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UPDATE ON THE RESTORATION OF PUERTO RICO'S ELECTRIC INFRASTRUCTURE

WEDNESDAY, APRIL 11, 2018

House of Representatives,

Subcommittee on Oversight

and Investigations,

Committee on Energy and Commerce,

Washington, D.C.

The subcommittee met, pursuant to call, at 3:11 p.m., in Room 2322, Rayburn House Office Building, Hon. Gregg Harper [chairman of the subcommittee] presiding.

Present: Representatives Harper, Griffith, Brooks, Collins, Walberg, Costello, Carter, Walden (ex officio), DeGette, Schakowsky, Castor, Tonko, Ruiz, and Pallone (ex officio).

Staff Present: Jennifer Barblan, Chief Counsel, O&I; Kelly Collins, Legislative Clerk, Energy/Environment; Lamar Echols, Counsel, O&I; Adam Fromm, Director of Outreach and Coalitions; Ali

Fulling, Legislative Clerk, O&I, DCCP; John Ohly, Professional Staff, O&I; Dan Schneider, Press Secretary; Austin Stonebraker, Press Assistant; Christina Calce, Minority Counsel; Jeff Carroll, Minority Staff Director; Tiffany Guarascio, Minority Deputy Staff Director and Chief Health Advisor; Rick Kessler, Minority Senior Advisor and Staff Director, Energy and Environment; Miles Lichtman, Minority Policy Analyst; Perry Lusk, Minority GAO Detailee; Jon Monger, Minority Counsel; and C.J. Young, Minority Press Secretary.

Mr. Harper. The subcommittee convenes the hearing today entitled "Update on the Restoration of Puerto Rico's Electric Infrastructure."

In September of 2017, Puerto Rico was hit by two unprecedented hurricanes in a 2-week period. On September the 6th, Hurricane Irma struck the island as a Category 5. Over 1 million residents lost power.

While still recovering, Hurricane Maria ravaged the island on September the 20th, 2017. 1.47 million customers lost power as the storm brought 150-mile-per-hour winds and 25 inches of rain to the island. Regrettably, many Americans lost their lives while others went months without access to potable water or electricity. Over 50,000 residents still don't have power today.

On behalf of the committee, I want the citizens of Puerto Rico to know that our thoughts are with you as recovery efforts continue. This committee will continue working to ensure that everyone in Puerto Rico has access to clean drinking water, healthcare, reliable telecommunications, and, of course, electricity.

Today, we look forward to hearing about ideas that could prevent another prolonged loss of power like Puerto Rico is experiencing from happening again.

I am pleased that we are joined here today by Representative Jenniffer Gonzalez-Colon from Puerto Rico. She has been a tireless advocate for Puerto Rico and has been on the front lines of hurricane recovery efforts since the very beginning. And I thank you for being

with us today on this very important hearing.

I also want to thank Chairman Walden for his leadership on hurricane recovery issues, including holding multiple hearings and organizing a bipartisan group of Members to visit Puerto Rico last December to see the damage and challenges facing the island.

The recovery of Puerto Rico's electric infrastructure has been a challenge for a variety of reasons including bureaucratic issues, geographic isolation from responders and crews, difficult mountainous terrain, supply issues, and limitations of the existing electric infrastructure. In the aftermath of the storm, the Puerto Rico Electric Power Authority, or PREPA, chose not to request mutual assistance from other utilities and instead relied on contractors to restore the grid. After the Governor of Puerto Rico requested the Federal Government to provide assistance in late September, FEMA tasked the U.S. Army Corps of Engineers with restoring the island's power. Rebuilding an electric grid is not a mission typically undertaken by the agency. Yet the Army Corps has used its expertise to spearhead rebuilding efforts by hiring contractors and providing logistic support.

On October the 31st, 2017, PREPA finally requested mutual assistance. But lacking existing assistance agreements, crews did not arrive until earlier this year. Currently, restoration is coordinated by the unified command of FEMA, the Army Corps, PREPA, and a power restoration coordinator who is joining our second panel today. The Army Corps of Engineers' mission assignment, to rebuild the electrical

grid ends on May the 18th of 2018. As of last week, power had been restored for 96.6 percent of customers. The remaining work to be done, sometimes referred to as the last mile, is the difficult mountainous region often requiring the use of a helicopter to access work sites. We look forward to hearing from our witnesses today about what it will take to get 100 percent of the customers back online.

One of the goals of this hearing is to explore the future of Puerto Rico's electrical grid. How do we prevent another sustained loss of power? The tragic circumstances in Puerto Rico provide us with an opportunity to build an electrical grid that is more reliable and able to withstand future storms. The Department of Energy will play a key role developing this plan moving forward, and we are eager to learn more from DOE about how the role of Federal agencies will shift during the rebuilding phase of operations.

Finally, we look forward to hearing more about the report entitled "Build Back Better: Reimagining and Strengthening the Power Grid of Puerto Rico." Written by numerous organizations from both the private and public sector, including Navigant Consulting, who is joining us today, the report provides a detailed plan on how to establish an electrical grade in Puerto Rico that withstands Category 4 hurricanes at an estimated cost of $17 billion.

I welcome and thank the witnesses and look forward to your testimony.

I now yield to the ranking member from Colorado, Ms. DeGette.

[The prepared statement of Mr. Harper follows:]

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Ms. DeGette. Thanks, Mr. Chairman.

Mr. Chairman, as you noted, the 2017 hurricane season was one of the most damaging on record for the United States and Puerto Rico and the U.S. Virgin Islands. Those two entities continue to reel from the catastrophic impact of Hurricanes Irma and Maria. I was part of that group that went to Puerto Rico and the U.S. Virgin Islands with Chairman Walden and Ranking Member Pallone in December very soon after the storm. And, you know, it is one thing to talk about the effects of the blackout and everything else. It is something else to actually go there and to talk to the people who are impacted by it every day. And, you know, the long-term -- the long-term crisis that has been caused by this -- we just can't overestimate the impact. We have to have a reliable grid. It is fundamental to Puerto Rico's economy and all aspects of life on the island. They can't keep their businesses going. They can't keep their homes going if they don't have a reliable grid.

And, you know, even today, months later, with the new hurricane season starting in just a few weeks, thousands of people still don't have power today, more than 6 months after Hurricane Maria made landfall. And I still have concerns about the response, including the awarding of questionable contracts may have impeded or slowed down the response effort. We need to find out what we can do better. We have got to have a strong and effective Federal Government. We have got to have strong Federal leadership and commitment, not just to address the impending objectives but also the longer term recovery, including grid design and rebuilding efforts.

So I am hoping that our two panels today can help explain why it has taken so long to restore power in Puerto Rico, which is actually in charge of restoration efforts, both now and going forward, and critically, as you mentioned, Mr. Chairman, what it is going to take to build a 21st century grid that will help prevent Puerto Rico from suffering another devastating blackout in the future.

You know, it appears to me that there is little effort being made to modernize the grid or otherwise increase its resilience as part of the restoration process that has been completed to date. FEMA's Federal coordinating officer in Puerto Rico actually described the restoration efforts as a, quote, "Band-Aid" and said that the system has, quote, "been patched back together." And that was sort of my impression when I was in Puerto Rico.

You know, this situation does not call for a Band-Aid, but it requires building of a stronger and much more resilient grid. And when we were in Puerto Rico and also the U.S. Virgin Islands, we were talking together, as members of the delegation on both sides of the aisle, about what we can do to deal with Stafford Act requirements and how we need to go much further than those requirements in order to ensure a strong grid going forward. Because with projections for severe weather incidents coming up more and more, what we are going to be seeing, if we don't rebuild to a higher degree and to resilience, we are going to be seeing a repeat of this over and over again. So we need to make sure that whatever grid we put into place won't be vulnerable to future storms.

We are a long way from that goal, as I said. Even where power has been restored, service remains unreliable, and blackouts and service outages continue to affect hundreds of thousands of people. Businesses and facilities like hospitals, police stations, and water treatment facilities have generators on hand simply to ensure that, if the grid goes out, that they can continue to provide services. I am also concerned because many Federal contractors have already left Puerto Rico or will be leaving in the near future despite the fact so much remains to be done.

Now, the U.S. Army Corps of Engineers did recently announce they will be in Puerto Rico until May 18, but many contractors are leaving. I would like to know how that is going to impact our ability to restore power to everybody.

So, Mr. Chairman, building a grid for the 21st century is going to require significant resources and a strong and ongoing commitment by this committee and the full committee. As we consider innovative ways to rebuild the grid, we have got to ensure that the process is transparent, and we also have to include consumer protections. Mr. Chairman, we need to have ongoing oversight over this. We need to keep it on our radar screen. And I think we should even consider, as it goes along, having field hearings in Puerto Rico and the U.S. Virgin Islands to see how this is happening.

I want to finish by just also thanking Representative Gonzalez-Colon who is here with us today and was there with us in Puerto Rico. I also want to thank Representative Plaskett who was with us

in the U.S. Virgin Islands. And I want to thank Representative Nydia Velazquez, who has been a real champion for full remediation of all of these issues.

With that, Mr. Chairman, I yield back and look forward to hearing from our witnesses.

Thanks.

[The prepared statement of Ms. DeGette follows:]

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Mr. Harper. The gentlewoman yields back.

I would ask unanimous consent that Chairman Walden's opening statement be made a part of the record and any other members' written openings also be made a part of the record.

Without objection, it will be so entered.

The chair will now recognize Ranking Member Pallone for any opening statement that he may have.

Mr. Pallone. Thank you, Mr. Chairman.

It is time we begin to find a commonsense solution for creating a 21st century electric grid for Puerto Rico. And I -- as our ranking member, Ms. DeGette, said, we witnessed the unprecedented destruction of the 2017 hurricane season when we traveled to Puerto Rico and the Virgin Islands with the committee. And I also want to thank Congresswoman Jenniffer Gonzalez, first of all, for her hospitality, which was overwhelming, but even more important for her insight, because without her practical insight, I don't think we would have really understood what was going on and what we needed to do.

On our trip, we saw the massive devastation to all aspects of life on the islands, including widespread damage to the electric grid in Puerto Rico, which, in the immediate aftermath of the storms, brought to a standstill any semblance of normal life or commerce on the island. And responding to the unprecedented level of devastation caused by these storms I think would have been beyond the capacity of any State, territory, or local government. And quick decisive Federal assistance and leadership was required to address immediate response needs.

However, I think the people of Puerto Rico received a visit where the President, as I saw on TV, tossed some paper towels into the crowd and sent tweets that suggested a lack of commitment by him to the response effort. And I do think -- I do criticize the Trump administration, because I do think they should have done more to ensure that those who remain without power in Puerto Rico over 6 months after Hurricanes Irma and Maria made landfall, that power should be restored as soon as possible. And this administration isn't doing enough.

I am also concerned that questionable contracts and contracting practices may have delayed or undermined the response effort. While restoring power quickly is the most urgent concern, significant improvements to Puerto Rico's electrical infrastructure will be needed to build the resilient and modernized grid in the wake of both hurricanes. And replacing -- I want to stress this -- replacing the old grid as it stood before the storms is going to cost a lot of money and do nothing to make electricity in Puerto Rico more reliable or affordable. There are going to be major storms in the future, and this old grid is simply not up to the task of withstanding these storms. So we may have a disagreement over technical strategies for building a more reliable and resilient grid, but I think that it has to be done. And hopefully this hearing will shed some light on how to do it so we are not relying or trying to restore the old grid.

I also have serious concerns about how PREPA oversaw the effort to restore power in Puerto Rico but also regarding how PREPA has managed or, more accurately, mismanaged the grid in Puerto Rico over the years.

Even before last year's hurricanes, PREPA was $9 billion in debt, the electric grid was outdated, and customers on the island paid some of the highest electricity prices in the country. So, as we consider ideas for strengthening Puerto Rico's grid, we must contemplate alternatives to PREPA for overseeing the rebuilding and operation. All ideas from direct privatization to creation of a new Federal power, marketing administration, and all proposals in between should be considered.

So, whatever road we go down, building a grid for the 21st century will require collaboration with the Puerto Rican Government and the people as well as a sustained Federal commitment that extends beyond the completion of current power restoration efforts. And I pledge my support for that kind of a Federal commitment and hope that the witnesses will give us a better idea of how we can create a truly modernized grid, because that is what we need.

I yield back.

[The prepared statement of Mr. Pallone follows:]

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Mr. Harper. The gentleman yields back.

Additionally, we also welcome non-Energy and Commerce Committee members who are with us today. Pursuant to House rules, Members not on the committee are able to attend our hearings but not -- cannot ask questions.

We want to thank all of our witnesses for being here today and taking the time to testify before the subcommittee. Today's witnesses will have the opportunity to give 5-minute opening statements followed by a round of questions from members. Our first panel today for today's hearing includes Mr. Jeffrey Byard, Associate Administrator for the Office of Response and Recovery at FEMA; Mr. Charles Alexander, Director of Contingency Operations and Homeland Security for the U.S. Army Corps of Engineers; and the Honorable Bruce Walker, Assistant Secretary of the Office of Electricity Delivery and Energy Reliability at the Department of Energy. I don't know how you put that on a business card, but thank you all for being here.

This is very important, and thank you for providing the testimony. We look forward to a very important update on your continued efforts in Puerto Rico. And you are each aware that this committee is holding an investigative hearing. And when so doing, it has been our practice to have witnesses testify under oath.

Do you have any objection to testifying under oath?

The chair then advises you that, under the rules of the House, the rules of the committee, you are entitled to be accompanied by counsel. Do any of you desire to be accompanied by counsel during your

testimony today?

In that case, if you would, please rise. I ask that you raise your right hand, and I will swear you in.

[Witnesses sworn.]

Mr. Harper. You are now under oath and subject to the penalties set forth in title 18, section 1001, of the United States Code.

You may now give a 5 minute summary of your written statement. And so I will begin with you, Mr. Byard, and ask you to give us a summary of your testimony.

TESTIMONY OF JEFFREY BYARD, ASSOCIATE ADMINISTRATOR, OFFICE OF RESPONSE AND RECOVERY, FEDERAL EMERGENCY MANAGEMENT AGENCY; CHARLES R. ALEXANDER, JR., DIRECTOR, CONTINGENCY OPERATIONS AND HOMELAND SECURITY HEADQUARTERS, ARMY CORPS OF ENGINEERS; AND BRUCE J. WALKER, ASSISTANT SECRETARY, OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY, DEPARTMENT OF ENERGY.

TESTIMONY OF JEFFREY BYARD

Mr. Byard. Thank you, Chairman Harper, Ranking Member DeGette, and members of the subcommittee.

Mr. Harper. Is that mike on?

Mr. Byard. Good afternoon, Chairman, Ranking Member DeGette, members of the subcommittee. As stated, my name is Jeff Byard. I'm the Associate Administrator for the Office of Response and Recovery for FEMA. It is my pleasure to be here on behalf the Secretary Nielsen, Administrator Long, DHS, and FEMA to share with you the opportunity to discuss the ongoing efforts to assist the power restoration in Puerto Rico and the U.S. Virgin Islands following the hurricanes of 2017.

As stated, last year's hurricanes were historic and a true test of our Nation's ability to respond and recover from multiple concurrent disasters. We estimate roughly 25.8 million Americans were affected by Hurricanes Harvey, Irma, and Maria. That's approximately 8 percent of the entire U.S. population. Within 2 weeks, last September,

Hurricanes Irma and Maria devastated Puerto Rico and the U.S. Virgin Islands, leaving nearly all of Puerto Rico's 1.5 million electric customers and more than 100,000 U.S. Virgin Island customers without power.

FEMA was actively engaged with the Commonwealth and the territory prior to each hurricane's landfall. Federal resources and personnel were positioned in Puerto Rico and the U.S. Virgin Islands to coordinate with Commonwealth and territory officials. Within days of Irma's impact, hundreds of thousands of meals, liters of water, and other lifesaving commodities were delivered to survivors. One day after Maria's landfall, there were already 3,500 Federal staff on the ground in both Puerto Rico and the U.S. Virgin Islands. Within 10 days, there were more than 10,000 Federal staff on the ground working around the clock with the Commonwealth and territory officials to stabilize the situation.

Power restoration in Puerto Rico and the U.S. Virgin Islands has been and continues to be top priority for FEMA. The Puerto Rico Electric and Power Authority, or PREPA, and the Virgin Islands Water and Power Authority are ultimately responsible for the permanent repair of power generation, transmission, and distribution infrastructure. However, FEMA and our Federal partners, including the U.S. Army Corps of Engineers, the Department of Energy, are closing working to assist in those efforts.

The FEMA mission assigned the U.S. Army Corps of Engineers is to provide temporary power to both the Commonwealth and the territory.

The Corps has installed more than 1,900 emergency generators in Puerto Rico and another 180 emergency generators in the U.S. Virgin Islands, prioritizing critical facilities, such as hospitals, police and fire stations, and water treatment plants. This temporary power mission is the largest in our agency's history.

FEMA has also issued a mission assignment to the U.S. Army Corps of Engineers -- excuse me -- U.S. Army Corps of Engineers to assist PREPA in emergency repairs across the island. Specifically, the U.S. Army Corps of Engineers was tasked to help develop a power restoration plan and execute temporary repairs to the grid to allow interim restoration until full electrical grid restoration can be implemented.

FEMA also mission assigned the Department of Energy to provide subject-matter expertise and technical assistance in support of the power grid damage assessment and power restoration efforts in both Puerto Rico and the U.S. Virgin Islands in coordination with the Army Corps of Engineers.

The Department of Energy is also working to identify various options for the long-term restoration of Puerto Rico's electric grid with added resilience. As of today, as stated, PREPA reports more than 90 percent -- 96 percent of the customers are able to receive power. And as of March 9th, 100 percent of the U.S. Virgin Islands' electricity customers have power.

FEMA's primary role of supporting the restoration of the Puerto Rico and U.S. Virgin Island power grids is through our public assistance program, which includes reimbursements for emergency work, which would

also include temporary power restoration as well as permanent work projects.

In Puerto Rico, the Governor elected to use section 428 of the Stafford Act, which is the public assistance alternative procedures, to allow applicants to request and obtain funding based on certified cost estimates. As the Administrator announced this morning, FEMA and the Commonwealth have coordinated on the guidelines for the permanent work. The goals of section 428 are to increase flexibility in the administration of assistance, expedite the delivery of assistance, and provide financial incentives for timely and cost-effective completion of public assistance projects. Once FEMA and the applicant agree on the damage assessment scope of work and estimated cost, a public assistance grant can be obligated.

Thanks to the action taken by Congress, the President signed the Bipartisan Budget Act of 2018 in February. And under these authorities given to FEMA, in this law, FEMA may provide funding in Puerto Rico and the U.S. Virgin Islands to rebuild damaged infrastructure without regard to its predisaster condition and to fund replacement of components that were not damaged but necessary to upgrade the system to industry standards. These new authorities allow FEMA to help Puerto Rico build more resilient infrastructure that will better withstand future storms.

The road to recovery will be a long one, but FEMA work with the Commonwealth and territorial partners as well as Congress throughout the recovery process. We will be in the impacted communities for as

long as we are needed.

I am pleased again to be here today to represent the dedicated FEMA staff and for the opportunity to discuss this important mission. I am happy to take any questions the subcommittee may have at this time.

Thank you.

[The prepared statement of Mr. Byard follows:]

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Mr. Harper. Thank you very much.

Next we'll recognize Mr. Charles Alexander, Jr., Director of Contingency Operations and Homeland Security Headquarters, Army Corps of Engineers.

Thank you, sir.

TESTIMONY OF CHARLES R. ALEXANDER, JR.

Mr. Alexander. Thank you, Chairman Harper, Ranking Member DeGette, and distinguished members of the subcommittee. Thank you for the opportunity to testify before you today. It's also good to see several of you that I accompanied you on your congressional delegation down to Puerto Rico. When you have a chance to get down there again, while we still have a lot to do, you will see we have come a long way.

The Corps conducts emergency response activities under two basic authorities: the Stafford Act and Public Law 84-99. Under the Stafford Act and the National Response Framework, we support FEMA as the lead Federal agency for Emergency Support Function 3, public works and engineering. ESF 3 provides for temporary emergency power, temporary roofing, debris management, infrastructure assessment, critical public facility restoration, and temporary housing. Under P.L. 84-99, we plan, we prepare for, and recover from disasters in coordination with local, State, and Federal partners.

When disasters occur, Corps teams and other resources are mobilized from across the command to assist the local office with a

response to the event. As part of this mission, the Corps has more than 50 specially trained teams supported by emergency contracts which perform the wide range of ESF 3 support missions. The Corps uses these pre-awarded contracts so they can be quickly activated for mission such as debris removal, temporary roofing, and generator installation.

This past year, the Corps has supported FEMA, led Federal responses in recovery operations in support of multiple events, including wildfires in California and Hurricanes Harvey, Irma, and Maria. The Corps was given 47 Hurricane Irma related mission assignments at 181 million and 42 Hurricane Maria related mission assignments at 3.4 billion by FEMA. This included missions in all six ESF 3 mission areas to include navigation restoration, levee and dam safety under our Public Law 84-99 authority. As of this morning, the Corps has completed over 2,200 temporary generator installations in the Caribbean, including 180 in the U.S. Virgin Islands and over 2,000 in Puerto Rico. The mission in U.S. Virgin Islands is complete while in Puerto Rico 881 generators remain installed at critical facilities across the island.

Under FEMA authority, we continue to assist Puerto Rico with operation and maintenance of critical, non-Federal generators across the island. Four out of 10 1- to 2-megawatt micro grids installed in support of the power grid restoration remain in service. As of today, this includes one in Vieques. The Corps completed over 73,000 temporary roofing installations this storm season, and that includes 3,600 in the Virgin Islands and over 59,000 alone in Puerto Rico. All

the temporary roofing missions are complete.

In the U.S. Virgin Islands, the Corps debris removal mission is 100 percent complete. In Puerto Rico, debris removal is 94 percent complete. We have removed over 3.9 million cubic yards of debris. We are still working on disposal, and that dialogue continues on what to do with it.

Our debris teams are actively working in 27 municipalities with debris complete -- removal complete in 28 municipalities. We expect to be complete with all debris removal and disposal by mid-June. The Corps worked closely with officials in Texas and Florida during their storm events. In Puerto Rico, the Corps dam and levee safety teams inspected over 17 priority dams and worked closely with the Puerto Rico Electrical Power Authority to stabilize a spillway failure at Guajataca Dam.

On 30 September 2017, the Corps was given a FEMA mission assignment under Stafford Act authority to assist the Commonwealth in conducting emergency repairs to the power grid itself. Unlike our ESF 3 mission areas, the Corps did not have pre-awarded contracts to use for this effort. Instead, we competitively awarded contracts for temporary power generation, line repair, and logistic support and transpiration. This included acquiring over $240 million in materials critical to the restoration effort, many with unique specifications to Puerto Rico alone. The Corps is partnering with PREPA in this effort, and we have energized over 96.7 percent as of today of customers thus far. And we acknowledge that over 49,000

customers remain without power.

In coordination with FEMA, PREPA, and the Commonwealth, we have begun to gradually right-size our contracted workforce. On April 6th, we modified our ongoing contract with PowerSecure, allowing Corps contractors to continue to assist through May 18. The Corps will continue to operate mega generator gas turbines at Palo Seco and Yabucoa through late May as PREPA completes repairs to the plants at those sites. Remaining materials we use to complete grid repairs and replenish depleted inventories on the island through mid-May. The Corps remains fully committed and capable of executing its 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 as they occur.

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

Thank you.

[The prepared statement of Mr. Alexander follows:]

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Mr. Harper. Thank you, Mr. Alexander.

The chair will now recognize the Honorable Bruce Walker, Assistant Secretary, Office of Electricity Delivery and Energy Reliability in the Department of Energy.

Welcome. You've got 5 minutes.

TESTIMONY OF BRUCE J. WALKER

Mr. Walker. Thank you. And I would note, I think Mr. Alexander's title is just a little longer than mine.

Mr. Harper. They both need a little work on the business cards.

Mr. Walker. Absolutely. Thank you, Chairman Harper.

Chairman Harper, Ranking Member DeGette, and distinguished members of this subcommittee, I appreciate the opportunity to participate in this update on the restoration and recovery of Puerto Rico's electric infrastructure.

Upon being sworn into my current job as the Assistant Secretary for the Office of Electricity last fall, my first order of business was to travel to Puerto Rico and the U.S. Virgin Islands. During my 2 weeks in Puerto Rico and USVI, I was able to gain firsthand experience about how DOE could best assist in the emergency restoration and the following recovery efforts. The Office of Electricity is responsible for providing energy-related expertise to FEMA, interagency partners, and the administration as part of DOE's emergency response activities. DOE serves as the coordinating agency for Emergency Support Function

12, Energy, ESF 12, under the National Response Framework. In addition, DOE is the primary agency for the Infrastructure Systems Recovery Support Function under the National Disaster Recovery Framework.

As the lead for ESF 12, DOE is responsible for providing information and analysis about energy disruptions and for helping to facilitate the restoration of damaged energy infrastructure. The mission of the Office of Electricity is to develop innovative, cutting-edge solutions and strategies to ensure that our Nation's critical energy infrastructure necessary for national security are secure.

In order to fulfill this mission, DOE leverages the technical capabilities of the national laboratories and partnerships with key private stakeholders to focus on early stage research and transformative projects. It is this type of assistance the Department has provided and will continue to provide to Puerto Rico as it restores and improves its electric infrastructure.

Over the course of the 2017 hurricane season, the Department has provided personnel to support National Response Coordination Center and several regional response coordination centers in support of FEMA's response operations. These included bilingual public information personnel to provide life-safety and life-sustaining communications and subject-matter expertise as part of FEMA's incident management assistance teams. Likewise, we provided subject-matter experts to the Army Corps from our Power Marketing Administration utilities. And we

sent line workers and equipment from our Western Area Power Administration to assist with the efforts on the ground in USVI.

DOE continues to maintain close coordination with FEMA, and three subject-matter experts from our Power Marketing Administration remain deployed to provide technical support to the Army Corps with restoration planning, cost estimates, validation, and quality assurance. DOE also continues to have responding -- responders deployed under the National Disaster Recovery Framework to support FEMA recovery activities and to coordinate with industry about mutual assistance to support restoration efforts. Long-term recovery efforts will continue in the months and years to come, and DOE will work in partnership with Puerto Rico Electric Power Authority, PREPA, as they decide on the best paths forward for the island's electric infrastructure. In fact, just last night, I spoke at length with Walt Higgins, PREPA's new CEO. We discussed his vision and the opportunities for DOE to assist in that effort as we transition into the recovery phase. I applaud the board of directors' decision to bring Mr. Higgins on board and look forward to working with him and his team.

Additionally, DOE continues to work with stakeholders such as the Puerto Rico Oversight, Management, and Economic Stability board, PROMESA; the Puerto Rico Industrial Development Company, PRIDCO; and PREPA's Transformation Advisory Council, the TAC, board, to ensure their priorities and concerns are incorporated into all aspects of our work.

During my meeting last week with several TAC members, we had a very open and productive dialogue that will further inform DOE's efforts to provide technical assistance to PREPA in the recovery efforts. DOE will continue to leverage and capitalize on the investments made at our national laboratories in grid technology research, development, and deployment. One endeavor we are pursuing is to increase the resilience of Puerto Rico's electric infrastructure through leading-edge grid modeling. This modeling will provide technical insight into the resiliency objectives allowing for coordination and communication of potential solutions across stakeholder groups. More importantly for the future, the modeling will enable interdependency analysis of critical infrastructure, highlight operational next worst scenarios, and facilitate contingency planning for investments in operational maintenance.

Working in partnership with FEMA and the Department of Housing and Urban Development, this project will allow us to work with PREPA as they plan future investments and determine where financial resources will be optimized.

Working with our highly qualified team at the Pacific Northwest, Oak Ridge, Sandia, and Argonne National Laboratories will also be utilizing our microgrid design tool looking at feasibilities of grids and local citing of distributed energy resources. There will also be a focus on the potential utilization of microgrids around industrial sites due to the important role they play in the economy.

DOE is working in partnership with a variety of stakeholders to

ensure long-term recovery efforts are conducted with input from a wide range of parties.

Recently, Secretary Perry and I met with Mississippi Governor Phil Bryant, the current chairman of the Southern States Energy Board. We met to discuss opportunities for SSEB to work with the Governor and the legislature of Puerto Rico to establish a reliable, affordable, and sustainable electric energy grid and to develop a policy and legal framework to provide a regulatory process for privatization.

After confirming Governor Rossello's desire to work with SSEB, my office awarded the strategizing electric energy regulatory framework in Puerto Rico contract to SSEB. DOE looks forward to working with SSEB to present Puerto Rico with various options and recommendations of the electricity and other sectors.

And with that, I am extremely proud of the work that my team at DOE has done, and I am encouraged to see that we were able to reach completely across the entire agency, bringing together resources from our headquarters, our PMAs, as well as our national labs, to bear down on this problem. The emergency restoration is nearing its conclusion, and now we must once again come together to ensure the recovery phase provides the value to our citizens in Puerto Rico and the U.S. Virgin Islands. We are committed to work with our partners to accomplish this.

I look forward to your questions.

[The prepared statement of Mr. Walker follows:]

******** INSERT 1-3 ********

Mr. Harper. Thank you very much.

Mr. Walker, the "Build Back Better" report that was released in December provided a series of high-level recommendations of what is needed to rebuild Puerto Rico's electric infrastructure to a level capable of withstanding a Category 4 storm. I understand DOE and some of the labs contributed to this report, and the recommendations align with the Department's guidance relative to the hardening and resiliency. And I recognize that this report was drafted relatively early in the recovery process and, therefore, had to rely on initial assessments and high-level assumptions.

Based on what you know now, do you think the $17 billion cost estimate remains realistic, or would it be more or less?

Mr. Walker. We are working on -- with the TAC committee, who also participated, our members participated in the work that was being completed under the "Build Back Better" plan to vet through the recommendations that were made in that plan and how indepth they went. So, as we work through that process, we'll define what the overall cost will be.

There are other recommendations that are beyond the scope of the "Build Back Better" plan that will be incorporated into a more overall and comprehensive plan. So, until such time as we have been able to pull all those together, I don't have an answer for the 17 billion.

Mr. Harper. So how long do you think it'll take before you can reassess that?

Mr. Walker. We're working right now with the TAC committee and

our national labs to pull together all the recommendations and vet through. So part of the concern we've got as we move forward is there are considerations that have to be undertaken, things like generation.

Mr. Harper. Yeah. And I understand that. All I was asking --

Mr. Walker. We don't have a model.

Mr. Harper. Do you have a feel for -- or are we talking another month, 2 months, 6 months, before you have --

Mr. Walker. We're shooting for 60 days to have the model done.

Mr. Harper. Okay.

Mr. Walker. And the model will enable us to go through different assumptions. In other words, where do you put generation? What value does it add? Does it change the paradigm of power flow such that you can actually reduce the cost per kilowatt?

Mr. Harper. Let me ask this: Are there specific aspects of that report you now feel exceed what is necessary to harden the electric grid in Puerto Rico?

Mr. Walker. There are some traditional transmission and distribution investments that -- you know, if you look at a lot of the work that companies like FP&L, CenterPoint have done with regard to hardening, things like using concrete poles, guying your poles differently, there are some very, very obvious things that can be done, maintenance program on the transmission towers so the guying that goes into the ground, the bolts actually don't rot away and the towers, you know, twist simply because one of the guys are broken. And so there is a number of those. And those are very, very quick wins. But

recognizing there's a lot of infrastructure. On a 3,500-square-mile island, you've got to go through a lot of poles to, you know, do the maintenance, evaluate them, change them out, and do the things necessary to undertake that.

Mr. Harper. Thank you.

Mr. Byard, last year, FEMA had tasked the Army Corps of Engineers with restoring power in Puerto Rico, as you know. That mission assignment ends May the 18th of 2018. Currently, approximately 50,000 customers are still without power.

Why is the Army Corps' role ending even though everyone may not have power on May 18th? And who made that decision?

Mr. Byard. Yes, sir. As stated previously, the FEMA mission assigned the Corps to do the emergency power restoration. And if I may, the -- you know, we use words like "unprecedented" and "catastrophic," which all fits. You know, earthquakes such as Northridge, Andrew, Katrina, major storms, we've never had to rebuild the entire -- an entire State or, in this case, commonwealth's infrastructure when it relates to power. We're rebuilding basically the entire thing, or the rebuild will be.

So the emergency power mission is there to provide that temporary power. It is not the end state of what the grid will look like. We traditionally -- and working with PREPA through the Unified Command Group, a very unified effort -- these are not one agencies, you know, going down different paths. It's coordinated through the joint field office. We are at 95, 96 percent complete with that mission

assignment. The remaining 5 percent -- or 2 to 5 percent -- is that difficult last file, the mountainous terrain.

So, you know, ending the mission of the Corps, first and foremost, you know, we do that. We extended it based on a request from the Governor. We want to transition that to PREPA because that's a good stage in recovery, you know, in any operation. Regardless if it's, you know, the Commonwealth or Texas, or you pick a State, it's better for them to start leading that recovery -- you know, the recovery efforts.

That doesn't mean we're leaving. That doesn't mean the unified command group's, you know, disbanding. There is a lot of work that will continue to go on.

Mr. Harper. My time has expired.

And I'll now recognize Ranking Member DeGette for 5 minutes for questions.

Ms. DeGette. Well, I must say: I appreciate all of your agency's efforts. I do think it was a very, very devastating situation in both of these locations, but we're talking about Puerto Rico here. And I appreciate the efforts. But the fact remains that we still have 50,000 American citizens who don't have power. And there's a great deal of work that everybody agrees we need to do to improve the resiliency of the grid with hurricane season starting up again, as I mentioned, in just a few months, less than a few months.

And so I know, Mr. Byard, you talked to the chairman a little bit about how the division of responsibilities has happened. But what I'm

wondering, maybe, Mr. Alexander, you can talk to me about what transition efforts are underway as part of the Army Corp's responsible draw down and if any of you can tell me what we're going to do to get this power restored to these 50,000 people. That's the most urgent. And these are -- we'll all stipulate, these are the people in the most remote and difficult areas of the island. But they still are without power.

I don't know who wants to talk about that.

Mr. Alexander. I'll give it at a shot, ma'am.

You know, we began what we called an orderly draw down previously with a mission assignment for PowerSecure as work goes. And I think on 6 or 7 April, Fluor was our large contractor. Their period of performance ended. There was no additional money to keep them under contract. So that -- they have redeployed, demobilized.

With the mod to our contract to PowerSecure, we still have 519 contractor crewmen on the ground. They have repositioned over to the eastern region to Humacao and Caguas, and are doing work in that very, you know, rough terrain, mountainous, jungle conditions. Much being done by use of rotor-wing aircraft.

PREPA, though, they still have significant resources in play. They've got over 800 personnel, and their contract for Cobra has an additional 600 plus as well.

Ms. DeGette. So is the concept that PREPA is going to be the agency that's going to finish the last -- the restoration of power to that last 50,000 citizens?

Mr. Alexander. That's the path we're headed down to, ma'am. But we are going to get as much done between now and 18 May. PREPA --

Ms. DeGette. Do you have that -- excuse me. Do you have an estimate of how many people's power will be restored by then, the -- May 18th?

Mr. Alexander. Ma'am, our goal is 100 percent.

Ms. DeGette. Well, do you think you can reach that goal by May 18?

Mr. Alexander. We're going to do our best. Material is no longer a limiting factor. It was for quite some time.

Ms. DeGette. Well, let us know what we can do to help because we feel quite strongly about that.

I just want to quickly, Mr. Byard, talk to you.

I understand the permanent work has not yet started in Puerto Rico. Is that correct?

Mr. Byard. Yes, ma'am.

Ms. DeGette. Okay. And I also understand that, this morning, Administrator Long announced procedures for funding the permanent work. Is that right?

Mr. Byard. Yes, ma'am.

Ms. DeGette. And here's the thing I'm concerned about with that: I've got a copy of that, which we just got this morning. Here's the guide for permanent work. And here's what I'm concerned about is that it says here it's a 90-percent Federal cost share, which I assume that they're saying Puerto Rico's going to pay 10 percent. Well, I

don't -- I mean, I don't see where Puerto Rico's going to get that 10 percent. Perhaps you can tell me where they might be able to get it.

Mr. Byard. Well, you know, the Commonwealth has access to -- as just, you know, noted -- I don't know the figures, and I don't want to speak necessarily for the -- you know, the working of it. But 20 billion, I believe it was, from HUD. They have access to community disaster loans upwards of a billion dollars.

But what I can speak to is the permanent reconstruction and the unique opportunity that we have. And when I say "we" in this, it's not FEMA. It's collectively with the Commonwealth. So what the 428 program will allow us to do, coupled with the Bipartisan Budget Act, is look at the permanent reconstruction.

Ms. DeGette. And improving it.

Mr. Byard. Yes.

Ms. DeGette. But if you can have the agency, please, supplement your responses to give us some better sense of --

Mr. Byard. Ma'am, by the law that guides us, the Stafford Act, we do not have the authority to increase the Federal cost share over 90 percent.

Ms. DeGette. So you think it's the Stafford Act that's with the 10 percent?

Mr. Byard. The Stafford Act guides how far we --

Ms. DeGette. Okay. And then Stafford Act says 10 percent. Is that what you're saying?

Mr. Byard. The Stafford Act allows us to increase to a 90 percent if --

Ms. DeGette. Right. But not beyond the 90 percent.

Mr. Byard. Not 100 percent.

Ms. DeGette. So you think it'd take an act of Congress --

Mr. Byard. Yes, ma'am.

Ms. DeGette. -- to fix that?

Thank you very much. That's very helpful.

Mr. Griffith. [Presiding.] Now recognize the gentlelady of Indiana, Mrs. Brooks, for 5 minutes.

Mrs. Brooks. Thank you, Mr. Chairman. And thank you so much for holding this really important hearing.

We certainly -- and although some of us haven't yet been to Puerto Rico, we certainly hear from constituents who have family still there, and we have certainly read a lot in the media as well. I want to thank our colleague, Representative Gonzalez-Colon, for sharing with us on a regular basis what's happening. As a matter of fact, I recall, when we were all headed home for the holidays, she shared with us that she did not have power yet when she was heading home for the Christmas break. And that had been a couple of months. I believe you have power now. I believe she has power now. But obviously 50,000 constituents do not.

And I happened to fly out yesterday with the head of Duke, from Indiana. And we had -- Duke sent a number of people to the island but yet the challenges they experienced had to do with equipment, as I understand, getting equipment.

And can all of you kind of share with us, what have we done in preparation either for the next hurricane or what kind of plans do we now have in place to get equipment there for these contractors who have gone in, for companies that have gone in to help to make sure that we have a new plan? Because the plan we had was incredibly frustrating and was very difficult because of the problems with it being an island and with it being -- who would like to start?

Mr. Byard. I'll gladly take the -- so, ma'am, you know, what we do know is that our ability to do logistics for an island has increased. And it's increased, you know, by the capacity we've been doing it.

So what we've done at FEMA, and as attested to here on the panel, you know, we know where the emergency generation needs to be. We know where the generators are. We have the ability to ensure -- again, you know, all of us want a resilient grid. All of us want the power to be 100 percent restored and stronger than ever by hurricane season. That's not going to happen. And so what we have to do is prioritize again the hospitals, fire stations, police stations, those critical nodes that are truly life safety after the event. And we've done that.

The other thing we've done is we have a large contingent of Federal resources on the ground in lieu of personnel, you know, the joint field office, made up of the agencies represented here and more. We've also -- FEMA has also, you know, currently just under 1,500 local hires, Puerto Ricans. I think the largest single employer on the island is 1,600. So we have a footprint. We have a means to move commodities in through our contracting with our barge, and we've gotten smart about

how to do that and how to source those nodes.

The other thing, if I may, is our now strong and continuing strengthened relationship with the critical sector of the private sector, the communications sector, the power sector. And those that -- now we know we have to better synchronize with and understand what that means to move, you know, Verizon in, because 86 percent of the Puerto Ricans are on cell phones. You know, these are the things that we traditionally don't, but we know now. We're smart now.

Mrs. Brooks. Have there been any Federal restrictions, whether it's regarding wilderness or land use, anything that has impeded your rebuilding efforts?

Any of you. Have there been any -- have you encountered any Federal laws or Federal restrictions that have impeded your progress?

I'm taking that as a no?

Mr. Alexander. Ma'am, the only thing I can think of, actually, is the environmental considerations with respect to debris reduction.

Mrs. Brooks. So that is a current -- you mentioned the massive amount of debris. And so what is that? You now have millions of acres of debris?

Mr. Alexander. It's been a challenge to reduce, you know, and chip that amount of debris that's collected. Efforts to accelerate disposal through air curtain incineration have not gained traction, environmental concerns on both Puerto Rico and the U.S. Virgin Islands. And we're still waiting ultimately on disposition of where all this debris is going to go, literally. Particularly in the Virgin Islands,

they have limited capacity to hold much more. That's the biggest challenge.

Mrs. Brooks. What are the options right now being considered?

Mr. Alexander. The -- well, there's options up to and including actually, by sea, taking this debris to several companies that have offered -- I mean countries that have offered to take it and have a means to reduce it or use it in a purposeful fashion.

Mrs. Brooks. Okay. Thank you for your efforts.

I yield back.

Mr. Walker. If I made add one, Congresswoman.

The Stafford Act doesn't contemplate rebuilding, as it's written, an electric system. And by virtue of the way the Stafford Act's written, it contemplates things being put back the way they were. That's not the way an electric system is typically -- or it's not the way it's restored during an emergency. There are NESC codes that are required to be followed by utility workers. And when you are in an emergency, unless you absolutely can't follow it, when you set poles and you run wire, you follow that national electric safety code. That's not contemplated in the law. And, you know, as we look at that Stafford Act moving forward, looking at different types of disasters, particularly as they relate in the energy sector, I think there's a number of significant improvements we can make in contemplation of future events and having to utilize the Stafford Act again.

Mrs. Brooks. Thank you. We would look forward to receiving your recommendations on those improvements.

I yield back.

Mr. Griffith. I thank the gentlelady.

I now recognize the gentlelady of Florida, Ms. Castor, for 5 minutes.

Oh, okay. I'm happy to recognize the gentleman from New York, Mr. Tonko, for 5 minutes.

Mr. Tonko. I thank my friend for allowing me to go first.

And thank you, Mr. Chair.

And thank you to all of our witnesses for joining us this afternoon.

I know that a number of New York State utility workers, line workers, participated in the comeback. And I know that Ellen introduced me to a number of folks who are with us today that worked on that exercise. So I thank you for the work from many utility perspectives for sharing in this comeback.

It's been 6 months since Hurricanes Irma and Maria made landfall in Puerto Rico, and it is important that the committee conduct proper oversight of the Federal Government's response to these natural disasters.

I would like to take a few minutes to turn our attention to the Federal Government's role in the Commonwealth's long-term recovery. We have heard from individuals on the island that the PREPA electrical grid was in poor condition prior to the hurricane -- hurricanes making landfall, which made it especially susceptible to storm damage.

So, Secretary Walker, could you please describe how the poor

condition of PREPA and its grid left it vulnerable to Hurricanes Irma and Maria?

Mr. Walker. Sure. And, you know, I'll answer it more generically.

In the industry, there are typical practices that are common throughout the different types of utilities in the United States, whether they're APPA, NRECA or IIU members. Those standards, you know, involve things like -- excuse me -- operational maintenance practices that would have you go inspect your poles for their integrity. You would go inspect your guy wires on your transmission systems for integrity. You would clear your vegetation from a vegetation management strategy that comports with the criticality of the system working from transmission down into your distribution separately.

So, when you don't follow those practices over time, equipment deteriorates. It doesn't have the capabilities that they were necessarily designed with initially. And then when they're faced with 140-plus mile an hour winds, they'll fail.

Mr. Tonko. I thank you for that.

A resilient electrical grid is a crucial component of a successful long-term recovery. The "Build Back Better" report, which was issued by a number of entities including Navigant Consulting, that we will hear from during the second panel, set out a number of recommendations for building a 21st century electric grid on the island.

Again, Secretary Walker, could you please explain DOE's role in the long-term modernization of Puerto Rico's electrical grid as well

as what the Department has done to modernize the electrical grid on the island to date?

Mr. Walker. Sure. The work that DOE does is fundamentally providing the technical expertise and convening the right stakeholders to move these initiatives forward. We specifically have tremendous capability within our national labs to model and work through developing a model for Puerto Rico that it is enabled to do load flow analysis, short-circuit analysis, things that you would see in a utility like Con Edison or Southern Company or most utilities that model their systems so that they can really inform the decisions of the investments that they make.

And so we've already started working with FEMA developing a model that also incorporates a critical infrastructure. So the couple thousand generators that have been placed at various locations -- you know, those locations and the functions of the underlying clients who are served by those generators will now all be incorporated into this model. The model will also have capabilities to enhance their operational capability from the standpoint of, when an event occurs by exception, the model will be able to actually determine and alert the operators as to what the next worst-case piece of equipment to lose is, which is tremendously important when you're operating the system. And as was noted earlier, you know, the citizens in Puerto Rico have experienced unreliability in the past. So this will help rectify that.

That notwithstanding, the other component, which is equally as important, is the contingency analysis which enables you to walk

through in an iterative process and take every piece of equipment in and out of the system and then evaluate what load flow analysis what happens to the system when you do that. And you can expand it to actually have two pieces out. So an N-1 would be the typical study that -- Congressman, you're very familiar with, these processes. And then you would do an N-1-1 on the transmission system. And these type of analysis and the requisite investment that come from that analysis will be what helps PREPA in the long run really make the right decisions going forward and being able to operate the system. And DOE is working on that. That model's already -- is -- the template for it exists. The critical infrastructure is in it. We've divided up the component pieces for the actual analysis and the algorithms for the load flow amongst a number of our national labs to complete that.

Mr. Tonko. I know that with some restoral scenarios in the past, they were able to invest to get the power back on but also with an opportunity in mind to upgrade the standards of the system. Has that been done here? Is it -- otherwise we can pour a lot more money into a system and say: This is as far as we're going to go.

Is it done with improvements in mind?

Mr. Walker. Well, the -- you're talking about the restoration that's been done heretofore?

Mr. Tonko. Yeah. Put the lights back on but keeping in mind a state-of-the-art opportunity that can serve as a prototype including, you know, distributed generation, microgrids.

Mr. Walker. So generally --

Mr. Tonko. -- renewables.

Mr. Walker. Right.

Generally speaking, no, from the standpoint of you're in emergency restoration mode. So there's -- it's not very feasible to redesign the system on the fly when you're really just trying to get the lights on. So the emergency restoration component is the component that we've been focused on up to this point. And, indeed, we still have 50,000, you know, customers that are still out of lights.

That being said, for the last 3 months, my team at DOE utilizing folks at our PMAs, as well as the national labs and in-house people here in D.C., have been working through the microgrid capabilities and designs particularly using our microgrid design tool kit that was developed by the Sandia National Lab. They've gone down to Puerto Rico. They've visited a number of sites in Puerto Rico where our capability to build microgrids can be utilized and accessed.

So there has been a significant amount of work done, very technical work, on looking at opportunities on the island for the integration of renewables in various forms. Modeling, working with other Federal agencies to understand.

Mr. Harper. I'm sorry.

RPTR KEAN

EDTR SECKMAN

[4:13 p.m.]

Mr. Harper. Sorry to cut everybody off, but we're on a fairly tight schedule. If we're going to get through this before votes, we're going to have to stay within the 5 minutes for future time. Thank you very much.

Mr. Walker. Thank you, Mr. Chair.

Mr. Harper. Thank you very much. At this time, the chair will recognize the vice chairman of the committee, Mr. Griffith, for 5 minutes.

Mr. Griffith. Thank you very much, Mr. Chairman. Let me put in two pieces of information, if I might.

Our colleague from Puerto Rico got some changes made in the law. We took care of one of the problems, Mr. Walker. And that was restoring -- because we saw that when we were down there on our tour -- restoring the system without regard to predisaster conditions was put in as part of a third supplemental.

Also the disaster, not long term, but disaster was raised to 100 percent of the cost. Now long term, we're still looking at 90 percent, so you would be right on that.

But I don't think we took care of the issue you were talking about related to code and how you put the wires up. And, of course, the codes are put there for safety, but I would ask you, are you saying that

there's some of that that we could eliminate in a disaster situation that would make it easier for you all and still maintain safety?

Mr. Walker. I'm familiar with the language that came out through the supplement, and I think it's narrowly scoped. And I think, as we consider the different types of emergencies that we have in the energy sector -- so it's not only the electric component; it's the gas, it's petroleum pipelines, it's the terminal ports, it's the L&G sites that we've got -- as we consider those things going forward, I think the language needs to be expanded, and I'm happy to provide, you know, potential edits to this committee for reconsideration.

Mr. Griffith. And let me say, we would love to see those suggestions, and so forth, because you might have been able to tell from the questioning, all of us on both sides of the aisle want to try to help these areas that were so devastated --

Mr. Walker. Sure

Mr. Griffith. -- in the islands.

Mr. Walker. I appreciate that opportunity.

Mr. Griffith. Mr. Alexander, good to see you again. Did you have something else you wanted to add?

Mr. Alexander. Yes, sir, if I may. You know, while not the long-term resilient grid that we know we all need, the grid that we're restoring today is going to be in much better condition than the grid that was there last August.

You know, we are repairing lines to code. Those crews would not work to any less standards for life, health, safety, and legal reasons.

There are new transmission and distribution lines. There are new lattice towers. There are new poles. So, again, while not anything has been done underground or to harden or to elevate power-generation facilities or substations, the work that we have done is not all for naught. It will be a much-improved grid to what was there previously.

Mr. Griffith. And I'll open it up. I'm going to have a series of questions on microgrids. And I'll open it up to anybody. I had them drafted for Mr. Walker. But I actually am a big fan of microgrids, maybe more as a part of a mesh, but so, if there is a disaster, you can break that part off and still have functionality.

So that being said, I know that a lot were used. That's correct -- isn't it -- the microgrids concept was used a lot in the restoration, at least getting things going? Isn't that correct?

Mr. Walker. That is correct.

Mr. Alexander. Sir, we put 10 in place. Four still in operation.

Mr. Griffith. And so how were these sites selected, and are these envisioned as permanent solutions? And keep in mind that maybe these aren't, but I think microgrids maybe ought to be a part of the long-term solution, because we're going to get more storms, and we might need to have those parts that can break out and be independent when needed.

Mr. Walker. I'll take that. DOE absolutely believes that microgrids have an opportunity to play a strategic part here, as well as in other parts of the country.

I will say that, you know, part of what we're trying to work

through is the development of a model to know where and how these microgrids will interact with the system.

So the concept of just dropping microgrids in and tie them together, just does not work.

Mr. Griffith. Right.

Mr. Walker. You know, there are some basic physics problems that we've got to figure out how to overcome. And that's what that model enables us to do.

Mr. Griffith. Well, one of the towns that we visited, at one time, it had a hydroplant.

Mr. Walker. That's right.

Mr. Griffith. And while it wouldn't supply everything, if that hydroplant had still been there, if we had maintained that as a small microgrid, it could have at least maybe supplied the hospitals or, you know, one of the schools and an emergency evacuation center.

That's the kind of thing I'm looking at. And you indicated that it could be used in other parts of the country, and I think we should use Puerto Rico, as long as we're spending the money down there, which I think is the right thing to do, use that as a testbed for this technology so that we can start building it into other places that might be remote or have issues that are similar where you might have the hydro available or some other power source available that you could have as a backup in emergency situations.

Are you all looking at that?

Mr. Walker. That's exactly what we're looking at.

We are looking at the different opportunities we have to integrate microgrids as well as other distributed energy resources in an approach where we can optimize the utilization of those types of sources and with a keen eye at driving the cost per kilowatt down on an overall basis while simultaneously improving the power quality.

The power quality is a major issue on that island, and nearly, you know, 50 percent of the island is manufacturing.

Mr. Griffith. Right. And I appreciate all you all's hard work on this. And it's good team work that we have going forward.

Thank you. I yield back.

Mr. Harper. The gentleman yields back. The chair will now recognize the gentlewoman from Florida, Ms. Castor, for 5 minutes.

Ms. Castor. Well, thank you, Mr. Chairman and Ranking Member DeGette, for having this hearing today, and for the work of the professional staff.

And it's nice to have you here, Ms. Gonzalez.

And thank you to all of you for your hard work on this.

I am very heartened by the discussion of the fact that we're not totally weighed down by the Stafford Act that says you can only repair a grid and you can't build it back in a more resilient fashion with all of the modern technology we have, with all of the tools, with the major investments we make in our national laboratories.

Mr. Byard, that was, I think, it's very important for the Congress to understand this: We appropriate enormous sums for the top line research, the best in the world, and now to have it out in the field

applied to protect the taxpayers from the next storm. I mean, this really hits home, coming from Florida, where I've seen damage like this. But we've never had devastation of electrical grid as we've had in Puerto Rico after Maria.

So is it clear to you that, in the last supplemental appropriations package, that the Stafford Act did give you all of the authority that you do need to build the more modern, resilient grid that we've been talking about, what Mr. Griffith talks about, the microgrid to build in renewals?

Do you have all of that authority, noting that we may have to go back and do some things relating to electrical grids and other disasters?

Mr. Walker. I'm aware of the authority. The issue is you just don't build a grid overnight and integrate all of these things together. You just can't. And we're further hampered by the fact that PREPA doesn't have a good model of their system that is able to demonstrate where you would place certain things so --

Ms. Castor. So how do you get to that model?

Mr. Walker. We're building the model.

Ms. Castor. Okay.

Mr. Walker. We're building it for them.

Ms. Castor. All right.

Mr. Walker. But it's a model that they would normally have so --

Ms. Castor. And that same model that's going to incorporate renewable energy and also improve resiliency so we don't get into the

same issues of importing a lot of fuel as well?

Mr. Walker. Well, those are a couple of questions mixed in. But the model will enable us to answer some questions like, where do I put generation, or do I need to replace generation? There's about 5,600 megawatts of name plate generation on the island. The peak load is roughly around 2,500 megawatts. Most of the generation is in the south. Most of the load pocket is up in the north in San Juan.

They've got reactive power flow issues --

Ms. Castor. So before the storms --

Mr. Walker. That the model illustrates.

Ms. Castor. Before the storms, renewable sources generated a mere 2.4 percent of the island's electricity, and many of the renewable energy facilities that did exist on the island were damaged. And this really gives us a fantastic opportunity.

Working with the national labs, there are scientists at the University of Puerto Rico. They've initiated an oasis. I know that Navigant Study that Mr. Tonko talked about. Mr. Walker, can you go into greater detail about how renewable energy sources are incorporated now? And then maybe you all could talk about how we build those in to protect the taxpayer in the future.

Mr. Walker. Fundamentally, I mean, on an aggregated basis, they are not built into the system today. Two percent of that system is very small, given the opportunity that was on the island, but those were the choices that PREPA made to not put those in.

Ms. Castor. But they have a renewable portfolio standard of a

goal of 12 percent renewables by 2019. So how will all of our Federal efforts help ensure that Puerto Rico meets that goal?

Mr. Walker. Well, you know, as we build this model, the model will enable us to identify where we have opportunities to put renewable energy into the island.

So, for instance, I'll give you an example, and for those who had gone down there, there are right places to put solar, and there are wrong places to put solar, as I think we saw on the island. There are right places to put wind, and there are wrong places to put wind, which is why I suggest that you just don't put all of these things into, you know, a 3,500-square-mile island without understanding the impact to reliability, the impact to resiliency, how power flows. You know, things like what exists today, where you've got generation in the south and load in the north, just doesn't make sense with the system that they have.

So a significant amount of electrical engineering work has to go into making the decision. And we are keenly aware of that given the fact that, in the supplement, there's $2 billion delegated to HUD for the electric system. And what we are doing and working with HUD to help define that and working with PREPA to get the information to build their model.

Ms. Castor. Thank you, Mr. Chairman.

And I did want to thank Senator Eduardo Bhatia from Puerto Rico, who has been a good resource of information on this. And thank you very much.

Mr. Harper. The gentlewoman yields back.

The chair would now recognize the gentleman from New York, Mr. Collins, for 5 minutes.

Mr. Collins. Thank you, Mr. Chairman.

Just out of curiosity, so we had couple thousand temporary generators. Are they all going to stay or -- I'm just thinking financially, you know, a lot of money.

Are they going to be remaining as backup power generators, or are they being removed?

Mr. Byard. That's a, you know, good question. There will be a, you know, there will be a number of those that remain on the island for backup generation.

If I may, Ranking Member DeGette, I need to clear one misnomer up. The legislature can direct the 100 percent, and also, the President can direct the 100 percent. I did not say that earlier so I just needed to make that note.

I apologize for that, but I wanted to --

Mr. Collins. Yeah.

Mr. Byard. So the generation can -- you know, generators aren't built to run for 6, 7, 8, 9 months, as you know.

Mr. Collins. Right.

Mr. Byard. So some of those will be taken offline. Some of those will be, you know, we're actively maintaining. They're owned by various, you know, other entities, through the Corps and so forth. But on our most critical facilities, we want to remain --

Mr. Collins. Yeah, well, that's good to hear. What about the microgrids? Same kind of question. We had 10 microgrids. Now you're saying there's four. What happened to the other six? Are they still there?

Mr. Alexander. They came offline as the grid was restored to those areas and those facilities that, you know, they were placed there for to begin with.

We've got what we call two mega-generation gas turbine-type plants, if you will, located in Palo Seco and Yabucoa that I believe will remain. Right now, we have continued to operate and maintain them, I think through the end of May. It is PREPA's intent, we understand, to ultimately purchase that equipment and use it to assist in stabilizing the power and backup to those power plants as they operate and maintain.

I don't know the future as far as the remaining four.

Mr. Collins. Okay.

Mr. Alexander. We just commissioned the one on the island of Vieques yesterday, which was welcome news to all of us.

Mr. Collins. Go ahead.

Mr. Byard. I was just going to followup a little bit further. We are working through the Unified Power Command Group on a transition of materials, on a transition of the maintenance and operating requirements to PREPA. So, again, I want to reiterate that it's not kind of handing the football off and turning around.

It is a team effort --

Mr. Collins. Okay.

Mr. Byard. -- throughout the push.

Mr. Collins. So the $64,000 question, to use that term, you know, as we're heading into hurricane season again -- it's hard to imagine, but, you know, in 3, 4 months, we'll be there -- and while, clearly, what we've done to restore power, as you've indicated, has also to some extent, hardened and improved, the question would be, are we -- hard to put into terms -- better off now if we got hit again this coming September? Would the island sustain the same kind of hit after all the moneys and all the effort come this September? I know you can't give a definitive answer.

Mr. Walker. I would like to answer that.

Number one, I would like to point to Mr. Alexander's comment regarding the 50 megawatts of generation that are, in Yabucoa and 50 megawatts of generation in Palo Seco. Both of those alone changed the dynamics of the system.

Part of the slow restoration of the system early on was the lack of generation in Palo Seco. So it was one of the plants that they didn't maintain the way they should have, and 550 megawatts is offline.

So that alone -- and again Yabucoa being on the southeastern portion of the island becomes a critical component. So just having those 200 megawatts of generation is very significant from an operating-the-system perspective. And then the fact that things were built back where they could be to NS -- National Electric Safety Code is important because that increases the resiliency as well.

Mr. Collins. I think that's the kind of answer we were kind of hoping for. We don't want to face this again, this year, next year, the following year. And I would like to think, as you're now indicating, we are better prepared. And certainly from Puerto Rico's standpoint, if we get hit again, we want to be back up a lot sooner. Is that right? Yeah, there we go.

Anyway, thank you all for what you've done. I think it was a situation we've never seen before. Hope to not see again. But thank you for all your efforts. I yield back.

Mr. Harper. The gentleman yields back.

The chair will now recognize the gentleman from California, Mr. Ruiz, for 5 minutes.

Mr. Ruiz. Thank you for being here. Thank you, Mr. Chairman.

Last year, I traveled to Puerto Rico and saw firsthand the disastrous consequences of Hurricane Irma and Maria, and I left the island heartbroken.

I visited shelters, toured hospitals, and met with survivors, doctors, and public officials, and even took care of a patient who had a seizure right in front of me. I'm a doctor, emergency medicine doctor, and had a seizure in front of me. She was at a shelter that was an elementary school turned into a shelter.

And one of their greatest needs was energy in restoration. And one of my constituents contacted my office concerned about her mother's health and well-being without power if she can't store her medications that need to be chilled and all the other medical necessities that she

had.

So, to many, having energy was a matter of life and death. And it is of the utmost importance, not simply to restore energy in the islands, but to build an energy infrastructure that can respond to future natural disasters. It doesn't make sense to build it vulnerable once again.

And the other thing that I just really want to note is, when I was there, people would say, "Yeah, this community has power now," but I visited those communities, and I visited those clinics. And yes, they might have electricity, but only 30 percent of what they needed. So only the lobby and one exam room had electricity, but they needed full electricity to meet the demands of their patients.

The second thing is that, you know, one can say, "Well we've got them back online," but if their generators keep breaking and they have to wait 1 week or 2 weeks to get them maintained, then that's difficult to really be assured that in reality what you're telling us that, you know, we've got 95 or plus percent people now have power, what does that mean? Because does that mean they have 10 percent spotty power that breaks and they need a generator that also breaks? Or what does that mean?

So I think that the goal should be to have full, consistent, adequate, and resilient power so that this doesn't happen again.

I'm concerned about some of the more remote areas like Vieques and Culebra. Reports indicate that power has only recently been restored to a number of smaller outlying areas in Puerto Rico, such

as Vieques and Culebra. And each day that the power was out in these towns carried significant consequences for members of these communities, including shuttering hotels and other businesses which employed significant number of people on the island.

So I would like to take a few minutes, ask Mr. Alexander: According to the grid restoration plans for Vieques and Culebra, the Army Corps was to establish generator-powered microgrids on the islands by April 10. Did it accomplish that goal?

Mr. Alexander. Sir, the microgrid was commissioned yesterday.

Mr. Ruiz. So it has not --

Mr. Alexander. Yesterday was 10.

Mr. Ruiz. Okay. So it was commissioned yesterday.

Mr. Alexander. Yes, sir.

Mr. Ruiz. All right. Does this mean that everyone on this island now has power? No.

So, when you say "commissioned," what do you mean by commissioned?

Mr. Alexander. It means we have a microgrid in operation that is --

Mr. Ruiz. So everybody on the island has power?

Mr. Alexander. I can't answer to that right now.

Mr. Ruiz. Okay. And are these microgrids designed to serve as a lasting permanent solution for restoring power, or is this another -- a temporary measure?

Mr. Alexander. It's a temporary measure. I think, you know, like all generators, you know, they have a certain amount of life in

there.

Mr. Ruiz. Okay. All right. So, as I mentioned earlier, the Army Corps established the microgrids on Vieques and Culebra. However, the Army Corps is now conducting a responsible drawdown from the island.

Mr. Alexander, who will take over the operation and maintenance of these microgrids once the Army Corps' drawdown is complete, and how will this transition occur?

Mr. Alexander. Well, our drawdown is associated with the end of our mission assignment and the funds associated with it.

It was recently extended to 18 May.

Mr. Ruiz. Sir, I'm concerned that these are temporary measures and you guys are leaving -- not, you know, you just mentioned you don't know if everybody still has power. So who is going to maintain these, and how is this transition going to occur?

Mr. Alexander. Well, the orderly drawdown is ultimately -- PREPA assumes operations, maintenance. They assume the restoration of the remaining percentage of service to customers.

Mr. Ruiz. And have they told you they have the capacity to do that right now?

Mr. Alexander. They are part of this Unified Command Group. You will have a member of that command group testify in your second panel here this afternoon, but that is the plan.

PREPA dictates the priorities with respect to line assignments. And so this transition, it's planned. There should not be any gaps.

Mr. Ruiz. Okay. So we haven't fully restored yet, and I hope the transition is adequate. So thank you.

Mr. Harper. The gentleman yields back. We'll let members know that votes have been called about 5 minutes ago, but I think we will try to conclude here.

And I'll recognize the gentlewoman from Illinois, Ms. Schakowsky, for 5 minutes.

Ms. Schakowsky. Thank you very much.

I've been in close touch with the mayor of San Juan who -- and I was watching some clips the other day where FEMA, a woman representing FEMA, said that Puerto Rico was a "good news story." This was when people were dying, without electricity. I do want to talk about electricity. But in general, let me ask you, from FEMA, do you think the way things were handled in Puerto Rico is a good news story?

Mr. Byard. Ma'am, what I know is Puerto Rico was devastated by a 1-mile per hour under a Category 5 storm.

The island, you know, all 3,500 square miles of the island was impacted by a storm.

What I can tell you from FEMA's perspective is we were there before the storm hit. We moved tremendous amount of resources, tremendous amount of personnel collectively from the Department of Defense to the Department of Energy to massive amounts of nongovernmental NGOs. All on an island with limited air capacity, limited port capacity that had to be sequenced in and moved in.

FEMA traditionally comes in to any State, as we did in Texas, in

Harvey -- and no two disasters are alike -- and we supplement the local and State efforts.

In this situation, we quickly had to realize that we were the final mile for a long time.

Ms. Schakowsky. Okay. Well, let me --

Mr. Byard. So, you know --

Ms. Schakowsky. Okay. Go ahead.

Mr. Byard. -- I think there's a lot of work to do, ma'am, in the books not written on the unique opportunity that we have to recover Puerto Rico in a more resilient fashion.

Ms. Schakowsky. Well, I want to try and get a better understanding of FEMA and the Army Corps efforts to restore the electrical grid on the island.

Last October, Major General Donald E. Jackson, the Army Corp's Deputy Commanding General for Civil and Emergency Operations, told the Senate Homeland Security and Government Affairs Committees that the Army Corps is responsible for restoring Puerto Rico's electric grid to quote, "pre-storm condition."

So, Mr. Alexander, can you please elaborate on what pre-storm condition means and provide us with an update on the Army Corps' progress.

Mr. Alexander. Pre-storm condition would be, in essence, what we put it in place, is exactly what the grid was like, you know, before the storm. And the reality is, as I mentioned earlier, that is not in fact the case.

We have, you know, put in place new transmission, distribution lines, new towers, new poles, other power generation equipment. It is not the resilient, you know, grid that we all recognize is needed, but it is in much better condition.

Ms. Schakowsky. So you're saying actually it's better than pre-storm condition.

Mr. Alexander. It's no secret that the grid was in very poor condition before the storm hit. It is in much better condition today. We are at 96.7 percent. We still have 49,000 customers without power.

That number is tied to meters, connected to the meters. Now whether residents or businesses inside those dwellings have the capability to draw that power or not, I can't speak to that.

Ms. Schakowsky. Okay.

Mr. Alexander. But that's where we're at. Our mission assignment is extended to the 18TH of May. We've got over 500 contractors remaining under our control. PREPA has an additional 800, plus 600 contractors.

Ms. Schakowsky. So do you think everything will be fully restored then by May, that May date?

Mr. Alexander. Ma'am, we're going to do everything possible to get as close to 100 percent as possible.

This is the most difficult terrain. The production rates are going to be hard to estimate. Much of the work has to be done by using helicopters and inserting crews and material. So you have air control issues there in terms of people working --

Ms. Schakowsky. So, if it's not done, are you out of there, anyway?

Mr. Alexander. Excuse me, ma'am?

Ms. Schakowsky. If it's not done, are you out of there anyway?

Mr. Alexander. You know, ma'am, that's probably a narrative that I would like to correct. It's not the Corps' decision whether to stay or leave. We are there under a FEMA mission assignment.

Ms. Schakowsky. Okay.

Mr. Alexander. We will stay as long as we have to and we have the authority and the resources to do.

Ms. Schakowsky. No, that was just a question. I don't have a -- I don't know. I didn't know that. So, it's not --

Mr. Alexander. We have never unilaterally said, "We're going home on this date," and we've done all the deliberate planning to properly transition and turn over equipment and lines in the event, you know, 18 May does come, and we do depart.

But 18 May will come, and that means crews will stop work, but then there will be an orderly demobilization. Corps personnel will still be there, working with, advising, consulting with our interagency partners and with PREPA and with the Commonwealth government.

Ms. Schakowsky. Okay. My time is expired. Thank you.

Mr. Harper. The gentlewoman yields back.

Ms. Schakowsky. I'll submit some more questions for the record.

[The information follows:]

******** COMMITTEE INSERT ********

Mr. Harper. And any questions that are submitted, we would ask, in very short order, that you respond to those.

Seeing there are no further members wishing to ask questions, I want to thank each of our witnesses on our first panel for being here with us.

Ms. DeGette. Can I say something for the record?

Mr. Harper. Certainly. I would now recognize Ranking Member DeGette.

Ms. DeGette. Sorry. I just really want to echo what I had said before. We are asking tough questions because we want to get the right answers for Puerto Rico, but we really appreciate the work all of your agencies are doing. And we saw that when we went down and visited. Thanks.

I want to yield back.

Mr. Harper. Well said. And I want to thank you for your time today.

It gives us a lot of details to get that update that's so important to where we are. So that concludes our first panel. We will now set up for the second panel while we go vote and come back. And so the subcommittee stands in recess.

[Recess.]

RPTR KEAN

EDTR SECKMAN

[5:20 p.m.]

Mr. Harper. Our second witness panel for today's hearing includes Mr. Carlos Torres, Puerto Rico power restoration coordinator and consultant for Edison Electric Institute; and Mr. Gene Shlatz, director at Navigant Consulting.

I want to thank both of you for being here. I apologize for the delay. Some of this is just outside of our control, but thanks for your patience today in joining us.

And you're aware the committee is holding an investigative hearing, and when doing so, we have the practice of taking testimony under oath. Do you have any objection to testifying under oath?

The chair then advises you that, under the rules of the House and the rules of the committee, you're entitled to be accompanied by counsel. Do either of you desire to be accompanied by counsel during your testimony today?

In that case, if you would, I would ask that you please rise and raise your right, and then I will swear you in.

[Witnesses sworn.]

Mr. Harper. You may be seated. Thank you.

You're now under oath, and subject to the penalties set forth in title 18, section 1001, of the United States Code. We're going to allow you to give a 5-minute summary of your written statement. And,

Mr. Torres, we will recognize you first for 5 minutes. The buzzer or the light system in front of you, when you've gone 4 minutes, the yellow light will come on. And then, at 5, the red light will come on. So thank you very much.

You may proceed, Mr. Torres.

TESTIMONY OF CARLOS D. TORRES, POWER RESTORATION COORDINATOR, EDISON ELECTRIC INSTITUTE; AND GENE SHLATZ, DIRECTOR, NAVIGANT CONSULTING.

TESTIMONY OF CARLOS D. TORRES

Mr. Torres. Thank you. Thank you, Chairman Harper, Ranking Member DeGette, and the members of the subcommittee.

Thank you for having me here today. My name is Carlos Torres, and I am testifying in my capacity as a consultant with the Edison Electric Institute.

Since November 17th, I have served as a power restoration coordinator in Puerto Rico and as a member of the Unified Command Group. Prior to my position, I worked for more than 30 years for Consolidated Edison in New York. During my career, I've managed emergencies and storm restoration efforts and oversaw Con Edison's response to major storms, including Con Edison's response to major storm -- Superstorm Sandy, Hurricane Irene, and emergencies such as the 9/11 attacks, and the 2003 Northeast blackout. Those events were certainly challenging.

However, the storm damage caused by Hurricane Maria is unlike anything that I or any of us in this industry has ever seen on the mainland United States.

This powerful storm affected 100 percent of the island's power generation, almost 90 percent of PREPA's transmission facilities, and

80 percent of the distribution system. Without a doubt, this power restoration mission has been the most challenging of my career.

Having lived on the island now for more than 5 months, I can tell you that the people of Puerto Rico are the most resilient that I have ever met in my life. While the resiliency is admirable, nobody deserves to be without electricity for this long.

I, and everyone involved in this restoration effort, remain committed to work as one team with one mission: restoring power safely and as quickly as possible to our fellow citizens in Puerto Rico. When I say "one team, one mission," I mean the partnership between PREPA, FEMA, DOE, the United States Army Corps of Engineers, the contractors, and the many mutual assistance crews from the electric companies on the mainland who have worked tirelessly to restore power to the people of Puerto Rico.

My written statement goes into more detail about the restoration timeline. And we do have photos running on the screen to help put in perspective the devastation and to provide a sense of the scope of the restoration effort.

So today marks 202 days since Maria made landfall in Puerto Rico. Every meeting that I start in Puerto Rico starts with "how many days since the storm hit Puerto Rico," and that's important because that puts context to the work that we're doing.

As of last night, PREPA reports that 96.67 percent of its more than 1.47 million customers who can receive electricity have had their power restored. So restoring power to the remaining customers, most

of whom are in the hardest hit and most remote areas, remains challenging and labor- and time-intensive. As mentioned before in the prior panel, it's important to note that one customer equals one electric meter, but the meter may serve several people.

PREPA made its initial ask for mutual assistance from the mainland industry on October 31st. I arrived on November 3rd with my colleague Manny Miranda, senior vice president of power delivery at Florida Power & Light.

Working closely with the Unified Command, we started to formulate a comprehensive massive restoration plan. Given the intensive and extensive damage to PREPA's transmission system, it was critical that the transmission reestablishment plan and the distribution and subtransmission plan be well-coordinated to restore power safely to the island.

Typically, when a storm or an incidence occurs, electric companies utilize a mutual assistance process to increase their workforce. It is important to remember that crews do not arrive automatically. A formal request for mutual assistance must be made by the affected electricity provider. The recipient of the assistance pays for it. The companies providing the mutual assistance are compensated on a not-for-profit basis for providing this service. I'll say that again: the companies committed to this mutual assistance effort are doing this at cost.

To date, nearly 60 investor-owned electric companies and the public power utilities have committed personnel, equipment, and

materials to the effort. Overall, approximately 3,000 industry line workers and the support personnel have been involved in the restoration effort to the island.

The challenges that we have encountered during this restoration mission are numerous and too detailed in the 5 minutes that I have, but I am proud to say that the difficulty of this work has been met with professionalism and determination by the men and women that work day in and day out to restore power.

Every single effort, a point has been reached when a substantial amount of work is completed and the type of workers needed to complete the job are reassessed. In many cases, more people simply does not mean that work gets completed faster. This is especially true in Puerto Rico's mountainous regions and roads.

I like to use the analogy that you can only fit so many mechanics around an engine of a car. As of today, mutual assistance crews have finished their mission and have returned to the mainland, and the restoration plans that PREPA and the remaining contractors will now converge to the hardest hit areas to restore power.

In closing, the 2017 storm season in general and the experience in Puerto Rico specifically has been historic.

I firmly believe that no one company has done this alone, and I am honored and humbled to have been involved as a team member in this mission.

I look forward to your questions.

[The prepared statement of Mr. Torres follows:]

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Mr. Harper. Thank you, Mr. Torres.

The chair would now recognize you, Mr. Shlatz, for 5 minutes for the purposes of a summary of your opening statement.

TESTIMONY OF GENE SHLATZ

Mr. Shlatz. Thank you, Mr. Chairman.

Chairman Harper, Ranking Member DeGette, and subcommittee members, I appreciate the opportunity to appear before you today.

My name is Gene Shlatz. I'm employed by Navigant Consulting, an independent consulting firm headquartered in Chicago, Illinois. I work as the director in Navigant's global energy practice.

I have over 35 years' experience addressing challenges that are facing the electric utility industry today.

My testimony supports findings and recommendations contained in our December 11th, 2017, report titled "Build Back Better: Reimagining and Strengthening the Power Grid of Puerto Rico" that Navigant and a working group comprised of industry experts performed on behalf of the Governors of the State of New York and Puerto Rico.

Our report provides an initial assessment of the electric power damage caused by Hurricanes Maria and Irma and proposes redesign and rebuild recommendations to strengthen the electric grid in Puerto Rico.

The damage caused by Irma and Maria was extensive and affected a substantial portion of Puerto Rico's electric generation and power

delivery system with an attendant loss of electric service to over 1 million customers.

The magnitude of the devastation, while unprecedented, still provides or now provides an opportunity to rebuild and transform the system to one that is hardened, smarter, more efficient, cleaner, and less dependent on fossil fuels.

The estimated cost and schedule to rebuild the system and achieve this vision is $17.6 billion over a period of 7 to 10 years.

Our recommendations, outlined in the report, include the use of modern technology and incorporation of lessons learned from successful rebuild efforts undertaken in other regions following the natural disasters such as Hurricane Sandy in New York and New Jersey.

The rebuild recommendations also align with the Department of Energy's recommendations for power system hardening and resiliency.

In short, we recommend that Puerto Rico implement resiliency and hardening measures to increase the capability of the power grid to withstand future storms.

These include modernizing the electric grid by using proven technologies to better contain outages, reduce recovery times and lower operating costs.

These actions will also enable the system to accommodate greater amounts of sustainable and renewable energy resources that in turn will reduce reliance on imported fuel.

In addition to the increased use of renewable energy resources, such as wind and solar, we recommend incorporating new distributed

energy resource technologies, such as energy storage and microgrids, to provide greater reliability and resiliency. There was significant discussion from panel 1 on that topic today, and we certainly support those efforts.

For example, microgrids would be, we would recommend, installing those critical facilities, such as hospitals, water treatment facilities, police stations, emergency shelters, and remote community most susceptible to sustain interruptions.

Turning to the transmission and distribution system, the T&D lines and substations that deliver power from generating stations to Puerto Rico's residences and businesses suffered severe damage.

As most equipment was built 40 or more years ago or longer, they were not designed or built to current industry standards and, at time, codes and could not withstand hurricane force winds and flooding.

Consequently, many transmission lines, including critical north to south lines traversing mountainous terrain suffered catastrophic failure. Electric substation equipment damage was extensive as high winds, mudslides and water intruded into sensitive equipment.

Thus, we recommend several short- and long-term design and rebuild objectives that should be considered to build back the system to current day standards.

Specifically, the working group in Navigant recommends that PREPA's bulk power system should be designed and constructed to withstand an upper Category 4 event, meaning 150-mile-an-hour winds and heavy flood waters.

Turning to the generation system, many generating plants also encounter significant damage, particularly along coastlines where storm surge and high winds resulted in the partial or complete loss of output from these stations. Many of these generating plants that were damaged were older and less efficient than modern generation. The units also mostly burn oil and do not meet, to my understanding, current mercury and air toxic standards.

Thus, based on the initial damage assessment, the working group also established a set of priorities and recommendations, including identifying opportunities to increase the use of renewables and distributed resources; shifting fossil fuel generation to mostly dual-fuel units with natural gas as a primary fuel; reducing the reserve margin by retiring older, less-efficient units; and hardening the remaining generating facilities that remain in service.

In closing, transforming and modernizing the Puerto Rico electric grid will not be easy. An ongoing commitment by affected stakeholders, including State, Commonwealth, and Federal agencies is essential to ensure a successful outcome as the complexity of rebuilding an island grid requires a coordinated and sustained effort to undertake projects that collectively may take 10 years or more to complete.

With that, I thank you for this opportunity to speak to you today, and I am prepared to answer any questions you may have.

[The prepared statement of Mr. Shlatz follows:]

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Mr. Harper. Thank you very much.

Members will now have an opportunity to ask questions of you. I'll recognize myself to begin.

And, Mr. Torres, if I may start with you.

You certainly have an extensive career and experience in emergency management, long time. And your comments about this being the most severe is -- certainly goes noticed. But you've certainly led recovery efforts following many severe natural disasters such as Sandy and others.

What has made this such a long and difficult recovery? And I know geography and terrain presented challenges, but were there other factors that contributed or are contributing to the challenge?

Mr. Torres. I think just the sheer fact that it's an island, I think is one factor.

The other factor is getting people, the restoration workers, to the island, the logistics that are needed to bring the materials and the equipment.

Also, materials were definitely an issue that I've never dealt with, and I think the challenge for the whole Unified Command Group and working with the Army Corps of Engineers and FEMA to try to secure those materials, having had Harvey, Irma, and then the forest fires in California really put a stress on the ability to have those materials available.

So we we worked with our partners to try to secure it and get it there as quickly as possible, and they used every means possible, using

barges to deliver the very heavy equipment materials, as well as airfreighting materials as quickly as possible.

Mr. Harper. Right. You know, so many factors that you're discussing, but was there anything in particular about PREPA, for example, their management practices, system design, or maintenance response capabilities that stood out to you as different than what you would have encountered elsewhere in the United States?

Mr. Torres. So I think, as I mentioned in my statement, I don't think any one company can handle an event of this nature. And when Manny and I went down we -- I'll say we injected ourselves very quickly into understanding PREPA's challenges and what their capabilities were, and we quickly said: We have to put these incident management teams in place. And these IMT's I think really served to support PREPA, but it doesn't leave PREPA out of it. They are still responsible. And they were part of delivering the plan.

It's their plan. We helped them develop the plan. Again, and I'll talk, and in my 30 years in the business, I've never seen such an extensive damage to the transmission system. And having to build a transmission system, I can say I've done one now. But it was a challenge, and a very big learning experience for myself, and I'm sure for everybody involved in that whole process.

Mr. Harper. Thank you.

Mr. Shlatz, you also have extensive experience with electric power systems. If you did a similar assessment of the grid in, say, Florida, would you expect to find similar opportunities for improvement

or hardening?

Mr. Shlatz. Well, my understanding in Florida, many of the utilities, for example, Florida Power & Light, have already upgraded their system to withstand hurricane force-type winds, and I think that may have been proven in the last hurricane. So I think there's quite a distinction between the design and construction standards that exists today in Puerto Rico versus Florida and other States as well.

Mr. Harper. You know, obviously some of the issues, such as the mountainous terrain, would be -- some of these issues would be different, but when it comes to things like poles, substations, integration of distributed resources, is there a dramatic difference in the resiliency of systems outside of Puerto Rico?

Mr. Shlatz. I think the mere fact that the facilities were deteriorated, my understanding is they hadn't been maintained perhaps up to industry standards, and the overall condition of the equipment was deteriorated. They were older. And so those factors, taken together, when you compare them to more the modern facilities that you find in the U.S., which perhaps may have been built over the past, say, 20 years, that very fact is going to underscore some of those differences in terms of the reliability of those assets and their ability to withstand storms. So I think there are distinct differences between what you see typically in the U.S., and there exceptions as you go across the country, but States which have been -- are most susceptible to hurricanes and storms either have recently or intend to upgrade their systems. So I think those account for the

differences.

Mr. Harper. Thank you very much, Mr. Shlatz.

The chair would now recognize ranking member of the committee, Ms. DeGette, for 5 minutes.

Ms. DeGette. Thank you, Mr. Chairman.

And, Mr. Torres, I want to also thank you for all of the work that you've done. It's been really Herculean what you've done down there.

In your written testimony, you say that efforts to restore power in Puerto Rico would have been more efficient if there had been better damage and equipment assessments, prepositioning of crews, access to equipment and materials, and investments in grid hardening.

And you just told the chairman here, part of the problem was materials, which you said in your written testimony, and also the fact that it's an island, which goes to the prepositioning and the other issues.

Is that right?

Mr. Torres. Yes, I agree.

Ms. DeGette. So I know the response effort is underway still. But, as I said in my opening statement, hurricane season is now less than 2 months ago.

Do you think any of the lessons that have been learned can be implemented in time to be ready for the next hurricane season so if we do have some kind of a devastating hurricane, we can be prepositioned, we can have better assessments, et cetera?

Mr. Torres. So I would say in terms of materials, we are working

with PREPA. I know FEMA is looking to replenish the stock that they've used during the storm, as well as securing stock for the hurricane

Ms. DeGette. Right. Do you think -- I'm glad they're looking into it. Do you think they'll be ready?

Mr. Torres. I believe they will.

Ms. DeGette. Okay, great.

Mr. Torres. In terms of materials, yes.

Ms. DeGette. Okay, good.

Now, we heard from the Army Corps of Engineers that they're going to completely draw down by May 18th with the hope of 100 percent restoration.

Do you think that we need -- but, yet, there's still 50,000 people who don't have power in some of the most difficult areas. Do you think we still need the Army Corps there? Do you think May 18th is a reasonable deadline?

Mr. Torres. I think that you get to a point in the storm where you have to right-size the workforce. And I think PREPA is positioning themselves to have the resources on the island to take over.

Ms. DeGette. So you think they will likely be able to do that?

Mr. Torres. Yes, I believe so.

Ms. DeGette. Okay. Now, are you helping PREPA to be able to take on that increased responsibility?

Mr. Torres. Yes, we are doing a transition with PREPA; as the workforce moves out, the IMTs, we're transitioning with them all the work packages so they can finish off the work.

Ms. DeGette. Okay.

Mr. Torres. So a lot of the engineering --

Ms. DeGette. So that work is underway?

Mr. Torres. Yes.

Ms. DeGette. So I wanted to also ask: You have a lot of years of experience working in the energy industry. And so I'm sure you understand how a utility's leadership and management is so important to its ability to mount an implement an effective response effort. And you talked a little bit about this before.

We all know about PREPA's management challenges. Do you think those management challenges have been addressed sufficiently to allow PREPA to be able to manage the remaining response and recovery work once the Corps leaves?

Mr. Torres. I've only known Walt Higgins for a short while since he's been on board and working with the PREPA team. I think that they have to meet that challenge. I think that --

Ms. DeGette. Do you think they can?

Mr. Torres. I think they're going to be challenged. I think they're going to be able to do it, but they're going to be challenged, and they're going to work through it.

Ms. DeGette. Are there risks to utilities or a risk to ratepayers if we don't have a strong regulatory structure in place to govern the utility?

Mr. Torres. I think regulations and having a regulatory body serves a purpose in terms of ensuring safety --

Ms. DeGette. Okay.

Mr. Torres. -- consistency in the standards, so I think it's very important to have a --

Ms. DeGette. Okay. Mr. Shlatz, I wanted to commend you on your "Build Back Better" report.

Mr. Shlatz. Thank you.

Ms. DeGette. And I wanted to ask you what the biggest implementation challenges to building a modernized electric grid are in Puerto Rico?

Mr. Shlatz. There's a set of challenges, but perhaps the overriding challenge is making all this happen. There's a lot of work to be done between the transmission and distribution, generating facilities, so it's a very big effort.

Ms. DeGette. Yeah.

Mr. Shlatz. And it's on an island system. So strong leadership, strong management, having the materials, crews available on a continued basis. We see this happening over a 7- to 10-year period so there has to be a sustained and committed effort to get this done. A lot of coordination, a lot of material procurement, a lot of engineering. So a lot has to happen. At the same time, trying to maintain a reliable electric system is going to indeed be a challenge.

Ms. DeGette. And do you think that Puerto Rico is committed to meeting that challenge?

Mr. Shlatz. I'm not sure I'm in a position to opine on that.

Ms. DeGette. Okay.

Mr. Shlatz. That type of organization still needs to be structured and assembled. So it's probably premature to comment on that yet, but your point is well taken because that needs to be in place.

Ms. DeGette. Right.

Mr. Shlatz. A very strong organization to be able to manage such an effort.

Ms. DeGette. Thank you.

Mr. Chairman, this seems like a good place for us to continue our regulatory oversight. And I would just propose that we do that, and I yield back.

Mr. Harper. The gentlewoman yields back.

The chair will now recognize the vice chairman of the committee from Virginia, Mr. Griffith, for 5 minutes.

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

And thank you, Mr. Chairman and Ranking Member DeGette, for rescheduling this hearing. When it had to be canceled earlier, I was concerned because this is an important subject that we need to keep, as Ms. DeGette just said, we need to keep our oversight going so that we can make sure things continue to work as well as they have the last few months.

And I appreciate you, gentlemen, taking your time. We're closing in on a quarter of 6. You all probably have been here most of the day. We got a little delayed on a couple of things this morning, but appreciate you all taking your time to be with us this evening.

Mr. Shlatz, I'm going to ask you, based on the "Build Back Better"

report recommending consideration of microgrids as a component of the rebuild effort in Puerto Rico -- and in your oral testimony here today, you see that as important. As you may have heard me in the previous panel, I think microgrids are something that we ought to be looking at as a Nation for other areas that may have needs or concerns. So, based on your experience in the electric sector, what do you see as the strengths and the weaknesses of microgrids?

Mr. Shlatz. Well, clearly the strength is the resiliency it provides. Both the electric power system and to the individual loads or communities or facilities which are equipped with microgrids.

Probably the biggest challenge or concern is one of cost. Microgrids are not inexpensive. It's a very expensive way to be able to maintain backup reliability and resiliency to the grid.

Over time, these costs, while we do expect them to go down, but right now costs of microgrid is high. And on a business case alone, it is very difficult to structure a business case on economics that would justify a microgrid in many situations.

Mr. Griffith. So how do we, particularly in areas that could easily be isolated in a time of a disaster, such as an island, but also some mountainous regions or some areas we heard testimony about Florida where part of it might be fine and the other part being hit by a hurricane, how do we justify building in that cost? Because I think it's something that we probably need to do, and you mentioned in your oral testimony making sure that we had hospitals, police stations, some other facilities that were hooked in and had that capability. So what

are your recommendations on how we can bring that cost down or justify to the public the spending of --

Mr. Shlatz. Well --

Mr. Griffith. -- tax dollars?

Mr. Shlatz. From a justification standpoint, you just named the critical facilities, so those facilities where sustained power is essential, certainly that. The value of the reliability, of the need for reliability is far enhanced in that case. So, in that situation, there's a much stronger case or justification for a microgrid.

Over the longer term, the industry envisions microgrids providing support to the grid. So, to the extent that, with the proper communication and control systems, the microgrids could be properly managed, can provide reliability to the system and, to some extent, may be able to defer the need for centralized facilities -- so, to the extent that those microgrids can play a role with regard to providing ongoing and firm support to the system, that further justifies the economics of a microgrid.

Mr. Griffith. So kind of like the situation that I mentioned previously, where those of us who went down to Puerto Rico earlier on a fact-finding mission earlier this year -- or late last year. You know, we went to a town that at one time had had hydropower, but because it was easier to wheel it in from somewhere else, that's what they did. But if you had the hydropower as part of your mesh or grid, then, in times of emergency, they could have it with the supply going to the hospital or the school or the police station, and the rest of the time,

it would just be a part of making the overall grid more resilient. Is that what I'm hearing you say?

Mr. Shlatz. To an extent. I suspect the hydroplants, ones which are owned and operated by PREPA, are already part of the integrated grid. So, to some extent, very often those facilities can be isolated if they're capable of being able to supply those locally without tripping offline. They, in effect, represent a microgrid, but they also represent part of the integrated system. So, incrementally, I wouldn't view that as a microgrid. They operate in a microgrid fashion but --

Mr. Griffith. Yeah. But what happened in this case was they had just abandoned the hydro. And it struck me. I was like: Great, if you had had the hydro, you would have had something. Now, you are having to rely on it coming in from miles away and over the top of a mountain.

And that was what I was thinking, that if you had some of these smaller systems that were there, yes, they might be a part of the overall system in good times, but in bad times, they could be a bulwark against disaster.

Mr. Shlatz. Yes. And, again, going back to my prior statement, I'm not entirely sure why the hydroplant was not available, maybe --

Mr. Griffith. I think it was just out of use for a decade or so.

Mr. Shlatz. Right.

Mr. Griffith. But I was doing the research.

Mr. Shlatz. But it needs to be connected to the loads. It needs

to be able to follow the loads.

Mr. Griffith. Right.

Mr. Shlatz. In the proper manner. And there may have been an absence of adequate lines to be able to deliver that power. There may be control system problems, even operator problems.

Mr. Griffith. Okay.

Mr. Shlatz. So I'm not personally aware of why that unit was or was not available, but I would view the hydro unit as being part of the integrated grid whereas microgrids typically involve smaller generation.

Mr. Griffith. All right.

Mr. Shlatz. Typically, 1 megawatt or less, combination of, say, diesel, perhaps wind, solar power, more recently, battery systems, as part of a contained grid within an area, being able to operate on a standalone basis or in parallel with the power system.

Mr. Griffith. And I see that my time is up, but it's been very educational.

And thank you, gentlemen, for your help. And I was hoping to give you a chance, Mr. Torres, to weigh in on this, but another day.

RPTR ALLDRIDGE

EDTR SECKMAN

[5:46 p.m.]

Mr. Harper. The gentleman yields back.

I just have one quick followup, Mr. Torres. Of course, one of the main problems here is this is an island. And how do you compare Puerto Rico to, say, Hawaii? How would I compare those?

Mr. Torres. Well, they have definitely different challenges. I mean, Puerto Rico is going through -- you -- PREPA is going through a bankruptcy. It's a different situation. So the challenges that they have to deal with, it is not your typical storm response. I mean, they're dealing with a lot of issues. And luckily for them, they have the help of the Federal Government to help fund a lot of this restoration work and hopefully the recovery, reconstruction, resiliency work.

Mr. Harper. Okay. We may have one other member who would like to ask questions.

Do you have followup?

Mr. Griffith. I was just going to say, maybe Mr. Torres would want to -- and he may not, but give him the opportunity to maybe talk about microgrids a little bit if he wanted to.

Mr. Torres. So, in terms of microgrids, I think they're very useful. We have used them here at the island. We had up to 10 of them; now we have 4. They do serve a purpose. But you still have -- you have to still build infrastructure to get to the customers. So, be

it having a microgrid or having the generation at a power plant, you still have to have an infrastructure in place, and you have to build it resiliently to be able to withstand those, you know, hurricane-force winds, floods. So I think microgrids are great because you try to centralize. Power quality is also good. But you got to manage that as a -- you know, as a macro system.

Mr. Griffith. Thank you very much.

I yield back.

Mr. Harper. I'll recognize Ranking Member DeGette for a followup question.

Ms. DeGette. Let me say, we may have some additional questions -- oh. We may have some additional questions that we'd like to submit to you in writing. And if you could get us those responses, that would be great.

[The information follows:]

******** COMMITTEE INSERT ********

Mr. Torres. Absolutely.

Mr. Harper. Great. Thank you.

The chair will now recognize the gentleman from Georgia, Mr. Carter, for 5 minutes for questions.

Mr. Carter. Thank you, Mr. Chairman.

And thank both of you for being here today and for your work on this very important subject.

Mr. Torres, if I could ask you, based on your experience, do you feel that PREPA is prepared or understands what it needs to be -- to do to prepare in advance of future storms? Have we learned something from this? I mean, tell me that it's going to be better next time.

Mr. Torres. So I think we've learned, and PREPA has learned. I think we still have to sit back and do our after-action review, and we're going to do it jointly as individuals, the companies; PREPA is going to have do their own, and the Federal partners are going to do their own. And we have to get back together again and look at that.

I think any experience that you go through is a learning experience, and you have to learn from it. I think that they are going to be challenged. And, you know, I know, as part of the Unified Command, we've talked with PREPA as a partner and the need for them to bring additional resources to help manage events, you know, to manage not just the restoration but more the future with the reconstruction and recovery and the resiliency. They are going to need resources. They're going to bring additional contractors on board to do this reconstruction work. So they're going to need a management team that's

going to focus on safety, on logistics, on the materials, on the engineering. So they probably don't have that bandwidth right now, and they're going to have to work on that. So in talking --

Mr. Carter. Have they made any improvements for the next time? I mean --

Mr. Torres. I will say yes, that the systems that we've been put back -- I mean, we've -- the large portion of their transmission and distribution system has been impacted. What we put back, we've tried to meet to their specifications.

Mr. Carter. To their specifications.

Mr. Torres. Yes.

Mr. Carter. How do those specifications compare to our specifications?

Mr. Torres. Well, that's something that Bruce Walker spoke to in the previous panel, and that's something that they have to work on. But we are -- you know, in terms of hardening perspective, we look at their spec, and we built it to -- if it was a wood pole, they prefer putting it through their specs to put steel poles or concrete poles. And that was what we tried to do when the material was available. If the material was not available, in order to expedite restoration, we went back with wood. The same thing with the wire and the insulators, all of -- the whole restoration. We tried to put it back. The same thing with the transmission system, we put back the ladder structures based on their designs, but they have new anchors and new bases, so I think that they should be able to withstand another storm. But not

to say that it will not be impacted. That -- I would be foolish to say something like that.

But I think it's built a little -- I'll say a little bit better. I think what Mr. Shlatz is looking for as part of that -- the plan is make it even better.

Mr. Carter. So let me ask you, Mr. Shlatz. Based on your work with the "Build Back Better" report, what are the obvious or the most important priorities for improving the resiliency, if you will, of the electrical infrastructure in Puerto Rico?

Mr. Shlatz. Well, both the transmission and distribution system were heavily impacted. But the resilience of the island is dependent first upon the bulk system, which is the power generating plants and the transmission lines that deliver it ultimately to the distribution lines and to the customers.

To the extent that the transmission system, although being rebuilt, being rebuilt well, may still be quite susceptible to hurricane damage in the future. So I would say a primary item right now is focusing on that transmission grid, ensuring that it's up to current standards. And we do recommend rebuilding it to withstand a Category 4 hurricane. So that, in my view, would be one of the higher priorities.

Mr. Carter. So, if it were your system, that's what you would do?

Mr. Shlatz. That's what I would do.

Mr. Carter. Okay. Anything else?

Mr. Shlatz. Well, along with that, you know, we are looking at damage that was done across the entire system, so identifying critical load centers. We had talked about a backup system, microgrids to critical facilities, at the same time ensuring that the lines serving those critical facilities, such as water treatment facilities, hospitals, police stations, that the lines, power lines serving those particular loads, are certainly quite reliable, built well, and most likely to withstand damage in a future storm. So I would prioritize based on criticality of load as well as in addition to ensuring that the bulk system is intact and robust.

Mr. Carter. Okay. One last question. When will the island be 100 percent again?

Mr. Shlatz. I'm not in a position to answer that. I'm not familiar with the day-to-day activities.

Mr. Carter. Mr. Torres, do you have any idea?

Mr. Torres. This being the most difficult work -- the terrain is really kind of treacherous. The roads -- very narrow roads and the equipment that's needed to put the lines back up and the poles in, it needs helicopter work; it's very hard. And I equate it to --

Mr. Carter. Is that an "I don't know"?

Mr. Torres. Well, I don't -- well, it's going to take time, and I can't really tell you.

Mr. Carter. Okay. Fair enough.

Fair enough.

Okay. My time's up.

Thank you very much, both of you.

And I yield back.

Mr. Harper. The gentleman yields back.

I want to thank both of for being patient today, for being here. And, remember, too, that both staffs, this is critical for them to help us, and this process of your being here accomplishes a lot. And we commend both of you for the great work and the effort to help us as we go forward.

I anticipate that you will get a number of written questions. And so members are advised that they have 10 business days to submit questions for the record. And if that happens, I would ask you to respond as quickly as possible.

With that, the subcommittee is adjourned.

[Whereupon, at 5:56 p.m., the subcommittee was adjourned.]