



Resiliency

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EXECUTIVE PRESIDENT PRASA



Puerto Rico Aqueduct and Sewer Authority
GOVERNMENT OF PUERTO RICO

acueductospr.com

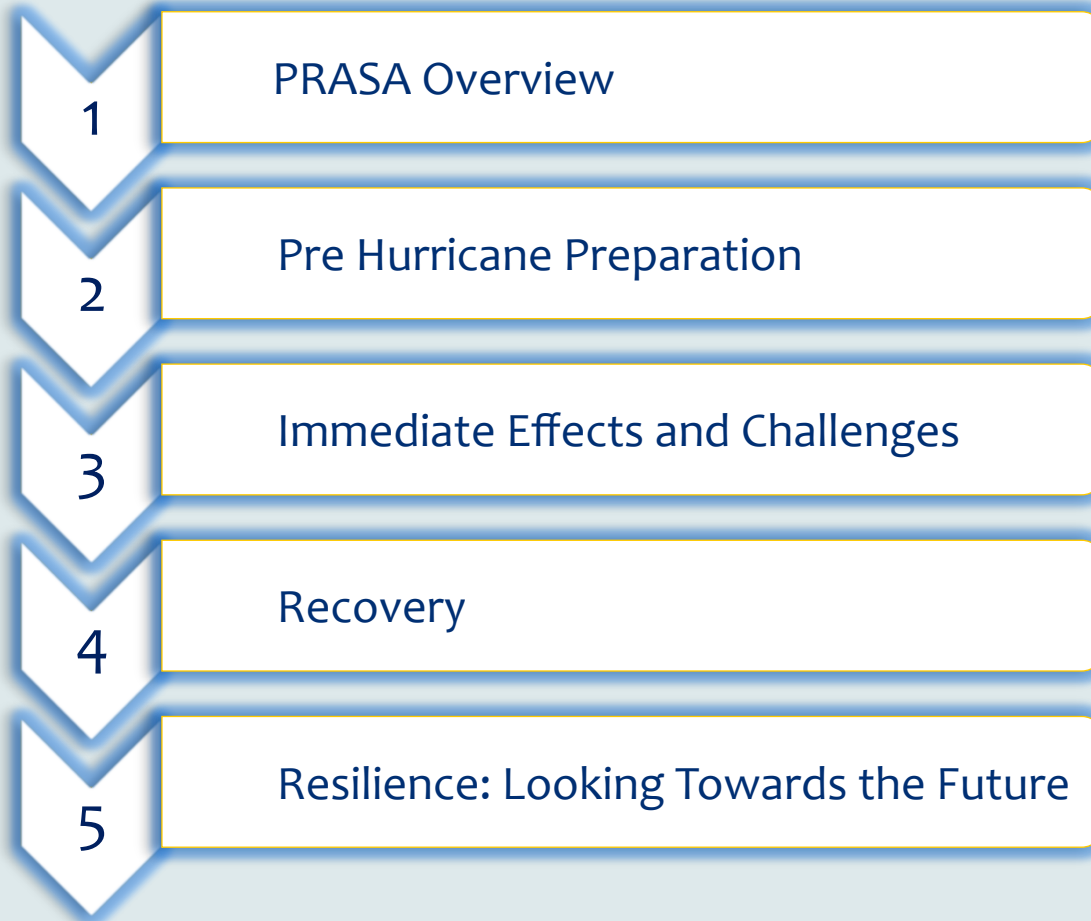
AMWA

2018



Resiliency: Hurricanes Irma & María

Agenda



PRASA Overview



1,236,728 customer accounts

Residential



95%

Government



0.8%

Commercial

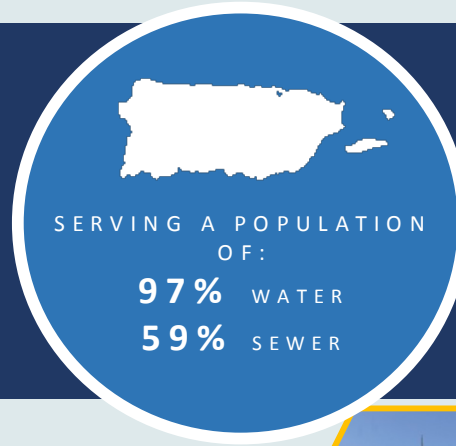


4.1%

Industrial



0.07%



4,654 employees

1,562 WATER TANKS



254 WATER WELLS



114 WATER TREATMENT PLANTS



51 WASTEWATER TREATMENT PLANTS



14,753 MILES OF WATER PIPELINE
5,994 MILES OF WASTEWATER PIPELINE



8 DAMS
143 WATER INTAKES



883 WATER PUMP STATIONS
714 WASTEWATER PUMP STATIONS



Strategic Objectives



Reduce Non-Revenue Water



Improve & Sustain Water Quality



Increase Resilience

PRASA Overview



A **Revised Fiscal Plan** was developed to guarantee:



The provision of essential services, **safe and reliable supply of drinking water and treatment of wastewater.**



The required **investment in necessary infrastructure**, focusing on renewal and replacement projects and reduction of physical water losses.



The inflow of **insurance and federal funds proceeds.**

PRASA's **long-term financial self-sustainability.**

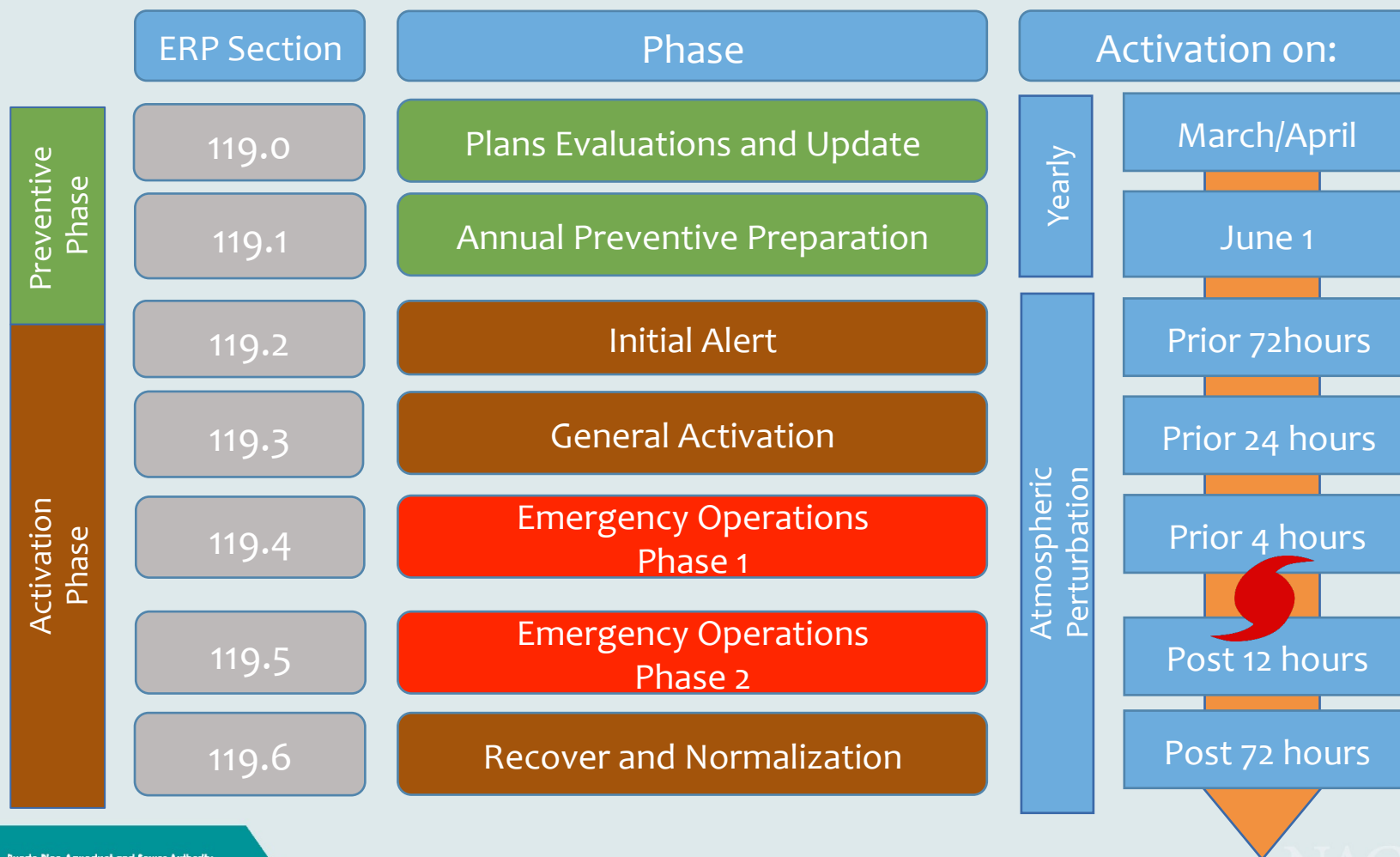


Affordable service for all customers.



Pre Hurricane Preparation Emergency Response Procedure (ERP)

PRASA applied its ERP during Hurricanes Emergency Irma and María during the following:





Pre Hurricane Preparation

Hurricanes Irma and Maria

✓ Hurricane Irma “dry run” (September 6, 2017)

✓ Preventive maintenance of EGUs

✓ Reduction of water levels in reservoirs

✓ Adequate distribution of materials by regions/areas

✓ Contracting with water truck and cistern providers



Immediate Effects and Challenges

Hurricanes Irma and Maria

■ September 6, 2017: Category 5 Hurricane Irma

- Winds of up to 185 miles an hour passed north of Puerto Rico

PRASA suffered **damages to water treatment facilities and structures** across the Island

Over **one million customers lost electric power** and over **1/3 of PRASA customers did not have drinking water**

September 20, 2017: Category 4 Hurricane María

Sustained winds of approximately **155 mph**, passed over Puerto Rico with powerful rains in excess of **20 inches** (over 40 inches in some isolated areas) and **widespread flooding**

Caused tremendous destruction, including further damage to Puerto Rico's electrical system and water/wastewater infrastructure island-wide

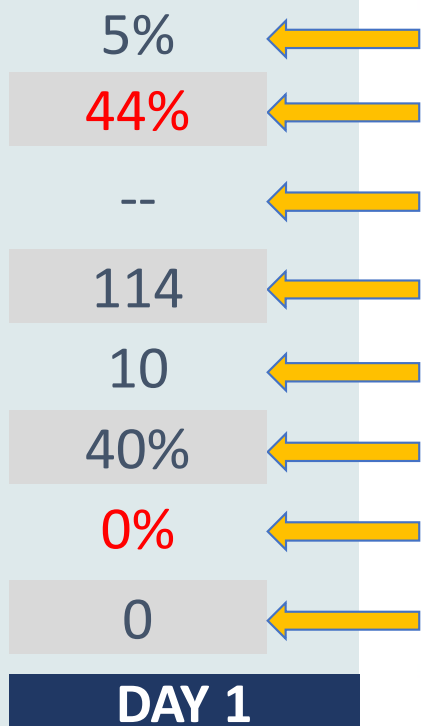


Immediate Effects and Challenges

Timeline Post-Hurricane

Statistics Progress in Puerto Rico

Hurricane Maria Update



Signs of Recovery	Icon	Initial Status	Days after Maria made landfall			
			30 DAYS	60 DAYS	90 DAYS	120 DAYS
Cell Service		61%	96%	96%	98.5%	
Potable water		69%	90.63%	86%	98.82%	
Patients cared for in hospitals by federal workforce		6,100	35,777	38,037	38,037	
Open ATMs		1,047	1,300	1,586	1,586	
Generators		148	645	933	708	
Gas Stations		78%	85%	84.3%	88%	
Power Generation		21%	49%	65.4%	80.3%	
Installation of Blue Roof		439	11,196	23,455	55,692	



FEMA
 Statistics as of 02/16/2018
 source: status.pr and FEMA
 situational report

Numbers of days after Maria made landfall



Immediate Effects and Challenges

Post-Hurricane PRASA Challenges

PRASA confronts major challenges to stabilize its operations and provide water and sewer services to its clients

- The hurricanes disrupted ordinary course of business tasks, such as:
 - Water Production and Treatment
 - **Drinking Water Services**
 - **Sewer Services**
 - Meter Reading
 - Service Billing & Collections
 - Telemetry
 - Non-Revenue Water Program





Immediate Effects and Challenges

Hurricane Impact Summary

Revenues



Billings and collections projected to be materially reduced:

- Credit for deficient services
- Reduction in customer accounts and consumption

Expenses



Some expenses will be lower, i.e. electricity costs; but others are projected to be materially higher, i.e. diesel purchases, security, chemicals and overtime

Capital Improvement Program (CIP)



Revised CIP to incorporate the costs for system restoration and rebuild after the Hurricanes

Insurance & FEMA Funds



New funding sources being considered to fund qualifying CIP projects and cover incremental operating expenses



Immediate Effects and Challenges

Damages – Morovis Sur Raw Water Intake





Immediate Effects and Challenges

Damages – Flood Debris at Dorado WWTP





Immediate Effects and Challenges

Damages – Humacao Buena Vista Tank



Immediate Effects and Challenges

Damages – Manatí Trunk Sewer





Immediate Effects and Challenges

Damages – Humacao Operational Office





Immediate Effects and Challenges

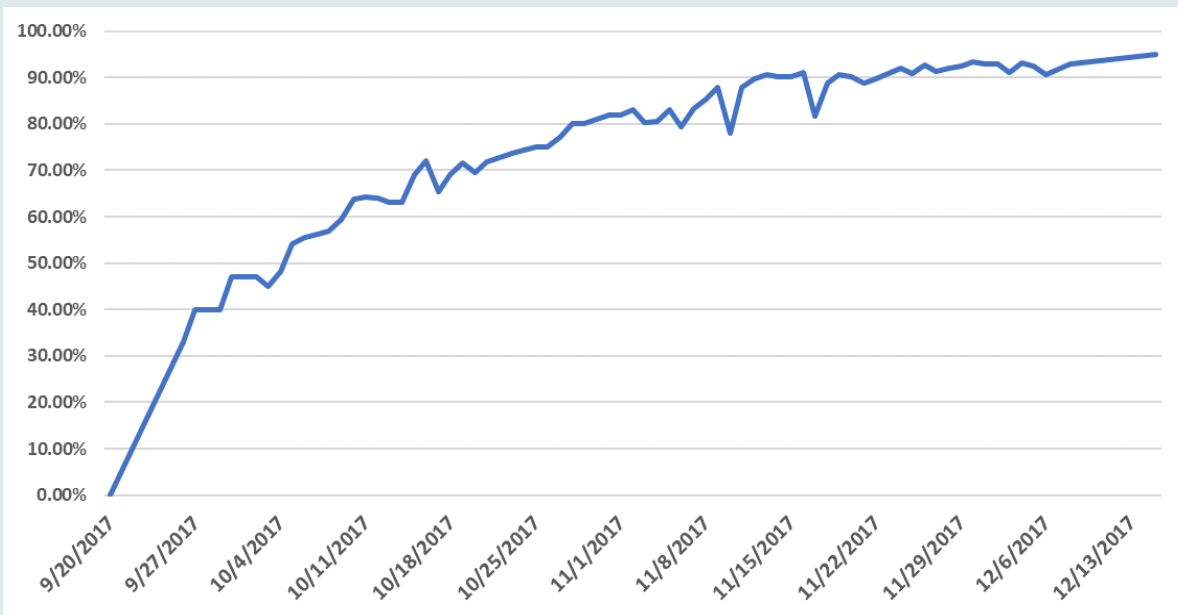
Damages – Caguas Central Laboratory



Recovery



Evolution of Clients with Service



1,229,365

total PRASA clients

1,165,045

clients with service

 95%

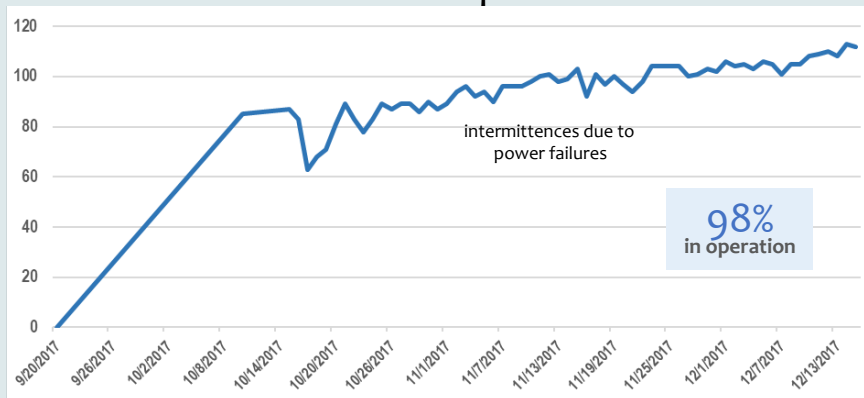
Evolution of clients with service shown intermittences are due to power service interruptions



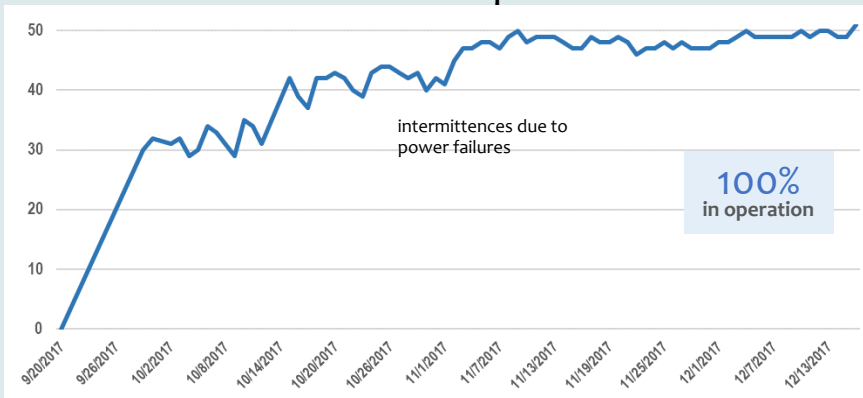
Recovery

System Recovery, as of 12/16/2017

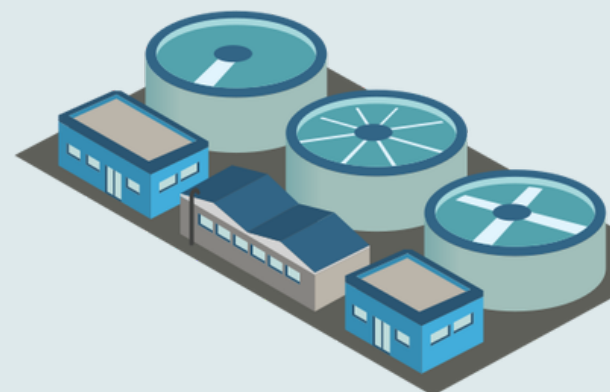
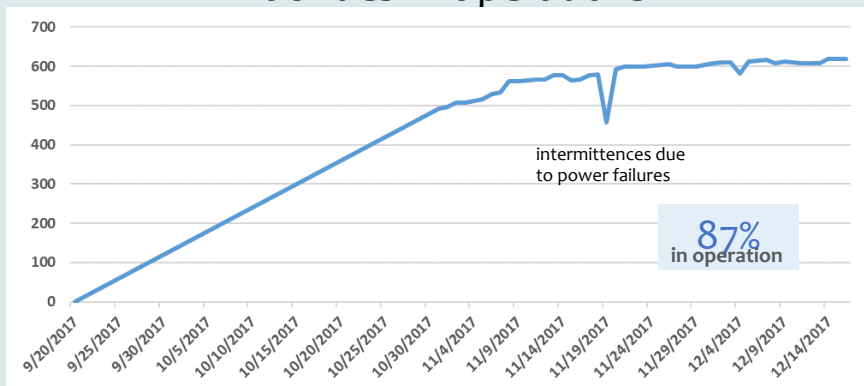
Water Treatment Plants Facilities in Operations



Wastewater Treatment Plants Facilities in Operations



Wastewater Pump Stations Facilities in Operations



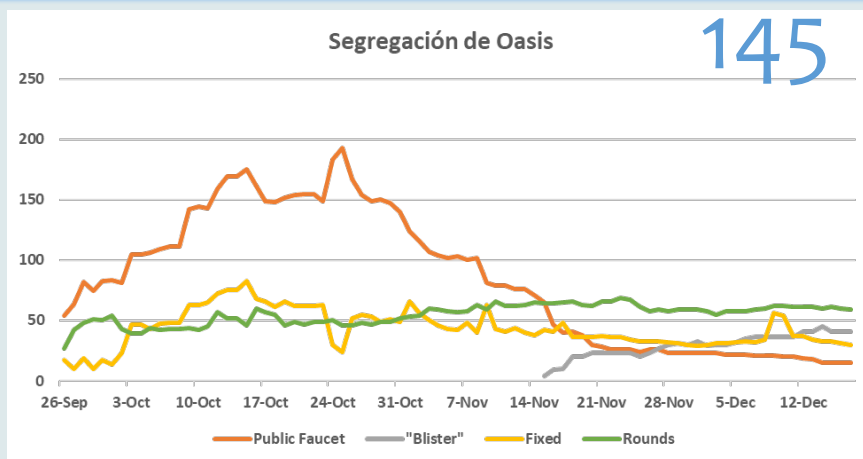
Note: Information for water pumps recovery is not currently available as the information is being gathered for around 1,000 sites



Recovery

Water Oasis and Distribution to Customers, as of 12/17/2017

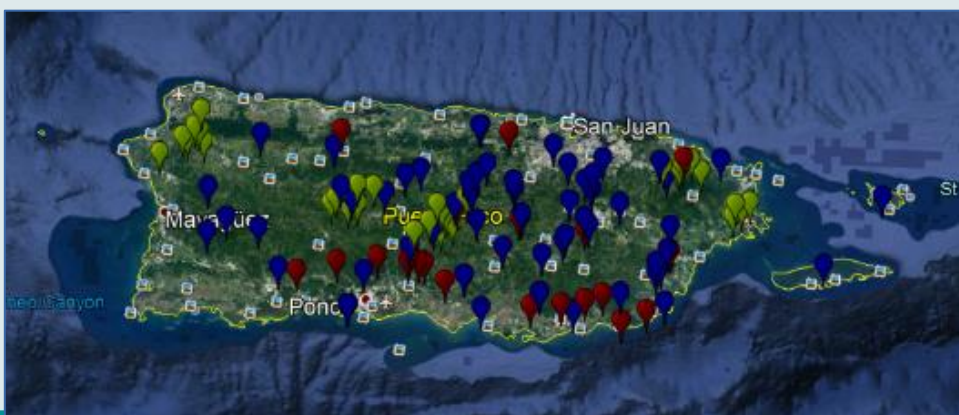
One of PRASA's priorities during and after the emergency was to supply water to the population in need



MAXIMUM

**304
OASIS**

in the peak period
(Oct 15, 2017)



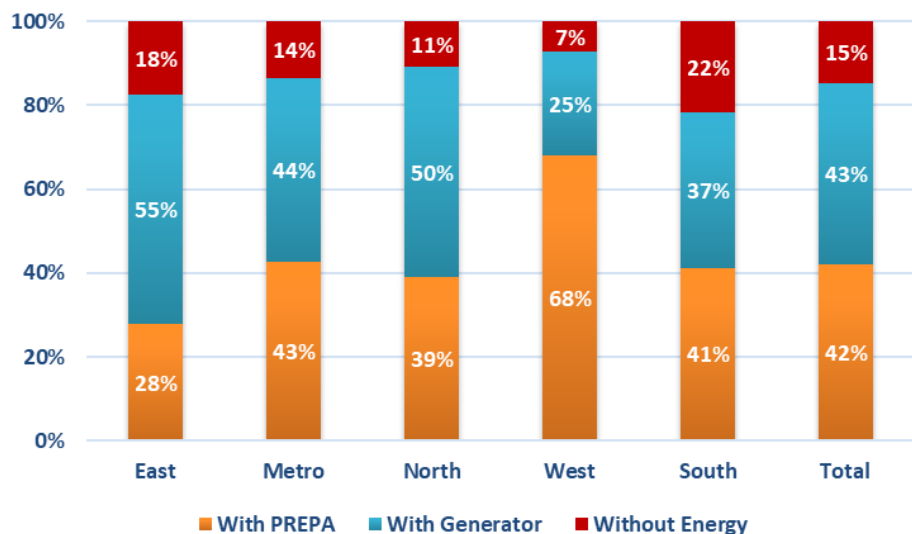
**OVER
500K**

customers served
during the emergency



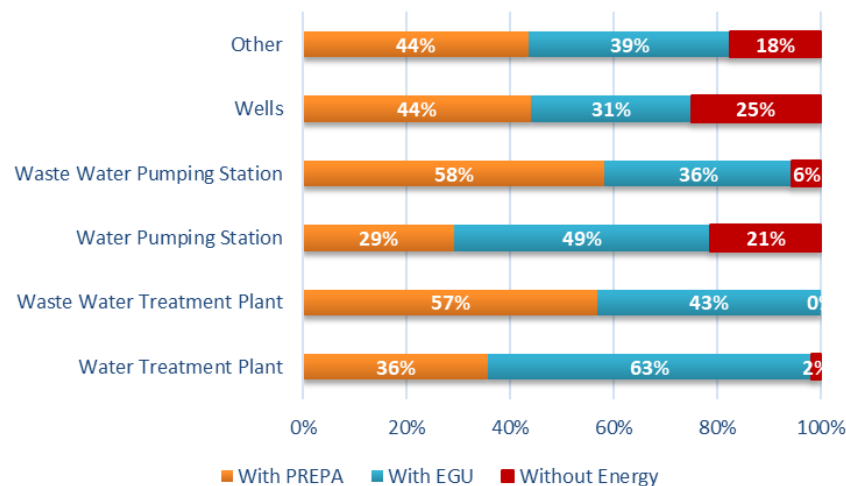
Recovery

Energy Status, as of 12/18/2017



Without PREPA: **58%**
 Without Energy: **15%**

Energy Status per Facility Type





Recovery

Emergency Generator Units, as of 12/15/2017

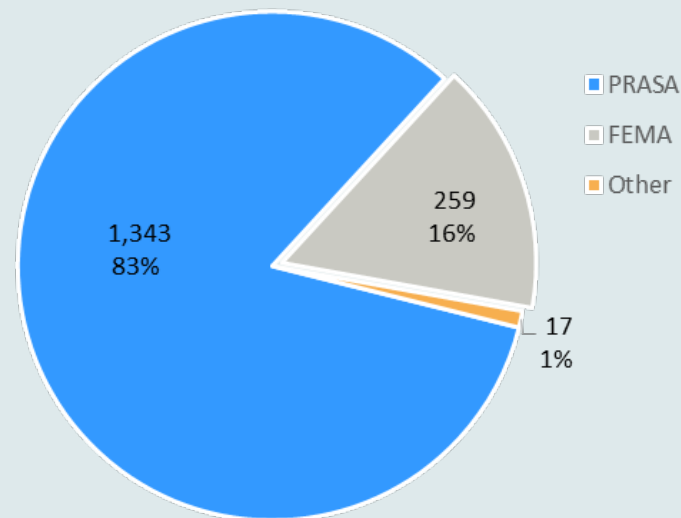
EGUs are key to energize facilities to continue providing our services.

- Identification of critical installations (FEMA)
- Fuel supply logistics (FEMA y private entity)
- Coordinating security for critical installations
- Coordinating operations and infrastructure resources to identify priorities



1,619 **EGUs**
in total

Providing for **31%** of PRASA's electricity consumption needs





Recovery

Commercial Services, as of 12/15/2017

The operation of the commercial offices is critical to normalize billing and collection activities



2 Still Closed Commercial Offices

10 Open Commercial Offices



Recovery

Completed work – La Virgencita, 16” Potable Water Line Repair





Recovery

Completed work – Comerío Trunk Sewer Repair





Recovery

Completed work – Guajataca Dam* Repair



Damaged spillway interrupted
and compromised raw water
sources to three plants





Recovery

Completed work – Utuado Filter Plant Temporary Intake





Resilience: Looking Towards the Future

Next Steps



Continue Recovery phase to sustain and resume ordinary operations



Complete damage assessment



Continue efforts to obtain all information needed for and requested by FEMA and insurance companies



Continue EGU logistics



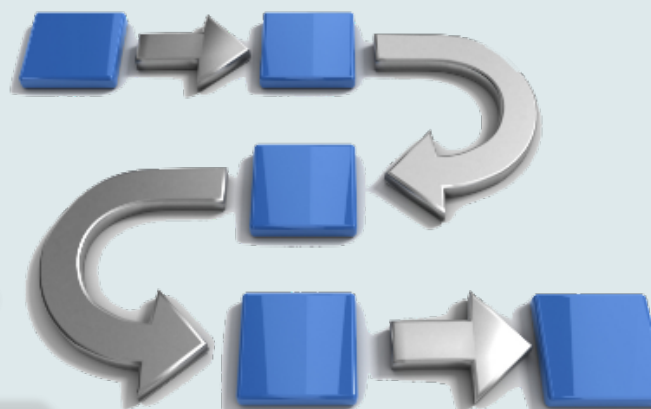
Continue efforts to repair all damaged infrastructure



Establish a reference timeframe to normalize operations



Update Emergency Response Procedure

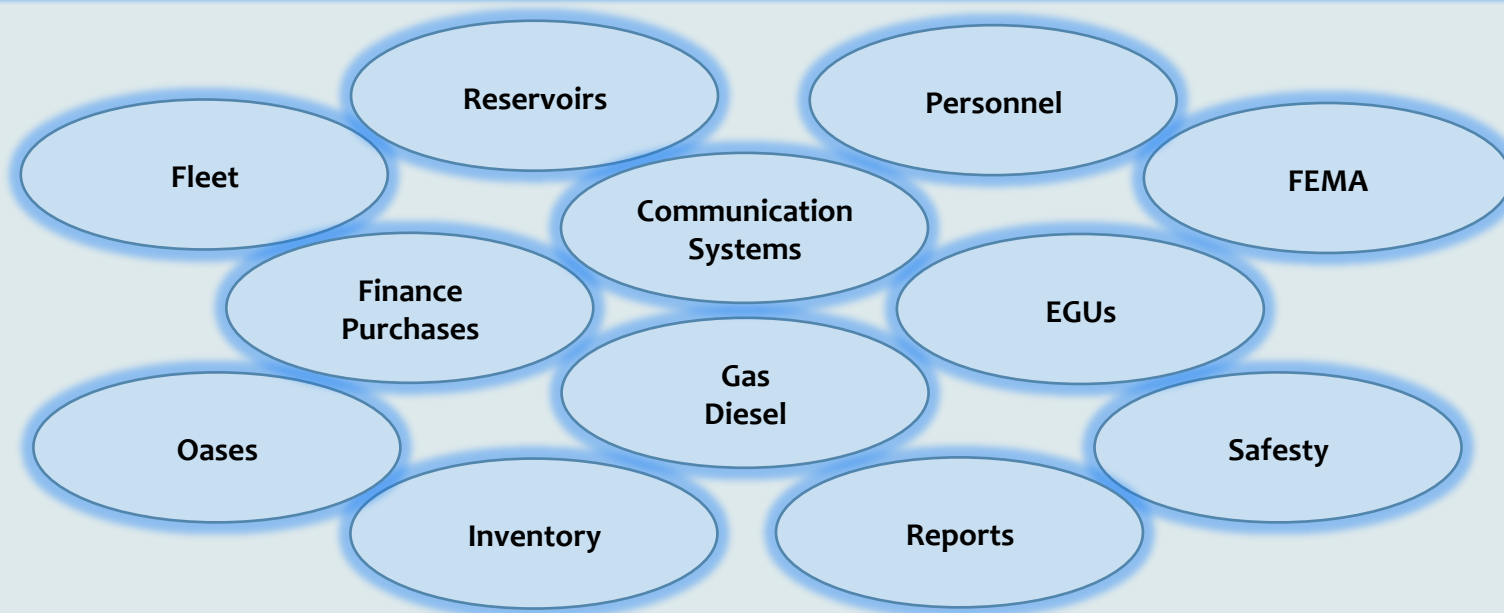




Resilience: Looking Towards the Future

Next Steps

Lessons learned are being applied and the ERP is being updated.
As part of the resiliency efforts, 12 Committees were created to address the most critical operational areas



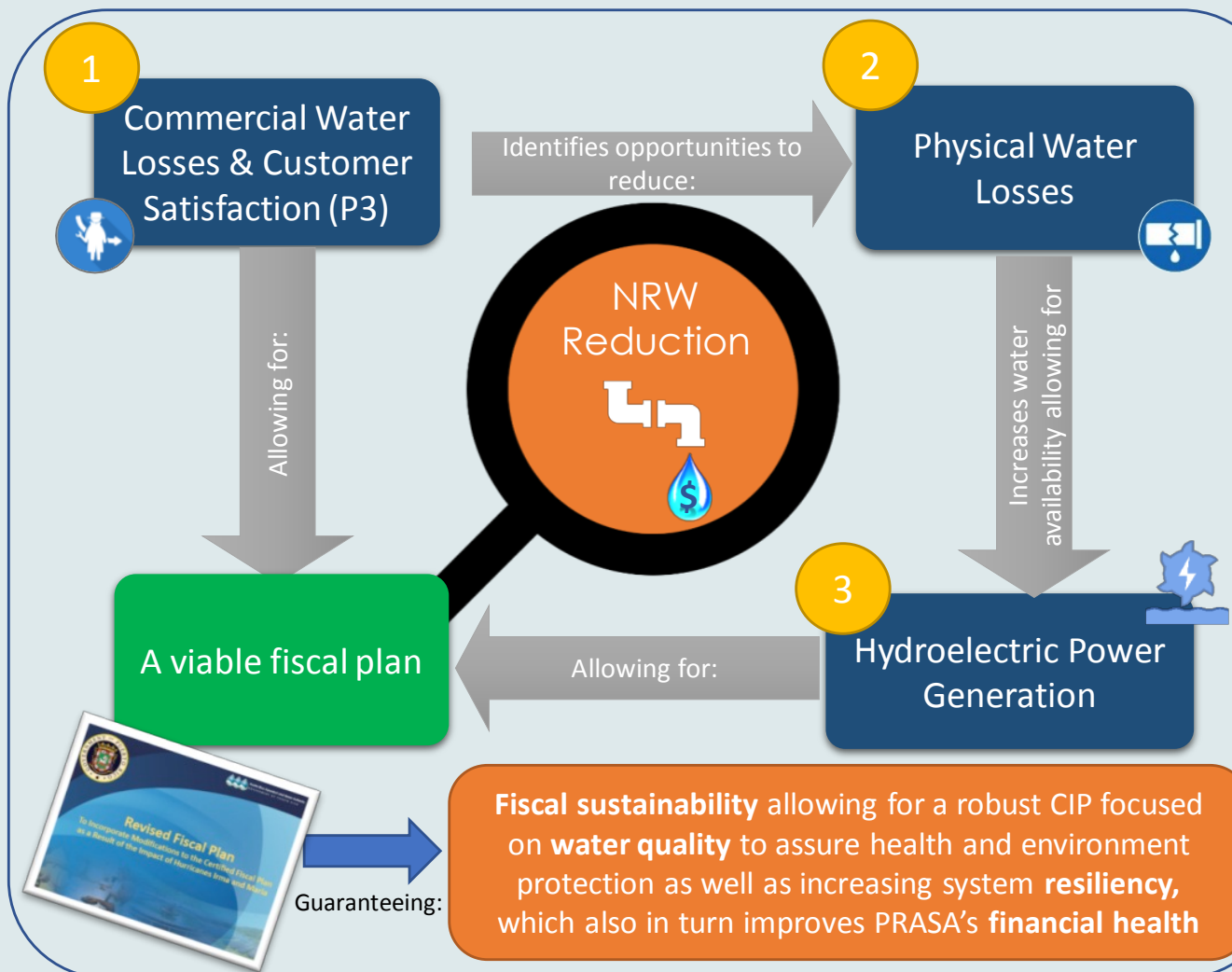
GOAL

Update **Emergency Response Program**
by **May 1st, 2018**, Next Hurricane Season



Resilience: Looking Towards the Future

Long-Term Vision



All initiatives will be integrated and monitored through:

1) The **PMO** office and specific **KPIs** to be included in the revised Strategic Plan



2) An optimized PRASA's modernization and innovation technology program (**INTEGRA**)



Resilience: Looking Towards the Future

Special Thanks



Appreciation to our current partners in our ongoing efforts

- Federal Government
 - Environmental Protection Agency – Pete Lopez, Andrew Sawyers and Peter Grevatt
 - Rural Utility Services – Kent Evans and Jacqueline Ponti-Lazaruk
 - FEMA – Michael Byrne and Nancy Casper
 - USACE – Lt. Gen. Todd Semonite and Lt. Gen. Steve Barry

- Associations and Consultants
 - AWWA / EMAC – Kevin Morley
 - Arcadis – Melissa Pomales
 - CSA – Jose Rodriguez Dominicci



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Thank You!

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