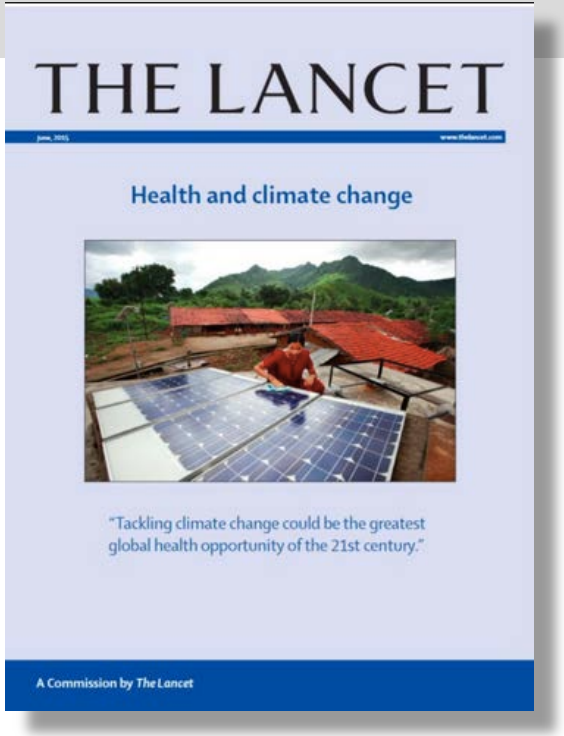

# LESSONS IN RESILIENCE FOR CRITICAL BUILDINGS

Robin Guenther FAIA LEED Fellow
Principal Perkins+Will and Senior Advisor Health Care Without Harm
November 22, 2016

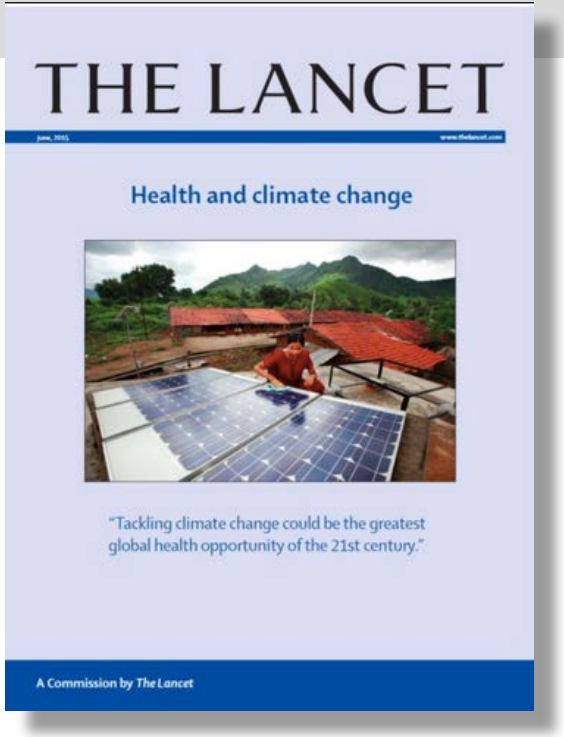
*Steinkamp Photography courtesy of Perkins+Will*

# The Lancet Commission




"The effects of climate change are being felt today, and future projections represent an unacceptably high and potentially catastrophic risk to human health."

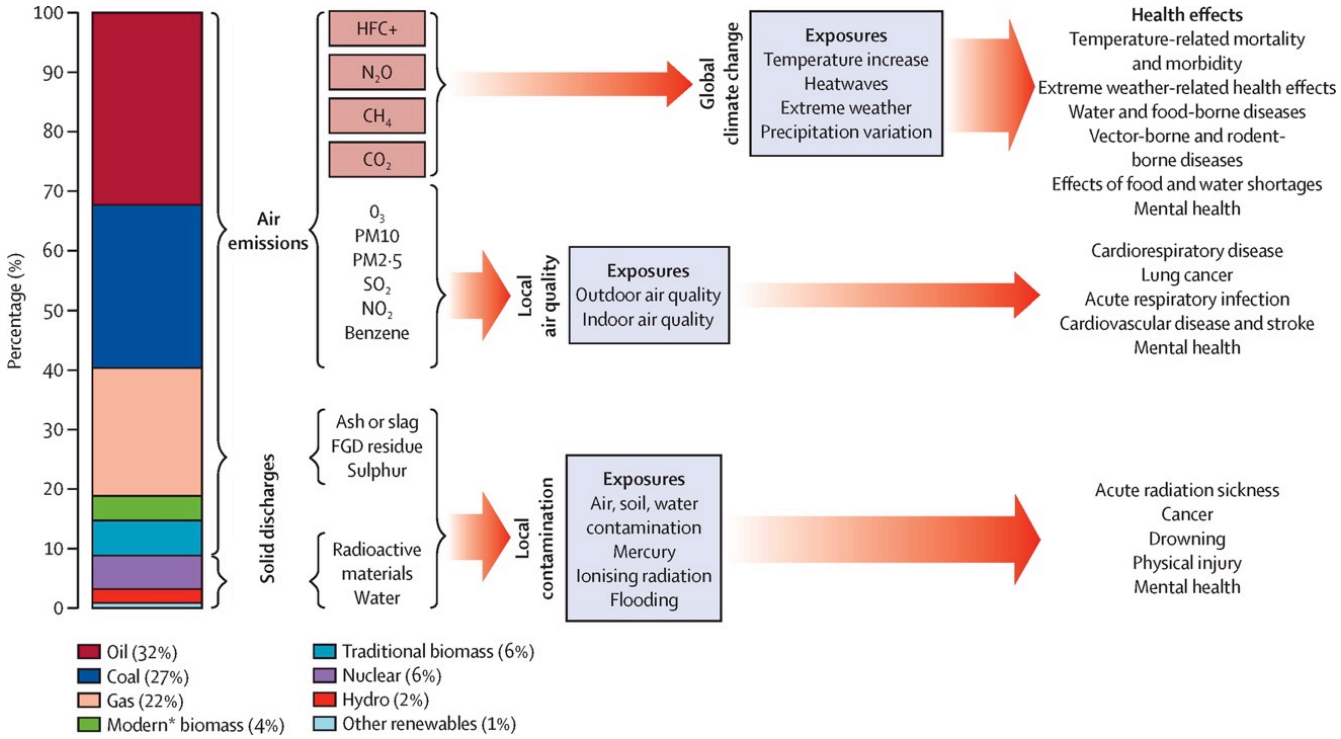
LANCET commission on health & climate '15




"Hospitals and health systems, particularly in more industrialized settings, have a significant carbon footprint."

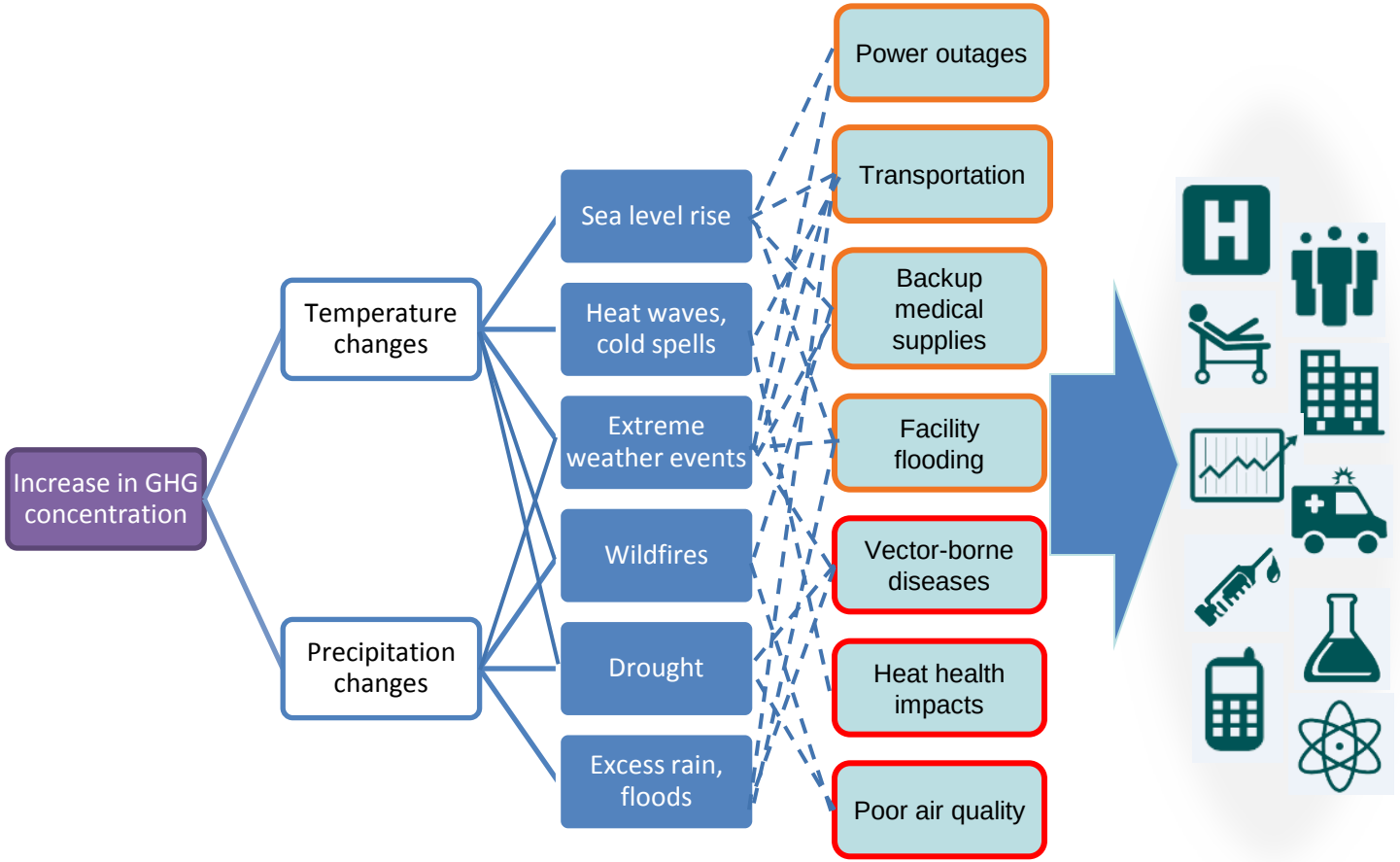
"By moving toward low-carbon health systems, health care can become more resilient to the impacts of climate change, save money, and lead by example."

# Fossil Fuels and Health

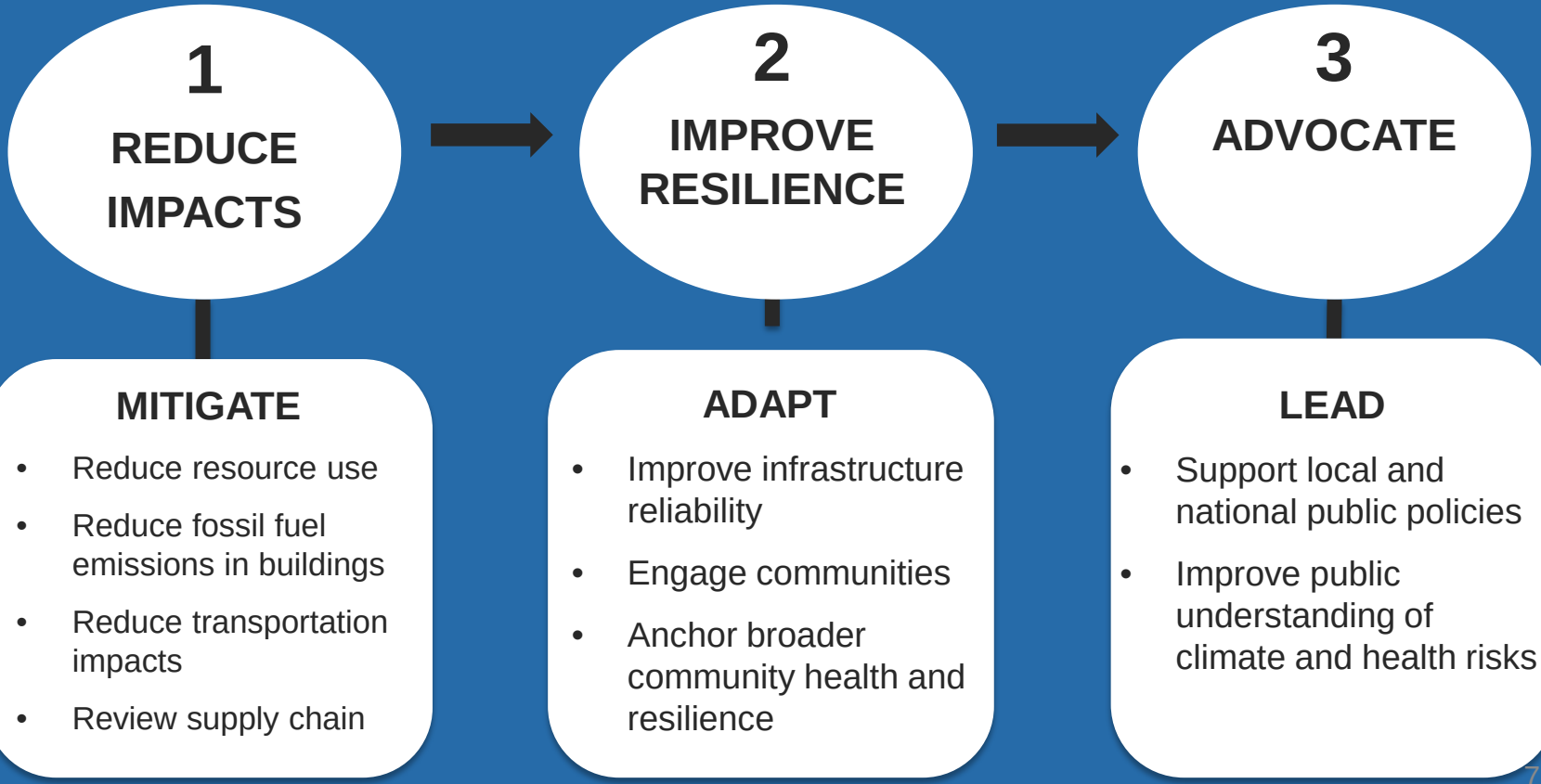


# IS OUR HEALTHCARE INFRASTRUCTURE RESILIENT TO CLIMATE CHALLENGES?


# Mapping Climate Impacts on Hospitals & Health



# Health Care's Role



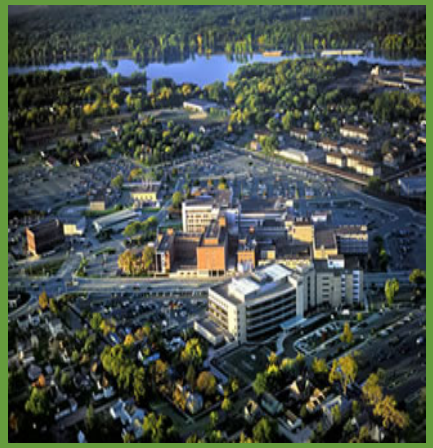
# MITIGATE

## Reduce Energy And Water Use

# *Energy Independent by 2014*

**"We did not set out to be the greenest health system. We set out to make the air better for our patients to breathe, control our rising energy costs and help our local economy."**

–Jeff Thompson, MD
Gundersen Health System 2014



- Low–energy design
- Passive design strategies – operable windows
- On-site power generation
- On-site renewable energy

- Low water use design
- Recycled and reclaimed water reuse
- Independent water source

**Kiowa Memorial Hospital**
Greensburg, KN
**(EF-5 tornado, 2008)**


Press Release

## Kaiser Permanente Pledges Bold 2025 Environmental Performance to Benefit People and Planet

Already a global leader in climate action, organization sets in motion its most ambitious plan ever for a healthier future

May 17, 2016

# carbon positive

**Kaiser Permanente**
Oakland, California

# ADAPT

## Improve Healthcare Infrastructure

## Anchor Community Health and Resilience

# Focus on patient health and safety and provider outages that will strain the healthcare system:

1. Reduce the risk of emergency evacuations
2. Be able to take on acute emergent patient needs (during and after)
3. Avoid extended facility outages that strain the system
4. Reduce how many patients cannot access their normal provider

Minimize disruptions in the **healthcare system** in order to preserve the wellbeing and health of staff, patients and community

**Operate continuously**

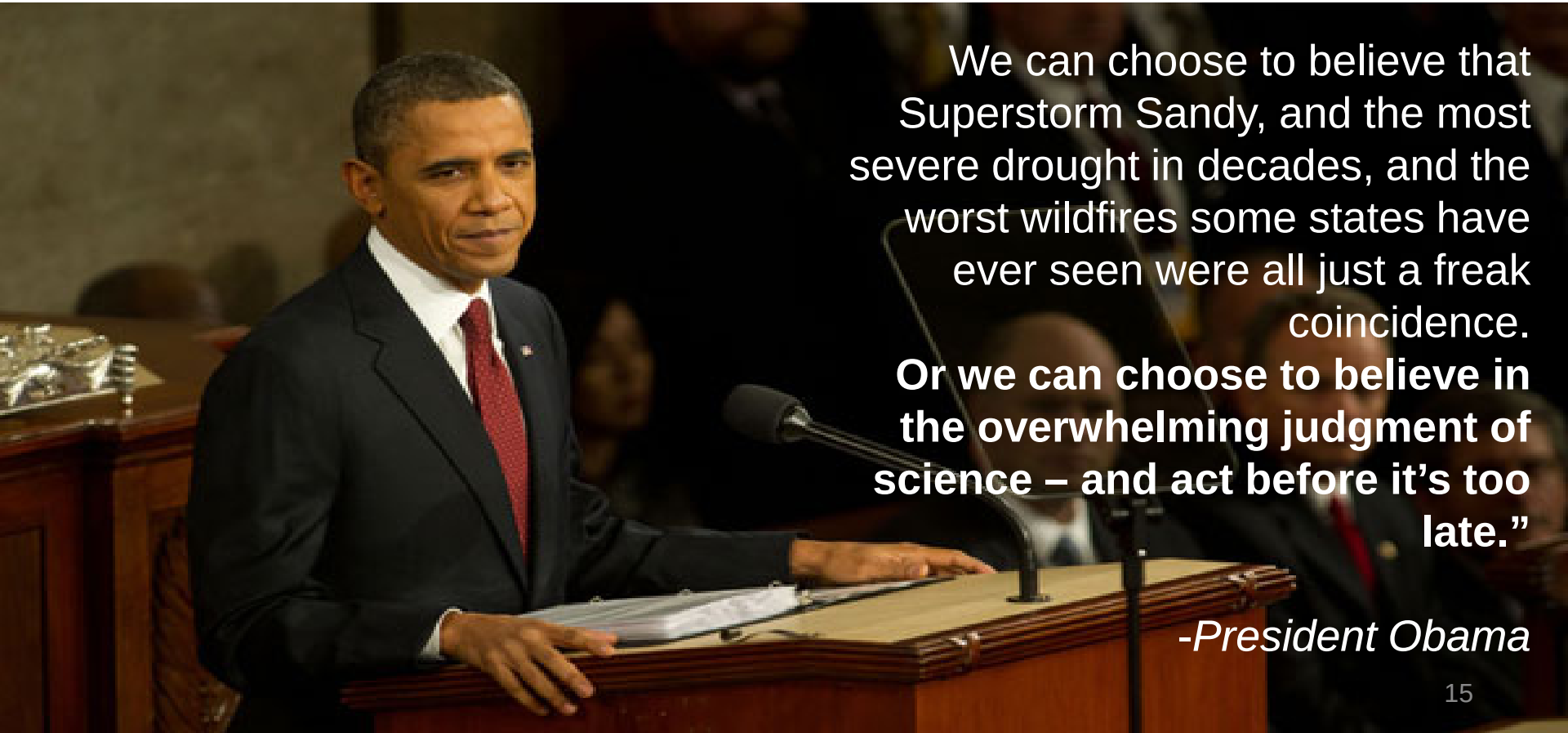
*or*

**Re-open quickly**

**Key strategies**

1. **Ensure critical healthcare providers' operability through redundancy and the prevention of physical damage**
2. **Reduce barriers to care during and after emergencies**

# The President’s Climate Action Plan- June 2013



We can choose to believe that Superstorm Sandy, and the most severe drought in decades, and the worst wildfires some states have ever seen were all just a freak coincidence.

**Or we can choose to believe in the overwhelming judgment of science – and act before it’s too late.”**

*-President Obama*

THE PRESIDENT'S PLAN WILL

# PREPARE THE U.S. FOR THE IMPACTS OF CLIMATE CHANGE

## WE'VE MADE GREAT PROGRESS

The Administration and partners developed national strategies to help decision makers address the impacts of climate change on freshwater resources — fish, wildlife, and plants — and oceans.

**PROGRESS:**
In 2013, federal agencies released Climate Change Adaptation plans for the first time, outlining strategies to protect their operations, missions, and programs from the effects of climate change.

**PROGRESS:**
The US Global Change Research Program, NOAA, USACE, and FEMA developed and released interactive sea-level rise maps and a calculator to aid rebuilding efforts in NY and NJ after Superstorm Sandy.

## THERE'S MORE WORK TO DO

Moving forward, the Obama Administration will help states, cities, and towns build stronger communities and infrastructure, protect critical sectors of our economy as well as our natural resources, and use sound science to better understand and manage climate impacts.

### SUPPORT CLIMATE-RESILIENT INVESTMENTS

at the community level by removing policy barriers, modernizing programs, and establishing a short-term task force of state, local, and tribal officials to advise on key actions the federal government can take to support local and state efforts to prepare for climate change.

### REBUILD AND LEARN FROM SUPERSTORM SANDY

by piloting innovative strategies in the Superstorm Sandy-affected region to strengthen communities against future extreme weather and other climate impacts and building on a new, consistent flood risk reduction standard established for the Sandy-affected region, agencies will update their flood-risk reduction standards for all federally-funded projects.

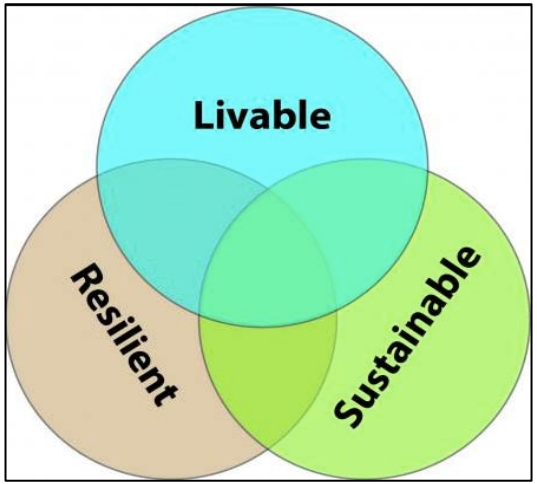
### LAUNCH AN EFFORT TO CREATE SUSTAINABLE AND RESILIENT HOSPITALS

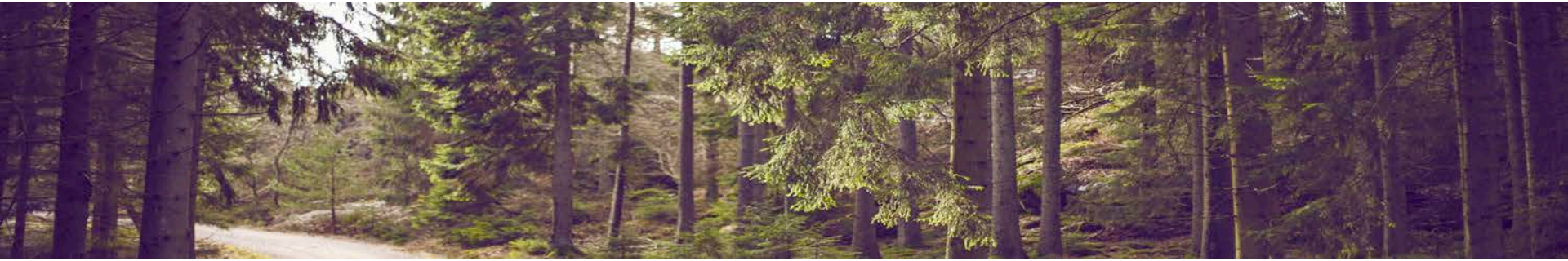
in the face of climate change through a public-private partnership with the healthcare industry.

# Why Integrate Sustainability and Climate Change Adaptation?

- Facilities perspective
  - Synergies in building resilience and reducing carbon footprint
- Public health perspective
  - Synergies with urban planning, community design
  - Sustainability + climate mitigation

  = health benefits





Sustainability

Low VOC Materials
Local Food Suppliers
Waste Recycling
Air Quality

Sustainability and Resilience

Energy, Water Efficiency
Daylighting
Natural Ventilation
Stormwater management
Heat island Impacts
Solar Gain Mgmt/insulation
Transportation
Density
Renewable energy

Resilience

Flood barriers
Elevation
Backup generators

# Toolkit.climate.gov

U.S. Climate Resilience Toolkit

Get Started | Taking Action | Tools | Topics | Expertise

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Search

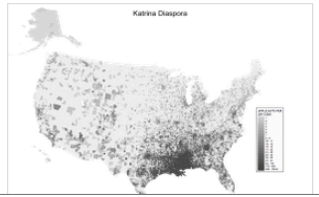
Topics › Human Health › Building Climate Resilience in the Health Sector ›

## Building Climate Resilience in the Health Sector

The United States depends on its health sector to provide needed services on demand, whatever the emergency–but to do this, the health sector must remain operational. Climate variability and change jeopardize the responsiveness of our health care delivery system and its public health facilities, making Americans more vulnerable to the negative health impacts of heat waves, floods, wildfires, extreme storms, and their aftermath.

Climate change poses several risks to the health sector:

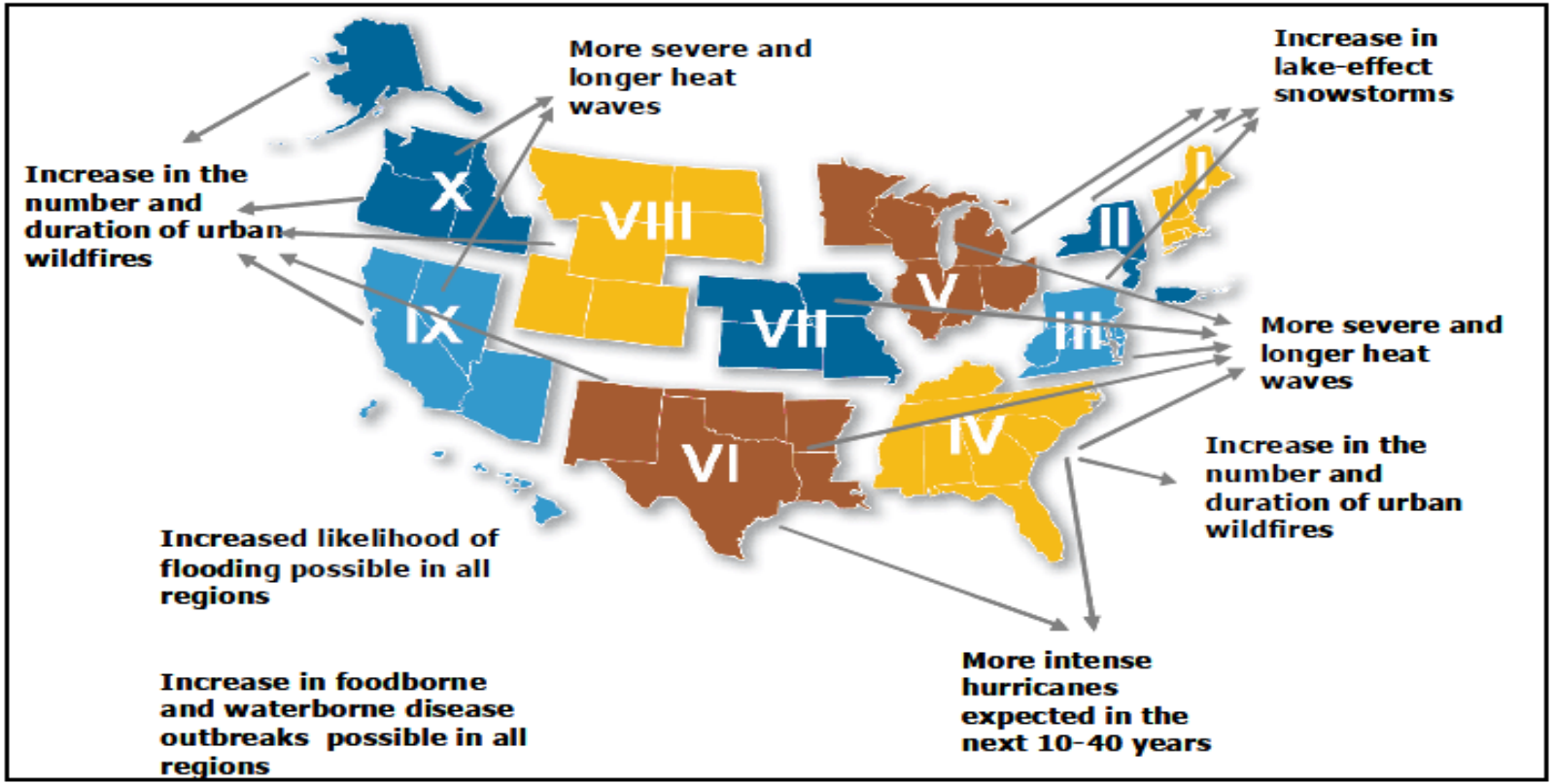
- Events like Hurricane Katrina and Hurricane Sandy have demonstrated that extreme weather can damage and shut down critical healthcare facilities such as hospitals and nursing homes. Climate change is expected to increase the severity of some extreme weather events, adding to the hazards healthcare facilities must be able to withstand.
- Healthcare facilities in coastal areas must also contend




Browse Topics

- Coastal Flood Risk
- Ecosystem Vulnerability
- Food Resilience
- Human Health
  - Extreme Heat
  - Severe Storms and Flooding
  - Increased Levels of Air Pollutants
  - Changing Ecosystems
  - Altered Risk of Infectious Diseases
  - Building Climate Resilience in the Health Sector

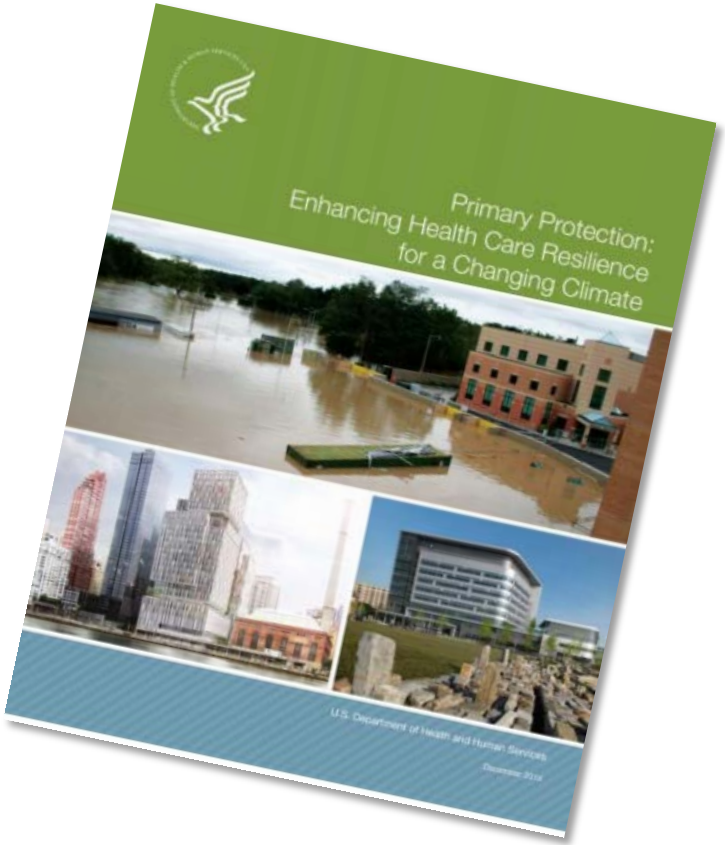
# Predicted impacts of climate change across the U.S.




http://www.cna.org/sites/default/files/SAS%20Climate%20Change%20and%20Emergency%20Management%20-%20Summary.pdf

# Primary Protection: Enhancing Health Care Resilience for a Channing Climate

- Assist organizations in reducing future vulnerabilities and losses, and improve the functioning of a broad range of health care facilities




http://toolkit.climate.gov/topics/human-health/building-climate-resilience-health-sector


# What happens?

- Increasing design thresholds to recognize ***more severe weather intensities–*** design temperatures, wind velocities, mean flood elevations

- Increasing warehousing and storage capacities to recognize ***longer severe weather durations***– increasing the minimum amounts of on site food, water and fuel storage

## Bellevue Hospital Evacuated After Two Days on Emergency Generators

By **Julie Shapiro** and **Jeff Mays** on October 31, 2012 2:32pm | *Updated on November 1, 2012 12:21am*

KIPS BAY — Bellevue Hospital Center was evacuated Wednesday after running on emergency generators for two days and could be closed for two to three weeks, officials said.

The East Side hospital transferred its most critically ill patients after losing power during Hurricane Sandy's floods, and on Wednesday, Bellevue began moving the roughly 500 patients that remained, Mayor Michael Bloomberg said.

# What happens?

- Enacting requirements for hardening and adapting facilities in ***new geographic regions to respond to changing extreme weather patterns***

- Increasing capabilities for "islanding operation" that recognizes that on site infrastructure may be required for extended periods of time because of ***damaged community infrastructure***



## Texas Medical Center

Houston, TX

Tropical Storm Allison, 2001


**Charity Hospital and VAMC**

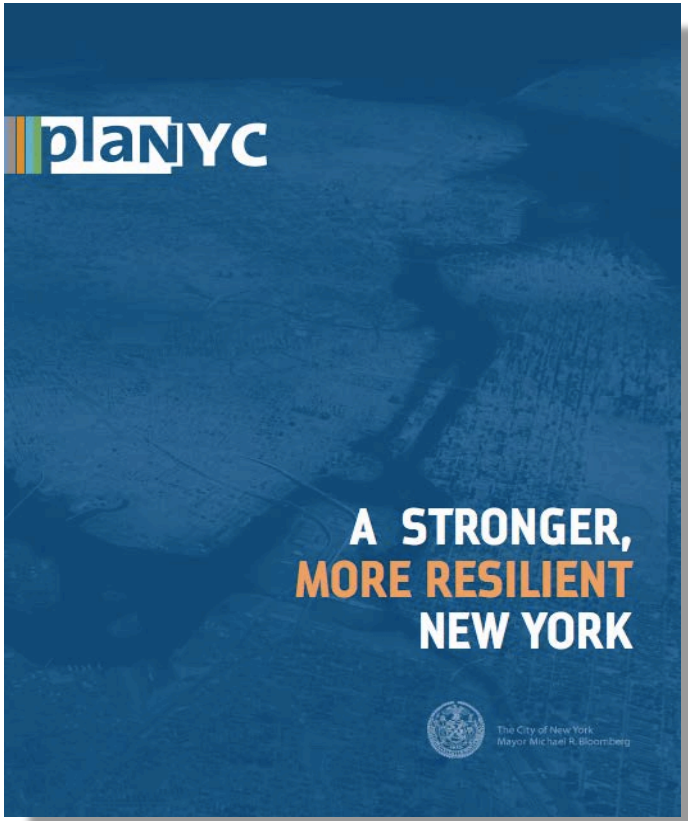
New Orleans, LA

**(Hurricane Katrina, 2005)**

**NYU Langone and Bellevue**

New York, NY

**(Hurricane Sandy, 2012)**

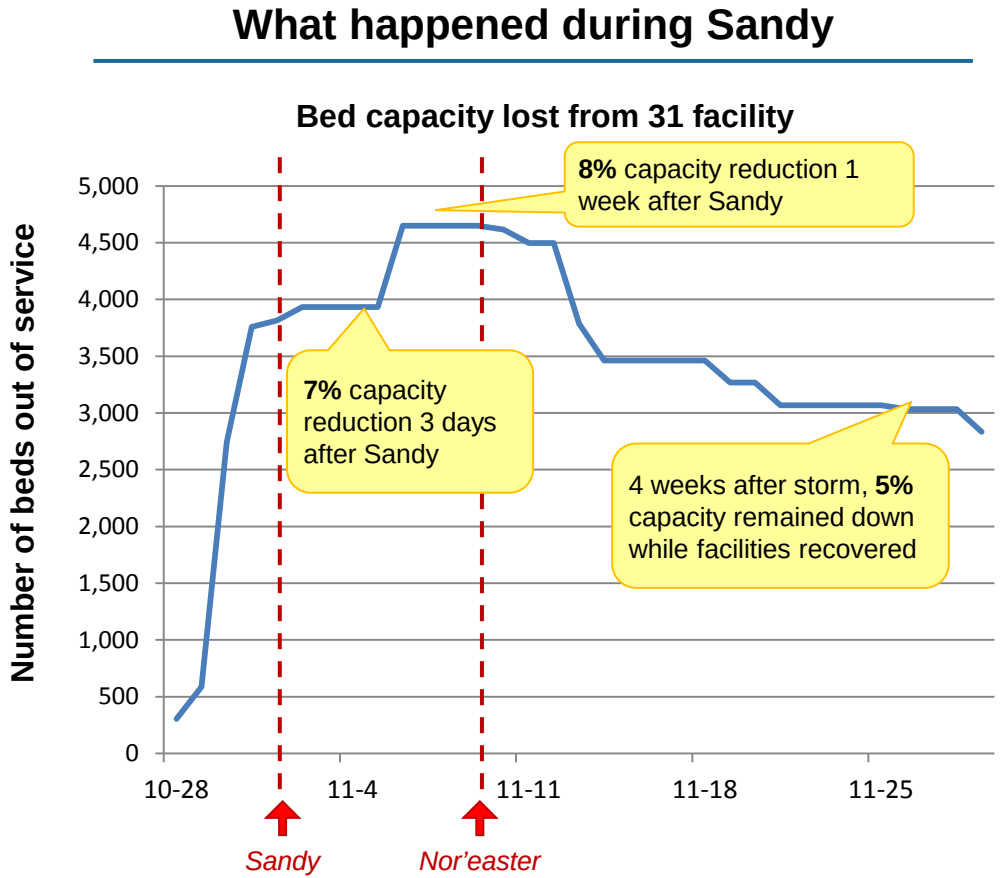



http://www.nyc.gov/html/sirr/html/report/report.shtml


Credit: Michael Brunet

# Nursing Homes/ Adult Care Facilities

**Patient impact:** emergency evacuations, reduced citywide bed-capacity, hospitals couldn't discharge




Source: NYSDOH, PLUTO, DOHMH, Mayor's Office of Analytics, SIRR interviews

# Critical system failures caused evacuations

| Providers | Impact | Building | Equipment (elevators. Imaging) | Utilities (power, water) | Heating/ cooling | Commun-ications/ IT | Staff | Supplies |
|---|---|---|---|---|---|---|---|---|
| **Hospital** | **Evacuations/ closures/ reduced services** | Flooded | Flooded | Back-up failed | Flooded | Phone/ internet outages | Staff couldn't travel | Limited deliveries |
| **Nursing homes/ adult care facilities** | **Evacuations** | Flooded | No back-up power | Back-up failed (NH) / no back-up (ACF) | No back-up | Phone/ internet outages | Staff couldn't travel | Limited deliveries |
| **Community-based providers** | **Closures / reduced services** | Flooded | No back-up power | No back-up | No back-up | Phone/ internet outages | Staff couldn't travel | Limited deliveries |
| **Home-based providers** | **Reduced services** | Disruptions in patients' homes/residences, e.g. loss of power, elevators not working | | | | Phone/ internet outages | Staff couldn't travel | Delayed deliveries |

Primary reason for disruption  Secondary reason  Tertiary reason

**What is the risk this could happen again to the same number or even more providers?**

Source: SIRR interviews

# Disasters Impact Healthcare Facilities
## Dollars and Cents

- After Superstorm Sandy
  - NYC public hospitals:
    - $800 Million in damage
  - NYC overall:
    - Estimated $3.1 billion recovery costs to healthcare facilities
  - Research:
    - Lost research animals valued at more than $100,000
    - Research losses estimated above $200 Million
  - FEMA Assistance:
    - $25.9 Million for Equipment replacement

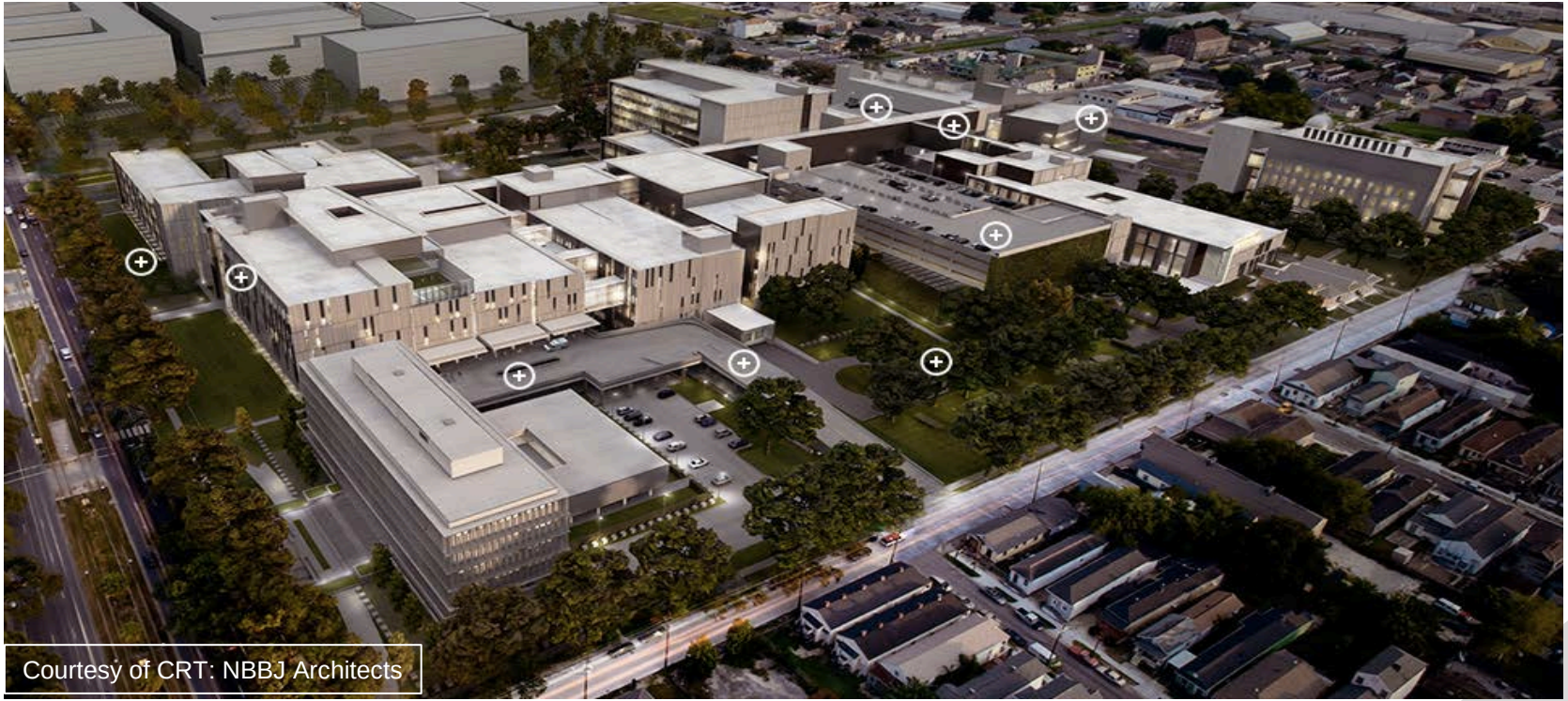

Texas Medical Center, Houston, Texas (SOM Site Master Planning)

Completed early in 2006, Brays Bayou Marsh at Mason Park is near the mouth of Brays Bayou. The marsh is an award-winning partnership project.

## Texas Medical Center

Houston, TX

Since Tropical Storm Allison, 2001

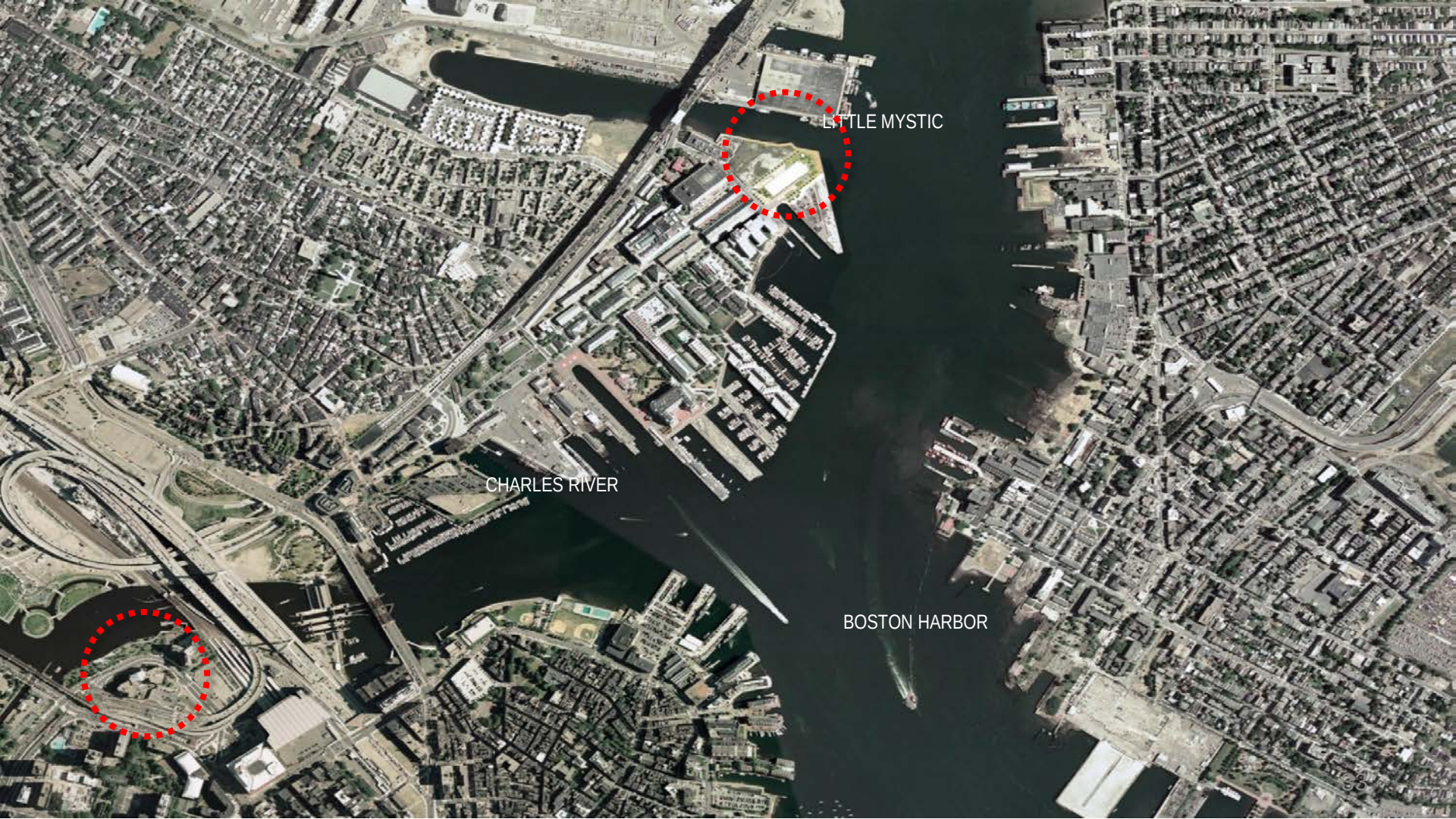


Courtesy of CRT: NBBJ Architects

## VAMC

New Orleans, LA

**(Hurricane Katrina, 2005)**

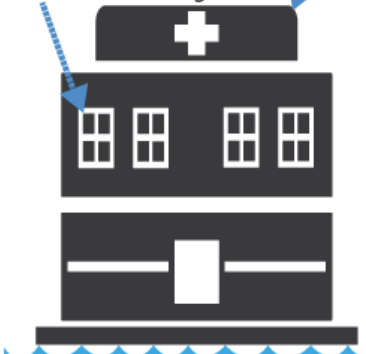

LITTLE MYSTIC
CHARLES RIVER
BOSTON HARBOR

## Boston's Spaulding Rehabilitation Hospital

Was climate-proofed for about a half-percent of total building costs.

Electrical equipment is on the roof in case of flooding.

Windows open, so patients don't overheat if air conditioning fails.



The ground floor is raised 30 inches above the current 500-year flood level and 42 inches above the 100-year flood level.


Image: Anton Grassl, courtesy of Perkins+Will

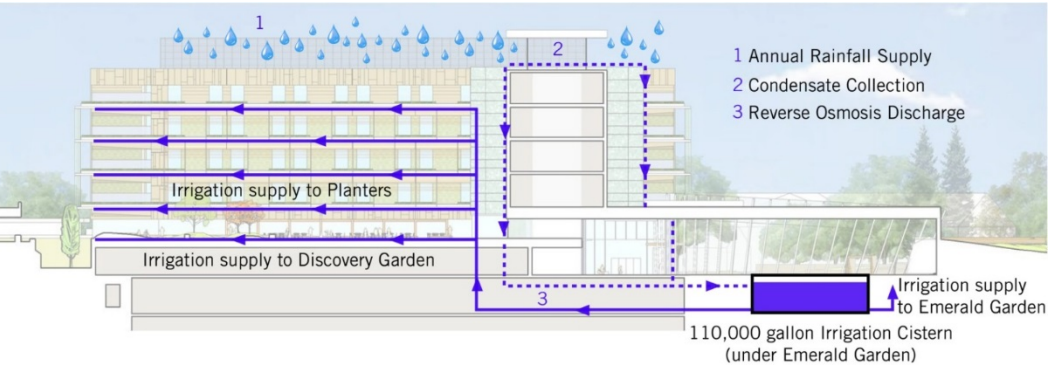
LEED Gold certified building includes sustainable/resilience features such as:

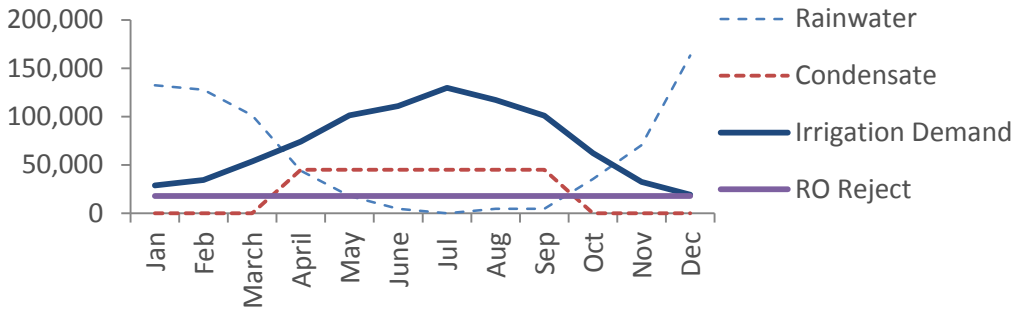
- Elevated ground floor; all infrastructure above flood elevations;
- Gardens utilizing native, drought and salt-tolerant vegetation
- Low energy design; at 150 kBTU/sf, 48% below average hospital energy demand. Maximization of daylight and views balanced with a high-performance building envelope
- On-site CHP plant for local electrical generation
- Operable windows for both natural ventilation and passive survivability in an emergency situation
- Green roofs to mitigate stormwater runoff, reduce cooling loads and heat-island effect

- Low–energy design
- Passive design strategies – operable windows
- On-site power generation
- On-site renewable energy

- Low water use design
- Recycled and reclaimed water reuse
- Independent water source

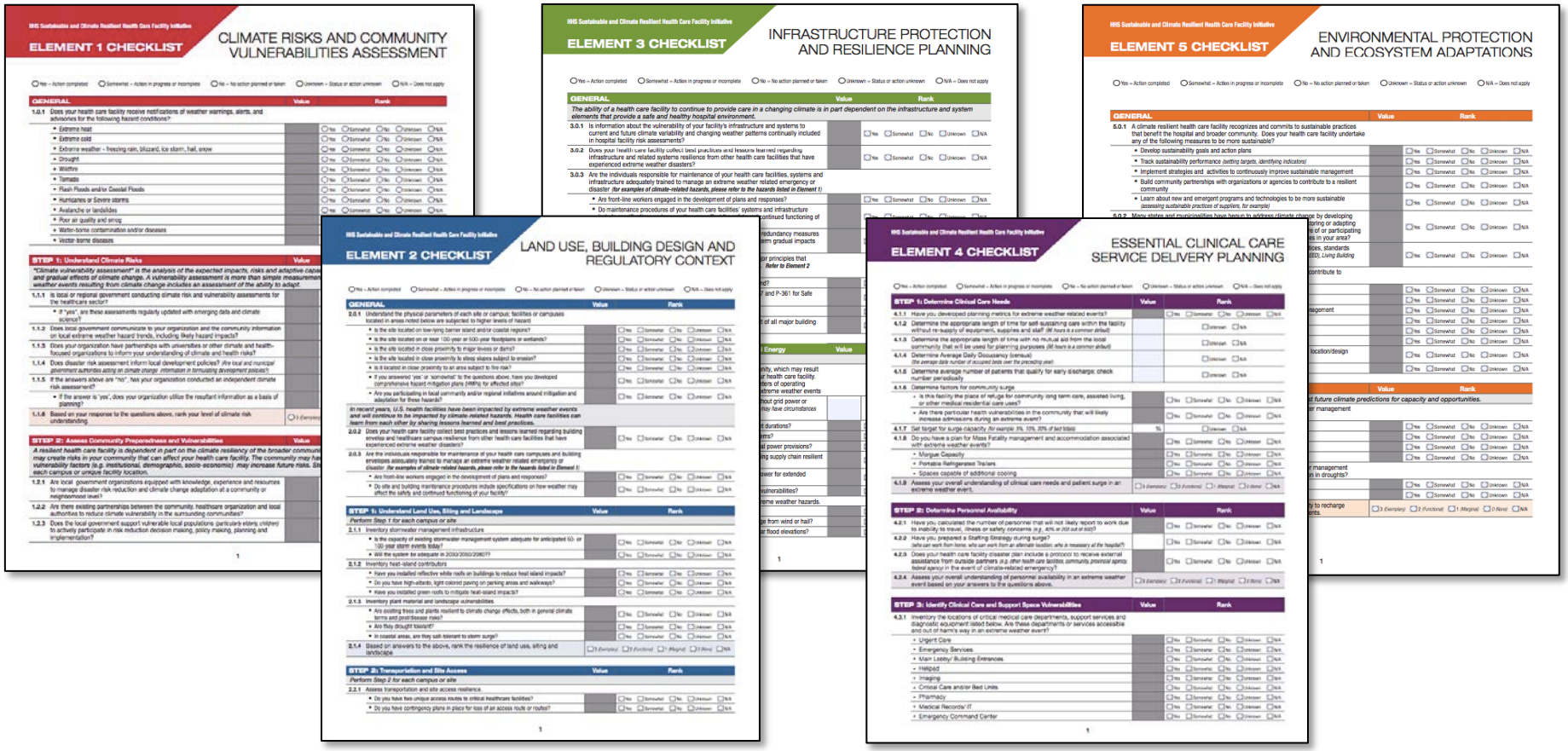
**Kiowa Memorial Hospital**
Greensburg, KN
**(EF-5 tornado, 2008)**



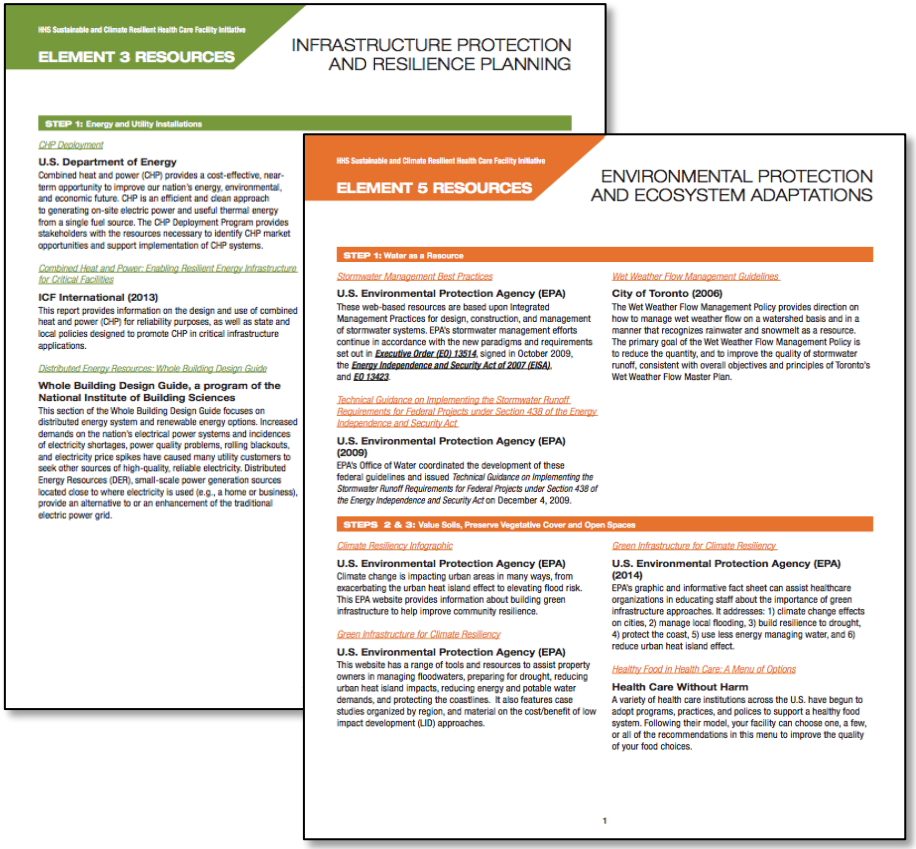




## Lucile Packard Children's Hospital at Stanford

Palo Alto, California


ELEMENT 1 CHECKLIST
CLIMATE RISKS AND COMMUNITY VULNERABILITIES ASSESSMENT
ELEMENT 3 CHECKLIST
INFRASTRUCTURE PROTECTION AND RESILIENCE PLANNING
ELEMENT 5 CHECKLIST
ENVIRONMENTAL PROTECTION AND ECOSYSTEM ADAPTATIONS
ELEMENT 2 CHECKLIST
LAND USE, BUILDING DESIGN AND REGULATORY CONTEXT
ELEMENT 4 CHECKLIST
ESSENTIAL CLINICAL CARE SERVICE DELIVERY PLANNING

# Resources and Case Studies



HHS Sustainable and Climate Resilient Health Care Facility Initiative

**ELEMENT 3 RESOURCES**

INFRASTRUCTURE PROTECTION AND RESILIENCE PLANNING

**STEP 1: Energy and Utility Installations**

*CHP Deployment*

**U.S. Department of Energy**

Combined heat and power (CHP) provides a cost-effective, near-term opportunity to improve our nation's energy, environmental, and economic future. CHP is an efficient and clean approach to generating on-site electric power and useful thermal energy from a single fuel source. The CHP Deployment Program provides stakeholders with the resources necessary to identify CHP market opportunities and support implementation of CHP systems.

*Combined Heat and Power: Enabling Resilient Energy Infrastructure for Critical Facilities*

**ICF International (2013)**

This report provides information on the design and use of combined heat and power (CHP) for reliability purposes, as well as state and local policies designed to promote CHP in critical infrastructure applications.

*Distributed Energy Resources: Whole Building Design Guide*

**Whole Building Design Guide, a program of the National Institute of Building Sciences**

This section of the Whole Building Design Guide focuses on distributed energy system and renewable energy options. Increased demands on the nation's electrical power systems and incidences of electricity shortages, power quality problems, rolling blackouts, and electricity price spikes have caused many utility customers to seek other sources of high-quality, reliable electricity. Distributed Energy Resources (DER), small-scale power generation sources located close to where electricity is used (e.g., a home or business), provide an alternative to or an enhancement of the traditional electric power grid.

HHS Sustainable and Climate Resilient Health Care Facility Initiative

**ELEMENT 5 RESOURCES**

ENVIRONMENTAL PROTECTION AND ECOSYSTEM ADAPTATIONS

**STEP 1: Water as a Resource**

*Stormwater Management Best Practices*

**U.S. Environmental Protection Agency (EPA)**

These web-based resources are based upon Integrated Management Practices for design, construction, and management of stormwater systems. EPA's stormwater management efforts continue in accordance with the new paradigms and requirements set out in ***Executive Order (EO) 13514***, signed in October 2009, the ***Energy Independence and Security Act of 2007 (EISA)***, and ***EO 13423***.

*Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*

**U.S. Environmental Protection Agency (EPA) (2009)**

EPA's Office of Water coordinated the development of these federal guidelines and issued *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act* on December 4, 2009.

*Wet Weather Flow Management Guidelines*

**City of Toronto (2006)**

The Wet Weather Flow Management Policy provides direction on how to manage wet weather flow on a watershed basis and in a manner that recognizes rainwater and snowmelt as a resource. The primary goal of the Wet Weather Flow Management Policy is to reduce the quantity, and to improve the quality of stormwater runoff, consistent with overall objectives and principles of Toronto's Wet Weather Flow Master Plan.

**STEPS 2 & 3: Value Soils, Preserve Vegetative Cover and Open Spaces**

*Climate Resiliency Infographic*

**U.S. Environmental Protection Agency (EPA)**

Climate change is impacting urban areas in many ways, from exacerbating the urban heat island effect to elevating flood risk. This EPA website provides information about building green infrastructure to help improve community resilience.

*Green Infrastructure for Climate Resiliency*

**U.S. Environmental Protection Agency (EPA)**

This website has a range of tools and resources to assist property owners in managing floodwaters, preparing for drought, reducing urban heat island impacts, reducing energy and potable water demands, and protecting the coastlines. It also features case studies organized by region, and material on the cost/benefit of low impact development (LID) approaches.

*Green Infrastructure for Climate Resiliency*

**U.S. Environmental Protection Agency (EPA) (2014)**

EPA's graphic and informative fact sheet can assist healthcare organizations in educating staff about the importance of green infrastructure approaches. It addresses: 1) climate change effects on cities, 2) manage local flooding, 3) build resilience to drought, 4) protect the coast, 5) use less energy managing water, and 6) reduce urban heat island effect.

*Healthy Food in Health Care: A Menu of Options*

**Health Care Without Harm**

A variety of health care institutions across the U.S. have begun to adopt programs, practices, and polices to support a healthy food system. Following their model, your facility can choose one, a few, or all of the recommendations in this menu to improve the quality of your food choices.

1

U.S. Climate Resilience Toolkit

Get Started | Taking Action | Tools | Topics | Expertise

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Taking Action › Following a Devastating Tornado, Town and Hospital Rebuild to Harness Wind Energy ›

**Following a Devastating Tornado, Town and Hospital Rebuild to Harness Wind Energy**

After 90 percent of the town was damaged or destroyed by a tornado, Greensburg, Kansas, and Kiowa County Memorial Hospital developed a Long-Term Community Recovery plan to rebuild for resilience.

## Climate stressors and impacts

Because climate change is projected to increase the frequency of severe weather, communities located in regions that have traditionally experienced severe storms need to be particularly well prepared for extreme events. The city of Greensburg, Kansas, and its hospital–Kiowa County Memorial–have been rebuilding for precisely this sort of resilience after experiencing a catastrophic tornado. On May 4, 2007, an EF-5 tornado estimated to be 1.7 miles wide with 205 mph winds struck Greensburg. Damage to the city was immense: over 90 percent of the structures in the community were severely damaged or destroyed.

## The power of wind

In the aftermath of the tornado, the Federal Emergency Management Agency (FEMA) activated the Long-Term Community Recovery (LTCR) program, which integrated assistance from the State of Kansas and federal agencies to support the community's long-term recovery goals. The program enabled the coordination of resources and planning services supporting the recovery effort. A key element of the effort was a planning process that produced a Long-Term Community Recovery Plan, supporting more resilient and climate-adapted redevelopment.

Before the tornado struck, Greensburg had relied on fossil fuel for electrical generation. With technical assistance from the U.S. Department of Energy and the National Renewable Energy Laboratory, Greensburg converted to receiving 100 percent of its power from wind. The Greensburg Wind Farm includes ten 1.25-megawatt (MW) wind turbines that supply 12.5 MW of renewable power to the town. This energy can power every house, business, and municipal building in Greensburg while also selling power to other Kansas municipalities.

The 50 kW on-site wind turbine at Kiowa County Memorial Hospital provides approximately 40 percent of the hospital's total electrical load, or 100 percent of its base load.

Steps to Resilience:

- Step 1: Identify the Problem
- Step 2: Determine Vulnerabilities
- Step 3: Investigate Options
- Step 4: Evaluate Risks & Costs
- Step 5: Take Action

Tools:

Sustainable and Climate-Resilient Health Care Facilities Toolkit ›

Topic:

Energy Supply and Use › Energy Production ›

Energy Supply and Use › Building Resilience in Energy Supply and Use ›

Human Health › Extreme Events ›

Human Health › Building Health Care Sector Resilience ›

Human Health › Building Health Care Sector Resilience › Element 3: Infrastructure Protection and Resilience ›

Additional Resources:

Long-Term Community Recovery Plan: Greensburg + Kiowa County, Kansas (PDF) ›

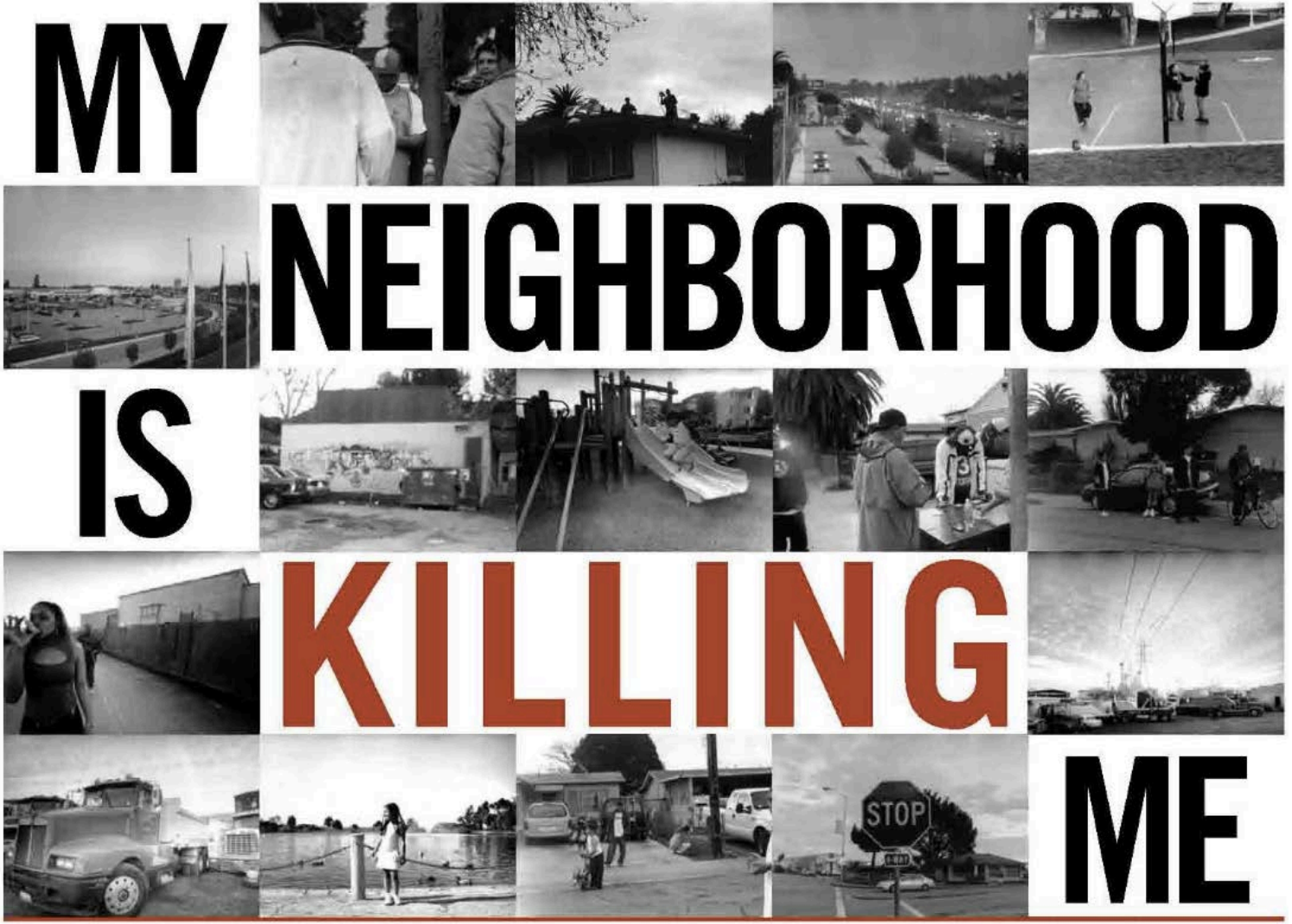
Rebuilding It Better: Greensburg, Kansas (PDF) ›

Advanced Energy Design Guide for Small Hospitals and Healthcare Facilities (PDF) ›

Partners:

Kiowa County Memorial Hospital ›

toolkit.climate.gov

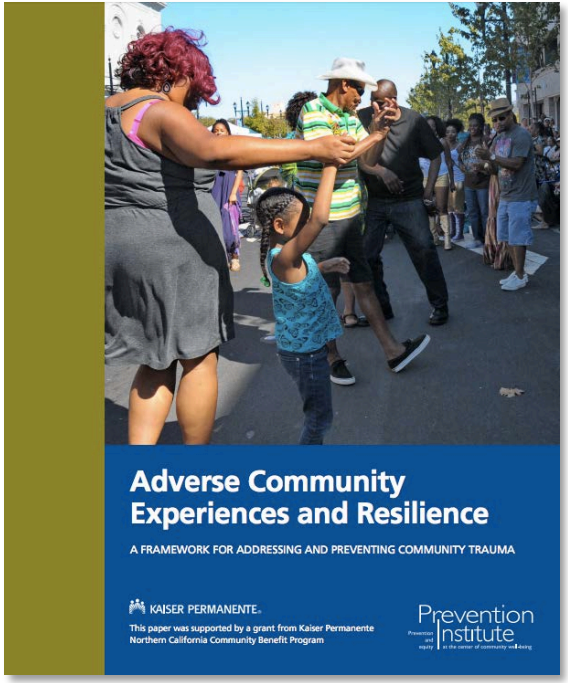

MY
NEIGHBORHOOD
IS
KILLING
ME
STOP


## Symptoms of Community Trauma

- Intergenerational poverty
- Long-term unemployment
- Relocation of businesses & jobs
- Limited employment
- Disinvestment

- Deteriorated environments and unhealthy, often dangerous public spaces with a crumbling built environment
- Unhealthy products

- Disconnected/damaged social relations and social networks
- The elevation of destructive, dislocating social norms
- A low sense of collective political and social efficacy



# Seattle Children's Hospital

## Washington


# Kaiser Permanente

## California

# Gundersen Health System

**LaCrosse, Wisconsin**


**250,000+**
PATIENT VISITS / YEAR

LARGEST EMPLOYER
IN LA CROSSE, WI

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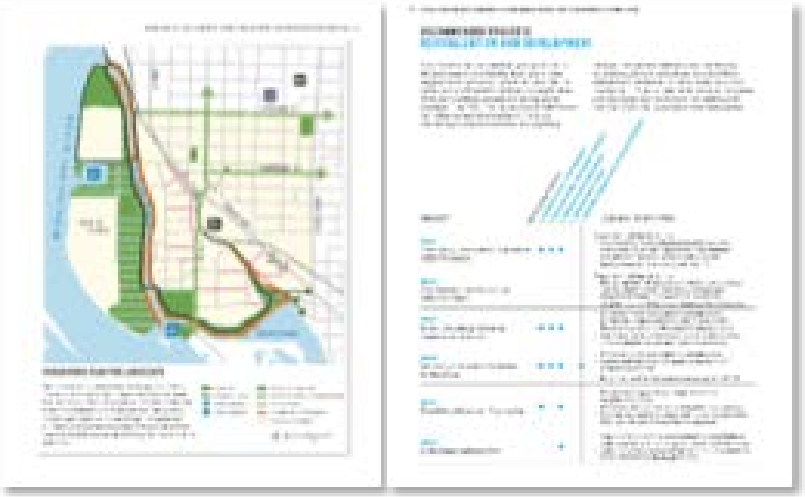
RESIDENTS EARNING
**58%** LESS THAN
THE CITY AVERAGE
USDA FOOD
DESERT



JOINT CAMPUS / NEIGHBORHOOD PLAN
March 2013

ReNEW La Crosse Neighborhoods

In Partnership With

Couleecap · Habitat for Humanity La Crosse Area · Wells Fargo · Gundersen Health System · United Way Great Rivers United Way

ReNEW CAMPAIGN
April 2013

# Cleveland Clinic

## Cleveland, Ohio


Forbes | New Posts +12 posts this hour | Most Popular America's Next Decade | Lists Top-Earning Tennis Stars

FORBES | 9/04/2013 @ 7:30AM | 41,680 views

### City Surgeon: Can The Cleveland Clinic Save Its Hometown?

*This story appears in the September 23, 2013 issue of Forbes.*

+ Comment Now + Follow Comments

Delos M. "Toby" Cosgrove arrived at the Cleveland Clinic in 1975 as an "incredibly poor" 34-year-old dreaming of a life as a cardiac surgeon. "Heart surgery was the astronaut corps of health care," he says. He had $3,000 in his bank account, left over from running an Air Force hospital in Vietnam, where he had won the Bronze Star. All his earthly belongings, including a Chevy Vega that was too flimsy to tow, fit in the back of a U-Haul.

Delos M. "Toby" Cosgrove

During his first year someone was shot dead at the clinic's front door. The bank in the basement was robbed. To avoid crime, patients were told to take a shuttle bus the half-block back to the hotel where they stayed. The executive offices

Evergreen COOPERATIVES

*Cleveland Clinic, University Hospitals and Case Western University* using purchasing power to drive local green economic development


# Green City Growers Cooperative

Green City Growers Cooperative, Inc. is a 3.25-acre leafy greens, hydroponic greenhouse in the Central neighborhood of Cleveland, OH. The greenhouse, which officially opened on February 25th, 2013, has 15,000 square feet of packinghouse and office space, and is currently producing Bibb lettuce, green leaf lettuce, gourmet lettuces and basil.

Fresh + Local Products

Our Mission

Image courtesy of Evergreen Cooperatives

Image courtesy of Shutterstock

# Henry Ford Health System

## Detroit, Michigan

livemidtown

Home Incentives Midtown at a Glance Sample Properties Information Boundaries Contact

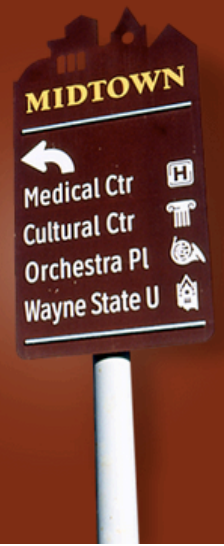
### It pays to live in Midtown!

That is…if you work at the Detroit Medical Center (DMC), Henry Ford Health System (HFHS) or Wayne State University (WSU). As if being a moment's walk from one of 10 theaters, nine museums, over 40 restaurants, 12 galleries, charming boutique retail, and more, wasn't enough! Now, there are financial incentives to live here for employees of these three major anchor institutions.

Yes, Live Midtown is a residential living program aimed to entice you, as a DMC, HFHS or WSU employee, to live and invest in a Midtown home. There are four **incentive options** to accommodate those looking to purchase or rent a home, and current homeowners interested in exterior improvements.

Your housing choices are endless – own or rent; condo or rowhouse; low-rise or mid-rise; historic or new construction – so dive into this Web site and learn more about the incentives and how to take advantage of them.

Most importantly, make sure to Live Midtown, where life is art!



# LEAD

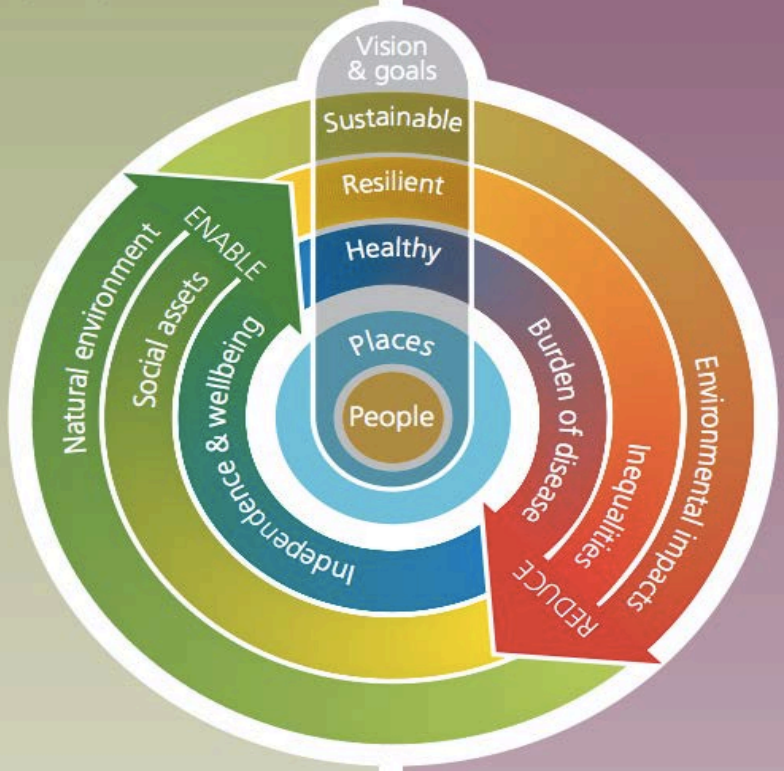
Educate and advocate locally and globally for climate policies

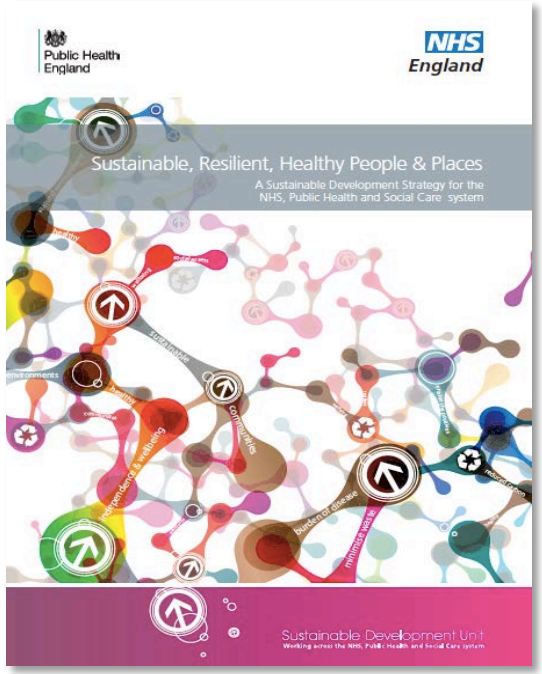
## Enable the positives

By valuing our physical and social environment, we can restore our natural environment and strengthen our social assets, whilst enhancing our independence and wellbeing at both a personal and community level. By doing so, we improve the quality of care, build strong communities and generate conditions where life is valued in ways that current generations can be proud to pass on.

## Reduce the negatives

By radically reducing the harmful impacts of how we currently live we can stop wasting finite resources, reduce the burdens of preventable mental and physical ill health, reduce social inequalities and reduce risks from a changing climate. In addition, many interventions that reduce harmful impacts also promote positive co-benefits and reduce the burden of disease.



GLOBAL GREEN and HEALTHY HOSPITALS


# Mitigation

**Reducing health care's own carbon footprint**

# Adaptation

**Preparing for the impacts of extreme weather and the shifting burden of disease**

# Leadership

**Educating staff and the public while promoting policies to protect public health from climate change**

2020 HEALTHCARE Climate Challenge

Kaiser Permanente, USA:

30% target by 2020, achieved by 2017!

Dignity Health, USA: 40% target by 2020

Gundersen Health, USA: 100% energy independent, 60% clean, renewables

GLOBAL GREEN and HEALTHY HOSPITALS

2020 HEALTHCARE Climate Challenge

***To Date***

*51 Participants*

*8,200 Hospitals and health centers*

*Partial List*

- Albert Einstein Hospital (Brazil)
- Catalan Institute of Oncology (Spain)
- Dignity Health (USA)
- Fraser Health (Canada)
- Health Department Xativa-Ontinyent (Spain)
- Hospital León Becerra (Ecuador)
- Hospital Sirio Libanes (Brazil)
- Hospital “Dr. Enrique F. Enril” (Argentina)
- Kaiser Permanente (USA)
- Partners Health Care (USA)
- National Health Service (England)
- Stockholm County Council (Sweden)
- TzuChi Medical Foundation (Taiwan)
- University Health Network (Canada)
- Virginia Mason Health System (USA)
- Western Cape Government Health (South Africa)
- Yonsei University Health System (South Korea)

GLOBAL GREEN and HEALTHY HOSPITALS

Health Care Without Harm

# THE RESTORATIVE HOSPITAL

...prioritizes health and prevention

...understands and takes responsibility for its environmental impacts

...engages the community in a new civic architecture

...operates with near-zero or positive environmental impacts

...is resilient, flexible and responsive to the climate and health challenges of our time

.