

A young boy is sitting on the edge of a rocky cliff, looking out over a vast, blue ocean. He is wearing a blue shirt and a red and white striped cape that resembles the Puerto Rican flag. The scene is set against a clear blue sky and a calm sea. The text 'REIMAGINA Puerto Rico' is overlaid on the image in a large, white, sans-serif font. The word 'REIMAGINA' has two upward-pointing arrows above the 'I' and 'A'. The words 'Puerto Rico' are stacked below it. A white rectangular frame is positioned above the text, and another is positioned below it, framing the text and the boy's figure.

REIMAGINA Puerto Rico

Resilient Puerto Rico Advisory Commission

Reimagina
Puerto Rico Report



RE↑MAGINA
Puerto Rico
Resilient Puerto Rico Advisory Commission



Reimagina Puerto
Rico Report

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LETTER FROM THE CO-CHAIRS

On January, when we were presented with the opportunity to be part of ReImagina Puerto Rico, the now Co-Chairs accepted the invitation enthusiastically because we were interested in making a contribution through a process and a project created to steer Puerto Rico in the aftermath of one of the worst disasters in our history.

All five of us understood, from the very beginning, that the final product of this effort was not to develop a comprehensive plan, but rather a report that lays out priorities for the reconstruction of Puerto Rico.

It would have been very easy for ReImagina Puerto Rico to convene an executive committee that shared the same visions on how to rebuild Puerto Rico. However, we opted to create a diverse group that reflected the Puerto Rican reality and our rich diversity of perspectives.

We strived to receive a great number of ideas from diverse groups in the Island and the diaspora communities in the United States. To achieve this, we organized 77 meetings and/or activities, which garnered the participation of 748 persons and generated 485 ideas for steering the reconstruction of the country.

After many months of intense work where we counted with the support from the ReImagina Puerto Rico team, we managed to achieve consensus on the vast majority of the recommendations included in the report

and were close to reaching agreement on others. It is a great triumph, considering all the difficulties that arise when people that want the best for the country, but have different visions, experiences, and opinions, sit in a table to work together.

In one aspect, this report is a first step and does not go far enough to address all the challenges that lie ahead. From another perspective, some of the recommendations could be deemed controversial. But at the end of this long journey, it is clear to us that we were able to push forward and seize this moment and historic opportunity for our people.

In adhering to this report, all five of us Co-Chairs validate this effort as transparent, broad, and noble in its aspirations. And we support it, not only for what is stated or proposed, but also for the hope that it represents.

RICHARD L. CARRIÓN
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LETTER FROM THE FOUNDATIONS

In the aftermath of Hurricane María, we witnessed the largest humanitarian crisis Puerto Rico has ever faced. The world watched in horror while an entire island, home to 3.4 million people, was devastated.

The physical damage and death toll have been well documented – a new Harvard study, recently published in the *New England Journal of Medicine*, estimates that at least 4,645 deaths can be linked to the hurricane and its immediate aftermath. A massive disruption in healthcare delivery, combined with the prolonged loss of vital utilities such as energy and drinking water, help explain this terrible human cost. In addition, there were billions of dollars in damage to natural and physical infrastructure – especially an antiquated and fragile electric grid that has left too many on the Island in the dark eight months after the storm – and tens of thousands of businesses shut down.

But the powerful hurricane wasn't the only reason that the damage was so severe. Before the waves came ashore last September, the Island was struggling with a host of serious challenges, including jobs and fiscal crises, which combined to magnify the impacts of the storm and added barriers to full recovery.

In the wake of this disaster, The Rockefeller Foundation, Ford Foundation and Open Society

Foundations recognized the urgency of helping Puerto Ricans recover from María and seize an extraordinary opportunity – the potential of billions of dollars in federal recovery funds and a unique, galvanizing moment. We recognized an opportunity to help the extraordinary people of Puerto Rico to shift the trajectory of the Island in a fundamental way.

We sought to build on our experience in the wake of other catastrophic disasters, including hurricanes Sandy and Katrina, and to provide the resources, expertise and space so that a dedicated and diverse group of Puerto Ricans could take stock of the current situation and recommend key actions and initiatives to make the Island more equitable and resilient – better prepared to face the future.

In this way, the ReImagina Puerto Rico project was born. The project was created in partnership with 100 Resilient Cities (100RC), an organization pioneered by The Rockefeller Foundation to promote resilient solutions to the physical, social, and economic challenges of the 21st century. Together, the project's five co-chairs, 22 commissioners representing diverse stakeholder groups, and the experienced 100RC team have produced a long-term strategy for a resilient recovery. They have done so in consultation with the communities most affected, as well as public officials and technical experts across the globe.

If this planning effort is successful, key recommendations will be adopted by the federal and local agencies that have taken part in this process and also by businesses, faith and community institutions, and philanthropic funders. Some recommendations will, with no doubt, inspire new ideas and responses, not yet captured in these recommendations, and make a more indirect contribution to the community's recovery. This is, as it should be, an ongoing, collective effort of learning by doing.

What's most critical is that the Island not just bounce back from this disaster but come back stronger, charting a path toward greater equity, prosperity, and justice – a dynamic community with better educational outcomes, a stronger and more diverse economy, a healthier and happier population, a place that those who have left the island might want to return to and call home again.

Hurricane María was a crisis unlike any that Puerto Rico has ever seen. But this crisis has presented us all with a potentially transformative opportunity. Our aim is simply this: To help leaders and innovators from across the island, and the large and vibrant Puerto Rican diaspora as well, to seize that opportunity and improve the lives of millions for years to come.



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FOUNDATION



MICHAEL BERKOWITZ
PRESIDENT, 100 RESILIENT CITIES



DARREN WALKER
PRESIDENT, FORD FOUNDATION



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PRESIDENT, OPEN SOCIETY
FOUNDATIONS

LETTER FROM THE **EXECUTIVE DIRECTOR**

I am extremely grateful for having the opportunity to act as Executive Director of the Resilient Puerto Rico Advisory Commission and be able to lead the ReImagina Puerto Rico project in the aftermath of Hurricanes Irma and María which brought such devastation and suffering to Puerto Rico. This moment in history is crucial for reimagining development and reconstruction efforts in Puerto Rico with more public participation and transparency in the recovery processes where the people of Puerto Rico take an active role in forging the new vision of the Island. Our combined efforts have been directed to help rebuild Puerto Rico in a way that makes the Island stronger – physically, economically, and socially – and better prepared to confront future challenges.

After many ReImagina Puerto Rico meetings from February through May of 2018 and much effort, we have developed a total of 97 actionable recommendations focused in Housing, Energy, Physical Infrastructure, Health, Education & Social Services, Economic Development, and Natural Infrastructure for how to maximize recovery funds. We have curated 17 of these recommended actions as high priority and impactful for the resilient reconstruction of Puerto Rico. We also

established six strategies and four guiding recovery principles to steer the reconstruction efforts to assure we maximize social well-being in all investments, we emphasize equity, inclusiveness, and transparency at all levels of policy making, and foster coordination and collaboration while establishing effective and equitable community participation and developing resilient and empowered communities. Actions presented range from establishing reliable and diversified backup energy systems for vulnerable individuals and critical facilities, such as hospitals, schools, and emergency shelters and services facilities, to updating the Island’s digital land cadaster and developing feasible models to establish land tenure and community ownership in informal housing.

I am extremely happy and proud to be part of this unique effort. We placed great emphasis in hearing, interacting and connecting with many different voices and perspectives throughout the Island and in searching for alignment and consensus on actions for a resilient reconstruction. We participated in more than 77 meetings with more than 748 individuals, including subject matter experts and other representatives from academia, private and public sector, and community leaders and NGOs. We developed an accelerated timeline and engagement plan

in order to produce recommended actions in time to influence required government planning efforts. We are hopeful that these recommendations will be integrated into the reconstruction plans required by the government and that ReImagina Puerto Rico will be able to collaborate with many actors in their implementation and monitoring.

Many thanks to the Co-Chairs for leading this effort, and Ford Foundation, Open Society Foundations, and The Rockefeller Foundation and 100 Resilient Cities for supporting this unique and important project. Thanks to the many participants who collaborated in one way or another and a special thanks to the ReImagina staff for always going the extra mile. We all need to continue collaborating and working together in building the new and stronger Puerto Rico.



MALU BLÁZQUEZ ARSUAGA
EXECUTIVE DIRECTOR



EXECUTIVE SUMMARY

The catastrophic events caused by Hurricanes Irma and María in September 2017 elevated a common plea to reimagine Puerto Rico, as it moves forward on its path towards recovery and reconstruction. This process should not focus only on replacing outdated infrastructure, but also must foster a social and economic transformation across the Island to create a more just, equitable and resilient society. As part of the numerous recovery efforts that emerged, the Resilient Puerto Rico Advisory Commission (the Commission) was created in November 2017 to serve as a unifying force among a diverse group of Puerto Rican voices.

The Commission's goal is to promote a stronger, more resilient Puerto Rico as it embarks on reimagining development and reconstruction with more public participation and transparency in the recovery processes where the people of Puerto Rico take an active role in forging the vision of the Island. The Commission's core project, ReImagina Puerto Rico, aimed at producing an actionable and timely set of recommendations for how to maximize philanthropic, local government, and federal recovery funds. The purpose of the project was to help rebuild Puerto Rico in a way that makes the Island stronger – physically, economically, and socially – and better prepared to confront future challenges.

The Commission adopted an accelerated timeframe to produce this report to complement on-going post-disaster recovery efforts being enforced by U.S. federal agencies, Puerto Rico government and non-governmental organizations (NGOs) across Puerto Rico. The Commission embarked in a broad and

participatory outreach approach toward Puerto Rico's recovery and reconstruction, enabling a conversation among a diverse collection of voices to build consensus while identifying opportunities to embed resilience in the rebuilding efforts. Considering the extent of the federal and philanthropic funding available to support recovery actions in the aftermath of Hurricanes Irma and María, contributions from the ReImagina Puerto Rico project to this effort will provide significant insight to responsible government agencies and NGOs toward achieving more resilient recovery actions.

During the process adopted by ReImagina Puerto Rico, important recommendations surfaced that the Commission identified and developed. While there may be many paths to recovery, the Commission established a set of recommended principles to steer all chosen paths.

These guiding recovery principles are:

- Maximize social well-being in all investments
- Prioritize equity and inclusiveness
- Ensure transparency at all levels of policy making
- Emphasize and foster coordination and collaboration

ReImagina Puerto Rico divided the work into six broad topic areas: (1) Housing; (2) Energy; (3) Physical Infrastructure; (4) Health, Education & Social Services; (5) Economic Development; and (6) Natural Infrastructure.

Developing actionable recommendations required a clear definition of the scope and reach of the issues these initiatives address. The purpose of well-defining the scope was to promote realistic expectations and avoid setting overambitious goals that ignore the current social, economic, and institutional landscape that define Puerto Rico's context. As such, ReImagina Puerto Rico established the following sector goals:

- **Housing:** Develop a portfolio of strategies that reduce risk exposure, foster community empowerment, and address the diversity in socioeconomic conditions, housing types, and tenure in Puerto Rico.
- **Energy:** Address Puerto Rico's energy needs by transforming its electric power infrastructure into an affordable, reliable and innovative system, while reducing adverse impacts on human health and the environment.
- **Physical Infrastructure:** Develop and maintain infrastructure systems that are accessible, integrated, flexible, and robust enough so they may sustain critical operations for the well-being of Puerto Ricans.
- **Health, Education, & Social Services:** Develop initiatives that ensure the provision of health, educational and social services to reduce existing and future vulnerabilities, and chart a pathway toward improved equity and well-being, with more participation of the people in its definition and implementation.
- **Economic Development:** Craft a diversified portfolio of economic activities that augment Puerto Rico's resiliency by enhancing existing

capabilities, improving employment prospects, and reducing inequalities.

- **Natural Infrastructure:** Improve human health and well-being, foster economic development, and reduce exposure to hazards, through the sustainable use of Puerto Rico's natural resources.

To help jumpstart the required planning efforts, ReImagina Puerto Rico has put forward specific and actionable recommendations that comprehensively address unmet needs, ongoing challenges and mitigate the impact of future disasters.

As part of the project's outreach process, ReImagina Puerto Rico also convened community members and leaders, grassroots organizations, business leaders, government officials, and representatives from professional organizations, among other groups. Furthermore, it provided a common platform to discuss concerns and aspirations regarding a stronger Puerto Rico. The ReImagina Puerto Rico process proposed six crosscutting strategies to achieve the recovery principles and a set of 97 recommended actions spanning across all working group sectors. Recommendations include 18 Housing sector actions; 12 for the Energy sector; 30 for Physical Infrastructure; 9 for Health, Education & Social Services; 12 for Economic Development; and 16 for the Natural Infrastructure sector. This report highlights 17 of these recommendations identified as high priority, actionable and address critical issues for the recovery and reconstruction of Puerto Rico.

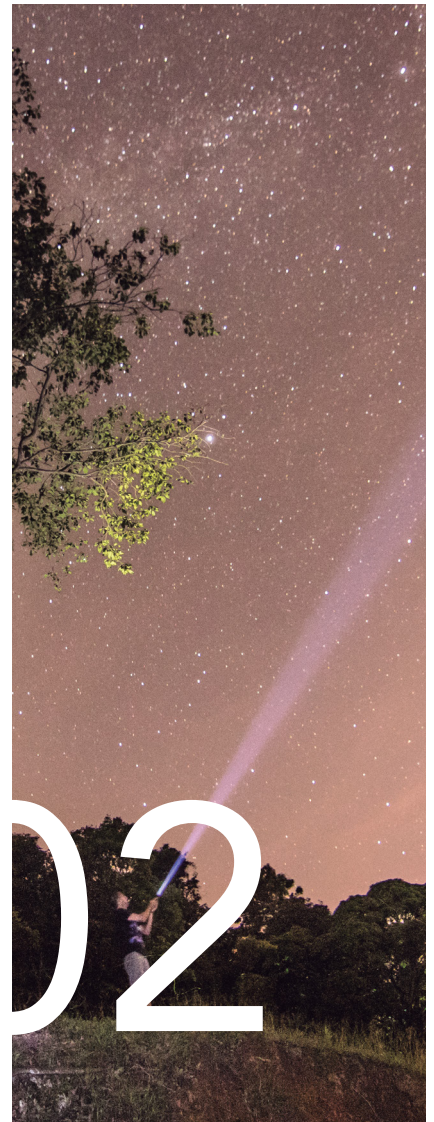
The results of this report are but an initial step toward a broader journey seeking the reimagining of Puerto Rico, as it reinvents itself in the wake of major disasters. The Commission steadfastly promotes that the set of recommendations put forth in the ReImagina Puerto Rico project provide a clear initial path toward the long-term recovery and reconstruction of Puerto Rico. The story of the new Puerto Rico is yet to be written.

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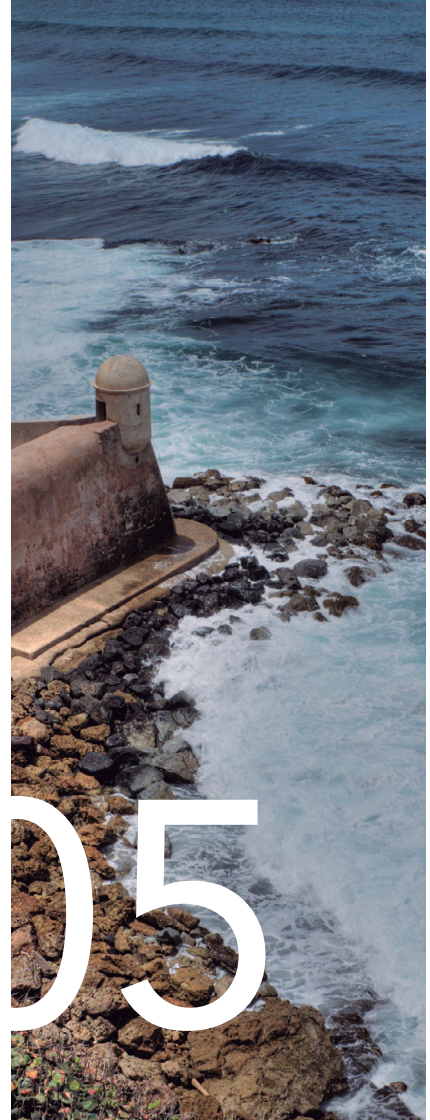
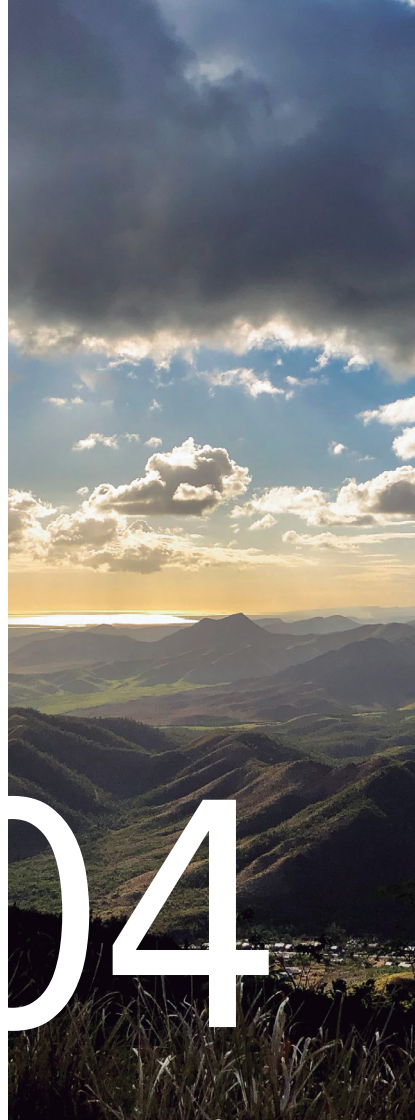
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APPENDIXES



Manatí, PR. Cristina A. Fawaz López

Acronyms

100 RC 100 Resilient Cities

ACA Affordable Care Act

ACS American Community Survey

ADUs Accessory Dwelling Units

AES Agricultural Extension Service

AGC Associated General Contractors of America

AIDIS Inter-American Association of Sanitary and Environmental Engineering

AMA, by its Spanish acronym Puerto Rico Metropolitan Bus Authority

ARRA American Recovery and Reinvestment Act

ASSMCA, by its Spanish acronym Puerto Rico Administration of Mental Health and Anti-Addiction Services

BLS United States Bureau of Labor Statistics

BTOP Broadband Technology Opportunities Program

Business PREP Business Preparedness and Resiliency Program

CAAPPR, by its Spanish acronym Puerto Rico College of Architects and Landscape Architects

CAGR Compound Annual Growth Rate

CAIDI Customer Average Interruption Duration Index

CBA Community Benefits Agreements

CBO Community-Based Organizations

CCLC United States Department of Education – 21st Century Community Learning Centers

CDBG Community Development Block Grant

CDBG-DR Community Development Block Grant Disaster Recovery

CDBs Community Development Banks

CDC Center for Disease Control and Prevention

CDCorps Community Development Corporations

CDFIs Community Development Financial Institutions

CED Community Economic Development

CHDOs Community Housing Development Organizations

CHIP Children's Health Insurance Program

CHP Combined Heat Power

CIAPR Puerto Rico College of Engineers and Land Surveyors

CNE Center for a New Economy

COFECC, by its Spanish acronym Corporation for

Business Financing of Commerce and Communities (now known as "lendreamers")

COOP Continuity of Operations Plan

COR3 Puerto Rico Central Office of Recovery, Reconstruction, and Resilience

CRA Community Reinvestment Act

CRF City Resilience Framework

CRIM, by its Spanish acronym Puerto Rico Municipal Revenue Collection Center

CSR Corporate Social Responsibility

DACO, by its Spanish acronym Puerto Rico Office of Consumer Affairs

DEDC Puerto Rico Department of Economic Development and Commerce

DHS United States Department of Homeland Security

DIRS Disaster Information Reporting System

DIY Do It Yourself

DNER Puerto Rico Department of Natural and Environmental Resources

DOLHR Puerto Rico Department of Labor and Human Resources

DOS United States Department of State

DTPW Puerto Rico Department of Transportation and Public Works

EDA United States Economic Development Administration

EOP Puerto Rico Emergency Operation Plan

EPA United States Environmental Protection Agency

EQB Puerto Rico Environmental Quality Board

EQIP Environmental Quality Incentives Program

EWP-FPE Emergency Watershed Protection - Floodplain Easement Program

FAA Federal Aviation Administration

FCC Federal Communications Commission

FEMA Federal Emergency Management Agency

FHWA Federal Highway Administration

FIDEVI, by its Spanish acronym Puerto Rico Housing and Human Development Fund

FIRM Flood Insurance Rate Maps

FOMB Financial Oversight and Management Board for Puerto Rico

FQHCs Federally Qualified Health Centers

FTA Federal Transit Administration

GAR Governor's Authorized Representative

GIS Geographic Information System

HHS United States Department of Health and Human Services

HiAP Health in All Policies

HIPAA Health Insurance Portability and Accountability Act

HMGP FEMA Hazard Mitigation Grant Program

HMP Puerto Rico Hazard Mitigation Plan

HRSA United States Health Resources and Services Administration

HUD United States Department of Housing and Urban Development

INE Instituto Nueva Escuela

IoT Internet of Things

IRP Integrated Resource Plan

IRS Internal Revenue Service

ISWM Integrated Solid Waste Management

KPIs Key Performance Indicators

KW Kilowatt

LIHTC Low-Income Housing Tax Credits

LISC Local Initiatives Support Corporation

LMI Low to Moderate Income

LQ Location Quotient

MA Medicare Advantage

MBA Mortgage Bankers Association of Puerto Rico

MCOs Managed Care Organizations

MGD Million Gallons Per Day

MIT Massachusetts Institute of Technology

MSA Metropolitan Statistical Area

MUSV Movimiento Una Sola Voz

NAICS North American Industry Classification System

NDRF National Disaster Recovery Framework

NERC North American Electric Reliability Corporation

NFIP National Flood Insurance Program

NGOs Non-Governmental Organizations

NIH National Institutes of Health

NOAA National Oceanic and Atmospheric Administration

NRCS Natural Resources Conservation Service

NTIA National Telecommunications and Information Administration

O&M Operations and Maintenance

OCIO Puerto Rico Office of the Chief Information Officer

OCPR Office of the Comptroller of Puerto Rico

OCS, by its Spanish acronym Office of the Commissioner of Insurance of Puerto Rico

ODSEC, by its Spanish acronym Puerto Rico Office for Community and Socioeconomic Development

OMB Puerto Rico Office of Management and Budget

OPPEA, by its Spanish acronym Puerto Rico Governor's Office for Elderly Affairs

OSTDS Onsite Sewage Treatment and Disposal Systems

P3 Public-Private Partnership

PACE Property Assessed Clean Energy

PDM FEMA Pre-Disaster Mitigation Grant Program

PICA, by its Spanish acronym Four Year Investment Program

PMO Puerto Rico Permits Management Office

PPA Power Purchase Agreement

PR Science Trust Puerto Rico Science, Technology & Research Trust

PRASA Puerto Rico Aqueduct and Sewer Authority

PRBA Puerto Rico Bankers Association

PRBC Puerto Rico Building Code

PRCC Puerto Rico Chamber of Commerce

PRDA Puerto Rico Department of Agriculture

PRDE Puerto Rico Department of Education

PRDF Puerto Rico Department of the Family

PRDHe Puerto Rico Department of Health

PRDHo Puerto Rico Department of Housing

PRDOJ Puerto Rico Department of Justice

PRDPS Puerto Rico Department of Public Safety

PREC Puerto Rico Energy Commission

PREMA Puerto Rico Emergency Management Agency

PREPA Puerto Rico Electric Power Authority

PRFN Puerto Rico Funders Network

PRHBA Puerto Rico Home Builders Association

PRHFA Puerto Rico Housing Finance Authority

PRHIA Puerto Rico Health Insurance Administration

PRHTA Puerto Rico Highways and Transportation Authority

PRIDCO Puerto Rico Industrial Development Company

PRIFA Puerto Rico Infrastructure Finance Authority

PRITA Puerto Rico Integrated Transit Authority

PRMA Puerto Rico Manufacturers Association

PRPA Puerto Rico Ports Authority

PRPB Puerto Rico Planning Board

PRPBA Puerto Rico Public Buildings Authority

PRPS Puerto Rican Planning Society

PRTC Puerto Rico Tourism Company

PRTD Puerto Rico Treasury Department

PRTEC Puerto Rico Trade and Export Company

PSHSB Public Safety and Homeland Security Bureau

QCEW Quarterly Census of Employment and Wages

RFP Request for Proposal

RISE Resiliency Innovations for a Stronger Economy

RPS Renewable Portfolio Standard

SAIDI System Average Interruption Duration Index

SAIFI System Average Interruption Frequency Index

SBA Small Business Administration

SMEs Small and Midsize Enterprises

SOPs Standard Operating Procedures

SSI Supplemental Security Income

SWMA Puerto Rico Solid Waste Management Authority

TIP Transportation Improvement Program

TRB Puerto Rico Telecommunications Regulatory Board

U.S. Army United States Department of the Army

UPR University of Puerto Rico

URA Puerto Rico United Retailers Association

USAC Universal Service Administrative Company

USACE United States Army Corps of Engineers

USDA United States Department of Agriculture

USDOC United States Department of Commerce

USDOED United States Department of Education

USDOL United States Department of Labor

USDOT United States Department of Transportation

USF Universal Service Fund

USFS United States Forest Service

USFWS United States Fish and Wildlife Service

USGS United States Geological Survey

WIOA Workforce Innovation and Opportunity Act

WPSs Water Pump Stations

WTPs Water Treatment Plants

WWPSs Wastewater Pump Stations


WWTPs Wastewater Treatment Plants



INTRODUCTION

01





Hurricanes Irma and María struck Puerto Rico on September 2017 and caused nearly complete devastation to the Island. On September 6th, Hurricane Irma — a category five storm — skirted the northern part of the island, causing significant flooding and leaving more than 1 million people without power¹. Two weeks later, on September 20th, Hurricane María passed east-to-west across the entire Island. Hurricane María caused a complete loss of power, and it damaged thousands of housing units, as well as telecommunication towers, roads, bridges, schools, and 80% of the Island’s crop value². Furthermore, Hurricane María impacted the structural integrity of all hospitals and health clinics, affected 70% of Puerto Rico’s potable water treatment and distribution system³, and caused immense suffering to nearly everyone in the Island. The Government of Puerto Rico’s damage assessment estimated that the Island would need \$94.4 billion to recover fully⁴. The National Oceanic and Atmospheric Administration (NOAA) estimates the damage from María makes it the third costliest hurricane in U.S. history, after Katrina (2005) and Harvey (2017)⁵.

The severity of the impacts highlighted the Island’s physical and natural infrastructure vulnerability to extreme weather events and the need to better prepare for future events. The hurricanes also exposed structural socioeconomic weaknesses that existed before the storms and that were exacerbated as a result. Such weaknesses include a contracting economy, a bankrupt public sector, declining jobs, high inequality, aging infrastructure and continuous population loss.

The combination of these physical, natural, and socioeconomic factors tested Puerto Rico’s resilience. Resilience is the capacity to respond, survive, adapt, and grow in response to shocks and stresses. Shocks are major crisis events that disrupt the normal operation of communities, as well as their institutions and systems. On the other hand, stresses are chronic conditions that progressively reduce the ability of individuals, businesses, institutions, and systems to function effectively.

Even in the midst of all this turmoil, Puerto Ricans are clear on one thing: The path forward is not to return the Island to its prior state, normality is not the goal.

Even in the midst of all this turmoil, Puerto Ricans are clear on one thing: The path forward is not to return the Island to its prior state, normality is not the goal.

The story of the new Puerto Rico is yet to be written. The Island must use this catastrophe to leverage the investments that will be made to change its growth and development trajectory. The recovery process should not focus only on replacing outdated infrastructure. Instead, it

should aim at building better assets, unleashing innovation, and coordinating among interested stakeholders. By creating these conditions, we will pave the path to address multiple challenges, increase social cohesion, strengthen the economy, and eliminate existing underlying socioeconomic weaknesses. Only then, Puerto Rico will be a better place for its citizens. The above is the vision of the Resilient Puerto Rico Advisory Commission and its core project, ReImagina Puerto Rico.

About the Resilient Puerto Rico Advisory Commission

The Resilient Puerto Rico Advisory Commission (the “Commission”) was created in November 2017 as an independent, inclusive, non-partisan, non-governmental body led by Puerto Ricans. It was designed to serve as a unifying force among a diverse group of voices. The Commission receives no public funding. It is financially supported entirely by Ford Foundation, Open Society Foundations, and The Rockefeller Foundation, with technical support from The Rockefeller Foundation’s 100 Resilient Cities, as part of a broad effort to support the resilient recovery of Puerto Rico.



The Co-Chairs lead the Commission. They are leaders from Puerto Rican civil society and professional communities that represent diverse interests and social sectors. They were selected in consultation with local groups to lead the effort and evaluate, endorse, and approve the overarching recommendations of this report.

Commissioners are civic, community, and business leaders appointed by the Co-Chairs. They represent a broad cross-section of NGOs, academic, civic, and professional communities in Puerto Rico. They are the project’s ambassadors, an integral part of the community engagement, and have contributed their knowledge and technical expertise to the development of this report’s recommendations.

(**Appendix A** contains a list of the Co-Chairs, Commissioners, and Secretariat of the Commission.)



Goal

The Commission’s goal is to promote a stronger, more resilient Puerto Rico as it embarks on reimagining its development and reconstruction processes. These processes must include more public participation and transparency, where the people of Puerto Rico take an active role in forging the vision of the Island.



Objective

The Commission’s core project, Relmagina Puerto Rico, aims to produce an actionable and timely set of recommendations for how to use philanthropic, local government, and federal recovery funds to help rebuild Puerto Rico in a way that makes the Island stronger – physically, economically, and socially – and better prepared to confront future challenges.

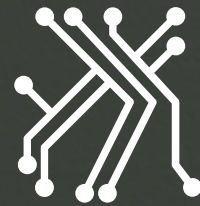
Reimagina Puerto Rico divided the work into six working groups:



Housing



Energy



Physical Infrastructure



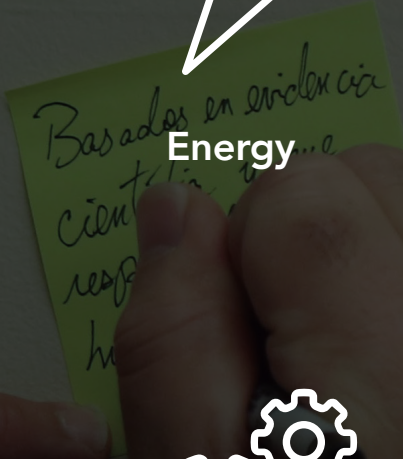
Health, Education & Social Services



Economic Development



Natural Infrastructure



Each working group met on three different occasions. They included Commissioners and other experts and stakeholders with extensive knowledge and experience in the focus of each of the working groups.

One of the central distinctions of this effort lies in the broad and participatory outreach process it has instilled toward Puerto Rico's recovery and reconstruction. The Commission has placed a primary focus on facilitating a conversation among a diverse collection of voices

to build consensus while looking for opportunities to embed resilience in the rebuilding efforts. As part of the outreach process, ReImagina Puerto Rico brought together schoolchildren and reached out to community members and leaders, community organizations, business leaders, government officials, and representatives from professional organizations, among other key actors. Also, it provided a common platform to discuss concerns and aspirations toward a more resilient Puerto Rico.

Puerto Rico's Resilience Challenge: Shocks and Stresses

Resilience describes the capacity of communities to organize themselves and function so that the people living and working in those communities – particularly the poor and vulnerable – can survive, adapt, and thrive no matter what shocks or stresses they encounter⁶. Therefore, it is vital to analyze Puerto Rico's shocks and stresses and their interdependencies.

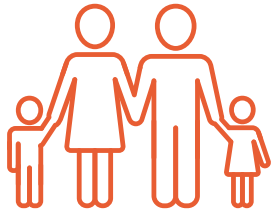
Hurricanes Irma and María were only the latest in a series of major events that have severely affected Puerto Rico over the last decade. The Island has faced multiple environmental and socioeconomic shocks that have tested its capacity and affected its ability to respond in the past. Tropical cyclones, floods, and wildfires have been common occurrences in its roughly 3,515 square miles. Between 1998 and 2017 the Governor of Puerto Rico has recognized over 45 emergency and disaster declarations associated with these shocks⁷.

Additionally, the Island's economy has been suffering a staggering economic contraction for more than 10 years. Outward migration and changing demographic patterns have resulted in reductions in the Island's overall population⁸ and an increase in the elderly and in the population living below poverty

levels. Over 41% of Puerto Rico's inhabitants are living below the U.S. federal poverty line, which is proportionally more than triple the U.S. average (11%)⁹. Puerto Rico's GINI coefficient – an indicator that denotes income inequalities across populations – is the highest in the United States¹⁰.

Moreover, in May 2017, a fiscal crisis that developed over decades spurred a bankruptcy declaration by the Government of Puerto Rico and several of its public corporations. The bankruptcy declaration¹² prompted a process to start restructuring Puerto Rico's debt obligations, placing additional challenges on the Island's public-sector operations and services. As such, any recovery measure that requires changes to the budget of local government agencies (from either revenues or expenditures), could be subject to additional restrictions by the U.S. Federal Court and the Financial Oversight and Management Board for Puerto Rico. All these factors constitute stresses affecting Puerto Rico, and they create additional challenges to the overall management of local government agencies and their policy implementation processes.

F1 Socioeconomic disparities in Puerto Rico¹¹



41.2%

Families under poverty level

U.S. 11.0%



\$19,606

Median household income

U.S. \$55,322



24.2%

18 years or older population with no high school diploma

U.S. 11.0%



0.54

Highest GINI coefficient within the U.S.

U.S. 0.48

12

The bankruptcy, which was made possible under Title III of PROMESA Law and enacted by Congress on June 30, 2016, allowed the U.S. Congress to impose a seven-member Financial Oversight and Management Board (FOMB) to deal with the Puerto Rico crisis. The President of the United States appointed seven members to the Board and the Governor of Puerto Rico designated one ex officio member. <https://juntasupervision.pr.gov/index.php/en/home/>

Throughout the ReImagina Puerto Rico project's working group meetings and community outreach efforts, the following shocks and stresses, which are affecting Puerto Rico, were identified:

Shocks



Floods



Hurricanes and tropical storms



Heatwaves



Epidemics



Landslides and ground subsidence



Earthquakes and tsunamis



Failure of health, communication, energy, fuel, water, and food distribution systems

Stresses



Urban deforestation and poor access to green spaces



Improper use of the land



Vulnerable populations in high-risk areas



Discrimination (gender, race, sexual orientation, homelessness)



Poor access to mental health and preventive and medical treatment services



Lack of available safe and affordable housing



Migration of health professionals



Sea level rise



Limited government resources to meet essential needs and services



Personal debt and increase in cost of living



Violence and crime



School closures



Obsolete, deteriorated, and aging infrastructure



Increased energy production cost



Lack of fiscal independence



Inability to pay mortgages and foreclosures



Ownership and tenure matters



Lack of municipal and other organizations' participation in decision making



Economic depression



Losses of employment and closures of companies; unemployment and underemployment



Aging of the population and social insecurity for the retired



Lack of preparation of individuals, communities, organizations, and the government before extreme events



Drought



Loss of home and personal property



Coastal and riverine erosion



When Hurricanes Irma and María struck the Island, the destruction – and the situation that has developed since then – was not just about the hurricanes. It was also about inequality, problems of aging infrastructure, a contracting economy, poverty, unemployment, immigration, lack of empowerment of social communities, and a debilitated social fabric. All of these factors increased vulnerability, undermined Puerto Rico’s resilience, and played an important role in the Island’s capacity to respond and recover from the hurricanes.

For instance, the high poverty rate in Puerto Rico and the lack of affordable housing have contributed to the inappropriate use of land, the increase of vulnerable populations that have settled in high-risk areas, and the increase of informal housing in general. The government agencies did not have an updated cadaster, and were therefore limited to rapidly and accurately assess the damages. Due to ownership and tenure rights, this already vulnerable population will experience increased difficulties in accessing available resources for home

repairs, which will, in turn, exacerbate poverty and vulnerability.

Puerto Rico’ infrastructure was brittle, outdated, and not properly maintained before the hurricanes. This was due to the government’s limited resources for capital investment. Also, the economic decline had led to the migration of professionals to the U.S. mainland, especially in the health and education sectors. The government’s damage assessment, performed after the impact of the hurricanes, indicated that each of the 68 hospitals and 107 health clinics experienced significant structural damages and power loss. Parts of the primary and critical care network had to close because of structural damages. There was a lack of reliable backup energy sources and of sufficient personnel and equipment. Combined with the tainted water supply and the widespread lack of reliable energy sources, this situation affected the population suffering from chronic diseases and represented a health crisis whose consequences will take years to manifest and fully assess.



📷 Lares, PR. Agustin Montanez

The Complex Landscape of Relief and Recovery Efforts

Immediately after the hurricanes – and since then – a wide array of organizations stepped up to support immediate disaster response and initial recovery actions. Among these, the non-governmental organizations (NGOs), community-based organizations (CBOs) and public schools (especially those in remote rural areas), as well as the local and federal government agencies, have played an instrumental role. Appendix B presents a glimpse of the vast array and complexity of recovery efforts led by NGOs, the federal government, and Puerto Rico government agencies.

The NGOs, CBOs and public schools all throughout the Island have been widely recognized for taking the lead in the immediate response efforts. They were first responders and, in many instances, the only ones¹³. NGOs and public schools were flexible and innovative. They took on new roles, created distribution centers, provided medical aid, collected information on damages

and vulnerable populations, established partnerships, mobilized resources (they produced more than 100 relief funds). In the process, they became strategic actors in the relief activities.

As public and private institutions continue to move forward, their involvement in recovery and reconstruction agendas presents a unique opportunity to strengthen Puerto Rico's infrastructure, processes, institutions, and communities in preparation for future shocks and to reduce day-to-day stresses. The government should leverage the work of the NGO sector and public schools. An organized, strengthened, and empowered nonprofit sector, in alliance with public school communities across the Island, will and should have an important role in the resilient reconstruction of Puerto Rico. They are close to the communities which give them invaluable knowledge regarding their needs, they have credibility, and they can act effectively and quickly.

Community Voices and Unmet Needs

Gathering public input was a main concern for ReImagina Puerto Rico. As part of the work, there was a broad and inclusive outreach engagement process (see Section III). Throughout this process, participants from all over the Island described and discussed their primary concerns and unmet needs as a consequence of Hurricanes Irma and María.



Limited financial capacity of local and Government of Puerto Rico institutions

One of the main unmet needs identified throughout this process focuses on the limited fiscal and financial capacities of public sector institutions and individuals to fund recovery actions¹⁴. Puerto Rico's limited budgetary capacity to engage in the reconstruction of critical infrastructure and the provision of essential services requires greater financial assistance from the federal government and philanthropic organizations¹⁵.

Deteriorated energy, water, transport, facilities, and telecommunication infrastructure systems

The need to address the derelict conditions of Puerto Rico's infrastructure emerged as one of the most essential across the Island after the hurricanes. There is a need for stronger and reliable protection against multiple shocks, particularly hurricanes, flooding and sea level rise impacts, for housing and critical infrastructure.



Limited health services, particularly mental health

A salient need discussed with community groups and technical experts was access to health services, particularly mental health. There have been many cases of human trauma after the hurricane, yet there is a great lack of access to mental health services (see Health, Education & Social Services Sector Report, Appendix C). The prevalence of mental health issues, high demand for these services, and lack of adequate medical attention is an ongoing stress for communities.





Disrupted education services

The aftermath of Hurricanes Irma and María severely disrupted the provision of education services. The use of schools as temporary shelters and a centralized school inspection process limited the prompt reopening of schools across Puerto Rico. The inefficiency of this process disrupted Puerto Rico's public education system for about eight weeks and the public higher education system at the University of Puerto Rico for over two months. Communities are worried about schools' infrastructure and the quality of the education. The consequences of the disruption of schools' academic calendars, the potential closure of schools, the absence of school personnel and communities in decision-making processes, and the growing migration of teachers undermine the state of education in Puerto Rico.

Limited enforcement of land use planning and building codes

Inadequate land use planning, implementation, and enforcement of existing development policies were also a limitation to the autonomous recovery of Puerto Rican families. Existing properties constructed along vulnerable areas prone to flooding, landslides, and high wind impacts, as well as with structurally insufficient construction, contributed to the loss of homes and buildings. Given the severity of the hurricanes' impacts on household structures, it is evident that laxity in land use zoning and permitting processes along vulnerable areas and in the structural safety of constructions is a major issue for communities. These conditions have exacerbated social insecurity and further limited the access to safe and affordable housing.



Limited access to safe and affordable housing

People living in high-risk areas (prone to flooding, landslides, and wind impacts) were greatly affected due to the destruction of their homes. They often do not have access to federal funds, lack resources to relocate, and are unable to reconstruct or retrofit their housing units to withstand and overcome these shocks. Given the predominance of families living in informal housing and in high-risk areas, the inability to take action is a great concern and it has led vulnerable populations to feel unprotected and at risk.



Increased social insecurity and inequality

Many communities across Puerto Rico were almost entirely inaccessible for weeks due to collapsed roads and bridges, landslides, and strewn vegetation that blocked many roads. Due to the lack of secure structures and access to transportation, in addition to vandalism and robbery after Hurricane María, people began to feel insecure in their communities. Additionally, heavy rains and sea swells continued to batter vulnerable populations in the hurricane's subsequent months, causing families to still be afraid of losing their homes and belongings. As a result, there has been significant displacement, and the economic and social impacts are not fully known but will manifest in the long term.



Lack of communication and coordination

The lack of communication and coordination between individuals, organizations, the media, and government officials is a core unmet need that needs to be addressed in order to overcome response and recovery challenges. Understanding individuals' and communities' needs is also critical in order to overcome these aforementioned challenges. As a result of the hurricane's aftermath, communities and organizations in all sectors of Puerto Rico consistently identified and recognized limited access to trustworthy information, efficient communication, and island-wide coordination. These limitations caused a sentiment of uncertainty and vulnerability that translated in challenges to cope with hazards, accelerate recovery, and minimize loss to life and damage to property and the environment.



The impacts, challenges, and unmet needs exacerbated by Hurricanes Irma and María offer a unique opportunity to adapt the Island's challenging path and steer a new course toward a stronger, equitable and transparent recovery process. Meeting the fundamental needs of the community is the first step in building long-term resilience. By addressing

the most fundamental challenges, Puerto Rico will recover and evolve to be stronger and better prepared to face any problems that come its way. Recognizing the multiplicity of challenges and unmet needs, the Commission established an engagement process to identify a set of actions to help Puerto Rico recover more resiliently.

A Pathway from Relief to Resilience: **Lessons from Hurricanes Katrina and Sandy**

One of the qualities of resilient systems is the capacity to be reflective and use past experiences to inform future decisions¹⁶. Post-disaster recovery efforts from Hurricanes Sandy and Katrina bring many valuable lessons at this moment of Puerto Rico's history. We will highlight four of them:

1 Climate Change: Resilience and Long-term Impacts

One of the first and main lessons lies in the importance of explicitly acknowledging the potential long-term impacts of climate change and highlighting and embedding resilience into all post-disaster recovery actions. The Unified New Orleans Plan¹⁷, the New York State 2100 Commission Report¹⁸, and the Hurricane Sandy Rebuilding Strategy¹⁹ all recognize the need to incorporate resilient solutions to the threat of climate change impacts as part of their actions. These components are particularly necessary to cope with the effects of sea level rise and more frequent and severe weather events, which in Puerto Rico also include changes in precipitation patterns and stronger hurricanes forming along the Atlantic Basin. As Puerto Rico rebuilds its infrastructure, it must incorporate resilience considerations in all actions to ensure preparedness for future disasters, reduce future costs, and improve the overall quality of life for Puerto Ricans.

2 Inclusive Recovery

A second lesson is that to be able to rebuild stronger and more resiliently, the recovery needs to be inclusive. It is necessary to provide strong support to local leaders and community-based recovery efforts, particularly to non-governmental organizations. Empowering local philanthropic organizations proved successful in supporting effective actions in the aftermath of Hurricane Katrina. The combined efforts of The Rockefeller Foundation and the Greater New Orleans Foundation were instrumental in the creation of the Unified New Orleans Plan, the guiding planning instrument for the recovery and reconstruction of the city. Also, Ford Foundation provided substantial support to the creation of the Louisiana Disaster Recovery Foundation to “provide resources for the relief, recovery, and betterment of Louisiana’s people and communities.... (and to) support nonprofit organizations engaged in economic development, housing, land use planning, education, and healthcare”²⁰. Given the strong performance and credibility of the NGO sector in Puerto Rico, serious considerations should be taken to strengthen them and include them as leading actors in the long-term rebuild.

3 Nature-based Solutions

A third lesson from the recovery efforts is to provide greater emphasis on the development of nature-based solutions and green infrastructure as part of an overall resilience strategy. Green infrastructure became an explicit recovery strategy of the federal government, as outlined in the *Hurricane Sandy Rebuilding Strategy* report. As part of recovery actions after Hurricane Sandy, several initiatives included green infrastructure projects, such as a coastal defense project in Jamaica Bay, Queens (NY) that harnesses wetland restoration to protect and restore its coastal zone. Also, hybrid projects that combine both green and grey infrastructure are currently being explored and undertaken across the country. Many of the actions presented in this report include these considerations. Decision makers in Puerto Rico should focus on adequately capturing the value and benefits of green infrastructure and environmental factors when defining infrastructure investments.

4 Investments for Long-term Recovery

Finally, one of the most important lessons arising from the catastrophes was the need for a system of transparent, coordinated, and aligned investments for long-term recovery. Although philanthropic funders, individual donors, and community-based lenders emerged to support the Gulf region, in New Orleans in particular, confidence was lacking about the capacity of local organizations to absorb and allocate funding transparently. Donors also worried about partnering with local government agencies and institutions due to pre-storm conditions of mismanagement and even corruption. Further compounding this challenge was an inability to coordinate and align the money — no one seemed to know who was doing what and how it cohered into a strategic recovery effort. Because of this, two important concurrent efforts emerged. One of them was the establishment of the Louisiana Recovery Authority (with professional staff guided by a volunteer citizen-led board) as the single point for federal funds budgeting and programming. The other one was the development of the Community Support Organization, housed at the Greater New Orleans Foundation, which supported the development of the Unified New Orleans Plan recovery strategy. The region and city suffered for a limited period, until these efforts began, because of the perception that investing in New Orleans' future was unwise.

The creation of the Louisiana Recovery Authority (LRA) and its sister organization, the Louisiana Disaster Recovery Foundation (now the Foundation for Louisiana), as well as the establishment of the Community Revitalization Fund at the Greater New Orleans Foundation, significantly changed Louisiana's trajectory. The LRA was a government agency established to be a transparent and credible clearinghouse of programming and investments, to ensure the coordination of significant fiscal efforts, and to take a strategic point of view about how investments would enable the region to build back better and increase resilience. They also facilitated the braiding of federal recovery dollars with other public and private investment. The Louisiana Disaster Recovery Foundation (now Foundation for Louisiana) became an incredibly important intermediary for national philanthropy to invest in the recovery of families and a low-income lender to facilitate small business and community investment.

Finding a Path Toward a Resilient Puerto Rico

Building resilience requires viewing a community holistically and understanding the systems that make up the place, as well as the interdependencies and risks through precise identification of existing and potential shocks and stresses. Beyond continuing to build its capacity for resilience, Puerto Rico must take advantage of the current moment to embark on a unified planning exercise that emanates from a series of consultations and debates, with numerous stakeholders and at multiple scales. Such a planning exercise can strengthen Puerto Rico's social fabric and devise and design a clearer set of projects and programs to improve its development trajectory and

the well-being of its citizens. To help jumpstart the required planning efforts, ReImagina Puerto Rico has put forth specific and actionable recommendations that comprehensively, and in a coordinated manner, address unmet needs and ongoing challenges and mitigate the impact of future disasters.

During the process adopted by ReImagina Puerto Rico, important recommendations surfaced which the Commission identified and developed, as described in greater detail in Section II. While there may be many paths to recovery, **the Commission established a set of recommended principles to steer all chosen paths. These guiding recovery principles are:**



Maximize social well-being in all investments

Given the extent of unmet needs and the fragile economic and fiscal situation of the Island, every recovery dollar spent should deliver positive social returns. As the recovery starts in full, decision-makers and investors should seek to maximize social well-being throughout all reconstruction efforts. This must be done explicitly across all investments in a way that not only improves resilience in Puerto Rico but also ensures social mobility and the just distribution of benefits.



Establish equity and inclusiveness as a priority

In this transformational moment, Puerto Rico must ensure its vulnerable population and all communities benefit from the recovery efforts. As we have presented throughout this report, the socioeconomic situation was difficult before the hurricanes. The hurricanes laid bare existing structural challenges and inequities. We have now the opportunity to address some of those disparities. Elements of participatory planning, design, budgeting, and decision-making should be incorporated in the path forward. The communities should be main actors in this process, and not passive recipients, to ensure these investments lead to equitable growth. The term “community” should be defined in a way that recognizes Puerto Rico as a migrant “crossroads” given that the Island has historically been a migrant-sending and -receiving country, and this migratory history has had a profound impact on our social, cultural, and political fabric.



Ensure transparency at all levels of policymaking

Accountability and transparency should be built-in to the ongoing process of recovery planning, implementation, and monitoring. Puerto Ricans should systematically and rigorously generate, as well as collect and update, data relevant to the recovery in order to make informed choices and determine if the investments are achieving their objectives and community goals. Strategies to improve data collection and ensure transparent dissemination can aid the delivery of existing programs, redirect funds when needed, encourage learning and innovation, and pilot new approaches.



Emphasize and foster coordination and collaboration

Coordination and collaboration among the multiple stakeholders involved in the rebuilding process can go a long way toward addressing the challenges presented by Puerto Rico’s complex governance and decision-making processes. Unnecessarily fragmented and disconnected systems lead to inefficiencies, redundancies, and gaps in addressing needs and providing services²¹. Open, conciliatory, and inclusive processes will generate better outcomes and increase the Island’s social and political stability.

These strategies aim to leverage recovery funding to address interrelated unmet needs associated with socioeconomic distresses, economic constraints, and limited adaptive capacities.

Crosscutting Strategies to Promote Recovery Principles

The Commission identified six crosscutting strategies directed toward reaching the four recovery principles previously described and leveraging philanthropic, federal, and local disaster recovery funds. These strategies are focused on addressing interrelated unmet needs associated with socioeconomic distresses, economic constraints, and limited

adaptive capacities identified during the Relmagina Puerto Rico engagement process. As an initial step to encourage a long-term vision for Puerto Rico, these strategies will foster best practices in the recovery and transformation process by attending unmet needs revealed by the passing of Hurricanes Irma and María.

1 Adopt a universal accessibility policy for the reconstruction efforts

Develop and implement a policy for all recovery and reconstruction efforts. This policy must center on accessibility regarding older adults, people with disabilities and others with access/functional needs in order to address current and future unmet needs for accessibility. This policy should stipulate that accessibility codes be applied in outreach processes, information and communication technologies, and basic infrastructure systems. Incorporating universal design principles into post-disaster situations with a long-term perspective is particularly important as it opens up opportunities for reconstructing infrastructure more inclusively.

2 Establish effective and equitable community participation

Design and execute unmet needs' identification assessments, allocation methods, and comprehensive recovery plans with inclusive participatory and collaborative processes with philanthropic, federal, and local disaster recovery funding opportunities. The rebuilding efforts and processes should be as close as possible to the people by establishing a procedural framework that incorporates participatory planning and decision-making processes. Municipalities will play a key role in establishing community engagement structures that are permanent and guided towards community participation, access to data, and understanding of the recovery processes. Identify groups with effective participatory models, and integrate them in the reconstruction efforts where reconstruction policies and actions have been determined and defined.

3 Implement evidence-based approaches to foster transparency and capacity building

Create a multi-sector advisory board to ensure evidence-based design and prioritization of projects and to enable knowledge transfer between municipalities, nonprofit organizations, community groups, public schools' personnel, academia and the private sector. This board would guide federal and local government officials through the design of multiple-benefit frameworks to develop, prioritize, and monitor evidence-based recommendations. It will also provide them with technical assistance in the dissemination of information to municipalities, community organizations, and nonprofit organizations.

4 Promote innovation in reconstruction efforts

Prompt and strengthen the capabilities of innovation labs to trigger new and refined products, services, and models that address unmet needs more effectively. Fostering innovative design and implementation in the reconstruction efforts will enable the development of novel social solutions (such as growth in jobs and sharing of information), technical approaches (such as technologies, types of construction, and flood control systems), and institutional advances and best practices (such as procurements, monitoring, transparency, and knowledge transfer). The innovation labs should be composed of multi-sector, cross-functional teams that include the government, academia, nonprofit organizations, private businesses, and communities. At the most basic level, these teams will be responsible for performing research, networking, innovative solution competitions, and evaluating the impacts of creative problem solving that attends a diverse spectrum of stakeholders.

5 Develop resilient and empowered communities

Support, develop, and implement place-based community resiliency plans, focused on disaster risk preparedness and strategies, that address community needs, aspirations, and integration. Support should be employed to create community engagement structures for individuals and businesses to work with professional planners and other multidisciplinary experts. The planning process should stimulate genuine community involvement and empowerment of socially disadvantaged groups at all stages in the development of comprehensive and disaster management programs. This will facilitate capacity building, coordination, and trust, which are essential in reducing community vulnerability to natural disasters. Structures and plans should be built upon from the application of knowledge, practices, and lessons learned by local communities after experiencing the impacts of Hurricanes Irma and María. This strategy recognizes the valuable contribution of empowered local communities and enables cooperation in all place-based planning programs.

6 Integrate a resilience dividend in all investments

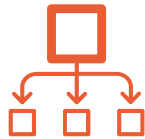
Design planning processes, prioritization frameworks, and policies that integrate the resilience dividend and factor in a decision-making criterion to leverage recovery funds. The resilience dividend refers to the cost-savings, cost-avoidance, and multiple benefits created across multiple systems through resilience planning, projects, and practices. Given the immensity of the unmet needs and the Island's fragile economic situation, every dollar spent is a precious investment. Individuals, decision-makers, and investors need to be explicit about maximizing the co-benefits of all investments. All investments deployed in Puerto Rico should aim to contribute to its resilience by delivering multiple positive returns and serving communities in both the good times and the bad times.

RESILIENT PUERTO RICO ADVISORY COMMISSION

STRATEGIC RECOMMENDATIONS

2022

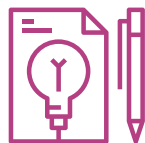
Even though it is initially difficult to determine when the relief efforts stop and the recovery starts, there is a path that Puerto Rico will need to navigate wisely to take advantage of all the opportunities that arise. By strengthening the territory's underlying social fabric and better understanding the potential shocks and stresses it may face, Puerto Rico can improve its development trajectory and the well-being of its citizens. This report puts forth specific and actionable initiatives that comprehensively, and in a coordinated manner, address unmet needs and ongoing challenges and mitigate the impact of future disasters. The report presents findings organized in the following groups:



Sector Goals



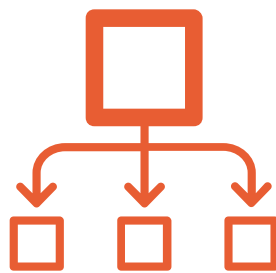
Priority Recommendations



Sector Specific Opportunity Recommendations



📷 Arecibo, PR. Jeff Miller



Sector Goals

Developing actionable items requires a clear definition of the scope and reach of the issues these initiatives will address. Such a definition promotes realistic expectations and avoids setting overambitious goals that ignore the current social, economic, and institutional landscape that defines Puerto Rico's condition. As such, Relmagina Puerto Rico has set sector goals, which appear on the following page.



Housing

Develop a portfolio of strategies that reduce risk exposure, foster community empowerment, and address the diversity in socioeconomic conditions, housing types, and tenure in Puerto Rico.



Energy

Address Puerto Rico's energy needs by transforming its electric power infrastructure into an affordable, reliable and innovative system, while reducing adverse impacts on human health and the environment.



Physical Infrastructure

Develop and maintain infrastructure systems that are accessible, integrated, flexible, and robust enough so they may sustain critical operations for the well-being of Puerto Ricans.



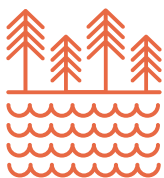
Health, Education & Social Services

Develop initiatives that ensure the provision of health, educational, and social services to reduce existing and future vulnerabilities, and chart a pathway toward improved equity and well-being, with more participation of the people in its definition and implementation.



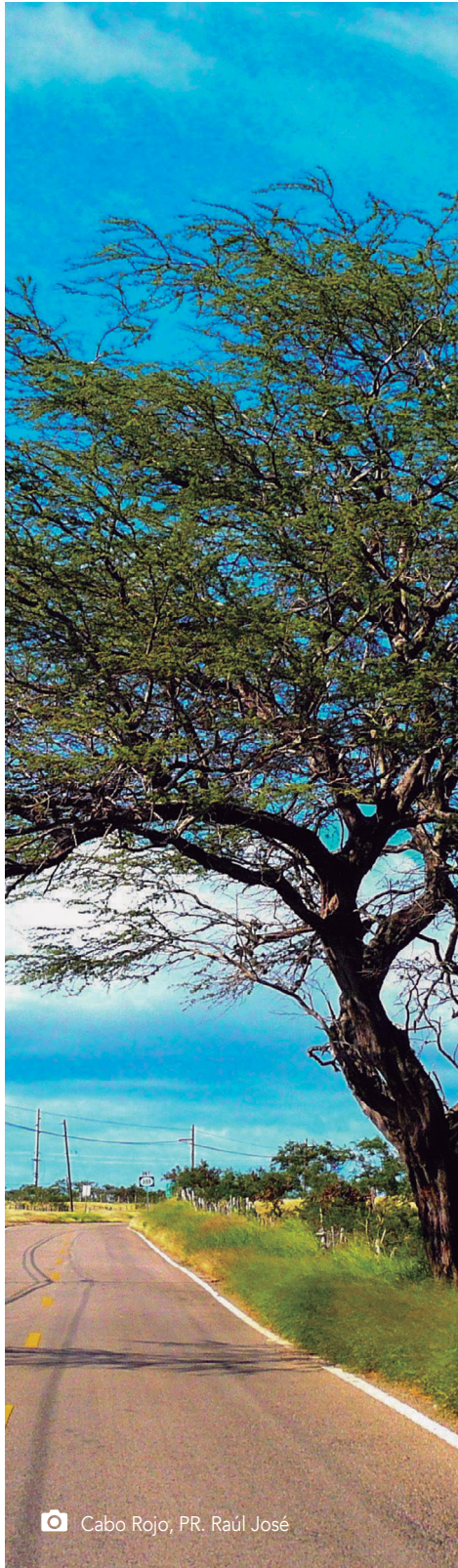
Economic Development

Craft a diversified portfolio of economic activities that augment Puerto Rico's resiliency by enhancing existing capabilities, improving employment prospects, and reducing inequalities.



Natural Infrastructure

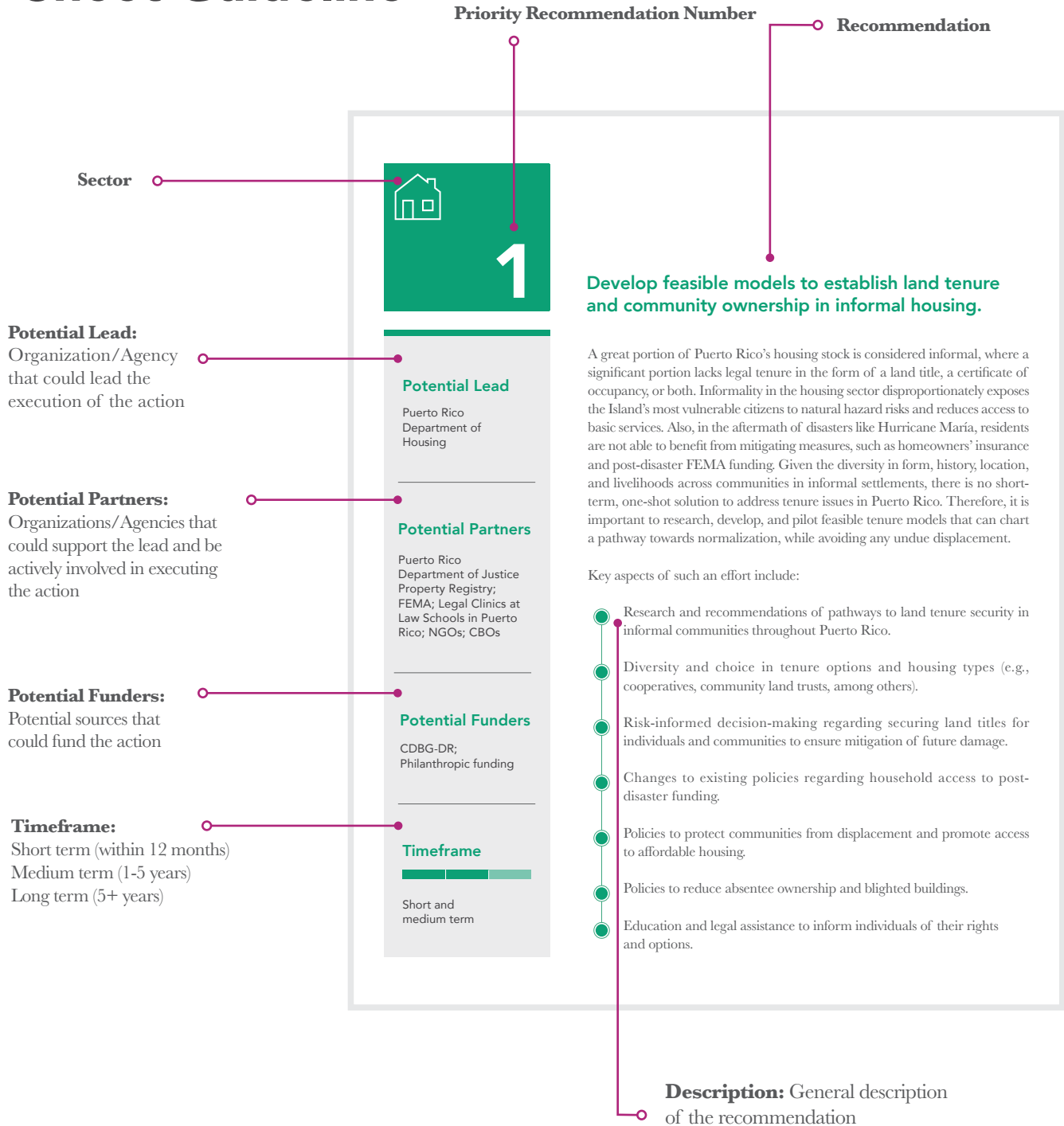
Improve human health and well-being, foster economic development, and reduce exposure to hazards, through the sustainable use of Puerto Rico's natural resources.



Priority Recommendations

These are 17 recommendations that have been highlighted from the sector reports as being particularly crosscutting, valued by participants as high priority, actionable, and attending critical issues. Each of these recommendations addresses several of the challenges and unmet needs of Puerto Rico. In this sense, these are initiatives that impact the rebuilding of Puerto Rico and significantly strengthen the Island's resilience.

Priority Recommendations Sheet Guideline





Develop feasible models to establish land tenure and community ownership in informal housing.

Potential Lead

Puerto Rico
Department of
Housing

Potential Partners

Puerto Rico
Department of Justice
Property Registry;
FEMA; University
of Puerto Rico Law
School; NGOs; CBOs

Potential Funders

CDBG-DR;
Philanthropic funding

Timeframe



Short and
medium term

A great portion of Puerto Rico’s housing stock is considered informal, where a significant portion lacks legal tenure in the form of a land title, a certificate of occupancy, or both. Informality in the housing sector disproportionately exposes the Island’s most vulnerable citizens to natural hazard risks and reduces access to basic services. Also, in the aftermath of disasters like Hurricane María, residents are not able to benefit from mitigating measures, such as homeowners’ insurance and post-disaster FEMA funding. Given the diversity in form, history, location, and livelihoods across communities in informal settlements, there is no short-term, one-shot solution to address tenure issues in Puerto Rico. Therefore, it is important to research, develop, and pilot feasible tenure models that can chart a pathway towards normalization, while avoiding any undue displacement.

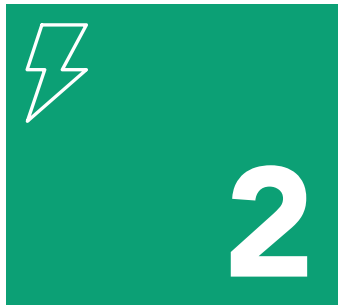
Key aspects of such an effort include:

- Research and recommendations of pathways to land tenure security in informal communities throughout Puerto Rico.
- Diversity and choice in tenure options and housing types (e.g., cooperatives, community land trusts, among others).
- Risk-informed decision-making regarding securing land titles for individuals and communities to ensure mitigation of future damage.
- Changes to existing policies regarding household access to post-disaster funding.
- Policies to protect communities from displacement and promote access to affordable housing.
- Policies to reduce absentee ownership and blighted buildings.
- Education and legal assistance to inform individuals of their rights and options.

Immediate Next Steps:

- ✓ Confirm the roles of initiative owners and contributing partners. Convene a kickoff workshop to design the initiative, including a phasing plan and site visits.
- ✓ Identify pilot communities, including initial conversations with residents, local leaders, and government authorities, to understand the context and long-term vision for the community.
- ✓ Initiate and document a research plan.





Establish reliable and diversified backup energy systems for vulnerable individuals and critical facilities, such as hospitals, schools, and emergency shelters and services facilities.

Potential Lead

Governor's Authorized Representative

Potential Partners

PREC; Electric utility and private stakeholders; Community groups; NGOs; Local health and human services providers; Resilient Power Puerto Rico; Siemens; RePowering; Rocky Mountain Institute

Potential Funders

HMGP; CDBG-DR; USDOC; U.S. Army; USDOED; HUD; Other federal funding under HR-1892

Timeframe



Short term

Recovery funds should be used to identify energy depending individuals and define guidelines to adopt adequate technologies. Also, backup energy systems that are reliable and diversified should be installed in critical facilities, such as hospitals, schools, nursing homes, fire and police stations, water supply systems, wastewater treatment plants, fuel pumping and pressurization stations, cellular communications, community centers, and emergency shelters, among others. The electrical systems of these facilities should be hardened and made redundant in order to protect assets and systems against natural hazards and power system failures. These efforts would follow redundancy recommendations as contained in FEMA P-1019 (September 2014). FEMA P-1019 promotes the concept of backup energy systems based on knowledge developed from Hurricane Sandy, and promotes the nonutility installation and operation of power generation for backup support.

In every community there are vulnerable individuals who rely on electricity for medical aid, treatments, climate control, and other essential health and safety supports. This initiative should give priority to enabling access to backup energy equipment for such vulnerable individuals, whether in critical facilities, in other locations, or by other means. Furthermore, critical facilities provide essential services and functions for survival, the continuation of public health and safety, and disaster recovery. These critical facilities rely on continuous electric service to ensure operation and services continuity.

In the advent of Hurricane María, the extensive failure of power service, including insufficient backup power at the Island's over 50 hospitals, is an indication that hospitals are excellent candidates for backup power additions or enhancements. These enhancements should focus on the development of diversified energy backup systems, such as renewables and energy storage. To the extent legally allowed, and supported by a sound business case, installations and retrofits to secure continuous power supply may be linked with the establishment of microgrids for critical facilities together with adjacent properties and facilities. On a longer-term basis, backup and microgrid energy systems can be coordinated with external predictive systems to anticipate weather emergencies and potential extended outages.

Action steps include:

- Identify the designation of all critical facilities with the relevant federal and local government departments. Similarly, the designation of ‘energy dependent individuals’ should be confirmed with relevant departments and services providers and the names and residences of such individuals should be identified.
- Organize and implement a full energy redundancy assessment of the identified facilities and individuals. Participation and input from stakeholders will provide real-time and recent experience from facility managers and specific user populations regarding power needs and energy priorities.
- Establish an appropriate mechanism to allocate and provide financial access to backup system procurements, purchasing, and installations based on the mix of facility types identified across the region and their different assessed needs.
- Fast-track demonstration projects should be prepared and implemented as early as possible for each of the different types of critical facilities and vulnerable population groups. These demonstrations can provide a basis for learning. They can also refine the approach to i) assessments or requirements, ii) evaluation and selection of solutions/technology, iii) project planning, iv) procurement and installation, and v) facilities' management training, and vi) systems performance monitoring. The use of demonstration projects should support refinement of technology choices, processes, regulations, funding, and operational aspects of subsequent projects.
- Simultaneously, implementation teams can be organized for project leads (e.g., hospitals facilities managers, community center facilities managers, nursing home facilities managers, among others.) Each demonstration project can be used to train the relevant facility managers in each cohort, on which basis they can initiate assessments and project planning for their respective facilities.

Immediate Next Steps:

- ✓ Confirm the roles of initiative owners and contributing partners. Convene a kickoff workshop to design the initiative, including a phasing plan and site visit to relevant existing pilot projects in the region.
- ✓ Secure existing data on designated critical facilities and vulnerable individuals, confirm designations with relevant government departments and service providers, and establish a database of these to track the establishment and progress of projects in each facility or for each group.
- ✓ Establish arrangements to make recovery funds available to all identified critical facilities across the region in order to plan and install reliable and diversified backup energy systems.



Develop resilient community centers to improve the provision of services during emergencies and disaster relief.

Potential Lead

Communities;
Municipalities;
Puerto Rico
Department of Housing

Potential Partners

PRPB; HUD;
FEMA; PSHSB; 911
Administrators; FCC's
Public Safety Support
Center; NGOs; PECES

Potential Funders

CDBG-DR; HMGP;
Philanthropic
funding; FCC;
Telecommunication
providers, including
AT&T and Claro

Timeframe



Medium term

Key locations that provide services to communities in municipalities across the Island could be adapted into resilient community centers. The key is to identify physical spaces providing communities with social, economic, health and education services that could be transformed into these aforementioned resilient community centers. These centers would provide multiple cross-sector benefits to the community, such as Pre-K, educational classes, and workforce training programs. These centers would also offer a space for disaster relief services and ongoing provision of resources for the community.

During emergency response situations, the resilient community centers would serve as command hubs for communication with federal and local agencies. They would also offer digital communication services for communities and businesses with limited to no access. Additional services could include access to a digital lifeline (e.g., radio communication and a command center), provision of water, information, and medical services. The resilient community centers should have redundant energy and water services, focused on renewable energy, rain harvesting, and community gardens.

Activities include:

- Develop a quick assessment to identify potential pilot projects across the Island.
- The aforementioned assessment could include existing community centers or rehabilitation of existing structures (e.g., government or public buildings, such as schools).
- Select potential sites based on communities and risk assessments, and informed by evaluating data from the Federal Communications Commission's Disaster Information Reporting System (DIRS).
- Design the centers based on community census to define geographic target areas, community profiles (e.g., elder people, children, people with special needs), adequate spaces for basic services, and community interests, such as types of social services and recreation activities.

- Pilot the resilient community centers in public housing projects.
- Resilient community centers could serve as testbeds for innovations on green building design geared toward resiliency strategies (for example, solar panels with battery storage, water capture and reuse, recyclable building materials, or 5G hubs).

Immediate Next Steps:

- ✓ Set up initial meetings with leads and partners to discuss project opportunities and define the roles of initiative owners and contributing partners.
- ✓ Assess potential locations, community census, and prioritization of needs.
- ✓ Establish a plan for implementation and monitoring, and develop a proposal with estimated costs and multipurpose co-benefits.
- ✓ Convene a kickoff workshop to design the initiative, including a phasing plan and site visit to relevant existing pilot projects in the region.
- ✓ Verify existing data on individuals, confirm designations with relevant government departments and service providers, and develop a database of the aforementioned data to track the establishment and progress of projects in each facility or for each group.
- ✓ Ensure that arrangements are established to make recovery funds available for the planning and installation of reliable and diversified backup systems (telecommunication, energy, water).



Invest in improvements to the physical infrastructure of educational and healthcare facilities to improve the provision of services on a regular basis and in the face of multiple hazards.

Potential Lead

Puerto Rico Public Buildings Authority

Potential Partners

PRIFA; PRDE; PRDHe; PREMA; PRDHo; NGOs; Puerto Rico Legislature; Public school teachers; FEMA; HHS; Private healthcare providers; Bechtel Corporation (for educational infrastructure); Thornton Tomasetti (for healthcare infrastructure); 100 Resilient Cities' Platform Partners

Potential Funders

HMGP

Timeframe



Medium and long term

This initiative will create a roadmap to direct investment in the improvement of social infrastructure toward facilities whose failure or closure, in the event of a disaster, would pose the greatest physical and social risk to users and communities. The initiative also proposes pilot retrofit projects for schools and hospitals with the objective of scaling the approach across the full portfolio of social infrastructure.

While schools perform vital functions in educating youth, they also serve as critical hubs in communities. In the event of a disaster, school closures, due to damage or their use as emergency shelters, prevent children from returning to school, which, in turn, limits the ability of parents to return to work. There is a ripple effect on the recovery of society as a whole. Facilities and their associated infrastructure must be capable of withstanding the impact of natural disasters with limited or no damage in order to allow swift recovery of community functions.

Recommended actions include the following:

- Conduct a vulnerability assessment of the Island's school infrastructure portfolio, identify schools which are most vulnerable to hazards, and use this information for long-term mitigation planning. This activity should enable a systems approach to prioritize infrastructure investments informed by risk awareness.
- Improve the reliability of critical infrastructure systems that support schools on a regular basis and in times of emergency. This must include alternative energy, water harvesting and other innovative methods that reduce dependence on centralized systems.
- Integrate passive design concepts into school buildings through building orientation, natural daylight, and cross ventilation in order to reduce energy needs and maximize student performance.
- Limit impervious surfaces on school grounds to decrease runoff and increase rainwater absorption.

- Build and retrofit school facilities with locally-available materials, construction techniques, and labor to stimulate the local economy and reduce reliance on and cost of foreign products. The design and construction of these facilities should conform to the latest adopted building code.
- Involve the community in the visioning, design and maintenance of schools.
- Use schools as multi-purpose, cultural utilities that provide resources and services to the wider community. Such resources and utilities should include capacity building/re-training spaces for displaced adults, libraries, internet access, performance/art spaces, playgrounds, gardens, and meeting rooms, among other.
- When schools are closed and no longer needed for education, consider using the infrastructure to build community resilience in other ways. These infrastructures could be used for housing, community centers, or emergency shelters, with the option to reinstate them as schools in the future if needs change.
- Where schools are needed as emergency shelters, ensure that contingencies are implemented to ensure students can have access to and continue to receive education services after the emergency declaration has finalized.

This action can be strengthened through strategies that establish alliances with municipal governments, philanthropists, foundations, and the school community. These alliances would enhance and improve the current overall condition of schools.

The physical infrastructure of hospitals and healthcare clinics in Puerto Rico suffered structural damages and power losses as a result of the hurricanes, preventing the provision of critical healthcare services. The recovery process presents an opportunity to make improvements to the infrastructure that will benefit users on a regular basis.

The following are key components of the process that should be considered:

- Develop and update a multi-hazard risk assessment for healthcare facilities.
- Compare the current expected performance of each facility with its desired performance. Performance should be evaluated based on everyday operations and defined emergency scenarios. The comparisons should identify the physical building performance (e.g., acceptable levels of structural and non-structural damage), the building services performance (e.g., water, power, communications

needs), operations (e.g., downtime, staffing), and other off-site considerations (e.g., access to the site, transportation, power grid). After identifying the gap, a cost-benefit analysis should be carried out to identify the most cost-effective solutions.

- Prioritize which healthcare facilities should be upgraded using this systems-level assessment at a regional or Island-wide level, taking into account both cost to upgrade to desired performance level and criticality of service/demand in emergency scenarios.
- Provide for backup power, water, medical supplies, food, fuel for generators, and emergency vehicles and housing for key staff on site.
- Develop emergency plans, training, and operational procedures, factoring in roles and availability of staff to complement physical infrastructure upgrades.
- Leverage investment for improvements in the performance of healthcare facilities during emergency scenarios in order to enhance everyday performance and address deficiencies that existed before the hurricanes. For example, consider how modifications to strengthen the envelope of buildings can be used to improve energy efficiency and thermal performance. Investigate options for distributed energy or Combined Heat Power/Cogeneration to provide reliable power, as well as reduced emissions and potential revenue generation. Study the use of green infrastructure to mitigate flood risks and create more appealing environments for patients and staff.

Immediate Next Steps:

- ✓ Confirm partnerships with education and healthcare infrastructure owners.
- ✓ Select pilot facilities for mitigation studies, conduct site visits, and begin scoping and data review based on the best available information from infrastructure damage assessments and hazard maps, in consultation with infrastructure owners.
- ✓ Develop the evaluation criteria and a work plan for the creation of a roadmap to prioritize investments in school infrastructure.



5

Prioritize Workforce Innovation and Opportunity Act (WIOA) funding for training, re-training, and skills credentialing within priority industry clusters.

Potential Lead

Puerto Rico Department of Economic Development and Commerce

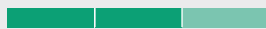
Potential Partners

COR3; DOLHR; PRDE; Labor unions; Industry associations; Universities and vocational schools; Not-for-profit training organizations

Potential Funders

WIOA; EDA; HUD; Municipal and Puerto Rico Government budgets; Workforce investment boards and intermediaries

Timeframe



Short and medium term

The recently passed Workforce Innovation and Opportunity Act (WIOA) establishes guidance for how workforce training dollars will be invested in Puerto Rico. Ideally, these dollars will be aligned with priority industry clusters that have clear potential to grow.

The allocation of WIOA funds should reflect the needs of prioritized industry clusters. Doing so will support the career pathways of individuals who have relevant employment experience and life skills but lack formal education or industry certifications in those clusters. Rapid assessments of workforce needs should be completed for priority clusters, considering both current reconstruction efforts and requirements for mid- and long-term cluster competitiveness and growth. Trade unions should work in these assessments with business groups and Puerto Rico agencies involved in the allocation of WIOA funds. As proposed in the WIOA State Plan, a working group of representatives from key existing and emerging industries, government departments, industry associations, and relevant labor unions should assist the State Board and local (regional) boards in the development of sector strategies and related career pathways.

Immediate Next Steps:

- ✔ Set up initial meetings with the Puerto Rico Department of Economic Development and Commerce, the Puerto Rico Central Office of Recovery, Reconstruction and Resilience, and potential partners from municipalities and the private sector.
- ✔ Set the scope of work with leaders and partners.
- ✔ Push for policy implementation.



Update the Island’s digital land cadastre to include: use and occupancy of structures, land tenure data, housing characteristics in informal housing, and information on insurance coverage.

Potential Lead

Puerto Rico Municipal Revenue Collection Center

Potential Partners

PR Science Trust; PRPB; PRDHo; PMO; Municipalities; HUD; Institute of Statistics; 100 Resilient Cities’ Platform Partners

Potential Funders

CDBG-DR

Timeframe



Short and medium term

The first step towards a safer overall housing sector in Puerto Rico should be the creation of a centralized and accessible database that includes (1) land tenure, use, and form for the informal housing sector, (2) community assets, and (3) economic opportunity. This database would help ensure social stability, security, and equity. More specifically, the cadastre should include use and occupancy of structures, inventories, and databases from the Department of Housing and its proposed land title grant plan. It should also include data on characteristics and typologies of informal housing (including, insured properties and exposure and vulnerability to floods, earthquakes, and landslides) collected through community-based projects. Additionally, this initiative would identify vacant properties and other existing building stock that are suitable for housing development, which will, in turn, help maintain affordability. It would also establish an evidence base that can be used for broad planning efforts that support resilience in the housing sector but also for physical infrastructure, natural infrastructure, and economic development.

Informal housing includes unpermitted residential structures that the occupants may or may not own, tenure situations that are not formally recognized by the state, as well as structures built on land owned by a public entity or a third-party private property owner. Informal structures disproportionately expose the island’s most vulnerable residents to natural hazard risks and limited access to basic services. In the event of a disaster like Hurricane María, residents of informal structures are unable to benefit from mitigating measures, such as homeowners’ insurance and post-disaster FEMA funding. Due to a lack of title, residents generally do not invest in risk reduction.

The data collection and mapping initiative will be community-driven and piloted in a selected community with the intention of scaling the approach to other locations. Data should be collected, digitized, integrated, shared, and regularly updated in a coordinated, transparent, and accessible way to create a trusted and accurate evidence base to inform decision-making related to reconstruction, mitigation, planning and future development.

Map layers could include the following content:

- Natural hazards and risk characterization, such as wind, flooding (including long-term sea level rise), earthquakes, landslides, ecologically-sensitive areas, and risk-based estimates based on hazards and existing conditions (e.g., vulnerable population, occupancy, constructions).
- Cadastre data, including land parcels, ownership, use, inventories from the Department of Housing and its proposed land title grant plan, and insurance data.
- Structure data locations, occupancies, ownership, permitting, and typologies, such as vulnerabilities to wind and earthquake forces based on age, construction type, and number of floors, to mention a few.
- Unoccupied structures or land suitable for infill housing, including public land and potential brownfield sites.
- Social data, including demographics, community assets, functions and organizational structures, and access to jobs and economic opportunities.

Immediate Next Steps:

- ✓ Confirm roles of initiative owners and contributing partners.
- ✓ Convene a kickoff workshop that includes a phasing plan and site visit to design the initiative.
- ✓ Identify pilot communities. Set up initial conversations with residents, local leaders, and government authorities to understand the context and long-term vision for the community.
- ✓ Begin initiative design, including data and mapping protocols, community engagement, and data collection strategies.



✓ Begin to aggregate existing data sources, including:

- Puerto Rico Land Use Plan maps, municipal land use plans maps, DNER environmental data maps, and integrated hazard assessment tools
- Cadastral data available in the CRIM's Digital Cadastre Portal website
- PRDHo data, including 610+ parcel communities and housing rehabilitation programs
- Puerto Rico GIS portal
- FEMA risk maps

- New damage assessment data from FEMA and other organizations
- Relevant data from the Tu Hogar Renace program
- Socioeconomic data from the U.S. Census Bureau, American Community Survey, and local schools of architecture, planning, and community social work studies
- Available insurance data
- Other sources, including 100 Resilient Cities Platform Partners



Commission a study to support the deployment (underground and aerial) of a more resilient telecommunications infrastructure.

Potential Lead

Puerto Rico Electric Power Authority

Potential Partners

TRB; Electrical conduit suppliers for Puerto Rico (e.g., American Wire Group, Underground Devices, Inc. and Gibson Stainless & Specialty, Inc.); FCC

Potential Funders

5G - franchise fee revenue; FCC's Universal Service Fund

Timeframe



Short and medium term

Before making capital investments in new infrastructure, a study should be commissioned to assess the best way to harden and protect the telecommunications and the energy transmission infrastructures. This study should include feasibility and cost-benefit of establishing an underground utility conduit system versus hardening the aerial infrastructure. The Puerto Rico telecommunications network sustained complete failure as a result of the hurricane. This was due to winds, wind-powered debris, falling tree limbs, and landslides.

Protecting the utility plants will make the network more resilient and mitigate shocks and stresses to the system. It is unlikely that any system can completely prevent outages, but a study would show which investments will have the best value. Deploying utilities in the underground conduit is generally more expensive than deploying on poles. Poles should be upgraded, and better attachment and maintenance procedures, like tree trimming, can mitigate against damage at a reduced cost.

The risk of future shocks and stresses impacting the utility plant is high. Therefore, a potential solution would be to move utility plants off aerial utility poles and into underground conduit. This solution must focus on building a redundant middle mile ring around the Island, along major highways.

Regarding implementation, direct burial conduit is a proven deployment practice, and the cost of deploying conduit, especially in conjunction with road work, can be cost-effective. Deploying a shared underground conduit bank for telecommunications and power cables, in a ring around the island, could help lay the foundation for this underground network in the near-term. In the long-term, it would potentially continue for utility infrastructure expansion.

Immediate Next Steps:

- ✔ Set up meeting with leads and partners to discuss project opportunities and define roles of initiative owners and contributing partners.
- ✔ Convene a kickoff workshop to design the study methodology, criteria, funding structure and set the scope of work with leads and partners.
- ✔ Review existing data and establish a database platform for tracking the study's progress.



Enforce open space determinations with programs/ guidelines for the dedication of lands to the creation of parks, green infrastructure projects, land conservation, or other adequate uses.

Potential Lead

Puerto Rico Department of Housing; United States Department of Housing and Urban Development

Potential Partners

Municipalities; HUD; GAR; FEMA; PRPB; PMO; DNER; NGOs

Potential Funders

HMGP; CDBG-DR; PDM; Repetitive Flood Claims Grant; EWP-FPE

Timeframe



Medium and long term

A program and guidelines should be developed to support the local and municipal governments to effectively promote the acquisition of open spaces in private lands and properties in high hazard areas. Under FEMA's Hazard Mitigation Grant Program, open spaces are areas perpetually dedicated to the conservation of natural floodplain functions and restricted from any use or development that interferes with that purpose.

The proposed programs and guidelines will create more resilient communities and enhance communities' aesthetics. They will also reduce spending on construction, maintenance of infrastructure for flood control, and National Flood Insurance Program (NFIP) payments for insurance claims. Overall, this action will reduce federal, local government, and municipal spending on emergency response.

This program will define actions to demolish existing structures and maintain lands as open spaces for permanent public use and multiple benefits. Besides reducing the number of individuals living in high hazard areas, these guidelines will: define land use requirements, establish processes for place-based projects, and promote multifunctional projects. Projects might create multifunction recreational parks, urban forests, and edible urban gardens, as well as restore dunes and wetlands and improve wildlife habitats while providing economic and social benefits. Projects might also include improvement of stormwater management with flood storage/overflow areas. Additionally, the program will define requisites for the establishment of partnerships and collaborations with NGOs to develop and administer the determined open spaces.

In Puerto Rico, high hazard areas impacted by Hurricane María and abandoned and deteriorated structures, should be prioritized. Structures and properties that have experienced repetitive losses based on the National Flood Insurance Program (NFIP) should also be highlighted. The Puerto Rico Planning Board should maintain all the determined open spaces in overlay districts and include coordination requirements and monitoring systems in association with nonprofit organizations.



Immediate Next Steps:

- ✔ Set up initial meetings with the Puerto Rico Hazard Mitigation Officer, FEMA, potential non-governmental organizations, and municipalities to discuss Hazard Mitigation Grant requirements for partnership and potential pilot projects.
- ✔ Perform an assessment of potential pilot projects, prioritization of needs, and community-based solutions.
- ✔ Establish a plan for implementation and monitoring and develop a proposal with estimated costs and multipurpose co-benefits.
- ✔ Design a database to track the establishment and progress of future projects.



Prepare a new Integrated Resource Plan (IRP), with public, community and private sector participation, to be used as the foundation for the energy sector transformation and which includes updated analysis and forecast of the demand base, aggressive renewable generation targets, and a risk-based analysis of the sector to strengthen utility oversight and operator decision making.

Potential Lead

Puerto Rico Energy Commission

Potential Partners

PREPA; DEDC; PRPB

Potential Funders

PREPA; PREC

Timeframe



Short term

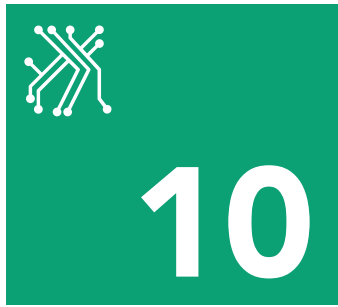
There is an urgent need for an updated IRP that reflects the changes required in light of the post-Hurricane María scenario. The IRP would be the guiding document for the transformational and any transactional processes in Puerto Rico’s energy sector, regarding the energy mix, grid structure and development, and demand management.

The IRP should lay the basis for the incorporation of distributed energy resources and microgrids into the system. To complement, the IRP effort, additional regulatory proceedings, such as the development of additional performance metrics and key performance indicators (KPIs), are required to deeply transform Puerto Rico's energy system. KPIs should promote risk assessments and a risk-based framework that will promote the system's security against natural hazards by defining effective and efficient capital investment decisions, systematic processes and transparency in the decision-making process. A central priority is to shift to dispersed generation sources (“location diversity”) that foster greater use of renewables, as well as various generation technologies that match the changing load profile in the near term and forecasted long-term planning, while progressively reducing fossil fuels. Monitoring and updating the IRP is also required. Current Puerto Rico statutory law requires a 20-year planning process that is overseen by the local independent regulator, PREC, and subjected to rigorous external review and public comments.

Immediate Next Steps:

- ✔ Follow-up on Puerto Rico Energy Commission's work for the development and preparation of an IRP.
- ✔ Take part in public collaboration initiatives.





Develop a master integrated Continuity of Operations Plan (COOP) for critical infrastructures and providers.

Potential Lead

Governor’s Authorized Representative

Potential Partners

PREMA; PRPB; FEMA; PREPA; PRASA; DTPW; PRPA; PRDHe; PRDE; Telecommunication providers

Potential Funders

HMGP; FCC; USDOT; DTPW; FEMA

Timeframe



Short and medium term

An integrated Continuity of Operations Plan (COOP) should be developed to ensure continued operation of the Island’s critical facilities and infrastructures. This would ensure that all private and government agency services are effectively communicating and following a master emergency response plan. It will also help minimize disruptions of essential services across the Island while supporting a quick recovery after an event. This thereby reduces the likelihood of economic hardships and maintains the health and well-being of the population.

Following Hurricane María, emergency relief resources for communities and businesses in Puerto Rico were often delayed due to the failure of critical operations. This caused a cascading effect between different infrastructures, reducing the recovery capacity of the Island. Disruptions in electricity and telecommunication services, as well as coordination between agencies and private actors, caused delays in emergency responsiveness and relief efforts. Ensuring continued operations of the Island’s critical infrastructure is essential to strengthen the capacity of Puerto Rico to survive, adapt, and thrive after a disaster. For this reason, critical infrastructure must be able to withstand and rapidly recover from hazards affecting Puerto Rico. This recommendation will address the need to understand the role of providers, recognize gaps in the delivery of services (roads, bridges, ports, water and power providers, telecommunication companies, etc.), examine post-hurricane conditions, and analyze the interdependency of critical infrastructure (for example how telecommunications and digital infrastructure play a role in facilitating the delivery of services in post-disaster scenarios).

Activities include:

- Assess and examine current critical infrastructure conditions and cross-sector dependencies to develop protocols for coordination among federal, local entities, and private service providers.

- Identify and operationalize protocols to improve cross-coordination between the government and the private sector during emergency response efforts. This is to ensure the continuity of essential services and the health and well-being of the population during a disaster.
- Design a COOP for immediate disaster coordination between agencies dealing with critical infrastructure and associated services, such as health, telecommunications, energy, transportation, and water. Align private business contingency plans and integrate them into the Puerto Rico Disaster Risk Mitigation Plan, as well as the Puerto Rico Emergency Operation Plan.
- Integrate a comprehensive assessment and asset management system focused on improving the condition of assets, timely restoration of essential services, and the provision of reliable mobility.

Immediate Next Steps:

- ✓ Convene and confirm potential initiative owners and contributing partners.
- ✓ Develop periodic meetings with local government and federal agencies, as well as with public and private providers, to define scope and priorities.
- ✓ Review possible arrangements to make recovery funds available for the development of a master COOP.



Potential Lead

Puerto Rico
Department of Health

Potential Partners

PRPB; PRDF;
Government organizations accountable for statistics and data; Private insurers and healthcare providers; Multisectoral Council on Health; FEMA; HHS; Municipalities; Universities; NGOs

Potential Funders

NIH;
Philanthropic funds

Timeframe

Medium and long term

Improve data collection, management and dissemination to ensure information transparency, reliability, and access.

Accurate, accessible and reliable information has been identified as one of the most important areas of opportunity in the wake of Hurricane María. Improving the way data is collected and managed can have a direct impact in supporting emergency preparedness and response actions within state, federal and municipal governments. In addition, the way the information is made available will have immense effects on how NGOs, communities, families, and individuals plan, prepare and respond to emergencies.

Improving data collection, management, and dissemination will enhance preparedness, emergency management, and disaster response. It will also support the Government of Puerto Rico and its municipalities in engaging on a more robust and reflective long-term comprehensive planning, increased stakeholder engagement and trust, improve tax collections and revenue, and well-informed decision-making processes that will improve health care policies and provision, education, and all other executive branch duties.

This action's purpose is to use technology, data collection, and GIS mapping to assemble evidence of specific data in order to develop place-specific health and social service policies. Government entities with data collection, management, and dissemination responsibilities need to ensure strong emphasis is given to certain attributes that need to be in place to effectively implement this action. These are systems integration, criteria independence, and stakeholder engagement. In this context, activities that support the implementation of this action include:

- Carry out an assessment of data shortfalls that were revealed after Hurricane María.
- Create and update a directory and a GIS geodatabase of all critical service provider resources, responders, and infrastructure. This should include location, a span of service capacity and preparedness plan, which they must maintain to keep participating in the mapping.
- Create a directory of all public and private healthcare sector resources, and responders, including where they are located and their emergency preparedness plan, which should be routinely updated.

- Train communities to gather, use and interpret information. This will strengthen the preparedness skills, while providing an active collaboration role to communities and civic sector. This active role may include identifying and filling data gaps such as locating vulnerable populations and risks.
- Increase electronic health record adoption and telemedicine capabilities.
- Ensure that any database that addresses health determinants includes behavioral and mental health care since these are closely related and should be treated comprehensively.
- Carry out syndromic surveillance using reliable data sources.
- Ensure right-sizing of staff dedicated to the collection, maintenance, synthesis, and deployment of data in order to identify populations at risk and serve vulnerable populations during emergencies and non-emergencies.
- Monitor and collect data to measure cost and effectiveness of programs and services, including the cost of health insurance administration.
- Identify potential technological investments and human resource investments for improved ability to make integrated data-driven decisions during normal times and emergencies.

Immediate Next Steps:

- ✓ Set up initial meetings with leads and partners to develop a data repository and discuss the project and methodological approach.
- ✓ Engage in the process of building a data repository, and establish mechanisms to provide access to information resulting from the data repository.



Develop a water efficiency program to improve water demand management through water conservation and use of alternative water sources.

Potential Lead

Puerto Rico Aqueduct and Sewer Authority

Potential Partners

PREPA; DNER; EQB; EPA; FEMA; NGOs

Potential Funders

HMGP; EPA; USDA; PRDE; CDBG-DR

Timeframe



Medium and long term

Education and technical assistance programs should be designed and implemented to inform the public about the impact of water efficiency and conservation, in order to promote behavior change in the long run. The program will incentivize customers to notify the Puerto Rico Aqueduct and Sewer Authority (PRASA) of leaks and damaged infrastructure to reduce losses in the distribution network and it will also incentivize them to notify the Puerto Rico Department of Natural and Environmental Resources (DNER) and the Environmental Quality Board (EQB) of any water contamination problems in their communities. In addition, guidance and incentives will be developed for the use of rainwater and greywater harvesting and other non-potable water sources. Water conservation is a critical element for enhancing the resilience of water systems and is proven to be the most economical and environmentally protective management tool for meeting water supply challenges. Water conservation and the enhanced use of alternative sources largely depend on public awareness and understanding, and incentives created.

The action will minimize the vulnerability of the island and improve the standard of living by not only allowing individuals, communities and businesses to meet their water demand during emergencies, but also in the face of climate change threats and diminishing water resources. It allows vulnerable communities to reduce their dependency on public water supply systems and to meet their basic needs in times of drought (rationing) or water supply system failures. Improved operation of water supply infrastructure and the reduction of technical losses will protect vulnerable water resources, enhance financial sustainability and promote efficient water use. Improved knowledge and sustainable behavior change will empower individuals and communities. The conservation of water protects the environment and ensures reduced water consumption supporting a fair and transparent allocation of water rights.

Furthermore, the use of alternative water sources will add flexibility to the existing water infrastructure system. With more climate extremes expected in the future, freeing up water for users builds on innovative solutions catalyzing the marketplace for resilient innovations and technologies. It encourages regional thinking and collaboration, promotes cohesive communities and improves connectivity to meet the future water demand more effectively while avoiding unnecessary investment in large capital-intensive infrastructure. Reduced expenditures on household, community and municipality level will help households to meet their needs and improve their well-being. It will also help communities and

municipalities to manage public finances better.

Action steps include:

- Develop a comprehensive metering and operations improvement program for community water supplies to ensure payment is based on consumption, taking water use efficiency criteria into account.
- Develop water balances for all community water supply schemes, Standard Operating Procedures (SOPs) to enhance performance and reduce losses, and action plans to control water loss.
- Develop a water conservation program that contains an outline of conservation goals and objectives to use alternative sources. This should include reuse and reclaimed water opportunities, and demand forecast reflecting savings from efficiency program. Establish measurable conservation goals with all water service providers on the Island, which include public consultation and annual progress reports. Improve data collection and reporting on water consumption/use (annual and "seasonal variations" consumption) by customer class for all water systems and service providers on the Island.
- Develop public outreach training activities with relevant stakeholders aiming at conveying water conservation, schools' educational programs, industrial water consumption and bill format that provides customers with water efficiency measures.
- Promote the EPA's WaterSense Program to protect water resources by promoting water efficiency and enhancing the market for water-efficient products, programs, and practices.
- Develop necessary regulation, permitting and guidelines procedures for alternative water systems (rainwater or greywater systems) to prevent possible contamination of the public water supply system.
- Review existing building codes to mandate low use plumbing fixtures and develop a municipal water efficiency program to make public buildings more efficient by, e.g. retrofitting plumbing fixtures.
- Develop and implement a training program for (community) water supply operators on how to operate the systems more efficiently and to minimize water losses within the distribution and treatment systems.

Immediate Next Steps:

- | | |
|--|---|
| <ul style="list-style-type: none"> ✓ Confirm partnerships with PRASA, FEMA, and other possible collaborative partners to design educational programs and alternative water sources. | <ul style="list-style-type: none"> ✓ Establish a plan for implementation and monitoring, and develop a proposal with estimated costs and multipurpose co-benefits. |
| <ul style="list-style-type: none"> ✓ Develop the evaluation criteria and a work plan for the creation of a roadmap to prioritize investments in water infrastructure and alternative water resources. | <ul style="list-style-type: none"> ✓ Design a database platform to track the establishment and progress of the program. |



Optimize healthcare financing to reduce the proportion of uninsured people and shortage of healthcare professionals, and improve quality, access, and continuity of healthcare provision in disaster-related emergencies.

Potential Lead

Puerto Rico
Department of Health

Potential Partners

NGO coalitions;
Multisector Council
onHealth; PRHIA;
HHS; FQHCs; PRPA;
PRDE; 330 clinics;
UPR Medical Sciences
Campus

Potential Funders

CDBG-DR;
HHS; USDOED

Timeframe



Short and medium term

This action seeks to evaluate the financial sustainability of the healthcare system, recognizing that the reduction of the insured population and health services coverage should never be a goal of healthcare systems.

Federal financing of the health care system is a major issue affecting both the delivery of services and the economic stability of Puerto Rico. In other U.S. jurisdictions, the federal government pays a fixed share of costs based on the state's relative per capita income, while the Island receives a fixed annual funding cap. The funding cap has been insufficient to cover needs, leaving Puerto Rico with a funding gap. Puerto Ricans are also ineligible for other federal health programs including Supplemental Security Income (SSI) benefits.

To that end this action will encompass the following:

- Conduct an actuarial and economic feasibility study, identifying necessary conditions to reduce the uninsured population, while achieving financial sustainability. This study must evaluate alternate scenarios for health financing reforms, such as Oregon, Massachusetts, and Colorado. Data collection and validation can be delegated to existing local entities, such as the Multisector Council on Health, whose purpose is to study and analyze healthcare financing and provision models.
- Produce an estimate of health care spending in PR to determine how current costs hinder economic development and out-of-pocket health care related expenses impose a burden on families.
- The actuarial and economic feasibility study will contain a breakdown of the overhead burden in health care expenses, such as administrative expenses, medical billing, marketing practices, and other non-health care related expenses.

Embed a thorough Stakeholder Engagement Plan, consistent with several federal mandates such as State Medicaid Medical Care Advisory Committee (42 CFR 431.12), the State Innovation Plan under the Affordable Care Act (ACA) and state legislation such as Law 235-2015 that creates the Multisectoral Council on Health to provide advice to the Governor and Legislative Assembly on health policy issues.

A set of initiatives can be pursued to address quality issues in the health care system, including:

- Align any recovery work with the PR State Health Innovation Plan.
- Enhance professional opportunities in order to improve access to quality of care by attracting and retaining qualified professionals
- Incorporate health and nutrition education into existing school curriculums as a part of healthcare delivery to help prevent and manage disease, as well as to involve communities on prevention and healthy lifestyles.
- Create policies for implementing an evidence-based approach to healthcare provision across public healthcare facilities.
Expand coordination with hospitals, public health organizations, and health providers to address health disparities, prepare for disasters, and increase community wellness.
- Establish a plan with ports and private shipping companies to manage supplies for health and other basic needs that can be deployed during emergencies.
- Establish standard policies and waivers through legislation with Executive Order templates to be activated upon emergency declaration.

Immediate Next Steps:

- ✓ Convene and confirm potential initiative owners and contributing partners.
- ✓ Develop periodic meetings with local government and federal agencies to define scope and priorities.
- ✓ Review possible arrangements to make recovery funds available to develop the feasibility study.



Potential Lead

Puerto Rico
Department of
Economic Development
and Commerce

Potential Partners

NGOs; Philanthropic
organizations;
Regional consortiums;
Municipalities;
PRMA; URA

Potential Funders

Private investment;
Philanthropic
funds; CDBG-DR;
Local and Puerto
Rico Government
budgets; Workforce
investment boards
and intermediaries;
EDA Federal Grants;
USDA Federal
Grants; NGOs

Timeframe



Short and medium term

Develop and implement a disaster resilience strategy for the micro and small businesses of Puerto Rico.

This initiative is intended to respond to the Hurricane María crisis with an explicit focus on micro and small business resilience. With up to 80% of the Island’s formal employment in the micro and small business sector, this initiative would provide tools to support baseline economic resilience through disaster preparedness.

Action steps include:

- Create a mechanism to provide grants and loans to micro or small businesses so that they may reopen, while incorporating resilience considerations in their operations. Community Development Financial Institutions (CDFIs) and Community Development Banks (CDBs) are highly encouraged. Establish technical assistance programs that will also enable existing Non-Government Organizations (NGOs) to grow and develop.
- Develop specialized financing mechanisms for backup power supply (see Energy Sector Report).
- Prioritize public policies that aim to keep businesses open by focusing on strengthening the entrepreneurial skillsets of Small and Midsize Businesses (SMBs) and managers, as well as promoting the development of CDBs and CDFIs that can provide more flexible access to financial tools, such as grants and loans, than commercial banking institutions. These public policies must:
 - Create a Disaster Workforce Subsidy Program to help small businesses that are struggling to keep their doors open during disaster events.

- Develop small business risk management education and ‘audit’ tools, including preparedness for weather and seismic shocks.
- Increase business continuity and recovery planning.
- Provide guidance on managing business and household finances separately, as to protect the latter from business risks.
- Explore collective risk transfer solutions, i.e., underwriting of risk pools and mutual insurance schemes.
- Provide specialized business development support and local supply chain development, i.e., competing with online and big-box retail.

Immediate Next Steps:

- ✓ Confirm the roles of initiative owners and contributing partners. Convene a kickoff workshop to design the initiative, including a phasing plan and site visits to relevant existing pilot projects.
- ✓ Review similar programs that are utilizing SBA and CDBG-DR funding.
- ✓ Prepare and conduct a needs assessment of business continuity programs and recovery capacities for micro and small businesses (i.e., surveys, data reviews, in-depth interviews).



Potential Lead

Puerto Rico Central Office of Recovery, Reconstruction, and Resilience

Potential Partners

GAR; PRPB; DNER; Puerto Rico Legislature

Potential Funders

EPA Environmental Education Grants Program; CDBG-DR; HMGP

Timeframe



Medium and long term

Develop a public policy to promote the use of nature-based solutions in the reconstruction process of Puerto Rico.

In the short-term, this action will consist in the development of a public policy that informs policy- and decision-makers, local permitting agencies, and the public on how nature-based solutions, such as green infrastructure, should be incorporated in the reconstruction process. This public policy framework will strengthen the capacity of municipalities, the Government of Puerto Rico, developers, and citizens to consider alternatives to gray infrastructure and base decisions on economic and resilience values. In the long-term, this initiative will raise awareness among all interested parties about natural infrastructure as a viable solution.

There is a huge potential to enhance the recovery process and address the destruction caused by Hurricane María by incorporating nature-based or green infrastructure solutions in local planning, zoning, regulations, and built environment projects. Nature-based solutions are cost-effective and enhance natural, or modified ecosystems, to reduce coastal and river flooding, coastal erosion, landslides, and improve watershed management. There is additional potential for agriculture and forestry protection, climate change mitigation and adaptation, research, and disaster prevention. An example of a similar policy exists in Maryland, which has the Living Shoreline Protection Act of 2008 with its regulations, and was adopted in 2013. The law requires the use of non-structural shoreline stabilization methods in tidal wetlands.

Action steps include:

- Revise and propose amendments to the existing public policy framework, based on a comprehensive gap analysis (e.g., Joint Permits Regulation).
- Define a decision-making framework and cost-benefit analysis tools to consider monetary benefits and costs in order to address the trade-offs between immediate economic benefits and future benefits from social and ecosystem services.
- Develop a monitoring system to evaluate the policy’s efficiency and effectiveness.

- Identify a priority pilot project to fast-track and demonstrate the value of nature-based solutions in building resilience, creating public awareness, and enhancing visibility.
- Develop at least two pilot projects that:
 - Develop wetlands for water and wastewater treatment to compensate or substitute the traditional wastewater treatment infrastructure.
 - Condition soils to improve biodiversity, restore natural functions (i.e., groundwater replenishment), increase or secure land productivity, and enhance well-being.
 - Restore wetlands and living shorelines to augment and strengthen gray infrastructure, reduce flood risk, and protect shorelines from erosion caused by waves.
 - Develop multifunctional public green spaces to reduce heat island²² effects, flooding, and climate change stresses, while improving life quality.
 - Enhance and generate innovative reefs to minimize erosion and coastal surge.
- Develop a financing or incentive mechanism (monetary or non-monetary) to promote the use of nature-based solutions during reconstruction.

Immediate Next Steps:

- ✔ Identify potential partners for initial discussions.
- ✔ Design a scope of work and parameters for a replicable pilot project.
- ✔ Coordinate with possible initiative owners and partners to develop the pilot project.
- ✔ Push for preliminary policy implementation within the recovery process.

22

According to the United States Environmental Protection Agency, the term "heat island" describes built up areas that are hotter than nearby rural areas. The annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F (1–3°C) warmer than its surroundings. In the evening, the difference can be as high as 22°F (12°C). Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illnesses and mortality, and water quality. Please refer to the following homepage: <https://www.epa.gov/heat-islands>



Potential Lead

Puerto Rico
Department of
Transportation and
Public Works

Potential Partners

COR3; FEMA

Potential Funders

USDOT; CDBG-DR

Timeframe



Short and medium term

Introduce alternative energy sources to power transportation-related infrastructure.

This action focuses on assessing opportunities to generate alternative energy and introduce independent energy sources in order to add redundancy to the system and ensure greater reliability and resiliency. Building-up on best practice initiatives, such as increasing roundabouts, this assessment includes the evaluation of diverse distributed energy sources, including the use of solar power, batteries, and kinetic energy as a means of generating electricity. Also, this action includes the development and implementation of a pilot program to expand the use of distributed energy sources in order to provide power supplies to transportation-related assets and facilities.

As transportation is a heavily power-dependent sector, and traditional energy sources are typically impacted by disasters, the aim is to reduce dependency on the electrical grid and provide alternative, independent and redundant energy sources. Traffic signals failure, for example, can significantly impact disaster recovery by increasing traffic congestion. Traffic chaos delays access to services and require the support of additional workforce to maintain traffic flows in more congested intersections. This action responds to both immediate issues resulting from shocks like Hurricanes Irma and María, while also providing more resilient solutions utilizing alternative energy technologies to provide redundant power sources for critical transportation infrastructure. The opportunities assessment and subsequent pilot program will evaluate the transportation infrastructure that could be optimized through alternative energy sources, such as roadway lighting and traffic signals.

Action steps include:

- Identify priority transportation infrastructure whose outages, following Hurricanes Irma and María, significantly impacted recovery efforts due to ensuing traffic chaos and subsequent travel delays.
- Identify potential alternative power sources to supply the prioritized circuits of traffic lights in the instance of a grid outage.



- Carry out a technical feasibility study of alternative power sources, including a cost-benefit analysis of each alternative relative to its ability to support critical traffic signal functionality for post-disaster recovery.
- Identify pilot project and funding to install alternative power sources.

Immediate Next Steps:

- ✓ Set up initial meetings with leads and partners to discuss initiative owners, contributing partners, and pilot projects.
- ✓ Prepare and conduct a needs assessment of power-dependent infrastructures and recovery capacities.



Improve the Puerto Rico Dam Safety Program to ensure coordination between responsible agencies and enhance community preparedness.

Potential lead

Governor's Authorized Representative

Potential Partners

PREPA; DNER; PRASA; PRPB; PREMA; FEMA

Potential Funders

USACE; FEMA Dam Safety Program; HMGP

Timeframe



Medium and long term

There is a need to improve the Puerto Rico Dam Safety Committee responsibilities and actions to ensure coordination between responsible agencies and enhanced community preparedness. The Puerto Rico Electric Power Authority (PREPA) presides and administers the Puerto Rico Dam Safety Committee in association with the Department of Natural and Environmental Resources (DNER), Puerto Rico Planning Board (PRPB), and the Puerto Rico Aqueduct and Sewer Authority (PRASA), and public-sector appointees by the Governor. However, the coordination and integration between these agencies are limited to periodical meetings with limited information sharing, where each agency responds directly to the federal regulator. This action looks to facilitate long-term engagement amongst responsible agencies as they continue to manage dam infrastructures.

Vulnerabilities of the dams, community planning, and warning systems were exacerbated with the impact of Hurricane María. For example, the Guajataca Dam, in northern Puerto Rico, was one of the most critical water system failures to occur as a result of the hurricane. Due to heavy rains, the Guajataca Dam suffered a major breach in its emergency spillway. This exposed the dam to possible structural collapse and threatened more than hundreds of Island residents downstream.

Activities include:

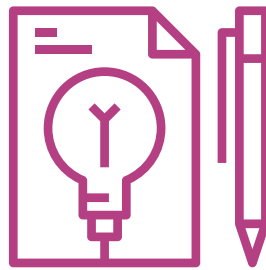
- Improve all plans and outreach related to dam safety.
- Integrate the Puerto Rico Emergency Management Agency in the Puerto Rico Dam Safety Committee.
- Review all the inundation maps for dams and reservoirs to ensure they are updated (including hazard characterization and GIS formats).



- Conduct flood risk characterization and map dam failure limits on Puerto Rico comprehensive plan at the state and local level.
- Install early-warning systems, train local officials and community leaders and conduct effective and participatory community planning capacity activities.

Immediate Next Steps:

- ✓ Convene and confirm potential initiative owners and contributing partners.
- ✓ Develop periodic meetings with local government and federal agencies to define scope and priorities.
- ✓ Set up an assessment of needs and potential community pilot projects.
- ✓ Develop and present a strategic improvement plan for the institutional, physical, and community levels.



Sector Specific Opportunity Recommendations

A total of 97 recommendations were developed within six sectors: Housing; Energy; Physical Infrastructure; Health, Education & Social Services; Natural Infrastructure; and Economic Development. Each sector produced a report that presents a goal for the sector and specific actionable recommendations. The complete set of Sector Reports, which include background, sector context and action details, are included in Appendix C of this document.

Sector Sheet Guideline

Sector

Sector Goal



Develop a portfolio of strategies that reduce risk exposure, foster community empowerment, and address the diversity in socioeconomic conditions, housing types, and tenure in Puerto Rico.

- A1** | Update the Island's digital land cadastre to include: use and occupancy of structures, land tenure data, housing characteristics in informal settlements, and information on insurance coverage.
- A2** | Provide technical capacity to implement a place-based and community-driven approach for identifying and planning reconstruction projects through collaborative and deliberative engagement.
- A3** | Develop feasible models to establish land tenure and/or community ownership in informal housing.
- A4** | Increase the affordable housing stock for low and moderate-income (LMI) households through a series of strategies, such as: infill development in hazard-free urban centers or adjacent suburban areas, new construction using low-income housing tax credits (LIHTC), creating rental housing cooperatives, project-based Section 8 rental-assistance projects, and up-zoning for mixed-income housing.
- A5** | Establish an Island-wide housing emergency management protocol that includes a voucher program for temporary housing, temporary rent control, foreclosure moratorium, and monitoring and prevention of predatory lending.
- A6** | Promote or incentivize community-driven, voluntary relocation of households from high risk and environmentally sensitive areas, using land buyouts and rezoning for land conservation.
- A7** | Repair, improve and retrofit public housing dwellings and facilities towards more resilient designs, including mitigation projects for public housing projects located in risk-prone areas.
- A8** | Improve the ability of local, municipal, and non-government agencies to regulate land use and construction through the adoption of improved rules and practices.
- A9** | Establish municipal and non-governmental land-banks to create: (a) lease buyback programs to prevent mortgage foreclosures and (b) buyout schemes to acquire code-compliant foreclosed or vacant properties for affordable housing in hazard-free areas.

Action Titles

Action Number



HOUSING

Develop a portfolio of strategies that reduce risk exposure, foster community empowerment, and address the diversity in socioeconomic conditions, housing types, and tenure in Puerto Rico.

A1

Update the Island's digital land cadastre to include: use and occupancy of structures, land tenure data, housing characteristics in informal settlements, and information on insurance coverage.

A2

Provide technical capacity to implement a place-based and community-driven approach for identifying and planning reconstruction projects through collaborative and deliberative engagement.

A3

Develop feasible models to establish land tenure and/or community ownership in informal housing.

A4

Increase the affordable housing stock for low and moderate-income (LMI) households through a series of strategies, such as: infill development in hazard-free urban centers or adjacent suburban areas, new construction using low-income housing tax credits (LIHTC), creating rental housing cooperatives, project-based Section 8 rental-assistance projects, and up-zoning for mixed-income housing.

A5

Establish an Island-wide housing emergency management protocol that includes a voucher program for temporary housing, temporary rent control, foreclosure moratorium, and monitoring and prevention of predatory lending.

A6

Promote or incentivize community-driven, voluntary relocation of households from high risk and environmentally sensitive areas, using land buyouts and rezoning for land conservation.

A7

Repair, improve and retrofit public housing dwellings and facilities towards more resilient designs, including mitigation projects for public housing projects located in risk-prone areas.

A8

Improve the ability of local, municipal, and non-government agencies to regulate land use and construction through the adoption of improved rules and practices.

A9

Establish municipal and non-governmental land-banks to create: (a) lease buyback programs to prevent mortgage foreclosures and (b) buyout schemes to acquire code-compliant foreclosed or vacant properties for affordable housing in hazard-free areas.

- A10** | Improve the capacity of local Community Housing Development Organizations (CHDOs), Community Development Corporations (CDCorps), and Community Development Financial Institutions (CDFIs) to leverage financing for affordable and mixed-income housing developments, including low-income housing tax credits (LIHTC).
- A11** | Establish community-based emergency response procedures, identify emergency shelters, and train community volunteers.
- A12** | Create a path towards code compliance of the informal housing sector through the development of a Puerto Rico Building Code 'Applications Document' that supports simplified, streamlined, and cost-effective design and permitting based on locally-appropriate housing typologies for new homes and retrofits.
- A13** | Create loans, grants, or subsidy programs to incentivize and support improvements on the physical resilience of existing housing.
- A14** | Create training and skills building certification programs, in the construction trades that are focused on locally appropriate housing repairs, retrofitting, and resilient building technologies and techniques.
- A15** | Establish a building retrofit program in selected receptive communities.
- A16** | Develop and disseminate a manual that provides practical guidance for do-it-yourself (DIY) repairs that will improve housing safety.
- A17** | Create insurance pools and build public awareness to expand access to and utilization of disaster insurance.
- A18** | Implement a communications campaign to build a culture of household emergency preparedness and awareness.



ENERGY

Address Puerto Rico's energy needs by transforming its electric power infrastructure to an affordable, reliable and innovative system, while reducing adverse impacts on human health and the environment.

A1

Prepare a new Integrated Resource Plan (IRP), with public, community, and private sector participation, to be used as the foundation for the energy sector transformation and which includes an updated analysis and forecast of the demand base, aggressive renewable generation targets, and a risk-based analysis of the sector to strengthen utility oversight and operator decision making.

A2

Increase the diversity of the energy fuel mix.

A3

Rebuild, harden and modernize the transmission and distribution system for a minimum of energy security and resiliency.

A4

Promote and enforce public policies and integrated regulations to allow the development of distributed energy.

A5

Integrate microgrids, mini-grids, and renewable energy into the Island's transmission and distribution grid to the greatest extent possible.

A6

Establish reliable and diversified backup energy systems for vulnerable individuals and critical facilities, such as hospitals, schools, and emergency shelters and services facilities.

A7

Facilitate access to backup energy systems/equipment to fill remaining gaps in individuals' capacity to generate backup electric power for small businesses.

A8

Build capacity across the Island's municipalities to plan, finance, and develop solar renewable energy systems for municipal buildings and facilities.



A9

Create consumer participatory and collaborative mechanisms and public education initiatives to strengthen informed public decision making and engagement on efficient energy usage and the development of resilient energy systems.

A10

Establish a program to increase energy reliability of Puerto Rico's critical water pumps systems.

A11

Promote the revitalization of Puerto Rico's hydroelectric generation resources, as long as it is cost-effective.

A12

Implement an Island-wide energy efficiency and demand response strategy, detailing and prioritizing cost-effective initiatives to reduce and balance energy demand.



PHYSICAL INFRASTRUCTURE

Develop and maintain infrastructure systems that are accessible, integrated, flexible, and robust enough so they may sustain critical operations for the well-being of Puerto Ricans.

Critical Infrastructure Systems

A1

Develop an integrated critical infrastructure management strategy to guide resilient long-term reconstruction.

A2

Develop a master integrated Continuity of Operations Plan (COOP) for critical infrastructures and providers.

A3

Implement an integrated flood risk management approach.

A4

Develop a critical infrastructure assessment and priority recovery plan to prioritize recovery and ongoing operations of key transportation assets.

A5

Improve the Puerto Rico Four Year Investment Program (PICA) with a risk-based asset management framework and integrated enforcement to embed resilience in the Island's infrastructure.

A6

Improve the Puerto Rico Dam Safety Program to ensure coordination between responsible agencies and enhance community preparedness.

A7

Assess and reduce the vulnerability of critical infrastructure against landslides.

A8

Develop and implement a Port Emergency Operations Plan.

A9

Improve the waste management industry to enhance metrics gathering, industry data mining and analysis, and fund allocation.

A10

Assess connectivity and develop a communication plan for primary anchor institutions.

Critical Infrastructure Sectors

- A11** | Commission a study of potential solutions to build an Island-wide Next Generation Network that supports the long-term telecommunication needs.
- A12** | Optimize recovery and reconstruction actions to the energy, transportation and telecommunications infrastructure to remove barriers to deployment and streamline building networks.
- A13** | Commission a study to support the deployment (underground and aerial) of a more resilient telecommunications infrastructure.
- A14** | Develop a sustainable mobility plan to enhance and integrate Puerto Rico's multi-modal transportation services and offer diverse and affordable transit access.
- A15** | Align reconstruction projects on the water systems to promote performance improvement on potable water infrastructure.
- A16** | Develop a water efficiency program to improve water demand management through water conservation and use of alternative water sources.
- A17** | Increase robustness and flexibility of vulnerable wastewater treatment systems.
- A18** | Protect existing drinking water sources and mitigate contamination in order to improve drinking water quality.
- A19** | Increase broadband adoption programs to support universal adoption of next-generation communications services.
- A20** | Develop a transportation technology strategy to integrate emerging technology services into the overall transportation network.



Río Grande, PR. Joshua L. DeMott

A21

Introduce alternative energy sources to power transportation-related infrastructure.

A22

Identify and integrate new drinking water sources into the water supply.

A23

Update Puerto Rico building codes in order to enhance their enforcement on critical infrastructure, and promote nature-based solutions.

A24

Establish redundant maritime sea cable connections.

A25

Develop an inventory of emergency response equipment, and train personnel to maintain and deploy such equipment.

Place-based Infrastructure

A26

Develop resilient community centers to improve the provision of services during emergencies and disaster relief.

A27

Develop a training and capacity-building program to promote local businesses and effective public participation throughout the recovery process.

A28

Develop an outreach and education program on domestic water treatment and storage in order to improve drinking water quality, at the point of consumption in times of emergency, for rural communities.

A29

Reconstruct decentralized wastewater systems to strengthen their recovery capacities.

A30

Improve solid waste management in urban and rural communities by adopting a circular economy approach.



HEALTH, EDUCATION & SOCIAL SERVICES

Develop initiatives that ensure the provision of health, educational and social services to reduce existing and future vulnerabilities, and chart a pathway toward improved equity and well-being, with more participation of the people in its definition and implementation.

- A1** | Optimize healthcare financing to reduce the proportion of uninsured people and the shortage of healthcare professionals, and improve quality, access, and continuity of healthcare provision in disaster-related emergencies.
- A2** | Expand the scope and availability of behavioral and mental health services.
- A3** | Address the social and environmental determinants of health that contribute to disease burden.
- A4** | Promote schools as centers for education, social cohesion, and catalysts for economic development.
- A5** | Explore opportunities for workforce training, placement, and retention in the education sector.
- A6** | Increase the resilience of educational infrastructure to protect students in the face of disasters and provide enhanced benefits to students and their communities every day.
- A7** | Invest in improvements to the physical infrastructure of healthcare facilities in order to improve the provision of services on a regular basis and in the face of multiple hazards.
- A8** | Create integrated government data systems, and improved access to these, to ensure transparency and preparedness while co-benefiting government structures with actual reliable data for informed decision-making processes.
- A9** | Identify and support vulnerable members of the population to address healthcare and social services needs related to the management of catastrophic events and emergencies, as well as the ongoing care needs of this population.



ECONOMIC DEVELOPMENT

Craft a diversified portfolio of economic activities that augment Puerto Rico's resiliency by enhancing existing capabilities, improving employment prospects, and reducing inequalities.

- A1** | Develop and implement a disaster resilience strategy for the micro and small businesses of Puerto Rico.
- A2** | Promote the adoption of best practices in enterprise risk management and business continuity planning for mid-sized companies.
- A3** | Leverage Hurricane María reconstruction investments to advance the construction sector's recovery, innovation, and resilience.
- A4** | Ensure that reconstruction-related procurements give priority to local workforce employment, training, and certification.
- A5** | Prioritize Workforce Innovation and Opportunity Act (WIOA) funding for training, re-training, and skills credentialing within priority industry clusters.
- A6** | Develop on-Island employment/career opportunities for both Puerto Rican youth and for aging members of the workforce, ensuring the quantity and quality of the future workforce is able to support growth in prioritized economic sectors/clusters.
- A7** | Support and communicate clear pathways for Puerto Rico's youth and young adults to establish businesses, social enterprises, and professional services careers in Puerto Rico's Next Generation Economy.
- A8** | Support social service programs that reduce family and child poverty to ensure the readiness of the future workforce.
- A9** | Strengthen broad-based, community-level economic development initiatives, building and strengthening Puerto Rico's community economic development organizations and their networks through sustained, collective investments from the Puerto Rican diaspora associations, foundations, and crowd-sourcing activities.

**A10**

Develop and implement specific industry cluster strategies for economic sectors that are key to the resilience of Puerto Rican society, such as housing, power supply, health services and medicine, food, global supply chain, knowledge economy, and education. Expand the organizational capacity as part of economic development efforts focused on these sectors and the resilience of mid-sized companies.

A11

Review existing laws and regulations and simplify the permitting and licensing processes that are required to open a business, without compromising human or environmental capital, and attracting new investment.

A12

Optimize the use of and improve fiscal stewardship of subsidies awarded to create quality jobs and stimulate economic activity.



NATURAL INFRASTRUCTURE

Improve human health and well-being, foster economic development, and reduce exposure to hazards, through the sustainable use of Puerto Rico's natural resources.

A1

Develop comprehensive watershed plans using integrated water resources management to promote the sustainable use of water resources and maximize the resultant economic and social well-being.

A2

Effectively implement the Puerto Rico Land Use Plan, following a risk-based framework, to achieve social well-being, economic development, and protect critical ecosystems.

A3

Adopt a post-disaster framework to delimitate the coastal maritime zone and effectively define land uses, development codes, and protect coastal ecosystems adapted to current and future conditions.

A4

Develop a public policy to promote the use of nature-based solutions in the reconstruction process of Puerto Rico.

A5

Enforce open space determinations with programs/guidelines for the dedication of lands to the creation of parks, green infrastructure projects, land conservation, or other adequate uses.

A6

Develop a coastal ecosystem restoration and enhancement program.

A7

Develop key policies, within and beyond the Common Agricultural Policy, to foster agroecology.

A8

Develop green infrastructure design guidelines for urban areas, and identify and implement pilot projects.

- A9** | Develop an integrated treatment program for wastewater and stormwater run-off to reduce sewage pollution affecting freshwater, coastal, and marine resources.
- A10** | Re-evaluate the design of proposed flood control projects to integrate resilience criteria and nature-based solutions.
- A11** | Develop a training and capacity-building program to promote key green businesses in the recovery process.
- A12** | Develop a comprehensive assessment of natural resources to identify priority areas for intervention and conservation.
- A13** | Develop an integrated recycling program to promote the use of resourceful construction materials and create green jobs.
- A14** | Develop a program to promote sustainable agricultural practices.
- A15** | Develop an emergency preparedness and response plan for Puerto Rico's natural resources.
- A16** | Create community gardens programs in rural and urban areas.

METHODOLOGY

03



The main objective of the ReImagina Puerto Rico project is to produce an actionable and timely set of recommendations to guide the use of philanthropic, local government and federal recovery funds to help rebuild Puerto Rico in a way that makes the Island stronger – physically, economically, and socially – and better prepared to confront future challenges.

To achieve this, the Commission combined two primary conceptual frameworks to guide the process of reimagining Puerto Rico’s recovery and reconstruction:



**FEMA's National
Disaster Recovery
Framework**



**The Rockefeller
Foundation's
City Resilience
Framework**



This is a guide that enables effective recovery support to disaster-impacted jurisdictions. It provides a flexible structure that enables disaster recovery managers to operate in a unified and collaborative manner. The framework establishes a common platform and forum for a comprehensive approach to how a community builds, sustains, and coordinates the delivery of recovery efforts.

The NDRF advances the concept that recovery extends beyond simply repairing damaged structures. Under this framework, recovery includes the continuation or restoration of services that are critical to support the physical, emotional, and financial well-being of impacted community members. Recovery also includes the restoration and strengthening of key systems and resource assets that are critical to the economic stability, vitality, and long-term sustainability of the communities themselves²³. These recovery elements are organized and coordinated under the following six Recovery Support Functions:



Health and Social Services:

Restore and improve health and social services capabilities and networks to promote the resilience, independence, health (including behavioral health), and well-being of the whole community.



Natural and Cultural Resources:

Protect natural and cultural resources and historic properties through appropriate planning, mitigation, response, and recovery actions to preserve, conserve, rehabilitate, and restore them consistent with post-disaster community priorities and best practices and in compliance with applicable environmental and historic preservation laws and executive orders.



Community Planning:

Conduct a systematic process engaging the whole community as appropriate in the development of executable strategic, operational, and/or tactical-level approaches to meet defined objectives.



Infrastructure Systems:

Stabilize critical infrastructure functions, minimize health and safety threats, and efficiently restore and revitalize systems and services to support a viable, resilient community.



Economic Recovery:

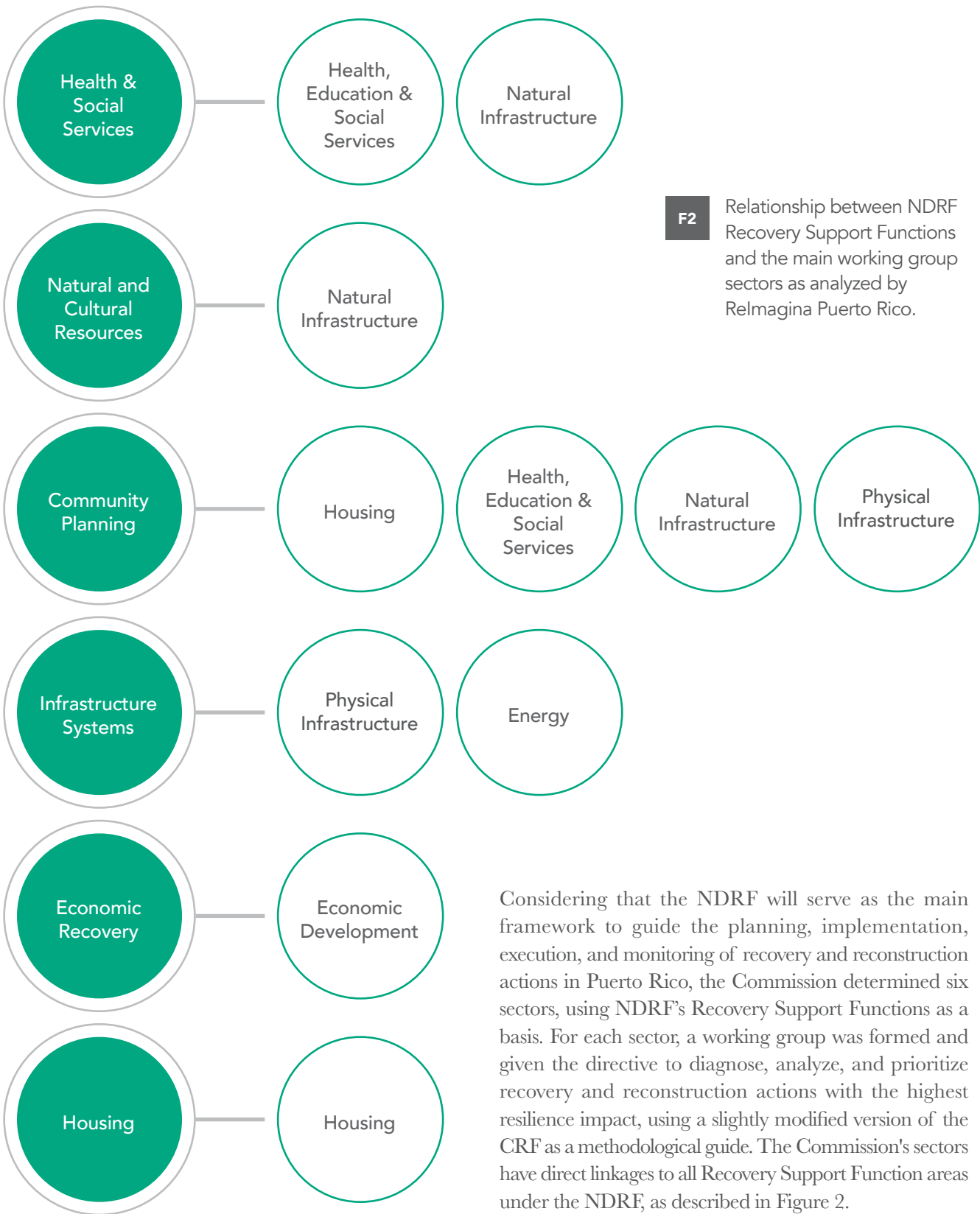
Return economic and business activities (including food and agriculture) to a healthy state and develop new business and employment opportunities that result in an economically viable community.



Housing:

Implement housing solutions that effectively support the needs of the whole community and contribute to its sustainability and resilience.

In the aftermath of Hurricanes Irma and María in 2017, this framework will guide all federal disaster recovery actions coordinated by FEMA in Puerto Rico.



F2 Relationship between NDRF Recovery Support Functions and the main working group sectors as analyzed by ReImagina Puerto Rico.

Considering that the NDRF will serve as the main framework to guide the planning, implementation, execution, and monitoring of recovery and reconstruction actions in Puerto Rico, the Commission determined six sectors, using NDRF's Recovery Support Functions as a basis. For each sector, a working group was formed and given the directive to diagnose, analyze, and prioritize recovery and reconstruction actions with the highest resilience impact, using a slightly modified version of the CRF as a methodological guide. The Commission's sectors have direct linkages to all Recovery Support Function areas under the NDRF, as described in Figure 2.



The City Resilience Framework (CRF)²⁴ provides a lens to understand the complexity of cities or systems and the drivers that contribute to their resilience. These drivers can help cities to assess the extent of their resilience, to identify critical areas of weakness, and identify actions and programs to improve the city’s resilience. It provides a more comprehensive vision of how resilience can be integrated into the Puerto Rico post-disaster recovery context.

The CRF, while originally focused on a city scale, provides a conceptual framework of resilience that is applicable across different geographical scales. The framework identifies four dimensions of resilience that comprise 12 drivers. The drivers describe fundamental attributes of resilient systems. They are organized as follows:



Leadership & Strategy

1. Effective leadership & management
2. Empowered stakeholders
3. Integrated development planning



Health & Well-being

4. Minimal human vulnerability
5. Diverse livelihoods & employment
6. Effective safeguards to human health & life



Economy & Society

7. Collective identity & community support
8. Comprehensive security & rule of law
9. Sustainable economy

F3

City Resilience Framework. This graphic represents the four dimensions of resilience, the 12 factors that contribute to resilience, and their interaction with the seven qualities of resilient systems.



Infrastructure & Environment

10. Reduced exposure & fragility
11. Effective provision of critical services
12. Reliable mobility & communications

These dimensions and drivers of resilience interact with the qualities of resilient systems, as is shown in Figure 3. This means, for instance, that to achieve long-term and integrated planning the planning process needs to be reflective, inclusive, and integrated.



This framework also identifies seven qualities of resilient systems:

Reflective



Refers to the use of past experiences to inform future decisions and the capacity to modify standards and behaviors accordingly.

Refers to designs that are well-conceived, constructed and managed and that include provisions to ensure failure is predictable, safe, and not disproportionate to the cause.



Robust

Inclusive



Refers to processes that emphasize the need for broad consultation and ‘many seats at the table’ to create a sense of shared ownership or a joint vision to build resilience.

Refers to processes that bring together systems and institutions and that can catalyze additional benefits as resources are shared and actors are enabled to work together to achieve greater ends.



Integrated

Resourceful



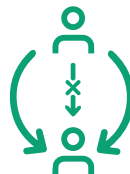
Refers to people and institutions that can recognize alternative ways to use reflective resources at times of crisis to meet their needs or achieve their goals.

Refers to spare capacity purposively created to accommodate disruption due to extreme pressures, surges in demand, or an external event. It includes diversity, where there are multiple ways to achieve a given need.



Redundant

Flexible



Refers to the willingness and ability to adopt alternative strategies in response to changing circumstances or sudden crises. Systems can be made more flexible through the introduction of new technologies or knowledge, including recognizing traditional practices.

ReImagina Puerto Rico: An Intrinsically Participatory Process

With the methodological frameworks and sectors defined, the Commission embarked on an ambitious participatory and consensus-building process to achieve the main goal and objectives set forth for ReImagina Puerto Rico, as described in Section I. This process was divided into four main sets of group meetings:



Public Sector Advisory Group



Sector-focused Working Groups



Youth Participatory Photography



Community Focus Groups

This process sought to bring the widest and most diverse set of voices together, facilitating an important conversation between students, community groups, business sector representatives, high-level government officials, academics and other Puerto Rican leaders to re-

imagine a more resilient Puerto Rico. The diverse set of meetings and discussions held between the Public Sector Advisory Group, Working Groups, Community Focus Groups, and the Youth Participatory Photography helped create and validate the information presented in this report.




Public Sector Advisory Group

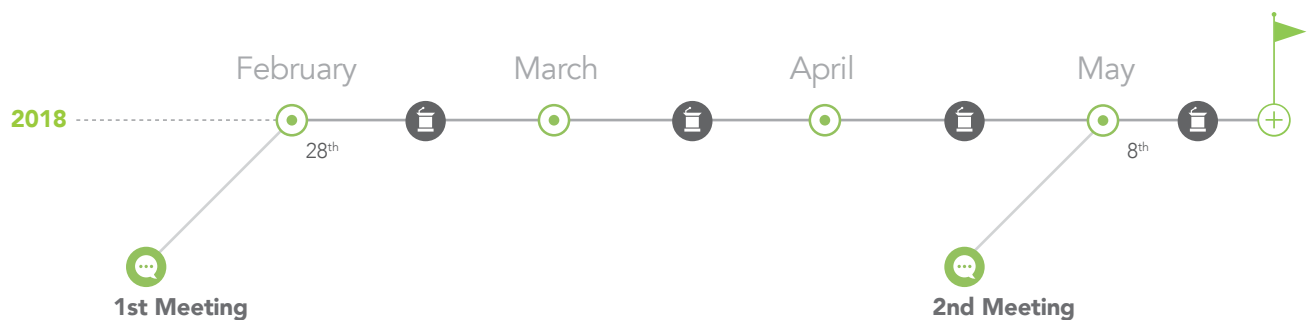
A group of government officials that received the Commission's reports and were encouraged to provide their comments, feedback, and recommendations.

This group included high-level officials from key Puerto Rico government agencies, as well as mayors from rural and urban municipalities representing the Island's main political parties. Meetings included representatives from the Puerto Rico Planning Board, Puerto Rico Department of Transportation and Public Works, Puerto Rico Department of Housing, Puerto Rico Department of Natural and Environmental Resources, the Puerto Rico Central Office of Recovery, Reconstruction and Resilience, the Governor's representative to the Financial Oversight and Management

Board for Puerto Rico, and the mayors of Bayamón, Carolina, Cidra and Villalba.

The first Public Sector Advisory Group meeting took place on February 28th, 2018 with subsequent one-on-one conversations with government officials between the months of March and May. On the second official meeting, which took place on May 8th, the Commission presented the preliminary results and recommended actions that came from the ReImagina Puerto Rico project. They also discussed opportunities and feasibility for the implementation of the recommended actions.

 Meetings with government officials





Sector-focused Working Groups

Each sector defined a working group, of approximately 20 people, that included civil society leaders, experts, and representatives from relevant organizations to the sector.

The Working Groups were divided into six key sectors:



Housing



Energy



Physical Infrastructure



Health, Education & Social Services



Economic Development



Natural Infrastructure



The purpose of the Working Groups was to facilitate a technical discussion among Puerto Rican experts, business and sector leaders, and relevant community actors in order to identify goals, objectives, and actions that contribute to the resilient recovery and reconstruction of the sector. This process was carried out in three Working Group meetings that took place in February, March, and April of 2018.



First Working Group Meetings

The first Working Group meetings took place on **February 13th to 15th, 2018 in San Juan**. The work focused on the identification of needs and opportunities. The goal was to identify a preliminary list of main issues, recovery goals, and opportunities for resilient policies and actions. There were over 65 participants across all six Working Groups.

Second Working Group Meetings

The second Working Group meetings took place on **March 13th to 15th, 2018 in San Juan**. The work focused on scoping and refining opportunity actions, following-up on information that emerged in the Community Outreach and Engagement Process (described later), and finalizing the general objectives of the sector, as well as actions that even though important had not been considered. There were over 75 participants across all six Working Groups.



Third Working Group Meetings

The third Working Group meetings took place on **April 10th to 12th, 2018 in San Juan**. They focused on validating the goals, objectives, and a general list of recommendations. The work also included applying a resilience lens to the proposed actions, analyzing interdependencies and resilience qualities, defining co-benefits, and prioritizing the recommendations. There were over 110 participants across all six Working Groups.



The process of developing recommendations for the resilient recovery of Puerto Rico accounted for its unique context:



The urban/rural divide on the Island, recognizing that resilient economic development opportunities for all areas are equally important.



The variety of ecosystems present in the Island, and the challenges and opportunities that they each represent.



Issues of equity, transparency, and sustainability.



The economic, political, and geographical realities of Puerto Rico.



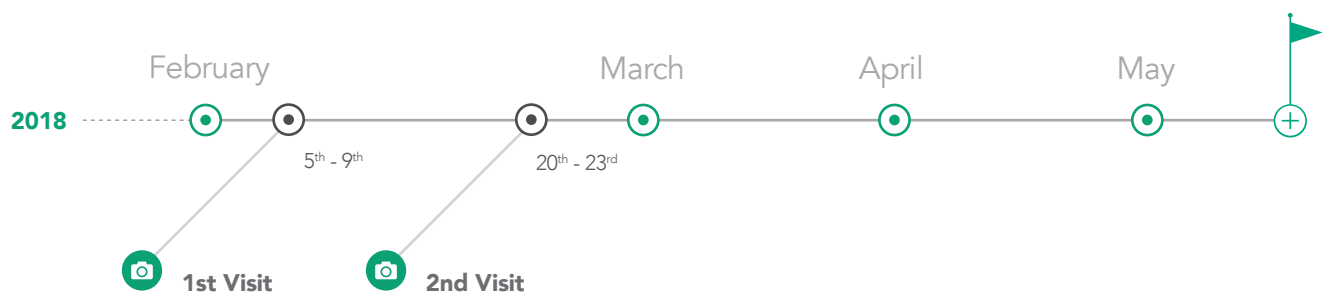
Youth Participatory Photography

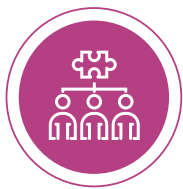
This part of the process included a participatory photography exercise that was held in six schools (one per region) of Puerto Rico.

This program was carried out in six schools across the Island (one in each region), with two visits to each school. Students were given the opportunity to identify and photograph assets in their community that were important for them to maintain and improve. The first visit with the students took place between February 5th and 9th, 2018. Approximately 360 students took part in this initiative. Meetings were organized in San Juan, Humacao, Guayama, Barranquitas, Utuado, and Lajas. The objective of the Youth Participatory Photography activity was to allow and encourage the young population to identify, through photography, important resilience and

recovery challenges in their community. The second visit was on February 20th to 23rd, 2018. The students discussed their photos within their group. They described their intentions behind the photos and what their priorities were for improvements in their communities. They also displayed and presented their photos to their communities and family members, and other residents commented. The Commission facilitated a conversation about the importance of changing and improving certain aspects of their communities, especially after the hurricanes. All of the information that was gathered was considered as input for the development of the Sector Reports.

 Youth Participatory Photography





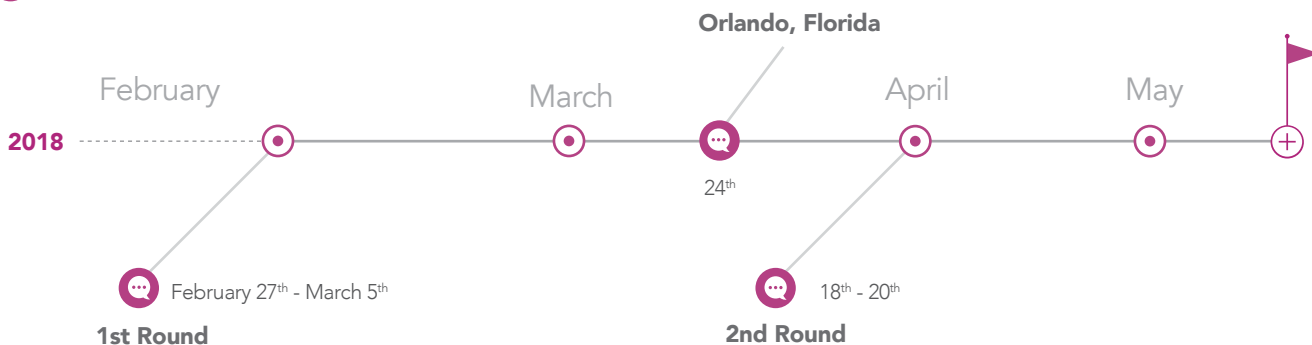
Community Focus Groups

This part of the process included Community Focus Groups in six regions of Puerto Rico, a Focus Group with the diaspora in central Florida, and a Focus Groups with NGOs.

These meetings were organized in the six regions that were defined. Also, two extra Focus Groups were carried out:

- 1 With philanthropic leaders and other NGOs in San Juan on March 1st, 2018 and on April 18th, 2018. These meetings provided an Island-wide perspective on the issues. Twenty-nine participants represented 22 NGOs in the first meeting and 12 participants represented 11 NGOs in the second one.
- 2 With Puerto Rican diaspora in Orlando, Florida on March 24th, 2018. There were over 20 participants. The main objective of this Focus Group was to obtain an Island-wide perspective on recovery and resilience from the diaspora in central Florida, where most Puerto Ricans have migrated to over the past year.

 Community Focus Groups



The Community Focus Groups took place after the first set of Working Group meetings. They were designed this way in order to be able to socialize the work of the Working Groups, elaborate and refine unmet needs, and validate goals, objectives, and actions. The six meetings were organized in San Juan, Humacao, Arecibo, Caguas, Ponce, and Mayagüez.



1st Round

The first round of Community Focus Groups took place between February 27th and March 7th, 2018. There were over 115 participants in total. This first round focused on describing the initial results from the first Working Group meetings. They facilitated a discussion about unmet needs before, during, and after Hurricane María, as well as the main shocks and stresses affecting Puerto Rico. The initial set of opportunities identified for resilient actions were also prioritized.



2nd Round

The second round of Community Focus Groups took place between April 17th and 20th, 2018. There were approximately 57 participants in this round. During this second round of meetings, the Commission presented the information produced in the third Working Group meetings. Participants provided feedback regarding the priorities for action, as well as recommendations to improve existing recommendations.

The information gathered throughout the Community Focus Groups served as a basis for the identification of unmet needs described in Section I of this report and in each of the recommendations proposed in the sector reports. In general, the information and perspectives obtained from the Community Focus Groups were an integral part of all the discussions, they informed the process, and have been incorporated in the actions and recommendations presented in this report.

The Community Outreach and Engagement Process has been an integral part of the Reimagina Puerto Rico project approach.



**Community Focus Groups
with the Puerto Rican Diaspora**

OVER 20 PARTICIPANTS

**Youth Participatory
Photography**



**6 schools
360 students**

San Juan, Humacao, Guayama,
Barranquitas, Utuado, and Lajas

The Community Outreach and Engagement Process had two sets of activities:



**Youth Participatory
Photography**



**Community
Focus Groups**

Each of the activities were held in six distinct regions of the Island. These regions were strategically selected to represent all areas of Puerto Rico, including the urban/rural divide and other geographical, social, cultural, and regional characteristics. Figure 4 shows the functional regions selected to carry out the activities of the Community Outreach and Engagement Process.

F4 Functional regions in Puerto Rico. These regions were used to coordinate meetings related to the Community Outreach and Engagement Process.



Community Focus Groups with philanthropic leaders and NGOs:

29 participants
representing 22 NGOs
in the first meeting

12 participants
representing 11 NGOs
in the second meeting

First round of
Community Focus Groups
over 115
participants



Second round of
Community Focus Groups
approximately
57 participants



During the second part of the Youth Participatory Photography activity,



students presented their photos to their communities and family members



PUERTO RICO'S PATH TO RESILIENT RECOVERY AND RECONSTRUCTION

04

Puerto Rico's recovery is unfolding across multiple timescales and with multiple partners. As the urgent, immediate needs for relief are being addressed, there is more opportunity to pursue improvements that will benefit communities over longer time horizons. The strategic recommendations presented in this report present a comprehensive path forward for all development and reconstruction processes in Puerto Rico. This path is rooted in a participatory process that is tailored to respond to and empower a broad set of actors. It is also calibrated to offer actionable, realistic interventions.

The Commission is not operating in a vacuum. In full view of this, the Commission adopted an accelerated timeline to produce this report to complement the on-going post-disaster recovery strategic plan currently developed by mandate of the U.S. Congress under the Bipartisan Budget Act of 2018 (H.R. 1892)²⁵. This plan, due on August 8th, 2018, will provide both Puerto Rico and the U.S. federal government with a strategic action plan to guide the use of federal funds toward recovery actions for the next two years. Considering the extent of the federal funding available to support recovery actions in the aftermath of Hurricane María, contributions from the ReImagina Puerto Rico project to this plan should be helpful for the responsible government agencies towards achieving more resilient recovery actions.

The results from this report are but an initial step toward a broader journey of reimagining Puerto Rico as it reinvents

itself in the wake of such major disasters. While this process aims at providing a broad set of recommendations to use federal, local government, and philanthropic funds for recovery and reconstruction actions, its results are expected to feed into the broader post-disaster recovery process (see figure 5). As the combined efforts of community groups, public schools, NGOs, federal agencies, and Puerto Rico government institutions move toward advancing the recovery efforts, ReImagina Puerto Rico will help bolster their ongoing recommendations while engaging a broad set of actors in moving forward a stronger recovery for the Island. A resilience-focused post-disaster recovery planning process is needed to ensure these recommendations are properly coordinated, implemented and evaluated in order to measure its success for the collective benefit of the people living in Puerto Rico.

Specific Pledges of the Commission

The Commission aims to support and work with all the different actors involved in the rebuilding and reconstruction efforts for Puerto Rico, specifically the following:

1

The Puerto Rico Central Office of Recovery, Reconstruction, and Resilience (COR3) and the Government of Puerto Rico

The Commission pledges to provide all available technical resources and analysis used to develop this report to the COR3 and the Puerto Rico Department of Housing teams developing strategic recovery action plans for Puerto Rico. The Commission stands ready to support current and future recovery activities and ask that the government consider the comprehensive input from stakeholders across the Island and diaspora that went into this reports' recommendations.

2

The U.S. Federal Government

The Commission pledges to work with all relevant federal agencies in order to advise and guide funding and recovery programs.

3

Puerto Rico's Private Sector

The Commission pledges to provide a coordinating role for private sector actors to support the implementation of these recommendations.

4

Puerto Rico Mayors and Municipalities

The Commission pledges to communicate and disseminate the ReImagina Puerto Rico Report amongst mayors and municipalities, and support them in incorporating and implementing them in their work plans.

5

Organized Communities

The Commission pledges to communicate and disseminate the ReImagina Puerto Rico Report among community groups and organizations. The Commission will support them in incorporating and implementing the recommendations in their recovery initiatives, and work with organized communities to advise and guide them regarding access to funding and recovery programs.

6

Philanthropies and Donors

The Commission pledges to support all the aforementioned actors in establishing links with other philanthropic organizations and donors interested in funding flagship recommendations and projects.

The recommendations developed through ReImagina Puerto Rico should be able to guide every element of the recovery planning processes moving forward. However, Puerto Rico's recovery process will require actions beyond the scope of these strategic recommendations. There is still a need for a broader, participatory, and comprehensive post-disaster recovery plan for Puerto Rico that extends beyond the scope of the U.S. Congress mandate. The Commission will serve as a conduit to help organize and support this important step towards the long-term recovery of Puerto Rico, building upon its experiences in this project.

The recommendations from this report are not only important to support government recovery processes implemented by federal and Puerto Rico agencies, but also to influence municipal governments, community organizations and NGOs who have been at the forefront of disaster response and recovery actions across Puerto Rico after Hurricane María. Municipal governments, community organizations, and NGOs can use these recommendations to implement actions within their communities. These actors have been providing direct critical support to the most vulnerable populations

and empowering local communities, even before the hurricane impacts. Several recommendations presented in this report are also focused on the community and municipal levels. By continuing with its participatory approach, the Commission can help implement these initiatives at the local level, providing a conduit between these entities and other philanthropic and U.S. federal entities looking to support high-impact actions with cross benefits to most distressed and affected communities.

As the Island continues to move ahead on its journey toward recovery, ReImagina Puerto Rico brought forth a participatory process to jumpstart a conversation with a broad set of actors. It's a strong foundation that must be built upon thoughtfully. It offers an invitation to create a vision for a resilient Puerto Rico, where people can build a stronger, more equitable and just society for its present and future generations. Above all, the project calls everyone to work together to reimagine Puerto Rico and collaborate to make this new vision a reality for all.

**There is still a need
for a broader,
participatory and
comprehensive
post-disaster
recovery plan for
Puerto Rico that
extends beyond the
scope of the U.S.
Congress mandate.**

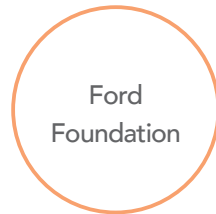
APPENDIXES

05

Appendix A: Structure of the Commission, Co-Chairs, Commissioners, and Secretariat

WHO

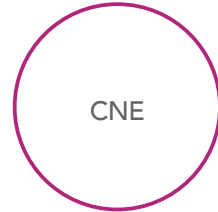
Funders



Commission

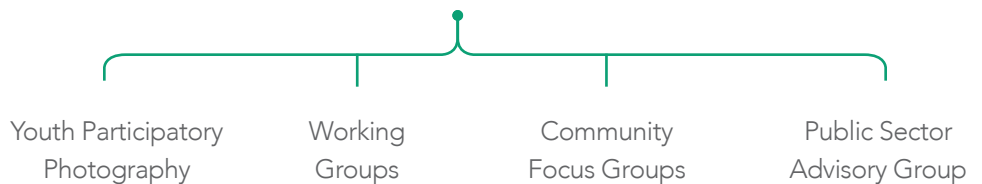


Consultants



HOW

REIMAGINE PUERTO RICO REPORT



Commission Co-Chairs

RICHARD L. CARRIÓN EXECUTIVE CHAIRMAN, POPULAR, INC.

Richard L. Carrión is the Executive Chairman of the Board of Directors of Popular, Inc., a publicly traded (BPOP) financial holding company. Banco Popular, a wholly owned subsidiary of Popular, Inc., is Puerto Rico's leading depository institution. Mr. Carrión served as Popular's Chief Executive Officer and Chairman of the Board from 1991 to 2017.

After obtaining a bachelor's degree from the Wharton School of Finance at the University of Pennsylvania and receiving a master's degree in information services from the Massachusetts Institute of Technology (MIT), Mr. Carrión joined Banco Popular in 1976. In the information technology arena, Mr. Carrión's vision brought the first network of ATMs to Puerto Rico and many other Latin American countries and spearheaded the successful migration from paper to electronic transactions.

Mr. Carrión sits on the Board of Directors of Verizon Communications since 1995, where he is a member of the Human Resources and Corporate Governance and Policy Committees and is Chairman of the Finance Committee. He also served as class A director of the Federal Reserve Bank of New York from 2008 through 2015.



**Mr. Carrión's
enthusiasm and
energy in professional
matters is coupled
with a deep sense of
social justice.**

Mr. Carrión's enthusiasm and energy in professional matters are coupled with a deep sense of social justice. He has been a member of the International Olympic Committee (IOC) since 1990, where he chaired the Finance Commission and the Audit Committee from 2002 until 2013. He was a member of the IOC Executive Board from 2004 until 2012. He is a founding member and trustee of the Banco Popular Foundation.

DR. CARMEN MILAGROS CONCEPCIÓN

CHAIR OF THE GRADUATE SCHOOL
OF PLANNING, UNIVERSITY OF
PUERTO RICO

Carmen Milagros Concepción is professor and director of the Graduate School of Planning at the University of Puerto Rico, Río Piedras campus. She completed a Ph.D. in City and Regional Planning and a post-doctorate in Environmental Policy at the University of California, Berkeley. She holds a master's in planning and a B.S. in Physics from the University of Puerto Rico.

Her research has focused on environmental policy and regulation, socio-environmental movements and organizations, institutions, and governance, topics on which she has published in academic and professional journals in Puerto Rico and abroad. She recently co-edited (with Gustavo García-López and Alejandro Torres-Abreu) the book manuscript entitled *Environment and Democracy: Experiences of Community-Based Environmental Management in Puerto Rico*, which has been accepted for publication by the University of Puerto Rico Press.

Dr. Concepción was director of the Social Sciences Research Center of the University of Puerto Rico from 2006 until 2009. Before becoming a faculty member of the Graduate School of Planning, she taught at San Diego State University and the New School for Social Research. Dr. Concepción also has a professional trajectory in the public service. Before beginning her doctoral studies, she held positions as a planner, researcher, and consultant in various agencies and entities of the Government of Puerto Rico, including the Municipality of San Juan, the



Her research has focused on environmental policy and regulation, socio-environmental movements and organizations, institutions, and governance.

Puerto Rico Planning Board, the Puerto Rico Energy Office, the Right to Employment Administration, the Commission on Educational Reform, and the House of Representatives. She also worked for the Planning Office of the Puerto Rico Legal Services Corporation.

DR. ANA MARÍA GARCÍA BLANCO

EXECUTIVE DIRECTOR, INSTITUTO
NUEVA ESCUELA

Dr. García Blanco is the Executive Director of Instituto Nueva Escuela (INE), a nonprofit organization dedicated to improving Puerto Rican students' academic and socio-emotional outcomes through the implementation of Montessori education in the public school setting. Dr. Ana María García Blanco is the founder and former principal of the first public Montessori school in Puerto Rico, Juan Ponce de Leon Elementary School (JPL) in the municipality of Guaynabo (established in 1990). In response to growing requests from other communities across the island to replicate JPL's public Montessori model in their neighborhood schools, Dr. García Blanco founded INE in 2008. INE works with 50 public schools and community organizations across 27 municipalities in Puerto Rico.

Dr. Ana María García Blanco holds an EdD in Philosophy in Education and Human Development from Harvard University, where she also completed her bachelor's and master's degree. Her doctoral thesis was an ethnographic study of the emergence of the community school model in Juan Domingo in Guaynabo, Puerto Rico. Throughout her career, she has given courses in the main universities in PR: Universidad de Puerto Rico in Río Piedras, Universidad del Sagrado Corazón in Santurce, and Universidad Interamericana, metro area. Dr. García Blanco worked as director of La Nueva Escuela Juan Ponce de León in Guaynabo for 23 years. Using an innovative approach and the Montessori method, she managed to reduce violence in the school and increase the academic performance of students.



Using an innovative approach and the Montessori method, she managed to reduce violence in the school and increase the academic performance of students.

She is the author of several educational publications. Among them: "The Participation of Parents", "The Education of the Youth", and "The Collective Work of the Teachers" of the "Tertulias de Aquí" section of the Diálogo newspaper.

MIGUEL A. SOTO-CLASS

PRESIDENT, CENTER FOR A NEW ECONOMY

Mike Soto founded the Center for a New Economy (CNE) in 1998, and since then, has steered CNE into becoming one of the most credible and influential voices in Puerto Rico. Since 2014, CNE has been recognized as one of the Top Think-Tanks to Watch by the Global Think Tank Report of the University of Pennsylvania.

Mike has served as a member of the Community Innovator's Lab at MIT in Boston, Massachusetts, and the YouthSave Advisory Board at the New America Foundation in Washington, D.C. In 2008, he was selected as an Aspen Institute Ideas Fellow.

Mike was an editor of *The Economy of Puerto Rico: Restoring Growth*, published by the Brookings Institution in 2006 and selected, that same year, as a Notable Book by the American Library Association. He has been a columnist for *El Nuevo Día*, Puerto Rico's largest daily circulation, since 2003, and was the host of a weekly news radio program on economics for several years.

He is currently the Yale Alumni Schools Director for Puerto Rico and the Virgin Islands. He is also a member of the Board of Directors of the Baldwin School of Puerto Rico, an Emeritus Member of the Advisory Council for the Conservation Trust of Puerto Rico, and the Chairman of Espacios Abiertos, an organization dedicated to growing civic capacity and promoting transparency in Puerto Rico. Mike has a B.A. from Yale University and a Juris Doctor from Vanderbilt University.



He has steered CNE into becoming one of the most credible and influential voices in Puerto Rico. Since 2014, CNE has been recognized as one of the Top Think-Tanks to Watch by the Global Think Tank Report of the University of Pennsylvania.

FEDERICO (FRIEDEL) STUBBE

CHAIRMAN, PRISA GROUP

Mr. Stubbe is a Chairman of the PRISA Group, developers of Green Resort Residential Communities and hotels in Puerto Rico. An award-winning developer of planned communities, he is an understated yet confident visionary. Stubbe is one of Puerto Rico's largest developer-builders of residential, master-planned communities with over \$100 million in annual sales and more than 800 employees.

He graduated from Georgia Institute of Technology with a Bachelor Degree in Civil Engineering and obtained a PMD (Program for Management Development) from Harvard Business School. He is an actual Governor of the Urban Land Institute and past Chairman of the Board of Directors of Península de Cantera Project (a government and private nonprofit initiative to re-develop the largest remaining slum in San Juan), past President of the Puerto Rico chapter of the National Association of Homebuilders, member of the Georgia Tech College of Engineering Advisory Board, past Board Member of National Fish and Wildlife Foundation, Chairman of the Board of Herencia (a nonprofit environmental foundation), and Chairman of the Tasis Foundation (a K-12 educational institution).

Stubbe personifies the modern-day entrepreneur whose concern for the environment has turned into a mission. "As developers, we are nothing more than an instrument of the people of Puerto Rico to help create a better society."



Stubbe personifies the modern-day entrepreneur whose concern for the environment has turned into a mission. "As developers, we are nothing more than an instrument of the people of Puerto Rico to help create a better society."

The Commissioners

Samuel Abrams – Director of the National Center for the Study of Privatization in Education, Teachers College, Columbia University

Ricardo Álvarez-Díaz – Principal of Álvarez-Díaz & Villalon

Félix Aponte Ortiz – Environmental Planner and retired professor of the Graduate School of Planning of UPR

Luis A. Avilés Vera – Public Health Professor at the Medical Sciences Campus of UPR

Rafael L. Bras – Provost and Executive Vice President of Academic Affairs at Georgia Institute of Technology

José “Pepe” Carlo – Professor of Medicine at the Medical Sciences Campus of UPR

Daniel Colón Ramos – Founder of Ciencia PR

Lucy Crespo – Executive Director of the Puerto Rico Science, Technology & Research Trust

José Luis Cruz – President of Lehman College

María Enchaetegui – Director of the Economics Department of UPR Río Piedras

María Eugenia Ferré Rangel – President of Grupo Ferré Rangel

Fernando Lloveras – Executive Director of Para la Naturaleza

Jonathan Marvel – Principal of Marvel Architects

Enrique Ortiz de Montellano – President and Executive Director of Claro Puerto Rico

Janice Petrovich – Executive Director and Vice President of Red de Fundaciones de Puerto Rico

Rosibel Recondo – Director of Luis Lloréns Torres School

Irwin Redlener – Director of National Center for Disaster Preparedness

Nelson Reyes del Valle – Founder of Incubadora de MicroEmpresas Comunitarias Solidarias (iMECs)

Gualberto Rodríguez III – President of Caribbean Produce Exchange

José Rodríguez Baéz – President of the Puerto Rico Workers Federation (AFL-CIO)

Josen Rossi – Director of the Institute of Competitiveness & Economic Sustainability (ICSE)

Kathryn Wylde – President of the New York City Partnership

The Secretariat



Malu Blázquez Arsuaga
Executive Director



Juan A. González Moscoso
Project Manager



Luis F. Cintrón Piñero
Project Manager



Alicia Díaz Santiago
Research & Policy Analyst



Cristina A. Fawaz López
Research & Policy Analyst



Vilmaris Rodríguez
Administrative Assistant



Héctor M. Cortés Ramírez
Community Outreach & Engagement Manager

Appendix B: Hurricane Response and Recovery Efforts



Federal Recovery Efforts

1. **Federal Emergency Management Agency (FEMA)**

- a. Community Planning and Capacity Building: facilitate support among a variety of partners for the planning, capacity, and resilience building capabilities needed by local or tribal governments.

2. **U.S. Department of Agriculture**

a. **Farm Service Agency**

- i. Tree Assistance Program: financial assistance to tree growers to replant and rehabilitate eligible trees and bushes.
- ii. Emergency Forest Restoration Program: provides payments to owners of rural nonindustrial private forest land to restore forest health.
- iii. Assistance for Livestock, Honeybees, and Farm-Raised Fish: payments to producers to help compensate for losses.
- iv. Emergency Conservation Program: provides funding to rehabilitate farmland damaged by natural disasters.
- v. Emergency Loan Program: loans to help producers recover from production and physical losses.
- vi. Noninsured Crop Disaster Assistance Program: financial assistance for no insurable crop losses.
- vii. Livestock Indemnity Program: provides benefits to livestock owners and some contract growers for livestock deaths in excess of normal mortality that are direct result of adverse weather events.



Federal Recovery Efforts

- 3. U.S. Army Corps of Engineers**

 - b. (9/24/17) In coordination with National Oceanic and Atmospheric Administration (NOAA): survey damaged channels and ports in PR.
 - a. Infrastructure Systems: facilitate the restoration of infrastructure systems and services to support viable, sustainable communities and improve resilience to, and protect from, future hazards.
 - i. Operation Blue Roof.
 - ii. Several temporary power installations.
- 4. U.S. Department of Health and Human Services**

 - a. Health and Social Services: support locally led recovery efforts to address public health, health care facilities and coalitions, and essential human services.
- 5. U.S. Department of Interior**

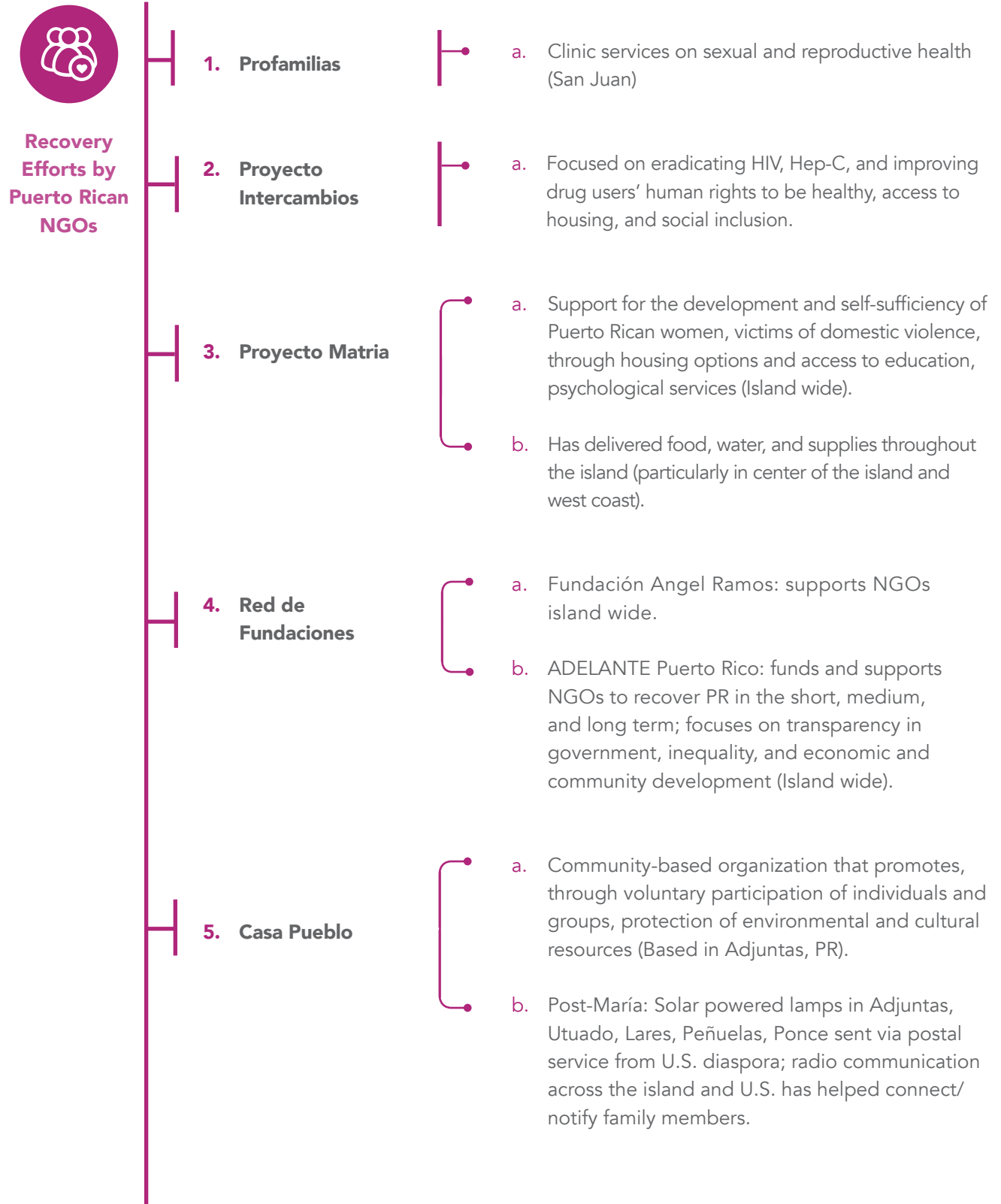
 - a. Natural and Cultural Resources: work with communities wishing to preserve, protect, and restore natural and cultural resources, such as historic structures.
- 6. U.S. Department of Commerce**

 - a. Economic Recovery: assist with sustaining or restoring business and employment in the affected area and developing economic opportunities in these communities (SBA).
- 7. U.S. Department of Energy & Western Area Power Administration**

 - a. 8-member advance team deployed in PR.
- 8. U.S. Department of Housing and Urban Development (HUD)**

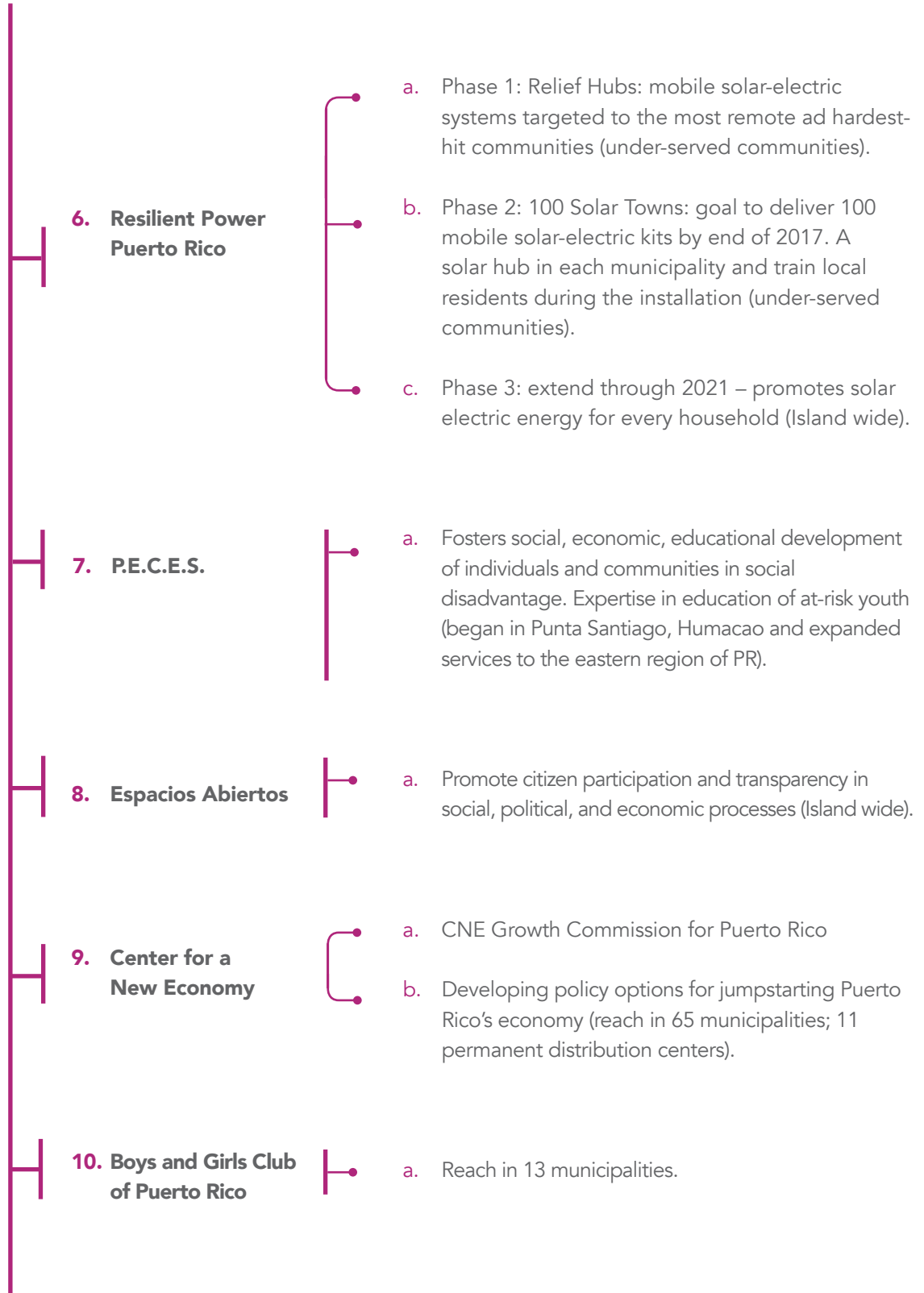
 - a. Housing: develop adequate, affordable, and accessible housing solutions for Hurricane Maria survivors.
- 9. Federal Highway Administration**

 - a. 9/29/17: made \$40m available to PR Highways and Transportation Authority for emergency relief work to impacted roads.





Recovery Efforts by Puerto Rican NGOs





Recovery Efforts by Puerto Rican NGOs

11. María Fund

a. Reach in 13 municipalities.



i. Environmental restoration and social justice initiative consists of public and private community organizations working together so that 8 communities on both sides of Caño Martín Peña overcome poverty and are not displaced during and after dredging (G-8 Inc: Leaders from the 8 communities in the area).

b. Organización Boricua de Agricultura Ecológica



i. Environmental restoration and social justice initiative consists of public and private community organizations working together so that 8 communities on both sides of Caño Martín Peña overcome poverty and are not displaced during and after dredging (G-8 Inc: Leaders from the 8 communities in the area).

c. CDPEC



- i. Desde Abajo: integrates the production and compilation of informational content for the public; cooperates with platforms to extend impact.
- ii. Radio Móvil: messaging on wheels
- iii. Center for Political, Educational and Cultural Development: food distribution and social activism (Caguas & Cayey).

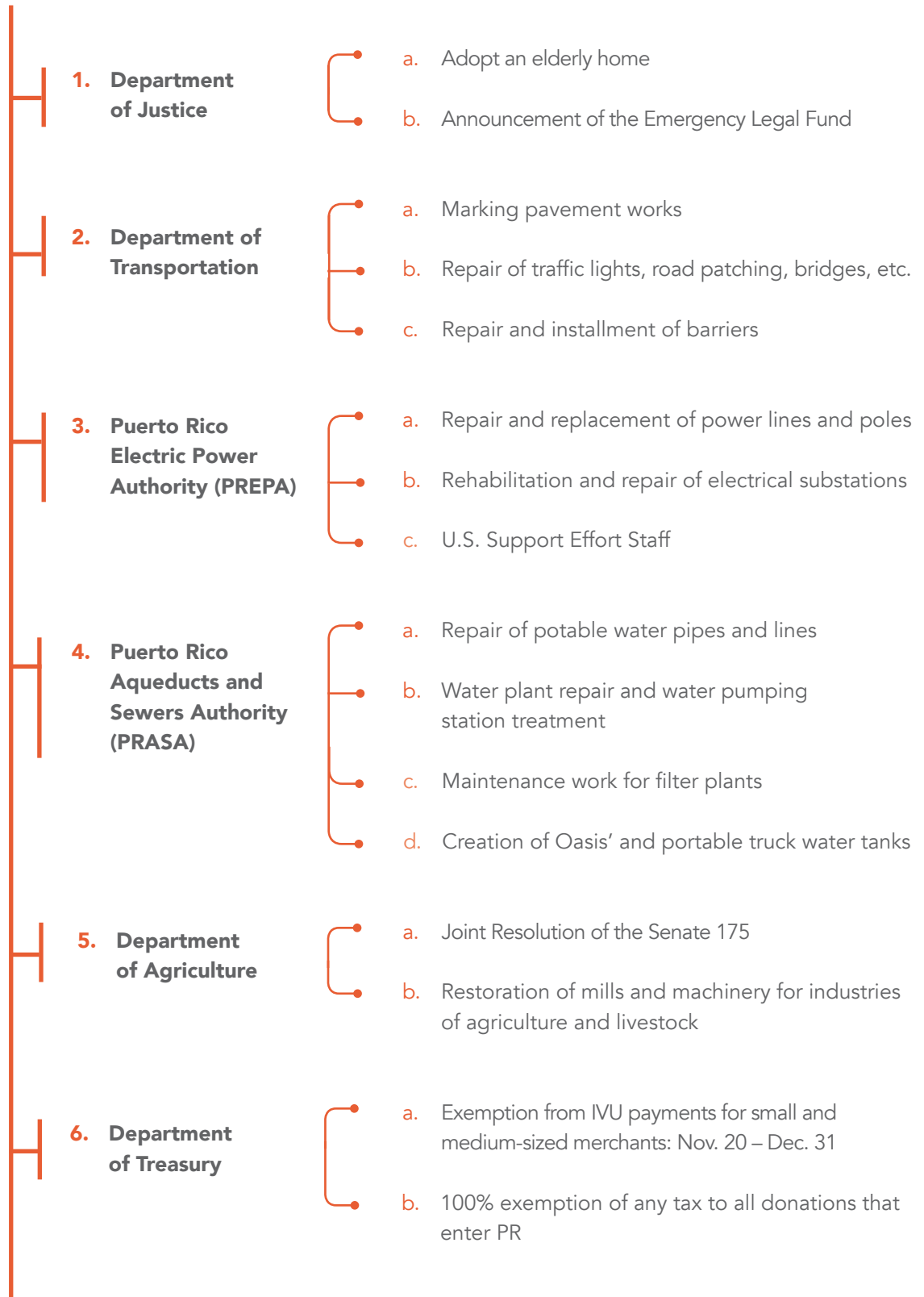
d. Taller Salud



- i. Focuses on education and prevention in areas of sexual and reproductive rights in Puerto Rico (works mostly with women and girls in Loíza).
- ii. Post-María: volunteer brigades to interview refugees to know in detail the immediate needs of the people.

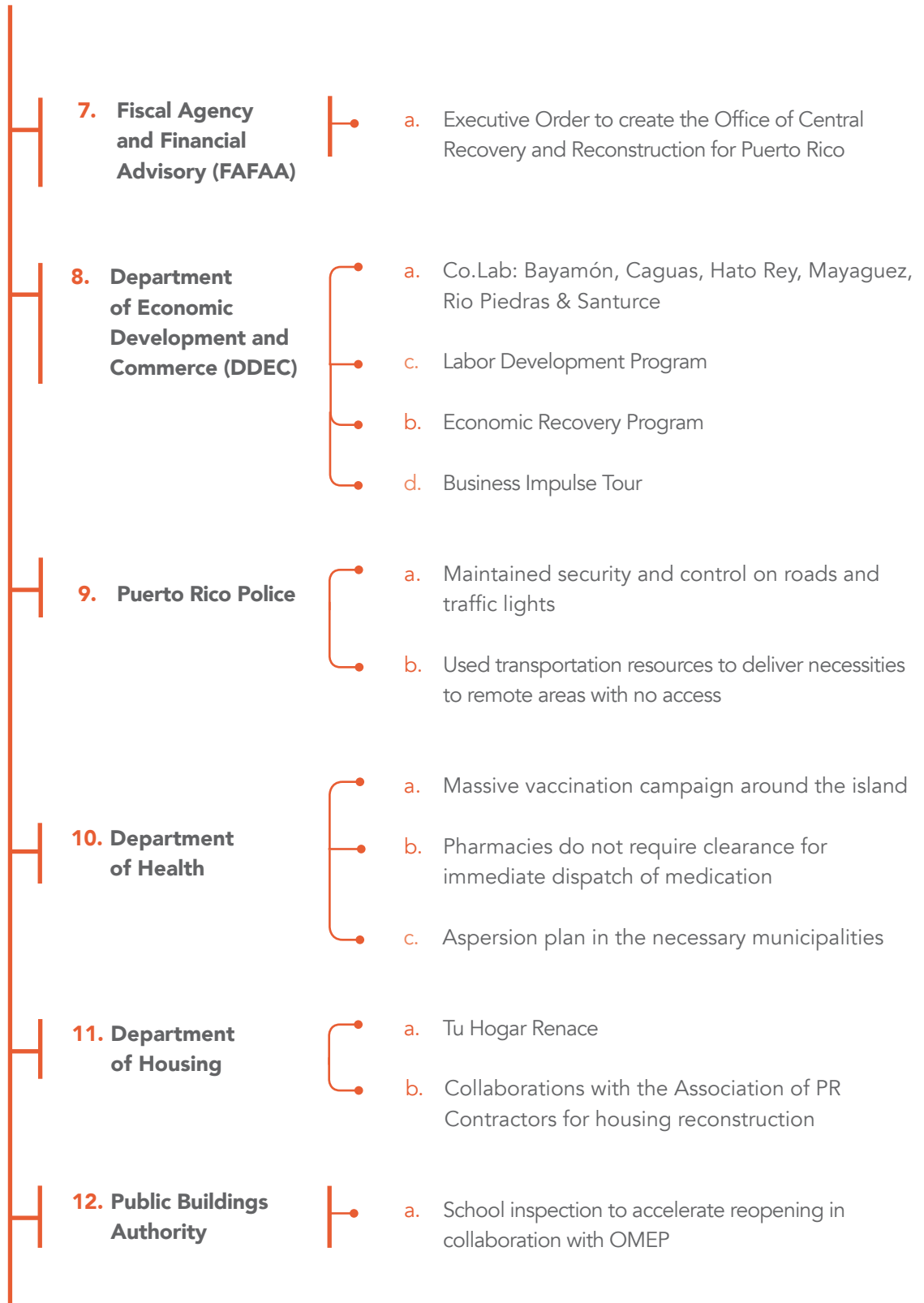


**Governemnt
Response
& Recovery
Efforts
(Puerto Rico &
Municipal)**





**Governemnt
Response
& Recovery
Efforts
(Puerto Rico &
Municipal)**





**Governemnt
Response
& Recovery
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(Puerto Rico &
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Appendix C: Working Group Sector Reports

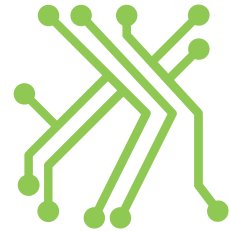
To find the Sector Reports, refer to Resilient Puerto Rico Advisory Commission's website (www.resilientpuertorico.org).



Housing



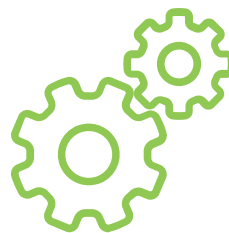
Energy



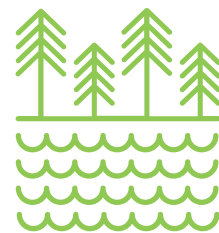
Physical
Infrastructure



Health, Education
& Social Services



Economic
Development



Natural
Infrastructure



Glossary

Disaster

Severe alterations in the normal functioning of a community or society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.

Effectiveness

The degree to which something is successful in producing an intended or expected result, success or purpose.

Efficiency

Performing or functioning in the best possible manner with the least waste of time and effort.

Emergency preparedness

Actions taken to plan, organize, equip, train, and exercise with the objective of building and sustaining the capabilities necessary to prevent, protect against, mitigate the effects of, respond to, and recover from those threats that pose the greatest risk.

Exposure

The presence of people, livelihoods, environmental services and resources, infrastructure, or economic, social, or cultural assets in places that could be adversely affected.

Flexibility

Flexibility implies that systems can change, evolve and adapt in response to changing circumstances. This may favor decentralized and modular approaches to infrastructure or ecosystem management. Flexibility can be achieved through the introduction of new

knowledge and technologies, as needed. It also means considering and incorporating indigenous or traditional knowledge and practices in new ways.

Flood risk management

Processes for designing, implementing, and evaluating strategies, policies, and measures to improve the understanding of flood risk, foster flood risk reduction and transfer, and promote continuous improvement in flood preparedness, response, and recovery practices. They have the explicit purpose of reducing the likelihood and/or the impact of floods in order to prevent the loss of properties, assets and life caused by floods.

Geographic Information System (GIS)

A framework for gathering, managing, and analyzing data and spatial location. It uses maps to organize layers of information into visualizations. Rooted in the science of geography, GIS integrates many types of data.

Governance

Structures and processes designed to ensure accountability, transparency, responsiveness, rule of law, stability, equity and inclusiveness, empowerment, and broad-based participation. Governance also represents the norms, values, and rules of the game through which public affairs are managed in a manner that is transparent, participatory, inclusive, and responsive.

Grant Programs

Programs that provide a sum of money given by a government or other organization for a particular purpose. These programs are discretionary or formula grants and/or cooperative agreements administered by a federal agency.

Inclusive

Emphasizes the need for consultation and commitment of communities, including the most vulnerable groups. An inclusive approach contributes to a sense of shared ownership or a joint vision to build resilience.

Infrastructure

Set of works and services that are considered fundamental and necessary for the establishment and operation of an activity. These include communication systems, aqueducts and sewers, electricity, telephone and health facilities, education, and recreation.

Integrated

Integration and alignment between systems promotes consistency in decision-making and ensures that all investments are mutually supportive to a common outcome. Integration is evident within and between resilient systems and across different scales of their operations. Exchange of information between systems enables them to function collectively and respond rapidly through shorter feedback loops throughout society.

Mitigation (for risk)

The lessening of the potential adverse impacts of physical hazards (including those that are human-induced) through actions that reduce hazard, exposure, and vulnerability. (for Climate Change) A human intervention to reduce the sources or enhance the sinks of greenhouse gases.

Non-governmental Organization (NGO)

An entity with an association that is based on interests

of its members, individuals, or institutions. It is not created by a government, but it may work cooperatively with government. Such organizations serve a public purpose, not a private benefit.

Nonprofit Organization

A tax-exempt organization that serves the public interest. In general, the purpose of this type of organization must be charitable, educational, scientific, religious, or literary. It does not declare a profit and utilizes all revenue, available after normal operating expenses, in service to the public interest. This organization is a 501(c)(3) or a 501(c)(4) designate.

Public-Private Partnerships

A cooperative arrangement between two or more public and private entities, typically of a long-term nature. These partnerships between a government agency and private-sector company can be used to finance, build, and operate projects, such as public transportation networks, parks, and convention centers.

Reconstruction

The reconstruction or replacement of permanent residential, commercial, or industrial facilities damaged or destroyed in a major disaster, as well as the construction of public or private infrastructure at large scale, the addition of community improvements, and/or the restoration of a healthy economy.

Recovery

Disaster recovery is the phase of the emergency management cycle that begins with the stabilization of the incident and ends when the community has recovered from the impacts of the disaster.

Redundant

Refers to spare capacity purposely created within systems so that they can accommodate disruption, extreme pressures, or surges in demand. It includes diversity: the presence of multiple ways to achieve a given need or fulfill a particular function. Examples include distributed infrastructure networks and resource reserves. Redundancies should be intentional, cost-effective, and prioritized at a society scale.

Reflective

Accepts the inherent and ever-increasing uncertainty and change in today's world. Reflective systems have mechanisms to continuously evolve and modify standards or norms based on emerging evidence, rather than seeking permanent solutions based on the status quo. As a result, people and institutions examine and systematically learn from their past experiences and leverage this learning to inform future decision-making.

Regulatory frameworks

Frameworks that provide the base on which institutions build and determine the scope and nature of participation in society. It is a complex combination of statutes and legal regulations, judicial rules, and actual practice.

Resilience

The capacity of individuals, communities, institutions, businesses, and systems to survive, adapt and thrive no matter what stresses or shocks they encounter.

Resilience dividend

The net social, economic, and physical benefits achieved when designing initiatives and projects in a forward looking, risk-aware, inclusive, and integrated way.

Resourceful

Implies that people and institutions are able to rapidly find different ways to achieve their goals or meet their

needs during a shock or when under stress. This may include investing in capacity to anticipate future conditions, set priorities, and respond, for example, by mobilizing and coordinating wider human, financial and physical resources. Resourcefulness is instrumental to a society's ability to restore functionality of critical systems, potentially under severely constrained conditions.

Risk

Potential consequences in which something of value is in danger with an uncertain outcome, recognizing the diversity of values. Often, risk is represented as the probability of occurrence of dangerous events or trends multiplied by the impacts in case such events or trends occur. Risks result from the interaction of vulnerability, exposure, and danger.

Risk assessment

The determination of quantitative or qualitative estimates of risk related to a well-defined situation and a recognized threat or hazard. The assessment includes the calculations of the risk magnitude, potential loss, and the probability that the loss will occur.

Robust

Robust systems include well-conceived, constructed and managed physical assets that can withstand the impacts of hazard events without significant damage or loss of function. Robust designs anticipate potential system failures and ensure failure is predictable, safe, and not disproportionate to the cause.

Sea level rise

An increase in global mean sea level as a result of an increase in the volume of water in the world's oceans. The two major causes of global sea level rise are thermal expansion caused by warming of the ocean (since water expands as it warms) and increased melting

of land-based ice, such as glaciers and ice sheets.

Shock

Sudden, sharp events that threaten a society, including earthquakes, floods, disease outbreaks, and terrorist attacks.

Susceptibility

Society's and ecosystems' predisposition to suffer as a result of intrinsic and contextual conditions that make it plausible for such systems to collapse or experience damage due to the influence of a dangerous event.

Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability has emerged as the guiding principle for long-term global development. Consisting of three pillars, sustainable development seeks to achieve, in a balanced manner, economic development, social development, and environmental protection.

Unmet needs

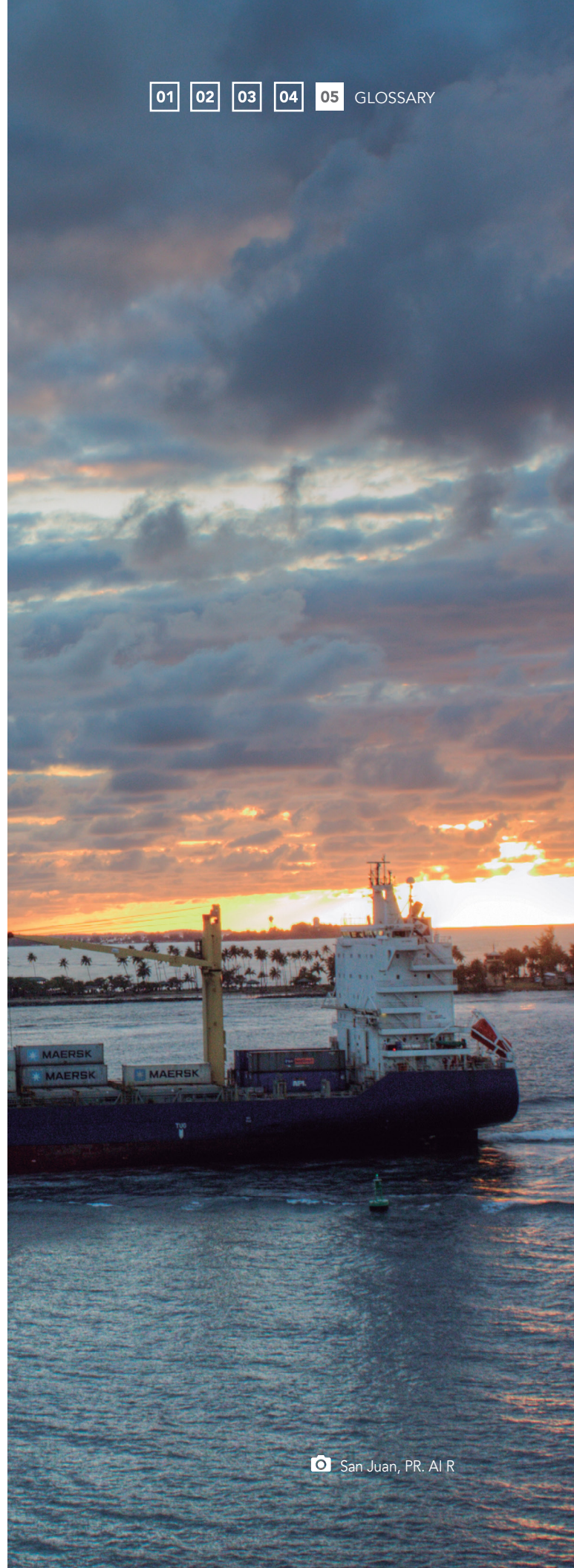
The needs of communities or families that have not been attended by federal government institutions as a result of a disaster.

Vulnerability

The propensity or predisposition to be adversely affected. Vulnerability comprises a variety of concepts and elements that include sensitivity or susceptibility to harm and lack of responsiveness and adaptation.

Vulnerable populations

Groups and communities at higher risk as a result of barriers they experience to social, economic, political and environmental resources, as well as limitations due to illness or disability.



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