
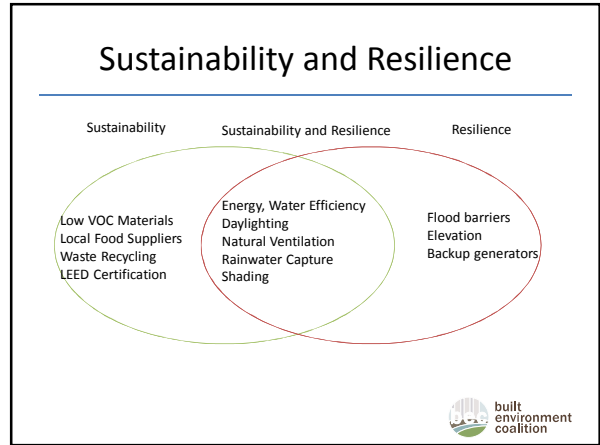
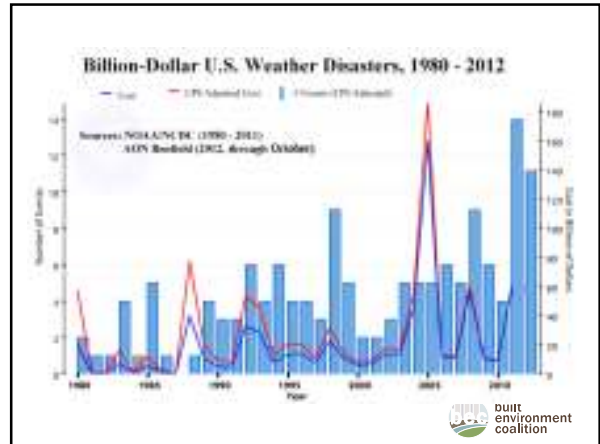



Disaster Resilience for Hotels

Boston Green Tourism
May 1, 2014


Dr. Sarah Slaughter
Built Environment Coalition

Framework for Planning for Resilience and Sustainability



- **Characterize** Critical Assets
- **Assess Vulnerabilities** of Assets to Extreme Conditions
- Identify **Intervention Points** and Solution Sets
- **Implement** using Rapid Prototypes, Monitoring, and Refinement of Potential Solutions



Critical Community Assets



- Critical Built Facilities
 - Emergency Response (Police, Fire, EMT)
 - Hospitals and Medical Care
 - Schools
 - Production Facilities
- Natural Systems
- Critical Infrastructure Systems
 - Water and Wastewater
 - Solid Waste
 - Energy
 - Communications
 - Transportation




Hospitality Organizations


- Places of Refuge During Extreme Events
- Accommodation of Current Guests
- Critical Services
 - Shelter
 - Potable Water
 - Sanitary Systems
 - Food
 - Conditioned Areas





Multi Hazard Approach




Flooding (blue color) combined with Wind Hazards (tan color) in Boston



Identify Intervention Points and Potential Solutions




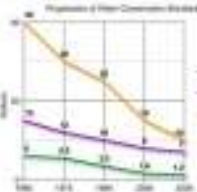
- General Actions
- Site
- Building Structure
- Building Enclosure
- Building Systems
- Building Operations
- People




Strategy: Increase Efficiency

- Eliminate Waste
- Increase Efficiency







- Water leaks equal over 1 trillion gallons/yr
- Energy generation, distribution, and usage waste may equal 40-60%



Strategy: Reduce Load

- Shade Building, Equipment, and Site
- Add Cool Surfaces (Site, Roof, Walls)
- Use Natural Ventilation
- Use Natural Lighting
- Widen Operations Settings

- Shade buildings with woody trees
- Shade air conditioner condenser and other cooling units
- Use bushes, shrubs or vines where trees don't fit

Center for Clinical Sciences Research, Stanford University, Palo Alto CA 2001

Strategy: Create Buffers

- Implement Soft/Green Infrastructure
 - Manage stormwater
 - Mitigate urban flood zones
 - Manage storm surge
- Stabilize Slopes and Inclines
- Coordinate with Community Groups




"Green Infrastructure not only provides stormwater management but also flood mitigation, air quality management, and much more" (EPA)

Evotranspiration and shading together can reduce air temperatures by 9 degrees F, and reduce air-conditioning costs by 40%. (p. 38)



Strategy: Enhance On-Site Services

- Capture/Use Stormwater
- Develop Backup Power and Communications Systems
- Generate On-Site Renewable Energy
- Capture/Use Waste Energy
- Establish Emergency Plans, Communications, and Training





Freeway Park, Seattle WA 1976

“Because co-generation and solar power systems are always in use, they can be more reliable than generators that are only turned on during emergencies.”

NYC Building Resiliency Task Force, p. 84

Strategy: Relocate and Protect

- Storm-proof Structure and Enclosure
- Equipment and systems above Design Flood Elevation
- Permanent or temporary flood walls
- Backup lighting and communications
- Secure Equipment
- Record and Inventory Protection

Many existing buildings located in flood zones have adjacent street grades with elevations below the Design Flood Elevation, with perimeter walls and egress doors at the property lines, presenting significant challenges to building owners.


Call to Action

- Assess and Re-Asses Vulnerabilities Over Time
- Plan and Invest for Resilience and Sustainability
- Contribute Expertise in Community and Regional Planning




Resources

- *Building Resilience in Boston*
<http://builtenvironmentcoalition.org>, or
http://www.greenribboncommission.org/downloads/Building_Resilience_in_Boston_SML.pdf
- *Hurricane Flood Maps – NOAA*
<http://www.nhc.noaa.gov/surge/slosh.php>
- *Boston Hazard Mitigation Plan*
<https://www.cityofboston.gov/environment/mitigationplan.asp>
- Boston’s Climate Plan – 2014 Update
<http://www.cityofboston.gov/climate/bostonsplan/>



Questions?

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