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
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

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

*NUMBER SERVED BY NYCHA’S PUBLIC HOUSING AND SECTION 8 PROGRAMS
NYCHA’s Housing Stock is Aging

328 developments

Made up of 2,550 buildings

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
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
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

- Recovery: $1.7B
- Resilience: $1.3B

1. Building Reinforcement
2. Surge Protection
3. Infrastructure Upgrades
4. Generators
**WET FLOOD PROOFING - PASSIVE**

- Allowing water to enter and retreat from a structure

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**DRY FLOOD PROOFING – MANUAL AND PASSIVE**

- Preventing water from entering a structure

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**STRUCTURAL REINFORCEMENT - PASSIVE**

- Physical reinforcement and waterproofing elements on the façade of a building
PROTECTING PEOPLE & PROPERTY  |  INNOVATIVE DESIGN
CASE STUDY | CONEY ISLAND HOUSES
CASE STUDY  | CONEY ISLAND HOUSES
CASE STUDY | CONEY ISLAND HOUSES
PROTECTING PEOPLE & PROPERTY | PROGRAM STATUS

Interactive Sandy Transparency Map

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

New York City Housing Authority
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
Solutions
Policy
NJ
NY
55 Sites

READY TO RESPOND
Strategies for Multifamily Building Resilience

Disaster Preparedness for Affordable Housing Organizations
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
New Orleans, LA
Laurie Schoeman
Program Director- National Resilience Initiative

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Judson Bruzgul

ICF
Climate Resilience in Context

Examples from work with utilities and communities to support local resilience

Better Buildings Summit

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Preparedness, Response, Recovery
The Disaster-Adaptation Cycle

1. Strategic Planning & Prep
2. Event Preparedness
3. Disaster Response
4. Post-Disaster Reconstruction

RESILIENCE IN A CHANGING ENVIRONMENT
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

RESILIENCE IN A CHANGING ENVIRONMENT

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

Figure Source: Wilbanks, et al. 2012
Resilience Action: From Buildings to Cities, Regions, and Beyond
Resilience Planning in The City of Philadelphia

- 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!
2 Ft. SLR + Cat 1 = 30.75 Ft.

4 Ft. SLR + Cat 1 = 31.0 Ft.

6 Ft. SLR + Cat 1 = 33.8 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
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

### Set the Context (Task 2)
- Review Existing Climate Change Information
  + Coastal Hazards
  + Adaptation Measures
  + Affected Assets
- Review Utility Asset Adaptation Measures
- Understand Asset/Operation Sensitivities

### Characterize the Hazards and Exposure (Task 3)
- Collect Data
  + Hazards
  + Resource
  + Assets
- Develop Hazard Scenarios
  + Evaluate current conditions
  + Climate change considerations
- Resolve missing data
- Identify critical assets
- Model Exposure

### Risk Analysis (Task 4 and Task 5)
- Assess Direct Consequences
  + Consider asset and system sensitivities
  + Consider Adaptive Capacity/Existing Risk Control Measures
- Assess Indirect Consequences
  + Dependencies
  + Inter-dependencies

### Prioritize Risks and Identify Actions (Task 6)
- Rank Risks
  + Likelihood
  + Consequence
- Develop Adaptation Measures
- Measure attribute list
- Evaluate Measure

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**CASE STUDY: RESILIENCE IN THE SDG&E NATURAL GAS SYSTEM**
Tiered Assessment Approaches Tailored to Decision Needs

- Indirect cost estimates
- Asset Replacement Costs
- Asset capacity
- Asset Damage
- Storm Surge
- Sea Level Rise
- Land Elevation

- Regional VOLL estimates from literature
- Local VOLL study
- Regional asset cost estimates
- Local asset cost estimates
- Asset capacity estimates
- Local asset capacities
- Assume 100% damage
- Generic damage functions
- Asset-specific damage functions
- SLOSH storm surge modeling
- Advanced storm surge modeling on top of SLR projections
- SLR with local tide gauge adjustments
- NED elevation
- Updated Lidar
- Local GPS surveys

Rapid screening analysis → Detailed engineering-level analysis

Figure Source: Climate Change and the Electricity Sector: Guide for Assessing Vulnerabilities and Developing Resilience Solutions to Sea Level Rise. Department of Energy 2016
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

**All data are preliminary and produced for demonstration purposes only**
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

Consolidated Edison 2013
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
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

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Thank You

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