



REBUILDING PUERTO RICO ENERGY SECTOR

May 10, 2018

Task Force Power Restoration

Power Restoration Visualization



USACE this together to show how restoration was achieved and the time it took. This loop is from November to May.

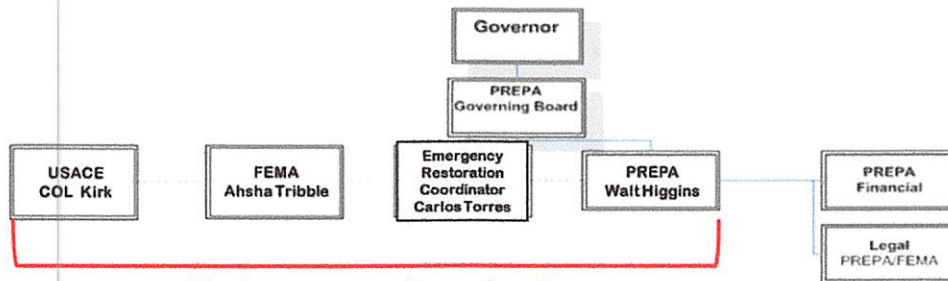
The map begins to brighten up, but we still see those pockets we have yet to reach.

And let me make this point....while we are talking today about rebuilding, let me be clear! We are NOT NOT NOT turning our back to the 1.56% of the customers that still do not have power.

We will continue to work just as hard on that restoration while we are looking ahead to our future...an amazing opportunity for the people of Puerto Rico, PREPA, and the Commonwealth.

So I want to take a few minutes to show how we got here and the complexity of this restoration

Unified Command



Unified Command Leadership

Engagements/Meetings/Calls

- Daily Unified Command and Stakeholders Update/Issues Meetings alternating (face-to-face)
- Daily Operations Conference Calls
- Weekly Transmission Planning Meetings (face-to-face/stakeholders and contractors)
- Weekly and Distribution/Sub-transmission Planning Meetings
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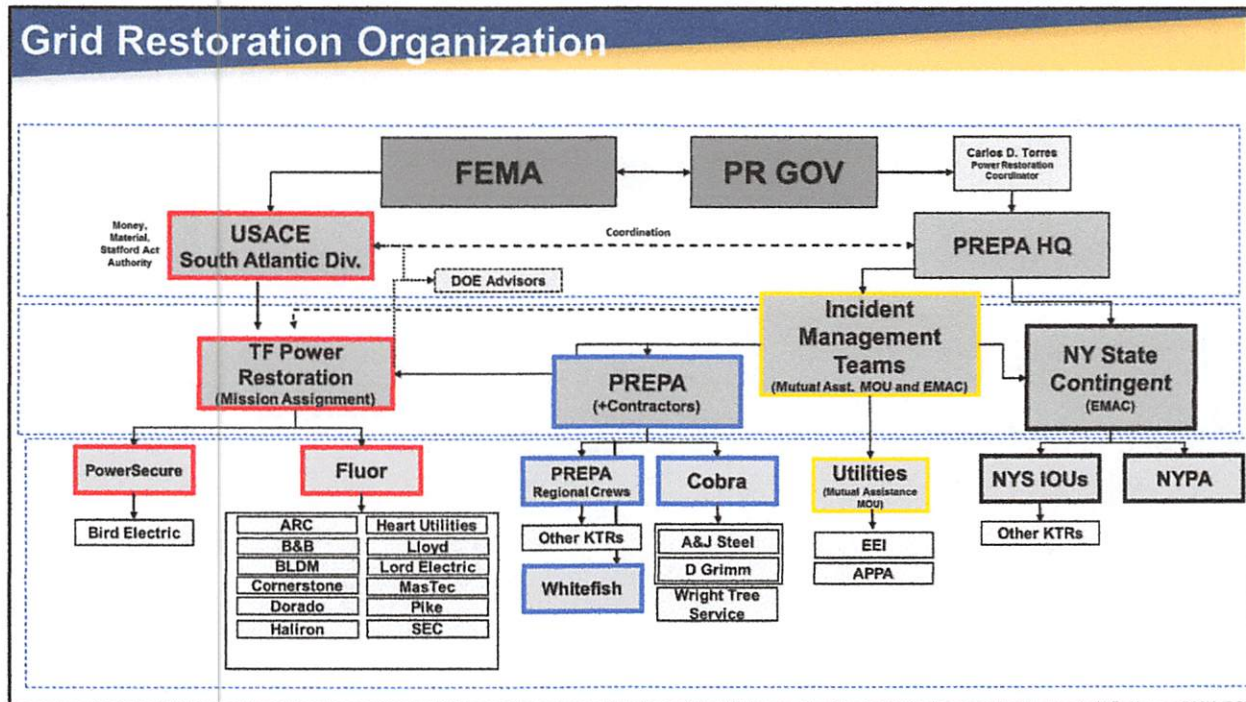
Because we gave a Mission Assignment to USACE, PREPA had its contractors, and the Gov's Island Restoration coordination.

We needed a process for **unity effort and unity of message**.

We met everyday, 7 days a week for 6 months.

FEMA –forever meeting agency

Grid Restoration Organization



Here is why it was so complicated

USACE – Mission Assignment

PREPA Contractors – PA Reimbursement

IOUs under a Memorandum of Understanding

NY State Contingent under EMAC

Consideration for where crews lived (Life support)

Where they were going to work...if you moved them, increase windshield time

Laydown Yards

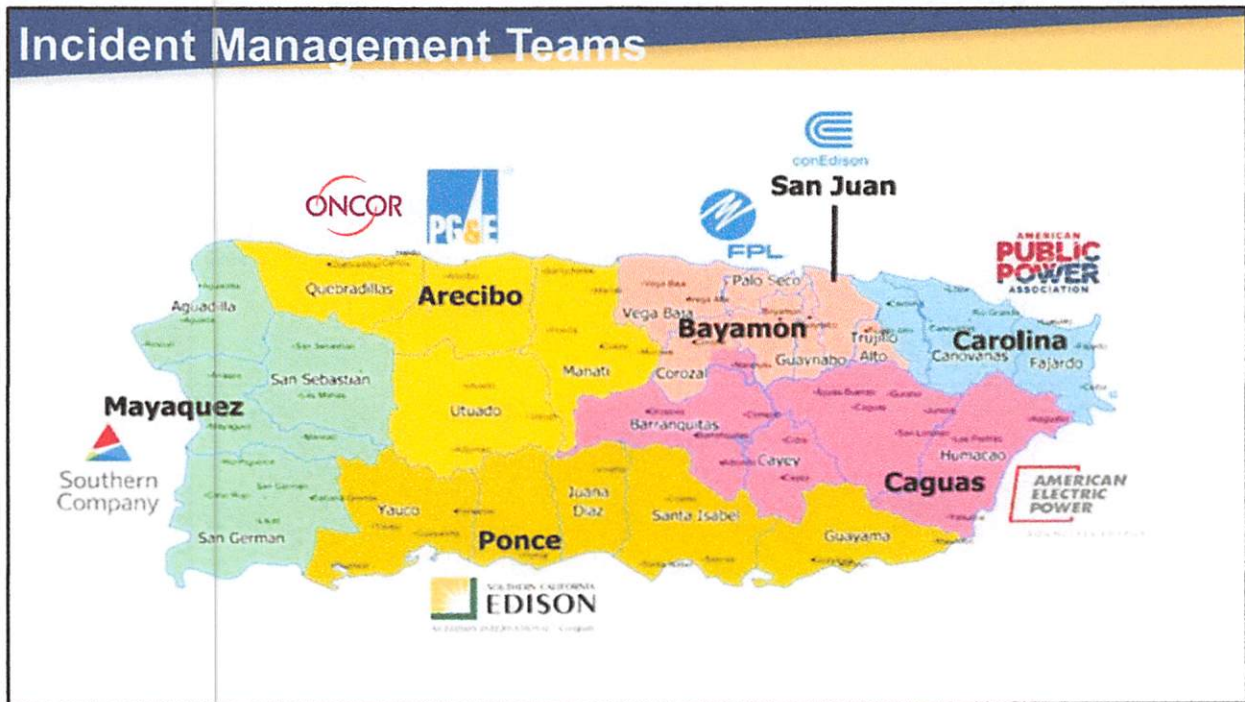
Materials management

Transmission or distribution?

Helicopter, Drone, bucket truck?

Wood, steel, or concrete pole...just because you can work one doesn't mean you can work the other....gloved, hot stick trailer...

Incident Management Teams















Layer on the 8 Incident Management Teams from Industry (planning, ops, safety, log, ...)

They really kept us to task, especially when we had all of the IOUs on island. It has the chance to be unwieldy and safety was always an issue

The road was bumpy at the beginning with these mainland folks coming to help manage an operation. But it worked out, and we felt it when they left.

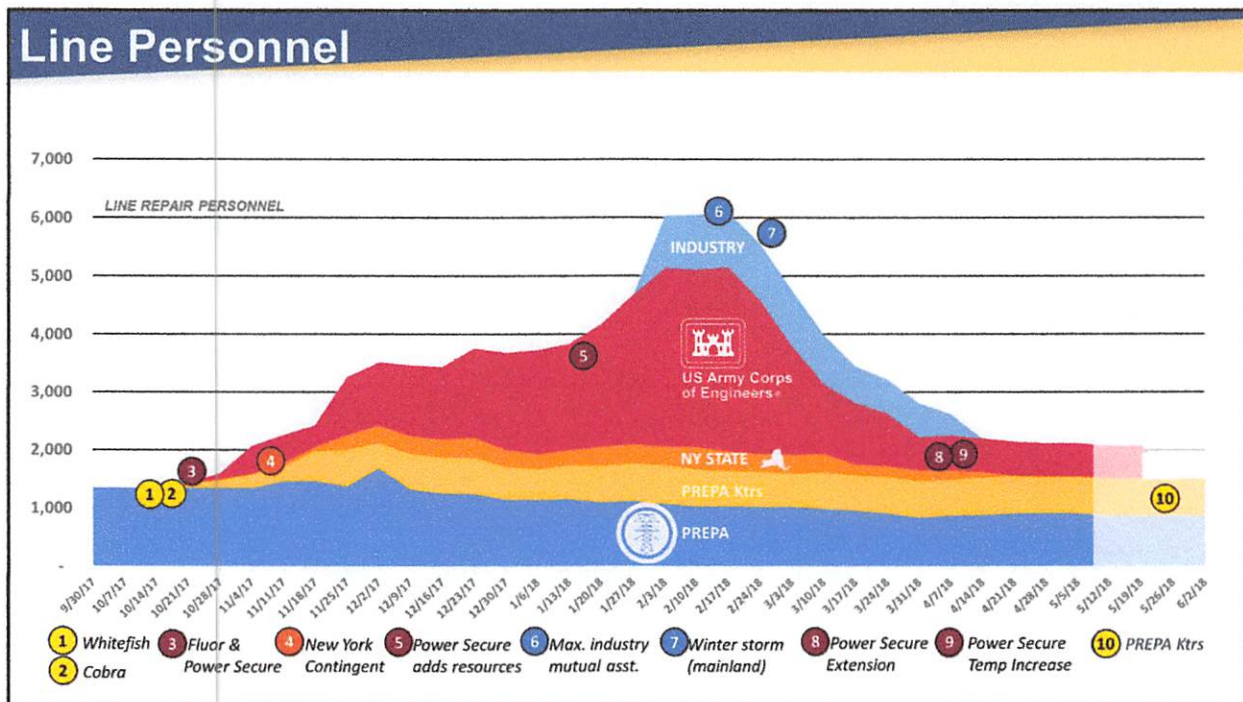
IT WAS COMPLEX...

Restoration Support to PREPA			
GENERATION	TRANSMISSION	SUBSTATIONS	DISTRIBUTION (+ Sub-Transmission)
	   	 	    

My favorite slide as it debunks media and congressional criticism of operations on the ground and what was really needed

NEEDED CONTRACTORS

To all of you, I thank you for your sacrifice, leaving families, and embedding with the community.



It took time to get mobilized...barges, space a ports, lodging, life support

Cobra lived on two barges and had the hardest hit part of the island and most of the transmission worked so that worked for them.

PowerSecure had the western portion of the island Mayaguez and had really neat travel trailers and that worked for them.

Creativity was the name of the game.

Where we are today?



GOVERNMENT OF PUERTO RICO

COR



FEMA

Municipality Map

98.47% restored; 1.53% remaining
22,562 customers still without power



Porcentajes en servicio:



*El porcentaje indicado en los municipios representa el porcentaje aproximado de clientes en servicio a nivel de alimentador de dicho municipio en base al total de clientes en el municipio.

RESUMEN MUNICIPAL

As long as people don't have power, we are not satisfied.

Current Focus

- 1) Restoring the remaining 1.56% of customers
- 2) Transitioning management of the restoration back to PREPA for completion
- 3) Preparation for upcoming hurricane season

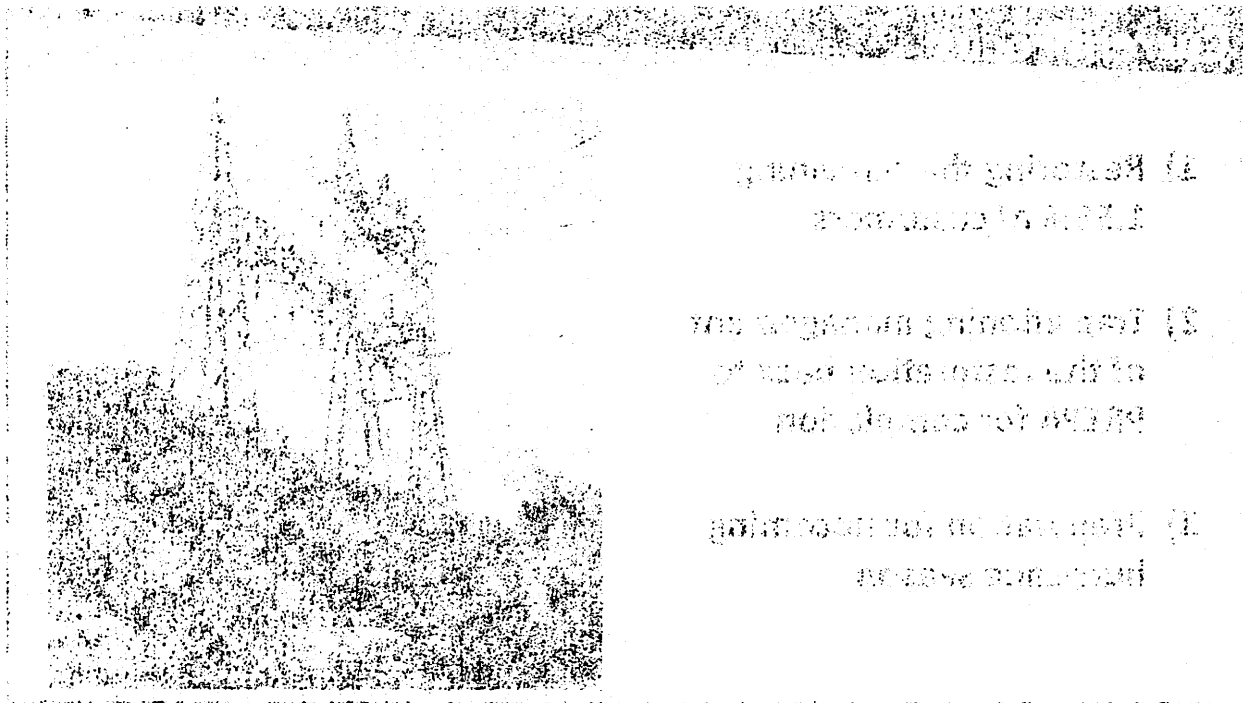


Restoring the remaining 1.53% of customers

Transitioning management of the restoration back to PREPA for completion

Preparation for upcoming hurricane season

NO!



1) Restoring the remaining
1.23% of the

2) The amount of the
of the amount of the
of the amount of the

3) The amount of the
of the amount of the

Restoring the remaining 1.23% of
customers

Transitioning management of the
restoration back to FEMA for completion

Preparation for upcoming hurricane

season

10/1

Where are we going?



GOVERNMENT OF PUERTO RICO

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FEMA

Vision Statement

Deliver a modern, reliable, and resilient power system for the people and businesses of Puerto Rico to support an enduring economy and future-ready island.



GOVERNMENT OF PUERTO RICO

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 **FEMA**

Energy Sector Solutions Team



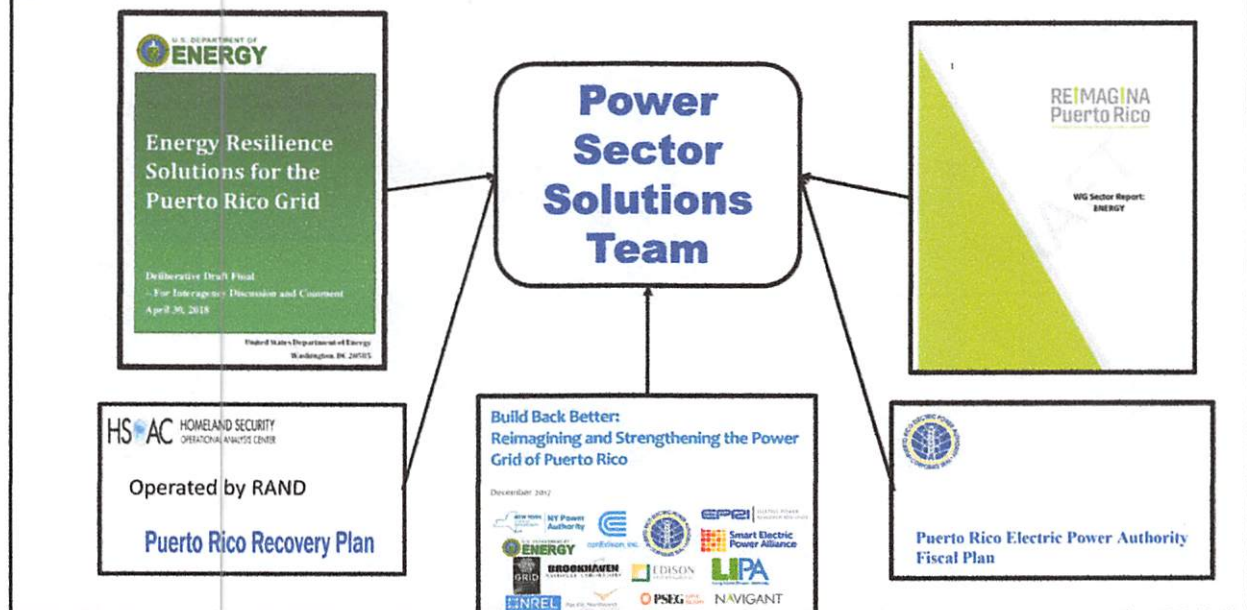
Which brings us to one of the main objectives the summit!...The Energy Sector Solutions Team: to imagine holistic solutions for the entire energy infrastructure on the island.

It is made up of federal agencies, industry, and stakeholders...some will be permanent here on the island, and others will be remote.

They will challenge us. Find creative solutions. Engage experts. And keep us legal!

The goal is to have a team with access to the most effective, innovative, and cutting edge technologies to build a future ready grid.

Planning for Reconstruction



We will use reports that have been developed to support decision making such as these on the slide.

The Commonwealth, NY State and partners, RAND, DOE, 100 resilient cities, and others who have been thinking about the grid here in PR.

Begin Permanent Work

- Establish Solutions Team (co-lead by COR3 and FEMA)
- Review reports/Summit results
- Retain diverse design engineers
- Scoping early projects
 - Distribution System Vieques and Culebra
 - 230KV Loop around the mainland

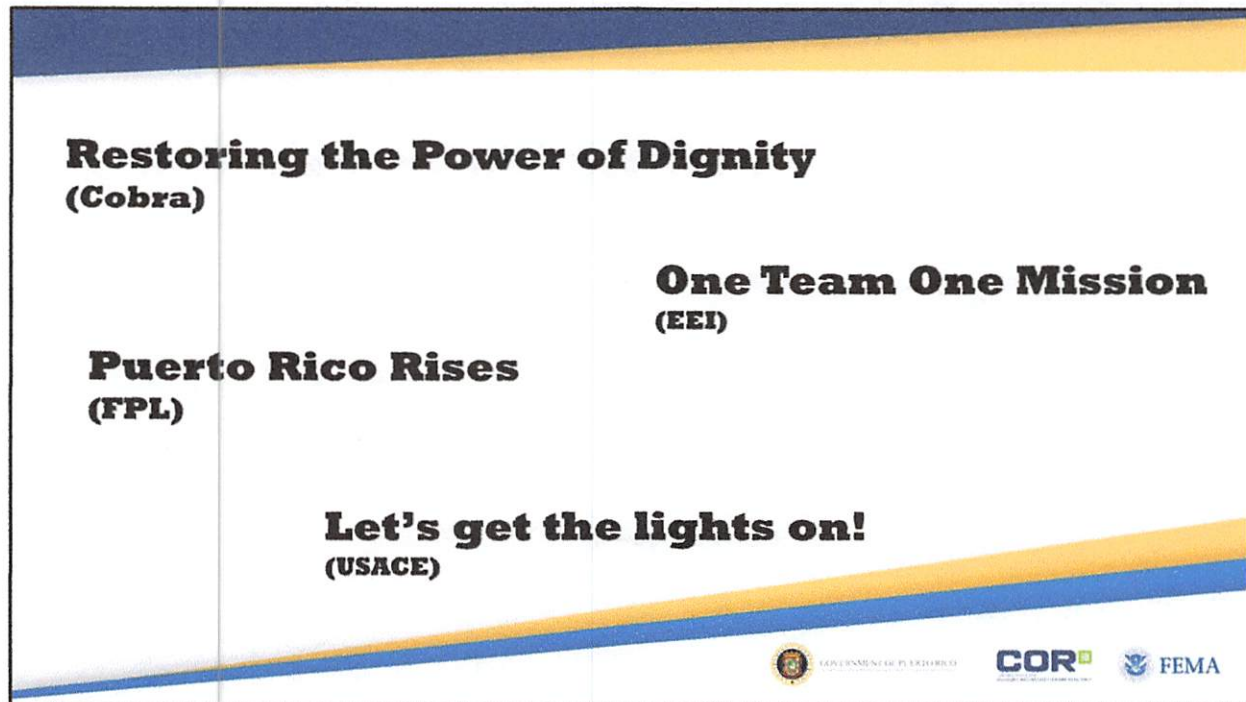


GOVERNMENT OF PUERTO RICO

COR



FEMA



We will work together in support of the Commonwealth and do what is right for the businesses and people of Puerto Rico.

Again, I want to thank everyone for being here and **we look forward to your input and questions.**

A photograph of construction workers in a construction site. In the foreground, a worker wearing a yellow hard hat with 'LUIS + 07280' on it, a light grey long-sleeved shirt, and yellow work gloves is lifting a large, dark wooden beam. Another worker in a yellow hard hat and gloves is visible in the background, also working with the beam. The background is slightly blurred, showing other construction elements. The image is framed by a dark blue diagonal band at the top and a blue diagonal band at the bottom.

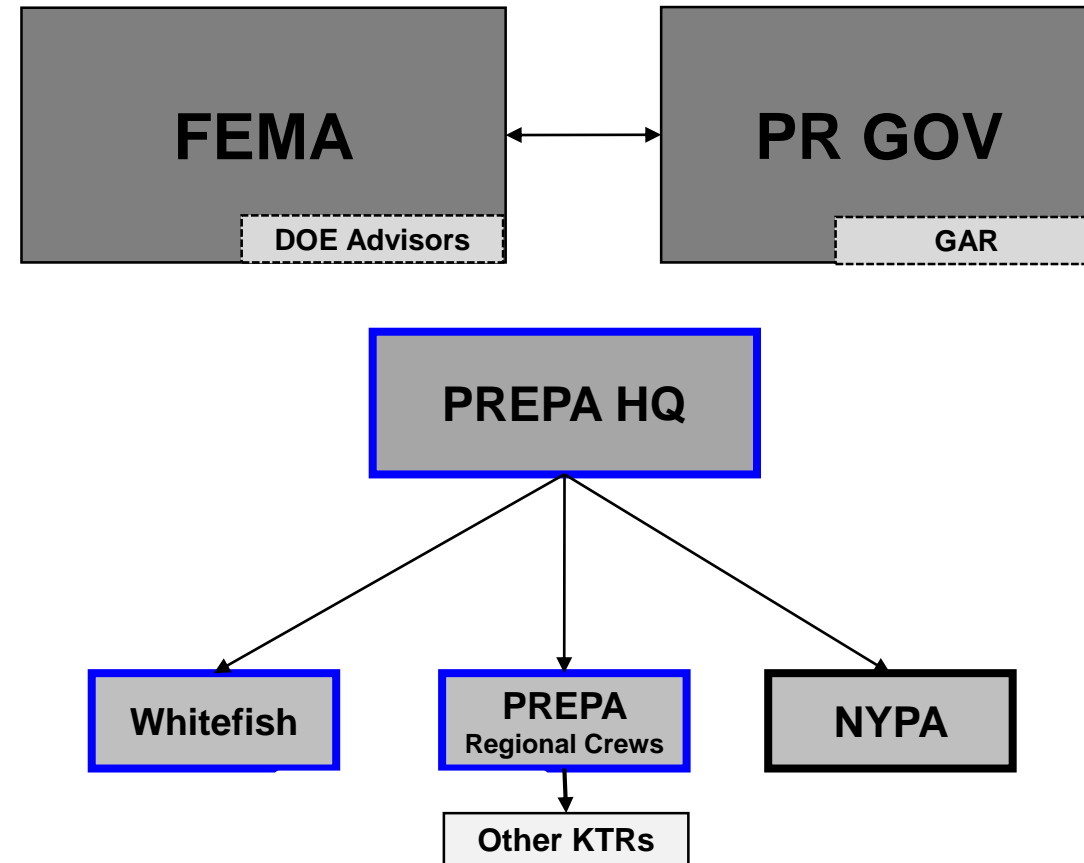
REBUILDING PUERTO RICO ENERGY SECTOR

October 23, 20

Grid Restoration Task Org

LANDFALL – October 2017

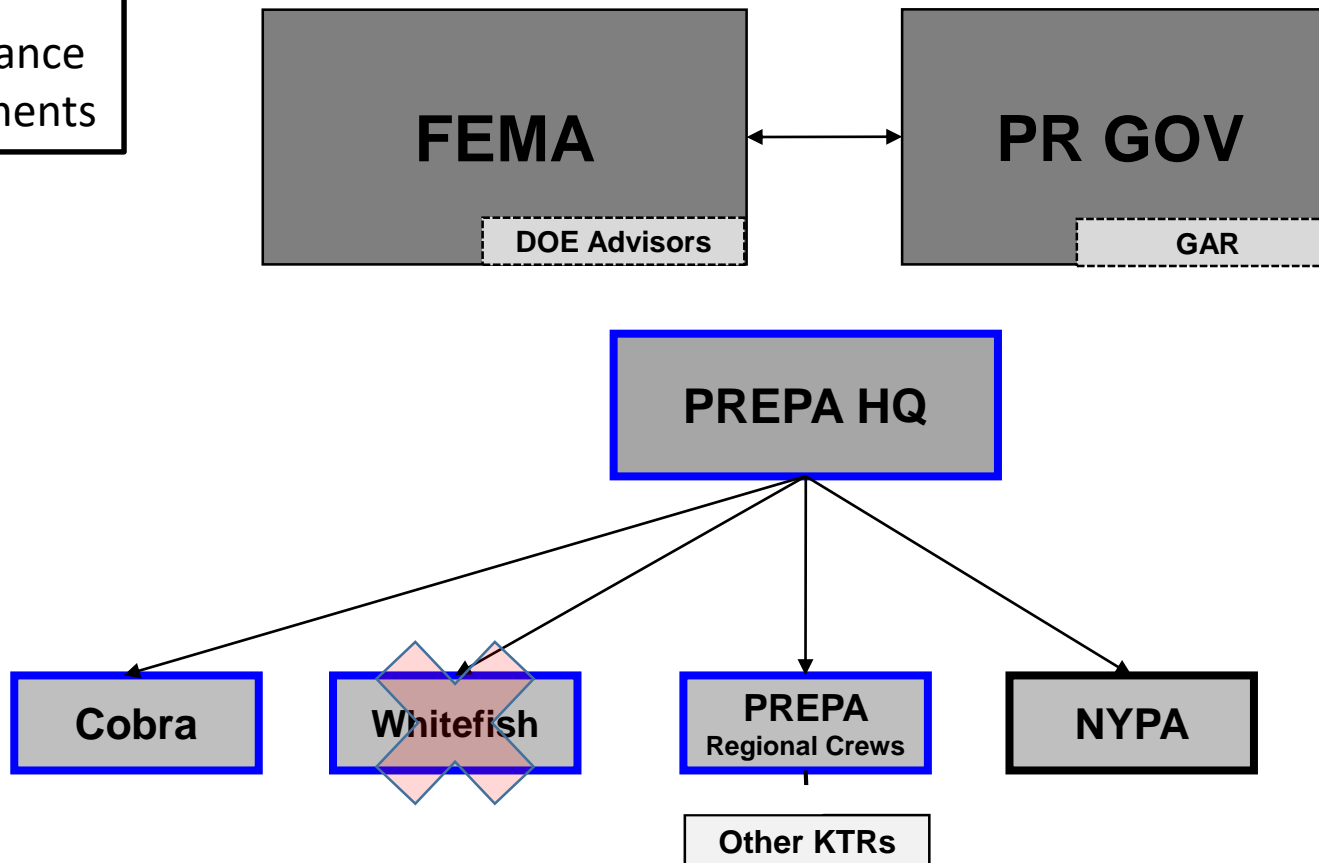
- Very limited communications
- Limited assessment capability
- No mutual aid agreements
- Bankrupt (no credit line)
- Mission Assignment to USACE
- Limited materials/requirements



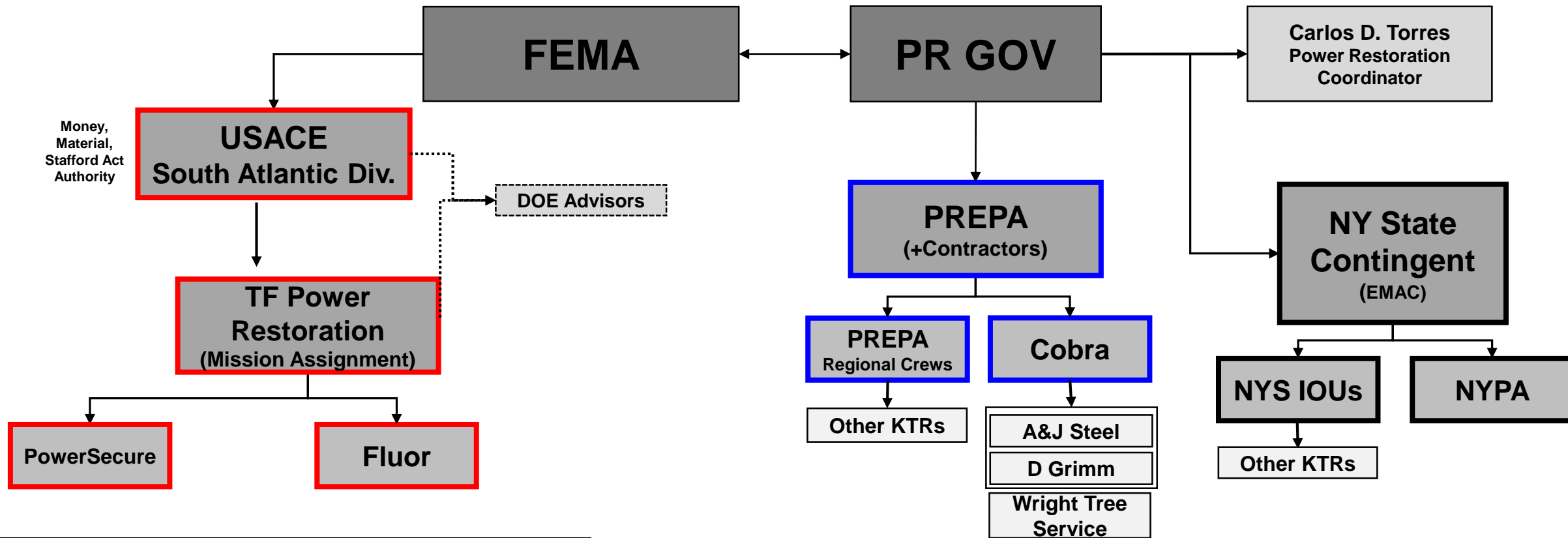
Grid Restoration Task Org

Late October – Early November 2017

- Whitefish contract questioned
- Cobra Energy contract (500pp)
- Assessments underway
- Discussing EMAC, Mutual Assistance
- Still validating material requirements



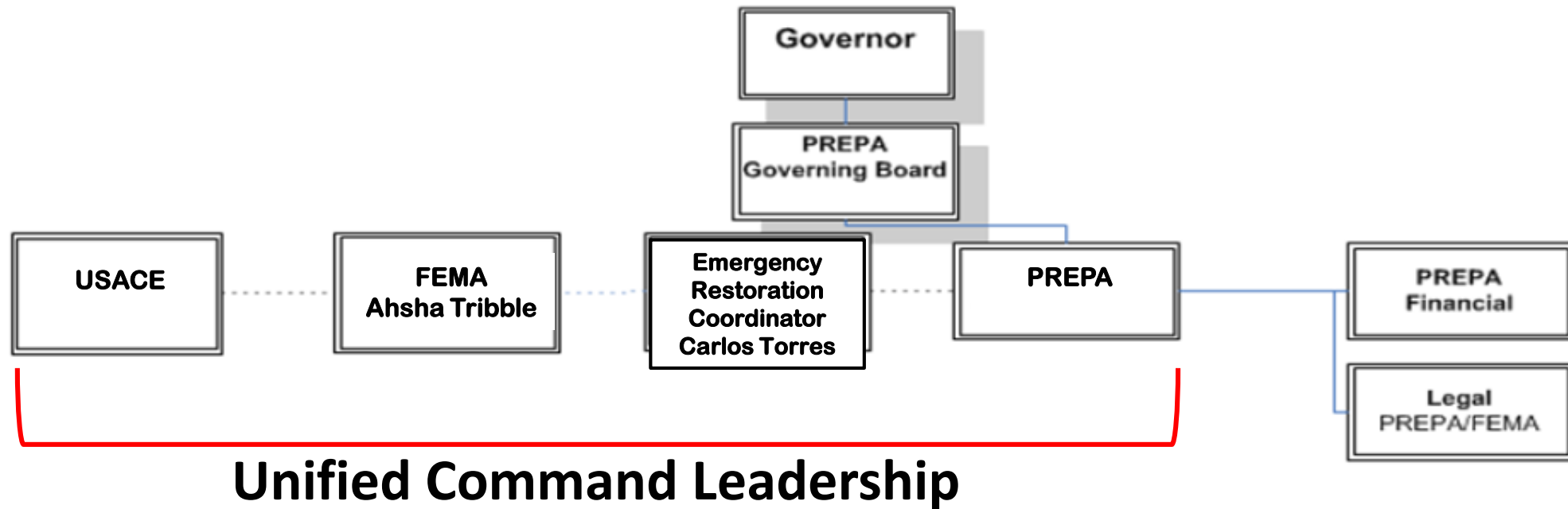
Grid Restoration Task Org



November 2017 – December 2017

- USACE contractors on the ground
- EMAC executed with NY State
- Materials enroute
- Power Restoration Coordinator on the ground
- Mutual Assistance MOU signed

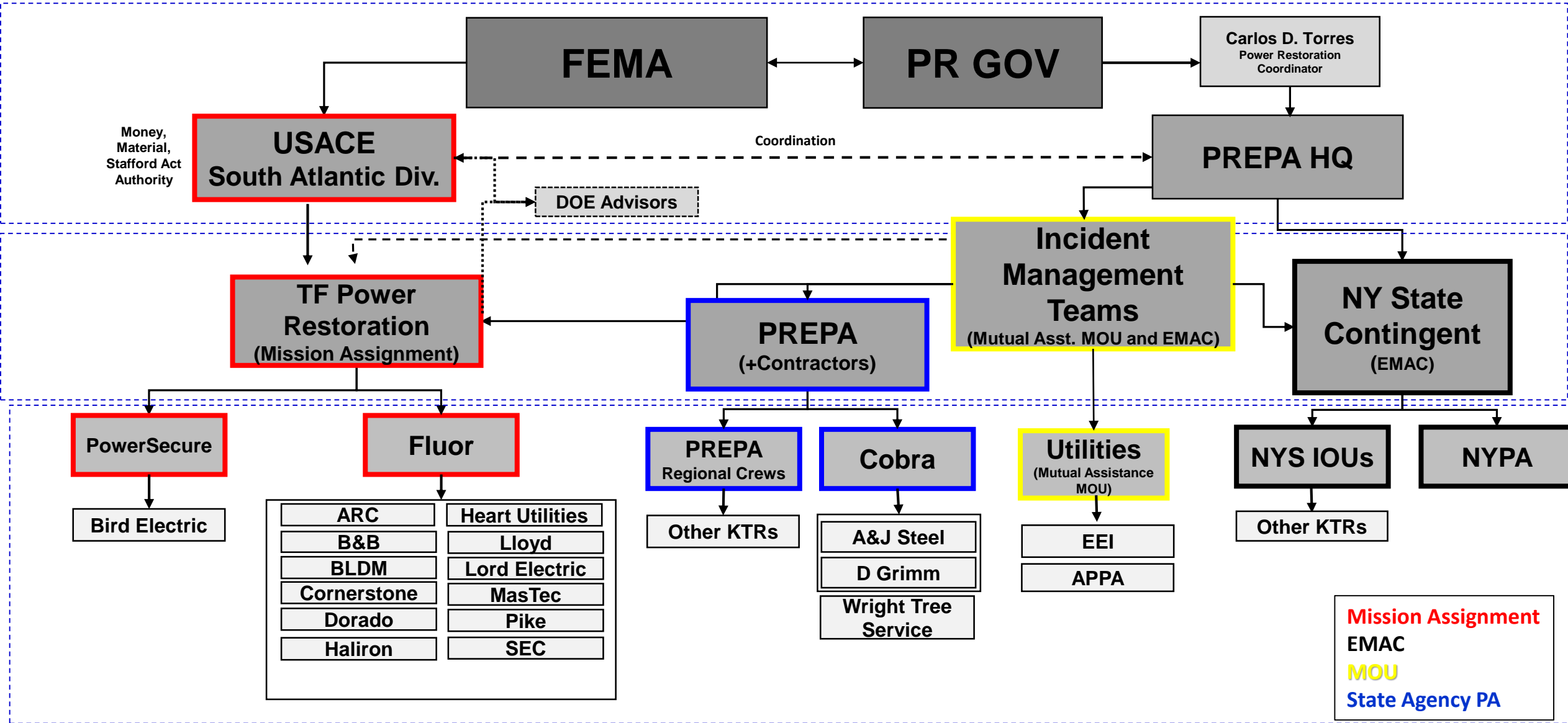
Unified Command Group



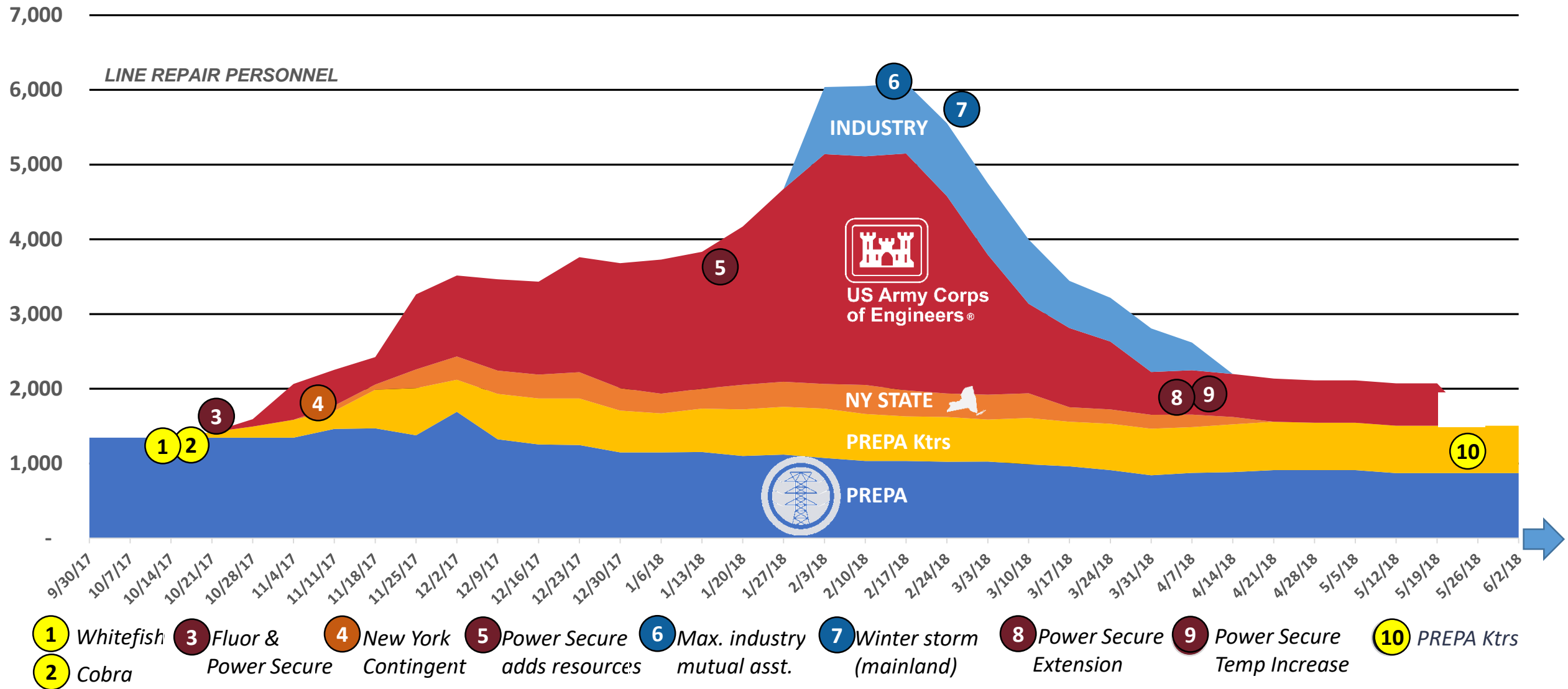
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Grid Restoration Organization



Line Personnel



INTERNAL FEMA ESTIMATES NOT FOR PUBLIC RELEASE

FY 2018 Power Restoration

Puerto Rico Temporary Power Restoration Grid Obligations and Estimates As of October 2018				
USACE Mission Assignment		Expenditures	Unliquidated Balance (ULO)	(ULO) %
Obligated	\$ 2,003,600,000.00	\$ 749,787,338.30	\$ 1,253,812,66.70	63%
Additional Estimated Obligations for Year 2018	\$ 51,000,000.00	N/A	N/A	
USACE Mission Assignment TOTAL	\$ 2,054,600,000.00	\$ 749,787,338.30	\$ 1,304,812,661.70	
PREPA				
PREPA Obligated Totals	\$ 1,481,761,897.55	\$ 931,148,264.04	\$ 550,613,633.51	37%
PREPA Force Account Labor	\$ 45,000,000.00	\$ 45,000,000.00	\$ -	0%
Cobra Contracts	\$ 1,195,429,800.00	\$ 747,632,363.08	\$ 197,797,436.92	17%
Obligations for Year 2018 & 2019 (1st quarter)	\$ 1,827,960,520.00	N/A	N/A	
New Cobra Contract	\$ 450,000,000.00	N/A	N/A	
New MasTec Contract	\$ 152,400,000.00	N/A	N/A	
IOU Mutual Aid Agreements	\$ 405,260,486.00	N/A	\$ 405,260,486.00	100%
Emergency Management Assistance Compact (with New York State)	\$ 232,000,000.00	N/A	N/A	
PREPA Force Account Labor / Equipment / Materials	\$ 322,183,157.00	N/A	N/A	
PREPA Totals	\$ 3,309,722,417.55	N/A	N/A	
Grand Total	\$ 5,364,322,417.55	N/A	N/A	

Key Actions

- On May 18, USACE completed its line restoration work, and the remainder of the work was transferred to PREPA's new competitively bid contract.
- On May 25, Carlos Torres departed (~95% restored, ~13,000 customers remaining).
- On July 13, PREPA CEO Mr. Walter Higgins resigned, and soon thereafter the UCG was disbanded (with remaining emergency work to complete).
- On July 18, Mr. Ortiz was named the 5th PREPA CEO in 10 months.
- On July 19, FEMA requested final list of emergency work.
- On August 14, PREPA announced all customers restored.

Next Steps










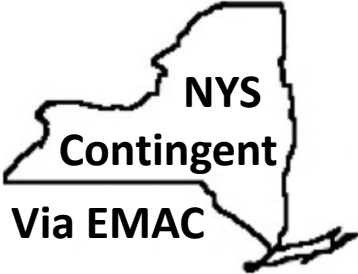






- 1) **Validating and completing Category B work**
- 2) **Vieques/Culebra distribution project (428)**
- 3) **Process for permanent work (UNDECIDED)**
 - Privatization
 - Generation vs T&D
 - Concessionaire versus receivership

***Major issue is current planning is focusing on what fits FEMA funding or what OIG might deobligate, which is limiting a full planning effort for the island.*



BACK UP SLIDES

Restoration Support to PREPA

GENERATION	TRANSMISSION	SUBSTATIONS	DISTRIBUTION (+ Sub-Transmission)
	<div></div> <div> Via EMAC</div> <div></div> <div><div></div><div>Via FEMA Mission Assignment</div></div>	<div> Via EMAC</div> <div></div>	<div> Via EMAC</div> <div></div> <div><div></div><div>Via FEMA Mission Assignment</div></div> <div><div> Edison Electric INSTITUTE</div><div></div><div>Via Mutual Assistance</div></div>

Puerto Rico: Hurricane Maria Presentation to PIA

Dr. Ahsha N. Tribble

Deputy Regional Administrator, FEMA Region II

PR: Infrastructure Lead; Energy Sector Chief



FEMA

Photo credit NOAA/NASA

August 16, 2018

Information herein is solely to share estimates with PIA partners.

Hurricane Maria

Historic Response



- 3+ million people without power over 30 days
- More than double generators installed than Hurricane Katrina

- Strongest hurricane to hit Puerto Rico in 85 years
- Longest-lasting power outage affecting the most people in modern U.S. history



Longest sustained domestic air mission of food and water in U.S. history

62 days



Largest disaster air mission in U.S. history

Sorties 4,679



Largest disaster commodity mission in U.S. history

**72.97 million liters of water,
63.24 million meals and continuing**



Largest disaster generator mission in U.S. history

2,044 generators installed



One of, if not the, largest disaster medical response missions ever

38,037 patients cared for



One of, if not the, largest disaster housing missions in U.S. history



The largest sea-bridge operation in U.S. history

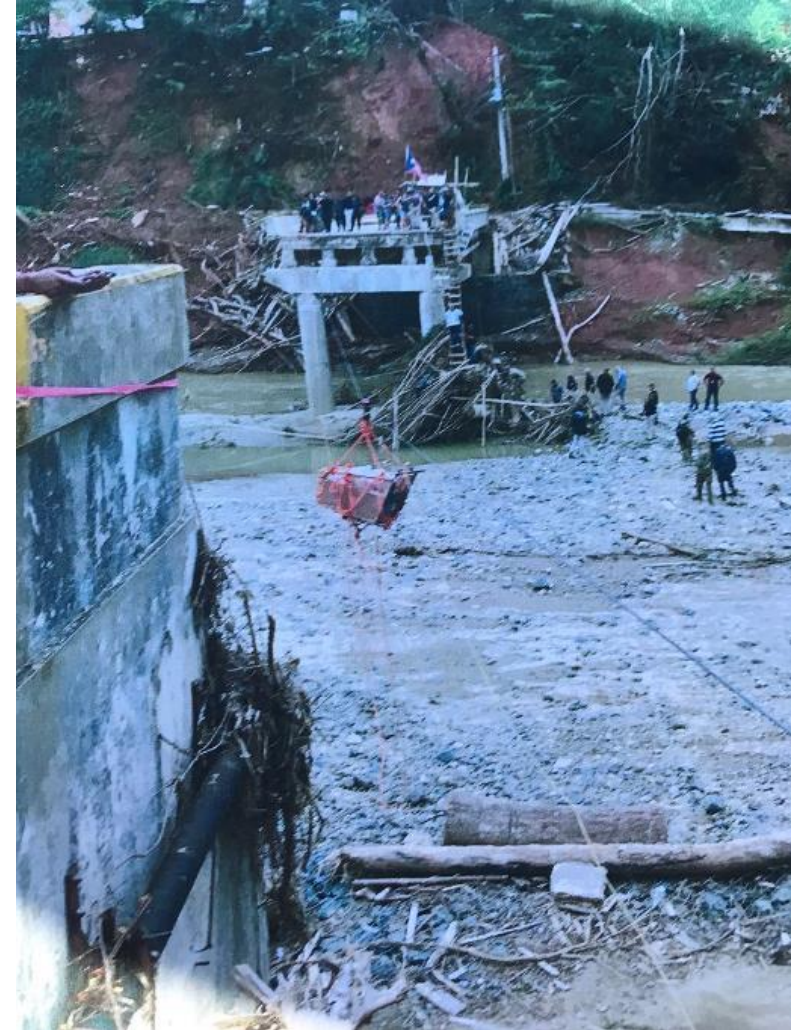
Response to Recovery

- **99.5 percent** water service restored.
- **99.9 percent** electric service restored.
- **\$1.38 billion** in federal grants approved for **462,000** homeowners and renters.
- **\$1.76 billion** in low-interest disaster loans from the U.S. Small Business Administration approved for more than **50,188** businesses and residents.
- **\$21 million** in NFIP flood claims paid.
- **59,465** temporary roofs installed by the U.S. Army Corps of Engineers (USACE).
- **7.98** million cubic yards of debris removed.



Response to Recovery

- **\$3 billion** in FEMA Public Assistance funding obligated.
- **\$79 million** for increased enforcement of a stronger building code.
- **\$210 million** in **Community Disaster Loans** obligated for **51** municipalities.
- **57,146 Tu Hogar Renace (STEP)** home repairs completed.
- **969 VALOR (Voluntary Agencies Leading and Organizing Repairs in Puerto Rico)** home repairs completed.
- **\$20 billion** obligated by the U.S. Department of Housing and Urban Development (HUD) for disaster-related Community Development Block Grants to Puerto Rico to provide resources for housing and infrastructure recovery.

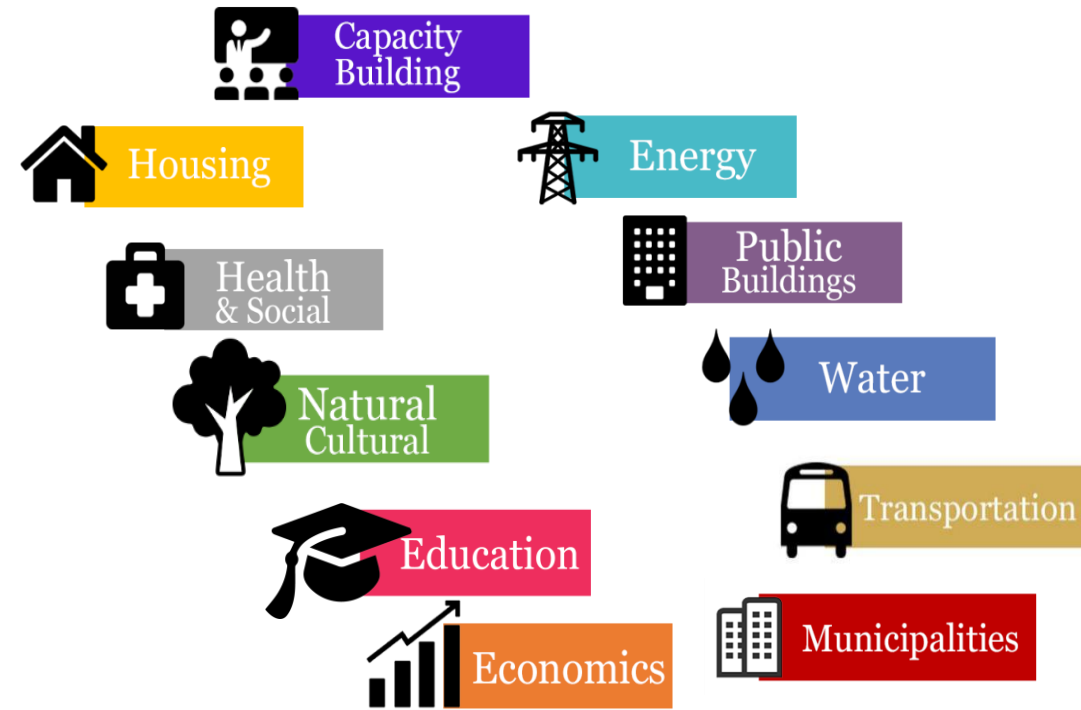


HoPE-PR

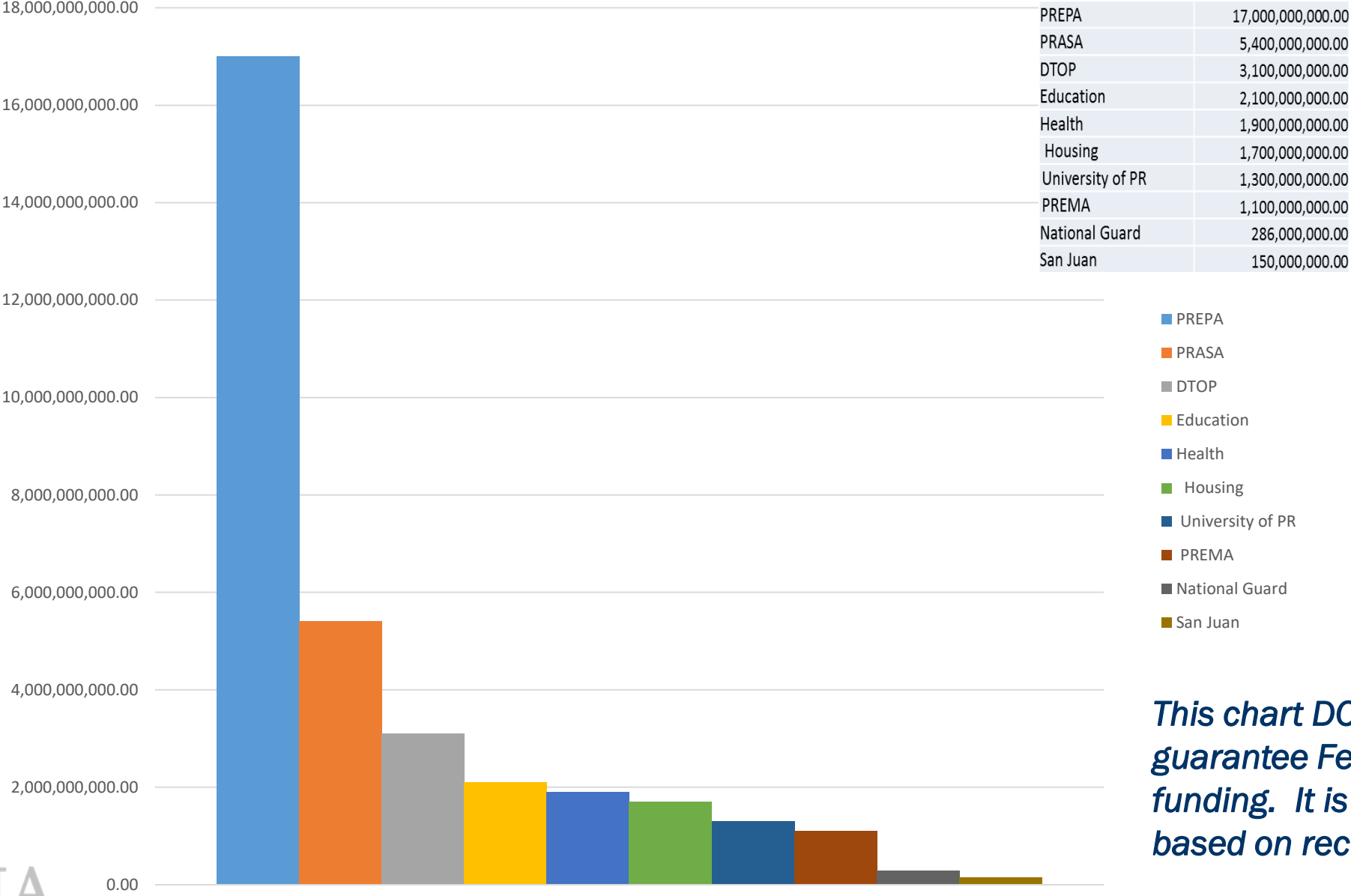
- Recovery requires resources that exceed government capabilities.
- FEMA launched the **Hub of Philanthropic Engagement** to connect disaster survivors and communities with philanthropic organizations that can accelerate recovery.
- Serves as a bridge between donor/service provider community and recovery needs.
- HoPE-PR is aiming for \$200 million in philanthropic contributions to recovery.

Going Forward

- FEMA organized into 12 sectors to match Recovery Support Functions.
- Emphasis is on the best solution, not rebuilding what was previously there.
- Requires input from local, federal, industry experts, academics and non-governmental organizations.
- Disaster Recovery presents opportunities to support and enhance the ultimate economic recovery of Puerto Rico.



ESTIMATED Top Ten Public Assistance Applicants *



This chart DOES NOT guarantee Federal funding. It is an estimate based on recovery plans.



2018 Hurricane Season Preparations

Planning & Training

- FEMA has 3,000 federal employees in Puerto Rico ready to respond to a new disaster.
- FEMA is providing training and technical assistance to the Puerto Rico Emergency Management Bureau and the 78 municipalities.
- 74 of the island's 78 municipalities developed recovery plans with the support and guidance of FEMA incident management teams.
- A joint Hurricane Conference was held with the island's governor, cabinet, mayors and emergency managers on debris management and lessons learned from Hurricane María, and to discuss infrastructure issues and commodity distribution for the 2018 hurricane season.

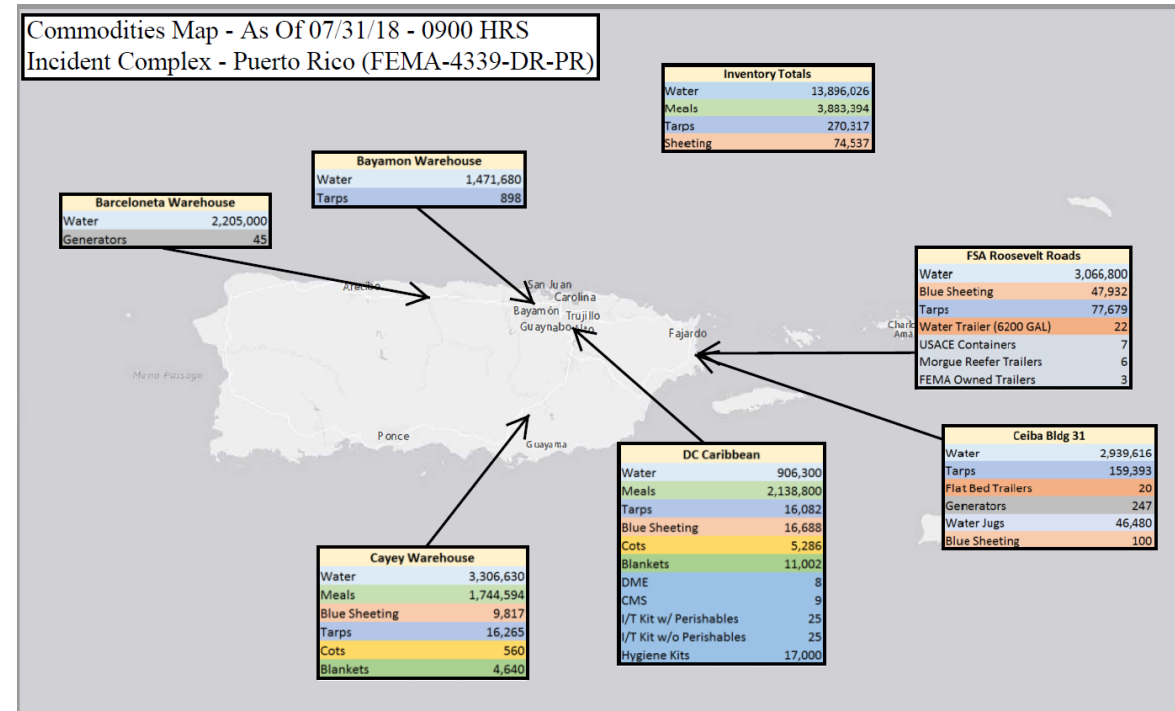


2018 Hurricane Season Preparations

Commodity Distribution in Puerto Rico

- **Puerto Rico:**

- 13.89 million liters of water
- 3.8 million meals
- 270,317 tarps
- 74,537 rolls of plastic sheeting
- 600 generators
- 15,642 blankets
- 5,846 cots
- 50 Infant and toddler kits



FEMA

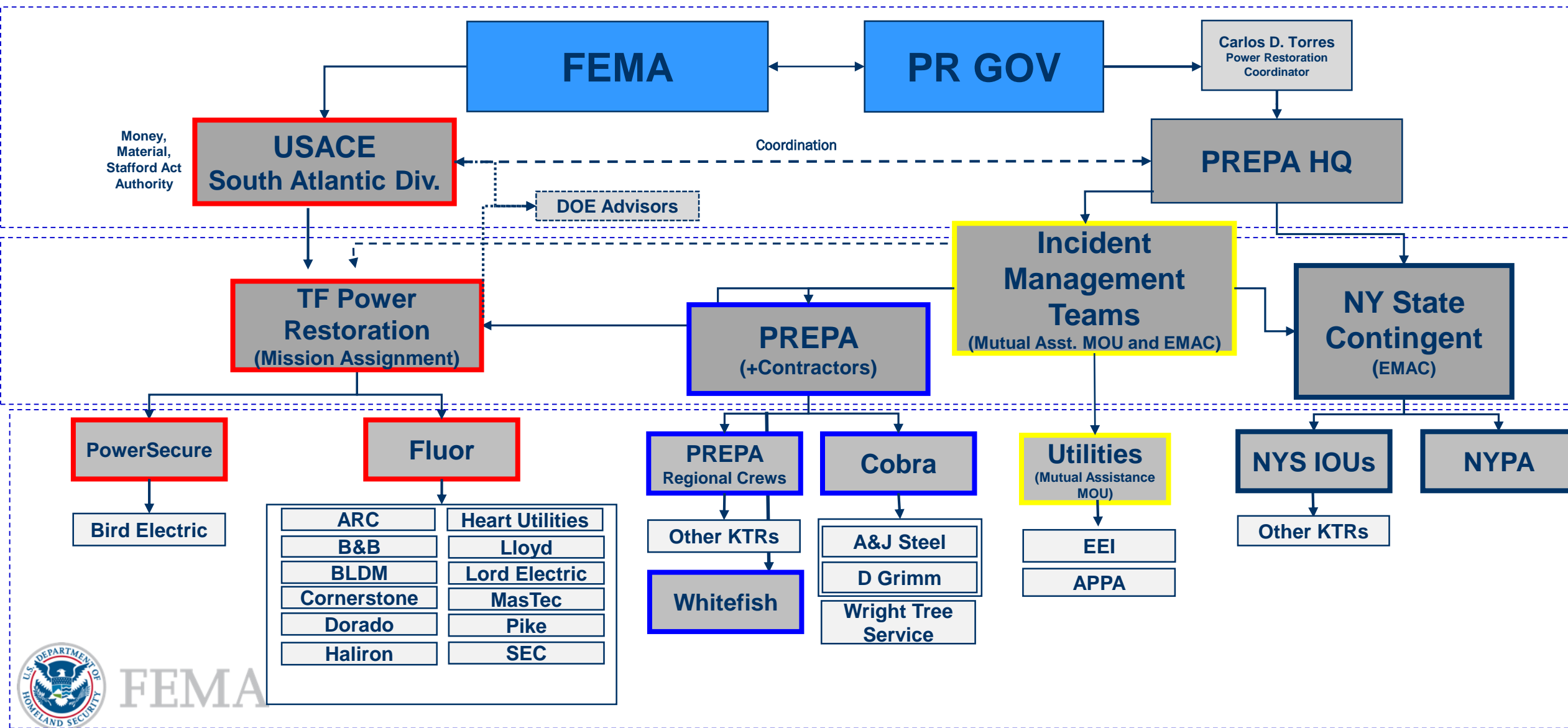


2018-2022
Strategic Plan
Helping People. Together.

Task Force Power Restoration

Power Restoration Visualization

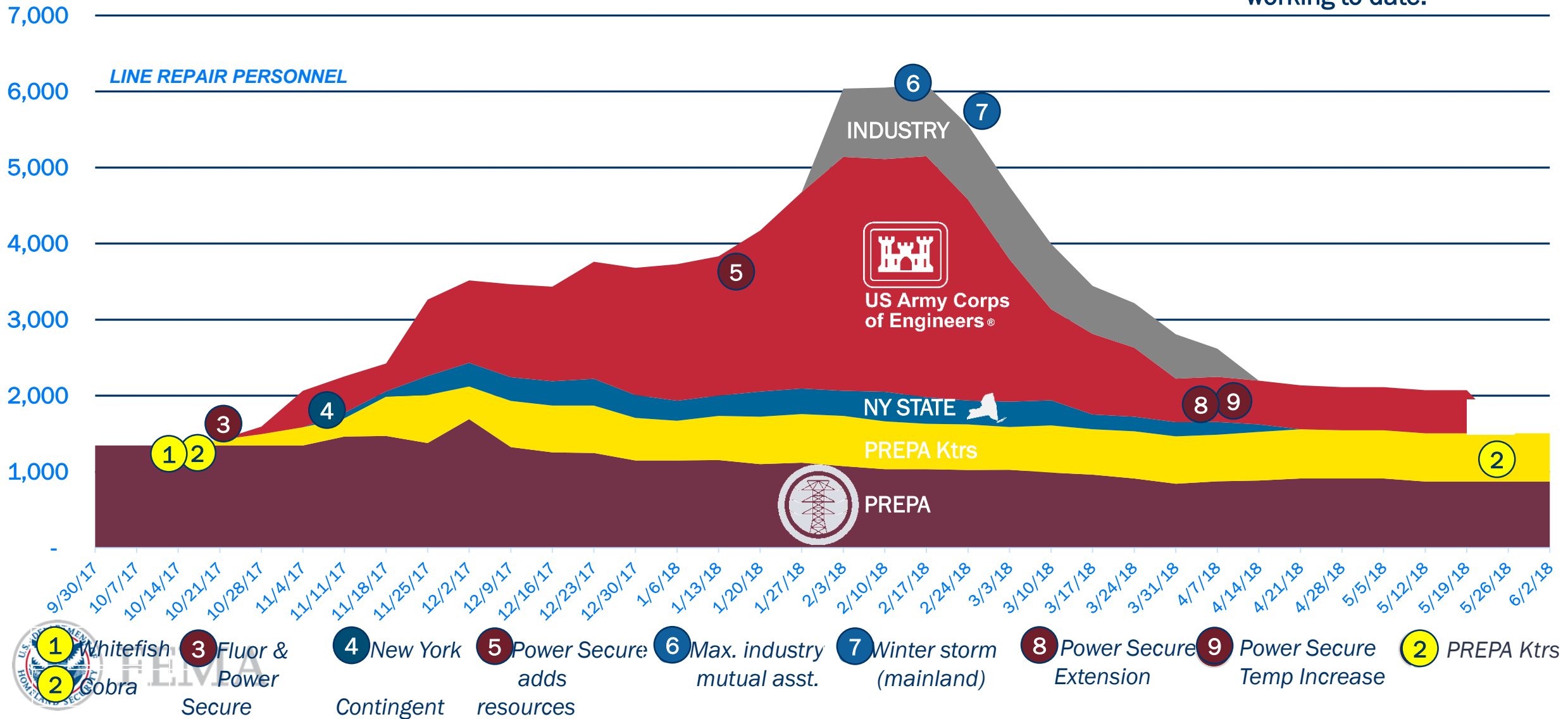






FEMA

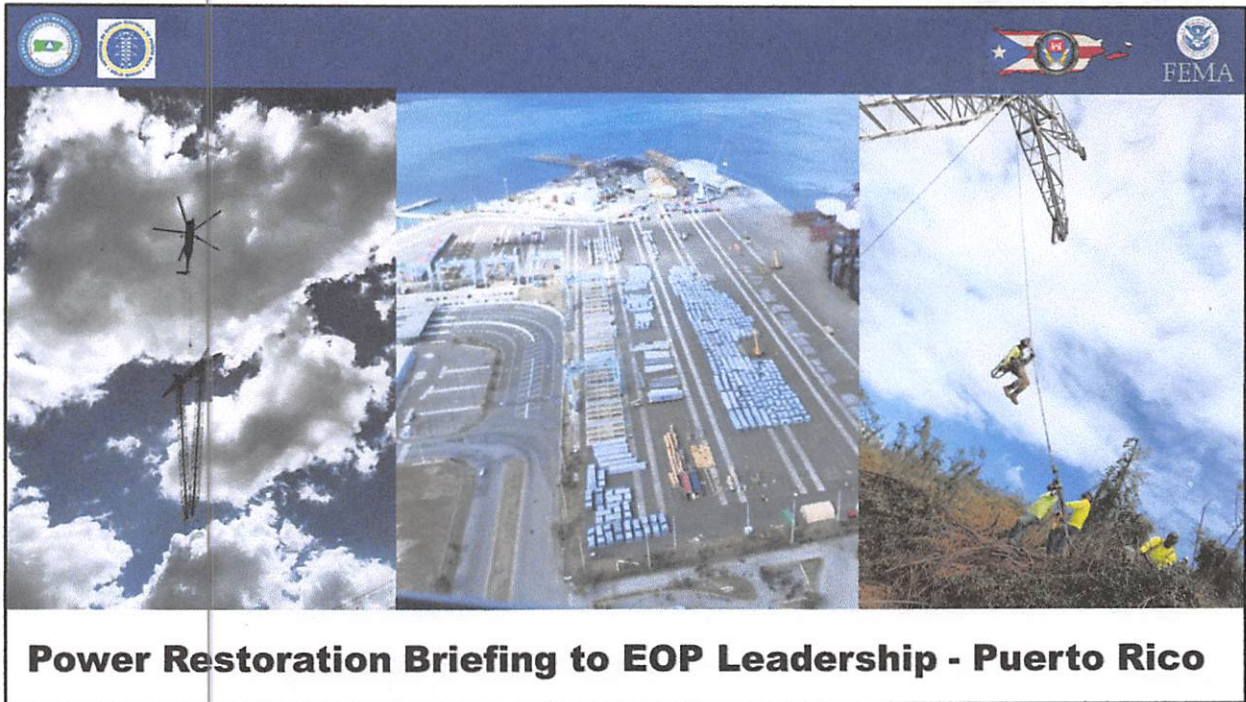
PREPA and Cobra remain working to date.



What's next

- Completion of Emergency Work
- Puerto Rico Recovery Plan (RAND report)
 - <http://www.p3.pr.gov>
- PREPA's Integrated Resource Plan
- Proposed Priority Projects
 - Vieques/Culebra Distribution Project (in progress)
 - San Juan Critical Facilities Distribution Project (approved for scoping)
 - **Manufacturing Corridor Project (approved for scoping)**
 - Propose meetings over the next few weeks
 - Site visit on Aug 28 or 29 (suggestion)





Thank you for the opportunity

We work as a team, so we have Carlos Torres (island restoration coordinator), COL Kirk from USACE, and Jeff Miller (DOE) to update you on the power situation.

We get hit pretty hard from all sides, so we hope to answer your questions and get you comfortable with where we are

We will start with an overview of typical power restoration and debunk some of the statements about mutual aid and contractors

We will give you an update on structure and status

Close with challenges and next steps

- Need much capital
 - design system & don't assume owner by opt
 - risk management
 - repetition loss cycle
 - hardening

- engineering solution (
- design
- generation



COW MAP to play while we do the introductions

map 9/10 - 3/15

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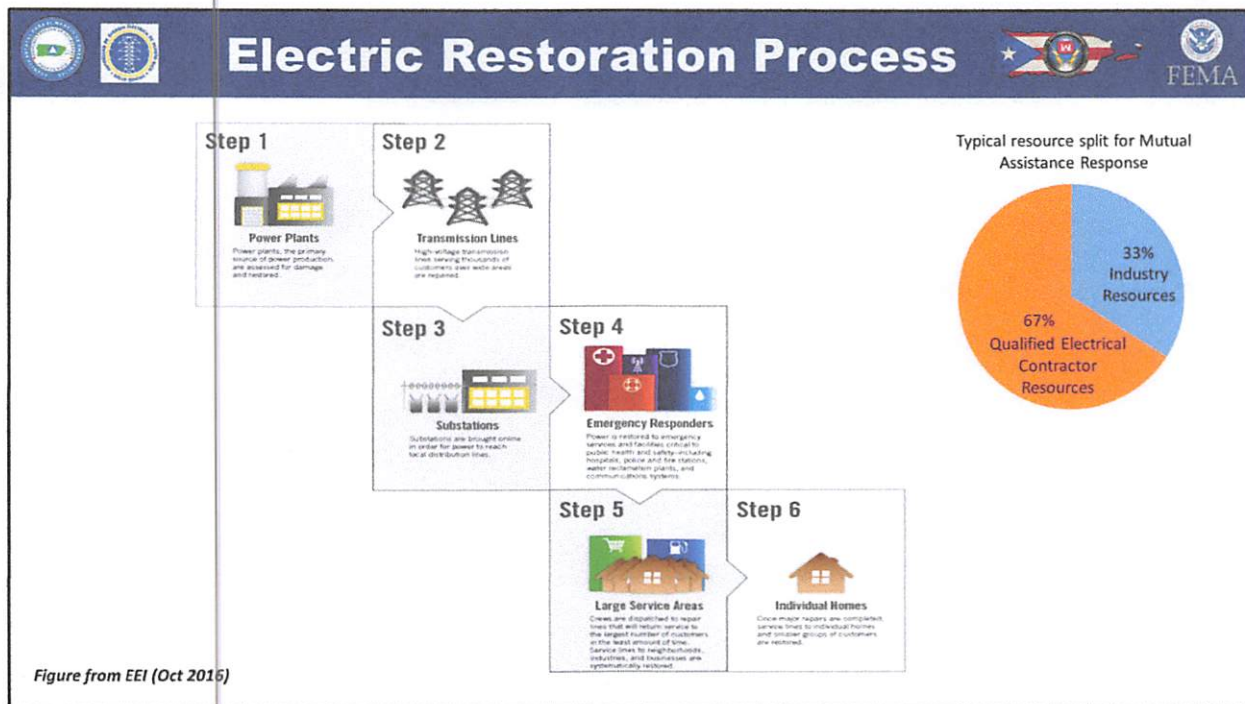
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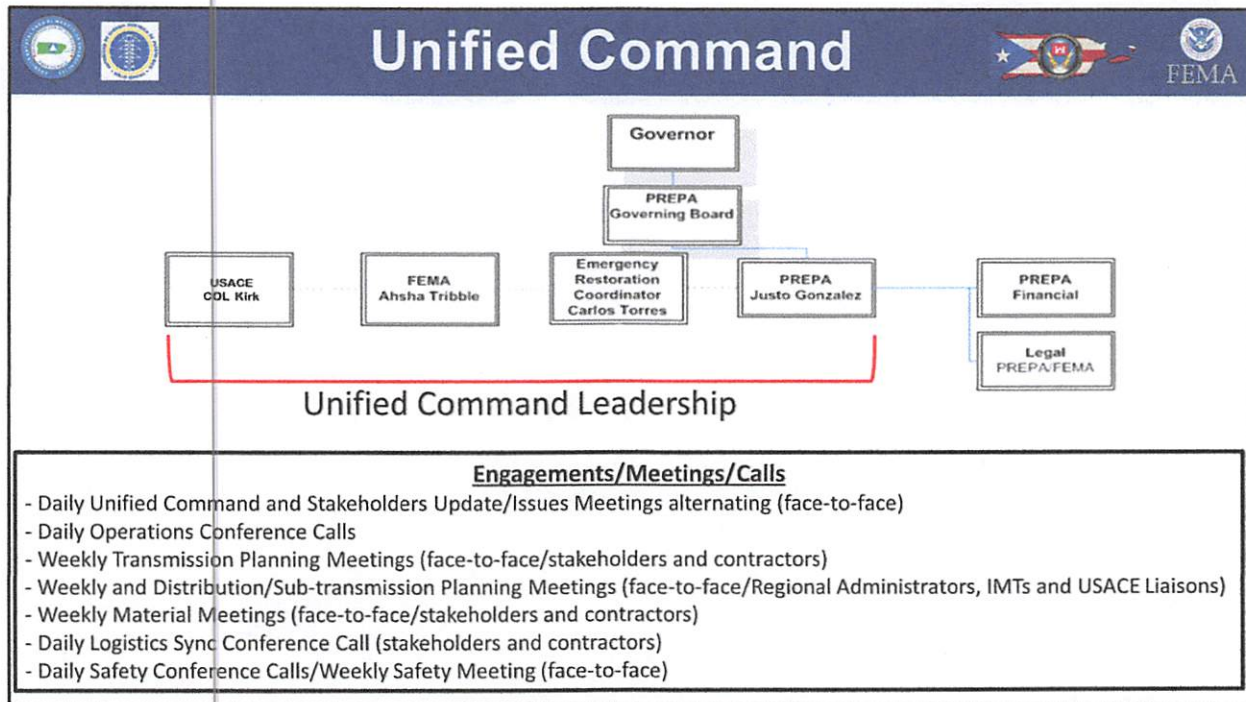
We will give you an update on structure and status

Close with challenges and next steps

TURN TO CARLOS



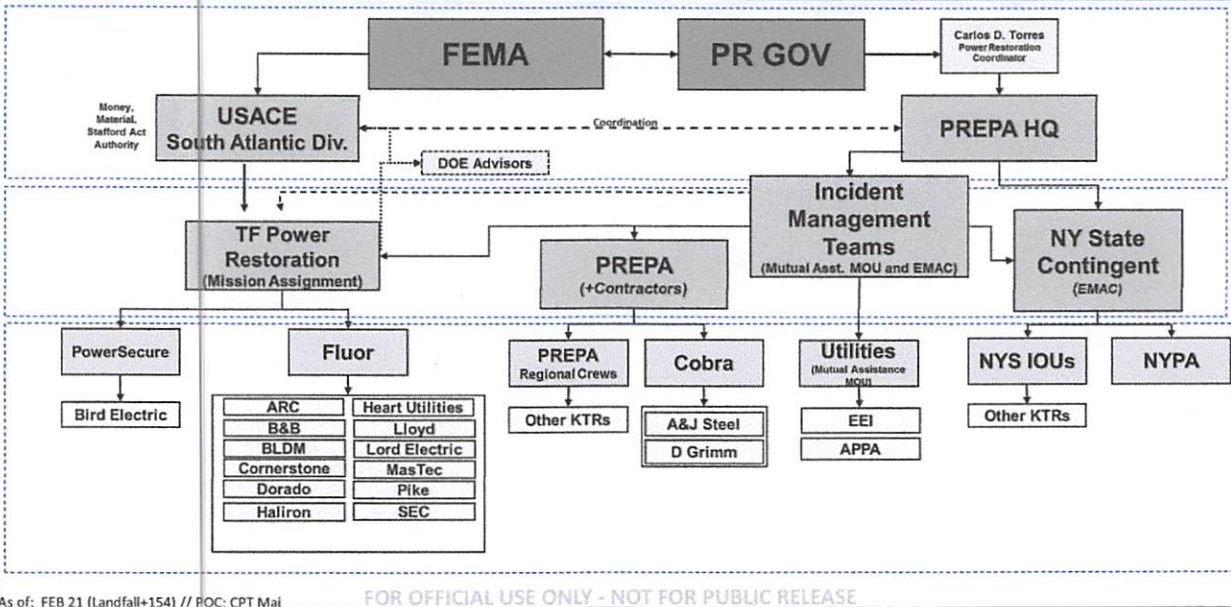
Contractors are critical for transmission and most other types of restoration
 APPA does not do transmission




















While USACE received the mission assignment for emergency restoration, PREPA was also letting contracts.



































Grid Restoration Task Org

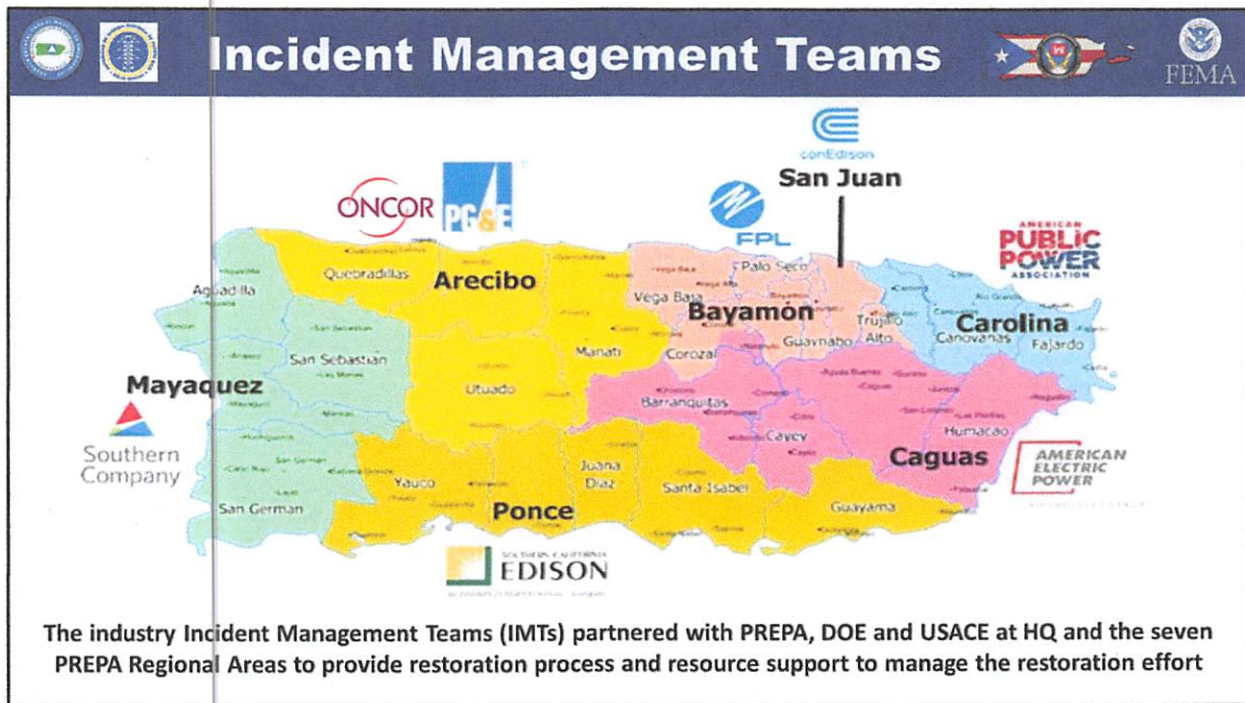


<div>   Restoration Support to PREPA   </div>			
GENERATION	TRANSMISSION	SUBSTATIONS	DISTRIBUTION (+ Sub-Transmission)
	  Via EMAC   Via FEMA Mission Assignment	 Via EMAC 	    Via FEMA Mission Assignment   Via Mutual Assistance

NYPA is part of NYS Contingent
ADD NUMBERS

LOG
95

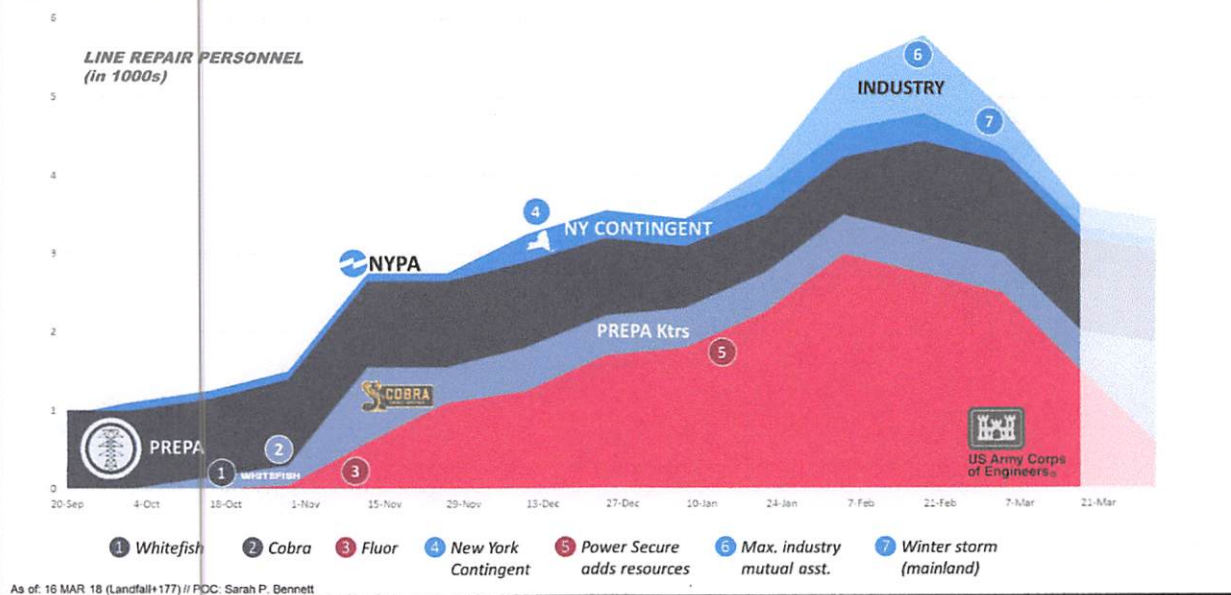
    	   	   	  
DISTRIBUTION	TRANSMISSION	GENERATION	GENERATION
    	   	   	  



You need to talk about what they do (planning, log, ops, etc.)



Line Repair Personnel





Current Restoration Statistics

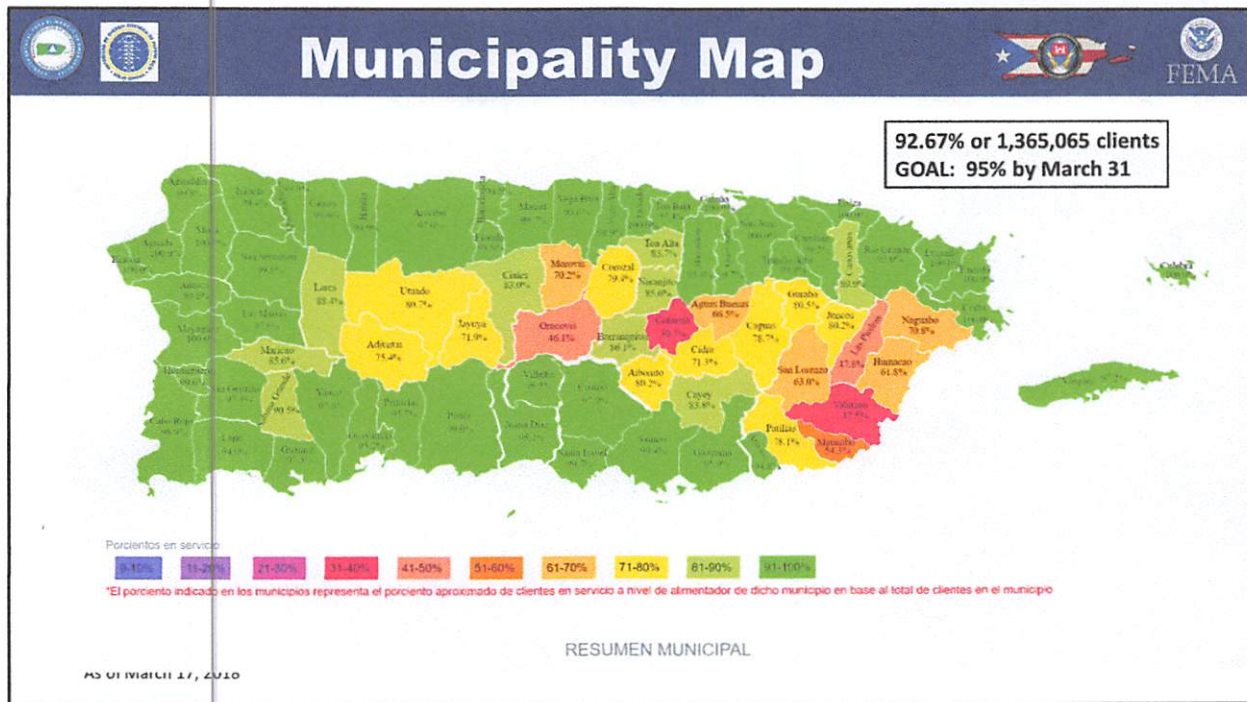


7 PREPA Regions	Arecibo	Bayamon	Caguas	Carolina	Mayaguez	Ponce	San Juan	Puerto Rico
% Clients Restored	93.80%	92.72%	65.25%	96.75%	98.13%	96.49%	99.93%	92.67%

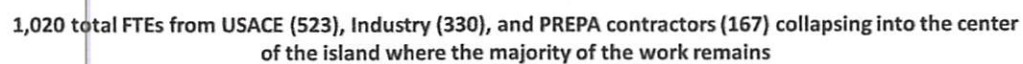
Line Resources (Peaked at 5,998 on 2/15/18) FTEs=Full-Time Equivalents		Distribution	Transmission
PREPA		768	142
PREPA Contractor (Cobra)		376	271
USACE Mission Assignment (Fluor and Power Secure)		710	170
EMAC (New York State Contingent)		193	0
Industry Mutual Assistance MOU (Electric Industry)		593	0

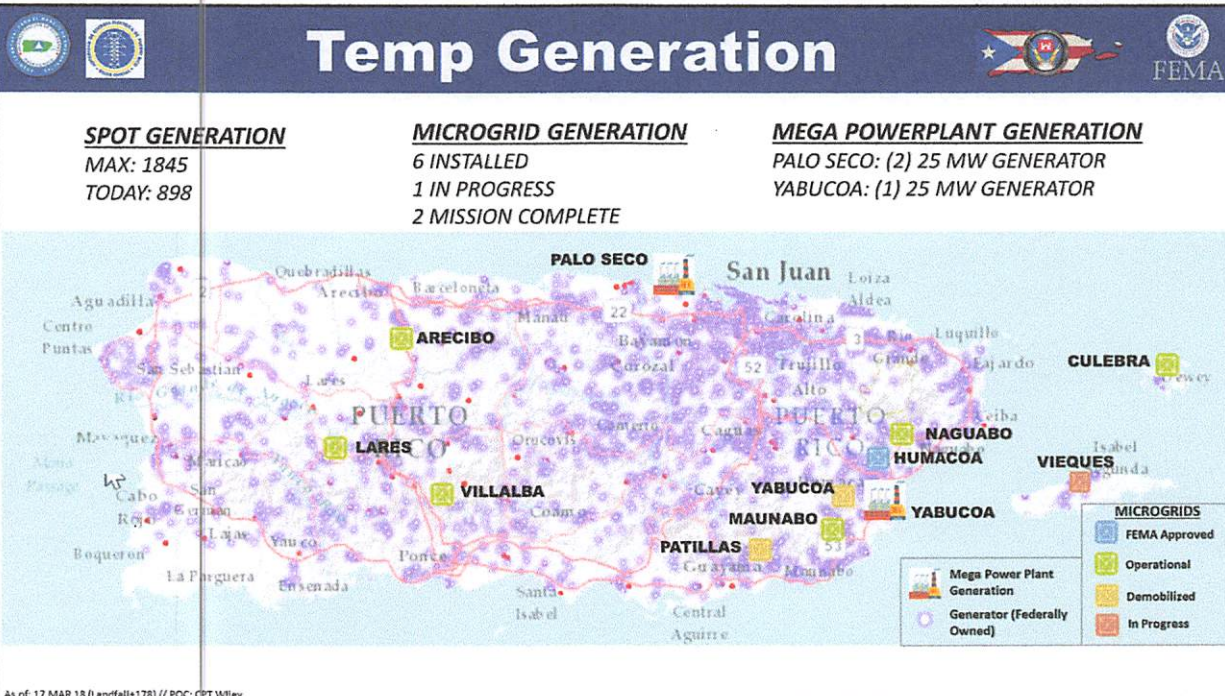
Infrastructure	System Total	Energized	Percent Energized
Transmission Lines	103	71	69%
Sub-Transmission Lines	319	191	60%
Substations	345	322	93%
Distribution Circuits	1162	841	72%

As of March 15, 2018



NEED MUNICIPALITY MAP







Key Challenges



- Unknowns
 - Houses that cannot take power
 - Material/equipment issues in the mountains
 - Weather/additional mudslides as we get to rainy season next month
 - Future of PREPA
 - Accuracy of feeder information versus Outage Management System
- Procurement and payment processes for PREPA
- Transition of full operations to PREPA
- Messaging

For the most part, NYPA and Cobra have done some amazing things in the community. Delivered toys during the holidays, food and water to orphanages and elderly homes, been invited to dinners at people's homes and then took groceries back to them. These guys don't want to go home.



Next Steps



- New PREPA CEO to be announced this week
- Post-95% of clients/customers restored
 - Transition work packages, materials, and oversight to PREPA
 - PREPA to complete plan to restore the remaining 5% of clients/customers
 - Ramp down of Federal support and ramp up PREPA capability
 - Stabilize generation at key power plants to continue work
 - Communication strategy around next steps
- Accelerate efforts to design the PREPA's future electric grid
- Preparing for the 2018 Hurricane Season (storm stock, exercises, etc.)
- Commence work on some permanent projects (recovery/mitigation)
- Conduct an After Action Review (Individual and/or joint with other stakeholders)

Working together to restore power to the people of Puerto Rico.



One team one mission!



FEMA



Restoration Requirements

Region	Total Served	Total Restored	%	Δ 90%	Δ 95%
AR	153,397	136,888	89.24%	1,169	8,839
BY	226,036	198,916	88.00%	4,516	15,818
CG-E	135,673	86,653	63.87%	35,453	42,236
CG-W	78,743	45,378	57.62%	25,491	29,428
CA	133,856	127,851	95.51%	0	0
MY	229,296	214,924	93.73%	0	2,907
PC	207,778	198,857	95.71%	0	0
SJ	308,221	307,826	99.68%	0	0
Total	1,473,000	1,317,293	89.43%	8,407	82,057

Data as of 3/6/2018

Transmission Priority List

Line	Voltage (kV)	Task Name	Proposed Finish	Status as of 3/3	System Priority as of 3/3	Responsible Party	Comments
50700	230	Guayama / A.E.S. - Yabucoa	4/1/2018	IN PROGRESS	1	COBRA/PREPA	
40200	115	Aguirre S.P. - Jobos	3/26/2018	IN PROGRESS	2.1	COBRA	Pre-req to line 51000
40300	115	Sta. Isabel TC - Aguirre	6/1/2018	IN PROGRESS	2.2	COBRA	Pre-req to line 51000
51000	230	Aguirre S.P. - Aguas Buenas	6/1/2018	IN PROGRESS	2	COBRA	
36300	115	Shell TC/Juan Martin Sect.- Yabucoa	3/7/2018	IN PROGRESS	3	Fluor/SEC	
36300	115	Maunabo - Shell/Juan Martin Sect.	TBD	IN PROGRESS	4	Fluor/PIKE	Need Work Package
37400	115	Candelaria Arenas TC - Dorado TC	3/5/3018	IN PROGRESS	5	COBRA/PREPA	
37400	115	Dorado TC - Vega Baja	3/16/2018	IN PROGRESS	6	COBRA/PREPA	
50500	230	Mora - Mayaguez TC	3/3/2018	IN PROGRESS	7	USACE/PowerSecure	
50500	230	Mora - Cambalache	3/24/2018	IN PROGRESS	7	USACE/PowerSecure	
39000	115	Toro Negro - Barranquitas	TBD	ON HOLD	8	TBD	Pending Resource Assignment
37800	115	Caguas - Cayey	TBD	ON HOLD	9	FLUOR	Need Work Package
39000	115	Barranquitas - Comerio	TBD	ON HOLD	10	TBD	Pending Resource Assignment
37400	115	Barceloneta - Cambalache	TBD	ON HOLD	11	TBD	Pending Resource Assignment
37500	115	MTC - Grana	3/13/2018	IN PROGRESS	12	COBRA	
36100	115	Monacillos - BTC	3/13/2018	IN PROGRESS	12	COBRA	
38200	115	Palo Seco S.P. - MTC	3/13/2018	IN PROGRESS	12	COBRA	
39000	115	Aguas Buenas - MTC	TBD	ON HOLD	13	TBD	Pending Resource Assignment
37800	115	Buen Pastor - Caguas	TBD	ON HOLD	14	FLUOR	Need Work Package

FLUOR ITEMS

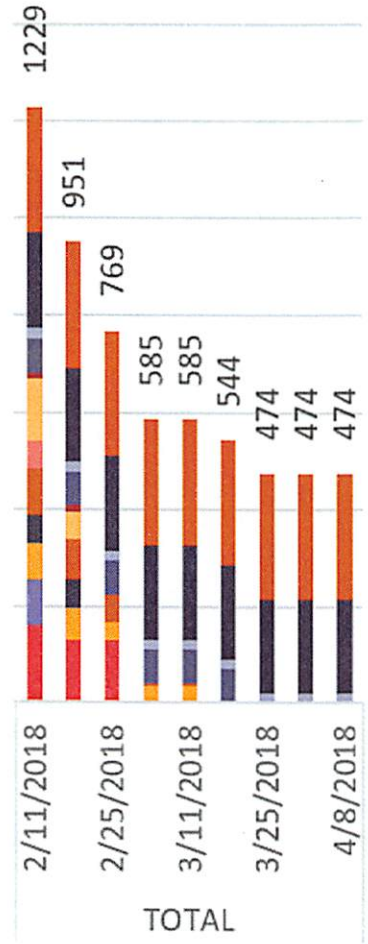
ETR WITHIN 7 DAYS

ETR WITHIN 14 DAYS

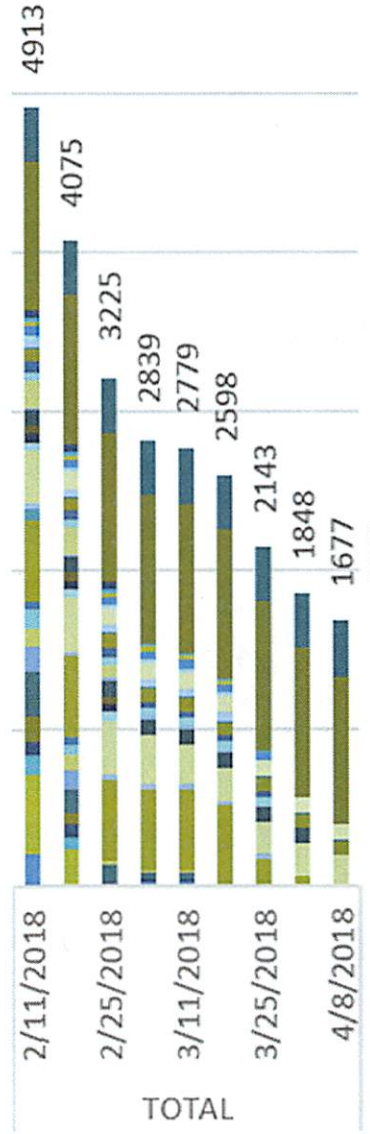
As of March 3

Resource Demobilization

Transmission

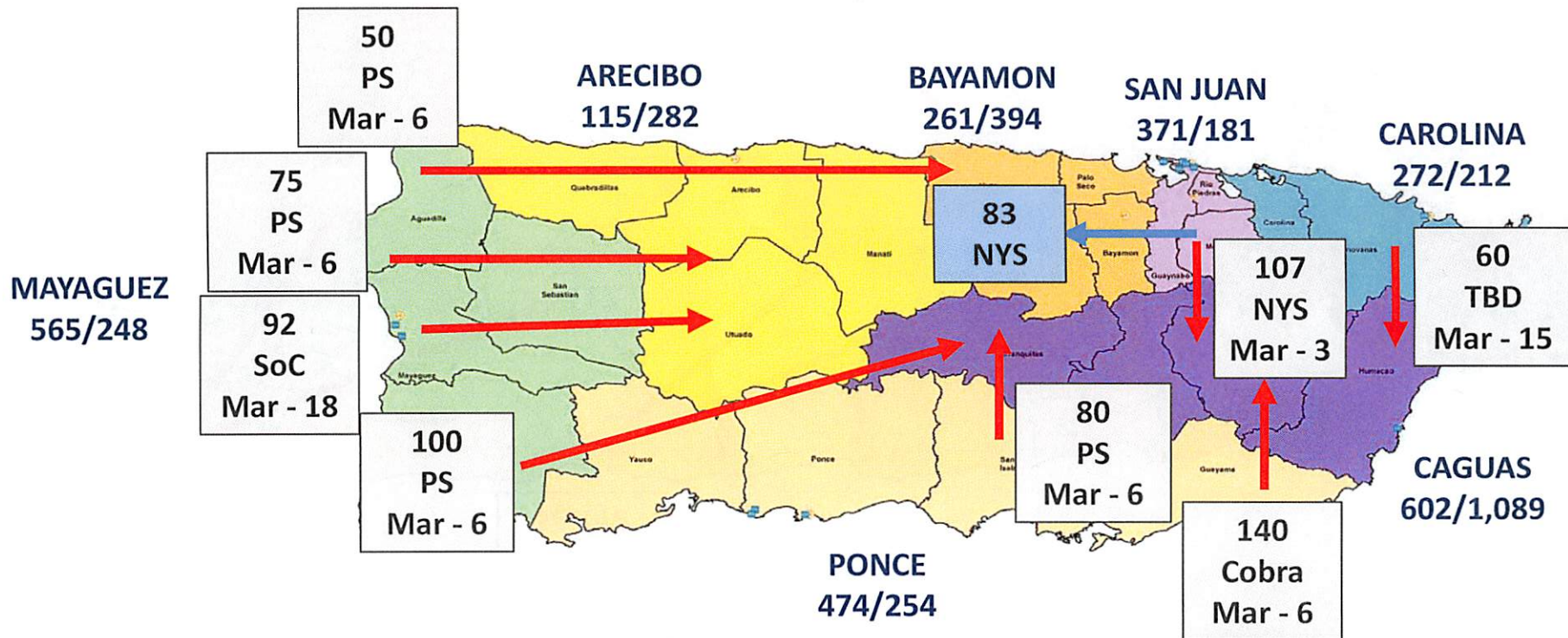


Distribution



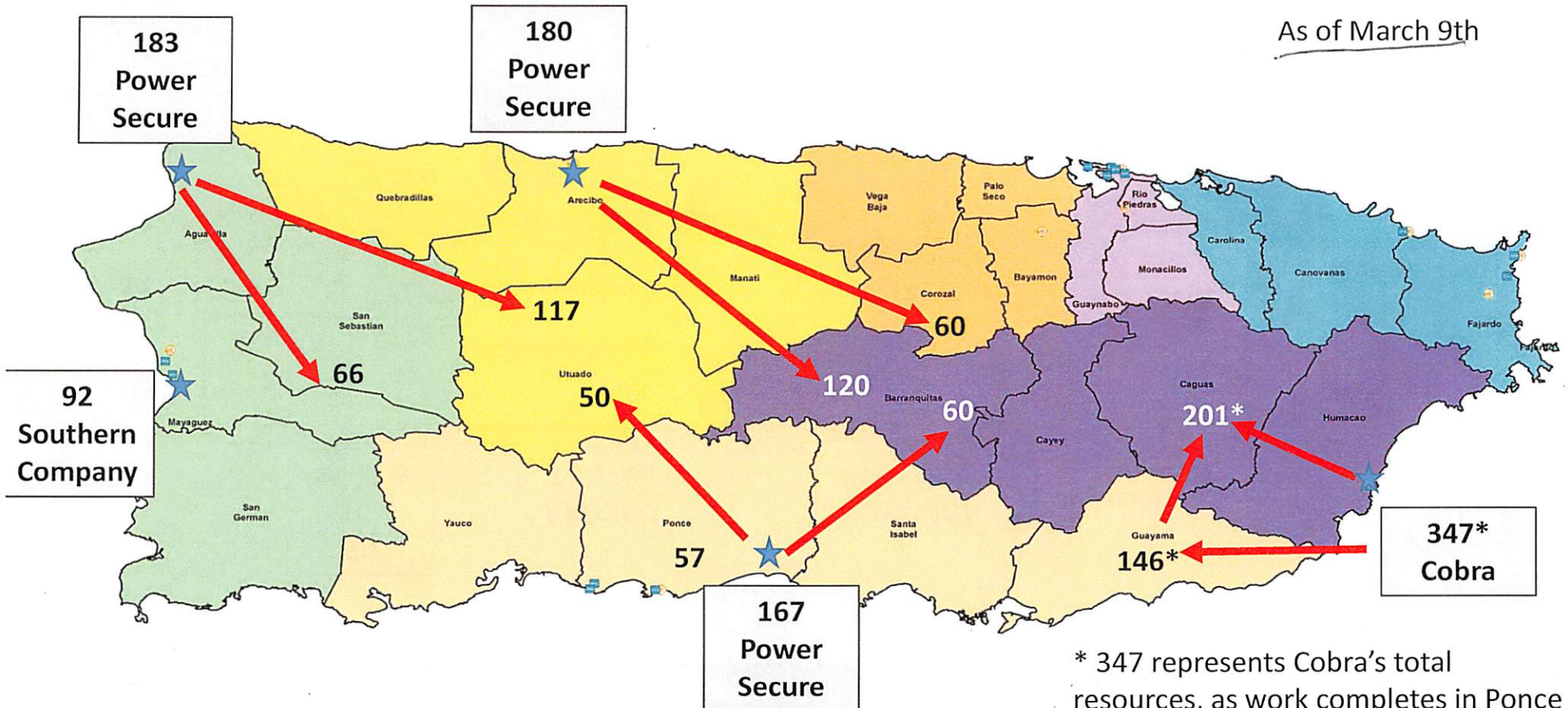
4/18 - PREPA / CORBA

Original Distribution Resource Movement

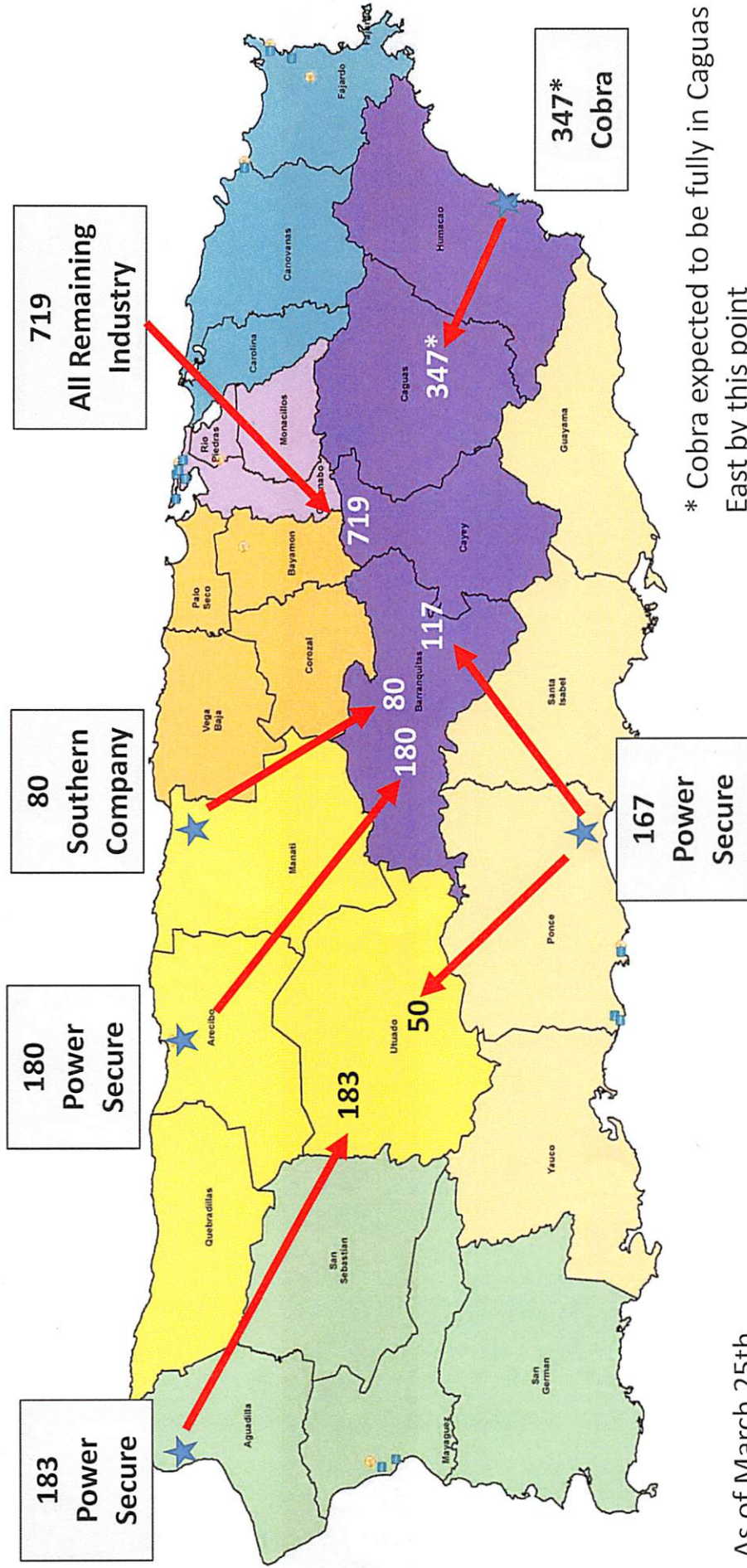


Revised Distribution Resource Movement

As of March 9th



New Distribution Resource Movement



As of March 25th

* Cobra expected to be fully in Caguas East by this point

Round Table