, following flooding along the Mississippi. Another example was in 2001 in Nebraska. Yet sadly, these are rare instances. FEMA needs to raise awareness of how conservation easements can be used to target agricultural lands that would be a natural buffer to flooding.

The third item that I want to identify is how farms can play a critical role in flood attenuation and groundwater recharge. We are talking about floods here, but we have to remember that through much of the country we also have a problem with water supply, right? And there is an opportunity, at times, to address both issues simultaneously.

In California, farmers are creatively working to both minimize the negative impacts of floods and help save flood water for future use. And the written testimony provides a couple of examples that I won't go into now, but the point is we need more innovative projects of this sort.

And the fourth point I wish to make is that farms and farmers also enhance resiliency in other ways. So far today, I have been talking about how farms can help buffer floods and storms through on-the-ground practices, but I want to mention two other ways that farms enhance resiliency.

First, I will stress how the economic and environmental health of so many rural communities is tied directly to the vibrancy of farming. And as we all know, the overall health of rural communities is critical to their resiliency and capacity for adaptation. Thus, it is critical that farming remain vital if rural communities are to remain healthy.

We know that many farm communities are struggling for a variety of reasons that are beyond today's hearing. But my point is

that any strategy designed to enhance rural resiliency must have at its core efforts to help strengthen farming.

Second, I want to mention the roles that farmers often play in rural communities in a crisis. Farmers more often than not are key contributors to a community, perhaps as volunteer firemen or as first responders. Beyond that, farmers often possess exactly what is needed in time of crisis, be that heavy equipment, or the know-how to use it, or stored food stuffs, or barns or warehouses that can be used to shelter people or supplies. Simply put, farms and farmers are essential to rural resiliency.

I thank you for the opportunity, and I look forward to any questions.

[The statement of Mr. Piotti follows:]

Testimony of John Piotti
President of American Farmland Trust
 September 24, 2019

Chairman Hastings and Honorable Members of the House Rules Committee.

I am John Piotti, the President and CEO of American Farmland Trust, a nonprofit organization founded 40 years ago to help protect farmland, advance sound farming practices, and help keep farmers on the land.

Thank you for the opportunity to testify today. I applaud the committee for exploring this issue of resiliency. It is critically important to our farmers and to our rural communities. Your purpose aligns closely with AFT's mission and activities.

Since our founding in 1980, AFT has helped permanently protect 6.5 million acres of farmland with agricultural conservation easements, making sure that that land will forever be available to both grow food and to provide critical environmental services, including those that increase resiliency. At the same time, we have helped advance farming practices that enhance resiliency on millions of additional acres, and we have promoted policies and provided services that have helped over a half million farmers and ranchers stay in business.

AFT has for decades undertaken a combination of critical research, policy work, and focused programming in multiple states. But my purpose today is not to list AFT's past accomplishments or current priorities; but rather, to outline some of the issues that we, through our experience, see as essential to the resiliency of farmers and rural America.

I am going to highlight four different areas, providing basic information on each. I will gladly provide more detailed information, as desired, either during the Q&A period or after the hearing.

Better farming practices boost resiliency

AFT has spent much of its history helping farmers improve soil health through practices that include reduced tillage (no till or low till) and active use of crop rotations and cover crops. Building soil health has numerous benefits, including these:

- Healthier soils soak up water more quickly and can store more of it. This keeps water on fields and reduces runoff into streams and rivers, reducing the severity of flooding. (You can see this with your own eyes if you drive around the countryside during a big spring rainstorm—bare fields will have water pooling and running off them, while pastures and cover cropped fields will have far less runoff.)
- Maintaining fields with cover crops and perennials, or even with crop residue, keeps soils in place during heavy rainfall or flooding. Farms managed with these practices will be able to bounce back after an extreme event and start farming again more rapidly.
- Keeping soil on farm fields will also reduce recovery costs downstream, because there will be less sediment to clean up.

There are many examples of how this past spring's heavy rainfall prevented farmers from planting or forced them to plant late. Yet AFT's heard from farmers who used practices like no-till and use cover crops that they were often able to farm when their neighbors often not. One of the most frequently heard comments was that regardless of how much rainfall there was, farmers who had cover crops saw little soil erosion.

Agricultural conservation easements can mitigate flooding

Farmland provides a natural means of tempering storm water and floodwaters. In fact, it is often the development on farmland that funnels storm water in ways that exacerbate negative impacts. Hurricane Harvey, which hit Texas in 2017, is an example of this. So much farmland around Houston had been developed that the city no longer retained a natural resiliency. Sadly, this is happening in Houston again right now.

Another example of where development has led to faster storm water flow and increased flooding is in the Pioneer Valley of Western Massachusetts. The devastation that occurred as a result of Hurricane Irene is well known to chairman McGovern. Many farms were underwater, and sadly, a lot of topsoil was washed to the sea. The irony is that farms were hurt by the fact that there is less farmland in the area now than there once was. Development occurring on farmland puts the remaining farmland at higher risk.

This does not have to be what happens. In response to the devastation of Hurricane Harvey the executive director of the Texas Agricultural Land Trust, one of many agricultural land trusts that AFT helped create, testified before the Texas Legislature on the use of agricultural conservation easements as a strategy to mitigate potential flooding.

Although agricultural conservation easements have been applied on millions of acres nationally, they are not commonly used to mitigate flood risks. A few states are using federal Hazard Mitigation Grant Program funds to buy "Floodplain Conservation Easements." The first application that we are aware of was in the late 1990s in Illinois following flooding along the Mississippi River. Another example was in 2001 in Nebraska. Yet these are rare cases. FEMA needs to raise awareness of how conservation easements can be used to target agricultural lands that would be a natural buffer to flooding.

Farms can play a critical role in flood attenuation and groundwater recharge

In California, farmers are creatively working to both minimize the negative impacts of floods and help save floodwaters for future use. Here are two examples from the San Joaquin Valley:

- In the King's River Basin, farmers are currently pumping an unsustainable volume of water during dry years that is drawing down the aquifer as much as 900 feet in some areas. The rapid withdrawal of water is causing the land to subside by over a foot per year. In high water years, the region risk floods from rivers that crest their bank. Farmers in this area are piloting a new approach in which excess water during high precipitation years will be diverted directly onto the fields, flooding them. The water then will slowly sink into the ground and recharge the aquifer.

- One local farm is undertaking a NRCS-funded project that will use a series of canals, pumps, and turnouts to capture and divert flood water from the King's River. This project will protect five thousand acres of farmland from flooding and create habitat for waterfowl. It will increase recharge and flood mitigation capacities while protecting groundwater quality.

We need more innovative projects of this sort.

Farms and Farmers also enhance resiliency in other ways

So far today, I have been talking about how farms can help buffer floods and storms through on-the-ground practices. But I want to mention two other ways that farms enhance resiliency.

First, let me stress how the economic and environmental health of many rural communities is directly tied to the vibrancy of farming. And as we all know, the overall health of rural communities is critical to their resiliency and capacity for adaptation. Thus, it is critical that farming remain vital if rural communities are to remain healthy. We know that many farm communities are struggling, for a variety of issues that are beyond the scope of this hearing. Any strategy designed to enhance rural resiliency must have at its core efforts to strengthen farming.

Second, let me mention the role that farmers often play in rural communities in a crisis. Farmers more often than not are key contributors to a community, perhaps as volunteer firemen or first responders. Beyond that, farmers often possess exactly what's needed in a time of crisis, be that heavy equipment and the know how to use it, stored foodstuffs, and barns and warehouses that can be used to shelter people or supplies.

Simply put, farms and farmers are essential to rural resiliency.

Mr. HASTINGS. Ms. Hamilton, just before you begin, the chairman is going to have to leave to go to a meeting. And so I can set the parameters here for the remaining portion of the hearing as well, at 4 o'clock, the Democrats have a caucus scheduled and many of the members here are going to have to attend that. I don't have to attend. I can if I choose, but I am here for you all. So I am going to be prepared to forgo my questions so that I can hear from the members on both sides.

But right now, Chairman, if you have anything you wish to contribute to us or leave a couple of questions with us.

Mr. MCGOVERN. The question is what is our assignment here? We are hearing some great conversation, and I know that there will be even greater conversation as we go on. But, what are the two things that Congress must do right now to help our communities become more resilient to strong damaging storms? That is after everybody has testified.

But let me just thank Chairman Hastings and Ranking Member Woodall for holding this subcommittee hearing. And I think it comes as no surprise that Chairman Hastings would focus his first hearing on something so important to his constituents and, frankly, to the entire Nation as to how to protect our communities from dangerous and expensive storms.

And this issue of resiliency, as Mr. Woodall pointed out, is being discussed by a lot of committees, but it is something, quite frankly, we should have been discussing a long time ago, right. And so I appreciate what I have heard up to this point. I have your testimonies, which I read in advance. I appreciate that as well.

But I will turn this back over to Chairman Hastings. And, again, thank you for your leadership.

Mr. HASTINGS. Thank you very much, Mr. Chairman.

Ms. Hamilton.

**STATEMENT OF KATHERINE HAMILTON, EXECUTIVE
DIRECTOR, ADVANCED ENERGY MANAGEMENT ALLIANCE**

Ms. HAMILTON. Thank you Chairman McGovern, thank you Chairman Hastings, thank you Ranking Member Woodall, and the entire committee, for inviting me to testify today. My name is Katherine Hamilton. I am executive director of the Advanced Energy Management Alliance. We focus on customer resources that can provide cost-effective, resilient, flexible, and clean solutions to our Nation's electric grid.

AEMA works to ensure that resources such as rooftop solar, demand response, energy efficiency, smart inverters, batteries, thermal storage like hot water heaters, fuel cells, combined heat and power, microgrids, electric vehicles, and geothermal heat pumps are taken into consideration to provide resilience to our electric grid.

While Federal agencies give grants for rebuilding, preparation in advance of these events using flexible technologies can lessen the burden both on the communities and on the government.

Distributed energy resource deployment has provided resilience to our grid, whether because of extreme temperature, natural disaster, or even the solar eclipse. The ability to fail fast and recover fast is particularly suited to these resources. As far back as Hurri-

cane Sandy, microgrids in New York and New Jersey enabled universities to continue operation in the face of massive power outages, providing a haven to others without electricity.

PJM Interconnection credited demand response with helping the grid withstand the polar vortex in January of 2014. As multiple winter peaks were set, demand response, which is only required to respond during summer peaks, reduce load most than most generating resources, allowing the system to function reliably.

After Hurricane Irma, demand response helped maintain balance between supply and demand to stabilize the flow to electric grid. As thousands of customers were rapidly having their power restored, demand threatened to outpace supply and cause additional blackouts. Tampa Electric Company had the foresight to install a diverse set of distributed resources.

As Hurricane Harvey unleashed trillions of gallons of rainwater along the Gulf Coast, there was a range of energy impacts, including coal-to-gas switching as coal piles were too wet for conveyer systems to handle. Texas Medical Center, the largest medical facility in the world, was able to sustain critical loads throughout the storm, thanks to a combined heat and power system which operated without interruption.

During heat waves in California, hundreds of energy storage facilities in San Francisco were called upon to operate collectively as virtual power plants, reducing demand on an overtaxed grid. And during the solar eclipse in 2017, over 750,000 consumers lowered their Nest thermostats to reduce demand by 700 megawatts as electrical systems across the country were displaced into temporary darkness.

Given wildfire season in California, and even today, the calling of public safety outages there, microgrids and other distributed resources will only become more important. It is critical that the Federal Government provide best practice planning and technical assistance for at-risk communities through the FEMA Pre-Disaster Mitigation Grant Program.

We need Federal programs also that can leverage private financing. An example of a local organization that has provided resilience services is Florida's Solar and Energy Loan Fund, SELF. It is a CDFI that raises low-cost capital from private entities and then delivers clean energy and climate resilience, like roof repairs and replacement, impact windows, hurricane shutters, in underserved neighborhoods. SELF has helped finance fortified roofs that reduce home insurance rates by as much as 50 percent, enabling homeowners to pay for those projects, keep their insurance, and lower their energy bills from the solar rooftop power.

Having a national nonprofit entity, such as the National Climate Bank Act that was introduced in the Senate, could fund regional resilience projects and enable more States to create and feed institutions like SELF that serve frontline communities.

The Department of Defense has identified the most at-risk bases for resilience needs in States as diverse as Florida, Georgia, Texas, Virginia, Utah, Oklahoma, Missouri, Maryland. Forts Benning in Georgia and Gordon in Georgia have both established resilience plans with solar energy as a key component.

These examples and many others in my written testimony illustrate that customer-based distributed resources that are available today can provide critical services to the grid when it needs them the most. These technologies and financing mechanisms are resources we should implement before a hurricane strikes our coast, a flood destroys our business, or a heat wave endangers our most vulnerable populations.

I urge the committee to take these solutions into consideration as we look broadly and strategically about how as a Nation we prepare for and respond to events that are beyond our control. The very solutions we choose could have the co-benefits of reduced cost of and time for recovery, increased jobs and economic development for communities at risk, and reduced environmental impact through clean, flexible technologies.

Thank you again for the opportunity to testify before the committee.

[The statement of Ms. Hamilton follows:]

Testimony
of
Katherine Hamilton
before the
House of Representatives
Committee on Rules
Subcommittee on Legislative and Budget Process
September 24, 2019

Good morning. Thank you to Committee Chairman McGovern, Subcommittee Chairman Hastings, Ranking Member Woodall, and the entire Subcommittee for inviting me to testify before you today regarding resilience technologies and policy in the United States. My name is Katherine Hamilton and I am Executive Director of the Advanced Energy Management Alliance (“AEMA”),¹ focused on consumer-sited resources that can provide cost-effective, resilient, flexible, and clean solutions to our nation’s electric grid.

AEMA has engaged in public policy in states, regions, and federally, to ensure that customer-sited distributed energy resources (“DERs”)—such as rooftop solar, demand response, energy efficiency, smart inverters, batteries, thermal storage (from hot water heaters, for example), fuel cells, combined heat and power, microgrids, electric vehicles, and geothermal heat pumps—are taken into consideration as resources that can provide resilient services to the electric grid. AEMA has weighed in on numerous and diverse proceedings regarding resilience, including at the Federal Energy Regulatory

¹ For more information about AEMA, see <https://aem-alliance.org>. The opinions expressed in this

Commission,² Puerto Rico's microgrid proceeding,³ and in California's wildfire response.⁴ In all of these state and federal proceedings, we have used examples of these resources providing resilience to the grid in a consumer-friendly, cost-effective, flexible, and reliable manner. Federal agencies such as the Department of Energy,⁵ Small Business Administration,⁶ Federal Emergency Management Agency,⁷ and U.S. Department of Agriculture⁸ have programs to provide both technical and financial assistance that can be leveraged for rebuilding efforts throughout the U.S., but my testimony seeks to demonstrate how preparation in advance of these events using flexible distributed energy technologies can lessen the burden on communities and the government.

There are numerous examples of how distributed energy resource deployment has provided resilience to the electric system during times of grid constraint, whether because of extreme temperature, natural disaster, or even the solar eclipse. The ability to fail fast, and then recover fast, is particularly suited to distributed energy resources.⁹ As far back as Hurricane Sandy, microgrids in New York and New Jersey enabled university campus facilities to continue operation in the face of massive power outages.¹⁰

Grid system operators recognize that distributed energy resources can enhance system resilience. The New York Independent System Operator, in their 2017 DER

² <https://aem-alliance.org/aema-files-comments-doe-nopr-ferc/> and <https://aem-alliance.org/aema-files-reply-comments-in-resilience-proceeding/>

³ Comments here <https://aem-alliance.org/aema-makes-resilience-recommendations-puerto-rico-commission/>

⁴ <https://aem-alliance.org/aema-urges-consideration-of-der-in-wildfire-mitigation/>

⁵ At DOE, the Infrastructure Security and Energy Restoration ("ISER") program within the Office of Electric Delivery and Energy Reliability has been focused on this issue.

⁶ The SBA provides loans to small businesses that can be used for distributed energy resource applications.

⁷ See Hazard Mitigation Grant Program: <https://www.fema.gov/hazard-mitigation-assistance>

⁸ The Rural Utilities Service program at USDA provides grants for these projects.

⁹ See article on disaster rebuild technologies here: <https://www.utilitydive.com/news/a-trio-of-storms-could-mean-grid-modernization-in-hard-hit-areas/506138/>

¹⁰ Article on Princeton's microgrid can be found here: <https://www.princeton.edu/news/2014/10/23/two-years-after-hurricane-sandy-recognition-princetons-microgrid-still-surges>

Roadmap, states: “DER can help grid operators by *improving system resilience* [emphasis added], energy security, and fuel diversity. DER can lower consumer prices, improve market efficiency, and allow consumers to take greater control of their electricity use and costs through a variety of new technologies.”¹¹

PJM Interconnection credited demand response with helping the grid withstand the Polar Vortex, stating: “Although demand response is usually only needed by grid operators in the summer, operators also successfully deployed it during the power emergencies occasioned by the bitter cold ‘Polar Vortex’ weather in January 2014. As PJM set multiple winter peak records early that month, it called on demand response, and received more megawatts as load reductions than it could obtain as generation from all but the very largest generating stations. . . . In the midst of those challenging conditions, demand response—responding to PJM’s dispatch as a wholesale market resource—helped maintain the reliability of the system.”¹²

After Hurricane Irma, demand response helped maintain balance between supply and demand to stabilize the Florida electric grid. As thousands of customers were rapidly having their power restored, demand threatened to outpace supply due to generation outages from the storm. This imbalance could have created another blackout for consumers who had already been without power for an extensive period due to the Hurricane. Fortunately, Tampa Electric Company had the foresight to contract for a

¹¹ Distributed Energy Resources Roadmap for New York’s Wholesale Electricity Markets, A Report by the New York Independent System Operator, January 2017, Page 4.
http://www.nyiso.com/public/webdocs/markets_operations/market_data/demand_response/Distributed_Energy_Resources/Distributed_Energy_Resources_Roadmap.pdf

¹² Petition For Rehearing En Banc Of PJM Interconnection, L.L.C., Electric Power Supply Ass’n v. FERC at 10-11, No. 11-1486 (D.C. Cir. July 7, 2014).

diverse set of resources, and dispatched demand response. In this case, demand response provided grid resilience, allowing the grid to bounce back from a major disturbance.¹³

As Hurricane Harvey unleashed 33 trillion gallons of rainwater along the Gulf of Mexico, the storm caused a range of energy impacts, including coal-to-gas switching as coal piles were too wet for conveyer systems to handle. However, the Texas Medical Center--the largest medical facility in the world--was able to sustain its air conditioning, refrigeration, heating, sterilization, laundry, and hot water needs throughout the storm thanks to a combined heat and power system which operated without interruption during the storm.¹⁴

During heat waves in California, hundreds of energy storage facilities at office buildings in San Francisco were called to operate collectively as “virtual power plants” reducing demand on an over-taxed grid.¹⁵ During the solar eclipse in August of 2017, over 750,000 programmable thermostats were lowered by their consumers to reduce demand by 700 MW as electrical systems across the country were displaced in the temporary darkness.¹⁶ In California alone, 800 MW of demand response was called upon to mitigate potential power surges during re-energization of the electric grid during that eclipse.¹⁷ Given the start of wildfire season in California and the calling of public safety outages, microgrids and other distributed resources will only become more important. It is crucial for the Federal government to provide best practice planning and technical

¹³ Program was through EnerNOC, now Enel X: <https://energysmart.enelxnorthamerica.com/following-hurricane-irma-demand-response-stepped-amid-efforts-restore-power>

¹⁴ <https://www.energy.gov/cere/amo/articles/chp-installation-keeps-hospital-running-during-hurricane-harvey>

¹⁵ <https://www.energy-storage.news/news/stems-virtual-power-plants-take-heat-off-californian-grid>

¹⁶ See blog from Nest thermostats: <https://nest.com/blog/2017/08/10/solar-eclipse-meet-the-nest-thermostat/>

¹⁷ See commentary from AEMA here: <https://aem-alliance.org/solar-eclipse-clean-response-california/>

assistance for at-risk communities through the FEMA Pre-Disaster Mitigation Grant program.¹⁸

In addition to grants and technical assistance, however, we need federal programs that can leverage private financing. An example of a local financing mechanism that has provided resilient services is the Florida Solar and Energy Loan Fund (“SELF”), a Community Development Financial Institution (“CDFI”) formed in St. Lucie County, Florida that raises philanthropic and low-cost capital from a wide range of sources, including private banks, foundations, and crowd-funding.¹⁹ SELF then delivers renewable energy, energy efficiency and climate resilience (roof repairs and replacement, impact windows, and hurricane shutters) in underserved neighborhoods. The organization has financed \$3.4 million for resilience projects. SELF also partnered with My Strong Home to finance fortified roofs that incorporate reduced home insurance rates—by as much as 50% reduction in cost (from \$2000 to \$1000 per year)—due to lower risk to the insurance company. These projects enable the homeowner to use those insurance savings to help pay for all or part of the project, while keeping their insurance. Those households in turn save thousands of dollars each year through reduced insurance costs because of stronger roofing from the solar panels.²⁰ Having a national non-profit entity, such as that contemplated in the National Climate Bank Act,²¹ could fund regional resilience projects and enable more states to create and seed institutions like SELF that serve frontline communities.

¹⁸ <https://www.fema.gov/pre-disaster-mitigation-grant-program>

¹⁹ SELF has raised over \$627,000 and helped more than 110 homeowners through KIVA’s international crowd funding platform, expanding this partnership to offer crowd funded loans (5% interest, fixed) for resilience projects. See stories of assistance to a single mother <https://www.kiva.org/lend/1702425> and a veteran <https://www.kiva.org/lend/1484421>.

²⁰ “SELF and St. Pete Partner on Clean Energy, Sustainability and Resilience,” SELF, November 9, 2017.

²¹ National Climate Bank Act, S. 2057, <https://www.congress.gov/116/bills/s2057/BILLS-116s2057is.pdf>

Thanks to U.S. innovation and creative deployments, Haiti, the number one country in the Americas at risk from climate change, has undergone a transformation since the devastating earthquake in 2010. Solar plus storage microgrids have deflected the need for generation fuel, which is experiencing an extreme shortage in that nation.²² This is a stark illustration of how back-up generation using diesel and other fuels can be riddled with supply constraints. The Army Corps of Engineers deploys diesel generators in its emergency back-up generator program and should be encouraged to ship energy storage batteries that can be easily paired with solar as back-up resources with no risk of fuel shortage.²³

As you are likely well-aware, Mr. Chairman, Massachusetts is one of the leading states in the U.S. on energy resilience, passing a \$1.3B GreenWorks bill to establish funds for green infrastructure.²⁴ Market mechanisms like the Clean Peak Standard²⁵ provide extra credit to utilities for clean energy resilient solutions. The Commonwealth is being intentional in deploying clean energy technologies as solutions to resilience needs; other states and the federal government could learn from these programs as additional policies are developed to shore up resilience.

Military bases around the United States are also confronting the need for more resilient infrastructure. Following a letter request in January of this year from Congressman Langevin, the Department of Defense identified the top ten most at risk

²² <http://www.earthsparkinternational.org/blog/no-shortage-of-opportunities-how-a-solar-microgrid-is-providing-resiliency-in-uncertainty>

²³ <https://www.dla.mil/AboutDLA/News/NewsArticleView/Article/1410067/usace-quality-assurance-checks-help-keep-temporary-emergency-generators-running/>

²⁴ <https://www.sierraclub.org/press-releases/2019/07/massachusetts-house-passes-greenworks-bill-extends-essential-lifeline-popular>

²⁵ <https://www.mass.gov/service-details/clean-peak-energy-standard>

installations in each branch.²⁶ The criteria included recurrent flooding, drought, desertification, wildfires, and thawing permafrost. Those at-risk installations were in states as diverse as Florida, Georgia, Texas, Virginia, Utah, Oklahoma, Missouri, and Maryland. Two bases in Georgia—Fort Benning and Fort Gordon—have both established resilience plans with solar energy baked in.^{27 28}

The town of Nags Head, North Carolina—in a particularly vulnerable position for sea level rise and hurricanes—adopted a plan in 2017 that created a vision for its future and steps the community could take to secure that future.²⁹ Other communities are learning from each other through the government’s own U.S. Climate Resilience Toolkit.³⁰ That platform has the potential to become more useful in identifying clean and flexible energy solutions for communities at risk of prolonged outage as a result of these events.

The point with these examples is to illustrate that customer-sited distributed energy resources—which are available today—can provide critical services to the grid when it needs them the most. And yet, in many venues our regulators and legislators focus more on the need for large, “baseload” power plants. The evidence suggests that we should instead ensure that, in our public policy and planning, we maximize the ability for consumers to participate in and contribute to the stability and resilience of our electric system by deploying flexible distributed energy resources. These cost-effective and available technologies, financing mechanisms, and services are resources we should

²⁶<http://www.airforcemag.com/DRArchive/Documents/2019/Updated%20Ranking%20of%20Installations.pdf>

²⁷<https://www.atlantaga.gov/government/mayor-s-office/executive-offices/office-of-resilience/sustainability-initiatives>

²⁸https://www.asaie.army.mil/Public/ES/oei/docs/Ft%20Gordon,%20GA_Fact%20Sheet_Aug2019.pdf

²⁹<http://www.focusnagshead.com/DocumentCenter/View/924/FOCUS-Nags-Head-Comprehensive-Plan-July-5-2017-PDF>

³⁰<https://toolkit.climate.gov>

implement before a hurricane strikes our coast, a flood destroys our business, or a heat wave endangers our most vulnerable populations.

I urge the Committee to take these examples and solutions into consideration as we think broadly and strategically about how as a nation we prepare for and respond to events that are beyond our control. The very solutions we choose could have the co-benefits of reduced cost of and time for recovery; increased jobs and economic development for communities at risk; and reduced environmental impact through clean, flexible technologies. Thank you again for the opportunity to testify before the Committee.

Mr. HASTINGS. Dr. Phaup.

**STATEMENT OF MARVIN PHAUP, RESEARCH SCHOLAR AND
PROFESSIONAL LECTURER, TRACHTENBERG SCHOOL OF
PUBLIC POLICY AND PUBLIC ADMINISTRATION GEORGE
WASHINGTON UNIVERSITY**

Mr. PHAUP. Mr. Chairman, Mr. Woodall, and members of the subcommittee, thank you for this opportunity to speak with you about this important and timely topic. I am especially appreciative for the chance to bring a budget and economics perspective to your discussions. I am also grateful for this chance to briefly summarize and perhaps clarify my written statement.

I also would thank Mr. Woodall for his kind and generous introduction. But I was reminded of a response once given by James Dickey, who was at one time poet laureate of the U.S. and also a Clemson football player, who said after a similar introduction, I wish my now deceased parents could have been here. My father would have been proud, but my mother would have believed every word. So thank you for that.

The gist of my statement is really pretty simple. It is to recommend that you consider integrating all Federal spending for disasters into the regular budget process. That would require giving up the use of an emergency spending to fund a significant portion of outlays for disasters. Those funds would not be lost to disaster relief and recovery however, but rather, would be provided through the process I described in my written statement.

I make this recommendation because I think it would enhance the effectiveness and efficiency of existing Federal spending for disasters. It would also be consistent with current efforts to improve overall Federal budget process.

There appears to be three distinct elements to our disaster policy. One, of course, is providing immediate relief to those who are suffering severe loss. And over the longer term, to promote mitigation of losses, especially in rebuilding structures that have been lost, but also, making—thirdly—new investments to increase the efficiency of both of the two previous objectives.

My impression is that most of the money for relief appears to come from the regular appropriation, but certainly very large amounts for mitigation and investment are provided under the emergency designation, which is importantly outside the regular budget process and free of Budget Act control.

From the viewpoint of specialist in budget response, the current process may seem highly desirable, but there is a downside to this current budget treatment. It makes spending for emergencies appear falsely to be free. It appears that nothing has to be given up or sacrificed by the decision to allocate resources to this purpose. No one else's spending needs to be reduced. No one's taxes or fees need to be increased now.

When the cost of an activity in a decision process is zero, it is rational to keep spending more of it until the benefit of the last unit is zero. That means spending too much for one purpose relative to the benefits of alternative uses of those resources. It also encourages spending on low value uses of those funds.

Congress created the congressional budget process to remind itself that resources are scarce in relation to the beneficial uses to which they may be put and that nothing is free. With scarcity, everything—every decision to use resources in one place requires something else to be sacrificed.

As weak and as troubled as the current budget process is, it remains the only salient source of the service of reminding us that using resources for one purpose are costly in terms of others. That reminder is useful in general and for specific policies, including disaster policy, because the limit on spending means that every opportunity cost means you—every use of resources means you are giving of something else. That limit when present forces us to think long and hard about how we use the available resources available in terms of their effectiveness and efficiency.

Fully integrating disaster spending into the Federal budget through the process I have outlined in my written statement could motivate the clear and thorough reconsideration of current policy that the chairman referred to, and it could do so with respect to improving its performance with regards to equity, efficiency, and sustainability. Hence, my principal recommendation for action is that you consider this change in the budgetary treatment of disasters.

Thank you.

[The statement of Mr. Phaup follows:]

42

Statement
of
Marvin Phaup
before
Subcommittee on Legislative and Budget Process
Committee on Rules
U. S. House of Representatives
U.S. Congress
September 24, 2019
Building Resilient Communities and Investing in America's Future by
Budgeting for Disasters

Mr. Chairman, Mr. Woodall, and members of the Subcommittee,

Thank you for this opportunity to speak with you on this important and timely topic. I understand that your specific interest is in promoting resilience from natural disasters including hurricanes, tornadoes, and flooding. I am especially grateful for the chance to discuss the potential contribution of an appropriate budgetary treatment of disaster assistance to improved federal policy for disaster recovery and relief. I think the power of budgeting in strengthening policy is often overlooked and underused.

This statement offers a high-level conceptual framework for assessing the interaction between budgeting for disasters and the effectiveness of federal disaster policy. In preparing this statement, I have not conducted a detailed analysis and evaluation of current legislation governing policy for disaster relief and recovery, notably the Stafford Act and the Budget Control Act of 2011.

In discussing alternative budgetary treatments of spending for disasters it is important to define what we mean by disaster. In this statement I am referring to a sudden, unexpected, loss of resources and productive capacity that results in a reduction of well-being that is large in relation to the resources of the affected area. In the language of economists, disasters reduce welfare by disrupting long-term, life cycle planned consumption. Government can reduce this harm principally through policies that reduce the magnitude of loss by increasing mitigation and by smoothing consumption before and after loss. The ability of government to improve outcomes largely depends of actions taken before the loss.

It is also useful to distinguish two polar extremes of budgeting for disasters. Those are *ex ante* budgeting or recognizing the cost of assistance in the budget before loss and *ex post* budgeting, or budgeting for cost after a loss has occurred. *Ex ante* budgeting involves planning a policy response and recognizing its budgetary cost in advance of loss events; *ex post* treatment permits policymakers to defer some decisions on a response until a loss occurs. The cost of that action is effectively excluded from the budget decision process

Sovereign governments facing this choice often seem to prefer the wait-and-see, deferred decision approach, at least initially. There appear to be good reasons for waiting until after a loss event has occurred. For one, it may seem easier to defer a decision than to try to foresee when various disasters will occur and the severity and types of losses that result from each. Proponents of *ex post* budgeting claim that it is impossible to allocate budget resources to an event whose occurrence and severity can't be predicted. In addition, it is often difficult to allocate scarce resources for losses that may not occur, especially when faced with urgent, but unfunded, needs in the here and now.

The message of my statement, however, is that the advantages of budgeting for disasters before loss likely dominate those of an after-loss approach. I also suggest that the claimed difficulties of *ex ante* budgeting for disasters are exaggerated.

In my judgement, the current budgetary treatment of disaster spending in the U.S. is not purely *ex post*, even though current policy makes heavy use of unbudgeted emergency spending. For example, federal disaster response policy is

sufficiently well-defined that budget analysts can estimate future program outlays under various weather scenarios. In addition, the budget recognizes a base level of spending for disaster relief and recovery. Nonetheless, additional social gains might be realized from a more comprehensive, forward-looking budget process that includes all disaster spending.

Shortcomings of Ex Post Budgeting for Disasters

Deferring decisions on the content and level of disaster spending until after the loss occurs has major disadvantages compared with pre-loss decision and cost recognition. Those include weak incentives for mitigation, difficulties in repetitively identifying the appropriate level and composition of assistance, a lack of attention to pre-loss smoothing of consumption, and automatic reliance on debt financing.

Reduced incentives for mitigation. The losses from a disaster are not fixed. They are determined by the severity of the event, past decisions and efforts at mitigation. An efficient disaster response policy minimizes the sum of losses from the event and spending for mitigation. To achieve efficiency in mitigation, it is necessary to maintain strong incentives for the “right” level of mitigation, i.e. to continue mitigation so long as a dollar spent saves at least a present value dollar in avoided losses, by the government, state and local officials, and private owners of assets subject to loss.

With wait-and see budgeting, once the event has occurred it’s too late to mitigate. Moreover, provisions for pre-loss mitigation have difficulty getting on the legislative agenda. Yet, given a demonstrated federal response to disaster that includes financial assistance, sub-national jurisdictions, firms, and households will have reason to scale back their own mitigation efforts, including saving for emergencies. With diminished mitigation, losses increase.

Difficulties in Deciding Repetitively How Much and For Whom. The natural human response to visible suffering and deprivation is to send aid generously now and consider the cost and consequences later. Policymakers who express concern about fiscal restraint or other pressing, unfunded needs are likely to be regarded as mean-spirited. In the urgency of the moment, questions of equitable treatment compared with previous disaster responses and with respect to the distribution of aid among those affected is unlikely to receive much attention.

Absence of Pre-loss Consumption Smoothing. An efficient disaster response policy shifts consumption through time from the pre-loss period when income and consumption is high and of lower marginal value to post-loss when consumption is depressed and its marginal value is higher. It does so by increasing saving and investment prior to loss and using the increase in productive capacity to replace the loss. Ex post budgeting policy forgoes this opportunity.

Default to Debt Financing. Most federal costs for relief and recovery are treated as emergency spending, which is outside the regular budget process, exempt from budget controls, and financed by increases in federal borrowing.

Addressing the Difficulties and Gaining the Advantages of Including All Disaster Spending in the Budget Process

Ex ante budgeting for disasters can be cognitively easier than the ex post approach. Pre-loss budgeting does not require policymakers to foresee the specific what, when, how big, or to whom for every future loss from disasters. Initially it requires using historical data on spending for all disaster relief and recovery to estimate a probability distribution of annual outlays. This is a task for which the budget support agencies, the Congressional Budget Office (CBO) and the Office of Management and Budget (OMB), are well-suited and currently perform. With this estimate—updated annually for changes in factors affecting disaster losses—Congress could budget for the mean or expected level of spending for each fiscal year. Those amounts would be paid into a new disaster relief and recovery fund and available for spending by FEMA and other agencies for authorized purposes whenever a disaster occurs. The fund would also need authority to borrow from Treasury, which might be required to finance all authorized payments in years with very high losses.

Saliently recognizing all expected costs of current disaster policy in the budget could increase policymakers' interest in and incentives for managing those costs through mitigation and other means. It would enable policymakers to secure offsetting cost savings for spending bills that were expected to strengthen mitigation and otherwise reduce federal costs. Bills that saved more in federal assistance payments than the cost of mitigation would be scored with net budget saving.

An increased emphasis on managing program cost could also prompt legislative review of the performance of current policy with respect to equity and efficiency. The latter requires that recipients not only have a high level of comfort with the reliability of assistance but also retain appropriate “skin in the game” for copays, deductibles and coverage exclusions.

Recognizing total expected annual cost of disasters in the budget could also encourage the use of alternative means of financing disaster spending, other than using borrowed money. Levying fees and taxes on actions that increase losses could dampen those behaviors, decrease losses, and reduce pre-loss consumption by taxpayers. It is important, however, to avoid identifying those receipts as available for additional spending on other beneficial uses. If spent for non-disaster consumption purposes, the collection of receipts will fail to reduce pre-loss consumption. The mechanics of federal budgetary accounting required to produce this result with a disaster fund are well known to budget technicians.

Concluding Comment

The effectiveness and efficiency of federal disaster relief and recovery policy in promoting resilience can be increased by creating strong incentives for mitigation by governments, households and firms, minimizing uncertainty about the timing and coverage of federal assistance; and smoothing consumption over pre- and post-loss periods.

Including total expected annual federal spending for disasters in the Congressional budget could provide robust support for those policy features. Absent comparable downside risks and other disadvantages, doing so appears socially desirable.

Mr. HASTINGS. Thank you very much.

Mr. Woodall.

Mr. WOODALL. Thank you, Mr. Chairman.

Dr. Phaup, you explained in budgetary terms what I think Mr. Johnson was explaining in man on the ground by dealing with disaster terms. Did I understand your testimony correctly, Mr. Johnson, that we can take the same amount of dollars before a hurricane and after a hurricane and we are going to get a whole lot more bang for our buck before that hurricane happens?

Mr. JOHNSON. Yes.

Mr. WOODALL. What I don't know is how to allocate those resources. Chairman Hastings showed me the picture that you referenced. But in Georgia—of course we are in the cut, we have been very fortunate during hurricane season—if we went through and built everything on 30-foot pilings and reinforced everything with—built it all out of reinforced concrete and cabling, might not be the highest and best use of those resources because we are more 1 in 100 years as opposed to 1 every 5 years.

Is it clear to folks who are in harm's way what that allocation of resources looks like? To Dr. Phaup's point, I only spend each dollar once. How I make sure I am spending that dollar on the family that is most likely to be affected as opposed to one that is much less.

Mr. JOHNSON. Yes. Our local mitigation strategy prioritizes all of our hazards. We have 12 hazards in south Florida. Earthquakes and volcanoes, luckily, are not one of our hazards. So obviously, we don't look at mitigating in those areas. Our number one hazard is flooding. Our project priority list, all of the projects on top of that list are all of our flooding and storm drainage type projects.

We—I worked in Miami Dade as well as the assistant director there, and we had it during the Project Impact years, and we were actually paying—or through Project Impact we were providing shutters for low-income and elderly populations. And that was just a little bit of money up front for the cost of those shutters, lower their insurance, it reduced my sheltering population, because those folks won't go to a shelter, and it kept them around. It kept them in the city just like we saw—contrary of what we saw of Katrina. When those folks leave and they don't come back, they abandon their home, the recovery is so much more devastating, and I question how much better off those folks are than when they left kind of thing.

So that is the short—that is the long answer to your question, that there are a lot of ways that when we, in looking at the variety of hazards, looking at our priority of our hazards, we can target that money and make it most effective.

Mr. WOODALL. And how do I make sure you keep that skin in the game? Again, to Dr. Phaup's point, the opportunity cost on free Federal money is very low.

I go up to Maryland and I see beautiful solar panels all across the northern roofs under beautiful oak trees, because we subsidized things to such a degree that we didn't need to put it on a south-facing roof and on and on.

Recognizing there will be a Federal partnership here, how do I make sure you are using the free dollar the very best you possibly can?

Mr. JOHNSON. We are already doing—we are already following a process, and that is our local mitigation strategy. And our local mitigation steering committee is comprised of individuals and representatives and organizations throughout the community. So they are the ones that help prioritize our community and they are the ones that help understand it so it is not, you know, my piece of the money or my chunk of the money. They are the ones that then prioritize those projects. And again, if you go back and look at our PPL, you will see that just in concert with our number one risk is our top number of priorities in terms of flooding mitigation.

Ms. TONEY. May I also respond?

Mr. WOODALL. I was going to ask. Because since you had the smaller disaster on your watch, the larger disaster on the next watch, I was actually going to ask what Greenville did differently, knowing you were going to—that this could happen again tomorrow, if that changed your local budget. But, please.

Ms. TONEY. Yes, sir. I wanted to sort of just add, piggyback onto an answer here. Because we were talking about flooding, but if you recall in Georgia in Atlanta, Snowmageddon in 2014, where the roads were shut down. And because of the extreme ice and weather that came through Atlanta, you know, entire industries were closed. And these same mitigation dollars would be able to be used in those instances because the infrastructure in those locations rely on mitigation dollars in order to ensure that they are up to par and sustainable to be able to deal with that in the future.

So, for example, Delta Airlines that is located there as well uses and can leverage this type of funding to assist them to prepare in the future and make sure that their runways are still able to move in the way that they need to move. I believe Coca-Cola, Mercedes-Benz are also two organizations that are in that area that are able to use and leverage those dollars in advance.

Now, to go to Greenville's situation, I think it is a little different scenario, because while there were certainly lessons we learned between 2007 to 2011, to now 2019, the reality we are embracing is that these storms are coming faster, stronger, and they have more water in them. And so we are working very closely. I know the mayor there, and I am quite positive that the Congressman from the Second Congressional District, Congressman Thompson, is also very vested in working to make sure that they are able to look at sustainable opportunities and really build such that, as these storms continue to come, they can maintain and really play catch-up, because that is what is happening.

Mr. WOODALL. From that local perspective, you are right, you have got needs across the board, right? One disaster goes through your entire annual budget by a factor of 10. I think about the money we spent in Flint, Michigan, after the fact instead of before the fact; we could have repaired that system for a fraction of the cost of mitigating the damage. But if I go to small town mayors across the country who have failing water systems, those mayors still haven't come up with the extra billion dollars to fix that sys-

tem. They are going to wait until the catastrophic event happens and their partnership with the Federal Government changes.

What can I do to encourage—here you are a moderate to low-income community, I still need you doing more. What does that leveraging look like to make it more valuable tomorrow than it is today, to take that preemptive step that is going to take \$1 out of a different pot that you would have otherwise spent it on?

Ms. TONEY. I will give you a great example, Spartanburg, South Carolina, where they were able to—in a low-income community of color, they were able to utilize roughly a \$300,000 EPA grant that was looking at the fact that they were in a community that was susceptible to flooding, susceptible to different types of extreme weather issues, they were able to in that community leverage that funding to work with, again, local industries, talk about revitalizing their grid, looking—partnering with FEMA, with HUD, with EPA, with Department of Transportation. And over the course of about 10 years, including revitalizing their waste water treatment plant, their different methods of just delivering to the community and educating the community at the same time, they turned \$300,000 into roughly \$300 million.

So I think they are a case study in the fact that it can work when you do it ahead of time, when you involve and include local people, and you include all aspects of the community. There are success stories in this country.

Mr. WOODALL. I am going to tell Jeff Duncan you were bragging about his district up here.

Dr. Phaup, let me ask you, because the—what divides us so often turns into—is a policy—is a policy debate. As a budgeteer, I want to see us forward fund things, because I too believe we make worse—certainly make worse decisions on the backside, more importantly, somebody's life has been affected that perhaps we could have intervened on their behalf ahead of time and prevented it. The dollars we spent on FEMA trailers after Katrina were not dollars well spent, if we could have spent that same dollar to keep a family in their homes ahead of that disaster.

But my question is, I come to this from a conservative side of the aisle, but I believe if we did more forward funding of disasters, knowing that the intensity and severity is increasing, that we would actually change the debate about the nature of climate change, the nature of mitigation in general. Right now, I don't feel the impact because it is an automatic spend in a disaster bill. If I had to pay for it up front, now I am making the same decisions that Spartanburg and Greenville are having to make trading different things off. And if the cost of doing nothing is a \$50 billion annual upfront disaster appropriation, maybe I am more interested in partnering with Mr. Hastings on whatever that next environmental bill may be.

Through your budgetary lens, do you see an opportunity for forward funding to be a unifying event in Congress? Because ordinarily, trying to parse out the dollars ends up dividing us and leads to more discord.

Mr. PHAUP. Yes, I think I do. I mean, I would say that, you know, getting a big—getting the biggest bang for a buck, doing the most good to reduce disaster losses doesn't seem like to me there

is much—there should be much partisan at stake there. I think it is a bipartisan desire to have a disaster policy that helps people in need and reduces the total overall cost of these losses, meaning that we would keep spending money for disaster mitigation up to the point where spending \$1 saved at least \$1 in losses. And for all those dollars that save more than a \$1, it is a great buy, and it is a great buy for people on both sides of the aisle.

Mr. WOODALL. Having to put a number on what inaction costs us, Mr. Chairman, is a worthwhile exercise, so it goes beyond the scope of what we are doing here.

I have taken too much time. I yield back.

Mr. HASTINGS. Mr. Morelle.

Mr. MORELLE. Thank you, Mr. Chairman. I must admit, when I saw that you were holding this subcommittee hearing I was excited about it. I think this is a really important topic, and I am going to just point to a couple of things, both for me personally and my district.

The other thing I was excited about is the Rules Committee is the only committee where you are not limited to 5 minutes in questioning witnesses, but I can see my time is going to be limited anyway, so foiled again.

But I do want to thank all the witnesses, and I want to thank the chair and the ranking member for what I think is a very, very important issue.

Obviously, folks have touched on the increased occurrence of weather events that come from climate instability. I am reminded, as I think our grandmothers would say, an ounce of prevention is worth a pound of cure. And that certainly should be, sort of, the theme of this hearing.

Just from my perspective, my district is upstate New York, Rochester, New York. I sit on the shore, my district, of Lake Ontario. For those who have not been up to the Great Lakes, please come and visit. I know Ms. Scanlon has spent some time there. Ninety-four-thousand square miles of the Great Lakes, the five lakes that make up the Great Lakes; 10,000 coastal miles that we share between the Canadian border and the U.S.—or the Canadian and U.S. coastline. So it is a massive—21 percent of all fresh surface water in the world is in the Great Lakes.

And what we have seen in my district, we have seen devastation in 2 out of the last 3 years, both in 2017, 2019. Significantly higher water levels that really start in Superior and go work their way all the way down. Lake Ontario is the bottom of the five lakes, in terms of elevation, so we end up seeing it sometimes years later. A couple years, believe it or not, it takes the water to flow.

But what we know is that it has caused significant disruption, significant property loss and damage over the last several years. When I was in the State legislature, before coming here, I got appropriated nearly \$100 million for just along the New York border of the Great Lakes to deal with the devastation. This year, Governor Cuomo has called for \$300 million resiliency by the State of New York.

And so, as I look at this, obviously, this is very local and very personal.

During my tenure in the State legislature, I was also the chair of the Insurance Committee and looking at property casualty losses for the State of New York, which included, of course, Long Island and New York City and their proximity to the ocean and Long Island Sound. And I was involved in something called the National Conference on Insurance Legislators to look at resiliency and even suggesting that there might be ways to reduce premiums for those individuals who did the appropriate things, as long as they were actuarially sound, to reduce premiums based on the types of investments you would make in resilient activities around property casualty loss.

So this is really, in my mind, very, very important. I am a proud member of the American Flood Coalition, working alongside our partners here in Congress to identify and invest in solutions that help protect communities. I am pushing the U.S. Army Corps of Engineers to do a coastal resiliency study for the Great Lakes, which was in our appropriation process. And I co-lead that with my fellow New Yorker, Representative John Katko, in a bipartisan effort to do that.

So I say all of this sort of as background, because I think this is truly, truly important. And, clearly, you see more and more efforts aimed at a conversation about resiliency. And finding the dollars is the question, which Mr. Woodall rightly points out.

But I thought if I could, just a couple questions. And perhaps I will start with you, Mr. Johnson. You mentioned Palm Beach County was one of the first jurisdictions in Florida to draft a post-disaster redevelopment plan. And, obviously, as we are readjusting, what takeaways can we take from you about building a robust plan that places in my community can learn from as we deal with this flooding? What are those challenges, and how do you get the parties together and get people effectively on the same page?

Mr. JOHNSON. Well, getting parties together at the table is a lot easier said than done. But, again, that is—again, kind of looking at the—what we tried to do was, kind of, look at our number-one priority, which was flooding. And it is unquestionably flooding in south Florida. Most of our land is between 7 and 8 feet above sea level.

So when you determine, in terms of flooding—because flooding is definitely an apolitical element. So we coach it all as pretty much flooding. And we think that when we look at all of our storm water drainage programs and forward pumping strategies and whatnot, we are trying to accomplish the same thing, and so it is kind of a discrete way of dealing with it, again, making it more apolitical.

Again, I want to go back to—the other solution, again, is to—I think it needs to tip the process on its head. Because, you know, the National Flood Insurance Program essentially incentivizes people to build in coastal and flood-prone areas, and we have to stop doing that and we have to turn it around the other way. Because we know how well that is working.

So, you know, just those kinds of strategies that need to be uniform and community-wide. And I am not just talking local; I am talking State and Federal.

Mr. MORELLE. And what assistance or incentives do you think the Federal Government doesn't have in place right now that you

would encourage to help build these local plans and assist local governments in developing these robust plans?

Mr. JOHNSON. I think the plans are in place, especially in Florida. You know, a local mitigation strategy is required of all of the counties. So I think that the plans are there.

I think the reality is, the fact that we have to wait until a major disaster occurs in order for us to access HMGP funds, again, it is kind of built backwards. If we could do more of a project impact-type model and less of the HMGP model and post-disaster cleanup and salvage model, I think that is the way to do it.

Mr. MORELLE. Mr. Piotti—am I pronouncing that right, sir?—you talked about farming practices to increase resiliency. What barriers are there that the Federal Government might have in place that we ought to be thinking about removing to help encourage that?

Mr. Piotti. Well, the Federal Government, primarily through the farm bill, the conservation title of the farm bill, provides a whole range of information and services and, at times, funding for farmers to adopt better farming practices, but we need more. So it is a shadow of what is incorporated in other parts of the farm bill.

So more conservation practices would be helpful, but building off Bill's point, this notion of getting in front of issues is so important. And funding for agricultural conservation easements, potentially targeting easements on property that would be great places to store storm water or be a natural buffer to flooding, would be really great.

Now, that program right now serves about 8 or 10 percent of the applicants, and there would be a lot more applicants for it if folks thought the chances of being funded was higher. But that is an example of how farmland protection could, in a proactive way, do exactly what Bill was referring to.

Mr. MORELLE. Ms. Toney, I am just curious—and I apologize. This is probably my last question. I apologize, Mr. Chair, for going on at some length here.

But any lessons that you can teach us about what you experienced that would make the Federal process, if it is too cumbersome, less cumbersome, more efficient, and more helpful to the local communities as you are going through this process?

Ms. TONEY. Yes, sir. I believe that immediate funding of emergency management personnel is extraordinarily helpful to cities. They are going to expend that funding immediately anyway. And so those are, like, first top-line expenses that can be reimbursed.

Typically, a damage assessment is required in those communities, and it does take a while to have officials to come down, do a damage assessment. It is a cumbersome process to get the paperwork done and then approved. And that is if you get a Federal declaration. Because cities are doing this on the hopes that they get a Federal declaration. To have a more streamlined process would not only be effective, it would help cities to save money.

That is all, again, on the back end. And I have to agree with my colleagues, the more you put on the front end, and maybe giving assessment and climate resiliency technical assistance to communities to help them prepare in advance, would greatly reduce this amount on the back end.

Mr. MORELLE. So I can't resist—and I will make this my last question, Mr. Chair, but——

Mr. HASTINGS. I thought the other one was.

Mr. MORELLE. I may have misspoken. I meant my second-to-last. Now this is really my last.

But I am curious if you have anything to observe about the link between flooding and toxic algae, which we are starting to see in the Great Lakes. And this is a growing, growing problem. If you have any thoughts about that.

Ms. TONEY. Yes, sir. It is not only a problem in the Great Lakes; it is a problem in the Florida coast lands; it is a problem in Mississippi. I live in Oxford, Mississippi, and we just heard about algae blooms that are coming up in a community not too far from us.

So when you do see increased flooding, especially for the length of time that we saw flooding—it began flooding, heavy flooding in Mississippi—I believe we reached flood stage mid-February, and we came out of flood stage in July. The Army Corps of Engineers has been activated since December of 2018.

And so, with that length of time and that pressure and that amount of water, it is certainly not only going to continue to create situations where you have algae blooms that do reach far across the Southeast but that you see other toxicities as the farmers are working on issues with runoff from their fields because they are flooded. So it creates huge problems that we are working to resolve now.

Mr. MORELLE. Thank you.

I don't have any other questions other than to again remark on, first of all, what a great panel this is and, secondly, what a distinguished gentleman the chair of this committee is and how much I value and admire him. Thank you.

Mr. HASTINGS. Thank you so very much.

Toward that end, Dr. Burgess has been very gracious in allowing—knowing that you all have to go to your 4 o'clock meeting, he is going to forego his questions. So we will go with you, Ms. Scanlon.

Ms. SCANLON. Thank you very much, Dr. Burgess.

Thank you, Chairman Hastings.

And thank you all very much for your testimony today. I appreciate the opportunity to address the impact on our communities of natural disasters and how we can build resilience in those communities.

Mr. Morelle talked a little bit about the shores of Lake Ontario, where my parents' home has been sandbagged for 2 out of the last 3 years—and that is something that had never happened before—because of the rising lake waters there.

In the region where I live, we have had increasing extreme weather events, including a lot of flooding, sudden rainstorms, and tornadoes in southeastern Pennsylvania. That has not really been a thing in the past.

And I don't think it serves any of us well when Congress is constantly playing catch-up, you know, and aid risks being delayed or denied due to political or regional rivalries or infighting. So I think this is a great panel to talk about these things.

Ms. Hamilton, you talked a little bit about building a cleaner, more reliable, resilient, affordable grid. And I was really interested, I don't know if everyone has this, but the committee had these renewable-energy jobs. And if we can submit that to the record by unanimous consent—

[This document is printed on pages 93–94]

Mr. HASTINGS. Without objection.

Ms. SCANLON. In looking at that, my State, Pennsylvania, lags behind in some of these things. And it has been kind of a frustration, as a former school board member, when other States would have incentives to push for some of these more renewable, resilient energy pieces.

Can you comment on what we need to do across the country to get that kind of a grid and that kind of resilience?

Ms. HAMILTON. Sure. Absolutely. And thank you very much for that question, Ms. Scanlon.

And Pennsylvania has a great climate plan that really talks about climate resilience and distributed energy resources as part of that. There are a few things that we need to do that are steps that aren't enormous but can have an enormous impact.

One is tax credits, making sure that those still exist for technologies like energy storage and others that can provide backup. And Rochester is a big hub for energy storage technology. It is also one of the coldest places I have ever visited.

But another big piece of this is actually leveraging private capital, so the government doesn't have to take this all on its own. There are over a dozen green banks that have popped up throughout the country. And this is something that Pennsylvania and any other State could do, but we need something on the Federal side.

So, in the Senate, this National Climate Bank Act was introduced at \$35 billion to leverage a trillion dollars. And this is bringing private capital in for communities and projects that were considered too risky to invest in previously. This is bringing in low-cost capital. The government can support some of it and seed it. The examples in the States have shown that for every dollar that the public spends the private sector comes in with \$4.

So New York has, you know, a billion-dollar green bank. Florida has a much smaller—it is a very small program, but they have leveraged hundreds of millions of dollars for projects for communities that are at risk from climate risk, from climate, you know, mitigation events, from frontline communities, lower-income communities.

And I think that putting some structure in place in the Federal sector that leverages all that private-sector capital out there would be really helpful and would really scale all these technologies that we need to deploy.

Ms. SCANLON. Okay. Thank you. That is really helpful.

My time is rapidly up, but I did want to thank Ms. Toney for being here. I regularly hear from members of Moms Clean Air Force in my district, who have very active chapters, and they are great. So thank you for your testimony today.

Ms. TONEY. Thank you.

Ms. SCANLON. I yield back.

Mr. HASTINGS. Thank you, Ms. Scanlon.

Ms. Shalala.

Ms. SHALALA. Thank you, Mr. Chairman.

Thank you, Dr. Burgess.

Let me quickly just make a couple of points. Since I live on ground zero—I represent Miami—for us, it is life or death. And since 1950, the sea level in south Florida has risen 8 inches. It is only speeding up now. And by 2030 the sea level in south Florida is projected to rise 12 inches and by 2100 perhaps 80 inches.

But we have already done some things in south Florida. As you well know, after Hurricane Andrew, we changed building codes. Very few buildings go down anymore unless a tree falls on them, because the building codes after 2000 have been strengthened across south Florida, and that has made a huge difference.

I have a number of points, but I have to get to this caucus, so let me simply say this. I am very interested in long-term budgeting. I do believe that budgeting for emergencies ought to be integrated into the overall budget. It is kind of a quaint idea now, since no one sort of wants to pay for what we spend. But my longtime friend, the late Alice Rivlin, had argued the case that we ought to integrate the budget.

Second, I believe in these public-private partnerships. And I believe, if we are creative about the infrastructure bill, Mr. Woodall, if we are really creative about the infrastructure bill—and in the Speaker's letter, she pointed out that part of the infrastructure bill ought to be, in addition to roads and bridges and public transportation, there ought to be a huge section on the environment and on resilience in particular.

That can be a public-private partnership. That could be leveraged money to do some of the things we need to do. In Miami Beach, we have raised most of the roads, we have spent millions on pumps, and we have built seawalls. Miami Beach might be able to afford it—though not anymore; I think the residents are getting tired of these extra taxes—but the communities around Miami Beach can't necessarily afford the same thing.

So if we are smart in a big-time infrastructure bill, we actually could be very creative and really make a long-term difference. Because in the infrastructure bill, we could do multiple-year funding, and I think that would make a major difference.

And I apologize. I have questions for all of you, but I need to obey my Speaker.

Mr. HASTINGS. All right. Thank you.

Dr. Burgess.

Dr. BURGESS. Fortunately, I am not constrained by any deference to the Speaker, so we can continue for quite some time, Mr. Hastings.

Mr. HASTINGS. You notice I am staying here.

Dr. BURGESS. Yes, sir, I do.

Well, I do appreciate all of you bringing what you have brought before us.

Mr. Johnson, I wonder if—you had provided us this nice picture of a homeowner in an empty neighborhood, now an empty neighborhood. And I was just interested, are—and it really doesn't have anything to do with our discussion here today, but have you—you mentioned several of the things this homeowner did during the

building phase which allowed him to be standing when everyone else wasn't.

So, in the arena of best practices, has someone looked at and perhaps ranked those measures that that homeowner or home builder took to allow that home to remain standing so that the next person who is going to build a home next-door would be able to look at that menu of options, maybe take that to his or her lender to—you know, what is the most important thing here? The pilings? Reinforced concrete in the walls? What is the most important thing or what are the most important things to preserve a structure? Not that anyone ever wants that to happen again, but you are building on the coast; things happen. So have you looked at, sort of, ranking those building activities?

Mr. JOHNSON. Emergency Management has not, but I will tell you that there are several universities down in south Florida that have.

Again, it is a complex answer to your question. The reality is that the pilings are there because of storm surge, the metal roof there is because of the wind, the elevation is because of storm surge. So it is a multifactor kind of solution.

The fact of the matter is that, I believe down in south Florida, we have the incentive, if you will, because we have seen things. I think those pictures are very dramatic. And if you have been in my position as long as I have—Mr. Hastings and I both remember Hurricane Andrew down in south Florida and everything in between.

When you realize, when you look at storms, you will see, it is the building code, quite frankly, that does it. And, unfortunately, we will see that the building code in south Florida is dramatically different than it is in north Florida. They are still building homes—

Dr. BURGESS. That is what I was going to ask you about that.

Mr. JOHNSON. And I think that is a local issue, that is a State issue.

Dr. BURGESS. Right.

Mr. JOHNSON. But, again, I would argue that the dollars spent to build these homes with the reinforced concrete and the 15-degree-slope roofs and those nails and—you name it; there are all kinds of things that are brought in in the south Florida code—would carry through to—and, of course, you know, clearing around your backyard so that when the trees do fall they don't hit your house, and things like that. There is a whole ton of different strategies that can be done.

And I think that needs to happen at a local level, but I think it needs to start, you know, at the Federal level that can serve as an example. For example, turning the NFIP on its head and not incentivizing people to build on islands, if you will, and if they do, they need to elevate, and those kinds of things.

Dr. BURGESS. So I was wondering about that as well. But, I mean, heaven help us, I am not a banker. I should not be. It would probably be a violation of so many things if I were put in charge of people's money. But—oh, wait, I forgot we are in the Congress—if I were a banker making a loan, this seems like, okay, this loan is for more than what we would normally lend for a house in this neighborhood, but because of some of the things they are doing,

this loan could, in fact, be better protected than a loan on something that is less expensive.

Mr. JOHNSON. I agree. I scratch my head. In south Florida, I watched a 30-story condo unit being built. They actually poured dirt—they moved out into the water so that it had, you know, a 360-degree view. And it makes me scratch my head as to what loan or lender would want to incentivize that. And, you know, it just blows me away that we continue to focus on building on the coastline. And, granted, the views are wonderful and whatnot, but I am not sure that that is really what we need to be doing in this day and age.

Dr. BURGESS. Well, I thank you.

And what brought this to mind was having visited down in those areas just north of where Hurricane Andrew came ashore, and it seemed like the houses there were different than houses you see in other places. And, I mean, I don't know that I would know this for a fact, but I suspected that was because of local codes that were developed in the aftermath of Hurricane Andrew, that, hey, we are not going through this again, we are not facing this rebuilding again.

But I thank you for bringing the picture and sharing it with us. It is certainly very dramatic. And, boy, your heart goes out to everybody else in that neighborhood. Clearly it was a bad day.

So, Dr. Phaup, let me ask you—and you kind of covered this with Mr. Woodall, but I just want to be sure that I am clear on this. The current process right now in our disaster response, it is post-disaster. And so these are dollars that are not considered under Budget Control Act or the Federal budget process.

Mr. PHAUP. A relatively small amount as a result of the Budget Act of 2011 that Mr. Woodall referred to. But large portions are treated as emergency spending, yes.

Dr. BURGESS. So, like, when we all had to come back here after Hurricane Katrina and appropriate \$100 billion, whatever it was that day, that is all off-budget. I mean, that is not added to our Federal budget.

Mr. PHAUP. It is outside the budget process. It is uncontrolled by the other rules of the Budget Act.

Dr. BURGESS. So what are you thinking of as far as amending our rules to improve—if we were going to move into a pre-disaster funding, I don't disagree with you, but I also have some concerns about that. Because just as nature abhors a vacuum, Washington abhors dollars that aren't spent. And I would worry about someone figuring that out, and before you know it, the cookie jar is empty when you need it the most.

Mr. PHAUP. Well, yes. I have colleagues who give a lot of emphasis to that. And it could be a serious problem.

So if you were budgeting money, for example, to a disaster relief fund, and you run some years of good luck and the fund looks very high, you couldn't stop Congress, necessarily, from saying, not with any other provision, but we are going to do something with that money that we hadn't previously authorized.

The nice thing about that is, that is pretty transparent. That is pretty easy to see as something that, unless there has been a seri-

ous error in estimating the long-term expected losses, that that is a violation of good practice.

And we have actually had some experience with these funds where—they are called financing accounts—but where you, quote, “set money aside.” You score it as outlays. It is included in the deficit, although you don’t have to borrow for it. But it is available for spending. And since you have already scored the money when you set it aside, it won’t cost anything, actually, to disburse it.

A couple of examples of that are—and people talked about leveraging guarantees, for example. I assume that is what they mean. We have had, kind of, forward funding of the cost of guarantees. When we issue a loan guarantee now, we recognize the expected loss on that guarantee and outlay it when the loan is disbursed. And that financing account has accumulated a lot of money. Similarly for direct loans, we treat them the same way, have since 1990 and earlier than that.

This is an odd thing. We actually recognize interest on the debt of the U.S. Government as it accrues rather than when it is paid. So if you have a quarter in which the following interest accrues, we outlay it, show it as an outlay, show it as an increase in the deficit, and it goes into one of these financing accounts that have a lot of money in them.

They have not been touched. I am not sure why. I mean, it looks low-hanging fruit, to finance somebody’s favorite project. It has not happened. And I think what you want to do to guard against something like that is to—is embarrassment, try to make it so obvious, what is happening, that money expected to be spent for another purpose that is important and is accumulated because we have been lucky is not there for spending on other purposes.

Otherwise, there is no real way to constrain opportunistic behavior like that.

Dr. BURGESS. And it is not just the fact that it is carried on the books so that the deficit looks lower than it actually is?

Mr. PHAUP. The deficit looks bigger—it looks bigger than it would on the cash basis because you haven’t outlaid the money yet. In other words, we count it in the deficit—so the proposal developed in the written statement is to follow the model that we use in budgeting for direct loans and guarantees. You recognize what you expect the costs to be up front. You pay it into one of those accounts. It scores as increasing outlays and deficits right then.

So people are a little reluctant about appropriating those moneys because it is going to be scored right away. And if you are interested in, you know, cost minimization, you now have an incentive that you didn’t have before to look at the drivers of those costs of loan defaults, for example.

The notion here is that when you make those funds available and score them as outlays before the disaster occurs, then people will have some interest in, well, what can we do to get more bang for the buck for those moneys, because it is counting right now against whatever caps and limits we have.

Dr. BURGESS. Well, I thank you.

Mr. PHAUP. That was a longer answer than it required.

Dr. BURGESS. But it is important, because we deal with that on a constant basis. Whether it be healthcare or infrastructure, we have to deal with that constantly.

Mr. Hastings has been very generous. I will yield back.

Mr. HASTINGS. Thank you very much, Dr. Burgess. I appreciate it.

I have three unanimous-consent requests that I will make for myself.

Ms. Ashley Daniels from North Carolina submitted testimony for us. And as I indicated earlier, we spent a lot of time talking with people in North Carolina.

[This document is printed on pages 64–65]

Exelon also submitted testimony to us;

[This document is printed on pages 66–80] and the American Property Casualty Insurance Association, which is pretty important to all of us.

[This document is printed on pages 81–92]

So all of those, unless there are objections, are admitted by unanimous consent.

Mr. HASTINGS. I am going to ask staff to send to all of you preparation information that they provided for us on Japan-related background. I think you all will find it of interest. They spend and have spent for a considerable period of time on concerns about resiliency.

And I come to this having, I think in my second term, visited Japan, and I found it interesting that their Diet, their parliamentary structure, was very similar to ours, but they had a related emergency disaster committee that was constituted of all of the chairs of the respective committees of jurisdiction and an appointee of the Prime Minister to that particular group to chair it.

And they were able to move their disaster funds a lot quicker than we have here, with the tug-of-war that goes on. And I have seen it from drought not being taken care of for 2 years, blew roofs down in my home territory, because we couldn't hook it up.

So I am for the integrated budget. And I appreciate my distinguished friend Mr. Woodall for bringing you here, Dr. Phaup, for enlightening us. I wish that more Members of Congress had been here today, particularly on the relevant committees, so that they could hear how we might very well be able to do this.

I will end by asking just a couple of questions of all of you, and I guess it is sort of related, but I will start with Ms. Hamilton and ask her to talk us through. Nothing is a silver bullet, but are tax incentives sort of a silver bullet for us in some respects?

Ms. HAMILTON. We know how to do tax incentives, so it makes them easy. They aren't a silver bullet, but it is something that is easy to administer and we are used to them.

I think there are a lot of other creative things that we can do to move forward. Having a vehicle that would allow for private and public partnerships would be good. Allowing communities to share information, you know, so we can learn from each other and be able to take some of these lessons learned, no matter where you are.

So I don't think there is necessarily one silver bullet, but this is something that is not going away and that, you know, preparing in advance is going to be crucial.

Mr. HASTINGS. Mr. Piotti and Ms. Toney, can you address this and walk us through how tax incentives help and what their limitations are in rural and agricultural communities?

Mr. PIOTTI. Sure. Well, the two areas that I identify, both agricultural conservation practices and agricultural conservation easements.

On the easements side right now, many States and the Federal Government allow easements, the donation of easements, to be charitable. That often makes a big difference. Some States have companion programs where there is also a conservation tax credit. There is nothing like that at the Federal level, but that could be a very powerful additional incentive.

On the farming practice side, there are, as I mentioned before, many good programs in the conservation title of the farm bill, but it is really not doing what is needed. The practices that I spoke about—say, the use of no-till and cover crops and rotations—if you look at the national statistics, it varies from area to area, but the percentage of farmers who are using those practices are in the neighborhood of about 6 to 8 percent at most. And it is because farming is such a tough way to make a living, and if you are taking additional steps, it has additional funding costs.

Mr. HASTINGS. Right.

Mr. PIOTTI. So some form of either incentives or additional conservation title funding in the farm bill would provide a huge incentive for farmers to do more up front. And that would have a significant impact on the amount of runoff and the resiliency of farmland in its role in flood mitigation.

Mr. HASTINGS. Uh-huh.

Ms. Toney.

Ms. TONEY. Thank you, Mr. Chairman.

When we usually think of tax incentives, I agree with my colleagues that it is one solution but not necessarily the silver bullet, particularly in vulnerable populations and low-income communities. Because the idea is going to homeowners and business owners, and oftentimes these are communities where everyone is not included into that group.

And so it has created and continues to create problems that we see in areas that are dealing with regentrification. You have communities of color where people may have owned their homes for years, and a natural disaster comes in, they are unable to rebuild or cannot afford the loan or for whatever reason are not able to stay, and then the area is turned and culturally shifted and changed, which changes the entire dynamics of the neighborhood.

We are seeing that not only in New Orleans, but the Florida Keys is experiencing that right now with so many people who simply cannot afford to stay. And it causes a number of huge problems socially for that community. Where are your teachers going to live? Your firefighters, your police officers, where do they afford to live?

Mr. HASTINGS. Right.

Ms. TONEY. And so we have to think also for those that are not necessarily homeowners or business owners in terms of our tax incentives, but maybe those who rent and/or are living with other family members.

I will say that there are some opportunities that we should look at if we are going to talk about tax incentives, in terms of making them palatable and reasonable so that everyone can embrace them.

When you are talking about businesses and tax incentives, it is, have we explored opportunities for job creation tax incentives for people to work in these spaces? Or if you are hiring someone, maybe, who needs to learn a new trade or tool, that is not only sustainable but creates resiliency in the community. Connecting with educational opportunities.

These are the types of incentives that not only support new business growth and continued existence for that community, but they also sort of spur a pride that folks need to have when they want to stay home and they want to come back home. And that is what I think local folks ultimately want to do.

So we should use this opportunity with our tax incentives to just broaden the scope a bit and figure out how we can help all people to not just take a little money off their taxes but actually stay in the community that they love.

Mr. HASTINGS. Let me end our hearing by thanking all of you and drawing from the information that I said that I would send to you about Japan.

Among the things that they feel is, if they invest heavily in resilience, they will be able to provide more export opportunities from a business standpoint, and, therefore, they draw in the private sector.

And this particular portion of the information says: "First, let us present the evidence. The governing Liberal Democratic Party politicians and disaster-resilience technocrats in the Cabinet Secretariat's National Resilience Council, the Association for Resilience Japan, and other new institutions are building an economic paradigm based on National Resilience. As part of the resilience project, the NRC undertook a survey of private-sector firms' current and projected spending in late 2015. The survey determined that private-sector spending on resilience was about 11.9 trillion—in Japan money, which was \$105 billion U.S. And, "That total can be broken down into core market segments."

And I won't go on, but I want to point out how the three biggest core and related sectors are electric vehicles, renewable energy—solar—and power regeneration and transmission bolstering. And I think all of you have touched on, in some ways, in that regard.

I would like now for us to be able to close and hear from our ranking member anything he may wish to say at this time.

Mr. WOODALL. Great.

I was talking with Dr. Phaup on the way up about how we so often come and go as Members and there are no bathroom breaks or dining breaks for the panel.

I could go about another 2 hours with questions that I have for you, but now that we have all of your contact information, I can find you at home and ask you those very same questions. And so I will do that.

Thank you, Mr. Hastings.

Mr. HASTINGS. Thank you.

One of the things we do, people think we drink a lot of water because we are hydrating, but we use it as an excuse to go to the bathroom.

Before we adjourn, I would like to reflect on this conversation. It strikes me that, for as much as we know about the challenges our communities face due to extreme weather, there is still much we don't know.

As is clear, I and Bill Johnson are from south Florida, and I know that hurricanes ruin lives, displace people from their homes, their jobs, and their communities. What I don't think we fully understand is this: What is the human cost of these storms, and how does that cost impact the Federal budget? And you all have helped us address some of those concerns today. What happens to educational pursuits, healthcare needs, and related costs? What happens with wages?

Our inaction on resiliency planning and preparation, our inaction on investing in building stronger communities today, costs taxpayers and all of us money. It also threatens the existence of whole communities. And it definitely threatens lives.

For all the time we talk about broadband, are we working to ensure that we are investing in communication technology that will withstand the next disaster in order to keep communities accessible to first responders and for first responders to stay connected to each other? I, for one, am just tired of them not being able to communicate with each other during the course of disasters, and I think the Federal Government, State, and local communities should have fixed that problem a long time ago.

This will require more conversation and more action. My colleague Mr. Woodall and I are prepared to do the hard work to find these solutions. And I just appreciate you all so much taking of your precious time to come up here and be with us. It has been enlightening and informative.

And I do believe that, as a result of this—and I do thank the staff. There are staff members from other committees that are visiting with us. The Moms for—what is it?

Ms. TONEY. Moms Clean Air Force.

Mr. HASTINGS [continuing]. Clean Air Force. Okay. It confused me at first. I was thinking, what do they do? They fly around out there? But I guess—

Ms. TONEY. We are everywhere.

Mr. HASTINGS. You are everywhere. All right.

But there were so many more questions I wanted to ask. I come from farm territory and represent the Glades, Mr. Piotti, along with one other of my colleagues. And when we talk about algae and red tide and all of those things, they are of vital concern to us.

But this will amuse Bill and you, Mr. Piotti. I recently moved to Boynton Beach. And, Bill, I live in Valencia Cove, right?

Mr. JOHNSON. We are neighbors.

Mr. HASTINGS. Yes. And in addition to that, it is in an ag reserve area that was originally ag reserve area, but we have these great developers, who I cast no aspersions on, that have decided that that ag reserve is not as important as some new homes. So everywhere I look, there is more development.

And my granddaughter and I, when we go to the movies, we pass by an area, and I tell her, I said, I won't be here with you 20 years from now, but you see all of this land right here? This is going to be houses. And you remember when you pass through here that that is going to be the case."

And you have made the point that, by diminishing the amount of agricultural land, we then cause additional problems in that regard.

All of you have been so enlightening and helpful, and I thank you all.

And the longer I talk, I don't have to go to this 4 o'clock meeting. Thank you all.

[Whereupon, at 4:30 p.m., the subcommittee was adjourned.]

Greetings Chairman Hastings,

I would like to extend my sincere thanks to you as well as the Rules Committee for hosting this very important conversation about resiliency.

A native of Southeastern North Carolina, I can attest that Florence solidly affirmed for many of us and introduced to others the validity of climate change. More specifically, how climate change translates to climate disaster when paired with storms.

One of the first experiences I recall was watching (via generator-powered TV) reports of what felt to me like relentless environmental disasters. First over 5 million gallons of partially-treated wastewater spilled into the Cape Fear River when mechanical issues caused two generators from the Cape Fear Public Utility Authority to fail, then floodwaters overtook the coal ash basin at Duke Energy's Sutton Power Plant and sent the mixture of flood water and coal ash into the Cape Fear River. Lastly, it was reported that nearly 6,000 pigs and over 4 million chickens were killed in the hurricane, many of the carcasses floating in floodwater until they could be removed. Naturally as waters rose the open-pit lagoons used to store hog waste became susceptible to flooding. Thirteen waste lagoons were reported to have flooded. Watching these events take place I felt helpless. There was no one to call, no complaint that could be filed, no meeting where I could stand and speak in opposition. We all had to wait for the storm to pass and the waters to recede and the only thing that could be done was to try and mitigate a small portion of the catastrophic damage after the fact. Storms lay bare the weaknesses in our systems. Coal ash and concentrated animal feeding operations pose a great risk to our communities on normal days, moving these operations outside of flood plains would be a solid step forward in protecting North Carolina families.

The days and weeks following Hurricane Florence was the first time I witnessed a wave of my fellow Wilmington residents suddenly and without warning become climate refugees. Apartment complexes would issue eviction notices demanding hundreds of residents be out in sometimes as little as one to three days. Tenants who chose to evacuate returned to the city, relieved to find their homes without mold or damage; only to be met with an eviction notice telling them they had days to leave. The majority of these tenants were in low-income housing, many of them were parents or grandparents caring for young children. Many of these individuals also were persons with disabilities. There is brand-new residential development on nearly every corner in the City of Wilmington, however it is not accessible for poor people. Ordered to leave their homes many Wilmington residents were left with no place to go and had to leave jobs and support systems to relocate to other parts of the state. These were the individuals we knew about, there were hundreds of others under the radar whose stories received less exposure. I knew of a couple in the city whose landlord refused to repair damages to the home they were renting. They didn't have the means to leave so they stayed and tried to fix the mold issues as well as the roof and structural damage themselves. After almost a year of trying to bring the home they were renting to a livable condition they were forced to leave. Protections for low-income families and vulnerable demographics would help the entire community experience

resiliency. Protections especially for tenants who are renting their homes would ensure individuals are supported when they experience something as devastating as losing their home.

Lastly, this storm showed me the richness of community relationship in Wilmington. The City nor the County were equipped for the level of need caused by this storm. Community members who had never before met came together and combined efforts to meet the needs of the community. Immigrant communities were afraid to venture away from their home because there were reports that ICE was in the area so we went and took supplies to them. Many residents didn't know where they could receive help. Evelyn Adger Bryant who directs Northside Bridge Builders in Wilmington noted that the city should reach out specifically to vulnerable communities and give direction about safe places to evacuate and offer transportation to those places. She also suggested the three hubs offered by the city were inconsequential to individuals who were unable to access them, she suggested there be plans to give residents information and access to hubs.

Thank you again for your attention to the importance of resiliency and the people of North Carolina.

Sincerely,
Ashley Daniels
Resident of Wilmington, NC



David C. Brown
 Senior Vice President,
 Federal Government Affairs & Public Policy
 Exelon Corporation
 101 Constitution Avenue, NW
 Suite 400 East
 Washington, DC 20001
 Telephone: 202-347-0808
 Mobile: 202-256-9236
 Fax: 202-347-7501
www.exeloncorp.com
davidc.brown@exeloncorp.com

September 23, 2019

Honorable Alcee Hastings
 Chairman
 Committee on Rules
 U.S. House of Representatives
 Washington, DC 20515

Honorable Tom Cole
 Ranking Member
 Committee on Rules
 U.S. House of Representatives
 Washington, DC 20515

Dear Chairman Hastings and Ranking Member Cole:

On behalf of Exelon Corporation, thank you for your attention to the issue of community resilience, an issue closely linked to the state of the nation's electric power sector. As the frequency, magnitude, and intensity of severe weather events continue to increase, the issue of electric infrastructure resilience is quickly becoming a top priority for the nation's electric utilities. Electric utilities must be vigilant in preparing for these events, planning their infrastructure investments to ensure that their systems are capable of both withstanding severe weather events and rapidly recovering from any resulting service disruptions (in a word, resilient).

Exelon is a public utility holding company, headquartered in Chicago, Illinois, with operations and business activities in 48 states, the District of Columbia, and Canada. Exelon's six utilities serve 10 million customers in the District of Columbia, Delaware, Illinois, Maryland, New Jersey, and Pennsylvania. Exelon Generation Company is one of the largest competitive power generators in the U.S., with approximately 33,000 megawatts of owned capacity comprising one of the nation's cleanest and lowest-cost power generation fleets, located in several organized markets. Constellation is one of the nation's leading marketers of electricity and natural gas and related products in wholesale and retail markets, serving approximately 2.5 million residential and business customers in various markets throughout the United States.

Enhancing the resilience of our electric infrastructure against severe weather events is a priority for Exelon, and it is essential to the continued provision of reliable service to our customers and the communities that we serve. We are actively reviewing the material condition of our transmission and

distribution systems, developing design and planning criteria to meet state and local standards, and assessing the threats that the increasing frequency, magnitude, and intensity of severe weather events pose to our assets and, more holistically, our systems. We are committed to investing in cost-effective mitigation measures to address our vulnerabilities, from hardening individual assets against severe weather events (e.g., elevating substations to prevent flooding) to developing system-wide capabilities that allow us to more rapidly identify and respond to system disturbances (e.g., communications infrastructure).

As the Federal government looks at the issue of resilience, it is important to note what a dramatically different world we are living in today compared to just a decade ago. The National Oceanic and Atmospheric Administration's National Centers for Environmental Information has tracked the number of weather and climate disaster events with losses exceeding \$1 billion per year. Since 1980, there have been 250 such events, with total costs in excess of \$1.7 trillion. The four years with the highest number of weather and climate disaster events with costs in excess of \$1 billion all occurred in the past eight years (i.e., 2017, 2011, 2016, and 2018); three of the top four years in terms of the total cost of such events occurred during that same time period (i.e., 2017, 2012, and 2018).¹

As Exelon and other utilities look at investments to strengthen the power grid, we must factor in not only severe weather events but also the "new normal" of a warmer climate year-round. In addition to protecting our system against severe storms, we need to ensure that our system can operate under everyday conditions that are now significantly warmer than in the past. While Exelon has a number of utility assets along the east coast, our assets in the Midwest may require the most investment because of the anticipated dramatic increase in 90-degree days. Given the fact that many utility assets are meant to last several decades, it is critical that we make investments that factor in a significantly warmer climate that will see more severe weather events.

Ensuring a reliable and resilient electric grid is particularly important as other sectors of the economy move to electrify to reduce greenhouse gas emissions. Preserving and improving on the industry's current level of superior reliability will require close coordination with Federal, state, and local governments.

Thank you for addressing this important issue for communities and for the nation. We look forward to serving as a resource to you and to the members of the committee as you consider resilience.

Sincerely,



¹ See National Centers for Environmental Information, *Billion-Dollar Weather and Climate Disasters: Overview*, <https://www.ncdc.noaa.gov/billions/> (last visited Aug. 13, 2019).

Investor-Owned Electric Company Perspectives on Investments in Resilience

By Scott Aaronson, Vice President, Security and Preparedness, Edison Electric Institute

Introduction

The Edison Electric Institute (EEI) appreciates the opportunity to contribute to the discussion about improving resilience for critical energy infrastructure. EEI's member companies—the nation's investor-owned electric companies—take their responsibility to support national and economic security very seriously; our members live and work in the communities they serve and understand that the infrastructure they own and operate plays a significant role in the life and safety of their customers.

EEI's member companies provide electricity for more than 220 million Americans and operate in all 50 states and the District of Columbia. As a whole, the electric power industry supports more than 7 million American jobs and contributes \$865 billion annually to U.S. gross domestic product, about 5 percent of the total. In addition to our U.S. members, EEI has more than 65 international electric companies as International Members, and hundreds of industry suppliers and related organizations as Associate Members. EEI's members are committed to the reliability, security, and resilience of energy infrastructure.

While improving security and reliability is a priority for our members, providing an energy grid that also is resilient against all hazards is an increasing focus for the sector and policymakers. Acknowledging and understanding how key stakeholders define resilience is valuable, but it is not EEI's intent, nor the purpose of this paper, to further refine the definition. Rather, we aim to illustrate how electric companies are key enablers of resilience and how the energy grid provides a platform for resilient energy services that support customers and national security.

For reference, however, EEI and its member companies have relied on several organizations that have provided definitions of resilience that are useful in any national conversation. These include the National Academy of Sciences, which states that resilience “is the ability to prepare and plan for, absorb, respond, recover from, and more successfully adapt to adverse events.”¹

Other entities have provided similar definitions. The Federal Energy Regulatory Commission (FERC or the Commission) proposed to define resilience as: “[t]he ability to withstand and reduce the magnitude and/or duration of disruptive events, which includes the capability to anticipate, absorb, adapt to, and/or rapidly recover from such an event.”² The North American Electric Reliability Corporation (NERC) built upon the National Infrastructure Advisory Council's (NIAC's) resilience construct to define resilience based on four outcome-focused abilities: (1) robustness—the ability to absorb shocks and continue operating; (2) resourcefulness—the ability to detect and manage a crisis as it unfolds; (3) rapid recovery—the

¹ National Academy of Sciences, Resilience @ the Academies, available at <http://www.nationalacademies.org/topics/resilience/>.

² *Grid Resilience in Regional Transmission Organizations and Independent System Operators*, Order Terminating Rulemaking Proceeding, Initiating New Proceeding, and Establishing Additional Procedures, 162 FERC ¶ 61, 012 at P 23 (January 8, 2018).

ability to get services back as quickly as possible in a coordinated and controlled manner; and (4) adaptability—the ability to incorporate lessons learned from past events to improve resilience.³

While there are various ways to define resilience, it becomes clear that the concept is based on a holistic approach to address dynamic and impactful risks to electric systems by anticipating, withstanding, recovering, and adapting to a wide variety of man-made or natural threats.

EEI's member companies are focused on providing a safe, reliable, and affordable supply of energy to their customers. The concept of resilience is embedded within these priorities. EEI's member companies invest more than \$100 billion each year to make the energy grid smarter, stronger, cleaner, more dynamic, and more secure. These investments help to increase the integration of renewable resources into the energy grid; power the rapid increase in electric vehicles on the road; harden the grid to better withstand extreme weather events; and facilitate the adoption of a broad array of smart technologies that enhance the energy grid in ways that better serve communities while advancing security and reliability.

However, an inherent challenge with resilience is that risks to the electric system vary across the nation. For example, the filings made by regional transmission organizations (RTOs), independent system operators (ISOs), and individual electric companies at FERC raise different threats, concerns, and urgencies in different parts of the country. As a result, coordination at all levels is needed. This includes working locally with customers and state governments to address distribution system needs; regional coordination that acknowledges different threats to different parts of the country; and a national strategy that facilitates investment and looks holistically at the broader energy grid.

Improving resilience requires a strong partnership among policymakers and regulators at the local, state, regional, and federal levels; customers; interdependent sectors; and electric companies. This coordination among stakeholders is imperative to ensure alignment on the understanding of resilience and to identify appropriate, cost-effective priorities.

1. What level and scope of resilience do we need, and how much are we willing to pay?

There is no simple answer or one-size-fits-all approach to resilience. The level and scope of resilience investments should be informed by risks and potential consequences to the electric system and those it serves. Risks to the system from cyber and physical attacks, fuel availability and security, and extreme weather are evolving rapidly to varying degrees across the nation. For example, the risk of hurricanes, wildfires, and extreme weather vary by region, requiring different resilience measures and levels of investment. In addition, the changing energy mix introduces potential new fuel security and reliability risks; as traditional coal and nuclear

³ North American Electric Reliability Corporation, *August 15, 2018, Agenda Member Representatives Committee at Agenda Item 8*, https://www.nerc.com/gov/bot/MRC/Agenda%20Highlights%20nad%20Minutes%202013/MRC-Agenda_Package_August_15_2018.pdf.

generation retire, dependence on natural gas and, increasingly, on renewable sources requires new resilience strategies and investments.

Customer needs and expectations also are changing. Residential, commercial, and industrial customers have different needs regarding reliability, outages, and recovery. While some customers value greater control over their energy choices and are participating in the active management and even production of the electricity they consume, others are more concerned with a high level of reliability, resiliency, and power quality. As more distributed energy resources and other new technologies integrate with the energy grid and as new organizations participate in retail and wholesale markets, new vulnerabilities and potential attack surfaces emerge, increasing the need for enhanced security and resilience measures.

It is important to have a national view and federal situational awareness regarding resilience strategy and priorities, particularly as it relates to national security. Again, a one-size-fits-all approach is not the answer. Local, state, and regional considerations and solutions are needed, operating in concert and coordination with federal approaches. Electric and natural gas company collaboration with regulators at all levels is essential to manage the evolving system successfully and to keep it reliable, resilient, and cost-effective.

Regarding cost-effectiveness and diversity of needs, different customers and regions will require different investments and resilience strategies. Developing a framework for regulators, customers, electric companies, and other stakeholders to support needed infrastructure and to recover costs appropriately will be key. Sharing best practices that can be tailored to various risks will support sound investment decisions. Partnership among electric companies; federal, state, and local regulators; and other organizations focused on customers, policy, and technology will be an important part of this effort. Coordination among these stakeholders will help to ensure that the most critical needs are identified and that solutions are developed for specific states, regions, and customers.

While electric companies have always taken their responsibility to ensure reliability seriously, the past two decades have highlighted the important role that other critical infrastructure sectors must play in supporting security and resilience. The Electricity Subsector Coordinating Council (ESCC) is helping government and private-sector partners deepen relationships with other, interdependent critical sectors (i.e., sectors that the electric systems depend on and that depend on the electric sector), including the financial services, communications, water, natural gas, and transportation sectors. Planning to defend, mitigate, respond, and recover to and from “black-swan” events requires coordination among all of these sectors.

2. Who’s responsible for resilience, and how should other entities coordinate with utilities when there are mutual benefits?

Addressing resilience is a responsibility shared by federal, state, and local governments; NERC in its role as the congressionally sanctioned “Electric Reliability Organization;” customers; interdependent sectors; and energy grid asset owners and operators. The diversity of responsibility can be seen just among the federal government with congressional funding related to grid hardening and resilience going to the Departments of Energy (DOE), Homeland Security

(DHS), and Defense (DOD). This includes research, development, and deployment programs for innovative technologies and strategies that address high-impact/low-probability events; recognize the work around improving security and resilience for defense critical electric infrastructure; and support FEMA's partnership with electric companies to respond to and recover from extreme weather events. Each of these departments has a very different role when it comes to interaction with the electric sector, but each is vital to ensuring a holistic approach to energy grid resilience.

From the federal regulatory perspective, FERC's authority over market and bulk electric system reliability can help to address grid hardening and resilience from a national, transmission system perspective, while recognizing, as noted in the response to Question 1, that state and local entities also must have the ability to secure appropriate resources and solutions to ensure and address regionally specific resilience needs. Additionally, the Commission should continue to monitor risks through non-regulatory offices, like the Office of Energy Infrastructure Security (OEIS), to ensure they remain well-informed and fully understand the threats stakeholders face and how best to leverage FERC's authorities to improve energy grid security and resilience. Convening events, such as technical conferences, is an important role for the Commission, providing the stakeholder community a valuable venue to address evolving threats.

NERC, in addition to developing and enforcing the reliability standards, which include aspects of resilience, conducts assessments to identify potential reliability risks. These risks may be addressed by making modifications to the reliability standards, by developing reliability guidelines, or by other appropriate actions to maintain the reliability of the bulk-power system, while improving system resilience. NERC should continue to use its technical resources, including industry expertise, to support future assessments and risk identification. NERC's biannual GridEx exercises also support resilience, helping to prepare for response and recovery against large-scale cyber and physical security incidents. The fifth GridEx will take place in November 2019 and represents the gold standard for private sector-led exercises, helping to prepare grid operators; emergency responders; federal, state, and local officials; the vendor community; and other key stakeholders for potentially catastrophic threats.

Providing state and local regulators with information to understand the value of resilience also is necessary to balance innovation, security, and cost-effectiveness within their jurisdictions. Local governments can align their planning and potential investment with electric companies and engage with customers, particularly in planning for incident response. Similarly, electric companies should coordinate with state, local, and federal governments, as well as customers and interdependent infrastructure sectors, to align resilience efforts to local expectations.

Electric company resilience programs often are tailored to meet specific threats or needs. In some cases, hardening or resilience benefits will accrue across the customer base (e.g., storm hardening for hurricanes); however, in other cases, there may be an individual customer who needs a higher level of resilience for a specific threat (e.g., an industrial facility or military base) where a cost-sharing approach may be more appropriate. The key is flexibility so that electric companies can tailor their resilience efforts to meet customer needs and expectations.

Electric companies also should continue to invest in grid hardening and resilience, share best practices, and participate in technology pilots. As these investments are made, electric companies will need to engage with state, local, and federal governments, as well as customers and interdependent infrastructure companies, to balance expectations for grid hardening and resilience.

As the most critical of critical infrastructure sectors, the electric sector often serves as the center of gravity for relevant stakeholders to engage on significant issues. Improving sector and critical infrastructure resilience more broadly is a shared responsibility that requires electric sector leadership and proactive engagement with multiple stakeholders.

Opportunities for coordination on resilience include electric system planning, identifying system risks, research and development, cross-sector coordination, joint emergency preparedness and response exercises, information sharing between the private sector and government, emergency/critical spare equipment sharing programs, and mutual assistance to support response and recovery. These coordination efforts should continue to build upon existing industry-government partnerships and programs, such as the ESCC's partnership with the Energy Sector Government Coordinating Council, established cross-sector efforts in collaboration with the DHS and respective sector-specific agencies, information sharing and analysis centers, and the states.

3. What types of utility investments have the most impact on improving resilience, and how can utilities and regulators tell whether utility investments in resilience are impactful?

The most impactful resilience investments are those that enhance resilience against a multitude of hazards. By focusing on managing potential consequences, rather than focusing simply on prevention, electric companies avoid chasing the latest defensive measure against always evolving threats and, instead, prepare to respond to all hazards. Prioritization of assets and prioritization that accounts for a company's particular risk profile also ensure more efficient resilience investments.

Electric companies and their regulators should work together to determine the right investments to improve the resilience of the energy grid for particular localities or regions. Some specific measures that have shown value include:

- **Undergrounding** – Moving infrastructure underground can have a positive impact on reliability. However, a wholesale move to underground substantial portions of existing distribution facilities is prohibitively expensive and, in areas where there is flooding or inundation risk, could be counterproductive. Instead, a more prudent approach requires looking at each opportunity to underground lines on a case-by-case basis that weighs costs and benefits with customer needs and expectations, as well as engineering considerations and alternative approaches to achieve resilience. This ensures that a variety of cost-effective solutions, including undergrounding, tree wire, or more aggressive vegetation management, are considered depending on the location.

- **Nontraditional Transmission & Distribution Pole Materials** - Considerable improvements have been made in the development of pole materials used for transmission and distribution overhead lines. While these new materials have higher upfront costs than traditional wood poles, they often provide greater resistance to weathering, insects, rusting, high winds, and even fire, and include materials such as concrete, advanced coatings for steel, high-strength fiberglass, polyurethane resins, etc. In some cases, these upgrades are more cost-effective long-term than more traditional materials.
- **Smarter Energy Infrastructure** - The energy grid is evolving rapidly, driven by advances in technologies and changing customer expectations. We already have seen substantial improvements driven by smart meters, advanced energy management systems, and transmission and distribution planning. These breakthroughs increase protection of equipment, enhance situational awareness of grid operations, reduce maintenance costs, and improve response times during outages. The grid's evolution has improved SCADA systems and network security; provided advanced analytics; deployed more intelligent sensors; improved automation of core functions; enhanced protection of hard-to-replace equipment from protective relays; provided better substation and distribution controls with intelligent end devices; created opportunity with dynamic line ratings; and provided more ubiquitous communications supporting a wide range of grid needs and solutions.
- **Distributed Energy Resources (DERs)** – As the number of DERs on the system grows, new infrastructure and technology are required. Policymakers, regulators, grid operators, and others should work together to ensure DER deployment is done in a way that, ideally, enhances overall grid resilience, but at least does not harm the security and reliability of the energy grid. Moreover, stakeholders should engage in discussions to ensure that appropriate actions are taken regarding preparedness efforts for new market entrants, including cybersecurity preparedness, targeted training and drills, and close coordination with other infrastructure sectors and critical stakeholders (e.g., larger customers, first responders, hospitals, public transportation agencies).⁴ In addition, the strategic deployment of storage at both the transmission and distribution level could enhance reliability and resilience. For storage to be able to play the most robust role possible, additional research and development is needed to reduce costs and improve performance. In addition, key questions about which entities can own and deploy storage need to be answered.
- **Cybersecurity Protections** – Digital electric infrastructure is advancing rapidly with great benefits. At the same time, associated cybersecurity risks are proliferating. Threats to critical infrastructure are escalating, and attack vectors are changing. These changes create new challenges to protect electric infrastructure. NERC reliability standards, including the Critical Infrastructure Protection (CIP) Standards, are one of the tools to support security for the bulk-power system. However, flexible security measures also are

⁴ Critical Consumer Issues Forum, *Security & Resilience at the Distribution Level: Integrating Technologies at the Grid Edge* (Jul. 2018), <http://www.criticalconsumerissuesforum.com/wp-content/uploads/2018/07/CCIF-Report-on-Security-Resilience-July-2018.pdf>.

important to ensure the energy grid remains secure and safe while leveraging these new technologies and enhancing the operational efficiency, electric system reliability, and overall resiliency.

An example of a cost-effective resilience approach that leverages consequence management against rapidly evolving cyber threats is the establishment of the Cyber Mutual Assistance (CMA) program. CMA was developed by the ESCC and has grown to a voluntary group of more than 150 electric and natural gas companies from all across North America that are committed to helping each other in the event of a cyber attack. Modeled on traditional mutual assistance, CMA requires very little in the way of upfront resource commitments, but it could have extraordinary benefit for an electric company should the need ever arise.

- **Physical Security Protections** – NERC’s CIP Standards focus on protecting substations that are most critical to the reliable operation of the bulk-power system. This includes installing physical security systems, such as electronically controlled access, barriers, and video surveillance, to protect critical facilities. In addition to actions taken in response to mandatory standards, electric companies assess facilities by their relative importance to (1) the delivery of electricity; (2) the national defense and impact on the national economy; and (3) customer and employee safety.
- **Asset Management** – Efforts are underway to leverage the vast amount of data collected around tracking, monitoring, and maintaining assets to improve asset utilization and to identify weaknesses or impending failures predictively. These technology developments and process improvements are leading to fewer unexpected equipment failures and improved maintenance cycles, which require fewer equipment replacements and save customers money. These advancements will lead to greater efficiencies and improved utility, reliability, and resiliency. The data collection and analysis required are a new cost to some companies, but these costs likely are offset by the improved outcomes and system savings.
- **Vegetation Management** – Vegetation management is key to ensuring that overhead transmission and distribution systems are well-maintained and managed. Without effective and proactive management of utility rights-of-way, both reliability and resiliency can be impacted negatively. Electric companies are rethinking vegetation management solutions to better inform their processes through improvements in data analytics; rights-of-way monitoring; consideration of the impacts outside of their rights-of-way; and improved forest management. Federal, state and local government cooperation that reconsiders utility rights-of-way is essential.
- **Advanced Grid Management / Proactive Shutdowns** – Advanced grid management, including programs to deenergize circuits during certain high-risk emergency conditions (e.g., dry and windy conditions that create high fire risk), are beginning to be used and considered, but raise significant legal and policy questions that state and federal regulators have not addressed yet.

- **Extreme Weather Damage Mitigation** – Electric companies in many flood prone areas, such as coastal regions, have experienced increased risks resulting from flooding at substations and other associated electrical equipment. This issue has led these companies to reconsider their design standards and to take proactive measures to raise the elevation of equipment and substations and, where practical, relocate affected equipment to areas less prone to these events. In some cases, the use of mobile substation equipment has provided added resilience and additional capacity in emergency situations.
- **Support for Smart Meter Investments** – Smart meters are one of the most important resilience investments for the distribution system. In addition to providing valuable electricity usage information to customers, these devices provide situational awareness to electric companies, including outage reporting that allows for more timely response. However, recently several state commissions have rejected proposals to deploy these devices. While each smart meter filing is unique, EEF's member companies would appreciate support in future proceedings that recognizes and enumerates the value of these investments to support distribution system resilience.
- **Support for Greater Visibility into Distribution Systems** – Unlike operations in the Bulk Power System, which are highly visible, energy companies rarely have equivalent visibility into their distribution systems. Investments made to improve this visibility is increasingly needed as more DERs are added to the system, as they inject variability and can complicate electric company operations.
- **Support for State Regulatory Commissions on Cyber Security at the Distribution Level** – State regulatory commissions have jurisdiction over distribution system policies, including cybersecurity. Many of these commissions lack the resources, staff, and access to sensitive information that would help them to address these issues. Providing support to these entities through the National Association of Regulatory Utility Commissions (NARUC) would be helpful to promote best practices among the states, especially as the "Internet of Things" and DERs proliferate and add to the "attack surface" of the distribution system.
- **Support for Transmission Investments** – Investments in transmission are challenging given the difficulty of siting these facilities, determining proper cost allocation for these long-term assets, and determining an adequate Return on Equity for projects. Yet the resilience and reliability attributes of these investments are rarely, if ever, included. Support for quantifying these attributes and investments is important for long-term resilience of the entire energy grid.
- **Support for Advanced Research for Development and Deployment of Transmission Sensor Technology** – Deploying sensor technology on energy infrastructure can provide predictive analytics to make maintenance more efficient. Further, sensors can help detect anomalies on the system and even help to prevent the spread of wildfires. Support for these investments will help increase the resilience of the nation's transmission system, particularly, but not exclusively, in the Western United States.

- **Support for Other Critical Infrastructure** – Electric companies in many areas are taking proactive measures to improve reliability and resiliency to identified critical customers (e.g., police, fire stations, hospital, military and government facilities, etc.) through measures such as redundant infrastructure. While these improvements can be costly, the benefits they provide during major events can outweigh the cost. The issue of resilience also must be looked at holistically since electric companies depend on other sectors, including water to generate steam and cool systems, telecommunications to operate, and transportation or pipelines to move the fuel that generates electricity.

Electric company response and recovery programs and processes also are critical resilience investments because it is difficult to anticipate all threats and may be cost-prohibitive to guarantee protection against all hazards. These programs include:

- Information sharing and analytics
- Mutual assistance networks, including cyber mutual assistance
- Spare equipment sharing programs
- Business continuity programs
- Emergency management structures
- Emergency drills and exercises
- Ability to operate the energy grid in degraded conditions
- Cross-sector information sharing and situational awareness programs
- Lessons learned and best practices sharing
- Use of drones

With respect to prioritization, electric transmission infrastructure is the backbone of the nation's energy grid, and investment in transmission infrastructure will continue to play an important role in electric system resilience. This access to varied generation and extra capacity enhances system stability and allows for communities to be restored more quickly when an incident occurs. This is the hallmark of a resilient system. However, as with the distribution system, flexibility is needed to address regional differences in transmission planning and development to promote a stronger, more robust system.

4. Should utilities take more proactive approaches to investments in resilience?

Electric companies already are taking a more proactive approach to investments in infrastructure. This includes investing in new and upgraded transmission and distribution infrastructure; using advanced technologies to enhance communications; improving operating efficiency and reliability; and enhancing protection to enable a more secure, flexible, and resilient electric system.

It is estimated that electric companies have invested more than \$285 billion in transmission and distribution since Superstorm Sandy, helping to harden the energy grid and make it more resilient. These investments include advanced monitoring systems, high-temperature low-sag conductors, underground cables, fiber optics, advanced high-capacity composite core conductors, new transmission lines, energy storage devices, enhanced condition-based monitoring, and mobile transformers and substations. These investments support electric company operations and other investments and enhancements in the transmission and distribution systems that, among other things, allow for the integration of distributed energy resources on the grid in a safe and reliable manner.

EEI's member companies are investing in efforts to harden transmission and distribution system infrastructure to resist storm damage, while also developing new technologies and techniques that allow for faster restoration of transmission service. In the case of Hurricane Irma in 2017, more than 4.4 million customers lost power, and Florida Power and Light (FPL) was able to restore electricity within 10 days versus the 18 days it took to restore power to 3.2 million customers after a similar storm, Hurricane Wilma, in 2005. FPL credits the reduced power outages and improved restoration efforts on infrastructure improvements (e.g., steel and concrete poles and burying power lines) and smart grid technology (e.g., flood monitors and smart meters). These efforts demonstrated improved restoration and recovery and reduced overall costs. In addition to investments in the transmission and distribution system, EEI's members continue to invest in the generation resources and new generation technologies necessary to maintain resource adequacy.

As the threats to the reliability of the bulk-power system have evolved, the Reliability Standards developed and enforced by NERC and FERC have evolved, too. Although there appropriately is not a resilience standard or requirement, FERC has taken steps directed at elements of resilience, including significant work to address bulk-power system reliability through NERC Reliability Standards, assessments, and risk identification. Collectively, the Reliability Standards developed by NERC inherently account for resilience by supporting robustness, resourcefulness, rapid recovery, and adaptability.

- The CIP Standards address risks from cyber and physical attacks. Many of the CIP requirements provide enhanced protections that help ensure that systems can resist, absorb, and rapidly recover from coordinated physical and cyber attacks.
- The Transmission Planning Standards are designed to ensure that the bulk-power system operates reliably through many system conditions and contingencies, including solar events, spare-equipment shortages, and generation retirements, assuring affected systems

appropriately absorb the impacts of changing conditions and continue to remain reliable throughout.

- The Emergency Preparedness and Operations Standards ensure entities have plans, facilities, and personnel in place that are capable of recovering rapidly from events (e.g., system restoration, loss of control center functionality, GMD events) that could impact the reliable operation of the bulk-power system.
- The Protection Control (PRC) Standards include loadability standards that ensure that key elements of the bulk-power system will remain in service while absorbing short-duration overload conditions, allowing time for system operators to mitigate the situation without unnecessary loss of load or damage to equipment. The PRC Standards also address stable power swings to ensure bulk-power system elements do not trip unnecessarily during system oscillations resulting from large disturbances, which allow the system to absorb and recover without unnecessary loss of load or without contributing to events that might result in much larger power disturbances.

In addition to developing and enforcing the Reliability Standards, NERC assesses various risks that may impact the reliability of the bulk-power system,⁵ including resource adequacy issues that cannot be addressed fully by reliability standards or requirements.⁶ However, NERC's reliability assessments and historical operational information can inform discussions between electric companies and state regulators responsible for addressing potential resource adequacy issues. The states and RTOs/ISOs may need to conduct additional analyses to identify issues unique to their local systems,⁷ including impacts caused by factors outside of NERC's bulk-power system focus, expertise, and regulatory authority.⁸

As mentioned, it is impossible to defend against all threats; therefore, resilience planning also must include consideration of how the industry proactively prepares for and responds to threats. The chief executive officers of 22 electric companies participate in the ESCC, which represents all segments of industry and the full scope of electric generation, transmission, and distribution in the United States and Canada. The ESCC is the principal liaison between senior officials of the federal government and the electric power industry for coordinating efforts to prepare for, and respond to, national-level incidents or threats to critical infrastructure. This partnership leverages government and industry strengths to develop and deploy new technologies, share information, conduct drills and exercises such as GridEx, and facilitate cross-sector coordination.

⁵ See e.g., NERC and U.S. Department of Energy, *High-Impact, Low-Frequency Event Risk to the North American Bulk Power System* (Jun 2010); NERC Severe Impact Resilience Task Force, *Severe Impact Resilience: Considerations and Recommendations* (May 2012); NERC, *Special Reliability Assessment: Potential BPS Impacts Due to Severe Disruptions on the Natural Gas System* (Nov. 2017); NERC, *Potential Reliability Impacts of EPA's Clean Power Plan*, Phase I (Apr. 2015) and Phase II (May 2016).

⁶ Resource adequacy issues may be identified by NERC in assessments, but the Reliability Standards or requirements cannot and should not be the means to require entities to secure resources to address resource adequacy issues. 16 U.S.C. §824(o)(a)(3); *Planning Resource Adequacy Assessment Reliability Standard*, Order No. 747, 134 FERC ¶ 61,212 at P 21 (2011).

⁷ See e.g., ISO New England, *Operational Fuel Security Analysis* (Jan. 17, 2018), available at https://www.iso-ne.com/static-assets/documents/2018/01/20180117_operational_fuel-security_analysis.pdf.

⁸ NERC's authority is limited to the operation of existing bulk-power system facilities. 16 U.S.C. §824(o)(a)(3). Threats to other infrastructure sectors that may impact the bulk-power system are not within NERC's authority or expertise.

In addition, mutual assistance is the cornerstone of electric company operations during recovery from power outages caused by infrastructure damage. Electric companies affected by significant outages often turn to the mutual assistance network—a voluntary partnership of electric companies from across the United States and Canada—to help speed restoration whenever and wherever assistance is needed when it is safe to do so. When natural disasters cause power outages, electric companies use this partnership to increase their restoration crews and contractors.

Since Superstorm Sandy in 2012, electric companies have enhanced mutual assistance programs⁹ to scale to national-level incidents. EEI's members created the National Response Event (NRE) framework to support the industry's Regional Mutual Assistance Groups (RMAGs) in the event of an incident that has national implications. This effort includes the development of emergency response playbooks and protocols to facilitate situational awareness and information sharing, an online tool to streamline the allocation of restoration resources, and a robust exercise program to prepare company personnel. These enhancements have allowed the industry to support large restoration efforts in recent years.

In addition to the industry's voluntary mutual assistance programs to restore power and respond to cybersecurity threats, electric companies participate in spare-equipment sharing programs to enable rapid recovery from events. For example:

- The Spare Transformer Equipment Program (STEP) provides a mechanism to share assets when equipment is destroyed deliberately and is based on binding contracts for access to hard-to-replace transformers.
- SpareConnect is an online tool for transmission asset owners and operators to connect and share transmission and generation step-up transformers and related equipment (e.g., bushings, fans, and auxiliary components) in the event of an emergency or other non-routine failure.
- Grid Assurance is a stand-alone company that focuses on critical transmission equipment procurement, security and strategic equipment warehousing, equipment management, and logistics support to facilitate rapid deployment of critical long-lead time equipment in light of a grid emergency.
- The Regional Equipment Sharing for Transmission Outage Restoration (RESTORE) program provides additional sources for obtaining critical transmission equipment following disastrous events.¹⁰

Investments in the transmission and distribution infrastructure that facilitate the use of clean energy will continue to be important to resilience. Tracking development and proactively planning transmission investment to accommodate EV charging stations supports resilience. Additional transmission infrastructure is needed to access that energy, to modernize transmission

⁹ Public power utilities and electric cooperatives have parallel and complementary mutual aid networks to support their members. All three segments of the electricity subsector share information and coordinate mutual assistance efforts through the Department of Energy's Emergency Support Function – 12 and the Electricity Subsector Coordinating Council.

¹⁰ Recently authorized by the Commission. Jurisdictional Regional Equipment Sharing for Transmission Outage Restoration Participants, Order Authorizing Acquisition and Disposition of Jurisdictional Facilities, 163 FERC ¶61,005 (April 3, 2018).

assets to meet growing customer demand for new and innovative services. Such initiatives, with an eye on affordability and reliability, have the capability to reduce the magnitude and/or duration of disruptive events. Additionally, for more proactive approaches to be successful, policymakers, regulators, and customers also must support resilience investments.

5. How can decision making about resilience investments be improved?

More support from stakeholders at the local, state, regional, and national levels would help to prioritize risks to resilience and inform investments required to address those risks. While customers, new grid service providers, regulators, policymakers, and other critical sectors all can help inform how best to improve system resilience, energy grid operators play a unique role in enabling resilience for some of the nation's most critical infrastructure.

Given limited resources and an always evolving threat landscape, prioritization of investments and a focus on consequence management will be key components to improving resilience. Moreover, all stakeholders will have to grapple with questions about costs and benefits, especially when making investments to address high-risk, low-probability events or investments based on evolving research and new data. This will require robust information sharing and collaboration to identify risks and will require protecting sensitive security information. Also, establishing clear criteria to resolve the tension between transparency and security issues raised by resiliency planning will be essential. Finally, sharing lessons learned and best practices on resilience investments will help to improve future investments.

As electric companies plan for change and more frequent and extreme weather events amid a changing climate, there will be an increased need for improved data, models, planning, and flexible design options. The quality of decision-making will be improved with better weather and climate data that can be used when making investments and maintenance decisions within an electric company's service area.



**Statement of the American Property Casualty Insurance Association
Building Resilient Communities for America's Future**

**Committee on Rules, Subcommittee on Legislative and Budget Process
United States House of Representatives**

September 24, 2019

The American Property Casualty Insurance Association (APCIA) respectfully submits this statement to the Committee on Rules' Subcommittee on Legislative and Budget Process for its hearing entitled "Building Resilient Communities for America's Future." APCIA commends Chairman Hastings and the Subcommittee for holding this important hearing.

Every corner of the country has significant exposure to natural catastrophes whether it be from hurricanes, floods, tornados, hailstorms, wildfires, earthquakes, blizzards, or "Nor'easters." Improving the nation's preparedness for, and resiliency to, these disasters is critically important to the individuals, businesses, and communities that are impacted by catastrophes on an increasingly frequent basis. Examining the effect that these events have on the federal budget is an important component in moving the nation toward a more proactive approach to mitigation and preparedness.

APCIA is the primary national trade association for home, auto, and business insurers. APCIA members represent all sizes, structures, and regions – protecting families, communities, and business in the U.S. and across the globe; and are among some of the first people on the ground following a natural catastrophe working with their customers to begin the process of recovery.

APCIA stands ready to assist the Committee and Congress in crafting specific public policy solutions to improve the nation's resiliency with the goals of protecting lives and property, reducing economic losses, limiting taxpayer expense, and helping communities recover more quickly.

RELYING ON POST-DISASTER RELIEF

Global and domestic catastrophic events – particularly natural catastrophes – are increasing in frequency and severity. Since 2005, GAO estimates that the Federal Government has spent at least \$450 billion on disaster assistance.¹ For example, during 2017 and 2018, which were the costliest back-to-back years for weather disasters on record, globally,² natural disasters caused near record economic losses in the United States.

In 2017 alone, there were 16 weather related events that each caused over \$1 billion in damages– the most notable being Hurricanes Harvey, Irma, and Maria. With the second highest economic losses from hurricanes, combined with severe economic impacts from wildfires, the National Oceanic and Atmospheric Administration (NOAA) estimates that in sum natural disasters caused over \$300 billion in damages.³

In response, the United States federal government appropriated nearly \$140 billion for expenses related to the 2017 natural catastrophes.⁴

In 2018, there were 14 weather related events that each caused over \$1 billion in damages – most notable were the California Wildfires and Hurricanes Michael and Florence. NOAA estimates that \$91 billion in damages occurred in 2018, making it the fourth highest loss year on record (2017, 2005, and 2013 round out the top three).⁵ Once again, the federal government responded by providing over \$40 billion for disaster relief.⁶

Looking beyond the past two years, and including Hurricanes Katrina, Rita and Wilma (2005), Gustav and Ike (2008), and Superstorm Sandy (2013), it becomes clear that post-disaster spending is not fiscally sustainable over the long-term. For the 2005 and 2008 storm years combined, Congress “. . . appropriated roughly \$121.7 billion in hurricane relief for the 2005 and 2008 hurricanes in 10 supplemental appropriations statutes.”⁷ Following Superstorm Sandy, Congress passed a \$50 billion supplemental appropriations bill.⁸

¹ https://www.gao.gov/key_issues/disaster_assistance#response_and_recovery

² AON: “Weather, Climate & Catastrophe Insight,” 2018 Report, Page1.

(<http://thoughtleadership.aonbenfield.com/Documents/20190122-ab-if-annual-weather-climate-report-2018.pdf>)

³ <https://www.climate.gov/news-features/blogs/beyond-data/2017-us-billion-dollar-weather-and-climate-disasters-historic-year>

⁴ The Hill, Niv Elis, October 14, 2018. (<https://thehill.com/policy/finance/411215-disasters-become-big-chunk-of-us-deficit>)

⁵ <https://www.climate.gov/news-features/blogs/beyond-data/2018s-billion-dollar-disasters-context>

⁶ Lingle, Brett, Kousky, Carolyn, and Shabman Leonard, “Federal Disaster Rebuilding Spending: A Look at the Numbers,” Risk Management And Decision Process Center, The Wharton School, The University of Pennsylvania, February 22 2018.

⁷ Congressional Research Service, Federal Disaster Assistance After Hurricanes Katrina, Rita, Wilma, Gustav, and Ike, February 2019, page 13. <https://crsreports.congress.gov/product/pdf/R/R43139>

⁸ “GAO, An Investment Strategy Could Help the Federal Government Enhance National Resilience for Future Disasters.” July 2015, <https://www.gao.gov/assets/680/671796.pdf>

The nation has always provided aid to those in need, and the country should continue assisting communities in their recovery from disasters. But, for too long, the nation has focused on post-event funding to assist in recovery and rebuilding efforts. As a country, we must shift our focus to preparedness and mitigation and leverage federal relief to reduce redundant spending on future catastrophes.

APCIA applauds Congress for the enactment of the Disaster Recovery Reform Act (DRRA) in 2018, as a first step in this important shift towards preparedness and resiliency. A key theme of the DRRA was the focus on pre-disaster mitigation including Section 1234, which authorizes the president to set aside 6 percent of the disaster relief fund for pre-disaster mitigation (PDM). Prior to the DRRA's enactment, PDM was funded via the annual appropriations process. This change will hopefully provide an additional steady funding source to plan and complete pre-disaster mitigation projects and is an important recognition of the need to fund pre-disaster mitigation.

Also, the Federal Emergency Management Agency (FEMA) recently launched its Building Resilient Infrastructure and Communities (BRIC) program. The BRIC program is a federal disaster mitigation effort that will allow FEMA to invest in community preparedness. The BRIC program is in early stage planning and organization, and is focusing on infrastructure mitigation, hazard mitigation, risk-based funding, cost-benefit analysis, building code enforcement and capacity, and other areas of preparedness.

APCIA member companies are on the front lines of disaster response and recovery. As such, they are keenly interested in public policy solutions to increasing resiliency in order to limit or prevent unnecessary losses from natural catastrophes. Responding to FEMA's request for input on the BRIC program, APCIA has provided feedback on the initiative's development. In our comments to FEMA (see appendix A), APCIA highlighted the importance of educating national, state, and local decision makers; adopting proven mitigation models; partnering with the private sector including insurers; engaging in a long-term effort to support and enforce model building codes; and demonstrating the returns of federal dollars spent on resiliency and mitigation.

BUILDING RESILIENT COMMUNITIES

A critical component of being more resilient is being better prepared for and mitigating against losses before a catastrophe occurs. As already demonstrated, the federal government spends staggering sums in providing relief to those impacted by disasters. While disaster relief is critically important, the federal government could potentially save billions in future federal disaster spending by investing in mitigation on the front end.

In January of 2019, the National Institute of Building Sciences (NIBS) issued the *Natural Hazard Mitigation Saves: 2018 Interim Report*. The report found a savings rate of "... \$6 for every \$1 spent

through mitigation grants funded through select federal agencies.”⁹ The NIBS study also looked at the impact of adopting model building codes, exceeding model codes, and mitigating infrastructure. In its review, NIBS found considerable savings for taking specific mitigation steps. Specifically, NIBS found that:

“... society saves a benefit-cost ratio (BCR) of 4:1 for investments to exceed select provisions of the 2015 *International Residential Code* (IRC) and *International Building Code* (IBC), the model building codes developed by the International Code Council (also known as the I-Codes); a BCR of 11:1 for adopting the 2018 IRC and IBC, versus codes represented by 1990-era design; a BCR of 4:1 for a select number of utilities and transportation infrastructure study cases;”¹⁰

Importantly, the report also concluded that investment in mitigation could save hundreds lives and prevent one million non-fatal injuries.¹¹

As compelling as the NIBS study is, there are recent examples, at the community and individual property levels, where strong building codes worked to reduce losses and improve recovery. After Hurricane Irma struck Florida in 2017, the Florida Department of Business and Professional Regulations did a comprehensive investigation of building damage that occurred as result of hurricane Irma. That report concluded, in part, that:

“Since Hurricane Irma was not a design-level hurricane, few structural failures should be expected in code-compliant houses. In our assessments we found no systemic failures of structural systems in single-family houses built in accordance to the 2001 Florida Building Code (i.e. houses built after March 2002). Conversely, we observed many structural failures in the pre-Florida building code houses (i.e. homes built before March 2002). Nearly 40% of the pre-2002 houses surveyed in the Florida Keys had structural damage (defined as damage to roof or wall structural members and roof sheathing)...”¹²

That same report went on to note that “[e]levated houses generally performed well against storm surge and flood inundation. Breakaway walls in lower enclosures were often damaged as expected.”

In contrast, many homes in the Florida panhandle were not constructed to conform with Florida’s statewide building code, and as a result many homes suffered catastrophic losses from Hurricane Michael in 2018. The following photo shows the horrific aftermath of hurricane Michael with the notable exception to the devastation being a home built to withstand wind of up to 250 mph, which far

⁹ National Institute of Building Sciences, “Natural Hazard Mitigation Saves: 2018 Interim Report,” (2018) Page 1. https://cdn.vmw.com/www.nibs.org/resource/resmgr/mmc/NIBS_MSv2-2018_Interim-Report.pdf

¹⁰ *Ibid.* page 1

¹¹ National Institute of Building Sciences, “Natural Hazard Mitigation Saves: 2018 Interim Report,” (2018) Page 86. https://cdn.vmw.com/www.nibs.org/resource/resmgr/mmc/NIBS_MSv2-2018_Interim-Report.pdf

¹² http://www.floridabuilding.org/fbc/publications/PrevattUF_FBC_2017_2018_FinalReport-Irma.pdf

exceeds Florida's code, which requires that homes be able to withstand winds of 120 mph. As a result, this home suffered minimal damage from hurricane Michael.



The examples above show that there should be no doubt that strong building codes and mitigation work to make communities and individuals safer and more resilient.

BRIDGING THE INSURANCE GAP

The property-casualty insurance industry is an essential part of our national emergency response apparatus. In the wake of 241 weather and climate disasters that each exceeded \$1 billion in damages/costs since 1980, property casualty insurers have consistently responded to help Americans recover. The total cost of these catastrophic events exceeds \$1.6 trillion.¹³ In 2017 alone, estimated insurance payments due to natural catastrophes in the U.S. topped \$78 billion, more than triple the \$23.8 billion total for 2016.¹⁴ In 2018, the U.S. experienced about \$92 billion in total damages and costs from natural disasters, with an estimated \$57 billion insured.¹⁵

¹³ NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2019). <https://www.ncdc.noaa.gov/billions/>

¹⁴ Insurance Information Institute, "Facts + Statistics: U.S. catastrophes." <https://www.iii.org/fact-statistic/facts-statistics-us-catastrophes>

¹⁵ AON: "Weather, Climate & Catastrophe Insight," 2018 Report, Page 38. (2018). <http://thoughtleadership.aonbenfield.com/Documents/20190122-ab-if-annual-weather-climate-report-2018.pdf>

Unfortunately, these figures represent approximately half of the total economic losses suffered. That is, a great number of people remain underinsured or uninsured against losses from natural catastrophes. While there is no doubt that insurance payments have helped communities and individuals recover, the United States faces a considerable insurance gap, especially for specific catastrophes like windstorms (hurricane), floods, and earthquakes. The following charts highlight the extent of the insurance gap for flood, wildfire, and hurricanes.

Chart 1 shows the difference between total losses and insured losses from 2000 to 2018 for flooding and flash flood. Note that it does not include flooding from cyclonic events (see chart 2). The data clearly show that far too few property owners have coverage for flooding, despite it being the most common natural catastrophe in the U.S.

Chart 1: Overall vs. Insured Flood Losses 2000-2018 (US \$ Billions)

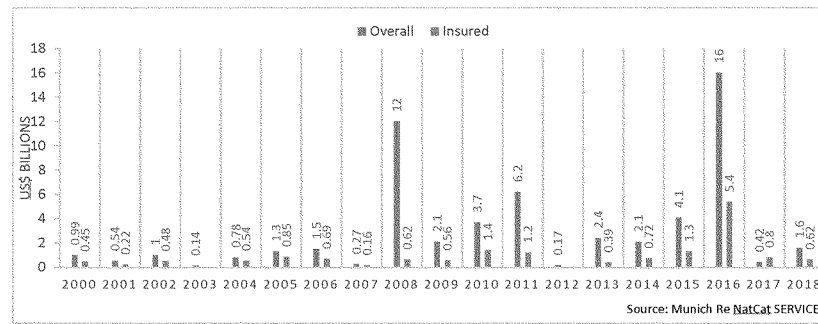


Chart 2 shows the difference between total losses and insured losses from 2000 to 2018 for tropical cyclones and includes flood losses from those events. As with flood, total losses far exceed the insured losses. In 2017, less than half of losses from hurricanes were insured and 2018 it was just above half. Unfortunately, looking over the entire period from 2000 – 2018, the data show a similar pattern.

Chart 2: Overall vs. Insured Tropical Cyclone Losses 2000-2018 (US \$ Billions)

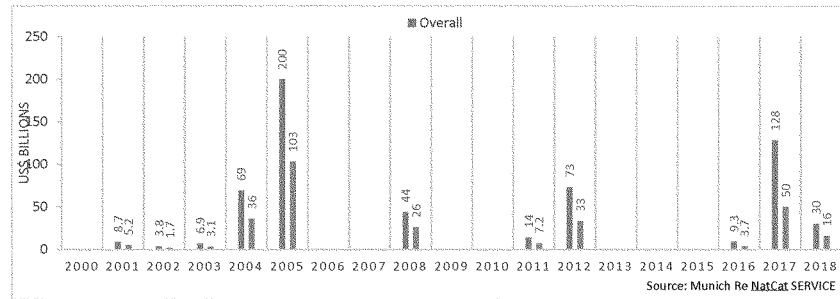
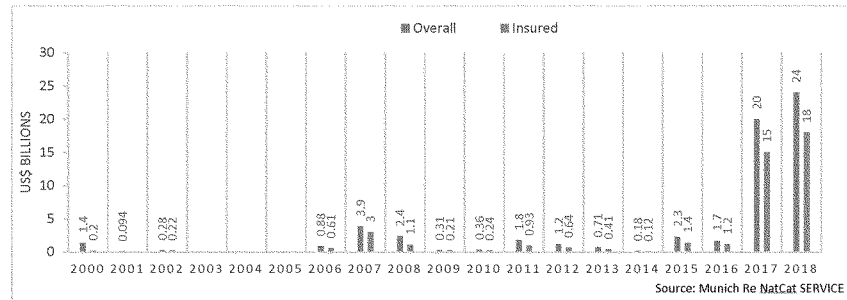


Chart 3 shows the overall vs. insured wildfire and heatwave losses from 2000-2018. With regard to wildfire, the insurance gap is smaller than with flooding or tropical storms. While smaller, there is still a considerable insurance gap when it comes to wildfires. Looking at the historic fires in 2017 and 2018, approximately one-third of total wildfire losses were uninsured.

Chart 3: Overall vs. Insured Wildfire/Heatwave Losses 2000-2018 (US \$ Billions)



With such a large portion of catastrophe losses being uninsured, many individuals and communities rely exclusively on government disaster assistance after a catastrophe strikes. Unfortunately, that assistance is often inadequate.

To highlight the benefit that insurance provides compared to disaster assistance, we can look to the National Flood Insurance Program (NFIP). Over the past five years, the average NFIP claim payment

was approximately \$69,000. The average FEMA individual disaster assistance grant is \$5,000 per household.¹⁶ Insurance coverage clearly provides a more robust means of recovery after a loss.

In addition to providing the financial means upon which individuals and businesses can start their recovery, property-casualty insurance can reduce the reliance on taxpayers or government assistance. Further, property-casualty insurance provides several other benefits that will improve resiliency. These include:

- Reducing exposure in a changing world through actuarially-sound risk transfer, risk underwriting, risk awareness and risk management;
- Sending important financial signals about risk and a creating a financial incentive to reduce or mitigate risk through risk-based pricing; and
- Articulating a common message about levels of risk and vulnerability posed by extreme weather to more directly match insurance coverage to relative risk.

Increasing take-up rates for catastrophe insurance is critically important if we really want to bend the curve in reducing costs and losses from natural catastrophes, and property-casualty insurers across the country are actively engaged in helping to close this insurance gap. The industry is working to improve insurance literacy, raise awareness of climate risks, urge disaster planning and preparedness, and encourage wider purchase of insurance.

CONCLUSION

Making America more resilient to natural catastrophe events will take the combined efforts of government, communities, the private sector, and individual property owners. As the Committee examines the impact of disasters on the federal budget and considers floor procedures for and/or amendments to legislation that will reduce economic losses, limit taxpayer expense, and make communities more resilient; we offer following broad-based suggestions:

- Require entities that receive federal disaster aid to rebuild stronger in order to limit the need for future disaster aid for similar losses.
- Adopt and enforce better building codes and defensible space requirements for both new and existing property and construction.
- Encourage states, U.S. territories, communities, and tribes to adopt prudent, hazard-specific land use measures including optimizing the natural infrastructure to limit damage.

¹⁶ <https://www.floodsmart.gov/why/why-buy-flood-insurance>

- Incorporate climate risk models and climate resilience standards into all public infrastructure projects.
- Commit additional government funds for resilient infrastructure and retrofitting existing infrastructure in areas at risk.
- Support and utilize research and targeted incentives (such as tax credits, loans, or grants) to promote effective loss mitigation, in order to reduce current and future risk to people, property, natural features, ecosystems, and critical infrastructure.
- Share science-based information to better inform public policy and decision-making at all levels of government and commerce, including analyses of the benefits and costs of property mitigation measures.
- Increase research funding for weather forecasting, including severe thunderstorms and hailstorms.

Property-casualty insurers stand ready to assist the Committee in building a resilient infrastructure and helping communities recover quickly after disaster strikes. APCIA thanks the Committee for holding this important hearing.



APPENDIX A

July 15, 2019

Ms. Kimberly Rogers
 Hazard Mitigation Grant Program Lead
 Federal Emergency Management Agency
 500 C St. S.W.
 Washington, D.C. 20472

Dear Ms. Rogers:

Representing nearly 60 percent of the U.S. property casualty insurance market, the American Property Casualty Insurance Association (APCIA) promotes and protects the viability of private competition for the benefit of consumers and insurers. APCIA represents the broadest cross-section of home, auto, and business insurers of any national trade association. APCIA members represent all sizes, structures, and regions, protecting families, communities, and businesses in the U.S. and across the globe.

APCIA supports FEMA's efforts to expand the nation's pre-disaster mitigation and the positive impact it will have on future disaster response and recovery efforts. We believe that FEMA's Building Resilient Infrastructure and Communities (BRIC) program creates a unique opportunity to expand FEMA's partnerships with stakeholders who share in the responsibility of preparation and recovery. As the nation's leading representative of property casualty insurers, we are writing to offer our feedback on the BRIC Webinar Series and recommendations for guiding principles as the program develops.

Prioritize Preparedness Through Education of Individuals and Community Leaders of Existing Risk.

There are two primary avenues of mitigation effort adoption: those taken by individuals, and those taken by communities to protect lives and property. While individual and community preparedness present unique challenges in pre-disaster mitigation efforts, both share fundamental characteristics that illustrate the core challenges to making those efforts effective.

APCIA believes that the most foundational component of disaster mitigation is education of individuals and community leaders. FEMA's educational efforts should be broad and include messaging that effectively communicates the risks faced at the individual and community levels. For individual risks, education should embrace and espouse the benefits of resilient materials in home construction, improvements available through retrofits, and financial protection available through insurance coverage. Such resilient building materials also have a better impact on the environment, by reducing the need for repair or replacement. For community risks, education should start with community leaders and elected officials, providing those leaders with data driven, cost-benefit analysis of traditional construction-based mitigation projects, as well as infrastructure resiliency upgrades.

Utilize Models of Proven Mitigation Efforts in States.

In the initial BRIC Webinar presentation, FEMA presented the City of Hoboken's Northwest Resiliency Park as an example of successful mitigation partnerships between the federal government and state and

555 12th Street, NW, Suite 550, Washington, DC 20004 | 202-828-7100
 444 North Capitol Street NW, Suite 801, Washington, DC 20001 | 202-639-0490
 8700 W. Bryn Mawr Avenue, Suite 1200S, Chicago, IL 60631-3512 | 847-297-7800

local officials.¹ The 6-acre park was initially designed to provide public recreation space. With design upgrades, funded in part through federal matching funds, a public recreation space was created that currently allows for 1.45 million gallons of stormwater storage. This provides significant mitigation of fluvial and flash flooding, protecting surrounding residential and commercial properties. The park demonstrates the positive impacts of effectively applied federal funds, the complementary benefits of improved infrastructure resiliency, and economic efficiencies of innovative design.

APCIA believes that existing programs created by municipalities and states in response to past catastrophic events, subsequently proven to be effective, should be studied and evaluated. Such programs can be developed as scalable models to be applied throughout the nation. Further, in-depth research and data gathering of known successes, such as the Northwest Resiliency Park, on an ongoing basis will serve to provide an objective measuring tool that FEMA can utilize effectively to guide future projects and allocations as the BRIC Program develops over time.

Develop a Broad Range of Partnerships -- Including Insurers.

Within the past several years, the United States has experienced some of the costliest disasters in the nation's history, bringing the need for pre-disaster mitigation to the forefront of planning discussions nationwide. While the particular response mechanisms are debated, it is widely agreed that a broad coalition of stakeholders will be needed to prepare individuals and communities for future hazardous events.

APCIA believes that building resiliency in communities will require the development of a risk assessment framework that will enable FEMA to prioritize mitigation resources based upon geographic risk categorization, and effectively target mitigation incentive expenditures. Development of such a framework will require a wide array of public and private partners. Because insurers utilize risk assessment at the core of their business practices, they are a capable resource for providing insight and analysis in the development of risk assessment tools employed by the BRIC Program.

Public/private partnerships at the local, state, and federal level also offer an opportunity for public interests to leverage the expertise of private companies to improve resiliency. Insurers stand closer in proximity to natural catastrophic events than any other private industry. Directly impacted by the adverse economic results of catastrophic events, insurers have worked for years to understand and measure the risks of such events. Insurers' substantial experience with data collection efforts provide a depth of knowledge that can be applied to both public and private hazard mitigation efforts. APCIA believes that the early adoption of public/private relationships during the development of the BRIC program will serve to broaden the program's reach and improve the efficiency of its long-term implementation.

Work Broadly and Continuously Towards Adoption of Modern Model Building Codes.

As mentioned on multiple occasions during FEMA's BRIC Webinar Series, the adoption and enforcement of modern building codes presents significant challenges, not least of which is that state and local jurisdictions currently apply their own codes and standards. This disparity results in federally supported infrastructure investments being implemented under a variety of resiliency standards, limiting the potential resiliency of future mitigation investments.

¹ <http://nwpark-cityofhoboken.opendata.arcgis.com/>

APCIA believes that, because building codes are currently so disparate, a long term, continuous, and nationwide effort should be made to adopt consistent modern model building codes. FEMA's BRIC Program provides an opportunity to highlight the potential positive impact in resiliency development and maintenance that building code uniformity offers, and the ongoing nature of the Program offers a mechanism and a forum for long-term continuity to the discussions surrounding modern building code adoption. Organizations and stakeholders such as the International Code Council (ICC), the BuildStrong Coalition, the National Institute of Business (NIBS), and APCIA stand ready to work towards this goal.

Support Community Lifelines to Ensure that Mitigation Efforts Produce the Maximum Benefit for Dollars Invested.

According to the National Institute of Building Sciences' -- Natural Hazard Mitigation Saves: 2018 Interim Report -- federal mitigation grants produce a 6:1 dollar cost ratio benefit, adoption of model building codes produce a 11:1 dollar cost ratio benefit, and mitigation infrastructure produces a 4:1 dollar cost ratio benefit.² Such a substantial return on investment illustrates the positive benefits of a holistic and analytical approach to disaster mitigation and response, which helps to maintain governmental support for mitigation and resiliency programs.

APCIA believes that continued prioritization of community and resilient lifelines is an essential component of developing the approach necessary to ensure that the BRIC Program fulfills its objectives. Disaster mitigation and response present complex challenges, which require organized advanced planning. APCIA believes that lifelines are effective mechanisms for addressing the complexities that exist in planning for future hazards, and the difficulties that result when hazards manifest. Finally, APCIA believes that lifelines illustrate the real-world benefits to disaster mitigation expenditures and helps to bring into focus the necessity of programs such as BRIC.

Thank you for considering our feedback and comments. APCIA will be an active participant in future discussions and efforts to strengthen the nation's resiliency and implement effective mitigation projects.

Sincerely,

/Mike Richmond-Crum/

Mike Richmond-Crum
Associate Counsel
American Property Casualty Insurance Association

² https://cdn.ymaws.com/www.nibs.org/resource/resmgr/mmc/NIBS_MSv2-2018_Interim-Report.pdf



Florida:

- Working in Solar generation – 10,528
- Working in Wind generation – 4,461
- Working in Hydro generation – 366
- Working in Energy storage – 1,851
- Working in Energy Efficiency – 118,412

New York:

- Working in Solar generation – 11,603
- Working in Wind generation – 3,491
- Working in Hydro generation – 5,487
- Working in Energy storage – 1,847
- Working in Energy Efficiency – 123,292

Pennsylvania:

- Working in Solar generation – 4,846
- Working in Wind generation – 2,815
- Working in Hydro generation – 299
- Working in Energy storage – 1,859
- Working in Energy Efficiency – 68,820

Massachusetts:

- Working in Solar generation – 16,527
- Working in Wind generation – 1,983
- Working in Hydro generation – 1,677
- Working in Energy storage – 3,803
- Working in Energy Efficiency – 86,473

Data comes from a report by the National Association of State Energy Officials and Energy Futures Initiative <https://www.usenergyjobs.org/2019-report>

Curriculum Vitae

WILLIAM PETER JOHNSON, R.N., M.S., CEM®

9468 Equus Circle
 Boynton Beach, FL 33472-4308
 bill.johnson.rn@gmail.com
 Telephone: (954) 990-9531

<u>EDUCATION</u>	<u>DEGREE</u>	<u>DATES</u>	<u>DISCIPLINE</u>
University of Wisconsin-Madison	M.S.	1985-1987	Nursing Administration
University of Wisconsin-Madison	B.S.N.	1979-1983	Nursing
University of Wisconsin-Stevens Point	---	1977-1979	Pre-Physicians' Assistant

PROFESSIONAL EXPERIENCE

4/2010 to present	<p>Palm Beach County, West Palm Beach, Florida. Director, Division of Emergency Management, Public Safety Department. Oversee the Emergency Operations Center and County Warning Point, the County's disaster planning, preparedness, mitigation, and recovery program and primary answering point for major emergencies. Additionally, manage the County's Emergency Medical Services program. Responsibilities include the establishment of the Division's goals and objectives, overall management of 27 FTEs, and development / coordination of a \$3.9 million annual budget. Also lead organizational planning, both operational and strategic; oversee the planning and development of technological upgrades for the EOC facility; and review and approve all Division policies and countywide preparedness plans. Major accomplishments include numerous EOC activations, two revision cycles of the County's CEMP, LMS, and PDRP plans, and ultimately, Emergency Management Accreditation Program (EMAP) Accreditation in 2016.</p>
5/2008 to 3/2010	<p>Broward County, Ft. Lauderdale, Florida. Assistant Director, Emergency Management Division. Function as second-in-command of the Emergency Operations Center, the county's disaster planning, preparedness, mitigation, and recovery program. Accountable for the planning, implementation, and coordination of diversified administrative activities. Responsibilities include the establishment goals and objectives, supervision of 16 FTEs, development and coordination of a \$2.8 million annual budget, expenditure monitoring, and fiscal control. Also accountable for the direction of emergency planners involved in the planning, mitigation, response, and recovery efforts in natural and technological disaster situations. Major accomplishments include physical and procedural reorganization of the EOC structure and requisite revision of the CEMP and subordinate SOPs, re-design of the duty officer program, implementation of WebEOC® software, revision of the LMS plan, and acquisition of numerous grants to maintain the division (55% grant-funded).</p>

CURRICULUM VITAE, William P. Johnson, R.N., M.S., CEM (continued)

6/2005 to 5/2008

URS Corporation, Miami, Florida. Director, Emergency Management Program. Accountable for the direction of the strategic business development activities for the Florida "All Hazards" market sector. Provide a wide array of emergency management and homeland security consulting services to numerous public and private accounts. Also serve as a corporate-wide subject matter expert for all hazards, especially homeland security. Developed strong client relationships within a highly competitive environment in order to accomplish over \$2 million in annual sales. Major accomplishments include development of a variety of all-hazards plans including CEMP, COOP/COG, plans gap-analysis, radiological response, mass fatality, pandemic/infectious diseases, TICP, terrorism response, and multi-hospital evacuation; performance of shelter assessments; performance of various exercises ranging from small table tops to full-scale functional; and training programs on many of the above plans. Achieved Project Manager Certification.

8/1995 to 6/2005

Miami-Dade County, Miami, Florida. Assistant Director, in the County Manager's Office of Emergency Management. Function as second-in-command of the Emergency Operations Center, the county's disaster planning, preparedness, mitigation, and recovery program. Accountable for the planning, implementation, and coordination of diversified administrative activities. Responsibilities include the establishment goals and objectives, supervision of 26 FTEs, development and coordination of a \$3.1 million annual budget, expenditure monitoring, and fiscal control. Also accountable for the direction of emergency planners involved in the planning, mitigation, response, and recovery efforts in natural and technological disaster situations including operational activities such as training, exercising, evacuation, sheltering, mass feeding, sheltering of people with special needs, public information, damage assessment, and coordination of response and recovery efforts. Major accomplishments included the development of a comprehensive emergency management plan, significant reduction in shelter deficit, design and relocation to a new EOC, acquisition of over \$2 million in grants for terrorism and hazard mitigation, and numerous EOC activations. Note: served in a dual-role as Director of the Office of Trauma Services from 8/1995 to 10/1997 when the Office's funding was eliminated.

9/1991 to 8/1995

Miami-Dade County, Miami, Florida. Quality Management Administrator in the County Manager's Office of Trauma Services. Accountable for the planning, development, implementation, and administration of a countywide *Trauma System Quality Management Program*. Responsibilities include reviewing trauma criteria cases and the treatment procedures used by all care providers and determining whether the cases fall within the guidelines set by the *Program* and the State; designing and revising evaluation methodologies and data collection procedures that lead to system improvement; refining the computer-based indicator monitoring system; developing reports that describe the effectiveness and efficiency of the trauma system; and coordinating inter-disciplinary groups to affect system changes in order to improve the quality of trauma care. The *Program* received a NACo Achievement Award in 1994. Instrumental in writing State statutes that provide for the confidentiality and non-discoverability of systems quality management activities. Also responsible for maintaining the Miami-Dade County *Trauma Registry* and publishing quarterly reports. In September 1992, after *Hurricane Andrew*, temporarily re-assigned to serve as Medical Operations Director for the southern portion of Miami-Dade County coordinating and reestablishing all prehospital, primary, and definitive healthcare services to the devastated area.

CURRICULUM VITAE, William P. Johnson, R.N., M.S., CEM (continued)

- 6/1990 to 8/1991 **South Miami Hospital**, Miami, Florida. **Nurse Manager** of the Emergency Department. Accountable for the operational management of a Level II emergency department and *Rapid Treatment Center*® together receiving over 19,000 visits annually. Responsibilities included management and implementation of departmental goals and objectives, supervision of over 26 FTEs, and fiscal responsibility for a \$1.7 million annual budget. Major accomplishments included: revision of the staffing mix and distribution based upon patient volume; implementation of departmental standards of nursing care; developed and implemented a preceptor and competency-based staff nurse orientation program; revision of the quality assurance program including implementation of a patient call-back program; and was actively involved in the planning of an extensive remodeling and expansion project to double the capacity of the department.
- 2/1988 to 5/1990 **Sacred Heart Hospital**, Eau Claire, Wisconsin. **Director** of the Emergency Medical and Trauma Center (EMTC). Accountable for the operational management of a federally designated Level II Trauma Center receiving approximately 17,000 visits annually. Responsibilities included departmental strategic planning and the implementation of departmental goals and objectives, supervision of 24.5 FTEs, and fiscal responsibility for a \$1.5 million annual budget. Major accomplishments included: facilitated the attainment of federal and state designation as a primary evacuation hospital for radiologically contaminated persons; developed and implemented an Education Coordinator position within the department; implemented a primary nursing care delivery model; developed, implemented, and tested a patient classification system; restructured the billing system to reflect patient acuity and resource demands; implemented departmental standards of nursing care; facilitated the major revision of the position description, evaluation tool, and peer review mechanism for the departments registered staff nurses; facilitated the major revision of the preceptor-based staff nurse orientation program; developed and implemented the quality assurance program including a patient call-back program; developed an extensive educational outreach program including courses in Critical Trauma Care, Basic Trauma Life Support, EMS For Children, and Trauma Nursing Core Course; and was involved in the planning of an extensive departmental remodeling project.
- 8/1985 to 2/1988 **University of Wisconsin Hospital and Clinics**, Madison, Wisconsin. **Staff Nurse III** on a neurology/neuro-surgical unit, and in 1985-86, on a renal, liver, and pancreas transplant unit. Assumed 24-hour accountability for care planning and evaluation of the pre-op, post-op, rehab, and discharge phases of neurology and neuro-surgical patients, organ transplant donors, recipients, and families under a primary nursing system. Also functioned as a "float staff nurse" in the cardiovascular surgical and cardiopulmonary intermediate care units, general medical-surgical, neuro-trauma, and pediatric units. Work also involved functions such as interdisciplinary communication and coordination; quality assurance procedures; and, management of ethical issues regarding neurological care, organ donation, and transplantation.

CURRICULUM VITAE, William P. Johnson, R.N., M.S., CEM (continued)

PROFESSIONAL ACTIVITIES AND COMMITTEE SERVICES

Member	Florida Division of Emergency Management (FDEM) Emergency Management Advisory Group (EMAG), Tallahassee, Florida, August 2016 to present.
Member	Southeast Florida Regional Domestic Security Task Force (RDSTF) Executive Advisory Board, Miami, Florida, May 2011 to present.
Member	Palm Beach County Criminal Justice Commission's Law Enforcement Planning Council's School Safety Committee. July 2018 to present.
Member	Florida Governor's Hurricane Conference Program Planning Committee, Tallahassee, FL, member 2006 to present; Chairman, July 2012 to July 2018.
Vice-President	Florida Governor's Hurricane Conference Board of Directors, Tallahassee, FL, July 2011 to 2018.
Team Member	Federal Emergency Management Agency (FEMA) Hurricane Liaison Team, Washington, D.C., September 2000 to February 2011.
Member	Broward County Regional Emergency Medical Services (EMS) Council, Ft. Lauderdale, FL, August 2008 to March, 2010.
Chairman	'Disaster: International Conference on Disaster Management' Program Committee, Florida Emergency Medicine Foundation, Orlando, Florida, May 1998 to February 2009.
President	South Florida Regional Disaster Medical Assistance Team (DMAT FL-5) Board of Directors, Miami, Florida, January 1996 to January 1999. Secretary from January 1994 to January 1996 and Director from January 1996 to January 2005.

RESEARCH, PUBLICATIONS, AND MAJOR PROJECTS

- United States. Department of Homeland Security, Federal Emergency Management Agency. (August, 2008). *Emergency Management Considerations in FEMA 361: Design Construction Guidance for Community Safe Rooms* (pp. 9-1 – 9-11).
- Johnson, B., (September, 2004). Miami-Dade's experience: Major drill...many lessons. *Disaster Medicine: Newsletter of the American College of Emergency Physicians*, 13(4), 7-12.
- Lanza, C.V., Johnson, W.P., & Batista, N.H. (December, 2003). Sunshine State Scenario. *Homeland Defense Journal*, 1(9), 34-38.
- Lanza, C.V., Johnson, W.P., & Batista, N.H. (July 31, 2002). A Blueprint for Anti-terrorism Planning. *Homeland Defense Journal*, 1(13), 9-10.
- Lanza, C.V., Johnson, W.P., & Batista, N.H. (April 9, 2002). Smallpox: A Global Problem with Local Solutions (Part 3). *Homeland Defense Journal*, 1(6), 1, 9.
- Lanza, C.V., Johnson, W.P., & Batista, N.H. (March 27, 2002). Smallpox: A Global Problem with Local Solutions (Part 2). *Homeland Defense Journal*, 1(5), 1, 10-11.

CURRICULUM VITAE, William P. Johnson, R.N., M.S., CEM (continued)

Lanza, C.V., Johnson, W.P., & Batista, N.H. (March 1, 2002). Smallpox: A Global Problem with Local Solutions (Part 1). Homeland Defense Journal, 1(4), 1, 3.

RESEARCH, PUBLICATIONS, AND MAJOR PROJECTS continued...

Johnson, W.P. (January-March, 1996). Evaluation of the Pediatric Trauma Triage Checklist as a prehospital pediatric trauma triage tool for the State of Florida. Prehospital and Disaster Medicine, 11(1), 31-37.

Johnson, W.P., & Lanza, C.V. (April-June, 1993). After Andrew: An EMS perspective. Prehospital and Disaster Medicine, 8(2), 169-171.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

1/2002 to present	International Association of Emergency Managers
2/2002 to present	Florida Emergency Preparedness Association
7/1984 to present	University of Wisconsin-Madison Nurses' Alumni Association
1/1982 to present	National Student Nurses' Association (Sustaining Member)

PROFESSIONAL LICENSES AND CERTIFICATIONS HELD

Licensed to practice professional nursing in the State of Florida. Certified as an Emergency Medical Technician and Paramedic in the State of Florida. Certified Emergency Manager® through the International Association of Emergency Managers (IAEM) in 1997 (re-certified in 2002, 2007, 2012, and 2016 – through 2022). Certified “Florida Professional Emergency Manager” (FPEM) through the Florida Emergency Preparedness Association (FEPA) in 2016 – through 2022. Protected Critical Infrastructure Information (PCII) certified in 2009. CJIS Level 2 certified in 2016; recertified biennially. Secret clearance granted April 2018.

HONORS, AWARDS, AND SCHOLARSHIPS

2016	Chad Reed Emergency Management Professional of the Year awarded at the 2016 Florida Emergency Preparedness Association Annual Meeting
2012	Emergency Management Award, [Florida] Governor's Hurricane Conference
2005	Dr. Robert Sheets Lifetime Achievement Award awarded at the South Florida Hurricane Conference
2001	Special Recognition for deployment to the New York City Mayor's Office of Emergency Management Emergency Operations Center (EOC) after the September 11 th attack on the World Trade Center
1994	National Association of Counties Achievement Award
1988	Wisconsin Student Nurses' Association Honorary Lifetime Membership

CURRICULUM VITAE, William P. Johnson, R.N., M.S., CEM (continued)

1984 Wisconsin Student Nurses' Association Special Recognition

REFERENCES

Full personal and professional references provided upon request.

Revised: December 2018

Truth in Testimony Disclosure Form

In accordance with Rule X1, clause 2(g)(5)*, of the *Rules of the House of Representatives*, witnesses are asked to disclose the following information. Please complete this form electronically by filling in the provided blanks.

Committee: Rules

Subcommittee: Legislative and Budget Process

Hearing Date: September 24, 2019

Hearing Subject:

Building resilient communities and investing in America's future

Witness Name: William "Bill" Johnson, RN

Position/Title: Director, Palm Beach County Division of Emergency Management

Witness Type: ☒ Governmental ☐ Non-governmental

Are you representing yourself or an organization? ☐ Self ☒ Organization

If you are representing an organization, please list what entity or entities you are representing:

Palm Beach County, Board of County Commissioners and Administrative staff.

If you are a non-governmental witness, please list any federal grants or contracts (including subgrants or subcontracts) related to the hearing's subject matter that you or the organization(s) you represent at this hearing received in the current calendar year and previous two calendar years. Include the source and amount of each grant or contract. *If necessary, attach additional sheet(s) to provide more information.*

N/A - governmental witness

If you are a non-governmental witness, please list any contracts or payments originating with a foreign government and related to the hearing's subject matter that you or the organization(s) you represent at this hearing received in the current year and previous two calendar years. Include the amount and country of origin of each contract or payment. *If necessary, attach additional sheet(s) to provide more information.*

N/A - governmental witness

Heather McTeer Toney was the first African-American, first female and the youngest to serve as Mayor of Greenville, Mississippi from 2004-2012. In 2014, she was appointed by President Barack Obama as Regional Administrator for Environmental Protection Agency's (EPA) Southeast Region. Known for her energetic and genuine commitment to people, her work has made her a national figure in the area of public service, environmental justice and community engagement. She currently serves as the National Field Director for Moms Clean Air Force, an organization of over 1 million moms and dads committed to fighting climate change and protecting children from the dangers of air pollution. Heather is also a sought-after speaker and writer.

The daughter of a civil rights attorney and public school teacher, Heather was born and raised in Greenville, Mississippi. In 2003, she was elected Mayor of the City of Greenville and re-elected for a second term in 2007. Under her leadership, the city thrived, emerged from significant debt, and received millions of dollars in grants and federal assistance. At EPA, Mrs. Toney was responsible for protecting public health and the environment in eight southeastern states, as well as six federally recognized tribes; making Region 4 the most populated and diverse of ten regions. In addition, she led efforts to maintain and enhance the quality of work life for Region 4's approximately 1,000 employees while effectively managing a budget of more than \$500 million.

Heather has served in several roles throughout her career including one of the National Spokeswomen for *She Should Run!*, a National Organization that encourages women to run for office. She is an expert on environmental and climate justice with *SheSource*, a publication of the Women's Media Center and has worked around the world. She is known for advocating and training diverse officials on leadership in over 15 countries including Kenya, France, Portugal, Nigeria and Senegal. She has appeared on news outlets such as CNN, MSNBC, Fox News, and *Democracy Now!* She has written for and been featured in numerous papers including the *New York Times* and the *Washington Post*. McTeer Toney was featured in the May 2005 issue of *Essence Magazine* as one of the "50 Most Remarkable Women in the World." She is also one of the winners of *Marie Claire Magazine's* "Women on Top" awards. Heather is often a guest on various Sirius/XM radio shows and was included in the PBS/AOL documentary entitled "MAKERS", where she appears alongside noted women such as Hillary Clinton and Condoleezza Rice.

Mrs. Toney earned a bachelor's degree in Sociology from Spelman College in Atlanta. She earned her law degree from the Tulane University School of Law. Heather is a member of numerous organizations, is an avid athlete that loves triathlons. She is a member of Alpha Kappa Alpha Sorority, Inc., and an active member of New Living Way Christian Fellowship church. She is married to Dexter Toney and they have three children.

Truth in Testimony Disclosure Form

In accordance with Rule XI, clause 2(g)(5)*, of the *Rules of the House of Representatives*, witnesses are asked to disclose the following information. Please complete this form electronically by filling in the provided blanks.

Committee: Rules

Subcommittee: Legislative and Budget Process

Hearing Date: September 24, 2019

Hearing Subject:

Building resilient communities and investing in America's future

Witness Name: Heather McTeer Toney

Position/Title: National Field Director, Moms Clean Air Force & Former Mayor of Greenville, MS

Witness Type: ☐ Governmental ☒ Non-governmental

Are you representing yourself or an organization? ☐ Self ☒ Organization

If you are representing an organization, please list what entity or entities you are representing:

Moms Clean Air Force

If you are a **non-governmental witness**, please list any federal grants or contracts (including subgrants or subcontracts) related to the hearing's subject matter that you or the organization(s) you represent at this hearing received in the current calendar year and previous two calendar years. Include the source and amount of each grant or contract. *If necessary, attach additional sheet(s) to provide more information.*

n/a

If you are a **non-governmental witness**, please list any contracts or payments originating with a foreign government and related to the hearing's subject matter that you or the organization(s) you represent at this hearing received in the current year and previous two calendar years. Include the amount and country of origin of each contract or payment. *If necessary, attach additional sheet(s) to provide more information.*

n/a



John Piotti

John Piotti has worked at the forefront of sustainable agriculture since the early 1990s, first in Maine, and now nationally.

In 2016, he became the President of **American Farmland Trust**, bringing new energy to this storied organization that helped create the conservation agriculture movement.

Under John's leadership, AFT has engaged in the most comprehensive study of American land use ever conducted, helped secure an additional \$200 million/year in Federal funding for agricultural conservation easements, and launched new initiatives that advance restorative farming practices, combat climate change, and support next generation farmers.

Prior to joining AFT, John served as President of Maine Farmland Trust, which during his tenure became recognized as one of the most innovative and impactful farm-support groups in the nation.

John has also served in the Maine State Legislature, where he chaired the Agriculture Committee and was later elected House Majority Leader.

In 2013, John was named to *Maine Magazine's* inaugural list of one of the 50 people who have done the most for the state.

In 2005, he received a prestigious Eisenhower Fellowship, which he used to study agricultural policy in Europe.

John holds three degrees from the Massachusetts Institute of Technology: in engineering, public policy, and systems management.

Truth in Testimony Disclosure Form

In accordance with Rule XI, clause 2(g)(5)*, of the *Rules of the House of Representatives*, witnesses are asked to disclose the following information. Please complete this form electronically by filling in the provided blanks.

Committee: Rules

Subcommittee: Legislative and Budget Process

Hearing Date: September 24, 2019

Hearing Subject:

Building resilient communities and investing in America's future

Witness Name: John Piotti

Position/Title: President and CEO

Witness Type: ☐ Governmental ☐ Non-governmental

Are you representing yourself or an organization? ☒ Self ☐ Organization

If you are representing an organization, please list what entity or entities you are representing:

American Farmland Trust (AFT)

If you are a **non-governmental witness**, please list any federal grants or contracts (including subgrants or subcontracts) related to the hearing's subject matter that you or the organization(s) you represent at this hearing received in the current calendar year and previous two calendar years. Include the source and amount of each grant or contract. *If necessary, attach additional sheet(s) to provide more information.*

Please see attached sheet for a list of American Farmland Trust's federal grants and contracts.

If you are a **non-governmental witness**, please list any contracts or payments originating with a foreign government and related to the hearing's subject matter that you or the organization(s) you represent at this hearing received in the current year and previous two calendar years. Include the amount and country of origin of each contract or payment. *If necessary, attach additional sheet(s) to provide more information.*

Not applicable.

Katherine Hamilton, Executive Director, Advanced Energy Management Alliance

Katherine Hamilton is Executive Director of Advanced Energy Management Alliance, an association of providers and supporters of Distributed Energy Resources, including Demand Response and Advanced Energy Management, united to overcome barriers to nationwide use of demand-side resources. Katherine is Chair of 38 North Solutions, a public policy consultancy specializing in clean energy and innovation. In this role, Katherine has been listed on the #Solar100 board by kWh Analytics and received a Cleanie Award as Entrepreneur of the Year in 2018. Katherine was Co-Chair of the World Economic Forum's Future of Advanced Energy Technology Global Future Council and President of GRID Alternatives Mid-Atlantic. Katherine served as President of the GridWise Alliance, advocating for nearly \$5 billion in funding for smart grid projects in the Recovery Act. Prior to that role, Katherine was a policy advisor for Good Energies, Inc., a private investment company with a portfolio in clean energy technologies of nearly \$6 billion. She co-directed the American Bioenergy Association, working with the states of Maryland and New Jersey to develop renewable portfolio standards. At the National Renewable Energy Laboratory (NREL), Katherine led buildings research and then managed government relations in Washington, DC. Katherine spent a decade at Virginia Power, designing overhead and underground electrical systems for commercial and residential developments. Katherine studied electrical engineering at Northern Virginia Community College and holds degrees from Cornell University and the Sorbonne. Katherine is part of The Energy Gang podcast through Greentech Media.

Truth in Testimony Disclosure Form

In accordance with Rule XI, clause 2(g)(5)*, of the *Rules of the House of Representatives*, witnesses are asked to disclose the following information. Please complete this form electronically by filling in the provided blanks.

Committee: **Rules**

Subcommittee: **Legislative and Budget Process**

Hearing Date: **September 24, 2019**

Hearing Subject

Building resilient communities and investing in America's future

Witness Name: **Katherine Hamilton**

Position/Title: **Executive Director, Advanced Energy Management Alliance**

Witness Type: ☐ Governmental ☒ Non-governmental

Are you representing yourself or an organization? ☐ Self ☒ Organization

If you are representing an organization, please list what entity or entities you are representing:

Companies and customer members aligned on distributed energy resources. The full list is on the website: <https://aem-alliance.org/about/members/>

If you are a **non-governmental witness**, please list any federal grants or contracts (including subgrants or subcontracts) related to the hearing's subject matter that you or the organization(s) you represent at this hearing received in the current calendar year and previous two calendar years. Include the source and amount of each grant or contract. *If necessary, attach additional sheet(s) to provide more information.*

AEMA has not in the past nor plans to receive any government contracts or grants.

If you are a **non-governmental witness**, please list any contracts or payments originating with a foreign government and related to the hearing's subject matter that you or the organization(s) you represent at this hearing received in the current year and previous two calendar years. Include the amount and country of origin of each contract or payment. *If necessary, attach additional sheet(s) to provide more information.*

AEMA members include companies in Canada, but do not include contracts with or payments from any foreign government.

MARVIN PHAUP

Trachtenberg School of Public Policy and Public Administration
The George Washington University
805 21st St., NW
Washington, DC 20052
MPhaup@GWU.edu; marvinphaup@gmail.com
Preferred mailing address: 301 G St. SW # 734
Washington, DC 20024-3132
Tel. 202-531-1862 (primary), 202-488-0992 (secondary)

Marvin Phaup is Research Scholar and Professorial Lecturer at the Trachtenberg School of Public Policy and Public Administration, the George Washington University, where he teaches federal budget concepts and policy, conducts research, writes for publication and provides consulting services. From July 2009 through December 2010, he directed the Federal Budget Reform Initiative of the Pew Charitable Trusts, whose objective was to improve federal policy by transforming the federal budget into a more relevant and useful source of fiscal information for decision makers and the public. Prior to joining the Trachtenberg School in 2007, he headed the Financial Studies/Budget Process group at the U.S. Congressional Budget Office. His work has focused on analyses of federal financial policies and institutions and the implications for their budgetary treatment. His early work contributed to the development and adoption of the Federal Credit Reform Act of 1990, which changed the budgetary basis of accounting for direct loans and loan guarantees from cash-basis to accrual. Under his direction, the financial studies group addressed the federal cost of government sponsored enterprises, including Fannie Mae, Freddie Mac and the Federal Home Loan Banks; the budgetary treatment of federal investment in risky private securities; the effect of including the cost of market risk in the subsidy cost of federal guarantees; the value of pension insurance provided by the Pension Benefit Guaranty Corporation; terrorism insurance; the market value of FHA mortgage insurance; the option value of deposit insurance; the cost of the federal student loan

programs; reconciling federal financial statements with the budget; and possible revisions to the Federal Credit Reform Act..

He also provided staff support for CBO members of the Federal Accounting Standards Advisory Board 1990-2004. He served as Senior Economist at the Federal Reserve Bank of Cleveland, Lecturer at the University of Lancaster (England), and Assistant Professor at Roanoke College. Phaup received a Ph.D. (economics) from the University of Virginia and B.A. from Roanoke College. He also studied at the University of Oslo, Norway under the Hays-Fulbright program.

He was elected Fellow of the National Academy of Public Administration in 2015 and awarded a Doctor of Laws (honorary) by Roanoke College in May 2014 for contributions to public policy and budgeting; service to country and college. He also received the Roanoke College Medal in 2009 and the S. Kenneth Howard Award for Lifetime Achievement in public budgeting and finance from the Association for Budgeting and Financial Management in 2004 and the National Distinguished Service Award from the American Association for Budget and Program Analysis in 1995.

In 2015, he served as Member, International Monetary Fund, Technical Assistance Team, Budgeting for Contingencies, Mission to the Republic of the Philippines. He is a long-term member of the Board of Directors, Public Financial Publications, inc. publishers of *Public Budgeting & Finance*.

MARVIN PHAUP

Trachtenberg School of Public Policy and Public
Administration
The George Washington University
805 21st St., NW, Suite 600
Washington, DC 20052
MPhaup@gwu.edu, marvinphaup@gmail.com
202-531-1862 (primary), 202-488-0992 (secondary)

Preferred mailing address:
301 G Street, SW
Apt. 734
Washington, DC 20024-3132

CURRENT APPOINTMENTS

Research Scholar and Professorial Lecturer
The George Washington University
Since November 2007
Teach graduate courses in Federal Budgeting. Conduct
research. Write for publication. Provide consulting
services.

Part-time Instructor,
Economic Analysis in Public Administration,
Schar School of Policy and Government,
George Mason University
Since Spring 2017

Fellow, National Academy of Public Administration, elected
September 2015

Director, Public Financial Publications, Publishers of Public Budgeting & Finance, since 1988

Referee for *Public Administration Review*, *Public Budgeting & Finance*, *Southern Economic Review*

Occasional External Examiner, Ph. D. dissertation defense, Department of Economics and Trachtenberg School of Public Policy and Public Administration, The George Washington University

Consultant, Arthur S. Fleming Awards to Federal Employees in Applied Science, Mathematics, and Engineering

CURRENT RESEARCH INTERESTS

- Improving performance of the federal budget process by: adding a more effective long-term constraint; increasing the planning horizon; broadening measurement focus; integrating tax expenditures, savings targets, performance measures into the process; applying findings of behavioral economics.
- Budget concepts and process reform; economics and public policy.
- Papers in process:
 - The Power of Salient Cost Estimates in the Federal Budget Process: Credit Programs and Implications for Reform
 - Strategic Misuse of the FCRA Measure of Budget Cost to Finance Unrelated, Costly Initiatives

PREVIOUS APPOINTMENTS

Member, IMF Technical Assistance Team, Budgeting for Contingencies, Republic of the Philippines, May-June 2015

Consultant, Peterson-Pew Commission on Budget Reform, January – December 2011. Advised members; drafted and reviewed Commission position papers.

Director, Federal Budget Reform Initiative
The Pew Charitable Trusts
Washington, DC
July 2009 - December 2010

Provided technical advice and support to the Peterson-Pew Commission on Federal Budget Reform leading to the publication of Commission reports, *Red Ink Rising* (December 2009) and *Getting Back in the Black* (November 2010). Documented the risks of current US fiscal policy and recommended structural reforms for restoring and maintaining fiscal balance.

Member, Task Force on the Reporting Model, Federal Accounting Standards Advisory Board, 2010

Member, Advisory Board, Pew Charitable Trusts, Subsidy Scope Project
2008 – 2009

Consultant, Organization for Economic Cooperation and Development (OECD), Paris, 2008 - 2009

Deputy Assistant Director and Principal Analyst, U. S.
Congressional Budget Office
June 1976 to November 2007

Deputy Assistant Director, Financial Studies Group, Macro
Analysis Division, (2004); Deputy Assistant Director,
Microeconomics and Financial Studies (2000); Deputy
Assistant Director, Special Studies Division (February 1992);
Chief, Budget Process Unit (1986); Principal Analyst (1976)
Responsibilities: develop, manage, conduct and write research
studies; advise Member of Federal Accounting Standards
Advisory Board; and prepare testimony for Director. Work
conducted or supervised included studies of the costs and
benefits of government sponsored enterprises; the subsidy cost
of federal loans and guarantees, including student loans, SBA
guarantees, and mortgage insurance; federal investment in risky
securities; using options pricing to value federal pension and
deposit insurance; the value and cost of the student loan
consolidation option; accounting for government-written put
options; tax credit bonds; and possible revisions to the Federal
Credit Reform Act. Goal: to improve the flow and use of
complex, decision-relevant cost information to the Congress for
use in budget and policy decisions.

Federal Reserve Bank of Cleveland
1969 to June 1976

Senior Economist (1973)

Responsibilities: Conducting research in money, banking and
finance; advising senior Bank officers; writing for Bank
publications; speaking for the Bank at business and public
meetings; developing a long - term plan for Bank services.

University of Lancaster (England, UK)

1967 - 1969

Lecturer in monetary theory; tutor in micro- and macro-economics; research

Roanoke College, Salem, Virginia

1965 - 1967

Assistant Professor; teaching principles, intermediate micro- and macro-, money and banking, international, and quantitative economics; coaching the Roanoke College GE Bowl team

EDUCATION

University of Virginia

Ph.D. (Economics), 1966; M.A., 1964

University of Oslo, Norway

Fulbright Fellow, 1964-1965

Roanoke College, B.A. 1962

HONORS AND AWARDS

Elected Fellow, National Academy of Public Administration, September 2015

Doctor of Laws (Hon), Roanoke College, May 2014, for contributions to public policy and budgeting and service to country and college

Recipient of Roanoke College Medal 2009

Association for Budgeting and Financial Management.

S. Kenneth Howard Award, 2004, for Lifetime Professional Achievement in the Field of Public Budgeting and Finance.

Congressional Budget Office:

Management Performance Awards, 2005, 2004, 2003, and 2001.

Appreciation Award (2004) Presented by Staff of MFSD.

American Association for Budget and Program Analysis:

National Distinguished Service Award 1995

Arlington County Public Schools:

Public Service Award, 1989

University of Virginia:

Raven Society

Omicron Delta Kappa

Omicron Delta Epsilon

Thomas Jefferson Center Fellowship

Fulbright-Hays Fellowship

Roanoke College:

Class Salutatorian

Wall Street Journal Award (Economics)

Sesquicentennial Alumni Award, 1992

PUBLICATIONS

Budgeting for Mandatory Spending: Prologue to Reform, *Public Budgeting & Finance*, 39, 1 (Spring) 2019, 24-33.

“Making Better Budget Decisions Easier: Some Changes Suggested by Behavioral Research” (with James Hearn), Brookings Research Papers, June 17, 2016. <http://www.brookings.edu/research/papers/2016/06/17-making-better-budget-decisions-easier-hearn-phaup>

“Federal Budget Reform: A Behaviorally-Informed Approach” (with James Hearn), National Budgeting Roundtable, Working Paper # 4, School of Policy, Government, and International Affairs, George Mason University, February 2016. <http://www.budgetingroundtable.com/working-papers/http://www.budgetingroundtable.com/working-papers/>

“Budgeting for Uncertainty and Bias: A Federal Process Proposal,” (with Imtiaz Bhatti) (2015) *Public Budgeting & Finance*, 35, 2 (Summer), 89-105.

“Could a Corporate Accounting Change Cost Millions of Jobs?” *The Conversation*, December 29, 2014 <http://theconversation.com/could-a-corporate-accounting-change-cost-millions-of-jobs-35071>

“A Case for Adding a Long-Term Budget Constraint to the Congressional Budget Process” (with Imtiaz Bhatti) (2013), *Albany Government Law Review*, 6, 1:110-147.

“Fair Market Values and the Budgetary Treatment of Federal Credit Activities: Comment on CBPP’s Release on H.R. 3581, Trachtenberg Blog Post, January 30, 2012.

“Tax Expenditures, the Size and Efficiency of Government, and Implications for Budget Reform,” (with Leonard Burman), *Tax Policy and the Economy*, Jeffrey R. Brown (ed.) University of Chicago Press, 2012, pp.93-124. Also NBER Working Paper No. 17268.

“Budgeting for Emergencies,” Peterson-Pew Commission on Budget Reform, Washington, DC, December 12, 2011

“Alternative Measures of U.S. Fiscal Deficits,” (with Zhuojun Xu), *Journal of Washington Institute of China Studies*, Vol. 5, No. 3, (Spring 2011), 88-96.

“Budgeting for Disasters: Focusing on the Good Times,” (with Charlotte Kirschner) *OECD Journal on Budgeting*, Volume 2010, 1, 21-44.

“Federal Budgeting in the United States,” (with Charlotte Kirschner) *Comparative Public Budgeting: A Global Perspective*, Charles Menifield (ed) Jones and Bartlett Learning, Sudbury, Mass., 2010, Chapter 18, pp 329-349.

“The Cost of Risk to the Government and Its Implications for Federal Budgeting” (with Deborah Lucas), *Measuring and Managing Federal Financial Risk*, D. Lucas (ed), NBER Conference Report, University of Chicago Press, 2010, pp. 29-54

“Federal Use of Implied Guarantees: Some Preliminary Lessons from the Current Financial Distress,” *Public Administration Review*, July/August 2009, pp.651-659

“Reforming Credit Reform” (with Deborah Lucas), *Public Budgeting & Finance*, 28, 4 90-110 (2008)

"Budgeting for Contingent Losses" (with David Torregrosa), Handbook of Government Budgeting, Roy T. Myers (ed) Jossey-Bass (1999) pp. 699-719.

The President's Commission to Study Capital Budgeting: An Interim Review, Public Budgeting & Finance, 18, 3 (1998) 1-10.

“Credit Reform, Negative Subsidies, and FHA,” Public Budgeting & Finance, 16.1 (Spring 1996) 23-36.

"Federal Financial Reporting: Some Views of R.K. Mautz", Public Budgeting & Finance 10, 2 (Summer 1990) 21-26.

Book Review, The Economics of Federal Credit Programs, Bosworth, Carron, and Rhyne, Public Budgeting & Finance, 7, 3 (Autumn 1987) 112-3.

"Accounting for Federal Credit: A Better Way", Public Budgeting & Finance 5, 3 (Autumn 1985) 29-39.

"Elementary Exercise in Noontime Economics", The Wall Street Journal, May 16, 1985, 32.

"Regulation and the Use of Knowledge", Challenge (January/February 1985) 56-57.

"The Nature of Our Regulatory Problems: Knowledge, Uncertainty and the Distribution of Authority", Journal of

Resource Management and Technology, 13,3 (November 1984) 171-181.

"New Approaches to the Budgetary Treatment of Federal Credit Assistance", (Lines and Items feature) Public Budgeting & Finance, 4, 3 (Autumn 1984) 97-100.

"Developments in the Credit Market in the 1980s: What Can We Expect?," Financing Agriculture in the 1980s, Proceedings of a Conference Sponsored by the University of Minnesota, September 23-25, 1980.

"Bank Earnings by Portfolio Category", (with M. Bagshaw, K. Sayan, and A. Severn) Nebraska Journal of Economics and Business, 18,4 (Autumn 1979) 53-63.

"The Relationship Between Economics and Politics", Three Aspects of Policy and Policymaking, Carnegie-Rochester Conference Series, 10 (1979), K. Brunner and A.H. Meltzer, (eds.) North Holland, Amsterdam, 349-354.

"Implicit Grants of Bank Reserve Requirements and Restrictions on Branching", Redistribution Through the Financial System: The Grants Economics of Money and Credit, Kenneth Boulding and Thomas F. Wilson, (eds.) Praeger, New York: 1978, 114-146.

"Seasonal Variation in Interest Rates", (with Michael Bagshaw) Review of Economics and Statistics (February 1977), 119-122.

"The Regional Impact of Open-Market Operations on Member Bank Reserves", (with James Barth and David Pierce) Journal of Economics and Business, 28, 1 (Fall 1975), 36-40.

"Observed Cash Reserve Ratios and Bank Reserve Behavior", Journal of Political Economy, 79,6 (November/December 1971), 1418-1419.

"Resource Allocation in a Market Economy", Perspectives in Economics, second edition, 1968.

"The Economic Problem", Perspectives in Economics, John W. Snow, ed., Interstate Publishers, Danville, Illinois:1967.

CBO PUBLICATIONS (www.cbo.gov; search term: Phaup)

Assessing the Government's Costs for Mortgage Insurance Provided by the Federal Housing Administration (July 2006) (with Susanne Mehlman).

The Risk Exposure of the Pension Benefit Guaranty Corporation (September 2005) (with Wendy Kiska and Deborah Lucas).

Valuing Federal Loans and Loan Guarantees Using Options-Pricing Methods (August 2004) (with Deborah Lucas and Ravi Prasad) CBO Technical Paper.

Estimating the Value of Subsidies for Federal Loans and Loan Guarantees (August 2004) (with Deborah Lucas and Ravi Prasad).

Subsidy Estimates for FHA Mortgage Guarantees (November 2003).

Evaluating and Accounting for Federal Investment In Corporate Stocks and Other Private Securities January 2003 (with Deborah Lucas and Douglas Hamilton)

"New Business Assumption" in the risk-based capital rule for Fannie Mae and Freddie Mac, letter to Senator Sarbanes (et.al.) (January 2003).

Federal Subsidies and the Housing GSEs (May 2001)

Assessing the Public Costs and Benefits of Fannie Mae and Freddie Mac (May 1996).

Developing a Secondary Market for Small Business Loans An Interagency Report (August 1994).

Controlling Losses of the Pension Benefit Guaranty Corporation (January 1993) (with Ron Feldman). ["Over the years, different organizations have produced publications of particular use to undergraduate teachers and policy-oriented economists. Currently, the best such source is the Congressional Budget Office, which offers well-balanced, verbal discussions of outstanding policy issues. A superb example of the genre is the CBO study, "Controlling Losses of the Pension Benefit Guaranty Corporation" which uses arguments that combine the effects of insurance, the institutional details of the pension system and the government's accounting methods to show why the government may be headed for a major crisis." Bernard Saffran, Journal of Economic Perspectives, 8, 1, (Winter 1994) p.194.]

The RTC's Loan Securitization Process (July 1992) (with Ron Feldman).

"Statement", Hidden Exposure: The Unfunded Liabilities of the Federal Government, (and related testimony) Hearing before the Task Force on Urgent Fiscal Issues, Committee on the Budget, U.S. House of Representatives, October 24, 1991, pp.59-67, 125-127.

Budgetary Treatment of Deposit Insurance: A Framework for Reform (May 1991). ["... details in a very lucid fashion the pros and cons of each accounting system without taking sides. It is required reading on this topic." Philippe Weil, "The Budgetary Arithmetic of Loan Guarantees and Deposit Insurance," Carnegie-Rochester Conference Series on Public Policy 37 (1992) 99f

"Student Loan Marketing Association," Chapter VI in Controlling the Risks of Government-Sponsored Enterprises (April 1991)

Credit Reform: Comparable Cost for Cash and Credit (December 1989).

An Analysis of the Administration's Credit Budget for Fiscal Year 1990 (April 1989). (Co-author).

Government Sponsored Enterprises and Their Implicit Federal Subsidy: The Case of Sallie Mae (December 1985).

New Approaches to the Budgetary Treatment of Federal Credit Assistance (March 1984)

"The Long-Run Effects of Annually Balanced Budgets on the Economy", Balancing the Federal Budget and Limiting Federal

Spending: Constitutional and Statutory Approaches (September 1982) 78-88.

"[A Review of] the United States Savings Bonds Program" (November 1981).

"Causes of the U.S. Productivity Slowdown", Chapter III of "The Productivity Slowdown: Causes and Policy Responses", Capital Formation and Industrial Policy, Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce (July 1981) 309-327.

"Tax Proposals to Change the Composition and Rate of Personal Saving in the United States", Chapter II, The Productivity Problem: Alternatives for Action (January 1981) 7-27.

"A General Overview of Federal Credit Activity and Summary of Conference Proceedings", Conference on the Economics of Federal Credit Activity, Part I, Proceedings, April 10-11, 1980, 1-17.

"The Economic Effects of Federal Credit", Chapter III, Federal Credit Activities: An Analysis of the President's Credit Budget for 1981 (February 1980) 19-27.

"Inflation", Chapter III, Recovery with Inflation (July 1977) 27-42.

"Budget Control and Fiscal Policy", Advance Budgeting: a Report to the Congress (March 1977) 45-68.

FEDERAL RESERVE BANK OF CLEVELAND PUBLICATIONS

Economic Commentary pieces on various financial topics such as: federal funds trading, the prime rate, Regulation Q, loan sales by commercial banks, the cost of demand deposits, the profitability of bank credit cards, book entry securities systems, the correlates of bank profitability, bank loan losses, and the public's desired currency mix.

Economic Review contributed articles include:

"Direct Placement of Corporate Debt", August 1970.

"Average Functional Cost and Revenue for Banks in Three Size Categories", April 1971.

"Some Characteristics of Fourth District FCA Banks", July 1971.

"Excess Reserves and Bank Size" (with James Barth), January 1972.

"The Effect of Federal Reserve Membership on Earnings of Fourth District Member Banks, 1963-70", January/February 1973.

"Characteristics of High Performance Banks, 1969-1975", Fall 1976.

OTHER PROFESSIONAL ACTIVITIES

TED-style presentation to annual conference of Behavioral Science and Policy Association, "Power of Salience in Federal Cost Estimates," New York, June 2019

Annual Presentations at Association for Budgeting and Financial Management (2007 -2019) and Southern Economic

Association (2013 – 2019)

Member, International Monetary Fund. Technical Assistance Team, Budgeting for Contingencies, Mission to the Republic of the Philippines, (May 18 – June 4, 2015).

Hearn, James and Marvin Phaup. “Federal Budget Reform: A Behavioral Approach,” Presented to: Brookings Budget Roundtable, (April 21, 2015); Spring Budget Conference, School of Public and Environmental Affairs, Indiana University, (May 1, 2015); American Political Science Association Annual Meeting, San Francisco (September 2, 2015)

Panelist, American Institute of Certified Public Accountants Webinar, “Pathways to Academia,” May 13.

Presenter, “Fair Value Budgetary Accounting for Federal Credit,” U.S. Government Accountability Office, February 19, 2015 and DC Federal Credit Group, National Academy of Public Administration, July 23, 2014.

Organizer, Annual Ferrum College Spring Forum on Public Policy, Roanoke, Virginia. Topics: Federal Fiscal Imbalance 2012; Sustainability: the Energy, Water, Food Nexus 2013; National Security and Internet Privacy, 2014; Federal Housing Finance Reform, 2015

Chair and Presenter, Federal Budget Reform, Western Economic Association International, Denver, June 30, 2014

Speaker, “Quo Vadis: Where Next for Federal Financial Accounting and Reporting?” Academy for Government

Accountability, George Mason University, July 12, 2012. (Also presented at Association for Budgeting and Financial Management, Annual Conference, New York, October 11, 2012)

Chair and Presenter, Reforming Federal Budgeting, Western Economic Association International, San Francisco, July 1, 2012.

Member, Public Finance Curriculum External Review Committee, School of Public and Environmental Affairs, Indiana University, March-May 2012.

Speaker, "*Reckless Endangerment*, Early Estimates of the Costs of Fannie and Freddie, and What went Wrong?" Lunch with Sandy and Al (A group of DC-based public policy writers), Washington, D.C. July 7, 2011.

Chair and Discussant, Sessions on Taxation and Financial Market Risks, Western Economic Association International Conference, San Diego, California, June 28-July 3, 2011

Presenter, Panel on Posner's Concept of the Pracademic, American Association for Budget and Program Analysis, Spring Symposium, May 2011, Washington, DC

"Risk and Subsidy Cost," Staff Briefing, Office of Management and Budget, April 20, 2011.

Speaker, "Integrating Tax Expenditures into a More Effective Budget Process," Faculty Workshop, Trachtenberg School, George Washington University, March 7, 2011

Speaker, “Transparency and the Federal Budget,” American Association for Budget and Program Analysis Conference, *Transparency 2011*, Graduate School of Public and International Affairs, University of Pittsburgh, February 25, 2011.

Presenter (with Leonard Burman), “Integrating Tax Expenditures into the Federal Budget Process,” Tax Policy Center and Loyola University Law School Conference, *Starving the Hidden Beast [Tax Expenditures]*, Los Angeles, January 14, 2011

Presenter, Panel on “Lessons Learned from Experience with the Congressional Budget Act of 1974,” American Association for Budget and Program Analysis, Fall Symposium, November 23, 2010, Washington, DC

Speaker, “What’s Wrong with the Federal Budget? (and, a Proposal to Fix It),” Fall Meeting of Mid-South Chapter of the American Association for Public Administration, University of Memphis, November 11, 2010

Presenter, “Unsustainable Federal Fiscal Policies and the Recommendations of the Commissions on Budget Reform,” Association for Budget and Financial Management Conference, Omaha, Nebraska, October 8, 2010

Discussant, “The Efficiency of ‘Build America’ Bonds,” ABFM Conference, Omaha, Nebraska, October 7, 2010

Presenter, panel on “Appropriate Measurement Focus and Coverage of Federal Financial Accounting” at AICPA Conference on Government Accounting and Auditing, Washington, D.C. August 16, 2010

Presenter (with Douglas Walton), “Reducing the Cost of the Failure of Fannie Mae and Freddie Mac,” Western Economic Association International Conference, Portland, Oregon, July 1, 2010.

Discussant of paper on “Wagner’s Law” [on the Growth of Government Budgets], WEAI conference, July 1, 2010

Session Chair, Budgeting for War and National Defense, Western Economics Association International Conference Portland, Oregon, June 30, 2010

Speaker, Academy for Government Accountability on “Bridging the Gaps Between Budgeting and Accounting to Improve Federal Financial Management,” George Mason University, June 29, 2010

Organizer and presenter, panel discussion, “Wolf at the Nation’s Door and the Termites in the Foundations of the Republic: Everything You Wanted to Know about the Public Debt, And More,” American Association for Budget and Program Analysis, Spring Symposium, May 18, 2010, Washington, D.C.

Delivered William A. Sandridge Memorial Lecture, “The Troubled Federal Budget: Outlook, Concepts, Process,” Virginia Association of Economists, Lynchburg, Va., March 4, 2010

Presented (with Charlotte Kirschner) “Budgeting for Disasters in OECD Countries,” Washington Conference of the Association for Budget and Financial Management,

September 26, 2009

Presenter, "Budgeting for Disasters II," OECD, Paris, June 5-6, 2009.

Convener and Moderator, "Budgetary Scoring and Accounting for Recent Federal Policies in the Financial Markets", American Association for Budget and Program Analysis, Spring Symposium, Washington, D.C., April 16, 2009.

Presenter, "Budgeting for Disasters," Symposium on Accrual Budgeting, Senior Budget Officials, OECD, Paris, March 3-4, 2009.

Presenter, "Fannie Mae and Freddie Mac," Regulatory Symposium: Forging an Agenda for Financial Regulatory Reform," National Academy of Public Administration, Washington, DC, January 23, 2009.

Presenter, "Federal Budgetary Accounting: Shortcomings, Consequences, Alternatives," Economics Seminar, University of Illinois, Chicago, February 22, 2008.

Presenter, "Reforming Credit Reform," ABFM Conference, Washington, DC, October 26, 2007.

Participant, NBER-Kellogg Conference on "Measuring and Managing Federal Financial Risk," Northwestern University, February 6-7, 2007.

Presenter, "Present Value Budgeting," ABFM Conference, Chicago, Illinois: October 2004.

Presenter, "Accounting for Loan Guarantees in the Federal Budget," APPAM Conference, Washington, DC: November 2003.

Judge, Graduate Poster Competition, Department of Public Administration. The George Washington University, February 2003.

President, Board of Directors, Public Financial Publications, inc., 1995 - 2002

Presenter, Budgeting for Risky Federal Activities, Brookings Accounting Forum, November 7, 2001.

CBO Delegate, OECD Meeting on Budgeting for Credit, Paris, November 9 - 15, 2000.

Discussant, "The Costs and Benefits of Fannie Mae and Freddie Mac," American Enterprise Institute, May 23, 2000.

Observer, President's Commission to Study Capital Budgeting, 1998-99.

Presenter, "The Congressional Budget Process," International Monetary Fund, June 24, 1997.

Member, Federal Accounting Standards Advisory Board, Task Force on Management's Discussion and Analysis, October 1995-November 1996.

Discussant, "Reforming the Budget Process," ABFM Washington Conference, October 13, 1995.

Presenter, "The Significance of the National Debt: Do We Have a Problem?" United We Stand America, Virginia, Fairfax, Virginia: October 1, 1994.

Presenter, "CBO: an Institutional Model for Latin America?" Conference for Parliamentarians, Pan American Health Organization, Quito, Ecuador, August 30 - September 1, 1994.

Presenter, "Politics of Budgeting," Intergovernmental Audit Forum, Biennial National Conference, Phoenix, June 5 - 7, 1994.

Presenter, "The Appropriateness and Effectiveness of the Resolution Trust Corporation's Loan Securitization Process," International Association of Financial Engineers Annual Meeting, New York: December 2 - 3, 1993.

Presenter, "Retrospective on Charles Wolf's Theory of Non-Market Failure," Association for Public Policy Analysis and Management, Annual Research Conference, Washington, DC: October 28 - 30, 1993.

Presenter, "Coping with Budget Crises," Pacific Emerging Issues Conference of the Association of Government Accountants and the Hawaii Society of Certified Public Accountants, Honolulu: September 15 - 16, 1993.

Presenter, "What's Right and What's Wrong with the Federal Budget as a Management Information System?" Western Intergovernmental Audit Forum, Honolulu: September 13 - 14, 1993.

Presenter, "Recent Developments in Federal Budget Concepts," San Francisco Bay Area Federal Financial Managers Council, Annual Conference, Monterey, July 28 - 30, 1993.

Member, Policy Council, Association for Public Policy Analysis and Management, 1992 - 1996. Committee on Search for A New JPAM Editor, 1993. Committee on a New Institutional Home for APPAM, 1993.

Presenter, "Market Accounting for Federal Credit and Guarantees: How Are the Reforms Working?" Annual Meeting of the Southern Economic Association, Washington, DC: November 22 - 24, 1992.

Chair and Presenter, "Beyond Cash-Basis Federal Budgeting," Association for Public Policy Analysis and Management, Annual Research Conference, Denver, Colorado: October 29 - 31, 1992.

Discussant, "Rebuilding Public Confidence Though Financial Reform," Ohio State University Conference in Honor of Edward J. Kane, Columbus: June 25, 1992.

Presenter, "Credit Reform" and "Capital Budgeting," Annual Conference, Section on Budgeting and Financial Management, American Society for Public Administration, October 10 - 12, 1991.

Presenter, "Recent Federal Efforts to Measure and Control of Federal Risk Bearing", Conference on Government Risk Bearing, Federal Reserve Bank of Cleveland, May 29-31, 1991

Member, Association of Government Accountants Task Force on Reporting the State of the Nation, 1990 - 92.

Presenter, "CBO's Views on Federal Budgetary Accounting," (with James Blum), The Brookings Roundtable, February 21, 1991.

Chair and Presenter of "Federal Credit Reform: The Next Step", Session on "Federal Credit Programs and the Budget: Advice for a New Administration", American Economic Association, Allied Social Science Association Annual Meeting, December 1988.

Chair and Presenter, "Credit Subsidies: Prospects for Reform", Office of Management and Budget Training Fair, September 1988.

1987 - 1993: Board of Directors, American Association for Budget and Program Analysis; Vice President for Symposia, 1988-89; President-Elect, 1989-90; President, 1990-91.

Participant, Executive Education, Pension Funds and Money Management (applied finance theory), Wharton School, University of Pennsylvania, June 1986.

Chair, Banking and Financial Markets Session, Southern Economic Association Meeting, November 1977.

Discussant, Banking Session, Eastern Economic Association, April 1976.

Lecturer in money and banking, Cleveland State University, Spring 1975.

Lecturer, Bank Performance: Measurement and Control, The School for Bank Administration, Bank Administration Institute, University of Wisconsin, Summer 1974 and 1975.

Lecturer in money and banking, American Institute of Banking, September 1974 - May 1975.

Discussant, Applied Econometrics, Southern Economic Association Meeting, November 1974.

Lecturer in economics, statistics, and econometrics, John Carroll University, September 1971 - May 1974.

Occasional Referee for Journal of Money, Credit, and Banking, Journal of Economics and Business, Brookings Institution, and Journal of Policy Analysis and Management.

Truth in Testimony Disclosure Form

In accordance with Rule XI, clause 2(g)(5)*, of the *Rules of the House of Representatives*, witnesses are asked to disclose the following information. Please complete this form electronically by filling in the provided blanks.

Committee: Rules

Subcommittee: Legislative and Budget Process

Hearing Date: September 24, 2019

Hearing Subject:

Building resilient communities and investing in America's future

Witness Name: Marvin Phaup

Position/Title: Research Scholar and Professorial Lecturer

Witness Type: ☐ Governmental ☒ Non-governmental

Are you representing yourself or an organization? ☒ Self ☐ Organization

If you are representing an organization, please list what entity or entities you are representing:

If you are a **non-governmental witness**, please list any federal grants or contracts (including subgrants or subcontracts) related to the hearing's subject matter that you or the organization(s) you represent at this hearing received in the current calendar year and previous two calendar years. Include the source and amount of each grant or contract. *If necessary, attach additional sheet(s) to provide more information.*

If you are a **non-governmental witness**, please list any contracts or payments originating with a foreign government and related to the hearing's subject matter that you or the organization(s) you represent at this hearing received in the current year and previous two calendar years. Include the amount and country of origin of each contract or payment. *If necessary, attach additional sheet(s) to provide more information.*