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THE 2017 HURRICANE SEASON: A REVIEW OF EMERGENCY RESPONSE AND ENERGY INFRASTRUCTURE RECOVERY EFFORTS

THURSDAY, NOVEMBER 2, 2017

House of Representatives

Subcommittee on Energy

Committee on Energy and Commerce

Washington, D.C.

The subcommittee met, pursuant to call, at 10:00 a.m., in Room 2123 Rayburn House Office Building, Hon. Fred Upton [chairman of the subcommittee] presiding.

Members present: Representatives Upton, Olson, Shimkus, Murphy, Latta, Harper, McKinley, Kinzinger, Griffith, Johnson, Long, Bucshon, Flores, Mullin, Hudson, Walberg, Walden (ex officio), Rush, McNerney, Peters, Green, Doyle, Castor, Sarbanes, Welch, Tonko, Loebsack, Schrader, Kennedy, Butterfield, and Pallone (ex officio).

Also present: Representative Bilirakis.

Staff present: Ray Baum, Staff Director; Mike Bloomquist, Deputy Staff Director; Adam Buckalew, Professional Staff Member, Health; Allie Bury, Legislative Clerk, Energy/Environment; Karen Christian, General Counsel; Kelly Collins, Staff Assistant; Zachary Dareshori, Staff Assistant; Wyatt Ellertson, Research Associate, Energy/Environment; Adam Fromm, Director of Outreach and Coalitions; Jordan Haverly, Policy Coordinator, Environment; A.T. Johnston, Senior Policy Advisor, Energy; Mary Martin, Deputy Chief Counsel, Energy and Environment; Alex Miller, Video Production Aide and Press Assistant; Brandon Mooney, Deputy Chief Energy Advisor; Mark Ratner, Policy Coordinator; Annelise Rickert, Counsel, Energy; Dan Schneider, Press Secretary; Peter Spencer, Professional Staff Member, Energy; Jason Stanek, Senior Counsel, Energy; Madeline Vey, Policy Coordinator, Digital Commerce and Consumer Protection; Hamlin Wade, Special Advisor, External Affairs; Everett Winnick, Director of Information Technology; Andy Zach, Senior Professional Staff Member, Environment; Priscilla Barbour, Minority Energy Fellow; Jeff Carroll, Minority Staff Director; Rick Kessler, Minority Senior Advisor and Staff Director, Energy and Environment; John Marshall, Minority Policy Coordinator; Jon Monger, Minority Counsel; Alexander Ratner, Minority Policy Analyst; Tim Robinson, Minority Chief Counsel; Tuley Wright, Minority Energy and Environment Policy Advisor; C.J. Young, Minority Press Secretary;

and Catherine Zander, Minority Environment Fellow.

Mr. Upton. [presiding] The Subcommittee on Energy will now come to order.

And the Chair will recognize himself for an opening statement.

So, this year's Atlantic hurricane season was unprecedented. Four named storms in close succession slammed into the Gulf, Puerto Rico, and the U.S. Virgin Islands. These hurricanes caused catastrophic damage and energy supply disruptions across the country. While Texas and Florida are further down the road to recovery, a humanitarian crisis is unfolding in Puerto Rico -- a number of colleagues from this committee have been down there -- and the U.S. Virgin Islands, where the majority of folks still remain without power for more than a month after Hurricane Maria made landfall.

Today's hearing will review the emergency response and energy recovery efforts in the wake of those storms. It will help us begin to understand what went right and what went wrong, what lessons can be learned, and how we, as policymakers, can identify gaps, so that when the next hurricane hits, we will be better prepared.

As a result of Hurricane Harvey, more than 275,000 customers lost power in Texas, and severe flooding also affected the supply and delivery of transportation fuels, compounding response challenges and energy impacts across the Gulf. Hurricane Irma left more than a million customers without power across Puerto

Rico and the Virgin Islands. More than 6 million customers in Florida and another million in Georgia and South Carolina also lost power. Then, two weeks after Irma, Hurricane Maria delivered the knockout punch, wiping out the entire grid on Puerto Rico and the Virgin Islands. At peak, more than 3.5 million folks were without power.

As with most disasters, energy restoration is performed by federal, state, and local authorities, who provide vital resources, infrastructure support, and logistical coordination, and by industry, which provides the expertise and manpower to restore energy supply and services.

As we have witnessed nightly in the news, recovery on the islands has been painfully difficult and slow. Questions are mounting regarding the role of the Puerto Rico Electric Power Authority, PREPA, and its initial reluctance to request mutual aid from mainland electricity companies that were standing by ready to assist immediately after the storm. Rather than request mutual assistance, as Texas and Florida did in the preceding storms, PREPA took the unusual step to award a contract to a virtually unknown company which it, then, cancelled. The deals that PREPA signed immediately following the storm are now the subject of an investigation by this committee, as they should be.

Today we are going to hear from two witness panels which will provide perspective from the federal level, the state level, and the industry responder level. As we have seen in recent weeks

across the areas affected by the storms, each disaster creates its own set of problems. Today's witnesses can help us understand the factors that contribute to these problems and what we may do to ensure a more effective response going forward.

It will also help us understand the challenges that they face as they move energy and product in the aftermath of devastating storms. While we have seen alarming devastation, we have also seen some aspects of the response go right. At this point, by most accounts, the Department of Energy's support functions have gone well. DOE's coordination of regulatory assistance, or waivers, during the disasters has gone well. Their informational assistance has been consistent and helpful to government and industry alike.

We will hear this morning about the Strategic Petroleum Reserve, which during Harvey served to provide emergency petroleum swaps to make up for the temporary loss of supply and keep prices at the pump somewhat stable.

We will also receive an important update on the various restoration efforts to bring power back to the folks of Puerto Rico and the Virgin Islands. It will be particularly helpful to understand what have been the barriers to a more rapid recovery, what we are learning about coordination of emergency response and restoration on these territories, and what is needed more from us, the Congress. How can we apply these lessons going forward? This hearing should help us answer some of those critical

questions.

And I yield now to the ranking member of the subcommittee, my friend, the gentleman from Illinois, Mr. Rush.

[The prepared statement of Mr. Upton follows:]

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Mr. Rush. I want to thank you, Mr. Chairman, for holding this important hearing, examining the 2017 hurricane season and the emergency response and energy infrastructure recovery efforts surrounding these emergencies.

Mr. Chairman, I hope this will not be a "one and none" hearing. Folks know in this year's historic and devastating hurricane season that there are many, many critical interrelated issues that must be addressed.

While I appreciate having witnesses here to discuss the GAO report that we requested last year, the fact of the matter, Mr. Chairman, is that, as we speak, there are still many millions of American citizens living without electricity, and many are facing dire life-and-death conditions. It is over a month now that Hurricanes Harvey and Irma and Maria shattered their lives and devastated their livelihoods.

Mr. Chairman, it is my hope that this hearing will shed light on what additional steps need to be taken quickly to restore power while also assuring those residents in Puerto Rico and the U.S. Virgin Island specifically that their government has not forgotten about them, and that we will provide the exact same effort and the exact same attention to helping them as we would for any other American citizen.

Mr. Chairman, as you know, more than six weeks after Hurricane Maria initially made landfall, nearly 70 percent of Puerto Rico and 80 percent of the U.S. Virgin Islands still, Mr.

Chairman, still lack the power needed for basic everyday services, such as lighting their homes, treating drinking water, preserving food and medicine, or even making emergency calls, among other critical functions that are so necessary to normal and daily activities.

While immediate attention must be focused, Mr. Chairman, on providing essential resources to protect the safety of individuals and helping them cope in maintaining their lives, over the long term we must also help to rebuild the energy infrastructure in a way that makes it stronger and more resilient against extreme weather conditions.

Mr. Chairman, Hurricanes Irma and Maria exposed the vulnerability of the Puerto Rico and U.S. Virgin Islands electric grids to extreme weather, while some communities expected to remain without power for even months on end. In fact, a study released last week by the Rhodium Group concluded that the outages caused by Hurricane Maria resulted in 1.25 million hours of electricity supplied disruption to a household in Puerto Rico and the U.S. Virgin Islands, Mr. Chairman, making this sole event the nation's largest blackout that was ever recorded. We can find no event in recorded U.S. history where there were as many people without power for as long as it has occurred over the past month in Puerto Rico and the U.S. Virgin Islands, the report stated.

Mr. Chairman, I look forward to engaging today's distinguished panel on the progress that has been made, the

additional steps that must be taken to immediately get the power grid on, as well as the ways that we build more resilient and sustainable infrastructure that is less vulnerable to an extreme weather condition that we have witnessed and that we certainly will witness in the future.

Thank you, Mr. Chairman. I yield back the balance of my time.

Mr. Upton. The gentleman yields back.

The Chair now calls upon the chairman of the full committee, Mr. Walden, for 5 minutes.

Mr. Walden. I thank the gentleman and acknowledge his uniform today.

The 2017 hurricane season has been among the worst in recent memory. Four major storms have wreaked havoc all over our Gulf Coast and, more recently, in Puerto Rico and the Virgin Islands. While fuel supplies and electricity have been restored on the mainland, a humanitarian crisis continues to unfold in Puerto Rico and the U.S. Virgin Islands, and I think you hear that from both sides of the aisle here. This is a real, real serious situation we all care deeply about.

As we often do following natural disasters, it is not uncommon to see stories in the news about heroics and acts of personal sacrifice and great kindness. We trust that our policymakers can put aside their differences to do what is in the best interest of the country. We have already passed initial

supplemental disaster relief funding this Congress, but we understand that much more is needed, and we will continue to work with the administration and our colleagues, so that our fellow citizens can get the additional resources they need to recover and to rebuild.

In this committee we roll up our sleeves and we search for solutions to the various challenges that present themselves after a major disaster. We want to make sure that the agencies under our jurisdiction are well-prepared and that you all are responding appropriately, both now and that we learn from lessons of bad incidents and are ready and even better prepared for the next storm or the next disaster.

If you are lacking certain authorities, let us know. We would like to expedite recovery. We want to know about these things, so that we can help fix them. We are all in this together.

We want to be practical and we want to be forward-thinking. How can we help ensure the relevant federal response is well-coordinated with state, local, and industry responders? How do we ensure decisions are made to guarantee taxpayer funding provides the maximum benefit for those in need and that taxpayers aren't ripped off? If we need to rebuild, what can we do to make our infrastructure more resilient?

Because of this committee's broad jurisdiction over public health, emergency telecommunications, and the supply and delivery of energy, we will be gathering facts, perspectives, and lessons

learned. We have already heard from witnesses on our Oversight and Investigation Subcommittee hearing about HHS's public health preparedness for and responses to the hurricanes. We will soon examine the disaster response related to environmental hazards and telecommunications as well.

But today we are focusing on emergency response and energy infrastructure recovery, both for fuel supply and the electric grid. This year we have already been confronted with several different challenging situations, historic flooding in Houston, possibly the greatest evacuation in Florida's history, an energy crisis in Puerto Rico and the U.S. Virgin Islands that could leave millions without power for estimated months to come.

We may take for granted how lucky we are that we can flip a switch and the lights come on. For our citizens in Puerto Rico and the U.S. Virgin Islands, however, almost every aspect of their lives has been deeply disrupted. Hospitals without external generators cannot serve their patients. Getting that power restored is critical. Water treatment plants without power threaten the health of individuals that rely on them for safe water. And those who live in remote areas that do not have access to fuel are cut off even from the most basic of necessities.

The witness panel today will provide important perspectives about the state of current fuel and electric supply recovery efforts, what worked, what could be done better under urgent circumstances of the hurricanes, and what may be considered in

the future. I expect this will be an excellent hearing for us to identify vulnerabilities and assess what is needed to better prepare and respond to future storms and disasters.

And with that, I want to thank you for being here today. I appreciate the testimony which you have already submitted that I have, and thanks for the good work you and your teams are doing out there. We really want to learn from you and be even better prepared when the next disaster hits.

So, with that, Mr. Chairman, unless anybody else on our side seeks the remaining minute, I would yield back.

Mr. Upton. I just might ask a question of the Vice Chair of the committee. Are you intending to wear that jersey on the House Floor when we take the picture of the full House this afternoon?

Mr. Olson. Chairman, that is not an issue. I tried to wear this about three weeks, and it was banned. So, this will not be in the picture --

Mr. Upton. All right.

Mr. Olson. -- much to your disappointment, I can tell.

Mr. Upton. I just was curious because, then, we would always be able to find you forever, right, in that picture?

[Laughter.]

Mr. Walden. Now, Mr. Chairman, I yield back the balance of my time.

Mr. Upton. Yes, the gentleman yields back.

I recognize the ranking member of the full committee, Mr. Pallone from New Jersey, for an opening statement.

Mr. Pallone. Thank you, Mr. Chairman, for convening today's hearing reviewing the disastrous 2017 hurricane season which has wreaked havoc on many parts of our country.

And I am grateful to former Senator Nieves of Puerto Rico and Mr. Rhymer of the Virgin Islands for coming here today. I guess they are on the second panel.

But I am disappointed that the committee did not even receive a response to its outreach to the Puerto Rico Electric Power Authority, or PREPA. I have serious concerns not only about how PREPA has overseen the effort to restore power in Puerto Rico, but also, more broadly, on how PREPA has managed or, more accurately, mismanaged the grid in Puerto Rico over the years.

Now today we are focusing on the energy infrastructure recovery efforts. I must say that accounts from the areas affected by these storms paint a dire situation that completely contradicts the often rosy stories that come from the White House. The truth is that, taken together, Puerto Rico and the Virgin Islands are currently experiencing the largest blackout in American history, and this nightmare for our fellow citizens is far from over.

The central question for us today should be, why is it taking so long to restore power in Puerto Rico and the Virgin Islands, and who is actually in charge of the effort to restore power to

Puerto Rico? No one person or entity seems to be in charge, and it is fostering a chaotic and ineffective effort to restore power on the island. And I want answers, and so do many of my colleagues on both sides of the aisle.

I am also troubled by the maze of contracts with numerous companies for overlapping missions, a patchwork that is failing to turn the lights back on in Puerto Rico. And that needs to change now. I am deeply concerned by the terms of the contract PREPA signed with Whitefish and Cobra Acquisitions, which went so far as to bar PREPA from holding the companies liable for delayed completion of grid repair work or letting the government audit their work. Now Governor Rossello has since taken steps to have the Whitefish contract cancelled, but we need to learn more about how these contracts are being awarded and whether the bidding process is truly competitive. That is why Chairmen Walden and Upton and Ranking Members Rush and I have requested documents and a briefing from Whitefish, so we can learn more about how that troubling agreement materialized.

Additionally, FEMA issued a statement that said it had no involvement in the development of this contract. Well, my question is, why not? The federal government should be engaged in the contracting process of large-scale rebuilding contracts for which U.S. taxpayers will ultimately foot the bill. The federal government needs to step up and take charge to expedite power restoration efforts. Missions like this are why we have

a strong federal government. And simply put, the Trump administration needs to be doing more. If we can't get the power turned back on soon, more people are going to die. This is a humanitarian crisis, and our government owes it to the citizens in these territories to do everything it can to fix it.

And while restoring power quickly is the most urgent concern, it is also crucial that the grid in Puerto Rico and the U.S. Virgin Islands be rebuilt with more modern energy technology focused on increased resiliency, energy efficiency, and renewable energy. Replacing the old grid as it stood before the storm will cost taxpayers more money and do nothing to make electricity in Puerto Rico more reliable or affordable.

So, as Congress prepares the next emergency spending bill, we must make changes to the current law to enable the rebuilding to occur in a way that lays the groundwork for constructing a modern electricity grid in the territories. Failing to invest wisely in Puerto Rico now will only cost all taxpayers more down the road. And we must consider innovative ways for turning around Puerto Rico's situation, including alternatives to PREPA for overseeing the rebuilding and operation of the grid, and all ideas from privatization, which I am not really a fan of, but from privatization to creation of a new Federal Power Marketing Administration. All these things have to be up for discussion. And whatever road we go down must have buy-in from the Puerto Rican people and the government.

I don't know if anybody wants my minute that I still have. If not, Mr. Chairman, I will yield back.

Mr. Upton. The gentleman yields back.

At this point we are ready for the testimony. Thank you in advance or thank you for sending your testimony in advance. It will be made part of the record. We would like each of you to take no more than 5 minutes to summarize your testimony. At that point when that is completed, we will be asking questions.

We are joined first by Patricia Hoffman, the Acting Undersecretary for Science and Energy, Principal Deputy Assistant Secretary for the Office of Electricity Delivery and Energy Reliability, at the Department of Energy. Welcome. Thank you.

STATEMENTS OF PATRICIA HOFFMAN, ACTING UNDERSECRETARY FOR SCIENCE AND ENERGY, PRINCIPAL DEPUTY ASSISTANT SECRETARY FOR THE OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY, U.S. DEPARTMENT OF ENERGY; RAY ALEXANDER, DIRECTOR OF CONTINGENCY OPERATIONS, U.S. ARMY CORPS OF ENGINEERS; DEANN WALKER, CHAIRMAN, PUBLIC UTILITY COMMISSION OF TEXAS; ROBERT CORBIN, DEPUTY ASSISTANT SECRETARY FOR THE OFFICE OF PETROLEUM RESERVES, U.S. DEPARTMENT OF ENERGY, AND FRANK RUSCO, DIRECTOR, NATURAL RESOURCES AND ENVIRONMENT, GOVERNMENT ACCOUNTABILITY OFFICE

STATEMENT OF PATRICIA HOFFMAN

Ms. Hoffman. Chairman Upton, Ranking Member Rush, and distinguished members of the subcommittee, I appreciate the opportunity today to discuss energy security and emergency response issues related to the 2017 hurricane season.

The mission of the Office of Electricity Delivery and Energy Reliability is to develop innovative, cutting-edge solutions to ensure our nation's energy infrastructure remains reliable, affordable, and resilient. In order to fulfill this mission, the Department of Energy leverages the technical capabilities of National Laboratories and partnerships with the key private sector stakeholders to focus on early-stage research and transformative projects.

Our organization is also the lead for providing energy-related expertise to the Federal Energy Management Agency,

also known as FEMA, our interagency partners, and the administration, as part of the Department of Energy's emergency response activities. DOE serves as the lead organization for Emergency Support Function 12 under the National Response Framework and as the sector-specific agency for energy. As the lead for ESF-12, DOE is responsible for providing information and analysis about energy disruptions and to assist in facilitating the restoration of damaged energy infrastructure.

During Hurricanes Harvey, Irma, Maria, Nate, we have worked with industry and the federal, state, territorial, and local partners to facilitate response and recovery. Overall, DOE has received 18 mission assignments and has deployed more than 110 personnel to the response efforts. Each of these storms has presented unique challenges to the energy sector.

With respect to Hurricane Harvey, we saw peak electricity outages of about 300,000 customers in Texas and Louisiana. While offshore and onshore, crude oil and natural gas productions were disrupted by the storm, the greatest impacts were to the midstream and downstream oil and refining sectors. At its peak, more than 4 million barrels per day of refining capacity, representing more than 20 percent of the U.S. refining capacity, was offline. It took several weeks for floodwaters to recede, but the refining systems in Texas and Louisiana have resumed normal operations. In addition, flooding closed two key injection points along the Colonial Pipeline, forcing the system to operate intermittently

at reduced rates for several weeks before normal service was resumed.

Hurricane Irma, the second category 4 hurricane to make landfall in the United States this year, caused approximately 8 million electric customer outages from the Caribbean to the southeastern United States. At Irma's peak on September 11th, there were approximately 7.8 million customer outages in Florida. Three days later, on September 14th, power had restored to approximately 5 million customers, 64 percent of those customers. And five days later, restoration was at 98 percent.

DOE is also playing a significant role in supporting the restoration and recovery efforts in the U.S. Virgin Islands and Puerto Rico from Hurricane Maria. In Puerto Rico, the U.S. Army Corps does have the primary role in emergency restoration and rebuilding the infrastructure, but DOE has deployed personnel and equipment from the Western Power Area Administration to provide mutual assistance through a mission assignment from FEMA and is working to facilitate additional mutual assistance with industry.

Days after Bruce Walker was confirmed as the Department of Energy's new Assistant Secretary for the Office of Electricity Delivery and Energy Reliability, he was on the ground in Puerto Rico assisting other DOE personnel in coordination with the governor, PREPA, FEMA, and the Army Corps of Engineers. Recently, the governor and PREPA have requested additional line workers and equipment necessary for the restoration of power.

Secretary Perry and our DOE team look forward to a thoughtful conversation focused on our response and recovery efforts for this hurricane season, and a focus on reliability, affordability, and resilience of the electricity system from hurricanes as well as other extreme weather events.

I would like to take a moment and thank the hard utility workers for their time and their efforts in responding to the hurricane season. But, like any event, there is always some hard lessons learned, and we look forward to improving our efforts.

So, thank you, and I look forward to your questions.

[The prepared statement of Ms. Hoffman follows:]

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Mr. Upton. Thank you very much.

Next, we're joined by Ray Alexander, the Director of Contingency Operations for the Corps of Engineers.

Welcome.

STATEMENT OF RAY ALEXANDER

Mr. Alexander. Chairman Upton, Ranking Member Rush, and members of the subcommittee, my name is Ray Alexander, Director of Contingency Operations, the U.S. Army Corps of Engineers. Thank you for the opportunity to testify today.

The Corps conducts emergency response activities under two basic authorities, the Stafford Act and Public Law 84-99. Under the Stafford Act, we support FEMA under the National Response Framework as the lead federal agency for Emergency Support Function 3, public works and engineering. ESF-3 provides temporary emergency power, roofing, and housing, debris management, infrastructure assessment, and critical public facility restoration.

Under Public Law 84-99, we prepare for disasters through planning, coordination, and training with local, state, and federal partners. We assist state and local entities to implement advanced measures that prevent or reduce storm event damages. We repair damage to authorized federal projects and work with states and municipalities to rehabilitate and restore eligible non-federal flood infrastructure to pre-storm conditions.

When disasters occur, core teams and resources are mobilized from across the command to assist local offices with their response to the event. As part of this mission, the Corps has

more than 50 specially-trained teams supported by emergency contracts that perform the wide range of support missions I just described. These contracts are pre-awarded and can be quickly activated to execute many of these missions.

This year the Corps has supported FEMA-led federal response and recovery operations in multiple events, including Hurricanes Harvey, Irma, and Maria. FEMA directed 37 mission assignments to the Corps for Hurricane Harvey. Currently, the Corps has 195 employees deployed. The Corps assisted in temporary emergency power and continues to support the state of Texas in the development and implementation of a temporary housing project management plan. Debris teams led by subject matter experts continue provide state and municipalities the technical assistance to define requirements and monitor debris removal and disposal operations in 15 counties.

FEMA directed 81 mission assignments to the Corps for Hurricanes Irma and Maria. Currently, the Corps has over 1500 personnel deployed. As of this morning, the Corps has completed over 1,000 assessments and over 500 temporary generator installations in the Caribbean. This includes 250 assessments and 150 installations in the U.S. Virgin Islands and over 750 assessments and 400 installations in Puerto Rico. Under FEMA authority, we are assisting Puerto Rico with the operation and maintenance of critical non-federal generators across the island as well.

The Corps has completed over 14,000 temporary roofing installations in Florida and is on track to complete that mission by 4 November. We have also completed over 7,000 temporary roofing installations in the Caribbean, including over 2500 in the U.S. Virgin Islands and 4700 in Puerto Rico. Roofing requirements have been extensive, requiring additional material and construction support, which initially slowed progress. We have adjusted. We have added additional capacity, and we are seeing daily improvements.

Corps debris subject matter experts provided technical assistance to counties across Florida and Georgia in response to Hurricane Irma, and continue to provide oversight to five regions within the Florida Department of Emergency Management. The Corps is working to remove an estimated 1 million cubic yards of debris in the U.S. Virgin Islands and over 6 million cubic yards in Puerto Rico.

The Corps works closely with the U.S. Coast Guard and the National Oceanic and Atmospheric Administration and local authorities to open harbors and navigation channels across all affected areas, critical to restoring commerce and the flow of commodities, and essential equipment to reach affected communities.

The Corps worked closely with officials of Texas and Florida to manage local flood control reservoirs during a period of unprecedented rainfall. In Puerto Rico, Corps dam and levy teams

inspected 17 priority dams and worked closely with the Puerto Rico Electrical Power Authority, PREPA, to stabilize a spillway feature, the Guajataca Dam. Additionally, the Corps cleared existing outflow conduits and placed emergency pumps to further reduce water levels in the dam that restore flow to a critical treatment plant that supports the needs of over 30,000 people.

On September 30th, the Corps received a FEMA mission assignment under Stafford Act authority to assist PREPA in conducting emergency repairs to the power grid itself. We are partnering with PREPA. We have established a general officer, senior-executive-led task force to oversee work and provide technical assistance.

The Department of Energy has embedded experts in our team and continues to assist in our efforts. Within two weeks of receiving this mission assignment, we awarded contracts for large-scale temporary power generation to stabilize the grid in San Juan and for additional line repair assets that will assist ongoing efforts by PREPA.

The Corps remains fully committed and capable of executing other civil works activities across the nation, despite our heavy involvement in these ongoing response and recovery operations. We also remain ready and poised to assist in future events, should they occur.

This concludes my testimony, and I look forward to answering any questions you may have. Thank you.

[The prepared statement of Mr. Alexander follows:]

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Mr. Upton. Thank you very much.

Next is DeAnn Walker, the Chair of the Public Utility Commission for Texas. You have got to be a happy woman today as well with the Astros.

STATEMENT OF DEANN WALKER

Ms. Walker. Yes. Thank you very much for your invitation to appear here today.

My name is DeAnn Walker. I am the Chairman of the Public Utility Commission of Texas. I have happily held that seat since September 20th. So, I am new to this.

I believe I have a unique perspective on restoration from hurricanes. The State Operations Center in Texas creates what they call a Tiger Team of utility personnel that is located within the State Operations Center to help with restoration, to coordinate with federal/state officials throughout an event. I have now served three hurricanes in the State Operations Center. Hurricane Rita and Hurricane Ike, I was actually representing a utility in the State Operations Center. During Hurricane Harvey, I was working for Governor Abbott and was down in the State Operations Center working with the utilities to restore service.

We believe that the electric industry and the infrastructure in Texas fared very well during Hurricane Harvey compared to past hurricanes. As has been stated, we had under 350,000 at any one time. We had more than that, but the utilities were continually restoring service during that time. The longest we had any customers out was for two weeks, and that was in the Rockport area, which was the direct hit of the eye of Hurricane Harvey. So, it took the brunt of it. During a storm, the PUC, as I said, works

with state, federal, and local agencies to restore power.

I wanted to focus the rest of my time on what we are taking as action items to better prepare for a new hurricane. Due to the amount of flooding that we had, some cities and towns, areas received 60 inches of rain throughout Hurricane Harvey. Many substations in our area flooded for the first time ever. So, we are looking at, and we moved in for the first time ever, mobile substations to help serve those customers. We are looking at whether or not it is prudent for the state as a whole, all of the utilities to get together and purchase these mobile substations to have on hand in such an event. We are also working with the utilities to elevate those substations when they rebuild them, so that we are taking care of hardening the system in the process of rebuilding.

I have also asked the state to look at whether or not we can better utilize utilities within Texas to send equipment and personnel. We were drawing people from all over the United States under mutual assistance crews, which we greatly appreciate, but I would like us to look and see if we can rely on the Texans that we have. SPS in the Panhandle and El Paso in far west Texas never were called on to help, and obviously, they were closer than a lot of places.

We have been working through the process with FEMA for how to interconnect their temporary housing, so that we could have one seamless process for all utilities to implement. We are

trying to do that on the fly. I would like us to further address that process in the meantime before the next storm hits us.

We also learned that not every utility is reporting outages consistently. In Texas we require that all utilities report outages to us and to DOE on a county- and ZIP-code-wide basis, but there is not consistency between the utilities on how that was being done. For instance, some of the flooded substations, once they had a plan to bring in the mobile substation, they took those outages and moved them to planned outages. So, they were no longer showing up as being impacted by the hurricane. I don't think that is an accurate representation. So, I have asked to look at that.

There are many other things that we have started looking at to correct and to, hopefully, do better. I am running out of time. I wanted to, again, thank you for your time today.

[The prepared statement of Ms. Walker follows:]

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Mr. Upton. Thank you.

Next, we are joined by Robert Corbin, Deputy Assistant Secretary for the Office of Petroleum Reserves, the U.S. Department of Energy.

STATEMENT OF ROBERT CORBIN

Mr. Corbin. Chairman Upton, Ranking Member Rush, and distinguished members of the subcommittee, it is an honor to appear before you today to discuss the Strategic Petroleum Reserve.

The Strategic Petroleum Reserve, or SPR, was established under the authority of the Energy Policy and Conservation Act in December 1975. At that time U.S. oil production was in decline, oil price and allocation controls separated the U.S. oil market from the rest of the world, and the global commodity market for oil as we know it now did not exist.

Today the global oil market has changed the environment in which the SPR operates. Although domestic oil production has increased dramatically in recent years, the global oil market is the largest commodity market in the world, making U.S. consumers subject to global commodity price fluctuations. Regardless of U.S. oil import levels, a severe global oil supply disruption today would impact domestic petroleum product prices.

In the event of a serious international oil supply disruption, offsetting disrupted supplies with SPR crude oil in concert with other countries that hold strategic oil stocks can help reduce an increase in international oil prices and the resulting adverse economic impacts that could otherwise occur.

The SPR maintains and operates four major oil storage sites,

two in Texas and two in Louisiana. The SPR's current crude oil inventory is approximately 670 million barrels stored in 60 underground salt caverns with a design capacity of 713.5 million barrels. The SPR is designed to provide the capability to draw down and deliver crude oil from the storage sites to designated distribution points, a design drawdown rate of 4.415 million barrels per day. The SPR can physically begin to draw down crude oil in as little as two days of notification, and taking into account the time required to meet sales requirements and draw down and deliver crude oil within 13 days of a presidential finding. SPR operating costs are less than 25 cents per barrel of design capacity per year, the lowest reported cost among oil stock-holding nations.

As a member of the International Energy Agency, or IEA, the U.S. has two primary oil stock-holding obligations. As a net oil importer, the U.S. must maintain oil stock-holding inventories equal to at least 90 days of net petroleum imports. As of June 30th, 2017, the U.S. held 149 days of net petroleum imports.

The U.S. must also be able to contribute a proportionate share to an IEA collective action in response to an oil supply disruption, based on its percentage share of IEA oil consumption. As of June 30th, 2017, the U.S. must contribute 43.2 percent of all barrels released during any IEA collective action.

As global oil trade increases, the potential role of the SPR to help mitigate global supply disruptions expands, regardless

of the level of U.S. net oil imports. Without the ability to replace disrupted oil supplies in the global market, global oil prices could increase significantly and the U.S. and global economy could be harmed.

SPR infrastructure has performed capability to ensure the SPR has been able to respond to every emergency release situation presented throughout its history. However, SPR facilities are aging. A significant amount of infrastructure components are at or beyond their design life, and equipment will be further stressed due to nine consecutive years of congressionally-mandated crude oil sales.

Congress, recognizing the need to modernize SPR infrastructure, included provisions in the Bipartisan Budget Act of 2015 to address this concern by authorizing the drawdown and sale of up to $2 billion worth of SPR crude oil over a four-year period to carry out an SPR modernization program. In response, the SPR has initiated a major capital asset acquisition project to modernize aging SPR infrastructure for systems upgrades and equipment replacement to ensure the SPR can meet mission requirements for the next several decades.

Hurricane Harvey severely impacted U.S. Gulf Coast crude oil infrastructure, closing refineries, ports, and supply pipelines. Many impacted refiners were operable following the passage of Harvey, but in some cases were unable to secure crude oil feedstock to recommence or continue operations, resulting in multiple

requests for emergency exchanges of SPR crude oil. After assessing prevailing supply conditions and consulting with other federal agencies regarding the status of crude oil infrastructure, the SPR received approval from the Secretary of Energy to execute six emergency exchange agreements. First deliveries of crude oil were provided on August 30th, just two days after the initial request was received. Deliveries to the remaining companies also commenced within days after those requests were received and continued until deliveries totaling 5 million barrels were completed on September 28th. These emergency exchanges helped alleviate the loss of crude oil supply, allowing the affected refiners to begin and/or continue operations that otherwise would have been halted due to the impacts of Hurricane Harvey.

This concludes my statement. Thank you for the opportunity to speak with you today about the SPR, and I look forward to answering any of your questions.

[The prepared statement of Mr. Corbin follows:]

********** INSERT 5**********

Mr. Upton. Thank you very much.

Lastly, on the first panel we are joined by Frank Rusco, Director of the Natural Resources and Environment from the GAO. Welcome.

STATEMENT OF FRANCO RUSCO

Mr. Rusco. Chairman Upton, Ranking Member Rush, and members of the subcommittee, thank you for the opportunity to discuss our past and ongoing work on energy resilience and particularly the effectiveness of the Strategic Petroleum Reserve in responding to domestic petroleum supply disruptions caused by extreme weather and other events.

The SPR was created at a time when global oil supply was dominated by OPEC and oil markets were characterized by long-term contracts with fixed prices. At that time a global oil supply disruption, as occurred during the Arab oil embargo, had the effect of physical oil shortages and in the United States and elsewhere long lines at the gas pump. It made sense at the time for the SPR to be comprised of crude oil centrally held in cheap salt dome storage in Louisiana and Texas, near the nation's largest refining centers.

Today global oil markets are robust, and prices change to accommodate supply and demand, so that physical shortages and long lines are less of an issue. In addition, the use of the SPR has been primarily in response to domestic supply disruptions, particularly those caused by extreme weather events, rather than global supply shortages. My remarks will focus on how well the SPR is able to respond to these domestic supply disruptions.

The SPR has been partially successful in responding to

domestic supply disruptions in instances when Gulf Coast refineries and pipelines are operational but crude oil supplies to these refineries have been disrupted. For example, this year following Hurricane Harvey the SPR was able to supply several refineries with crude oil by pipeline while shipping ports were closed.

However, the SPR has been less effective in responding to reductions in petroleum products in the rest of the country, as has occurred multiple times when hurricanes have shut down refineries or shut down power to other petroleum infrastructure. In this latter cases, including following Hurricane Harvey when as much as 34 percent of the Gulf Coast refining capacity was shut in, the real supply problem was gasoline, diesel, and jet fuel, and the SPR has only a small reserve of gasoline in the Northeast and no other petroleum product reserves. As a result, the SPR cannot provide needed petroleum products to Florida, the Eastern Seaboard, and other regions typically supplied by Gulf Coast refiners.

DOE has recognize the desirability of having regional reserves of petroleum products. For example, in 2014, DOE identified five regions that are vulnerable to petroleum product supply disruptions. These include the West Coast, which is vulnerable to earthquakes and tsunamis, parts of six Midwestern states vulnerable to earthquakes, a number of states vulnerable to extreme cold weather, and the entire coast from Texas up to

Massachusetts that is vulnerable to hurricanes.

With the exception of the small gasoline reserves held in the Northeast, there are no other petroleum product reserves held by the SPR in any of these vulnerable regions. Further, while DOE has recognized these vulnerabilities and conducted some studies of alternatives to the current composition and configuration of strategic reserves, it has not completed these studies. As a result, DOE cannot determine the efficacy of creating regional petroleum product reserves.

In contrast to how the SPR is configured, most other countries with strategic reserves have chosen to hold significant quantities of petroleum products in addition to crude oil, and some have chosen to spread these reserves out across their countries to be closer to centers of demand. For example, Germany chooses to hold about 55 percent of its strategic stocks as petroleum products. France spreads its reserves across seven geographic zones that enable it to distribute petroleum products to distribution networks all over the country.

The United States has benefitted from European strategic stocks of petroleum products during past hurricane damage to Gulf Coast refining and production infrastructure. For example, in response to Hurricane Katrina in 2005, as prices of gasoline rose across the United States, shipments of gasoline from Europe began arriving on the East Coast within days. This mitigated the economic effects of the hurricane-caused refinery and oil

production shutdowns.

As DOE undertakes a modernization program of its existing systems, this committee and others have requested that we undertake an evaluation of the SPR, its size, composition, location of reserves, and options for improving its effectiveness. We will report our findings in the next few months.

Thank you. This concludes my oral remarks. I will be happy to answer any questions you may have.

[The prepared statement of Mr. Rusco follows:]

********** INSERT 6**********

Mr. Upton. Well, thank you all. At this point we will move to questions from the dais.

Mr. Alexander, you said in your testimony that the Corps is overseeing the work that is done by PREPA in Puerto Rico. I would like to ask the question, how has that gone? Because this subcommittee has tried to contact PREPA both by email and phone. They are not answering. There is not heartbeat that we are getting back. So, how has that oversight gone?

Mr. Alexander. Sir, perhaps I misstated. We have a task force -- again, general officer, senior-executive-led -- that is overseeing our mission to restore the grid, as assigned by FEMA. What we are doing with PREPA, though, is we are working in coordination and collaboration with them, so that we can have well-defined, focused areas of operation. So, we are not working in each other's area and we ensure that there are no gaps. We are only working with PREPA; we are not working for PREPA, but we are working in coordination with PREPA.

The oversight of the Corps' mission assignment we believe is going well. Again, we were assigned this mission on 30 September. Within 18 days, we were able to award three major contracts, one for temporary power generation, 230-megawatt power plants to put in the vicinity, the Palo Seco Power Plant near San Juan, and restore the power grid around San Juan. Those generators have arrived. They have been installed, and we have additional load on the grid in the greater San Juan area as of

several days ago.

The other two contracts focused on line repair, transmission distribution/line repair. A larger contract to Fluor, a $240 million contract. They have boots on the ground today. They are conducting assessments. They are starting to have crews arriving. I believe, as I said in my testimony, we are ramping up quickly, 620 by the end of this weekend, and that number will double by mid-November.

And then, we also have a company named PowerSecure. They are fully engaged and will be. They, too, have assessment teams on the ground. Their equipment is actually en route by sea now on a MARAD, Ready Reserve Fleet vessel that should arrive at Ponce port on 3 November.

Mr. Upton. Did the Corps have any advance knowledge of working with PREPA prior to the contract that they established with Whitefish and Cobra? Were you aware of that contract before it was signed?

Mr. Alexander. No, sir, we were not. We were engaged in our temporary power mission under the Stafford Act, and we have been working that since the 6th of September. The news that PREPA had independently committed in a contract to another company, we were not consulted; we were not aware.

Mr. Upton. You indicated in your written testimony that the temporary housing plan includes establishing -- this is as it relates to Texas -- 20,000 travel trailers and 4,000 mobile

housing units. I presume that most of those are for folks that were actually displaced, homeowners or families that were displaced. Do you know what that number is for Puerto Rico? It's 20,000 for Texas. Do you know what the number would be for Puerto Rico?

Mr. Alexander. No, I do not, sir.

Mr. Upton. Ms. Hoffman, I have met with a number of pharmaceutical/medical device companies, many with very large operations in Puerto Rico. We are all aware of the critical need to get those facilities back online. It is a public health priority because it is so critical for patients to ensure that their products that are being manufactured there don't go into a shortage. How are you incorporating medical manufacturing in an approach to restore the grid in Puerto Rico?

Ms. Hoffman. So, thank you.

Critical infrastructure, critical loads on an electric system is very important, utilities. In our conversation with the utilities, with FEMA and the interagency partners, we discussed what are some of those priority restoration efforts and helping with the communications, so that we understand where some of those needs are and where some of the activities should be with respect to restoration processes. So, those coordinations occur with FEMA and with the local utilities in the territory itself.

Mr. Upton. Okay. Thank you. My time has expired.

I recognize the ranking member of the subcommittee, Mr. Rush,

for 5 minutes.

Mr. Rush. I want to thank you, Mr. Chairman.

Mr. Alexander, I am kind of curious, not "kind", I am very curious about your Army Corps of Engineers' lack of information about this Whitefish contract. You, the Army Corps of Engineers, were unaware of this contract, is that correct?

Mr. Alexander. Yes, sir.

Mr. Rush. The governor says he was unaware of this contract.

Mr. Alexander. I'm sorry, sir, did you say --

Mr. Rush. The governor of Puerto Rico has stated publicly that he was unaware of this contract.

Mr. Alexander. The governor of Puerto Rico said he was unaware?

Mr. Rush. Right.

Mr. Alexander. Sir, I am not privy to that. I do not know.

Mr. Rush. Are you aware that this contract is being cancelled or has been cancelled?

Mr. Alexander. Sir, I understand that the governor has given the direction to terminate that contract. Whitefish and other contractors, they are completing the task, the last task they have been assigned. So, they are still working on the island.

Mr. Rush. Do you have any information about who executed that contract?

Mr. Alexander. No, I do not.

Mr. Rush. Do you trust PREPA? Do you trust them?

Mr. Alexander. Sir, I have no reason not to. Again, we are working in collaboration with them on restoring the power.

Mr. Rush. Do you have any estimate in terms of how much additional dollars the cancellation of this contract will cost the American people?

Mr. Alexander. No, I do not.

Mr. Rush. All right. Secretary Hoffman, the economic consulting firm Rhodium Group concluded that Maria cost 1.25 billion hours of electricity supply disruption to households, which they say is the longest disruption in recorded history. Do you concur with their finding?

Ms. Hoffman. I will have to look at the information, but it is a significant duration for outage for Puerto Rico.

Mr. Rush. And what is the best estimate on when power will be fully restored to both the U.S. Virgin Islands and Puerto Rico?

Ms. Hoffman. So, that is information that the governor as well as PREPA is looking at, as well as partnerships with the Army Corps of Engineers, on the supplies that are needed, the resources that are required for restoring power. Some initial indications are that for, I would say 50 percent -- I believe the Army Corps has estimated that 50 percent of the island will be restored by the end of December, and that the significant portion of the restoration will occur later on.

Mr. Rush. Mr. Alexander, can you give us some insight on

your opinions about the timeline, the estimated timeline? There might be some others on the panel that might also have some idea about the estimated timeline for Puerto Rico and, also, the U.S. Virgin Islands.

Mr. Alexander. Sir, as for Puerto Rico, we estimated 30 percent of the pre-storm load on the grid would be restored by 30 October. We did achieve that metric on time before the 30th. I believe we are up over 31-32 percent today. Our estimate is 50 percent pre-storm load restored by 30 November. And then, as we go on into the new year, we are estimating 75 percent by 31 January.

Mr. Rush. Anyone else want to add?

[No response.]

All right. Mr. Alexander, is the Corps currently involved in discussions with PREPA, or any other government entity in Puerto Rico, to ensure that when the grid is repaired, it will meet construction -- it will be a way to account some of the lessons learned from this ongoing catastrophe for the American taxpayers' dollars are not being wasted?

Mr. Alexander. Sir, we are focused on executing the mission we have been assigned, which is the restoration of the grid to pre-storm conditions, the load, and we are coordinating with PREPA as we do that. We actually, though, are working with the Department of Energy on what a more resilient grid might look like, as they lead the effort to develop recommendations and cost

estimates. But, for now, we are executing our mission under the Stafford Act, which does not allow for any permanent construction or enhancement of the existing grid.

Mr. Rush. I yield back, Mr. Chairman.

Mr. Upton. The Chair will recognize the Vice Chair of the subcommittee, the gentleman from Houston, Texas, Mr. Olson.

Mr. Olson. I thank the Chair.

And welcome to all five witnesses. A special pony up to the new Chairwoman of the PUC of Texas, Ms. DeAnn Walker. My daughter Kate is a junior at SMU, your alma mater, and she loves it.

My first two questions are for you, Mr. Alexander, one about Harvey and one about Irma. First of all, Harvey. As you know, sir, I live in Fort Bend County, Texas. When Fort Bend floods, it floods. We have had four major floods in the past three years. Our drainage district works hard 24/7, 365, to make sure our drainage ditches are maintained. After the first major flood in 2015, the Army Corps told our drainage district they need a Section 404 permit under the Clean Water Act to maintain the ditches. The maintenance of a drainage ditch is supposed to be exempt from the permitting process under Section 404. But the Corps disputed the exemption and referred the district to the EPA. The EPA agreed it is maintenance work and the county should be good to go. But here we are, two years and four floods later, with Fort Bend County still unable to fix this critical problem. And now, Harvey has made a bad problem much, much worse.

These repairs can't wait. Texas and Fort Bend need to rebuild after Hurricane Harvey. Things are being made worse with erosion and piles of silt. We don't need red tape at the Corps hindering the maintenance project that should be exempt under Section 404(f)(1)(C) of the Clean Water Act.

My question is, will you guarantee me that your office will work with my staff and local Fort Bend County officials, under Judge Bob Hebert, to get this fixed ASAP, so Texans can protect their livelihoods?

Mr. Alexander. Sir, thank you. I acknowledge your concerns. I am generally aware of this issue in Fort Bend. While I do not have all the specific details here with me today, I can assure you and can guarantee you that the Corps remains committed to working with our partners and your office to resolve this issue.

Mr. Olson. Great. ASAP, please.

The next question about Hurricane Irma that follows up on comments and questions from my colleague from Illinois, Mr. Rush. Sir, have you ever talked to someone on the ground in PREPA? Have you, yourself, talked to someone on the ground PREPA about the situation in Puerto Rico?

Mr. Alexander. No, sir, I have not.

Mr. Olson. Wow, have not. Okay.

The second round of questions is for you, Ms. Walker. First of all, I want to thank you for your service to our state. I appreciate your work in guiding us through Harvey. And I know

Drew Vincentchild at the PUC. You have been our PUC Chair for 41 rather intense days, I do believe. And as you know, for a city like Houston, I want you to talk about how Harvey as being a storm event with heavy rain as opposed to wind and storm surge, and how does that change the impacts you have to address? And what was the biggest surprise you had to recovery? Can we help with that surprise to mitigate that, either D.C. or NGOs? How can we address your concerns/surprises after Hurricane Harvey with our grid there in Fort Bend County, Texas?

Ms. Walker. Well, as you noted, wind damage is very different than flooding damage, and Houston did have the flooding damage during this hurricane. The biggest surprise was the amount of rain. There was substations such as Memorial substation that took on water that had never taken on water in the 50 years that it had been there. And so, we were having to come up during the storm with ways to address all of the flooding, moving crews. Frankly, they were using aquatic equipment that they had never used before to get to things because of the flooding.

Houston, also, downtown experienced heavy flooding. I believe I heard that 83 of the downtown buildings lost power, and I think some still are without power. Luckily the medical center did not. We have reinforced the medical center time and time again since Hurricane Allison. It wasn't a hurricane, but since Allison.

And so, I am not sure of anything that you all can pass here that would help us. We continue to learn from each storm. Each storm is different. Hurricane Ike was a wind event. It took, out of 2.2 million, it took out 2 million. It was a much different storm.

Mr. Olson. Again, being a Member who lives in the area, I have to thank you so much because, when Harvey hit my house twice in two days, we never ever, ever lost power. So, thank you for that.

I yield back.

Ms. Walker. Thank you.

Mr. Upton. The Chair recognizes the ranking member of the full committee, Mr. Pallone.

Mr. Pallone. Thank you, Mr. Chairman.

Obviously, in addressing the panel, I have to say it, express my concern that the federal response so far is nowhere near where it needs to be. Reports indicate nearly 70 percent of Americans on the island are without electricity. The New York Times recently described the situation of Puerto Rico, quote, "like going back in time". Most of my questions are of Mr. Alexander and the Corps.

Mr. Alexander, who is in charge of the effort to restore power in Puerto Rico and the Virgin Islands? Is it the Army Corps or another agency?

Mr. Alexander. Sir, again, our mission, assignment from

FEMA, is to restore the grid to pre-storm condition in coordination/collaboration with PREPA.

Mr. Pallone. That is fine. I just wanted to get --

Mr. Alexander. Okay.

Mr. Pallone. You answered my question.

Is there a strategic plan for these federal restoration efforts?

Mr. Alexander. Sir, if you look at strategic beyond the pre-storm restoration, that is being looked at by Energy and other departments and the interagency --

Mr. Pallone. So, the DOE is more responsible for a long-term plan, is that what you are saying?

Mr. Alexander. For full, permanent grid restoration enhancement, yes, sir.

Mr. Pallone. And you are more involved in trying to get things up and going?

Mr. Alexander. Sir, we are involved in trying to restore the grid in different sectors as expeditiously as possible with concentration initially on San Juan and, then, out to seven larger municipalities on the island, and then, finally, preparing and transitioning to PREPA for permanent service.

Mr. Pallone. All right. Now how many companies -- yes, I understand the Corps has several contracts with private companies for restoration work -- how many companies has the Corps contracted with to perform the grid-rebuilding work in Puerto

Rico?

Mr. Alexander. Sir, we have contracted with three companies.

Mr. Pallone. And will the Army Corps provide the committee with copies of those contracts, so that we can get an understanding of their scope? Would you be willing to do that through the chairman?

Mr. Alexander. Sir, I will have to speak to our contracting authority and see what is permissible because it is acquisition-sensitive material.

Mr. Pallone. All right. If you can, we would appreciate it. I know I am acting through the chairman in asking you for it.

We have heard varying reports as to how long it will take to restore power to the citizens of Puerto Rico. By some accounts, it will be many more months until power is fully restored. So, Mr. Alexander, when did the Army Corps receive its mission to repair Puerto Rico's grid from FEMA?

Mr. Alexander. On 30 September.

Mr. Pallone. And Hurricane Maria made landfall in Puerto Rico on September 20th. Do you know why it took FEMA 10 days to give the Army Corps its mission?

Mr. Alexander. Sir, we were not involved in deliberation. We were executing our temporary emergency power at that time.

Mr. Pallone. All right. Just on that issue, does the Army

Corps mission assignment provide -- well, I guess you did answer that. You basically said, if I understood, that the short-term repairs in San Juan and these other areas is under your jurisdiction, but the long-term and fully reconstruction of a more efficient and resilient grid, that would be more DOE, correct?

Mr. Alexander. Yes, sir.

Mr. Pallone. All right. So, then, let me turn to Ms. Hoffman, to the DOE witness. If the Army Corps is not responsible for making long-term improvements, is the DOE taking the lead on this effort?

Ms. Hoffman. So, the Department of Energy is looking at strategies for long-term improvements with respect to strengthening the grid. So, ideas such as energy storage, microgrids or minigrids, options for rerouting power, better situational awareness, all those activities are activities that we are looking at. But, once again, the actual financing and implementation is the responsibility of the utilities or the governance structure that will be decided for Puerto Rico.

Mr. Pallone. But you stated in your testimony that DOE is leveraging the National Labs to develop long-term solutions to improve resiliency. What is the status of that effort?

Ms. Hoffman. So, the National laboratories, we have been in active discussion with the Grid Modernization Lab Consortium in looking at areas such as planning activities, situational awareness, looking at analysis-type activities, as well as

hardening activities. What this is going to have to be done as is mirrored up with the existing rebuilding process and looking at how some of the innovative solutions can be married in and built upon the existing rebuilding. So, that is going to take time and it is going to have to run in close coordination. So, we have seven technical experts in Puerto Rico working with the Army Corps to understand the timing and the extent of where their activities are going and opportunities for the future.

Mr. Pallone. All right. Thank you so much.

Thank you, Mr. Chairman.

Mr. Upton. The Chair will recognize the gentleman from Illinois, Mr. Shimkus.

Mr. Shimkus. Thank you, Mr. Chairman.

I want to try to go to three different directions real quick. But, Mr. Alexander, I am a former military officer. Someone has to be in charge. So, I think it is very troubling that we have you all there trying to restore the grid and you are not in consultation with PREPA. The basic question is, if you are going to call and yell at someone to get the job done, does anyone know who we are going to call? Mr. Alexander?

Mr. Alexander. Sir, my job is really --

Mr. Shimkus. Yes, you have been very good at trying to answer this tactfully. But who do we call?

Mr. Alexander. FEMA.

Mr. Shimkus. We call FEMA?

Mr. Alexander. FEMA.

Mr. Shimkus. Okay. Do we get our answer?

Mr. Alexander. It is the authority we are operating under.

And I will say this: from our Chief of Engineers to our South Atlantic Division commanding general, and to a number of colonels that are on the ground in Puerto Rico, they collaborate and meet with PREPA on a daily basis.

Mr. Shimkus. Okay. Thanks. So, I think we probably should have FEMA here. That is who we should have had, FEMA, as far of this committee hearing. So, maybe we will do that as a followup.

Because, obviously, we all know the history behind PREPA and the bankruptcy and their questionable practices and their ability even to provide power before the storm.

Does anyone know why it took -- and Puerto Rico is separate because it is an island; it is far away; it is hard. Other states usually have, with the utilities have mutual assistance agreements. And you will see folks flow. Does anyone know if PREPA had a mutual assistance agreement with any stateside utility? Does anyone know that?

Ms. Hoffman. It is my understanding that PREPA had not asked for mutual assistance agreements. Early on in the storm they just did ask for it.

Mr. Shimkus. Yes, I have been told it took five weeks, PREPA took five weeks to ask anybody for help.

Ms. Hoffman. Yes, a letter was submitted two days ago, I believe, for mutual assistance. But, generally, the industry is very forward-leaning in discussing with the utilities and activating mutual assistance --

Mr. Shimkus. Well, we see it all the time.

Ms. Hoffman. Yes.

Mr. Shimkus. I mean, the trucks are on the road, whether there is an ice storm, whether there is in my neck of the woods a tornado, whether it is hurricanes. I have members of my congregation who are utility workers, and they are gone. That is a disappointing statement.

I also wanted to put on the record, I think we wanted the Nuclear Regulatory Commission to submit a letter for this hearing because the hurricanes did come through some of our locations where we have nuclear power plants, and we think that would help build the record of the resiliency, baseload power, the importance of that. And I would ask that, if we finally get a letter from the NRC, Mr. Chairman, that we are allowed to submit that for the record.

[The information follows:]

********** COMMITTEE INSERT 7**********

Mr. Shimkus. And the last point, I really want to go to Mr. Rusco and maybe Mr. Corbin. The crude oil world has changed significantly since the establishment of the SPRO. I have been here a long time, 20 years, and I think one thing is for sure: we have always bought high and sold low. Is that a safe statement in the history of the SPRO, in the purchase of crude oil? Mr. Rusco, do you want to answer that?

Mr. Rusco. I think that, just by the nature of when it was established, you know, it was established after a crisis. Usually, when DOE has had authority to expand, it is --

Mr. Shimkus. Quickly.

Mr. Rusco. -- after a crisis. And so, it has been at higher prices.

Mr. Shimkus. So, we have a history of buying high and selling low?

Mr. Rusco. At least buying high.

Mr. Shimkus. And your testimony talked about refined products. In the world really now the need is for immediate refined product, not base crude oil. In the old days when we were worried about deploying forces to Europe and sea lanes being closed, and importation of crude oil, a SPRO made sense. Am I right, based upon your testimony today, that you are saying maybe regional systems -- well, actually, regional systems which DOE was supposed to analyze, and that there would be more focus on refined product?

Mr. Rusco. I think that it is fair to say that most other countries that have strategic reserves have chosen to do that, for the reasons that you state, yes.

Mr. Shimkus. Thank you. I hope my colleagues will follow up on some of those questions. I have run out of time. I yield back.

Mr. Upton. The Chair recognizes the gentleman from California, Mr. McNerney.

Mr. McNerney. Well, I thank the chairman, and I thank the witnesses this morning.

Mr. Alexander, you mentioned prevention as a part of the mission. Within the Stafford Act framework, can the electric structure of Puerto Rico be rebuilt to improve grid resilience and using sustainable technology?

Mr. Alexander. Sir, the Stafford Act allows us to restore the grid to pre-storm conditions, meeting U.S. Code, electrical code, in order to satisfy life, health, safety requirements. Some have interpreted that to mean we are making a more resilient or betterment on the system, but that is not the case.

Mr. McNerney. Okay. Ms. Hoffman, has there been a credible estimate of the cost difference between rebuilding a system that is resilient and just rebuilding the old system to look like it did before?

Ms. Hoffman. There has not been a complete cost estimate, taking into consideration the amount of work that has been done

and that is being planned to be accomplished from the Army Corps of Engineers. So, there has been discussion around different advanced solutions, but that needs to be baselined with the work and the building planout. So, that needs to be evaluated still.

Mr. McNerney. So, it could be that building a system that is resilient and sustainable wouldn't cost much more than just rebuilding the old system up to code?

Ms. Hoffman. I think the analysis has to be completed.

Mr. McNerney. Okay. Thank you.

The Office of Electricity has worked on a State Energy Risk Assessment Initiative that helps states understand the risks to their infrastructure. Did the Virgin Islands and Puerto Rico have a risk profile before the hurricanes?

Ms. Hoffman. I would have to go back and look into that. I am not sure whether they did do a risk profile with the state assessments.

Mr. McNerney. Thank you.

Mr. Stafford, is it true that the National Science Foundation facility at the radiotelescope has an infrastructure that supported FEMA operations subsequent to the hurricane?

Mr. Shimkus. You said "Stafford".

Mr. McNerney. Oh, Mr. Alexander? Excuse me. Thank you, my colleague from Illinois.

Go ahead.

Mr. Alexander. Sir, now that I know it was me you were

talking to, could I ask you, please, to repeat the question?

Mr. McNerney. Sure. Is it true that the National Science Foundation facility radiotelescope infrastructure survived well enough to serve as a FEMA operations center?

Mr. Alexander. Sir, I am not aware of that.

Mr. McNerney. Okay. I was going to ask you what differentiated that facility that survived from facilities that did not survive. Does anyone have a clue to that question?

Mr. Alexander. I do not.

Mr. McNerney. No?

Ms. Walker, you highlighted the inconsistencies in tracking outages in the system. Would better tracking of outages be beneficial? Or how would it be beneficial?

Ms. Walker. It helps us determine where to deploy services, such as, we call them pods, but water, food, whether or not outages are going to be restored quicker, and we know how many in the area have outages. We are able to, then, deploy the needs for that community better with that knowledge; also, working with the Corps of Engineers on deploying temporary generators. It just helps us to understand where to deploy for those needs.

Mr. McNerney. Do you have the authority to require utilities to report outages?

Ms. Walker. Yes, we do.

Mr. McNerney. Is that authority a state authority or is it a federal authority?

Ms. Walker. It is a state.

Mr. McNerney. Thank you.

Ms. Hoffman, how does the DOE go about helping utilities prioritize which lines, substations, and so on, should be put online first?

Ms. Hoffman. So, thank you very much for the question.

The utilities have a restoration plan as they look at their outage management system. They look at prioritization for transmission lines to get the most customers on as soon as possible and, then, work down into the distribution system. But they first must do damage assessments and assess really the extent of the damage on the system, and accelerating that damage assessment really helps a utility outline the restoration process.

What the federal government does is look at where the critical infrastructure is and are there any special needs with respect to storing large loads or storing critical infrastructure, whether it be telecommunication facilities, hospitals. And so, that is an ongoing discussion. But it gets melded with a utility's restoration plan and the utility's commitment with respect to how they are doing the restoration.

Mr. McNerney. I yield.

Mr. Upton. The Chair recognizes the gentleman from Ohio, Mr. Latta, for 5 minutes.

Mr. Latta. Well, thanks very much, Mr. Chairman, and for calling this hearing today. And thanks to our witnesses for being

here.

Ms. Hoffman, if I could ask you my first question, you noted that one of the reasons for the rapid electrical recovery in Florida was the nearly $3 billion in grid resiliency improvements since 2006. Could you elaborate as to what those improvements were, and will DOE be working with Florida going forward to identify additional hardening practices?

Ms. Hoffman. So, thank you, sir, for the question.

The investments by Florida really have stimulated from activities that looked at, first, situational awareness, so looking at advance meter and infrastructure to provide the situational awareness that we have been talking about. Because, once you have that awareness, you can do an outage management system. You can actually look at how you can advance and preposition crews for a restoration process. It also has allowed for advanced switching to be able to minimize the amount of customers without power; versus taking down a whole feeder system, you can really isolate damage on a system and look at restoration opportunities.

Other things that the utilities have done is hardening their infrastructure by looking at stronger poles, looking at concrete poles, steel poles, versus your traditional wooden poles. But all these capabilities are pulled together with an advanced kind of communications and control system, but a situational awareness system that can help with the restoration process.

Mr. Latta. Okay. You are talking about the different types of poles. Are there other things that they were doing on hardening, did you say?

Ms. Hoffman. So, with respect to substations -- and this would probably go more for Sandy, but also looking at hardening substations and being able to --

Mr. Latta. And how do they go about hardening the substations?

Ms. Hoffman. Pardon?

Mr. Latta. How do they go about hardening the substations?

Ms. Hoffman. So, when hardening the substations, you really look at increased capabilities with respect to duration, being able to support prevention of damage from wind, but also from flooding. So, it goes back to supporting infrastructure, so that you don't see the flooding damage that can occur.

Mr. Latta. Okay. Thank you.

Ms. Walker, if I could turn to you, can you elaborate on working with the federal agencies after Hurricane Harvey? And could you see any improvements that need to be made between federal, state, local, industry, all working together out there? Or what is your view as to what happened, and is there anything that can be improved on?

Ms. Walker. I think there are improvements that we can make. My view is that the time to make those is before the next storm. I found myself in the State Operations Center addressing issues

that I think are better to try to handle after the storm and get ready for the next one. Some have to do with the interconnection for the FEMA temporary housing. Some had to do --

Mr. Latta. Could you elaborate on that, on the temporary housing, because I know I've seen different press reports on that, but would you elaborate on the temporary housing of FEMA?

Ms. Walker. Once they bring in temporary housing, it is not set, usually, right at the meter that the house is on. So, the utilities have to set a new pole. There are processes in Texas for each utility, and my guess is throughout the country for each utility, on how those processes are to interconnect the new customer, a new facility.

And we would like to streamline that for all utilities in Texas. We had five major utilities impacted by Harvey and, then, multiple coops and municipalities. And so, we are hoping to have one process for FEMA to have to go through, instead of multiple different processes. So, that is an example.

Mr. Latta. Okay. Any other examples you can think of that would be how to improve things out there?

Ms. Walker. We understood, or I understood, during Hurricane Harvey that there were issues, chokepoints, as they were called during Hurricane Ike, related to the processes, inspection processes, for cities to get homes reconnected once they are rebuilt, once they are remodeled. And so, I think that is something we can address going forward, how those inspections are

done, who does them, to make sure we have enough people on the ground.

It was during recovery. It is not, to me, the time to try to be addressing things like that. And I just think that that is something we can look at going forward.

Mr. Latta. Okay. Well, thank you very much, Mr. Chairman. My time is just about expired, and I yield back.

Mr. Olson. [presiding.] The gentleman yields back.

The Chair now calls upon the gentleman from Pennsylvania, Mr. Doyle, for 5 minutes.

Mr. Doyle. Thank you, Mr. Chairman.

Ms. Hoffman, welcome back to our committee. It is always nice to have another Penn-Stater here at the committee.

Let me ask you, in your testimony you explained DOE's role in restoration and recovery efforts in those areas affected by recent hurricanes. A DOE piece from 2015 published in Power & Energy Magazine that is still on your energy.gov site explained that, and I quote, "Both the frequency and intensity of these disaster events have been trending higher in recent years, with 7 of the 10 costliest storms in U.S. history occurring in the last 10 years. These weather disaster events represent one of the most significant threats posed by climate change." Now that was published in 2015. And since that time, we have witnessed the most extreme month of hurricanes that has ever been recorded earlier this year.

So, I want to ask you, how is the Department of Energy responding to this increasing threat of climate change and extreme weather events?

Ms. Hoffman. So, the Department of Energy is looking at all hazards, including extreme weather, as we look at investment opportunities or research opportunities for advancing our electric grid. And so, a lot of our research focuses on advanced technologies, energy storage capabilities, advanced minigrids or microgrids, as they are called. We are looking at advanced capabilities that the utility industry can build and invest in for hardening and improving the infrastructure.

Mr. Doyle. Yes, I mean, exactly. In fact, that article goes on to detail the SmartGrid R&D Program which is designed to improve grid resilience and, also, modernizing the grid through the adaptation and integration of advanced technologies.

So, in your testimony you explain your recommendation for the rebuild as being formed in consultation with the National Labs. And a presentation from my NREL earlier this year explained the importance of distributed generation, calling it "a large factor in developing resiliency with clean energy technologies and solutions".

So, my question is, is the Department, in making recommendations to those that are helping rebuild the grid in Puerto Rico, which will essentially be a brand-new system, are you urging deployment of distributed systems and renewables?

Ms. Hoffman. So, distributed generation, combined heat and power, which is probably the most efficient form of distributed generation, is an option that should be considered in any sort of restoration improvement process. But one of the things that we are going to have to think about moving forward is how are we going to repair systems if another emergency happens. As you look at Puerto Rico, which had, I believe, over 8,000 solar panels there, what is the process in which the Department of Energy and the restoration activities in the next event, how are we going to orchestrate the repair of those systems?

As you look at an efficient restoration process, there is an advantage to restoring the core electric grid. So, microgrids might a good balance between the two of looking at siting generation closer to load, but I think it has to be an individual evaluation with respect to the state of the system and the opportunities from that point of view.

Mr. Doyle. Thank you.

Let me just ask anybody on the panel, does anyone have a comment regarding FEMA's resistence to authorizing reconstruction aid? My understanding is this makes local governments and local utilities ineligible for long-term grants. And I am also concerned, because Puerto Rico is only eligible for emergency services, that these contracts don't end up following federal procurement rules and we end up with situations like Whitefish Energy. Has any of your agencies weighed in on this

topic? Is there an expected timeline for action on this? Anyone?

[No response.]

I mean, FEMA authorized in 10 days in Houston, in Texas, and I believe in a couple of weeks in the Virgin Islands. But, yet, still, for some reason, this hasn't been fully authorized. They claim they are working on it; they are close to it. Could anyone explain what this holdup is and why it has taken so long?

[No response.]

I think you are right when someone said we should have had FEMA up here. FEMA should be sitting on this panel, too, because it seems like a lot of the questions we have need to be answered by them.

Well, let me ask it. Do any panelists have suggestions for any highly beneficial action we could take to help expedite the rebuilding efforts in a prudent, sustainable manner? Can you give any suggestions to this committee on what we should be doing that we are not doing right now?

Ms. Hoffman. Sir, if I may add some comments?

Mr. Doyle. I am glad to see Penn State stepping up to the plate here and at least answering a question.

[Laughter.]

Ms. Hoffman. As we look forward to investing in resilience, I know it is something that the Administrator of FEMA is looking at, as well as the Department. It is, how do we build in

resilience and how do we think about that upfront investment ahead of a disaster, and looking at what funds are available, to really think about investing for resilience?

Mr. Doyle. The idea that our citizens are going to go another three months without electricity is just unconscionable, I think.

I yield back.

Mr. Olson. The gentleman yields back.

The Chair now calls upon the gentleman from Ohio, Mr. Johnson, for 5 minutes.

Mr. Johnson. Thank you, Mr. Chairman.

I appreciate the opportunity to ask of this panel. A very, very important hearing that we are having today because we saw the effects of the hurricanes and how the destruction that occurred during and afterwards, how that affected not only the areas that were hit, but other regions of the country as well, since so much of our energy resources reside there on the Gulf Coast.

So, Mr. Corbin, how much does the Northeast Gasoline Supply Reserve cost on an annual basis? Let's get that question out of the way first.

Mr. Corbin. Thank you for the question, Mr. Johnson.

For the Northeast Gasoline Supply Reserve, the average storage contracts, which are for leased commercial storage for the product, are approximately $19.60 per barrel per year. And

when you include overhead costs, to include quality assurance and administration of your IT/sales platform, in the event you have to release the gasoline, it comes to a little over $20 per barrel per year, sir.

Mr. Johnson. Okay. So, is the higher per-barrel cost of storing gasoline versus crude oil a good use of taxpayer dollars, do you think?

Mr. Corbin. That is really not for me to decide, whether that is a good use of the taxpayer dollars.

Mr. Johnson. But you have got an opinion?

Mr. Corbin. I will say, Mr. Johnson, that in terms of the cost of storage for refined products, the United States has, out of 14 countries that participated in benchmarking studies that are stock-holding countries, the U.S. has by far the highest cost for gasoline storage out of the 14 countries.

Mr. Johnson. Okay. All right.

Also, Mr. Corbin, continuing on, the SPR is almost entirely located in the Gulf Coast region of the United States, limiting its ability to respond to disruptions in other parts of the country, particularly if we were to have a repeat of what we saw recently. For example, the West Coast has relatively few pipelines that are connected to the SPR, meaning that some petroleum products must be shipped by truck, barge, or other domestic methods or by tankers even from foreign countries. These modes of transport, obviously, are slower and more costly

and limit the usefulness of the Strategic Petroleum Reserve. So, how would expanding, in your opinion, how would expanding the number of SPR locations across the country enhance the effectiveness of the SPR?

Mr. Corbin. First, I would just like to make a correction to your statement, sir. There are no pipelines that directly connect the SPR to the West Coast of the United States.

The SPR, as I mentioned in my testimony, our crude oil is stored in underground salt caverns in two sites in Texas, two in Louisiana. Salt cavern storage is very inexpensive. We have the lowest operating cost of any stock-holding country in the world for our crude oil. There are no salt domes along the West Coast of the United States. There are some outside of the immediate Gulf Coast area, but they are not significant. So, crude oil storage would be problematic on the West Coast.

Mr. Johnson. So, you are basically saying -- I don't mean just the West Coast; I mean other regions of the country as well. I mean, the question centered on the West Coast. So, you are saying, in your opinion, developing other storage areas for the SPR around the country in different regions would be problematic?

Mr. Corbin. For crude oil storage. Now, in discussions that were mentioned by Mr. Shimkus earlier, and talked about refined product storage, the U.S. Government currently has two refined products reserves, the Northeast Gasoline Supply Reserve and the Northeast Home Heating Oil Reserve. They are both very

small, 1 million barrels apiece. They are intended to meet regional supply disruptions.

There are challenges associated with product reserves, regardless of the model that is used. Both of the product reserves that are currently in existence, they are, essentially, government-owned refined product in leased commercial storage facilities. In any product reserve with that model, there is an initial refined product acquisition cost associated with it. In studies that we did in PADD 5, which is the West Coast, and in the Southeast U.S., my staff found that there is little to no spare commercial storage capacity. And as I mentioned previously, the leased commercial storage costs are high.

Mr. Johnson. Okay. All right.

Mr. Chairman, I yield back.

Mr. Olson. The gentleman yields back.

The Chair now calls upon the gentlelady from Florida, Ms. Castor, for 5 minutes.

Ms. Castor. Thank you, Mr. Chairman. And I want to thank Chairman Upton and Ranking Member Rush, and the professional staff, for bringing this hearing to be. And thanks to all of our witnesses.

There is a very serious tension that the Congress has to address as soon as possible. On the one hand, we need to restore power in Puerto Rico and the U.S. Virgin Islands as quickly as possible, but, on the other hand, Congress has an overarching

responsibility to protect the taxpayer from future losses by building a more resilient, modern, distributed grid with better technology, technology, by the way, that has largely been funded by the taxpayers that we see in our National Laboratories that is used by utilities and businesses all across the country.

Senator Ramon Luis Nieves, who is in the audience and is going to testify on the next panel, is a former Chairman of the Puerto Rican Senate Committee on Energy. He says the current grid is obsolete, the grid before the storm, before the hurricanes. He said in his testimony, "Appropriating taxpayer money just to repair an old 20th century grid would be a waste of resources." In fact, Ken Buell, the Director of Emergency Response and Recovery with the U.S. Department of Energy, stated that, "We really should think in terms of rebuilding at this point, not just repairing the old grid."

The problem that we have all got to grapple with is PREPA is largely in debt. They do not have the wherewithal now to take the lead on this. They have governance problems. Gosh, what else do we have to know after this Whitefish contract controversy? I think we have a very significant responsibility to protect the taxpayers here.

A few weeks ago, there was a congressional briefing provided by the Department of Homeland Security, FEMA, and the U.S. Army Corps of Engineers was there. They also relayed that they only have the authority now to go in and make repairs, and not do the

kind of rebuilding of a modern grid that needs to happen.

In fact, Mr. Alexander, in your testimony you say that your mission right now is to repair the power system to its pre-storm condition, is that correct?

Mr. Alexander. Yes, ma'am.

Ms. Castor. Ms. Hoffman, what kind of direction do you need from the Congress to begin to go beyond a planning stage and do something that your very own Director of Emergency Response and Recovery has said needs to be done? And do you agree that you need that authority to go beyond repairing?

Ms. Hoffman. So, I think there has to be an ability for the Department of Energy to work closely with PREPA in planning and actively engaging and discussing what some of those advanced technologies solutions are. So, the forum has to be codified, so that there can be active engagement and discussion of what are the opportunities. I know that PREPA has their own plans and their own activities, but how do we really take the advancements and provide that?

Ms. Castor. So, you think, yes, it would be helpful for Congress to provide additional clarity, so that you can move forward to do what, on a bipartisan basis, what experts have advised that needs to be done in Puerto Rico?

Ms. Hoffman. Yes.

Ms. Castor. And the Virgin Islands? Okay.

Ms. Hoffman. Yes.

Ms. Castor. We have got to do this with a sense of urgency, though. Mr. Alexander, how do we do this? As you keep going on to repair, what kind of advice, what kind of clarity do you need from the Congress in maybe the next emergency aid package, maybe in something that would allow you to go beyond just repairing the old, obsolete grid and moving forward on something that would protect the taxpayers?

Mr. Alexander. So, while we recognize that the pre-storm grid was not in good condition, the current authorities under the Stafford Act, and the mission assigned for FEMA, limits us to restoring to pre-storm condition, meaning U.S. Code. I think this is, ultimately, a policy decision. Do we need to relook at the Stafford Act? As written, it was --

Ms. Castor. And Colleagues, let me -- thank you very much -- in previous emergency aid packages for Superstorm Sandy and for Katrina, it has been the Congress that has been able to go beyond the Stafford Act that limits the government to just going and repairing what was, and building in, instead, a new resiliency, whether it is in housing or defense installations and things like that, those previous emergency aid package. We have never had a blackout and destruction of an electric grid the scale of this ever before in the country, and that is why this is something new this committee needs to work on together with our colleagues in the Senate and, hopefully, with DOE, as they have expressed they are already doing some of this planning. But, to

put this into action, it is going to be our responsibility to actually pass that authorization in the next emergency aid package or before.

And I yield back my time.

Mr. Olson. My friend's time has expired.

The Chair now calls upon the gentleman from the Commonwealth of Virginia, Mr. Griffith, for 5 minutes.

Mr. Griffith. Thank you very much, Mr. Chairman. I appreciate it,

Ms. Hoffman, during a hearing before this committee, Secretary Perry mentioned that microgrids could be a solution to quickly restore electricity after future natural disasters. I am also interested in how microgrid technology could be used to provide power to rural and rural mountainous areas of the country. Do you believe Puerto Rico could benefit from microgrids and, if so, how?

Ms. Hoffman. So, thank you very much for the question.

Microgrids provide an opportunity to bring generation closer to the load and be able to manage supply and demand on a more local basis. In Puerto Rico you have the generation on one side of the island and, of course, the load on the other side of the island. So, ultimately, you really would like to be able to create a minigrid or a microgrid. It would be able to balance that in a different form. But that does require generation, and it does require load management and advanced communications and controls

to be able to manage that on a more localized basis. So, you look at things such as energy storage and other generation that can be meshed very well with a local distribution system.

Mr. Griffith. Now would you see that as exclusive of the current type of system or would you see it as an ancillary except in times of disaster?

Ms. Hoffman. So, ideally, I would love to think about how you build off of the existing system and capitalize on the existing investment, where it is electrically feasible. And then, once again, that requires close coordination with the existing infrastructure. Whenever utilities look at isolation or separation of the grid and look at microgrids, they are looking at utilizing the existing assets and being able to build upon those assets with new technology and new capabilities.

Mr. Griffith. And if you are suddenly cut off, as we have seen in Puerto Rico, from your supply of either electricity or the fuel to produce that electricity, doesn't that require that the microgrid also have some kind of a fuel source that it can tap into in cases of emergency?

Ms. Hoffman. Absolutely. You need a fuel source. You need redundancy. You need to be able to ensure reliability of the microgrid. Whether it is a utility-owned or a private-sector-owned, you have to have that redundancy and capability for your customers.

Mr. Griffith. I appreciate that.

What are the current limitations associated with the microgrid technology, if any?

Ms. Hoffman. So, some of the current limitations are really looking at microgrid controllers to be able to have an ability from a standards form to be able to look at control of the microgrid, looking at cybersecurity. Regardless of who owns the electric grid and how the electric grid is developed, you have to be secure. You also have to have the capability to dynamically manage supply and demand. So, looking at some of the advanced control solutions and things along those lines, as well as the generation technology.

Mr. Griffith. Now let me ask you this: can you envision that a microgrid might be as small as, say, just a power source that would handle a hospital and its needs or a factor and its needs for short periods of time, as a part of the system as a whole, but, then, also, in times of emergency be able to take care of those needs where we have seen problems in Puerto Rico and other places?

Ms. Hoffman. So, absolutely. We have seen microgrids at university campuses, at hospitals. So, it can be as small as one wants to define a microgrid, but also can be larger from a minigrid point of view, if you want to support multiple services in a locality.

Mr. Griffith. And I would assume that, based on what we have already discussed, that if you had, if for some reason in the

natural disaster your fuel source was damaged, but the rest of the equipment was still good, that it would be easier to drop in the fuel, for the federal government to come in after the disaster and drop in the fuel than it would if you drop in a whole new system, isn't that correct?

Ms. Hoffman. I think that has to be evaluated on a system basis, to be fair.

Mr. Griffith. Okay.

Ms. Hoffman. I mean, you are bringing in a lot of fuel, and it kind of comes down to what really is it required for a cost-effective restoration. What we are talking about is getting the power back on for as many customers as possible as efficiently and as effectively as possible. And so, in some cases that may be putting in, re-establishing a grid system and a grid network. In other cases in a localized community that is very far and isolated, it may be putting onsite generation there and creating a minigrid in the near term until lines and power can be restored from a main grid point of view.

Mr. Griffith. And I appreciate that. Of course, in my neck of the woods where we have a lot of coal and some natural gas, but a lot of coal, we think that might be an answer for us, and maybe for others, to have that fuel source available and have the big microgrid ready to go.

With that, Mr. Chairman, I appreciate it very much and yield back.

Mr. Olson. The gentleman yields back.

The Chair now calls upon the gentleman from Iowa, Mr. Loebsack, for 5 minutes.

Mr. Loebsack. Thank you, Mr. Chair.

Thanks to the panel today for your excellent testimony, and we have had a lot of great questions.

I guess I want to join in with everyone else in expressing the fact that I was heartbroken by the devastation of these most recent storms. I think it is unfortunate that we are probably going to see a lot more of this down the road. So, we are going to be faced with these issues, I think, across the country.

And many of us represent districts that have already been affected over the years by this kind of devastation. I represented Cedar Rapids, Iowa, for six years. Back in 2008, we had the Flood of the Century or the flood of whatever number of centuries, and the river crested at 31 feet, 9 feet over the previous record. There was $2.5 billion damage done immediately in Cedar Rapids, the economic loss of probably the same. And they have been through a lot, like a lot of communities around this country, and just most recently what we have seen in Puerto Rico and Texas and Florida.

I do want to, I guess, address my concerns more to Mr. Alexander than anybody with respect to the Corps. You know, the Corps I know ranks the projects, and we are going to have a lot of projects coming up, what we have seen recently, projects for

reconstruction, for flood mitigation. I run the benefit/cost ratio, and it has to be at least 1-to-1, as you know.

Cedar Rapids was 1.2-to-1. We authorized the project to go forward in 2014, but we haven't seen any movement on it in terms of funding. And this is going to happen in these other instances, too. We are going to have a lot of challenges, sort of where to prioritize, where to put the money.

But I have a lot of concerns with this benefit/cost ratio. It seems awfully bureaucratic to the folks who are living in these communities when they want to prevent floods in the future. Can you address that issue and give us any hope at all that, not just Cedar Rapids, Iowa, but these communities that are going to be faced with flood mitigation down the road might get some relief and actually see some projects built?

Mr. Alexander. Sir, I am familiar with benefit/cost ratios and prioritizing and racking and stacking of projects, and the needs are many, but the budget is limited. But my focus is on contingency operations. And so, to adequately address your question, I would have to refer to our Civil Works personnel. So, I could have my staff coordinate with them.

Mr. Loebsack. Yes, I suspected that might be the case, but I am going to go ahead and submit a question on the last. Then, if you can get us an answer from the relevant person at the Corps, that would be great. Again, I just want to bring up this issue more than anything else, because going forward this is going to

cost, as we know, billions of dollars for reconstruction in these communities. And a lot of them are going to face the same questions that Cedar Rapids faced since 2008, and a lot of other communities around the country, and it is something that we are going to have to pay close attention to and we are going to have to resolve that issue, because folks are going to be depending upon those reconstruction funds to make sure that they can go forward with their communities.

So, thanks to all of you.

And thank you, Mr. Chairman. With that, I will yield back.

Mr. Olson. The gentleman yields back.

The Chair now calls upon the patient gentleman from West Virginia, Mr. McKinley, for 5 minutes.

Mr. McKinley. Very patient, very patient. Thank you, Mr. Chairman.

Mr. Olson. Very patient.

Mr. McKinley. Mr. Chairman, given the aftermath and all the discussion here we have had about the natural disasters we have had in Florida, Texas, Louisiana, Puerto Rico, I really want to applaud the Department of Energy's efforts to refocus the narrative and the discussion about reliability and resiliency, because really it underscored how serious that problem is if we don't address it. So, thank you for what you are doing, and for Secretary Perry, for focusing on that, because I think that could have some impact.

But my question, a little along the same line, has to do with the petrochemical industry in the Houston and Louisiana, all of the Gulf Coast, where we were so hard hit when that Category 4 hit there that it wiped out or shut down 17 -- I think there are 23 crackers down in that area -- 17 of them were shut down. One of them is still out. Sixty percent of our production of polyethylene and propylene were lost for a period of time. It showed how vulnerable we are in that area.

And I know that, in contact with folks that have reached our office, because of that slowdown, because of the lack of cracker facilities to be able to provide the ethylene and propylene around the country, companies all across America that use their plastic resins are slowing down as a result. One company, particularly, in my district was working seven days a week. It is now down to five because it can't get the plastics.

So, this thing is serious about it. What we have done, or what I think DOE maybe has an interest -- and I would like to hear more from you -- is that, rather than taking a page from the Strategic Petroleum Reserve of having it all in one location, what if we were to locate an ethane storage up in the northern Appalachian area, right where the Marcellus and the Utica shale formations are located, so that we could have a secondary supply, a secondary source, to be able to provide that, the petrochemical supplies of material for around the country?

Do you have a thought about that from DOE's position, here

they may be on having a secondary? It is not replacing Houston by any stretch. It is just having something that is in another location, so it is not vulnerable to the weather.

Ms. Hoffman. So, Congressman, you bring up an important issue. It is location, location, location. Diversity is very important. And as we look at any sort of, whether it is fuel product, chemical product, having and thinking about having flexibility in where that product is developed also looks at our security and resilience for the nation. So, I understand that in the Appalachian area there is a lot of natural gas resources and a byproduct of natural gas and the ability is ethane. And so, I know that the Secretary had a roundtable discussion and is looking at the opportunity. But it brings up the important point that we need to think about diversity and I wanted to say "generation diversity," but product diversity in the United States.

Mr. McKinley. Following up on that is that, during last year's appropriation process, our office had introduced an amendment to the appropriation bill to see that a study was undertaken to confirm whether or not there was an interest or possibility and potential for having it in the Marcellus and the Utica shale formations. That has been since, I think it was May. Do you have a sense? Can you give me a status on how far along, if it has been undertaken yet, to make a determination of the feasibility of locating a secondary ethane storage?

Ms. Hoffman. So, I understand the Department is undertaking a study in this area, and it is my understanding that this study will be completed in 2018.

Mr. McKinley. Do you have an idea when in 2018? In December or is that going to be in September or October?

Ms. Hoffman. I don't have that.

Mr. McKinley. Okay.

Ms. Hoffman. I will get back to you on that answer.

Mr. McKinley. If you could back to me, I would appreciate it. And I yield back. Thank you.

Mr. Olson. The gentleman yields back.

The Chair now calls upon the gentleman from the Bay state, the Bayline state -- I'm sorry -- the goldmine state, Mr. Sarbanes, for 5 minutes. I apologize.

Mr. Sarbanes. All those names work.

Thanks to the panel.

I wanted to ask you, Mr. Alexander, to step back in terms of the Corps' relationship to these disasters that have been occurring with more frequency, and give me a sense of how much the Corps' mission and effort and sort of the deployment of its various projects has changed over the last few years in either response to the disasters that we are seeing, these natural disasters, or in anticipation that the frequency of them is going to increase. Is that an analysis that is happening? Can you cite some trends in terms of the Corps' projects around this, the kind

of requests that come in that are related to resiliency and adaptation, and so forth, in addition to just efforts to respond to things that happen? So, if you could give that kind of 30,000-foot perspective, that would be helpful.

Mr. Alexander. Thank you, sir.

First, every year following a storm season, we do an after-action review and we identify lessons learned, and we work to develop and establish best practices, so that we can improve ourselves, train accordingly. How can we work with state and local governments to help them prevent and work toward mitigation of a disaster?

We are always looking at how we can improve our critical infrastructure. We have an aging infrastructure, as you know. So, that is a separate issue. We acknowledge that infrastructure needs to be resilient in order to withstand storms such as this, flooding on the Mississippi, tornadoes out in the Midwest. We are looking, as we move forward and develop and study projects and future projects, we are looking at ways to ensure that a greater degree of resilience is incorporated in those designs.

Mr. Sarbanes. Are you seeing an increase? Is there a marked increase or at least something measurable in the kinds of proposals that are coming into the Corps that relate to these extreme weather events, either responding to something that has happened or projects that are anticipating increased exposure from these events? And has the Corps' kind of scoring system for

projects been adjusted in any way relative to what has been happening with these kinds of disasters and weather events?

Mr. Alexander. I am not in a position to adequately address your question. I can say, I mean, we do every year; we have requests for additional flood damage mitigation projects. How can we increase the resilience in levy systems and support and mitigate flooding in low-lying areas, flood plains, things of that nature?

Mr. Sarbanes. I would appreciate it, if it were possible, to go back to the Corps, and maybe after the analysis following this hurricane season has been completed, to see if you could give us some information about trends over the last few years in terms of the number of projects that fall into that kind of a basket and, as I said, whether the Corps is putting that analysis and thinking into a strategic plan for the Corps going forward that may lead to creating different sets of priorities for project based on some of these issues. So, if that is something, certainly getting that analysis -- I assume we can get some report on the analysis that is done on an annual basis -- that would be helpful, but, then, any additional perspective you can bring on those kinds of trends would be helpful.

Mr. Alexander. Yes, sir, we will.

Mr. Sarbanes. Thanks. I yield back.

Mr. Olson. The gentleman yields back.

The Chair now calls upon the gentleman from Missouri, Mr.

Long, for 5 minutes. Welcome back, Billy.

Mr. Long. Thank you, Mr. Chairman.

And, Ms. Hoffman, 10 or so years ago, my hometown of Springfield, Missouri, we received a devastating ice storm where there were folks out of power for 10, 12 days, two weeks, whatever, and the utility companies came in from all over to help us in that situation. I know the recent situation in Florida, from the Washington, D.C., area here in Maryland, Virginia, and Springfield, Missouri, again sent crews down to Florida to help in that situation. So, I know what it is like whenever people -- neighbors helping neighbors, so to speak.

You note in your testimony that mutual assistance provided by electric companies, public utilities, and electric cooperatives across the country played an important role in restoring power so quickly in Florida. Could you discuss the logistics of bringing in as many as 60,000 workers from across the country to quickly assess and restore, or assess restoration locations, and how this effort is being coordinated by industry?

Ms. Hoffman. So, thank you very much for the question. And I think it is an impressive network, and the aggressive posture that the utility industry has had, as well as the lessons learned from Katrina and past events, that the utilities have really taken it upon themselves to have a leadership position in developing a mutual assistance network. This is a network where utilities talk among each other, request mutual assistance, and it is

organized to provide mutual assistance to utilities that request it. And this is across the United States. There is different coordination and different entities that are responsible for a mutual assistance request in different areas of the country.

The utilities that provide mutual assistance, they talk about the management structure; they talk about laydown procedures with respect to equipment and equipment necessary. And there is a huge coordination with respect to supplies and the availability of resources.

Mr. Long. Okay. What role do state or federal emergency operations officials have in monitoring the use of mutual assistance and to ensure that it is applied to the most critical areas?

Ms. Hoffman. So, this is real interesting, and I thank you for bringing up the point. What we deal with is, first and foremost, the utilities are in a leadership position, as they should be, for providing response and recovery. The federal agency and the federal government and the Department of Energy, what we do is help understand when is it outside the ability of a utility to be able to manage their response and recovery efforts, and what are the resources that are required, the gaps that are needed in providing support. So, whether it is transportation issues, access issues. And so, that is the activities that the Department of Energy and the federal government help with. And that is whether it is hours of service waivers, whether it is

weight restriction waivers, whether it is understanding if there is a priority, whether it is a heavy load like a chemical facility or a pharmaceutical or a hospital, what some of those restoration needs are.

Mr. Long. Speaking of the federal government, what does the federal government do to remove regulatory roadblocks to recovery and repair efforts, and are there areas that we can improve in those?

Ms. Hoffman. So, the efforts that the federal government does and looks at are from a waiver point of view. So, looking at access to any sort of damaged area, to making sure that the utilities -- I guess where I would go with this answer is I will be very pointed here. It is that utilities nowadays are very much seen as emergency responders. Typically, that has been the health and the safety side of things. But now, as you look at critical infrastructure and as you look at the needs moving forward, telecommunications and electricity are primary for providing an effective restoration process and life and safety. And so, access for utilities in a damaged infrastructure environment, being able to be forward-leaning in getting utility resources there, are absolutely critical as we move forward. And it is going to be more critical as we look at onsite generation and being able to restore power.

Mr. Long. Okay. Thank you.

And will the Department of Energy be working with the states

and territories impacted by these recent hurricanes to assess grid resiliency efforts and identify ways to improve grid resiliency?

Ms. Hoffman. Yes.

Mr. Long. Okay. I wish we had time today for an EMP discussion with all of you, but perhaps another day. It seems like our time is taken up today with talking about the Astros all the time.

Mr. Chairman, I yield back.

Ms. Hoffman. I look forward to future conversations on that.

Mr. Olson. The conversation is a problem, my friend, about the Astros? Is that a big problem?

The gentleman yields back.

The Chair now calls upon the gentleman from New York 20, including the state capital of Albany, Mr. Tonko, for 5 minutes.

Mr. Tonko. Thank you, Mr. Chair.

While we hear about restoration working along in some of our states, many of our fellow Americans in Puerto Rico and the United States Virgin Islands remain in the middle of the most serious blackout in United States history. Restoring services is absolutely critical, but we also need to acknowledge the risks of this happening again and the need to support the development of a more resilient grid moving forward.

Over the last decade, extreme weather and fire events have cost the federal government well over $350 billion, according to

the Office of Management and Budget. A GAO report last week estimated that these costs will likely rise in the future, due to the effects of climate change. This is not a choice between pay now or pay later. It is a pay now by supporting research, hardening infrastructure, and making meaningful investments to adapt to and mitigate climate change, or pay now in multibillion dollar emergency spending packages. The fiscally-sensible approach is to acknowledge the risk posed by extreme weather and to make the necessary investments that will mitigate it.

We just passed the five-year anniversary of Superstorm Sandy hitting the Northeast. We have seen a lot of effort in New York to build a more resilient grid, but the experience of Sandy shows that rebuilding takes time. And it is clear that lessons learned from one disaster can make future response and recovery more effective. We have been learning from Sandy. We are learning from Harvey, from Irma, and from Maria, and the learning will continue until we address some of the preventative measures.

So, Ms. Hoffman, your testimony mentioned that Florida Power & Light has made major investments since 2006 to build a more storm-resilient grid. Similar work has been done in New York State in regard to Sandy. How can a smarter, modernized grid be more resilient?

Ms. Hoffman. So, thank you, Congressman, for the question.

A smarter grid allows for advanced communications and controls. It allows for rerouting power. It allows for an

accelerated situational awareness.

So, let's first talk situational awareness and the ability to have smart meters and you are able to have better visibility into your system, be able to isolate damage, be able to reroute power. And so, having that ability allows you to be forward-leaning on placement of resources, to have a very effective restoration process, well-planned, well-distributed with respect to priorities and how a restoration process can be done.

With respect to being able to reroute power, you can really look at isolating customers and being able to make sure that you can restore most of, a large number of customers quickly, as well as prevent damage to additional customers unnecessarily.

Mr. Tonko. Thank you.

And, Ms. Walker, can you explain how grid modernization efforts in Texas, advanced meters, and others, aided in a more rapid recovery there?

Ms. Walker. Yes, sir. Thank you for the question.

The advanced meter systems that we have -- we have them through most of the ERCOT region -- were very helpful. It notified the utilities of when those customers were out. So, they knew where those customers were located. It also helped, as Ms. Hoffman said, in rerouting and knowing where they needed to send their crews, and being able to reroute electricity to serve people in a more timely fashion. So, we found that it was very helpful

to have the advanced meter systems and the new technologies.

Mr. Tonko. Thank you.

And DOE's quadrennial energy review heavily focused on critical infrastructure interdependencies. I am particularly concerned by the harrowing statistics of Puerto Ricans without access to safe drinking water. Water, telecommunications, hospital, and public safety infrastructure are dependent on electricity.

So, Ms. Hoffman, is a more resilient grid system, perhaps one that includes microgrids, distributed generation, and storage, important for supporting rapid response and recovery in regard to and in interaction with these other critical infrastructure needs?

Ms. Hoffman. So, thank you, Congressman.

Using a microgrid in a smart fashion around critical infrastructure is absolutely important. As you look at telecommunications, as you look at water and wastewater treatment plants, it is really how do we harden those areas to allow for them to either sustain or be able to recover quickly. And having generation closer to these critical loads, through the form of a microgrid, is absolutely important. I know that ConEd and areas in New York are also looking at how do they harden their infrastructure.

And I do want to say I appreciate NIPA and their efforts in going down to Puerto Rico as well and supporting the recovery

efforts.

Mr. Tonko. Thank you.

Has there been any interaction with EPA and DOE in regard to this interdependency on infrastructure?

Ms. Hoffman. Sorry, you said EPA?

Mr. Tonko. Yes. Any efforts with drinking water, DOE, and the infrastructure, the electric utility?

Ms. Hoffman. Thank you very much. I understand.

Through the Electric Sector Coordinating Council and through our responsibility as a sector-specific agency, we have had coordination discussions with the telecommunication sectors and some of the other critical infrastructure sectors to think about how do we really move forward from a restoration process, from a hardening process, from an advanced technology process, from a coordination process, and moving forward and strengthening our economy.

Mr. Tonko. Thank you so much.

Mr. Chair, I yield back. And congratulations.

Mr. Olson. Thank you. The gentleman's time has expired.

The Chair now calls upon the gentleman from Florida, Mr. Bilirakis, for 5 minutes.

Mr. Bilirakis. Thank you, Mr. Chairman. Thanks for allowing me to sit on the committee.

And then, also, I want to congratulate you on the Astros' victory. They are a model. They really accomplished quite a bit

this year, and I like the way they rebuilt their team.

So, anyway, can I have an extra 2 minutes because of that?

Mr. Olson. As long as you want to talk like that, you can have 10 minutes.

[Laughter.]

Mr. Bilirakis. All right, but I am going to root for another team next year. You know that.

But, in any case, I wanted to talk about -- Ms. Walker, if I can ask you a couple of questions? I understand that there is a site prioritization when utilities are being restored and in the midst of a response resources are often spread thin. If there are two hospitals -- this is a question -- if there are two hospitals in a given area, how do utilities determine which facility is responded to first?

Ms. Walker. Well, in Texas the hospitals by statute are required to have backup generation. So, they do have that requirement. I am not sure how they are decided which one they respond to first. I know that for CenterPoint Energy during Hurricane Ike that that was the first areas that the company went to, was to the hospitals. So that all of the personnel were trying to restore service to those. So, I am not for sure and I would have to look into how they would decide between two.

Mr. Bilirakis. Thank you.

What role do utility companies play in crafting a state's disaster response plan and determining which sites are

prioritized?

Ms. Walker. They have complete power to come up with their plan on how to restore power. The Commission does have levels that we ask them to look at, which are the critical structures such as hospitals. By statute, they also have to respond to nursing homes. We clearly have them respond to refineries and things in the ship channel. So, there is a tier, but the utilities are responsible for setting their own priorities.

Mr. Bilirakis. Thank you.

How much flexibility does a utility company have in determining which sites are restored first?

Ms. Walker. They have a lot in Texas. They do work, and Texas recovery is at the local level, so they do work also with their counties and their cities to make those determinations. But the utilities in Texas have a significant amount of determination on how they restore power.

Mr. Bilirakis. Thank you.

The next question to the panel, what challenges still exist for Florida and what are your post-storm recommendations? What DOE resources are available to the communities like mine impacted by Irma? Who would like to being first?

Ms. Hoffman. I will start. Florida had a very effective restoration process. They had the arrangements from a mutual assistance point of view. They looked at, and their investments in the infrastructure have helped with, hardening their systems.

Their advanced control and metering has advanced their capabilities. At this stage in the game, Florida really looked at their codes and standards from a perspective of a Category 3 hurricane. As we are looking at Category 4 hurricanes and additional hurricanes, I think now it comes down to, what are some of the additional new capabilities to mitigate a Category 4 and higher-level hurricanes that they are going to have to consider?

I think from a fuel distribution point of view, that was the one area of looking at distributing fuel. Gasoline was a challenge in Florida, but I think it was also partly that the necessary evacuation that occurred had a run-on on gasoline stations. And so, it looks at, they did advance by having generation hookup. So, from an electrical point of view, they advanced capabilities there. But if I had one area, it is probably look at the distribution network with respect to gasoline.

Mr. Bilirakis. The fuel issue, yes, definitely. We were very fortunate in the Tampa Bay area, I think as you know, to dodge the Category 3 or 4, but God forbid we have one.

So, anyone else want to comment? I don't have much time. I know I asked for an additional couple, but I was just kidding. But does anyone else want to comment on that? Any suggestions?

[No response.]

That is great input. I really appreciate that.

Thank you very much, Mr. Chairman. I yield back.

Mr. Olson. The gentleman is always welcome here. He yields back.

The Chair now calls upon the man who is working very hard for a bipartisan agreement to allow me to wear this jersey on the House Floor later today, Gene Green from Houston, Texas, 5 minutes.

[Laughter.]

Mr. Green. I thank my colleague and neighbor for yielding to me.

For our colleague from Florida, I know there were some problems with gasoline supplies there, and maybe you can tell me, does Florida import all your gasoline and diesel? I didn't know if you had any refineries in Florida. Okay. Well, that is okay because we want to keep selling you the stuff we produce in Texas and Louisiana.

But, anyway, being a native Houstonian and going through lots of storms and hurricanes over the years, Harvey was probably the toughest, even compared to Hurricane Carla who hit us in 1960, 1961. But every eight years we have a tropical storm or a hurricane. In 2008, we had Hurricane Ike, which damaged our infrastructure because it was a wind storm, the storm surge, but the wind. By the time Harvey got to Harris County, it was mostly rain. And our biggest problem was typically so much rain that it overflowed a lot of our sanitary sewer systems in the west side of Houston, and even Houston facilities and our smaller cities

and how that did.

But, somewhere along the way when we have these thousand-year storms that are happening so often, and the average rainfall in Houston is 49 inches a year and you get 52 inches in five days, I don't know how we can deal with it. We just have to dig more reservoirs, spend more money to contain that water, because water is a precious commodity and we need to do it, instead of letting it go into the Gulf of Mexico.

This is the first storm that I have had where I have had fatalities in our district. We lost eight people in our district. Two of them were breadwinners in their family, because they thought they could go through this high water in an underpass.

But the sad one was that we lost a family of six in our district on Greens Bayou, northeast Houston. The bayou, we have been working on it for decades to build detention ponds upstream, but the family turned off into the bayou, literally, because they thought it was the road. And it was widely publicized the family was missing, but we didn't find them until after the water went down down in Greens Bayou, northeast Harris County.

But, as far as for the utilities, we didn't have that big a problem. But, as we are sitting here, we will get another hurricane or a tropical storm. And so, that is what I am concerned about.

It is important we try to learn from these lessons of these storms. We are in the middle now of building back houses, shops,

and communities, but we know we have to do better on the flood infrastructure, both working with the Corps of Engineers and in Harris County. We have a Harris County Flood Control District. We tax ourselves to keep from flooding in Harris County, so we can partner with the Corps. But it is essential that we fund the Corps of Engineers, FEMA, and other related agencies in our next supplemental.

I am concerned about Puerto Rico because their electric grid was in pretty bad shape even before. And some of us were talking on the Energy Subcommittee a week ago about this may give us the opportunity for the United States to actually provide an electric system in Puerto Rico, because I understand they are still burning fuel oil.

Again, coming from Texas, we can put all the windmills up and all the solar, which you can't get wind and solar. We would be glad to have an LNG export/import facility there, because, one, it would be much cleaner than fuel oil. It would probably be cheaper, too, because the price of natural gas is relatively cheap.

I would just like to ask -- like I said, I have driven around Puerto Rico, but I don't live there and I don't represent it, but I know they need help in getting literally the whole grid back up. Is that something that we could look at through the Department of Energy to see if we could redo the grid in Puerto Rico to where it would be brought up to what we would consider

standards?

Ms. Hoffman. I think it is an opportunity to look at all technologies and different solutions for investment in Puerto Rico, and looking at how we can harden the system. But everything should be on the table of what advancements can be done with respect to their energy infrastructure. Forty-seven percent of Puerto Rico electricity comes from petroleum, 34 percent from natural gas, 17 percent from coal, and 2 percent of renewable energy. And so, there is a lot of opportunities to think about the generation mix as well as the location of generation, and the use of the transmission and distribution system, as well as demand/response and customer engagement.

Mr. Green. Yes. Well, I know in Texas we have had success with the wind power, not only in west Texas, but south Texas, and it gives us that type of opportunity to have a different fuel supply, although it is hard today to heat with low-price natural gas. That is why some of our coal plants are problems.

Ms. Walker, in your testimony you said that the PUCT's initial assessment of the Texas utilities is that they did an outstanding job of responding to the storm. And I know over the years we have had partnerships with other states and other communities, that we will send our utility workers up there when they have a problem. When there are ice storms in Dallas, we will take care of that. But I don't remember seeing that much in the Houston or southeast Texas area.

Ms. Walker. Mutual assistance?

Mr. Green. Yes.

Ms. Walker. There probably wasn't that much because the damage was very different and the cause of the outages was very different. Usually, the mutual assistance comes in to repair wind damage, the poles going own, the wires going down. Houston and Beaumont was flooding. And so, most of that was due to the substations being out. And so, once we were able to get these mobile substations in or the waters recede and get those substations back up and running, we were able to restore the customers.

The outages in those areas really weren't very long-lasting. They were more like a thunderstorm. And Houston and CenterPoint Energy and Entergy were continually restoring customers. And so, their numbers were very low on an ongoing basis, although they ultimately restored a lot of people.

Mr. Green. And that is why it worries me, because here in Puerto Rico I think they are still only about 30 percent of the power that has been restored. So, it is really a case that we need to work on.

So, thank you, Mr. Chairman. I yield back.

Mr. Olson. The gentleman's time has expired.

Seeing no members seeking to ask questions, the Chair wants to thank our five witnesses. Thank you, thank you, thank you for coming here today.

I remind our witnesses that every member can submit questions for the record for 10 days. Once you get that, you have 10 days to respond.

Mr. Rush. Mr. Chairman, I request, I would like to make a statement.

Mr. Olson. Yes, sir, you have a minute, Bobby.

Mr. Rush. A minute? Thank you, Mr. Chairman.

Mr. Chairman, I must say, with all due respect, as we conclude this panel and are getting ready and prepare to introduce the next panel, with all due respect, Mr. Chairman, I simply smell a rat here. I really smell a rat.

PREPA's lack of response to this subcommittee's efforts to invite them to attend and provide witness testimony to this subcommittee is most disgusting and extremely disrespectful. Mr. Chairman, that said, I strongly request that we use our subpoena authority to demand that PREPA come to this subcommittee and disclose to Members of Congress who are members of the subcommittee what were the facts involved in its awarding this $300 million contract, which I call the sweetest of sweetheart deals, to repair and reconstruct Puerto Rico's electrical infrastructure.

And I also believe, Mr. Chairman, that as has been stated by members of both sides during this panel, that FEMA should also be invited to be at the same witness table. Mr. Chairman, we ought to get to the bottom of this, and we have got to know what happened,

when did it happen, and who is responsible for this absurd sweetheart deal that is going to result in numerous people paying an extraordinary additional amount of millions of dollars because of the delay in the withdrawal of this contract.

So, I really request that we use our subpoena authority to make sure that PREPA stop disrespecting the United States Congress.

Thank you. I yield back.

Mr. Olson. And, my friend, I share your concerns. It sounds kind of odd, what happened there, but I will talk to the Chair for the subcommittee, Mr. Upton, and the full committee, Mr. Walden, about the subpoena issue.

But, right now, a point of personal privilege before the first panel leaves, and this is maybe at the risk of offending Ms. Castor. But, Commissioner Walker, I hope you are going to SMU Saturday, joining my daughter and my wife to watch SMU beat the tar out of Central Florida.

[Laughter.]

The panel is dismissed.

Okay. Second panel, are you all ready? And just like before, we will start out with opening statements from all of the panelists, followed by questions from members.

And I recognize Thomas Fanning. Tom is the President and CEO of Southern Company. He is here on behalf of the Electricity Subsector Coordinating Council.

Tom, you have 5 minutes for an opening statement.

STATEMENTS OF THOMAS FANNING, PRESIDENT AND CEO, SOUTHERN COMPANY, ON BEHALF OF THE ELECTRICITY SUBSECTOR COORDINATING COUNCIL; JULIO A. RHYMER, SR., EXECUTIVE DIRECTOR, VIRGIN ISLANDS WATER & POWER AUTHORITY; CHET THOMPSON, PRESIDENT AND CEO, AMERICAN FUEL & PETROCHEMICAL MANUFACTURERS; MAX MCBRAYER, CHIEF SUPPLY OFFICER, RACETRAC PETROLEUM, INC., ON BEHALF OF THE NATIONAL ASSOCIATION OF CONVENIENCE STORES AND THE SOCIETY OF INDEPENDENT GASOLINE MARKETERS OF AMERICA; RAMON LUIS NIEVES, ATTORNEY AT LAW, FORMER MEMBER, SENATE OF PUERTO RICO, AND CATHERINE B. KENNEDY, VICE PRESIDENT, NATIONAL NURSES UNITED

STATEMENT OF THOMAS FANNING

Mr. Fanning. Thank you. Thank you for inviting me to testify today.

My name is Tom Fanning. I am the Chairman, President, and CEO of Southern Company. I am also the Immediate Past Chairman of the Edison Electric Institute, the association that represents all U.S. investor-owned electric companies. However, I am addressing you today in my role as one of three Co-Chairs of the Electricity Subsector Coordinating Council. We collaborate closely with our colleagues from public power utilities and rural electric cooperatives on the ESCC.

I am pleased to address the subcommittee and to share the steps the electric power industry is taking to make energy infrastructure smarter and more resilient, allowing us to

continue delivering affordable and reliable power.

The 2017 hurricane season highlights the critical importance of cooperation and coordination among electric utility companies, the government, and other key infrastructure industries to ensure fast, efficient recovery for customers.

The electric sector faces constantly-evolving threats to the energy grid. The industry's risk mitigation strategy emphasizes a defense-in-depth approach. We focus on preparation, prevention, response, and recovery, with an emphasis on the isolation of and enhanced protections for critical assets.

While this hearing is focused on storm response and recovery, it is important to note that our companies do not build the energy grid or our security responses to meet only one type of threat. We must prepare and plan for them all, whether manmade or natural, malicious or unintentional, relating to the cyber or physical security, or a combination of threats.

Weather is an unavoidable part of our business. In the aftermath of such events, the industry works to identify gaps, compile lessons learned, and disseminate best practices. As an industry, we strive to be better today than we were yesterday and to be better tomorrow than we are today.

Since Superstorm Sandy five years ago this week, the electric power industry has combined efforts across all segments of the industry and has worked with the government partners to streamline restoration efforts and to improve preparation for and response

to major threats that cause significant outages.

The benefits of this coordination were visible over the past several months as the industry and federal government worked to prepare for and respond to the hurricanes. There is an understandable urge to compare storms, but the reality is that each storm is different. The common threads, however, are the need for resilient infrastructure, a plan for response and recovery, and the awesome nature of our industry's ability to respond to emergencies.

Before I close, I would like to underscore the importance of the ESCC. During the most recent storms, the ESCC held daily coordination calls among impacted companies and government officials to address critical operational issues such as identifying specialized equipment needs, removing temporary flight restrictions for both manned and unmanned aircraft to assist with aerial damage assessments, coordinating how industry could re-enter and access disaster areas, and coordinating response efforts with the oil and natural gas, telecommunications, transportation, and water and wastewater sectors.

Energy Secretary Rick Perry was on every call and was frequently joined by other officials such as Homeland Security Acting Secretary Elaine Duke. These calls were essential to identify and address critical issues in the response and recovery efforts.

The reliability and resiliency of the energy grip are of paramount importance. Our customers expect the lights to go on when they flip a switch. When the power goes out, our customers expect that it will be on soon.

The electric power sector will continue to strive to meet those expectations through a multilayered strategy, to invest in smart energy infrastructure, continuous enhancement of our industry/government partnership, and the grit of the amazing men and women who make the energy grid work day-in and day-out.

The subcommittee is showing great leadership with its focus on preparedness, and we look forward to working with you on this critical topic.

Thank you again for the opportunity to testify on behalf of the ESCC, and I look forward to your questions.

[The prepared statement of Mr. Fanning follows:]

********** INSERT 8**********

Mr. Olson. Thank you, Mr. Fanning.

And now, the Chair is glad to call upon Mr. Julio Rhymer, the Executive Director of the Virgin Islands Water & Power Authority, that suffered devastation from two hurricanes, Irma and Maria. A 5-minute opening statement, Mr. Rhymer. Thank you.

STATEMENT OF JULIO A. RHYMER, SR.

Mr. Rhymer. Good evening, Mr. Chair, other honorable members of the Subcommittee on Energy.

My name is Julio A. Rhymer, Sr. I am an Executive Director and Chief Executive Officer of the Virgin Islands Water & Power Authority.

On behalf of the governor of the Virgin Islands, the honorable Kenneth E. Mapp; the Virgin Island Delegate to Congress, Honorable Stacy Plaskett; the members of the 32nd Legislature of the Virgin Islands, and the Governing Board of WAPA, I thank you for the invitation to provide testimony on the energy challenges facing the U.S. Virgin Islands as a result of the passage of Hurricanes Irma and Maria.

As you all are aware, in September of 2017, the Virgin Islands faced the phenomenon of two back-to-back Category 5 hurricanes within two weeks. According to the Saffir-Simpson Wind Scale, a Category 5 hurricane has sustained winds of greater than 157 miles per hour. There were cases in Hurricane Irma that winds were sustained at above 190 miles an hour.

WAPA's transmission and distribution facilities were, plain and simple, destroyed by the catastrophic winds of two hurricanes. Due to Hurricane Irma's impact on September 6th, 2017, the St. Thomas, St. John, Water Island, and Hassel Island electrical transmission distribution system suffered significant damage.

The St. Thomas system sustained damages of approximately 80 percent; St. John, approximately 90 percent; Water Island, 90 percent, and Hassel Island, 90 percent.

Approximately two weeks later, on Tuesday, September 19th, 2017, Hurricane Maria caused damage to almost 60 percent of the transmission and distribution system on St. Croix. The islands of St. Thomas, St. John, Water Island, and Hassel Island did not receive any significant damage from a result of Hurricane Maria.

To date, the Authority has approximately 536 linemen and other related off-island personnel in the territory, restoring WAPA's electrical infrastructure. With the assistance of FEMA, naval vessels and cruise ships have been brought in to provide sleeping quarters for the off-island crews, since many hotels and guesthouses throughout the territory remain closed after sustaining major damages during these two hurricanes.

By far, the biggest challenge that I would like to focus on today is funding the day-to-day operations and hardening of the system in the event of future storms. Without question, these hurricanes have decimated WAPA's finances. While we appreciate the assistance that has been, and will be, forthcoming to rebuild the systems that were damaged, one of our primary concerns as the Authority is the ability to meet pre-storm expenses. Prior to hurricanes, the Authority's revenues were approximately $25.6 million per month. Since the hurricanes events, and since we are unable to provide electrical service and bill customers, revenues

have dropped below $2 million per month.

WAPA has reoccurring expenses such as payroll, insurance, plant operation and maintenance, debt service, and previously-executed contracts, and financing agreements it must pay. To address this dramatic shortfall, the Authority has sought, through the government of the Virgin Islands, a community disaster loan. Any support or assistance that you can offer in this regard is appreciated.

One of the evident takeaways from the two Category 5 hurricanes, and significant damages to this regional system territory-wide, is that there is an urgent need for WAPA to rebuild its transmission and distribution systems, but to harden it to a point where it is resilient to wind storms. WAPA believes it would significantly reduce its post-storm hurricane period by undergoing more of its critical infrastructure and by moving away from wooden poles and introducing composite poles on the major distribution circuits.

WAPA must also address its grid, since it is too susceptible to damage from wind storms. WAPA had a proposed plan to construct a series of microgrids on each island. Each microgrid would be a localized group of electrical facilities that would either work in tandem with the generating facilities or an option for disconnection where they can stand alone. In the event the power and the main grid is interrupted for any reason, the microgrid would function as a small facility generating its own power at

this point.

Currently, you have in the works a microgrid on the island of St. Croix that is actually going to go out for bid, and that will provide, basically, power through solar and battery storage to our airport facilities, a waste treatment facility, a correctional facility, and, basically, a police station at this point. What we are actually attempting to do here, as a utility moving forward, is to harden our system, No. 1, and, basically, make it more resilient by having microgrids.

I would like to thank you for the opportunity to appear before the Subcommittee on Energy. I am available to answer any question that you may have on this matter.

[The prepared statement of Mr. Rhymer follows:]

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Mr. Olson. Thank you, Mr. Rhymer. And I heard what Irma didn't destroy, Maria drowned.

Mr. Rhymer. Yes, it did.

Mr. Olson. The Chair now calls upon Mr. Chet Thompson. Chet is the President and CEO of the American Fuels & Petrochemical Manufacturers.

Mr. Thompson, you have 5 minutes for an opening statement.

STATEMENT OF CHET THOMPSON

Mr. Thompson. Thank you, Mr. Vice Chairman, Ranking Member Rush, and members of the subcommittee. Thank you for having me here today.

My name is Chet Thompson. I am the President and CEO of the American Fuel & Petrochemical Manufacturers. AFPM represents the refining and petrochemical industries. Our members represent 120 refineries, 140 petrochemical facilities. That represents 98 percent of U.S. production capacity. More than half of that capacity is located along the Gulf Coast.

Hurricane Harvey impacted our facilities in the fuel supply chain very hard. Hurricane Irma impacted the fuel supply chain, but largely in Florida, while Nate's impact on our assets was rather minimal.

But, more importantly, the combination of Hurricanes Harvey, Irma, and Maria were devastating to the people of the Gulf Coast, particularly those in Houston and the Beaumont area, Florida, and Puerto Rico. Many of those impacted are part of our extended oil and gas family. Our hearts and prayers continue to go out to those still struggling to recovery, and we stand by them and will help them any way we can.

As a result of this personal impact on us, the subject of today's hearing is particularly important to our industry. So, I would like to limit my time this afternoon only to three key

points of my written testimony.

First, by and large, the U.S. refining and petrochemical industries weathered the storm fairly well and proved to be very resilient. This did not happen by accident. Rather, it was the result of lots of hard work and preparation, and with the help of an incredibly dedicated workforce and federal, state, and local first responders. They are the true heroes coming out of these events.

If you wanted to draw the storm up that could wreak the most havoc on our industry, Harvey was it. Harvey hit Corpus Christi as a Category 4 storm, moved right up the east coast, stalled largely over Houston, which is the epicenter of the refining and petrochemical industries. It dumped over 60 inches of rain in some locations and more than a trillion gallons of water across Texas and Louisiana.

At its peak, Harvey knocked 24 of our refineries offline. That represents 25 percent of all U.S. refining capacity. It had a similar impact on our petrochemical members. It knocked 60 percent of U.S. petrochemical capacity down. That is 80 percent of the capacity found in the Gulf Region.

Harvey also had a significant impact on the entire fuel supply chain. It shut down ports, pipelines, terminals, rail, and certainly gasoline stations. Our facilities couldn't get feed into their plants, and we certainly couldn't get products out.

This had the potential to be catastrophic for the fuels and petrochemical supply chains, but in the end it wasn't. Just two weeks after Harvey made landfall, 20 of the 24 facilities that went down had restarted. And the petrochemical facilities made substantial progress during this period as well.

Again, this was not by accident. Facilities were prepared for the storms. They had applied many of the lessons learned in the aftermaths of previous storms like Katrina and Rita. For example, our facilities developed more sophisticated preparedness plans, improved storm monitoring, hardened critical infrastructure, elevated pumps and generators, procured spare parts so we could be ready to move with recovery efforts after the storm. We upgraded our IT systems to help us locate employees and ensure that they had the assistance they needed. All of this made a difference. We came back online much faster than we did after prior storms.

The second point I would like to make, the federal and state response was significantly improved compared to previous storms. One of the lessons we have learned is that we have to better coordinate federal, state, and local governments. So, over the last few years, we have been working hard in that regard, working closely with DOE and DHS to improve our relationships.

The results during Harvey, in particular, were excellent. We were in constant contact before, during, and after the storms. The improved coordination was most evident in the quick review

and approval of fuel waivers, unlike in prior storms, helping us get fuel to where it was needed quickly and efficiently. Our federal and state partners, particularly Secretary Perry, Administrator Pruitt, Governors Abbott and Scott, deserve kudos for these improvements.

If I had to identify the one area that could be improved, it would be better communication by our government to consumers about the fuel supply chain and the challenges that often accompany events like hurricanes. For example, the government could help us explain the timelines for bringing facilities back online and getting products back to the distributors and the marketers. And it could also help us discourage panic buying that always seems to accompany these types of events.

Third and finally, as always, our companies will work with federal and state authorities to identify and apply lessons learned. Although we did fare fairly well, no doubt there are going to be things we can learn and improve upon to make future responses even better. We would caution anyone to resort to any knee-jerk reactions or conclusions, particularly those based on a few isolated events, before full assessments are in.

So, I know I am running out of time. I thank everyone for my time and the opportunity to speak today.

And again, I would like to express our thanks and appreciation for our incredible workforce and our first responders. They certainly deserve our appreciation.

So, thank you, and I am happy to answer any questions.

[The prepared statement of Mr. Thompson follows:]

********** INSERT 10**********

Mr. Olson. Thank you, Mr. Thompson.

The Chair now calls upon Mr. Max McBrayer. Max is the Chief Supply Officer for RaceTrac Petroleum, Incorporated.

You have 5 minutes, sir.

STATEMENT OF MAX MCBRAYER

Mr. McBrayer. Thank you. Mr. Vice Chairman, Mr. Ranking Member, and members of the subcommittee, thank you for the opportunity to testify today on the retail community's response efforts to 2017 hurricane season.

My name is Max McBrayer. I am the Chief Supply Officer and the Chief Financial Officer of RaceTrac Petroleum, Inc. I am testifying today on behalf of the National Association of Convenience Stores and the Society of Independent Gasoline Marketers of America. RaceTrac is a family-owned business, headquartered in Atlanta, Georgia, operating more than 450 convenience stores across 12 states and employing nearly 9,000 team members.

The 2017 hurricane season had a devastating effect on America's fuels infrastructure and markets. During Hurricane Harvey, flooding damaged more than a quarter of the U.S. refining capacity and shut down fuel pipelines. This put severe strain on the domestic fuel supply. Hurricane Irma led to an increased demand for fuel in Florida, further straining the fuels market and causing prices to rise sharply.

Natural disasters directly and severely affect the retail fuels market. Margin on fuel sales range between 2 and 20 cents, and retailers must constantly react to changes in supply and demand to ensure their prices remain competitive.

During any severe weather event, wholesale fuel prices become more volatile as the market tries to assess and anticipate supply availability. When these unwelcome changes occur, retailers respond to meet their cost.

Due to the infrastructure damage, compliant fuel inventories became strained, leading to escalating wholesale prices. Retail market prices generally reflect rapid increase in the wholesale prices. In this instance, fuel retailers made individual decisions on whether to increase prices and risk losing customers or potentially take losses by keeping prices low and not covering the increased wholesale cost.

Despite the tough situations, the fuel market was supported by the actions of both the federal government and the state governments. The governments worked with us to deal with the issues before, during, and after the hurricanes.

Communication and coordination initiatives were particularly important. For example, the governors of Texas and Florida held conference calls with industry and government stakeholders where they listened to concerns and rendered prompt assistance.

In Florida specifically, the governor's office waived certain restrictions for highways, helped ensure that ports prioritized fuel shipments, coordinated escorts for fuel trucks and ships, easing the movement of product to the retail fuel locations.

At the federal level, disaster response efforts spanned a number of agencies, which ultimately issued more than 30 waivers to help deal with fuel supply issues. Of particular importance to RaceTrac was the waiving of hours-of-service limitations for drivers providing assistance to affected areas. These waivers were the difference between getting fuel to our customers in a reasonably affordable and timely manner and not being able to supply customers with the fuel they needed.

In response to state petitions, federal agencies also eased restrictions on the type of product that retailers could sell. For example, EPA temporarily waived certain reformulated gasoline requirements under the Clean Air Act.

Despite the major disruptions to the fuel distribution system after the hurricanes, the impact on consumers and the economy was still less than what occurred with Hurricanes Katrina and Rita in 2005. This is because the government worked with the private sector to respond appropriately.

There are still important lessons to be learned, however. For instance, there is no good coordinated effort to make sure that consumers were informed of the status of fuel supplies via social media. As the hurricanes approached, we believe that much of the panic about fuel availability caused a significant and totally unnecessary pull on the available fuel supply. The panic lessened when information on the fuel supply was shared with the public. In addition, bottlenecking at ports and fuel terminals

was a problem that the government could have done more to alleviate.

Finally, in the hurricanes' aftermath, truck drivers and other employees found it difficult to get to affected areas quickly. Anything that can be done to remove hurdles for fuel transportation would speed up recovery efforts in the wake of future hurricanes.

RaceTrac believes the collaboration between the public and the private sectors was critical to the successful response efforts. We are proud to have been able to serve the communities that we operate in.

And I thank you for the opportunity to provide this testimony.

[The prepared statement of Mr. McBrayer follows:]

********** INSERT 11**********

Mr. Olson. Thank you, Mr. McBrayer.

The Chair now calls upon the honorable Ramon Luis Nieves, who is now an attorney at law, was a former distinguished member of the Senate of Puerto Rico.

You have 5 minutes for an opening statement, sir.

STATEMENT OF RAMON LUIS NIEVES

Mr. Nieves. Thank you, Chairman Olson, Ranking Member Bobby Rush, members of the subcommittee.

My name is Ramon Luis Nieves. I had the privilege to serve the people of Puerto Rico as Senator of San Juan and Chairman of the Committee on Energy. I currently practice law in the state and federal courts of Puerto Rico.

I want to thank the subcommittee for this opportunity to discuss Puerto Rico's energy challenges. As a resident of San Juan, I have personally suffered the problems associated with the lack of electricity for more than 40 days. The currently energy crisis is destroying our economy and our way of life.

Nobody denies the challenges of repairing the collapsed energy grid of Puerto Rico, but I submit to you that most of the challenges to turn the lights back on in Puerto Rico are neither natural nor geographic. They are manmade.

The Puerto Rico Electric Power Authority, PREPA, was already a bankrupt, fragile, and useless entity before Hurricane Maria made landfall. The Power Authority's grid was obsolete, lacking adequate maintenance.

The recent Whitefish debacle is exhibit A of the governance issues plaguing PREPA. As we evaluate energy options for Puerto Rico, we must be particularly alert about disaster contractors who may try to take advantage and profit off of our people's

misery.

But I didn't take two flights from San Juan to complain about PREPA. I come before you with proposals to help us transform Puerto Rico's energy model.

Energy equals life. As most Puerto Ricans sadly understood after Hurricane Maria, the lack of a strong, resilient, and smart energy system has the potential of killing people and destroying the economy. The actual death toll not of Hurricane Maria, but of Hurricane PREPA has not been properly disclosed by the government of Puerto Rico.

While working hard to turn the lights back on as soon as possible, policymakers must also think long term. A plan to transform Puerto Rico's energy model, supported by significant federal support funding, is the right course of action.

Technology and innovation are transforming the energy industry. Puerto Rico must break free from PREPA's centralized energy model. The people of Puerto Rico deserve an energy model whereby more and more customers are able to opt for distributed generation or go off the grid in their homes and business.

Policymakers are agreeing with the idea of a new energy model based on several regional microgrids. Microgrids for key government security and health installations, such as hospitals, will also help recovery efforts after future storms and hurricanes.

The mandate to regulate microgrids is already in our law

books. Act No. 133 from last year the last bill that I sponsored in the Senate, to include microgrids as a mandate. However, a federal mandate to include microgrids in a new energy model for Puerto Rico will certainly help.

PREPA has also pointed out that the Stafford Act restricts to rebuild the grid as it was. Perhaps you may be able to change that by amending federal law.

PREPA's old, and now collapsed, grid is not able to deal with the technical challenges of an energy model that embraces renewable power. However, as I have said, countless policymakers agree that just repairing the old, obsolete energy grid of Puerto Rico will be a colossal waste of taxpayer dollars. PREPA is broke. So, the federal government is the only entity able to finance this key project.

Let's talk about PREPA's governance. The Whitefish scandal is a sad example of the shameful and incompetent governance that characterizes PREPA. PREPA awarded a no-bid $300 million contract to an unknown company with just two employees. The government recently requested PREPA to cancel the contractual agreement, but 40 days after Hurricane Maria, and hundreds of deaths later, PREPA did what it should have done from the start, request the mutual aid offered by private and public electric companies. But where was PREPA's governing board? Nobody really knows, but I submit to you that this Whitefish business is very harmful to Puerto Rico's credibility.

Very quickly, since my time is almost up, PREPA collapsed under its $9 million debt. Congress, the administration, and the oversight board must create a financial solution for PREPA's debt. Aggressive restructuring of the debt, combined with new Brady-type bonds and continued oversight over PREPA, could be a way to solve this monumental problem.

And just to finish up, the most efficient way to transform the energy model of Puerto Rico is by giving the proper resources to Puerto Rico's independent energy commission. An independent and strong regulator is key for our recovery. In order to guarantee the federal funds to build a new energy grid are properly used and allocated, I propose that the Revitalization Coordinator of Puerto Rico under PROMESA and the Puerto Rico Energy Commission be given sole authority over PREPA. PREPA shall cease to exist in its present form.

Just to wrap up, thank you for the opportunity. The people of Puerto Rico urgently need to turn their lights back on, but we also demand the resources to create a new energy model for our island. Our lives depend on it.

Thank you.

[The prepared statement of Mr. Nieves follows:]

********** INSERT 12**********

Mr. Olson. Thank you, Senator Luis Nieves.

We saved the best for last, ma'am. Our final opening statement is going to be from Ms. Cathy Kennedy, and she is the Vice President of the National Nurses United.

Ma'am, you have 5 minutes for an opening statement. Welcome.

STATEMENT OF CATHERINE B. KENNEDY

Ms. Catherine Kennedy. Vice Chairman Olson, Ranking Member Rush, and members of the subcommittee, good afternoon, and thank you for inviting National Nurses to take part in this hearing.

My name is Catherine Kennedy of Carmichael, California, and I have been a registered nurse for 37 years. I currently serve as the Vice President of National Nurses United, which is the largest union of RNs in the country. I submit the testimony today on NNU's behalf.

From October the 4th through the 18th, I served on a voluntary deployment to Puerto Rico with NNU's Registered Nurse Response Network to assist with Hurricane Maria's disaster relief. Fifty nurses deployed with R&R into Puerto Rico among 300 skilled union members organized by AFL-CIO.

NNU nurses very much appreciate your holding this hearing and providing us the opportunity to share our account of the public health crisis that we witnessed. NNU's full report on the conditions of Puerto Rico is attached to my written testimony.

The lack of electricity is endangering people's lives and leading to preventable death and illness. I was the lead RN for the healthcare teams on the deployment. I helped to organize nurses into teams and, with a map of the island, we tracked the public health assessment of each community that we visited, evaluating whether people had access to food, water, and

healthcare, their basic living conditions, and medical needs. Time and time again, we saw that lack of power exacerbated the disaster or created new ones.

Basic medical services were down in many areas and not fully functioning in others. An acute public health crisis has developed. Without electricity, people with chronic illnesses, such as diabetes and hypertension, cannot refrigerate their medications. For example, in Loiza, nurses worked with elderly residents who had to put their insulin in bowls of tepid water, trying to keep this lifesaving medication cool enough to use.

Pharmacies could not refrigerate their medications, either. They also cannot access computer systems which store prescription orders. Therefore, patients were scrambling to find doctors to write new prescriptions, so they can give them to the pharmacies. But many doctors' offices were closed, partly because the grid is still down and accessing reliable generators and fuel for them was nearly impossible.

Pharmacies also cannot access insurance information. So, patients are being asked to pay full price for medications. Most people don't have cash, and if they had money in the bank, they can't access it because the ATMs and the banking process systems are also down.

As long as the power grid is down, hospitals cannot function at full capacity. Generators are prone to failure, and fuel is hard to access. With generators, hospitals can't perform certain

procedures or tests which use a large amount of energy. And at one hospital we know that they could not perform MRIs as long as they relied only on generators.

Without reliable power, the problems of accessing food and water are amplified. The simple act of purchasing food and water, when it is available, is nearly impossible. Stores can't take credit cards, and ATMs don't work. Bank services that normally take minutes now take hours.

The people of Puerto Rico are unable to refrigerate and cook their food. They must rely on canned and processed foods, which are high in sodium. Access to food in rural communities is especially difficult. As long as there is no power, people will be reliant on relief organizations to provide food and water for them.

Electricity is also needed to run wastewater treatment plants and to restore the functioning of water utilities. Without clean running water, nurses have witnessed the beginnings of multiple outbreaks of waterborne diseases, including leptospirosis, an animal-borne bacterial disease that can be fatal if not treated in time.

Then, there are problems accessing FEMA aid. People can't access FEMA's online notices and aid application. For those that are able to apply for aid, they are told that necessary followup communication will be sent either by text or email. People don't have power right now. They are not going to receive any followup

for their FEMA applications.

NNU urges Congress to use its oversight and appropriation authority to ensure that FEMA and other U.S. agencies respond to this crisis effectively. It is unacceptable that citizens of the richest country on earth have been denied necessary humanitarian aid and left to die. With a growing climate crisis, relief to Puerto Rico must come in the form of responsible measures that can build a sustainable energy future.

Thank you again for giving NNU the time to share the stories of the people and places in Puerto Rico that we cannot and must not forget. Thank you.

[The prepared statement of Ms. Catherine Kennedy follows:]

********** INSERT 13**********

Mr. Olson. Thank you, Mrs. Kennedy.

And now is the fun time, questions from the members. And the Chair will yield to himself for 5 minutes of questions.

My first questions are for you, Mr. Thompson. First of all, I have to say congratulations. I mean, I was there for Hurricane Ike, Tropical Storm Allison. I was there for Hurricane Harvey. Most of our capacity was in that storm. You guys came roaring back. So, congratulations for getting that turned around so quickly.

I have talked to a lot of people. You guys have gotten much better preparing for hurricanes or sort of natural disaster. Yes, we are going to take a hit; we know it. I have heard like with Katrina, Rita, and Ike, you all learned how to not fully shut down our refinery, but keep it warm, so to speak, not the complete shutdown, but keep it going where it is that risk of some sort of breach. But, once the storm clears, get that thing up like that.

So, I just want you to talk about how you prepare a refinery that is directly in the path of a storm like Harvey to make sure to get that thing back online as quickly as possible.

Mr. Thompson. Well, thank you for the question, and I address some of this in my opening remarks. Most of this, of our ability to weather the storms, one was our credible workforce. We literally had thousands of people that were riding out these facilities. When their own families and houses were in peril,

they were helping keeping our facilities literally above water and ready to go.

Also, lots of preparation. We have been working on storm for years, working with the National Petroleum Council, working with DOE and DHS. This was not something that we prepared for just a few weeks ago.

We took all the lessons learned from prior storms and we put them in the action. We hardened our infrastructure. We elevated what we could elevate. We have much better storm-tracking capabilities now. So, we could identify exactly where the storm was going and identify when we had to bring the systems down.

Safety is the No. 1 responsibility. So, our facilities will come down when safety demands it. And so, for those facilities where they realized that they weren't going to be hit as hard, they could remain warm and ready to go. Some of the facilities, indeed, had to come all the way down.

So, I would just end by saying a lot of hard work, a lot of dedication. And again, we can't applaud our employees enough.

Mr. Olson. And lessons learned, which I know it just goes with the territory. You will have some leaks, some chemical leaks, you know, whatever. For example, we have these big tanks that have floating tops. And the water got so high, almost 5 feet of rain overcame the capability, and you had some small leaks.

So, my question is, what are you all doing to prevent and respond to these spills before they happen? Because I know it

is amazing what happened. I mean, it was such a stellar performance. But how do you make it even better going forward?

Mr. Thompson. Well, I can assure that every company, those impacted and those that even weren't directly impacted are assessing how we responded to the storm, what went well, what didn't go well. We, as a trade association, bring our members together. We share information. And we will work to improve. Very storm, we learn from the prior one to get better.

Mr. Olson. Thank you.

A question for you, Mr. McBrayer. I mean, I was driving around pretty much for a week after Harvey hit and you could find gasoline. Some shops were shut down. My question is, was that because of power, because of lack of supply, lack of the gasoline, or lack of the employees being able to get to work because of all the floods? So, what was going on there? Because, again, you could find it, but some stations weren't up and running and, as you mentioned, there was some price gouging because of all sorts of rushes because people are panicking that there will be no gasoline.

Mr. McBrayer. All of the things that you mentioned, Mr. Vice Chairman, are correct. Some of it is due to the fact that we rely upon the employees who are living in the affected area. And like any good employer, we are more concerned about their life at home and being sure that they are prepared to meet the needs of their family before they return to work.

We do have some problems with the electrical supply. Getting generators into our stores, specifically, was quite challenging in the Houston area because of the amount of flooding in the roadways. There are some stores that just choose not to buy at the costs that tend to go up during these disasters.

But most everyone is working hard because in our business we build 50-year assets. We are there for a long time. And so, our long-term mentality is to provide what our guests, our consumers, need, and to work hard to do that.

It is a site-by-site 1issue as to what the problems are and what we may need to do. We have stores in the south Houston area with some water in tanks. We have had stores that were completely flooded out that are still yet to reopen. But you have to assess your assets one at a time and do things you can quickly in order to bring them back online.

Mr. Olson. One further question, Mr. Fanning. You brought up UAVs, and that is a big deal, hard back home. A town called Missouri City had some levies, not so much oil production, but levies that may be breaching. They were fine, the UAVs, they could see it and, then, they were grounded. So, how about the role of UAVs in these disasters for oil and all the operations with the petrochemical industry? Because those things are working and, for some reason, they were shut down because there was some kind of danger. And that was just not right to do because of that breach; they may have prevented a breach because they saw

it with the UAVs. So, any idea about oil and gas operations, refining, storage, whatever, that UAVs could help out?

Mr. Fanning. Yes. Well, we don't impact oil and gas particularly. But, in response to any storm, there should be a comprehensive plan that is undertaken, really driven by the local authorities.

I was listening to your prior panel. Very interesting, in that every utility works with -- for example, in Georgia, they would work not only with the federal agency FEMA, but with GEMA. Within that context, all critical infrastructure is evaluated with respect to the approaching threat. And therefore, we develop a set of priorities and, essentially, a response regime as to how to provide the best benefit going forward.

I can't speak to Missouri or whatever the impact is there, but I would assume that they have taken those things into account.

Mr. Olson. Thank you. I am aware of my time.

The Chair now recognizes the gentleman from Illinois, the ranking member, Mr. Rush, for 5 minutes.

Mr. Rush. I want to thank you, Mr. Chairman.

Ms. Kennedy, your testimony has been very, very amazing testimony. I am amazed at the breadth of the tragedies that are occurring, even as we speak, in Puerto Rico. And I amazed at the lack of proper attention by those in our government in determining their response to this American tragedy in Puerto Rico.

There are some who are disputing the official death toll.

Some say that, oh, 51 casualties due to the hurricane. But, yet, the Puerto Rican Department of Public Safety confirmed that over 900 bodies have been authorized for cremation since Hurricane Maria tore through their island on September the 20th. And that 900 figure includes deaths related to lack of oxygen and other fatalities that appear to be due to the power outage. Yet, some say that those fatalities should just be considered natural deaths.

Do you concur with this definition from your experiences? You have spent time there. Do you believe that the death toll from Hurricane Maria is actually 51 or is it closer to 900, or is it somewhere in between?

Ms. Catherine Kennedy. Well, thank you for the question.

We were there from October the 4th through the 18th. And as I said in my testimony, what the nurses saw was that, when you get outside of San Juan, that they were pretty much cut off from electricity, from communication, from anything. So, when you ask me what was the death toll, do I believe whether it is 51 versus 911, or somewhere in between, personally, I think it is more of the higher.

What we saw was people were desperate. We were considered almost the first ones that they even saw as it relates to food or water, or any kind of communication. And through word of mouth, they did say that the neighbor passed, whether it was through leptospirosis or natural causes -- you mentioned the lack

of electricity and without oxygen. So, yes, I think it is rather on the high side.

Mr. Rush. Mr. Nieves, do you have any further insight into the actual number of fatalities and the reason for those fatalities?

Mr. Nieves. Yes. Basically, I really agree with Ms. Kennedy. The official death toll of 59 up until now is very superficial and misleading. By personal experience, I have talked with dozens of family, friends, that have told me, "Oh, my grandmother died. She passed because she didn't have electricity in her nursing home." A lot of elderly people that do not have electricity are simply dying.

And so, how can you relate that to Hurricane Maria? It is very difficult because it didn't happen that day. But the death toll is, in my view, in the hundreds.

Mr. Rush. So, even today, as we sit here in this committee room, there are people who are still dying in Puerto Rico simply because they have no electricity, even today?

Mr. Nieves. Yes. As I said in my testimony, people are dying today not because of Hurricane Maria, but because of Hurricane PREPA, because they don't have electricity in their homes and care centers.

Ms. Catherine Kennedy. I would agree. Without electricity, without power, you know, there are stories where patients actually go to San Juan when the electricity is up, and

they take their nebulizers and plug them in, so that they can do the breathing treatments. Or they may sit in clinics where they have access to oxygen and use the oxygen there throughout the day, and then, they go home where there is no electricity and they are without oxygen, without anything.

Mr. Rush. Thank you, Mr. Chairman. I yield back.

Mr. Olson. The gentleman yields back.

The Chair now calls upon the gentleman from Illinois, Mr. Shimkus, for 5 minutes.

Mr. Shimkus. Thank you, Mr. Chairman.

It is great to have you here. I want to direct some of my questions to Mr. Fanning.

Mr. Fanning, if the electricity went out in Atlanta, Georgia, who would get called?

Mr. Fanning. Initially, Paul Bowers, President of Georgia Power Company, but that is a pretty clear deal.

You know what is interesting in these storms, we have, essentially, people that run the storm activity. They are fully empowered to work with whatever state, local, federal government, to get the lights on as fast as we can. They have a clear sense of priority and they get the job done.

Mr. Shimkus. Again, Puerto Rico is an island. It is very difficult, and I kind of wish the administration would have deployed the 82nd Airborne and just had a parachute jump into a lot of communities that don't have access. At least there would

be a meal ration. And the military has even solar packs that they take in Afghanistan. If there was one thing I wish they would have done more than anything, it is really deployed.

But you also heard in the first panel that the fact that there was no request for help until five weeks later. That is not normal. I mean, you represent the Electricity Subsector Coordinating Council.

Mr. Fanning. That is right.

Mr. Shimkus. Isn't that something that you all do as part of that?

Mr. Fanning. Absolutely. In fact, I would argue, especially this year -- the Electricity Subsector Coordinating Council was originally formed to focus on cyber and physical security. We have added to that, given the success we have demonstrated on those issues, this notion of storm response.

Following Sandy, the electric utility industry reorganized what we call regional mutual assistance groups. And so now, under the kind of structure of the ESCC, we bring together, really for the first time, an enhanced collaboration, not only of investor-owned utility responses, but also collaboration/coordination with municipal utilities, cooperative utilities.

We offer that up and we participate in a series of restoration activities, federal government, local, and with each other. And we do that, also, interdependent with the other kind of industries

that you all were talking about in the last segment. And that is telecom, so important; water and sewer; health care.

Believe it or not, we go beyond the notion of offering assistance just for the restoration of electrons. In Houston, particularly, my company got called on for two things that had nothing to do with electricity.

One was for the humanitarian rescue effort. Within 20 minutes of a phone call, we sent forward pilots and drones to help identify where survivors and other people may be.

Secondly, through Alabama Power, we delivered machinery that was able to operate in very high water conditions that were used to help rescue people.

Mr. Shimkus. Thank you.

And PREPA, or the Puerto Rican Electric Power Authority, they are not involved in this group, are they?

Mr. Fanning. So, PREPA works under the aegis of the American Public Power Association, which is, essentially, a municipal organization. We offered help, but PREPA, the State of Puerto Rico, for whatever reason, elected to pursue a different path, not pursue the mutual assistance rubric and really go through bilateral --

Mr. Shimkus. Yes, and let me go to the elected representative, Mr. Nieves. When we look back now on lessons learned and how we want to move forward, would you agree that we probably should look at ways in which the whole community can be

helpful and develop these memorandums of understanding where we can get joint use and quick response? That would be probably a pretty good lesson learned in this?

Mr. Nieves. Well, the thing is, the fact is that the American Public Power Association, and I understand that at least the Electric Institute offered since day one mutual assistance to PREPA, but PREPA pursued another way. So, it is not a lack of an agreement, but it was a lack of will from PREPA's part. And then, we have the Whitefish situation.

Mr. Shimkus. Yes, yes. And I am sure we are going to have time to continue to look at that. But, believing your testimony, which I do, that is, I would call that criminal negligence. And I am sorry for that.

My time has expired, Mr. Chairman. I yield back.

Mr. Olson. The gentleman yields back.

The Chair now calls upon the gentlewoman from Florida 14, Ms. Castor, for 5 minutes.

Ms. Castor. Thank you, Mr. Chairman.

Thank you all very much for being here.

The more we hear directly from folks like you that are in the U.S. Virgin Islands and Puerto Rica, the more disturbing it gets. I think you can sense the outrage building from this committee over the Puerto Rico Electric Power Authority.

Mr. Nieves, are you surprised that PREPA did not respond to this committee and, in essence, refused to appear here?

Mr. Nieves. I am sad to say that I am not surprised. When I used to Chair the Senate's Energy Committee, one of the things that we found is their total lack of transparency. So, to me, I assume this is a lack of respect for this committee that PREPA is not here on this group.

Ms. Castor. And were you surprised to hear Mr. Alexander, who is the lead for the U.S. Army Corps of Engineers in repairing the grid in Puerto Rico, were you surprised to learn that he hasn't even been able to have a conversation with PREPA

Mr. Nieves. Sadly, I am not surprised.

Ms. Castor. So, how do we justify taxpayer dollars now going to repair a grid in Puerto Rico, trying to work with PREPA after they refused to interact with the committee? They are not working with the Army Corps of Engineers. They are wasting taxpayer money through this Whitefish contract that has outraged so many people. And yet, the need is so great on the island. How do you recommend that we move forward? We are going to have to address the PREPA situation in law as soon as possible, I would assume.

Mr. Nieves. Yes. First of all, we have to really understand and consider at the end of the day, given PREPA's governance problems, we need to think that people are dying. Our economy is dying. So, how do we work around that, or PREPA's lack of governance and transparency?

My suggestion, and that I did in my testimony, is that since Congress already passed the PROMESA act, and the oversight board

named a Revitalization Coordinator that has been appointed to take over PREPA, that Congress finds a way, a mandate, a specific mandate, that federal taxpayer money to create a new energy grid be under the supervision of the Revitalization Coordinator of the board and the Puerto Rico Energy Commission, which is an independent, non-political, nonpartisan, and highly technical body. So, you can bypass PREPA and the government of Puerto Rico. So, that could be a way to get around it.

Ms. Castor. And this has to be, we have to have a sense of urgency to do this, because they are talking about the next emergency bill maybe will be in December, hopefully. I mean, there is a lot of things on the agenda for Congress in December. But time is of the essence here.

Mr. Nieves. Yes.

Ms. Castor. And, Colleagues, we simply have to find a way to at least begin to plan to build in some resiliency, get the power on, but begin to lay the groundwork for a modern electric grid, and address the ineptitude of the Puerto Rico Electric Power Authority. Lives hang in the balance.

We have the experts at our fingertips. We have the technology to do this. Does Congress have the capacity to act with a sense of urgency, knowing how our fellow citizens are suffering there? So, that is a challenge for us.

So, I thank you all very much for being here.

And I yield back my time.

Mr. Olson. The gentlelady yields back.

The Chair now calls upon the gentleman from Mississippi, Gregg Harper, for 5 minutes.

Mr. Harper. Thank you, Mr. Chairman. Congratulations to the Astros.

Mr. Olson. Thank you.

Mr. Harper. And I know it was a great series.

I want to thank each of you for being here. This is still something that just is stunning, the hurricanes we have had to deal with this season. And certainly what has happened in Puerto Rico has concerned us all.

So, Mr. Fanning, I know you mentioned that it is more than just power or restoration of power. It is also telecom, water and sewer issues. Can you talk for a moment and tell us how utilities use their communications network to recovery and respond from hurricanes and other weather-related events, and how reliable do those communications networks need to be?

Mr. Fanning. Yes. Thank you, Congressman, and thank you for your service to the great state of Mississippi.

Mr. Harper. Thank you.

Mr. Fanning. The best example of that is Katrina, as you well know. I think Katrina and the national story gets told around New Orleans in the breaching of the dam. The truth is, in Mississippi, when Katrina came through, every light was out around Mississippi Power.

And when you went in to try to restore that activity, the streets were unrecognizable. You couldn't even use, essentially, GPS to find your way around. All of the telecom was out as well.

We have to have an interconnected effort between telecom and electricity in order to most efficiently respond to these sorts of disasters. Southern Company, as a matter of its own resilient strategy, has our own dedicated telecom company called Souther Linc, in which we can bring in mobile cells on wheels, towers essentially, to set those things up.

As I am working within the context of the ESCC as it relates to Puerto Rico, early on -- and this is where the ESCC was not asked to help in a mutual assistance effort -- but, still, we were working with different parts of the economy to try to bring help to that island.

I called personally John Donovan. He is roughly the No. 2 guy at AT&T, as I understand it. And also, at -- hold on -- at Verizon, Lowell McAdam, who is the CEO there, to link together our efforts in bringing help down there. And we assured each other that, between telecom and electricity, we would provide every level of support, whether it was even asked for or not, to try to get that situation rectified.

Congressman, it is critical. If we are going to communicate with people in the field, if we are going to have people in the field without telecom, we need some way to kind of communicate

to get the stuff back on. It is absolutely critical.

Mr. Harper. So, you provided assistance in that area, even though it was not requested by PREPA?

Mr. Fanning. That is right. And in fact, I will give great kudos to the folks at FEMA, whether it is Brock Long who has done a heck of a job. I was on the floor of FEMA during a weekend during this situation. Another guy that works in DHS, Chris Krebs; in the White House, Tom Bossert, all of these people have been champions in trying to aid the situation without a whole lot of encouragement.

Mr. Harper. Got you.

You know, Southern Company is right in the middle of what I guess we would call the hurricane belt. But Southern Company has a long and good track record of restoration after a hurricane, not only in your home service area, but helping your neighbors, certainly through the ESCC and others.

Have you seen changes based on lessons after Katrina that you are using today to improve that?

Mr. Fanning. Oh, sure. We have this mantra I had in my opening statement. We want to be today better than yesterday; tomorrow better than today. And no matter how good we think we are, we can always be better, me included.

And we are accountable for always improving. When you think about some of the testimony, life-and-death matters that are at stake here, you know, it isn't just about electrons; it is about

restoring hope to communities and people's ways of life.

And so, we always work hard to think about what we can do better. I think the latest iteration, whether it is Harvey, whether it is Irma, the ESCC has demonstrated a much better capability of working across not only investor-owned utilities, munis, and coops, but also across cross-sector industries, telecom, finance --

Mr. Harper. Right.

Mr. Fanning. -- water, et cetera. And so, those are particularly good things.

The other thing is this whole notion -- and we have heard a lot about new technology being brought to bear. Good heavens, we deployed that in terms of resiliency as a strategic objective of America, whether it is cybersecurity, protection against terrorists from a physical standpoint, but also against natural disasters.

Mr. Harper. Fine. Thank you, Mr. Fanning.

My time has expired. I yield back, Mr. Chairman.

Mr. Olson. The gentleman yields back.

The Chair now calls upon the gentleman who made sure that Texans signed Justin Verlander to get us through the playoffs here, Gene Green, Texas 29.

[Laughter.]

Mr. Green. I wish I could claim, except going to a couple of the games. But thank you, Mr. Chairman.

Mr. Thompson, you talk about how quickly refined production was back online after Harvey. And I would like to commend the job industry did in our district, because in east Harris County we have five refineries. I sat down and met with Lyondell refinery and, also, with Shell. And a lot of folks don't understand you just can't turn switches off and on and get them back up. But now the price of gas is going down because all those refineries are back up. I know in our area -- and I assume over in Beaumont-Port Arthur also -- I know a lot of my constituents worked around the clock to get that back up.

One of the concerns I had, though, was the issue with the tanks. In east Harris County, we have the tanks that are -- we keep building them because it is either holding crude or product or whatever. The engineering of them now is a floating roof. Because of the amount of water that hit the top of that, it actually turned that top over, and water went into whatever product was there. It could have been crude oil; it could have been refined products, and emissions from that, but also overflowing. Because when you get 52 inches of rain anywhere, you are going to have a problem.

Has the industry looked at what we are going to do? I know, talking with the two companies, they said, we are going to have to look at it because how do we plan for 52 inches of rain. But see if engineering-wise there is a way we don't repeat that problem if we have another -- well, not if; it is when we are going to

have another storm because on the Texas Gulf Coast -- I am a native Houstonian; we have lived through them, and we will get through this, too, but it is not pretty. But we need to learn from our mistakes if we have another 52-inch rain in those plants.

Has there been talk about how, across from API -- because, like I said, just talking with two companies, they said they had to look at it and see what is going on.

Mr. Thompson. Thank you for the remarks.

Yes, our industry, as I have said open remarks, we fared fairly well. We proved to be resilient. We weren't perfect by any stretch of the imagination. We were better prepared than we were in prior storms. We have installed a lot of floating roofs, which you know are better for the environment. In the normal states, emissions are much lower.

But we weren't prepared for 60 inches of rain at times. And so, some tanks did have some failures. But the key is that was the exception and not the rule --

Mr. Green. Yes. Mr. Thompson. -- for sure. And I can assure you that this is already a No. 1 topic of conversation, about to prevent this going forward, and there will be lots of discussion. And I am sure there will be engineering to make sure these problems don't happen going forward, to the best we can.

Mr. Green. Okay. Can you talk a little bit about the difference in how quickly the refining sector came back up online, and the difficulty, how long it took for the petrochemical sector

in Houston?

Mr. Thompson. Yes. Well, certainly the refining industry came back online a little bit more quickly. A lot of that was from preparation. The petrochemical side, we knocked out, as you know, 60 percent of the national capacity, 80 percent in the Gulf. About 75 percent of that capacity has returned to the industry. Some of our facilities, they were under lots of water and it has taken a lot of time to get those facilities back up. Repairs have had to be made, and that just takes time. But we are well on our way. We think we have turned the corner and, hopefully, we will be back up to full capacity soon.

Mr. Green. And I also know that you can tell that at the price at the pump because the prices went up 25-30 cents a gallon, but now it is back down, maybe not in Washington, but at least in southeast Texas it has gone back down to maybe a little higher than it was, but still it is not $2.49; it is $2.19 that you can get on the side of the road now.

Mr. Thompson. And certainly we are getting back closer to pre-hurricane levels, but one thing I will point out is, since that time, the price of crude oil is certainly higher.

Mr. Green. Yes.

Mr. Thompson. And so, some of that is being reflected at the pump as well.

Mr. Green. Yes.

I yield back, Mr. Chairman. Thank you.

Mr. Olson. The gentleman yields back.

The chairman now calls upon the House's best birdwatcher, the man from the Commonwealth of West Virginia --

Mr. Griffith. Virginia.

Mr. Olson. I am sorry. Virginia. I am confused.

[Laughter.]

Mr. Griffith. You have been in the chair a long time.

[Laughter.]

I appreciate it.

Mr. Olson. Five minutes, my friend.

Mr. Griffith. Thank you very much.

Mr. Fanning, Mr. Harper touched on this a minute or two ago, but making sure we have lines of communication up. The National Infrastructure Advisory Council, noting this absolute criticality that communications play in grid resilience, suggested that electric utilities may need some dedicated spectrum space. What do you think?

Mr. Fanning. Well, listen, there is a number of solutions that go to that very important problem. Even to be provocative, in the circumstance of a national emergency, should you have dedicated internet access? There is a lot of things that you need to clear the way for.

Let me just give great kudos. So many people today I think lose faith in government and the institution and the people that run it, and all that. I can say without equivocation that, in

response to these events, whether it is in the White House with Tom Bossert, whether it is Energy Secretary Perry, one of the things that we can do is to work with these folks. And these folks can clear the way to get the work done.

So often, I think the question goes to who is in charge. You know who really knows how to get stuff done are the line crews and the supervisors and the people that have the boots on the ground to get this done. And when there are barriers, what we have got to do is work in this effective public/private partnership to get whatever barriers exist cleared away. The government in this case has been fabulous during Harvey and Irma particularly.

Mr. Griffith. I appreciate that, and thank you for your answer.

Mr. Rhymer, I was very pleased, as I was listening to your testimony, to hear you talk about microgrids and what you all are planning on doing. I particularly like the way you described how you are going to have them interact with the full system, and then, if they need to be standalone -- I thought that was very good and I appreciate it. I hope you all success in that, and I look forward to seeing it at some point when it is working, because I think that is helpful. Not just in the islands, but in mountains and other regions of the United States those kinds of concepts can be very, very helpful. So, thank you for that.

Mr. Rhymer. Thank you.

Mr. Griffith. Mr. Nieves -- did I say that close to right? Thanks.

I appreciated your stark comments. It seems that there have been a lot of problems with the electric utility in Puerto Rico for some time, based on your comments. I am just wondering, you know, the federal government is going to be asked to come in there and spend a lot of money. I understand that and think that is right. But, if we do so, are you willing -- do you think that the government there, particularly the electric utility, is going to be willing to introduce some of these novel concepts like microgrids, and working on ways to use Puerto Rico as a land of experiments where we can try different things? They won't all necessarily work, but things that we can do to try to make the grid better long time, and try out some of these new ideas that are out there that have been talked about for years, but we have never had an opportunity.

And for all the tragedy that is taking place in Puerto Rico, for which I am very sorry and worry about figuring out what we can do, we may have the opportunity to do something better. Do you think that the utility company would be willing to embrace some of that?

Mr. Nieves. Well, my proposal during testimony is that, if the federal government is going to step up and allocate considerable resources to not just repair the old grid, but to create a new grid, you cannot do that alone. You have to also

establish a specific mandate in the law saying we are appropriating this "X" amount of dollars to build a new grid for Puerto Rico, but with these specifications.

And I respectfully submit that macrogrids could work; regional microgrids for Puerto Rico could really work to create a strong, resilient system. That might as well be ordered by federal law.

Under Puerto Rico local law that I worked on last year when I was a Senator, we authorized microgrids. And the Puerto Rico Energy Commission is right now working on an expedited regulation to put them in place. But I really submit that "X" amount of dollars appropriated by our federal government have to be with a specific federal mandate.

Mr. Griffith. And I appreciate that and would agree that we are going to have to do some different things there. One of the things that I think might help is if we have the utility accountable to shareholders. I don't know how you would spin that off with the assets they have. But I noticed from your comments that one of the problems was that you had, while it was a semi-regulated monopoly, it was a nonprofit. And it is amazing, when you are trying to figure out ways to make yourself more efficient, you come across ways to make at least a little bit of profit, even if it is not required to be much profit. Anyway, it is a thought to think about, and I hoped that you would consider that as well.

And my time is way over. So, I have to yield back. Thank you.

Mr. Nieves. Thank you.

Mr. Olson. The gentleman from the Commonwealth of Virginia yields back.

The Chair now calls upon the gentleman from Amsterdam, New York, Mr. Tonko, for 5 minutes.

[Laughter.]

Mr. Tonko. Thank you, Mr. Chair.

Mr. Rhymer, your testimony mentioned that the Water & Power Authority had used FEMA hazardous litigation grants to bury infrastructure underground, making it more resilient. When did you receive those grants?

Mr. Rhymer. We received those grants approximately in 2010-2011.

Mr. Tonko. Okay.

Mr. Rhymer. And we have underground a portion of St. Thomas and a portion of St. Croix. We are currently seeking additional hazardous litigation grants currently to underground St. John in the Cruz Bay area and additional parts of St. Thomas and St. Croix.

Mr. Tonko. Okay. And is there any other FEMA money you are asking to secure beyond that burying of cable? Anything with your microgrids? Are you requesting --

Mr. Rhymer. Well, we are seeking to get litigation grants for the microgrid stuff, renewable energy stuff that actually adds

to the microgrid. We are also looking to do some hardening of the system in terms of administration, in terms of the buildings. Like the line department building is completely destroyed. So, basically, we need to have that building be resilient.

Mr. Tonko. Thank you.

New York State and the utilities there benefitted greatly from mutual assistance in the aftermath of Superstorm Sandy. And now, it is our turn to be called upon. It is your turn to be called upon in making things better.

Mr. Fanning, do you believe the utility industry's mutual assistance efforts work well?

Mr. Fanning. Oh, they are outstanding.

Mr. Tonko. I know islands present unique challenges to mobilizing workers and equipment, but can you think of specific reasons why mutual assistance would be resisted?

Mr. Fanning. No.

Mr. Tonko. Okay. Mr. Nieves, you testified that Puerto Rico's grid had limitations certainly in the amount of renewable resources that could be integrated into its energy mix. What were the reasons for that?

Mr. Nieves. Yes. According to a 2014 report that PREPA received, the grid, as it stood before Maria, could only integrate up to 580 megawatts of renewable power. Renewable power has certain technical issues that the grid that we had could not really tolerate without jeopardizing the system.

Mr. Tonko. Is it a matter of better interconnect devices? There is technology already shelf-ready, I would believe, that might be able to help --

Mr. Nieves. That is correct.

Mr. Tonko. -- your situation?

Mr. Nieves. Well, PREPA's grid was not a smart grid. It was not a grid that could really accommodate a system whereby customers are also generating power, renewable power, so they are not just passive customers of our energy model. So, according to that report from Siemens, PREPA's grid only can tolerate up to that amount of renewable power, which is really unacceptable, and a really small amount.

Mr. Tonko. And, Ms. Kennedy, thank you for making it so clear that Puerto Ricans are still dealing with a life-and-death situation. Can you further explain the health impacts you have seen due to a lack of safe water in Puerto Rico?

Ms. Catherine Kennedy. Sure. Like I said, we were there for about two weeks. One of the things that the nurses had to go out and do was really within the community to take a look at what kind of resources were available. Time and time again, it was the lack of clean running water.

One of the things that the nurses saw was that people were very desperate. So, they were actually drinking from river water. Water that came down they would save from their roofs. As you know, with hurricane, you have rodents and, of course,

bacteria. So, the prospect of leptospirosis was imminent. And clearly, there were people that were infected, but, again, if treated properly, then, I mean, it wouldn't be life threatening. But these were things that we saw for the last two weeks.

Mr. Tonko. Right. I have also seen some photos shared with me by family members in my district. They cause grave concern.

I believe -- and I think Ms. Kennedy would agree -- that we need to have a serious discussion about waiving cost-sharing requirements, especially for critical public health infrastructure such as our water systems. It is a public health and public safety situation.

I would also express that Puerto Rico can learn a great deal from New York's REV Initiative. It was in response to the Superstorm Sandy situation. And that state, our state, my home state has worked to understand changes in the traditional utility business model and how to plan for a more decentralized grid.

My concern is that, if we build back to this failed system that you cite, it is a very troublesome investment made by any level of government and the private sector, and we need to do better than that and encourage smart, flexible, and reliable grid for a cleaner and stronger energy future.

And with that, I yield back. And congratulations on last night.

Mr. Olson. Thank you, thank you, thank you.

The gentleman yields back.

The Chair now calls upon the gentleman from our neighbor to the north, Oklahoma, Mr. Mullin, for 5 minutes.

Mr. Mullin. Chairman, you are in almost a giddy form today. I wonder why.

[Laughter.]

Mr. Olson. Guilty as charged.

Mr. Mullin. The best thing is the third baseman for the Dodgers, I guess, can shave and cut his hair now, right?

Hey, I appreciate you guys coming up here and informing Members of Congress. It is very important for us to have a working relationship in a situation like this.

It has been a long day, and I appreciate your all's patience. But I feel like we are going to continue to learn from these lessons. What we don't want to do is get in the habit of repeating them.

Mr. Fanning, if you don't mind, I would like to start with you. The physical work of the restoration I know falls mainly on industries, but what role does the federal government play in this?

Mr. Fanning. Oh, they play an exceedingly important role. As I described earlier, when I think about the role of the ESCC, I describe it kind of in three levels. The first is to harmonize the efforts of the federal government. This is truly a public/private partnership, particularly in a super-regional kind of disaster where we absolutely --

Mr. Mullin. When you talk about a private/private partnership --

Mr. Fanning. Right.

Mr. Mullin. -- does the partnership end when the federal dollars are put in and, then, the utility companies reap the benefits of it? Or do the federal dollars, since it is a partnership, get paid back?

Mr. Fanning. Listen, the partnership exists whether there is a disaster or not.

Mr. Mullin. Sure.

Mr. Fanning. This is our, what we call, playbook.

Mr. Mullin. Right.

Mr. Fanning. This is our regime in which we respond to cyber, physical security, or natural disasters. And what it describes here is, frankly, not only the unity of effort, the "what's" of a restoration effort, but also the unity of message and the "how's" around a restoration effort. That has to be coordinated and harmonized between the federal government and not only electricity in this case, but, as we said before, the lifeline sectors. In cyberwarfare, it is going to be in the context of finance, telecom, electricity. Broadly, it would include transportation and water, and then, there are other priorities going from that.

Don't ever forget the need to harmonize, also, state and local government efforts, the boots on the ground that ultimately

will impact our ability to deliver.

Mr. Mullin. So, when we are talking about a partnership, are we talking about just in financial support or, as you are describing, all the above from the logistics behind it, from the federal government stepping out and getting some of the red tape out, letting you guys go to work, getting some waivers in place?

Mr. Fanning. Yes, Congressman, absolutely right. In fact, somebody else mentioned this National Infrastructure Advisory Council made a recommendation to the President to form something called a SICC, Strategic Infrastructure Coordinating Council, of electricity --

Mr. Mullin. We have acronyms for everything around here.

[Laughter.]

Mr. Fanning. Yes. Yes, I know it.

Electricity, finance, telecom. And what we will do is bring CEOs together, so me and others representing the electricity sector, finance, telecom, to put together a common set of regulatory permissions, legislative initiatives, harmonizing technology systems, information-sharing, and physical coordination. If we can get that done, that is an enormous activity.

The other thing that I think we need to do is inform policymakers like you all. And that is why I applaud this effort. Because there is so much noise around these kinds of disasters or potential disasters, we have to take action before they get

here. If all we are doing is reacting to the latest disaster --

Mr. Mullin. Thank you.

Mr. Fanning. -- we are way behind the ball.

Mr. Mullin. Yes.

Mr. Fanning. We have got to pitch, not catch.

Mr. Mullin. No, I agree with that. But look at that; wasn't that neat. You get a little zing in there for our chairman. Wow. That was thinking on your feet.

[Laughter.]

I agree with that. We would love to move to a point of being more proactive than reactive, and take the lessons learned. So, I actually applaud the idea of putting together that committee, so to say, where we can say, "Hey, look, this is our lessons. These are what we need. These are the roadblocks that need to be dropped. This is why it happens." And let's move forward, so we can react faster.

Mr. Fanning. And, Congressman, I think it needs to be CEO-led. Eighty-seven percent of the critical infrastructure is owned by private industry.

Mr. Mullin. Right.

Mr. Fanning. We have to work together.

Mr. Mullin. Mr. McBrayer, I have got just a short time here. The EPA issued several fuel waivers --

Mr. McBrayer. Yes.

Mr. Mullin. -- along the way for diesel and gasoline that

maybe didn't meet the standards, but was able to get delivered. Was it effective? Was that helpful?

Mr. McBrayer. I think it was effective and helpful at the time. I think one of the things we have to adjust to as it relates to getting fuel to folks who are your constituents, our consumers, is that, at least in the Southeast, we are transitioning from summer-grade gasoline to winter-grade gasoline on September 15th every year. Because of the nature of the two specifications, winter-grade gasoline is less costly than summer-grade gasoline. So, whether your inventory is in your store or whether you are a placeholder for inventory in a terminal, the financial incentive is to diminish the amount of supply that you have going into September 15 and 16 because you are going to take in many cases a 10-to-15-cent devaluation of that inventory, basically, at 12:01 a.m. on the 16th.

One of the things I would ask from a federal perspective is to take a look at that date. Is that really the only date that we can in the Southeast convert from the lower-RVP to the higher-RVP gasoline? Or is there a way to allow that date to move from time or time, or be fixed, so that folks like RaceTrac and other members of our association are not forced by the changing cost to diminish inventories in a time where hurricanes are more likely to occur?

Mr. Mullin. Thank you. That is a great point.

And, Mr. Chairman, thank you for entertaining a little bit

more time there. I yield back.

Mr. Olson. And seeing only Astros fans, but no further members seeking to ask questions, I would like to thank all of our witnesses again for being here today.

I have a unanimous consent and our nine documents for the record.

No. 1 is the PREPA letter to EEI and APPA.

No. 2 is an APPA letter to the Energy and Commerce subcommittee on mutual aid.

No. 3 is an APPA and EEI letter to Mr. Ricardo L. Ramos Rodriguez.

No. 4 is a letter from a farmer to the Energy and Commerce, the Energy Subcommittee.

No. 5 is the EIA supplemental testimony with attachments.

No. 6, AVA Med letter.

No. 7, letter from the FDA.

No. 8, GridWise Alliance document.

No. 9, letter to Senators Murkowski and Cantwell from the former EPA official and Puerto Rico Energy Commissioner.

Without objection, so ordered.

[The information follows:]

********** INSERT 14**********

Mr. Rush. Mr. Chairman, I want to restate or reiterate my request that PREPA be subpoenaed and that we have FEMA before this subcommittee in the near future.

Mr. Olson. As I told my friend, I will carry that message to Chairman Upton and Chairman Walden.

Pursuant to committee rules, I will remind members that they have 10 business days to submit additional questions for the record. As to the witnesses, submit their response in 10 business days upon receipt of those questions.

And one final comment, a point of personal privilege. You guys have, it looks like, 23-and-a-half hours to get to Houston for our big parade for our Astros.

[Laughter.]

Without objection, the subcommittee is adjourned.

[Whereupon, at 2:31 p.m., the subcommittee was adjourned.]