



Keeping the Lights On: Stories from Housing Providers on Disaster Preparedness and Recovery

Wednesday

11:15-12:30pm



Panelists

- **Speakers**

- Joy Sinderbrand, New York City Housing Authority
- Laurie Schoeman, Enterprise Community Partners
- Judsen Bruzgul, ICF

- **Moderators**

- Kevin Bush, U.S. Department of Housing and Urban Development



Joy Sinderbrand

New York City Housing Authority



U.S. DEPARTMENT OF
ENERGY



RECOVERY TO RESILIENCY

**NYCHA'S SUPERSTORM SANDY
RECOVERY PROGRAM**

Joy Sinderbrand
Vice President
Office of Recovery & Resilience
New York City Housing Authority

ABOUT NYCHA | NYCHA SERVES 1 IN 12 NEW YORKERS



WITH **MORE THAN 607,000***
PEOPLE, NYCHA'S POPULATION IS
LARGER THAN LAS VEGAS, ATLANTA,
OR MIAMI

*NUMBER SERVED BY NYCHA'S PUBLIC HOUSING AND SECTION 8 PROGRAMS



77,000
SENIORS
62 YEARS OLD OR OLDER



110,000
CHILDREN
UNDER 18 YEARS OLD



61%
ARE EMPLOYED
(OF NON-DISABLED,
WORKING AGE ADULTS)



\$23,000
AVERAGE
HOUSEHOLD
INCOME

ABOUT NYCHA | NYCHA'S HOUSING STOCK IS AGING



THAT CONSIST OF  **178,000** APARTMENTS

CONTAINING OVER  **175 MILLION**
SQUARE FEET OF SPACE

60% OF NYCHA'S BUILDING
ARE **50+ YEARS OLD**



THE LARGEST DEVELOPMENT: A **26-BUILDING**
APARTMENT COMPLEX WITH **7,000 RESIDENTS**

THE SMALLEST DEVELOPMENT: A **SINGLE-STORY**
SENIOR BUILDING WITH **13 RESIDENTS**

ABOUT NYCHA | NEXT GENERATION NYCHA



FUND: Achieve short-term financial stability and diversify funding for the long-term



OPERATE: Operate as an efficient and effective landlord

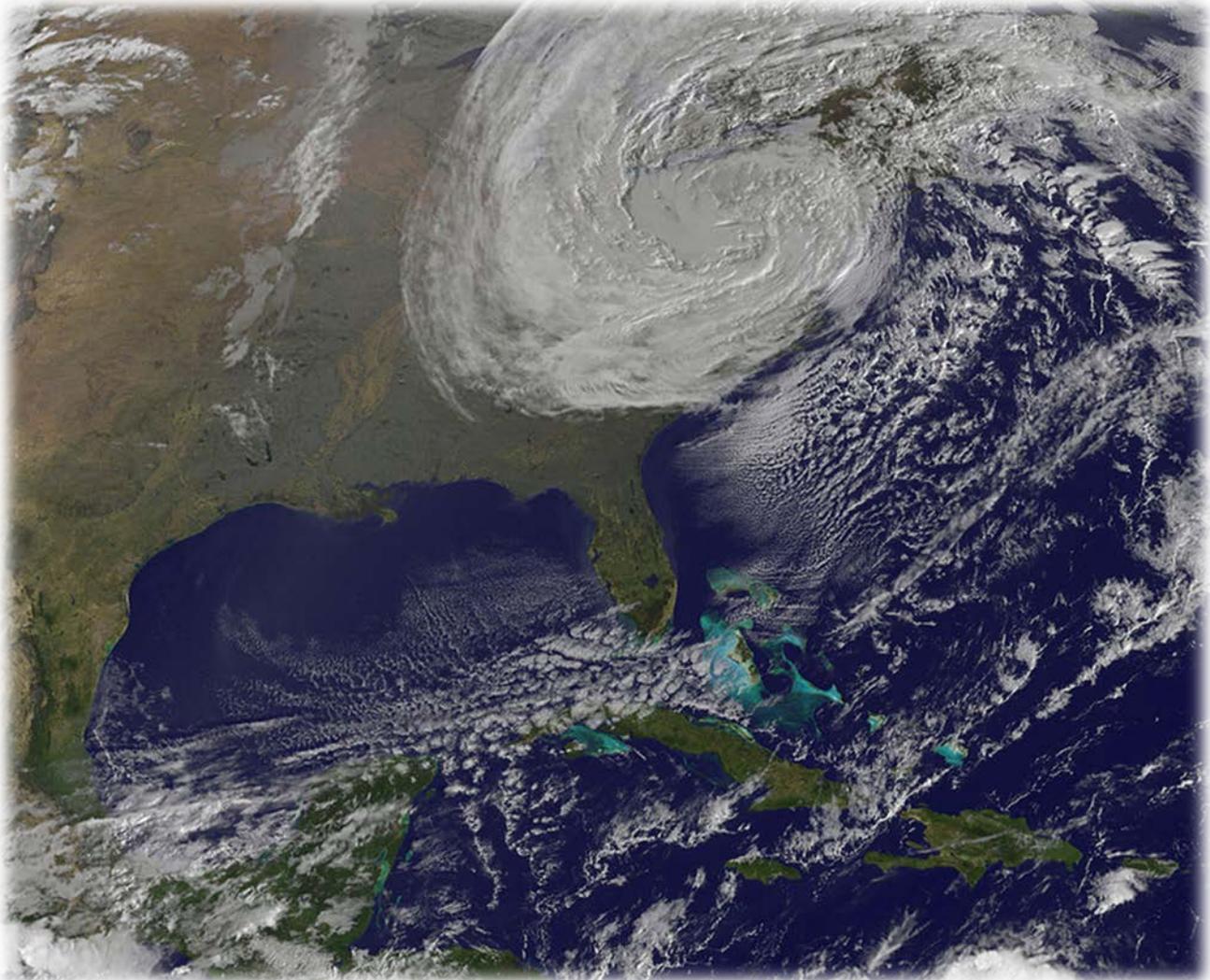


(RE)BUILD: Rebuild, expand, and preserve public and affordable housing stock

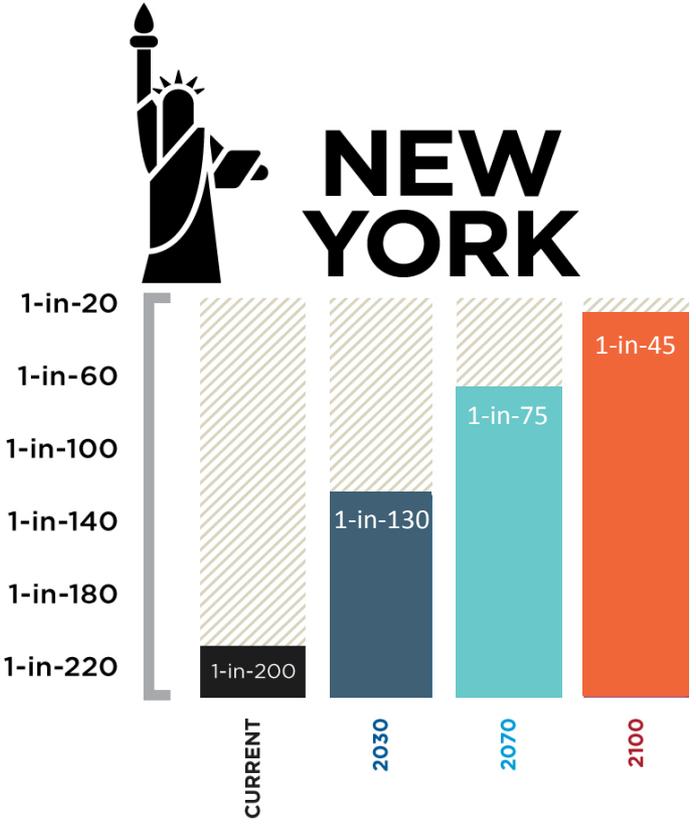


ENGAGE: Connect residents to best-in-class social services

RECOVERY AND RESILIENCE | SUPERSTORM SANDY



RECOVERY AND RESILIENCE | EXTREME WEATHER



CHANCE THAT AN EVENT WILL CAUSE AT LEAST \$15 BILLION IN ECONOMIC LOSSES FROM STORM SURGE IN ANY GIVEN YEAR ACCORDING TO INSURANCE MODELS

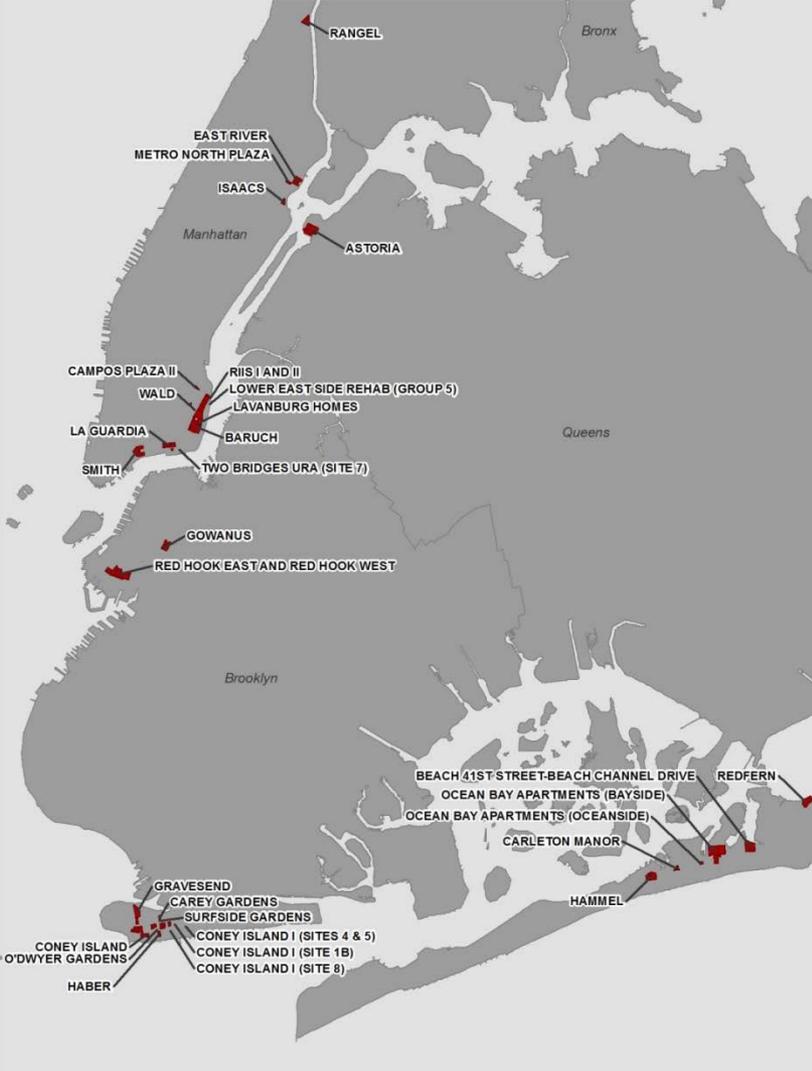
RECOVERY AND RESILIENCE | PROGRAM PORTFOLIO

33 SITES

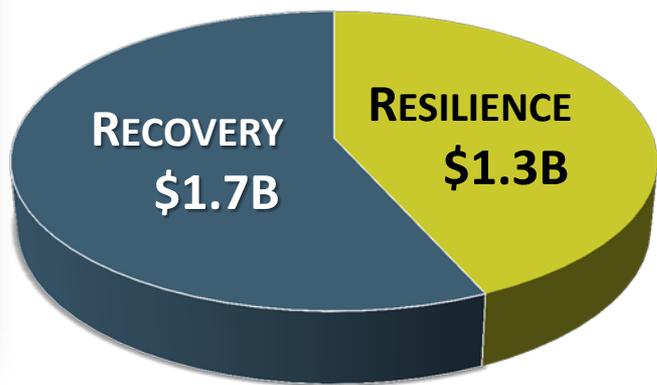
3 BOROUGHS

60,000 RESIDENTS

\$3 BILLION OF INVESTMENT



PROGRAM SCOPE | MAJOR ELEMENTS



- BUILDING REINFORCEMENT
- SURGE PROTECTION
- INFRASTRUCTURE UPGRADES
- GENERATORS



RECOVERY AND RESILIENCE | BUILDING REINFORCEMENT

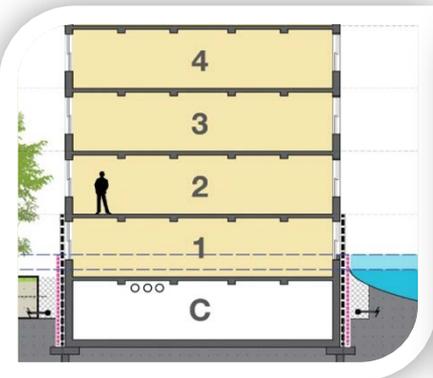
WET FLOOD PROOFING - PASSIVE

- ALLOWING WATER TO ENTER AND RETREAT FROM A STRUCTURE



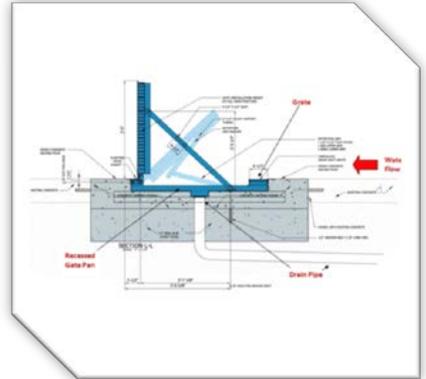
STRUCTURAL REINFORCEMENT - PASSIVE

- PHYSICAL REINFORCEMENT AND WATERPROOFING ELEMENTS ON THE FAÇADE OF A BUILDING



DRY FLOOD PROOFING – MANUAL AND PASSIVE

- PREVENTING WATER FROM ENTERING A STRUCTURE



PROTECTING PEOPLE & PROPERTY | SURGE PROTECTION



PROTECTING PEOPLE & PROPERTY | INFRASTRUCTURE UPGRADES



PROTECTING PEOPLE & PROPERTY | INNOVATIVE DESIGN



CASE STUDY | CONEY ISLAND HOUSES



CASE STUDY | CONEY ISLAND HOUSES



KEY NOTES:

- NEW ANCILLARY BUILDINGS
BOILER PLANT & GENERATORS
- EXISTING BUILDINGS

CASE STUDY | CONEY ISLAND HOUSES



CASE STUDY | CONEY ISLAND HOUSES



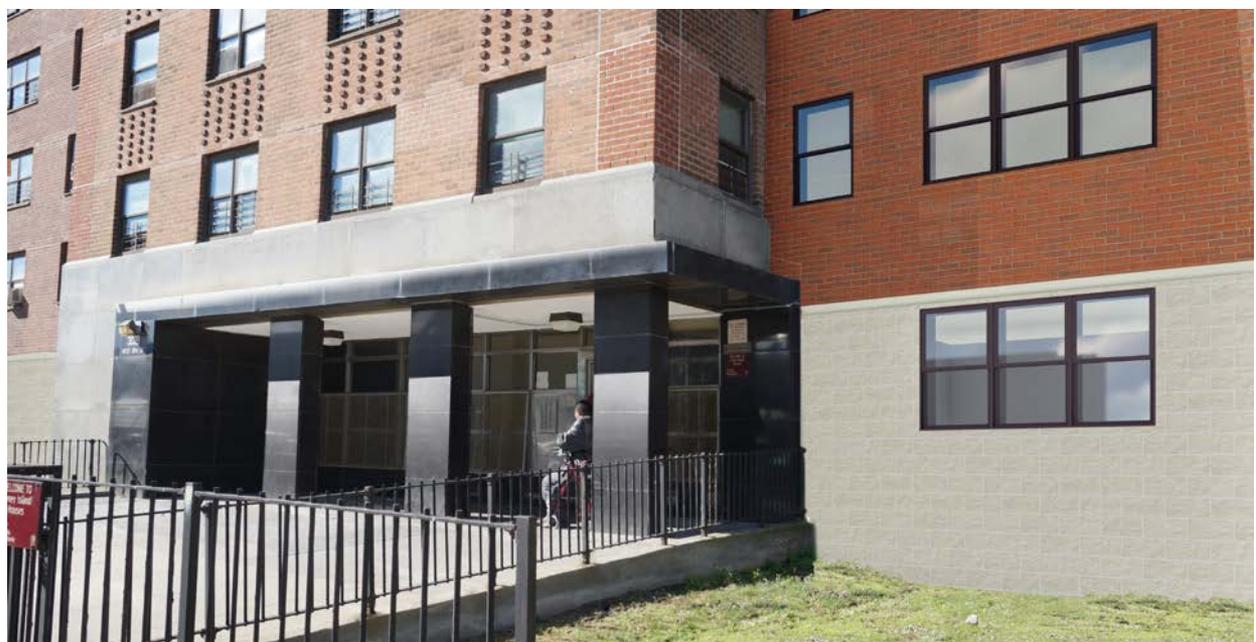
CASE STUDY | CONEY ISLAND HOUSES



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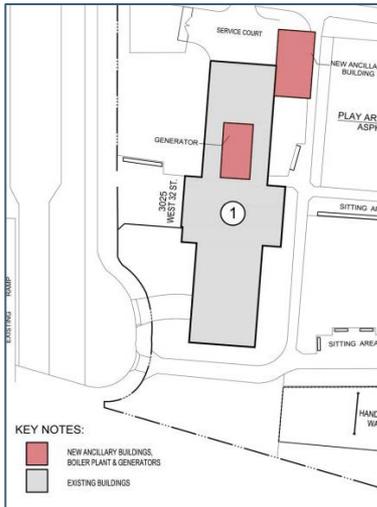


ENTRANCE WITHOUT FLOOD BARRIERS
LOBBY @ WING E

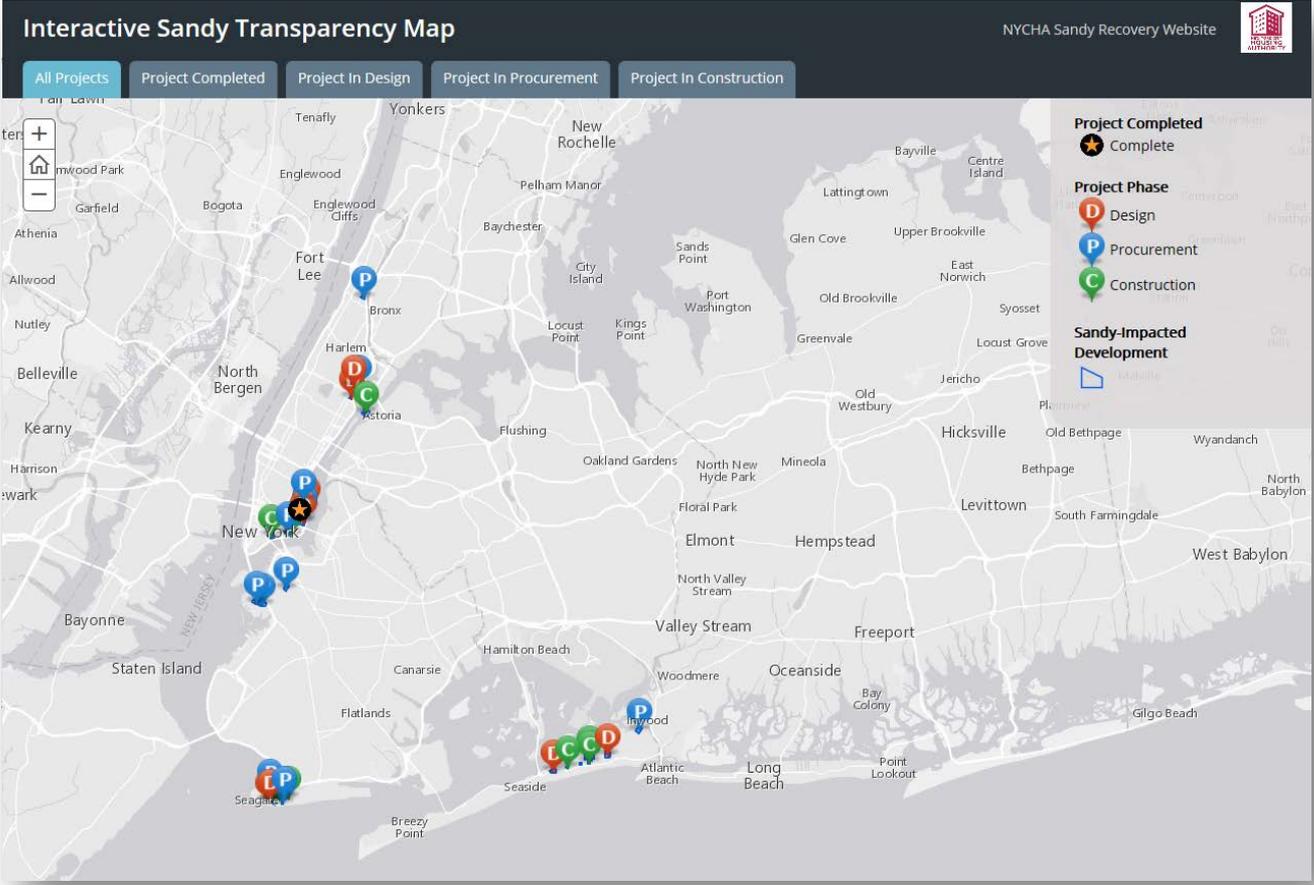


ENTRANCE WITH FLOOD BARRIERS
LOBBY @ WING E

CASE STUDY | CONEY ISLAND HOUSES



PROTECTING PEOPLE & PROPERTY | PROGRAM STATUS



11 MAJOR PROJECTS IN CONSTRUCTION

11 MAJOR PROJECTS IN PROCUREMENT

23 SITES COMPLETED PRELIMINARY CONSTRUCTION

ALL 33 MAJOR PROJECTS TO BE IN CONSTRUCTION BY THE END OF 2017

PROTECTING PEOPLE & PROPERTY | THE PROGRAM IN CONTEXT



Laurie Schoeman

Enterprise Community Partners



U.S. DEPARTMENT OF
ENERGY

 Enterprise® **NATIONAL RESILIENCE
INITIATIVE**



ENTERPRISE'S MISSION

To create opportunity for low- and moderate-income people through affordable housing in diverse, thriving communities.

Capital.

Enterprise is a recognized leader in socially driven capital investment, having delivered more than \$23.4 billion to low-income communities across the U.S.

Solutions.

We work with local partners to test and scale new solutions to some of the most pressing housing and economic problems facing low-income communities.

Policy.

Enterprise is a crucial voice for America's low-income communities with a strong presence in Washington, D.C., and city halls across the country.





Resilience—An Investment to Protect and Strengthen Our Communities

Across the nation, heatwaves, droughts and floods are becoming more frequent and severe, increasing risks to people, homes and infrastructure. Between 2011 and 2013, the U.S. experienced 32 weather events that each caused at least one billion dollars in damages, and two-thirds of counties nationwide had presidentially declared disasters.



Resilience is the capacity for households, communities, and regions to adapt to changing conditions and to maintain and regain functionality in the face of stress or disturbance.

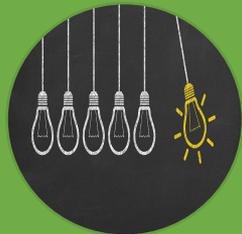
Vision for a Resilient Nation



Housing organizations design affordable housing with resilient infrastructure that is sensitive to the community's cultural needs and adopt emergency preparedness protocols;



Community stakeholders reflect the diversity of the communities themselves and are engaged in planning resilient homes and communities that are able to bounce back quickly after extreme events;



Federal, city and state planning processes are shaped and supported through public policies and funding that protect vulnerable communities and promote resilient planning.

Building on a Strong Foundation—Our Work on the Ground



Capital

READY TO RESPOND DISASTER S

**Overview: Why You
be Ready to Respo**



Disaster Preparedness
for Affordable
Housing Organizations

Enterprise
green
Communities®

READY TO RESPOND

**Strategies for Multifamily
Building Resilience**



Disaster Preparedness
for Affordable
Housing Organizations

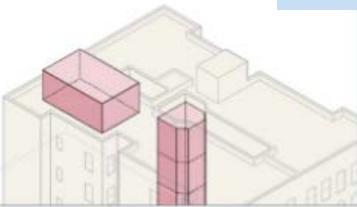
Enterprise
green
Communities®



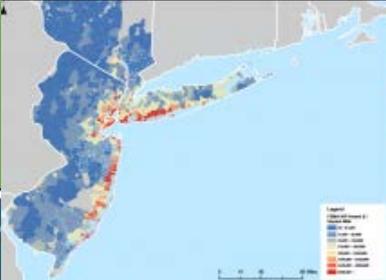
Solutions

NYU Furman Center
Advancing research and data on housing, neighborhoods, and urban policy

The Price of Resilience: Can Multifamily Housing Afford to Adapt?



NEW YORK UNIVERSITY • 100 EAST 42ND STREET, NEW YORK, NY 10017



527,327
% of registrants with FEMA assistance

290,431
registrants inspected by FEMA

178,095
registrants approved for FEMA assistance

\$1.4 Bil.
FEMA assistance approved by FEMA

Hurricane Sandy Fall 2013 Update

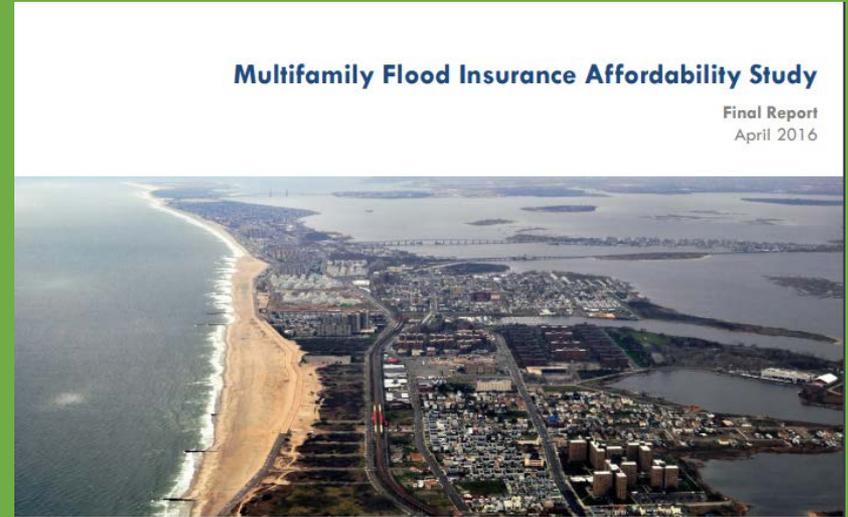
The devastation unleashed by Hurricane Sandy in October 2012 is a stark reminder of the importance of having a safe place to call home. In this brief, we use data released in August 2013 by FEMA to evaluate the level of need and the response efforts in the communities hardest hit by the storm, in addition to providing the characteristics of registrants for assistance. This release includes information about inspections and assistance approvals for those who registered for assistance through FEMA's Individual and Households Program (IHP).¹

Key findings of this report include:

- The number of registrants for FEMA assistance grew by only 8.8M (1.8%) between February and June 2013.
- Of all registrants, 59% had their home or property inspected for damage. The inspection rate did not differ substantially between renters (59%) and owners (58%).
- About 91% of those inspected (178,095 registrants) were approved by FEMA for assistance through IHP. The average award approved was \$2,385.
- FEMA has approved a total of \$1.4 billion in IHP assistance in N.Y. and N.J. Current registrants were awarded \$1.1 billion of that total, while earlier registrants were awarded \$322 million.

The IHP program provides grants and/or rental-based assistance to support the temporary needs of: 1. Nonprofit housing (short-term) or temporary and/or long-term rental; 2. Owner and tenant/occupant during the temporary or repair or restore or damage-causing; 3. Other needs include to cover medical treatment, personal property loss, utilities, heating, moving expenses, food, temporary shelter, and other service needs.

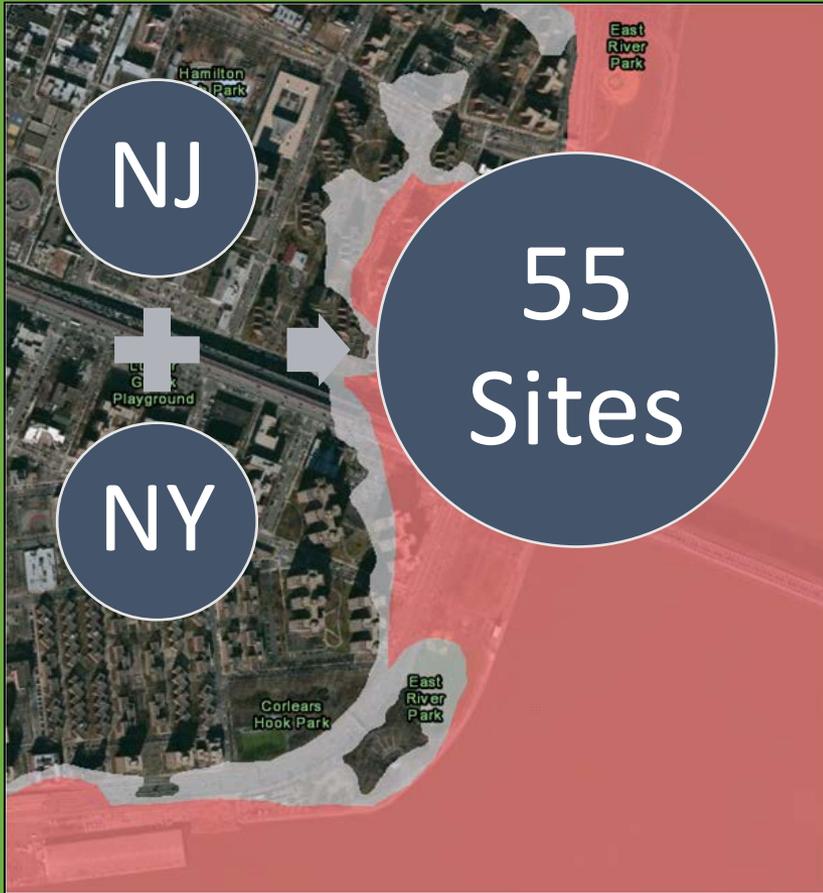
FEMA Assistance Analysis
New Jersey, New York City and Other Areas of New York



Multifamily Flood Insurance Affordability Study

Final Report
April 2016

Policy



READY TO RESPOND

Strategies for Multifamily Building Resilience

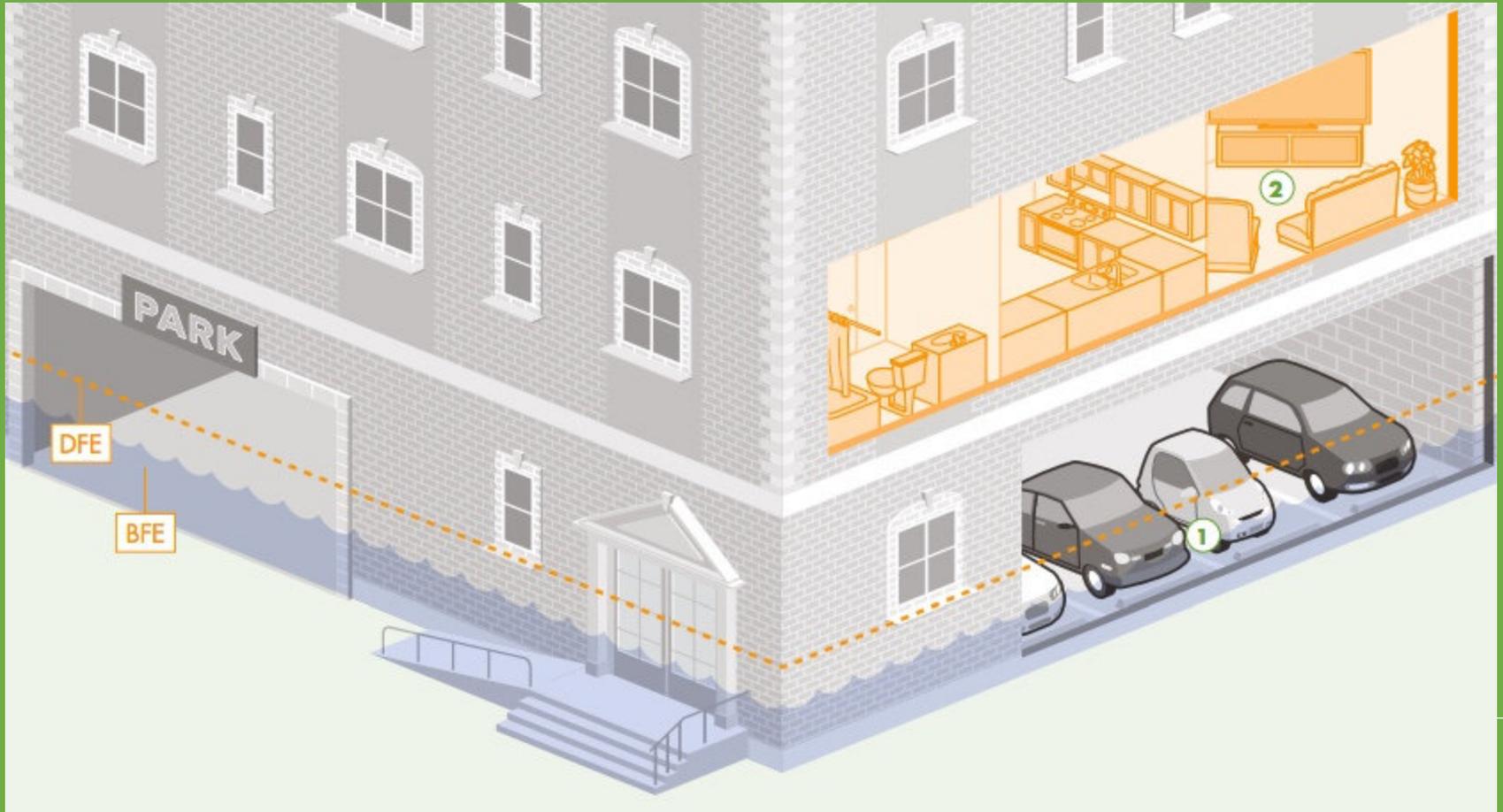
Disaster Preparedness
for Affordable
Housing Organizations

Enterprise
green
communities®

Protection

Strategies that reduce a facility's vulnerability to extreme weather





Adaptation

Strategies that improve a facility's ability to adapt with changing climate conditions





Backup

Strategies that reduce a facility's vulnerability to extreme weather





334 east 8th street



New Orleans, LA

A nighttime aerial view of Los Angeles, California, showing the city's skyline and illuminated streets. The image is used as a background for the text.

San Francisco

Chicago

Atlanta

Memphis

Denver

Los Angeles

SPARCC

Laurie Schoeman

**Program Director- National Resilience
Initiative**

Phone: 212-284-7156

lschoeman@enterprisecommunity.org



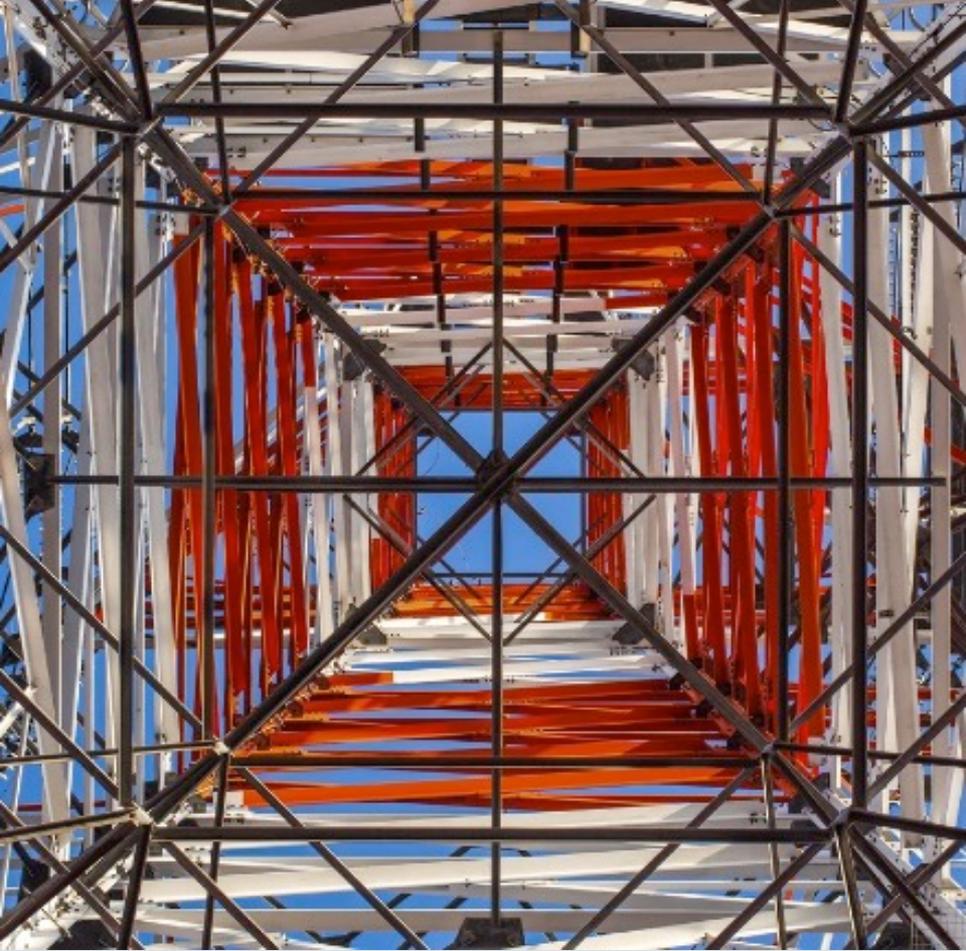
Contact

Judsen Bruzgul

ICF



U.S. DEPARTMENT OF
ENERGY



Climate Resilience in Context

Examples from work with utilities and communities to support local resilience

May 17, 2017

Better Buildings Summit



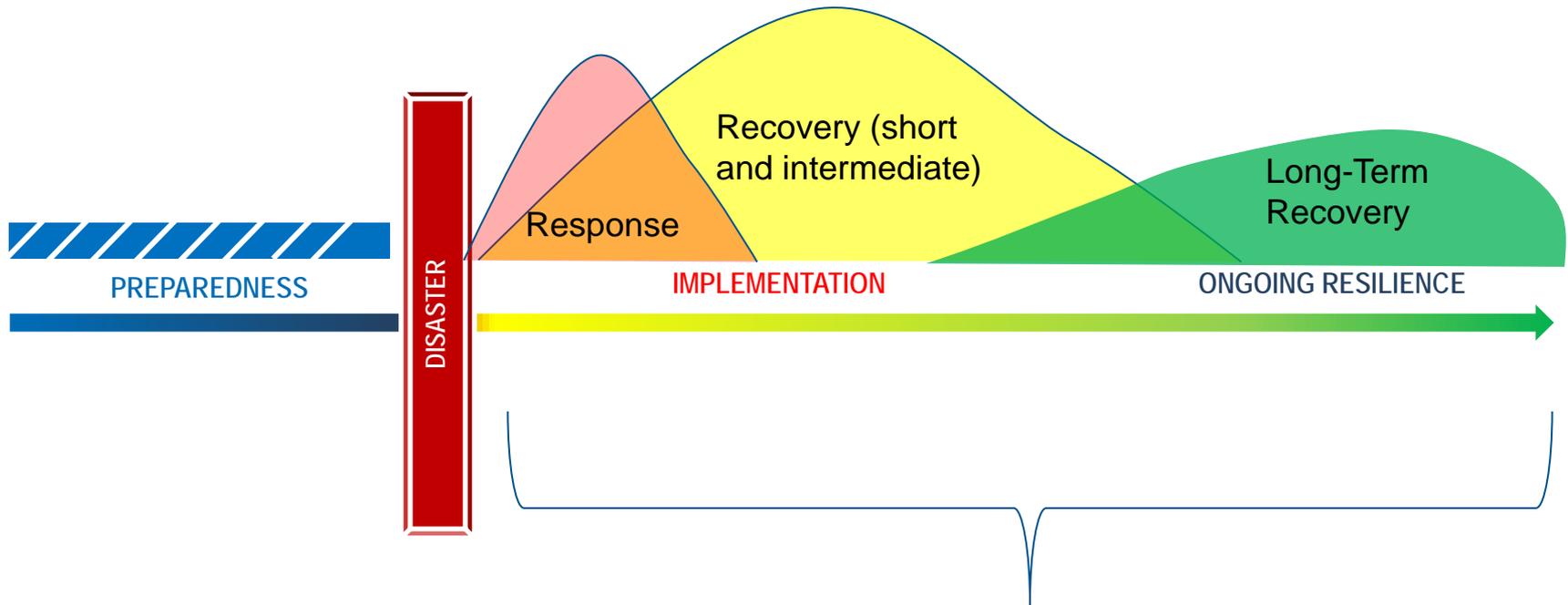
Judsen Bruzgul, PhD

ICF

Judsen.bruzgul@icf.com



Preparedness, Response, Recovery



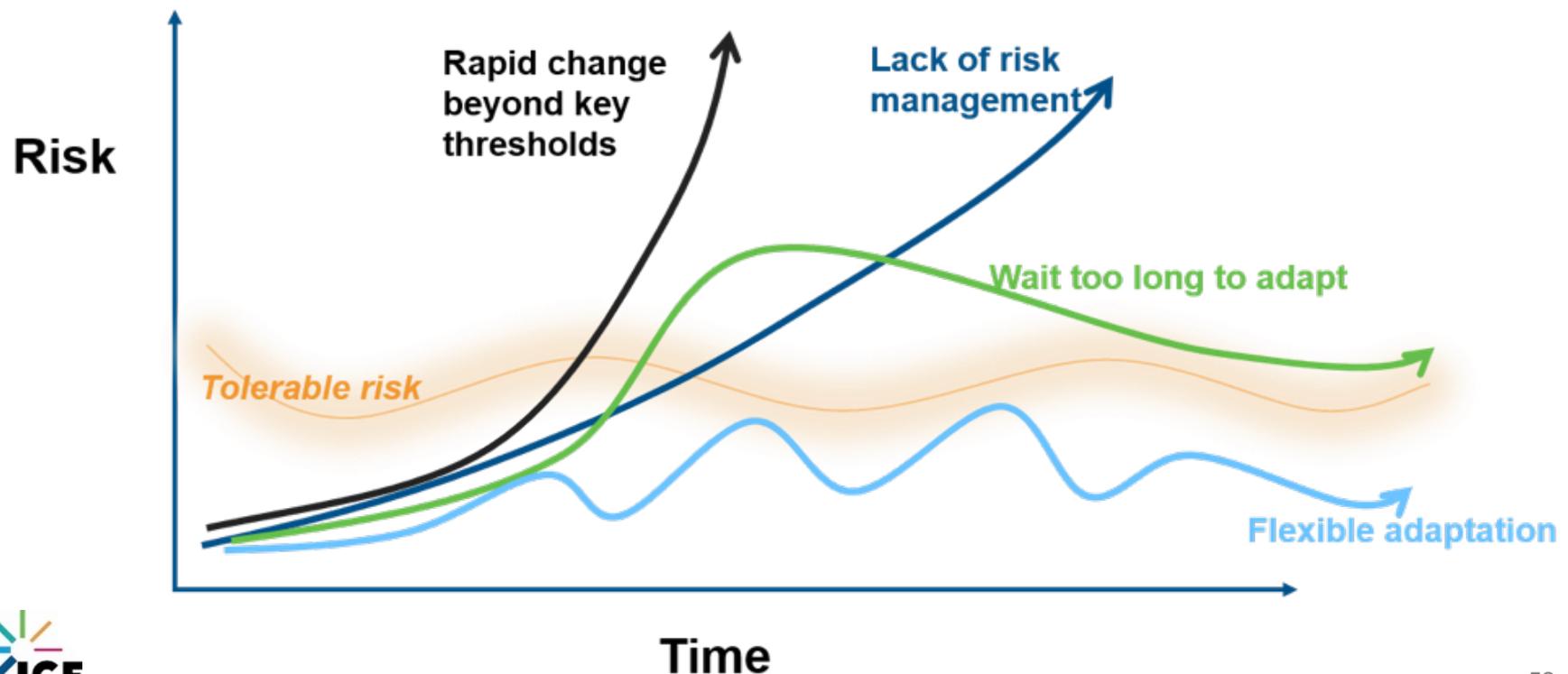


The Disaster-Adaptation Cycle



Managing Through Change to Build Resilience

- Extreme weather events—coastal storms, heat waves, etc.—are changing in frequency and intensity, challenging traditional risk management
- Transformation to adapt to a “new normal” is more than incremental change and needs long lead times
- Unexpectedly rapid change—frequent coastal flooding, permanent drought, etc.—can lead to threshold surprises





Managing Today's Risks & Adapting to Future Conditions

Planning for All Hazards

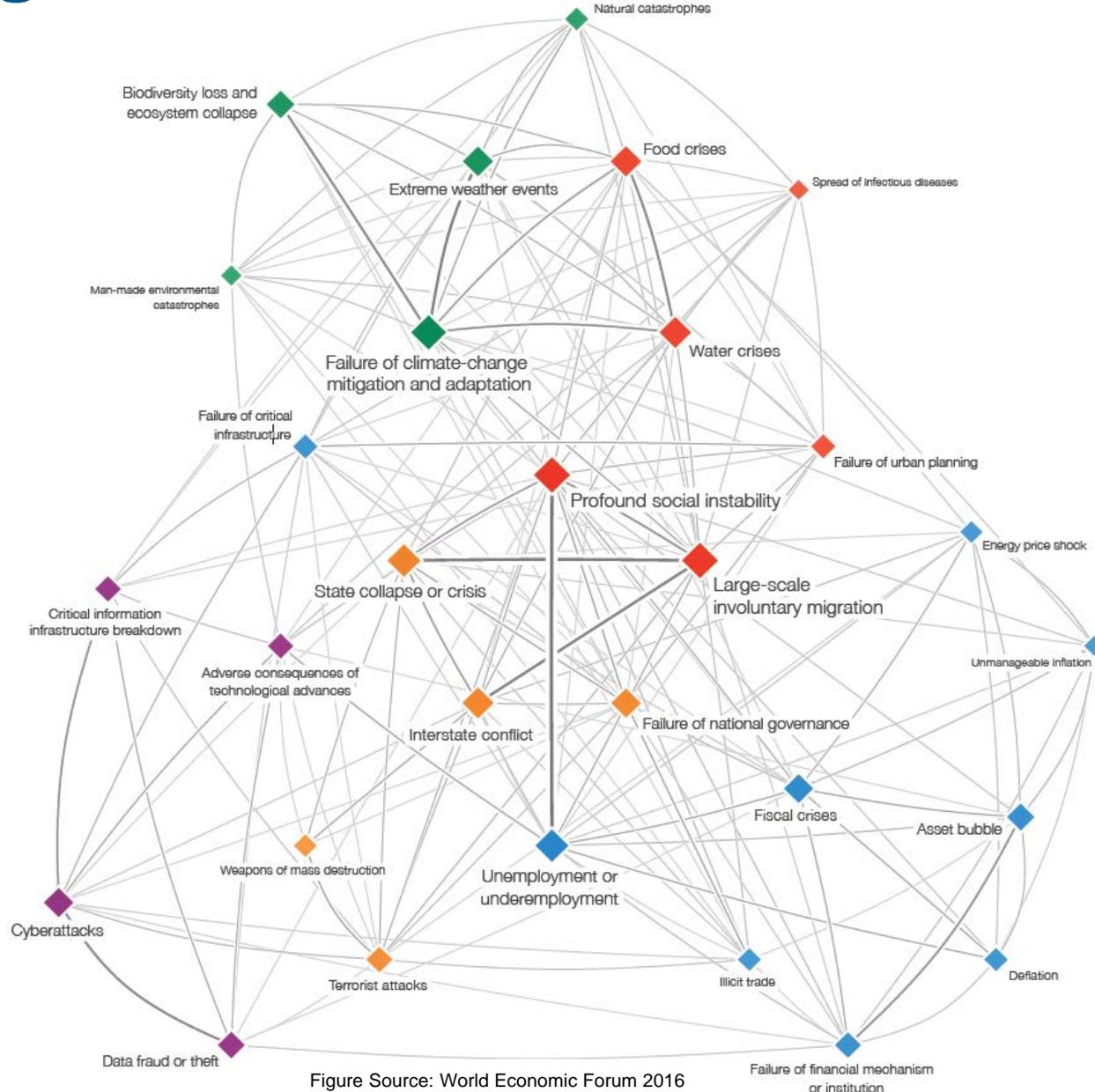


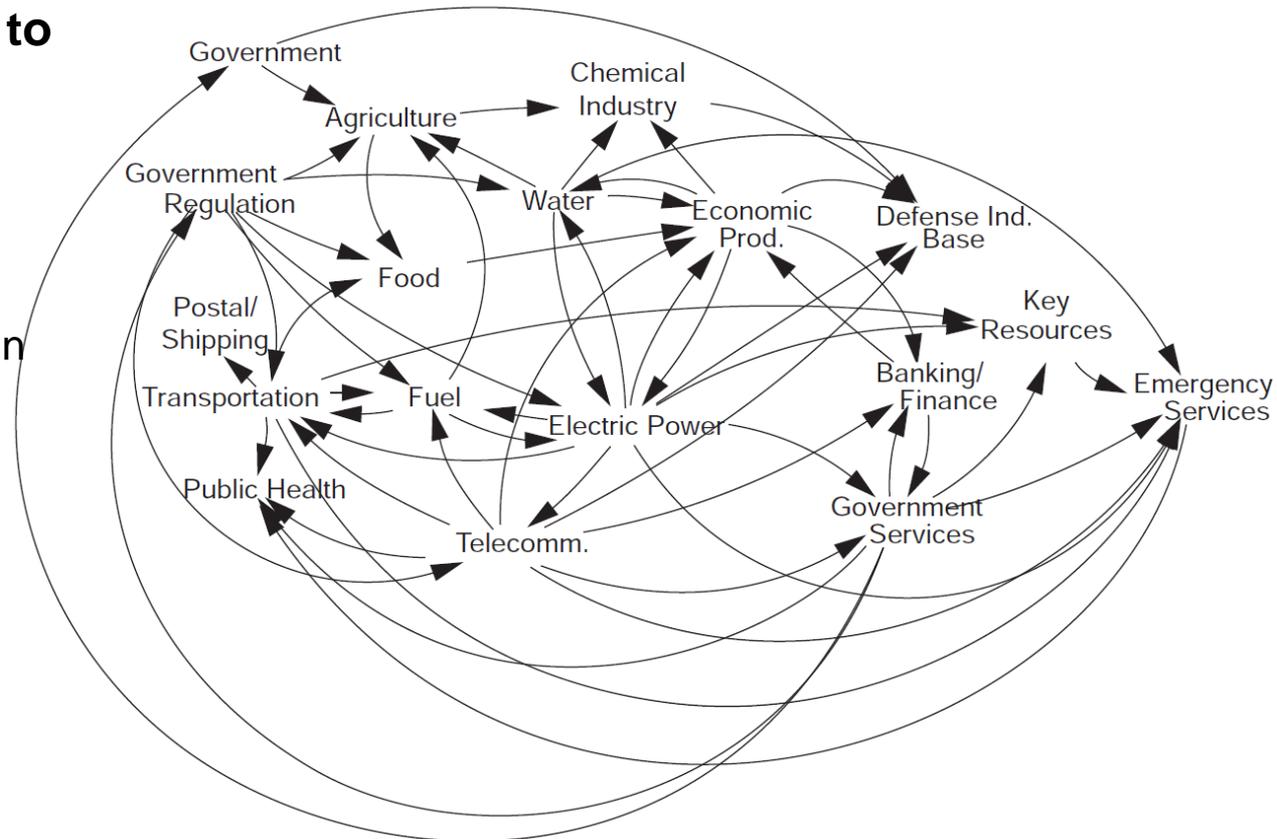
Figure Source: World Economic Forum 2016



Disruption of Critical Infrastructure Systems Will Have Important Indirect Impacts

- For example, disruption to electricity can cause:

- Displacement
- Economic Losses
- Public Health Impacts
- Long-Distance Supply Chain Disruptions
- Fuel Shortages



Resilience Action: From Buildings to Cities, Regions, and Beyond



Resilience Planning in The City of Philadelphia



GROWING STRONGER:

TOWARD A
CLIMATE-READY
PHILADELPHIA

Report by the Mayor's Office of
Sustainability and ICF International

NOVEMBER 2015



- **Why Climate Change Matters to Philadelphia**
 - Sea Level Rise, Storm Flooding, and Extreme Heat
 - Potential costs of climate change
- **Reducing the Risks**
 - Existing resilience efforts
 - Early implementation opportunities
 - Interdependencies and opportunities for collaboration—system based strategies
- **Capital Planning**



Collaboration: Every Department!



THE CITY OF PHILADELPHIA
MAYOR'S OFFICE OF
SUSTAINABILITY



PHILADELPHIA
PARKS &
RECREATION







6 Ft. SLR + Cat 1 = 33.8 Ft.

2 Ft. SLR + Cat 1 = 30.75 Ft.

4 Ft. SLR + Cat 1 = 31.0 Ft.

Ground Elevation = 26.50 ft

Integrate Risk Screening into Existing Processes

Discrete Project, Existing Asset/Retrofit

- Does the facility house people, or contents that are climate or temperature sensitive?
- What is the lifetime of the facility?
- Is there a plan to install an HVAC system?
- If needed:
 - Reduce building thermal load
 - Increase HVAC reliability
 - Monitor temperatures over time

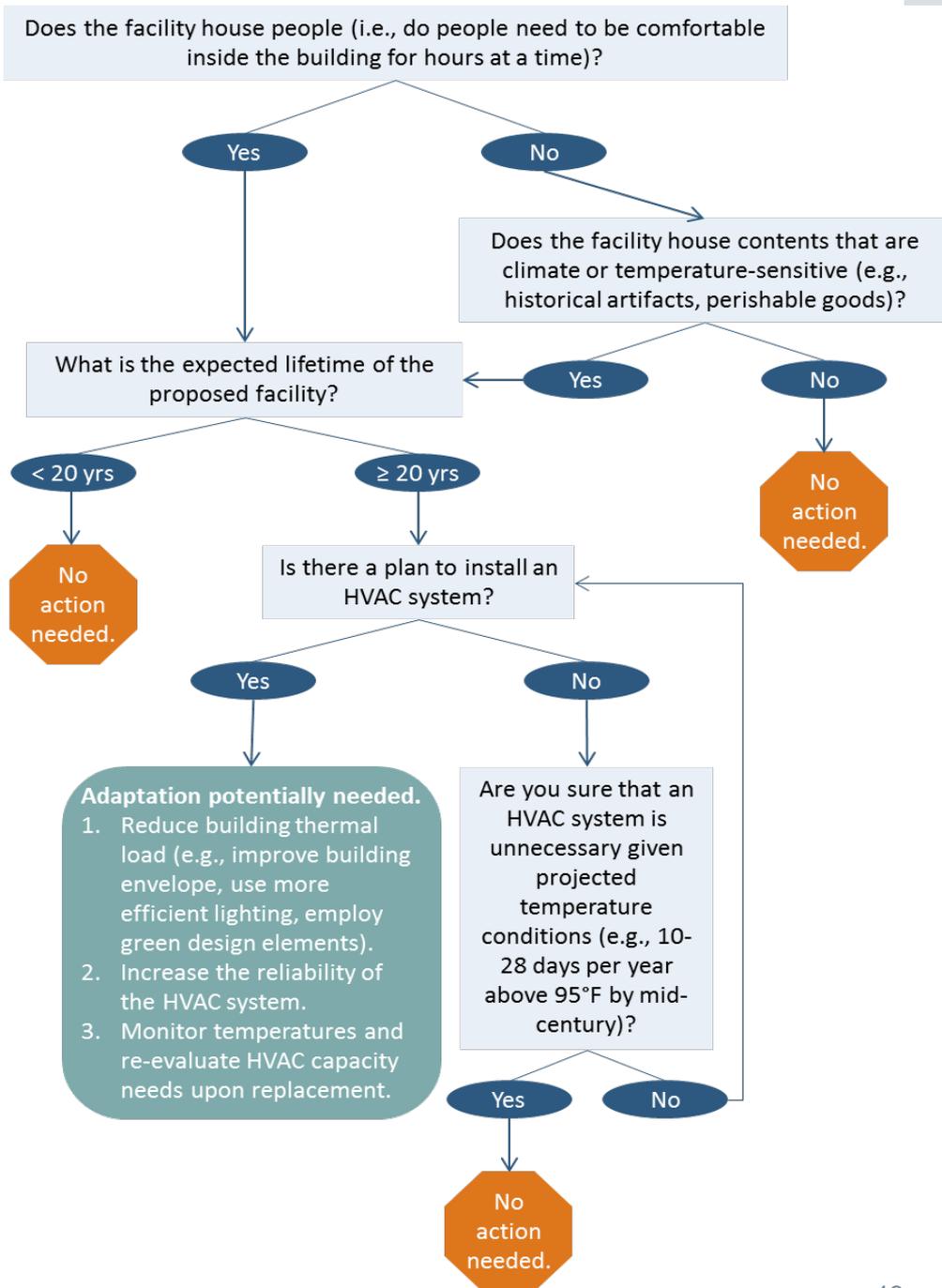
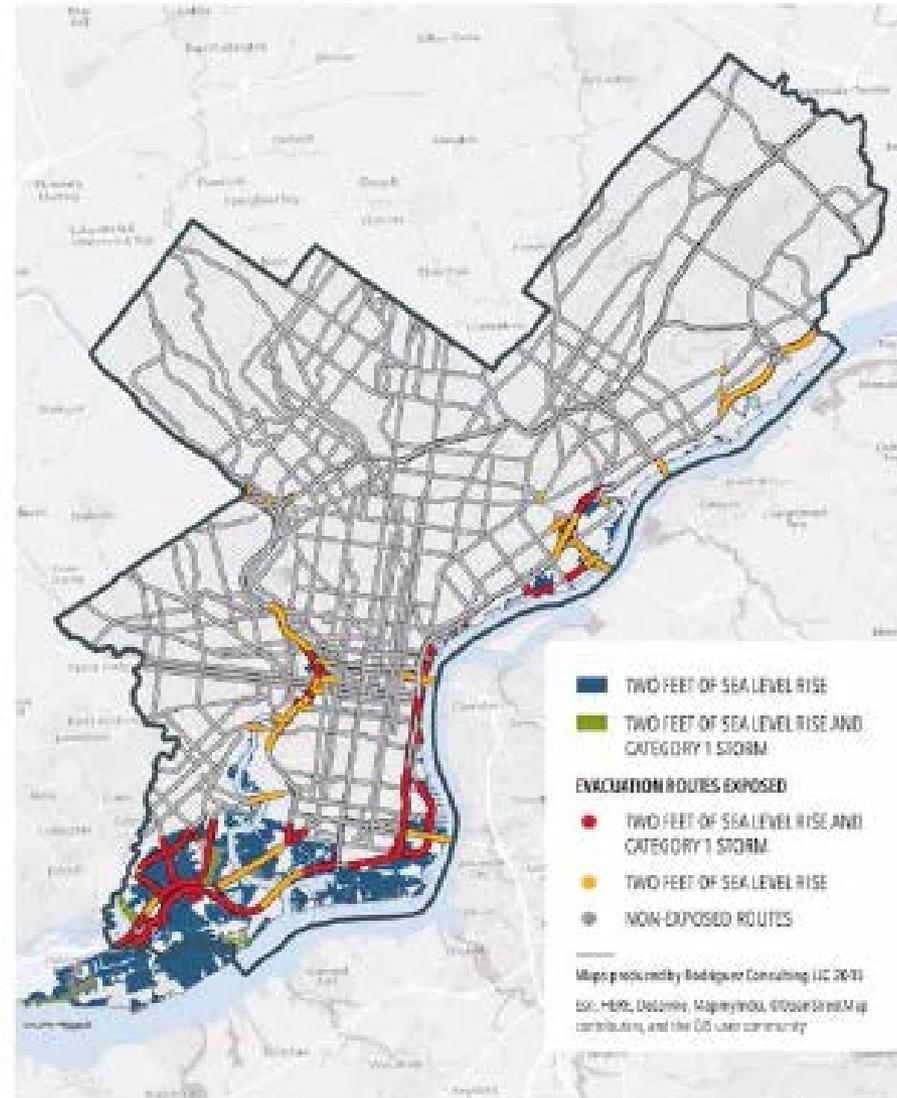


Figure Source: Growing Stronger: Toward a Climate-Ready Philadelphia 2015

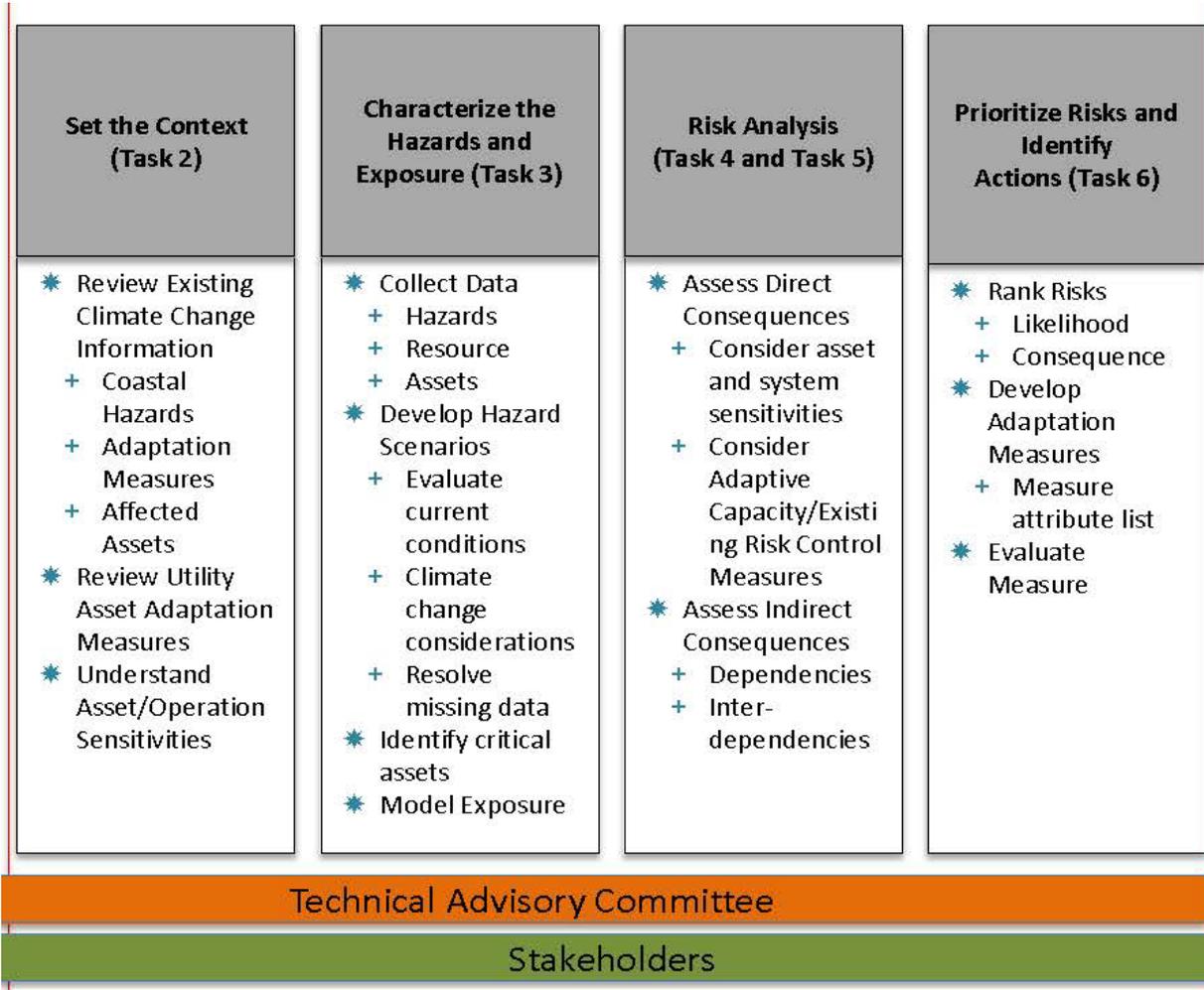
Consider System-Level Impacts and Resilience Measures

EXPOSURE OF OEM'S DESIGNATED EVACUATION ROUTES

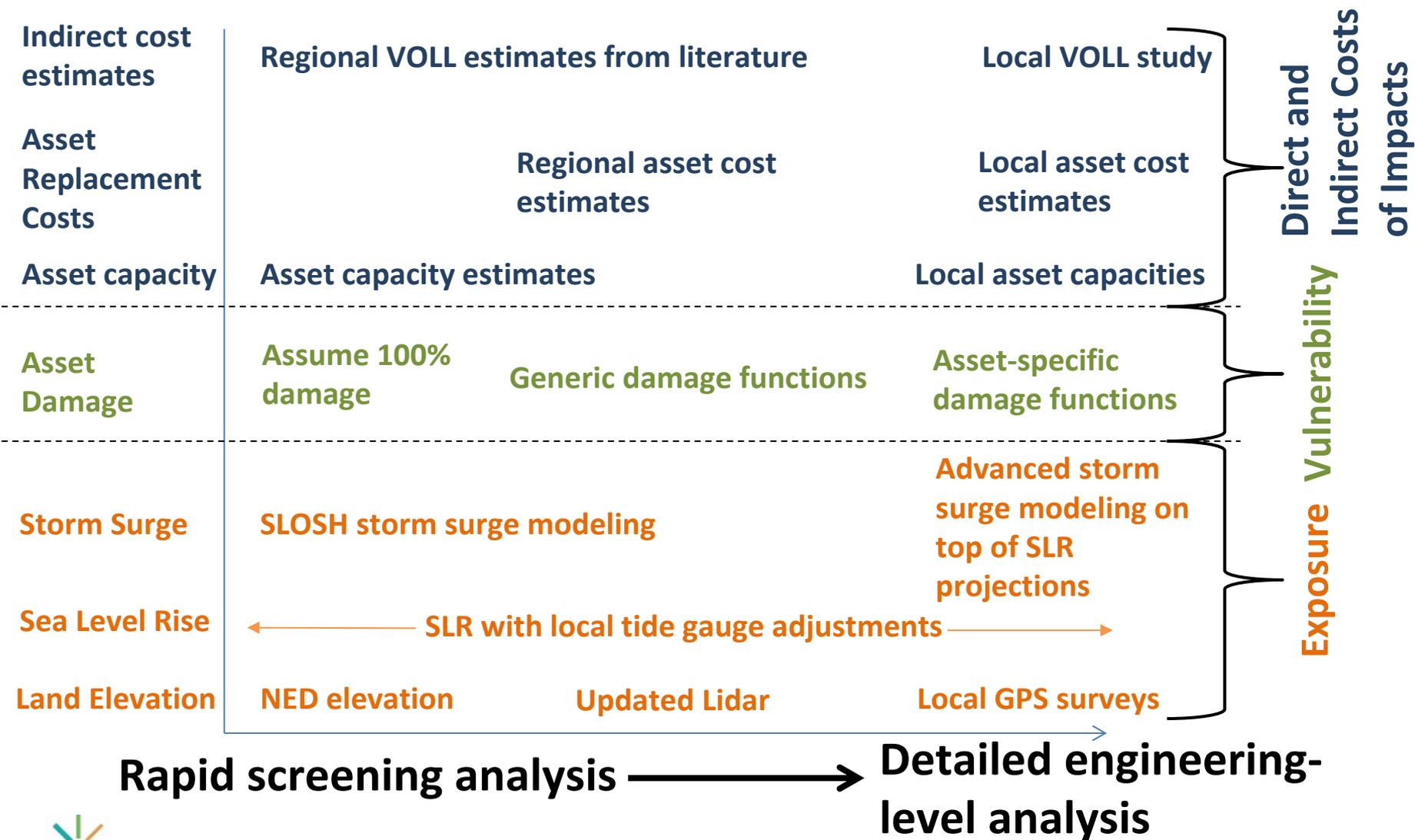


Resilience Planning at San Diego Gas & Electric

- **Direct Partnership between ICF and SDG&E**
- **Multi-Hazard**
 - Coastal Hazards
 - Extreme Heat
 - Inland Flooding
 - Wildfire
 - Landslides\Mudslides
- **Quantitative Modeling**
- **Expert and Stakeholder Workshops**



Tiered Assessment Approaches Tailored to Decision Needs



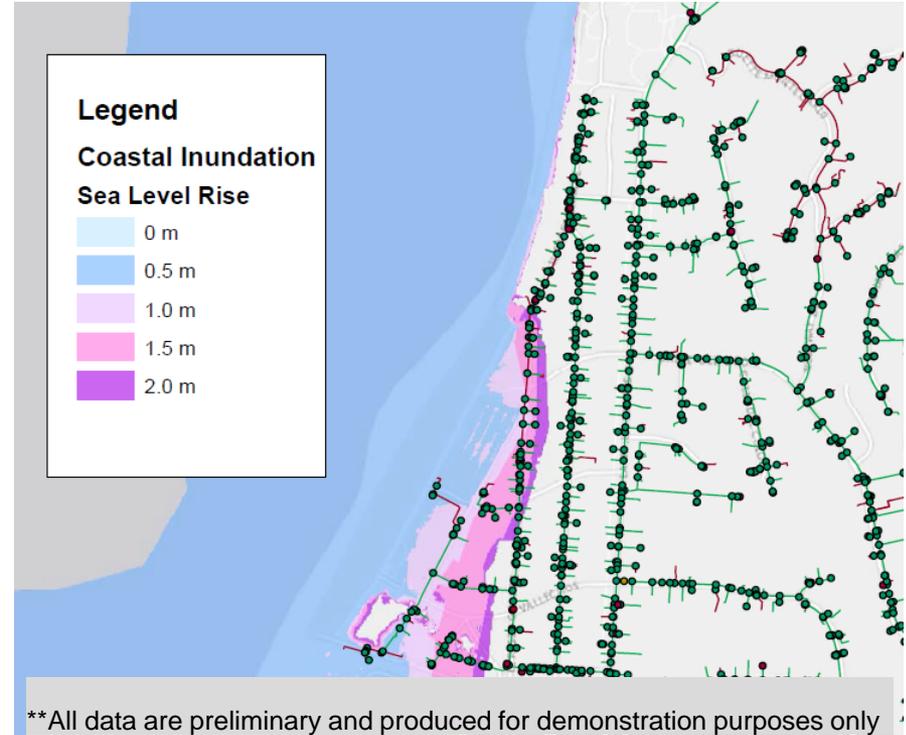
Potential Exposure of Assets and Operations

Key Asset Types

- Transmission Pipelines (high pressure)
- Distribution Pipelines (low pressure)
- Natural Gas Power Plants
- Compressor Stations (including pump components)
- City Gate and Distribution Regulating Stations
- Storage Facilities
- Communications & IT Equipment

Key Operations Types

- Emergency Response
- Communications
- Demand Forecasts & Long-Range Planning





Direct and Indirect Impacts

- **Potential damage to SDG&E owned/operated infrastructure, for example:**
 - Coastal pipeline corrosion due to saltwater intrusion
 - Direct damage from floating debris during inundation
 - Permanent inundation of water levels beyond design strength
 - Electrical power outages impacting control systems
- **Gas service disruptions**
- **Impacts on industrial, commercial, and residential customers**
- **Potential downstream impacts to market prices and local economy**

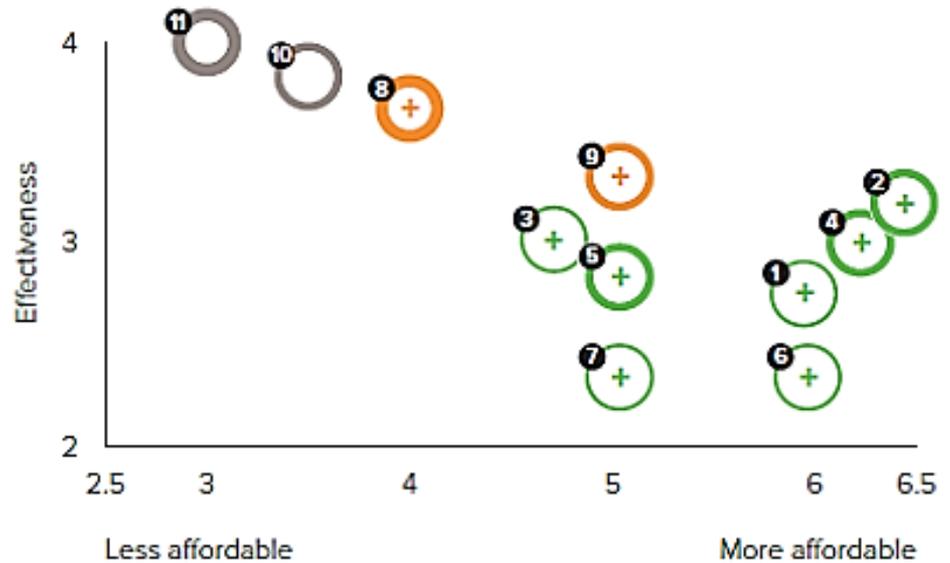




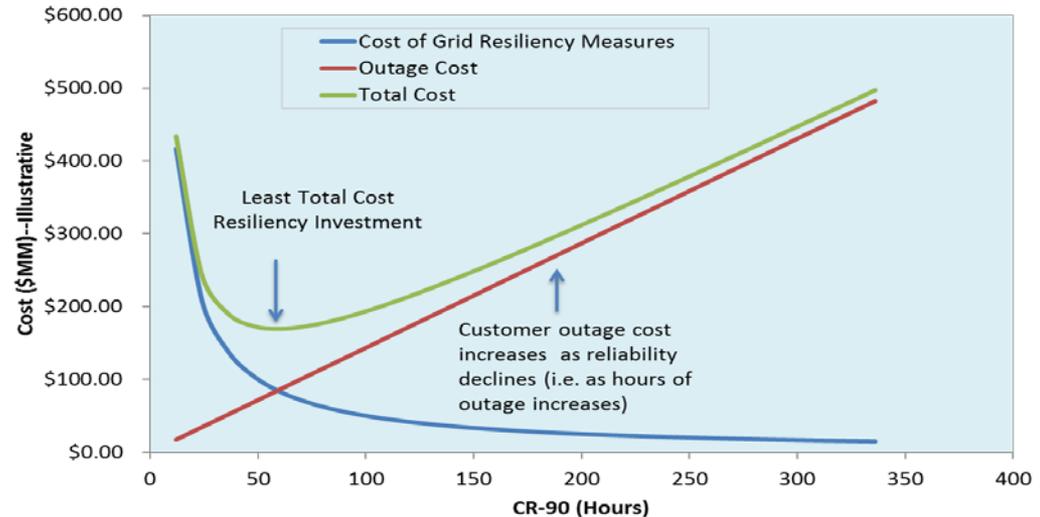
A Portfolio of Resilience Measures

- **Consider multiple criteria, for example:**
 - *Robustness*
 - *Effectiveness*
 - *Reversibility and Flexibility*
 - *Cost*
 - *Co-Benefits*
 - *Rapidity*

- **Consider multiple metrics, service life, and marginal return on investment**



Royal Society 2014



Note: Outage Cost likely not linear and will vary by customer class.

Figure Source: Mihlmester & Kumaraswamy 2014





Lessons from Application

- **The resilience of critical infrastructure contributes to the resilience of the supported communities—and *vice versa***
- **Integrate climate resilience planning into existing processes and an all-hazards approach**
- **Consider system-level impacts and resilience measures (even when assessing asset-level vulnerability)**
- **Utilize maps and other tools to reach varied audiences, drawing on readily available data (asset, climate, etc.) when possible**
- **Use cost-effective and tiered vulnerability assessment approaches tailored to the specific decision needs**
- **Consider a portfolio of resilience measures and resilience criteria in addition to traditional costs and benefits**

THANK YOU

Judsen Bruzgul, PhD

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Thank You

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