The Greenest Building is… One That is Already Built

2.16.2017

COG Built Environment and
Energy Advisory Committee

Energy Efficiency, Sustainability, and Green Building Practices in Historic Buildings

Carl Elefante FAIA
Principal
Director of Sustainability

QUINN EVANS
ARCHITECTS

World's Greenest Office Building

ca 2015

The Edge Amsterdam PLP Architecture

Advanced Automation & Intelligence

Renewable Energy

Contemporary Workplace Design Strategies

World's Greenest Office Building

ca 1887

The Pension Building
Washington DC
Montgomery C. Meigs

Heavy Thermal Mass

Window Operability, Through Ventilation & Temperature Stratification

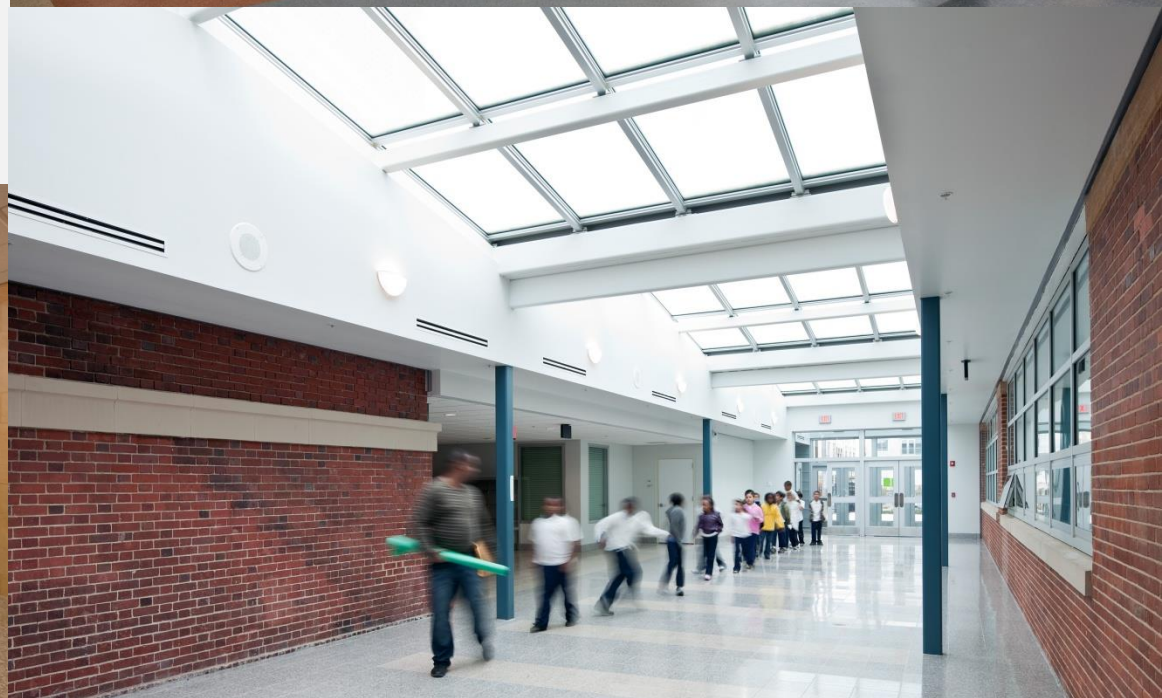
Contemporary Workplace Design Strategies

HD Cooke Elementary School

HD Cooke

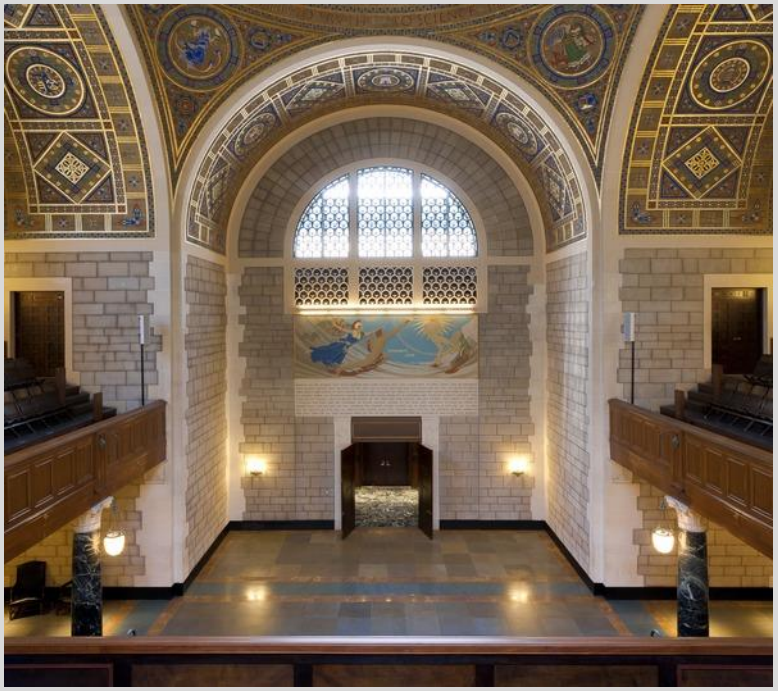
HD Cooke

HD Cooke



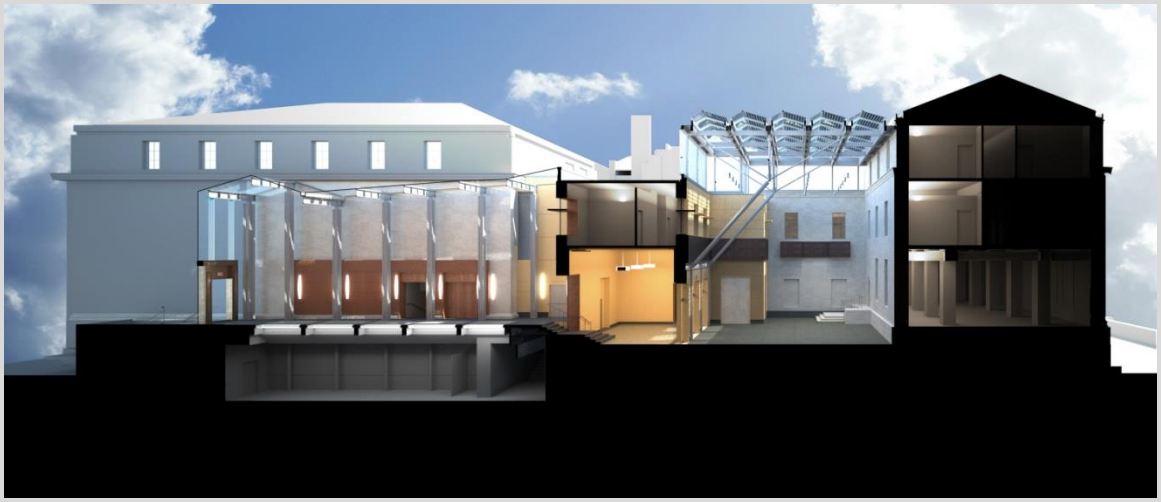
National Academy of Sciences

National Academy of Sciences



National Academy of Sciences

National Academy of Sciences



National Academy of Sciences

71 Garfield

71 Garfield

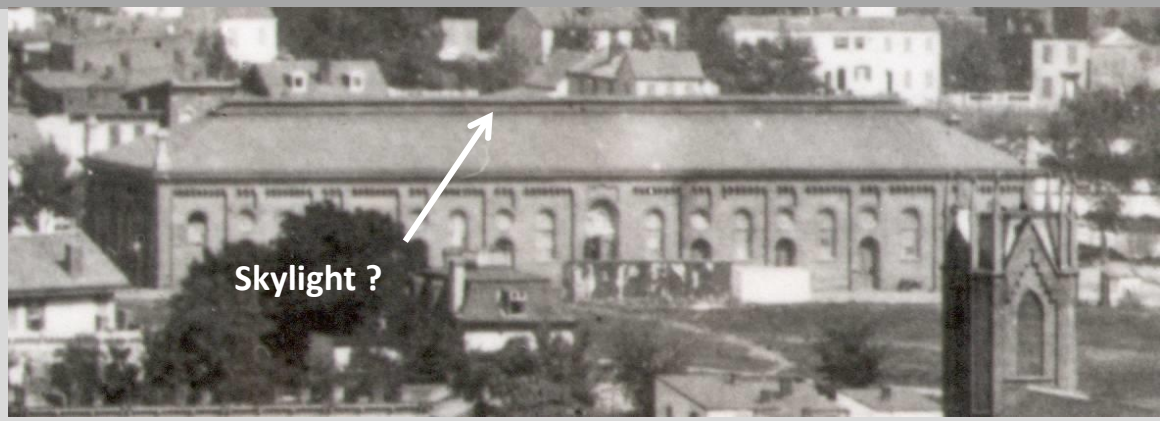
71 Garfield

Eastern Market

Eastern Market

- 1873
- South Hall
- Adolf Cluss

- 1908
- North & Center Halls
- Ashford Snowden



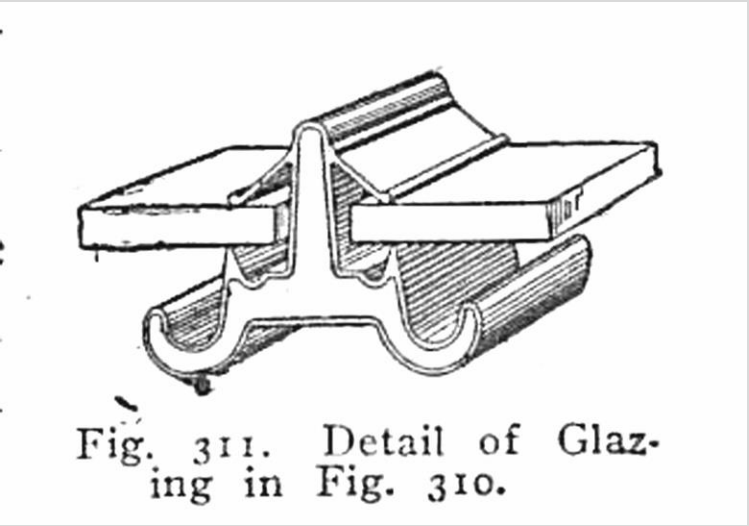
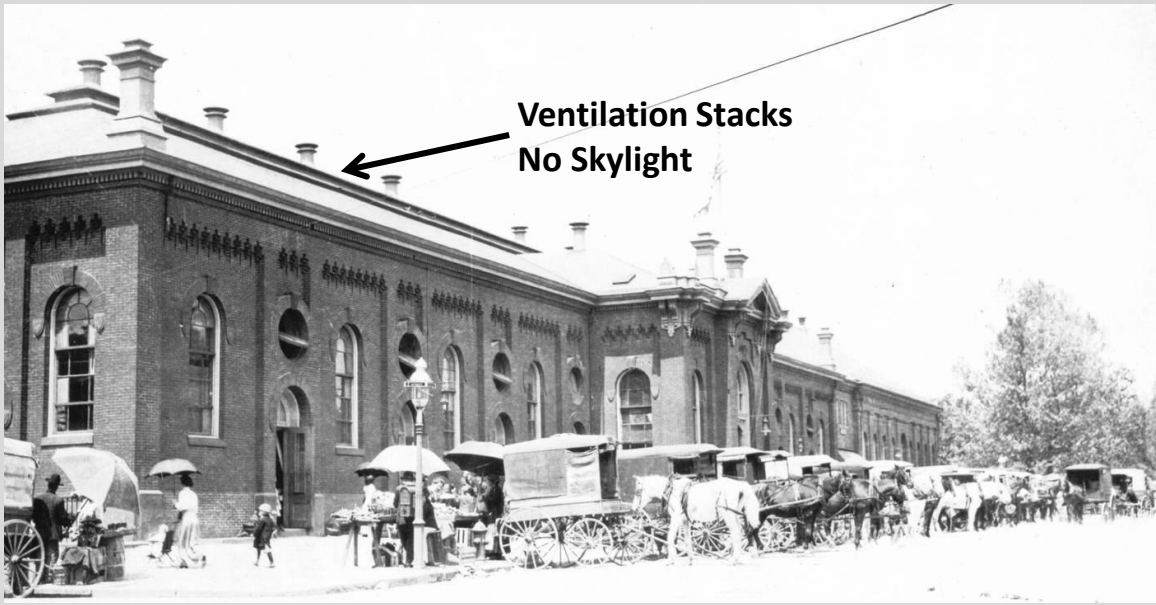


Fig. 311. Detail of Glazing in Fig. 310.

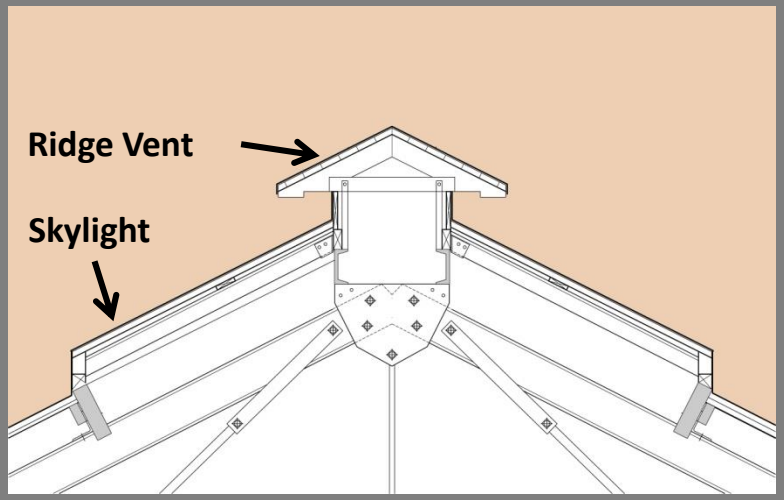


1873

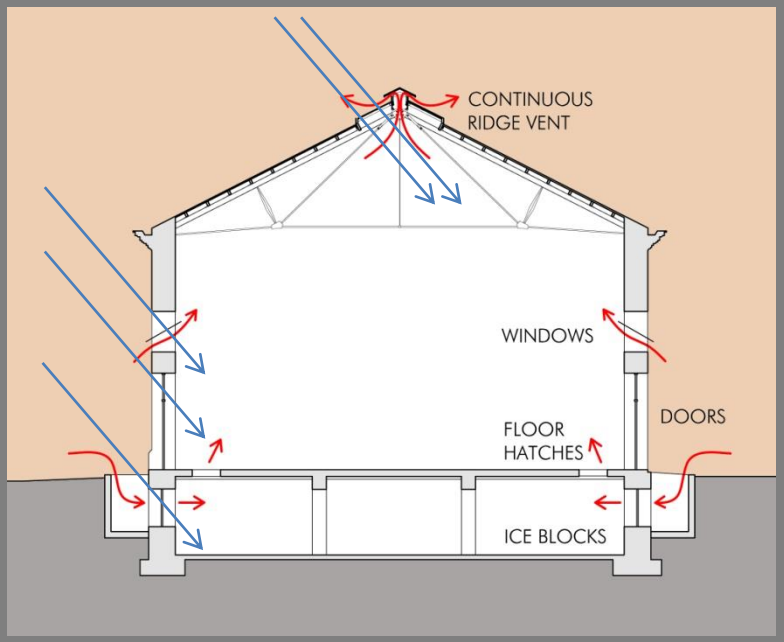
Daylighting and Ventilation Scheme

Conjectural Reconstruction

View of Skylight from below



Section at Ridge



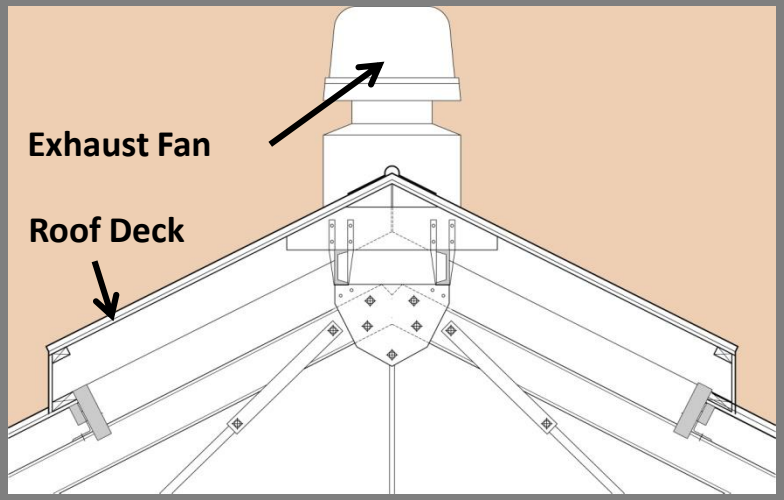
Building Section

1977

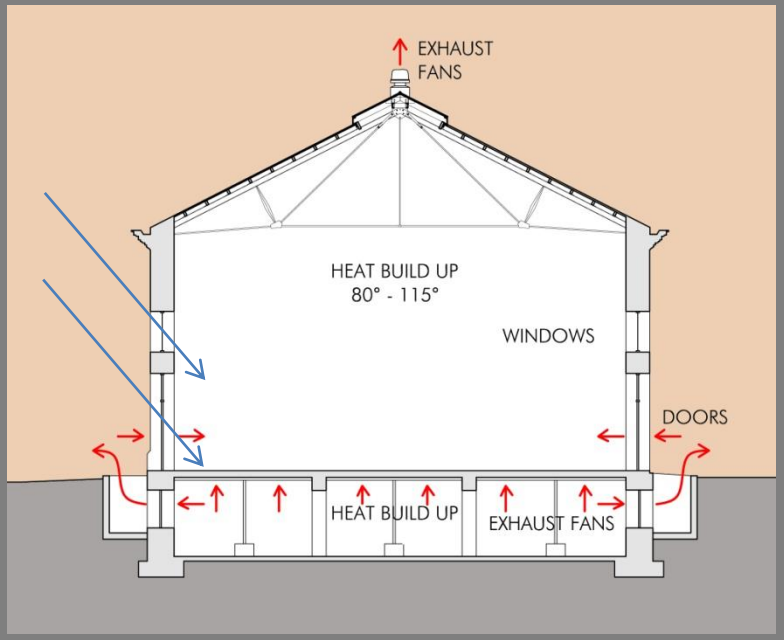
Daylighting and Ventilation Scheme

After “Restoration”

View of Ridge from below



Section at Ridge

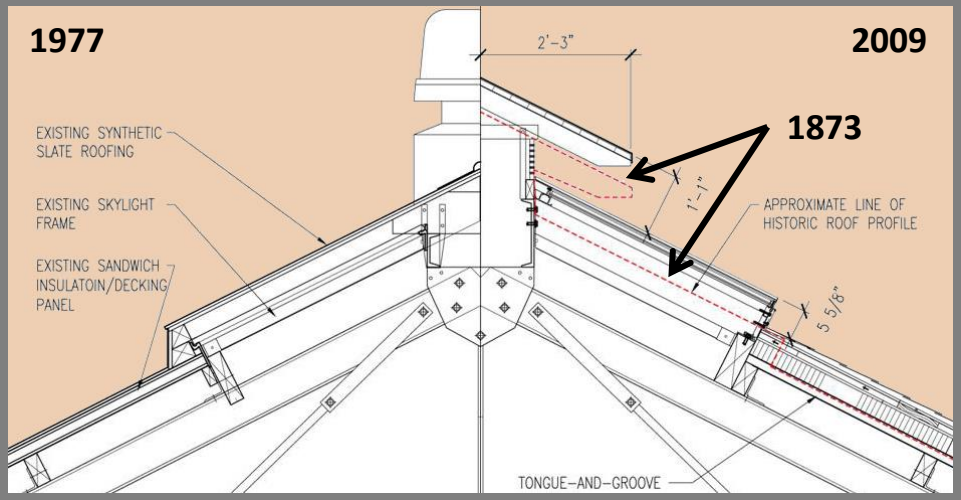


Building Section

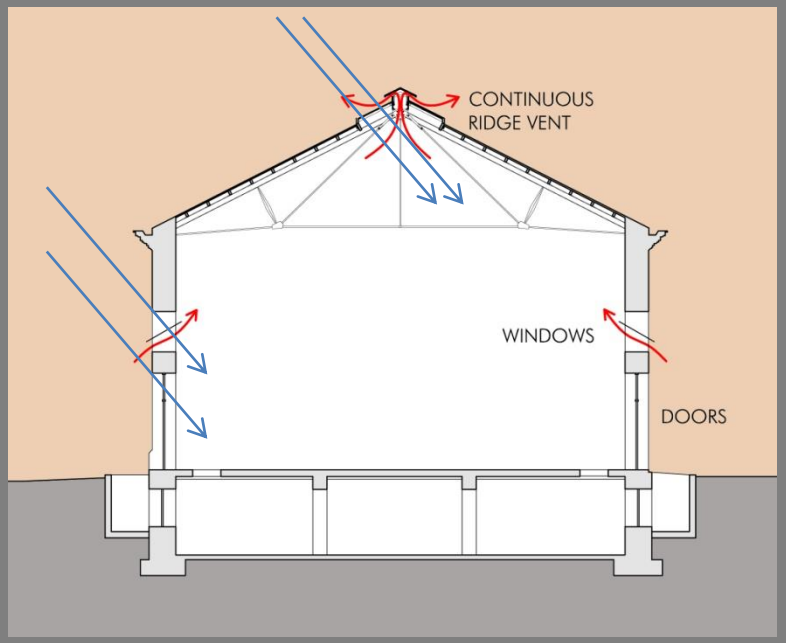
2009

Daylighting and Ventilation Scheme

View of Skylight from below



Comparative Section at Ridge



Building Section

Built Enrionment Impacts “Whole” Cities

People live in a **“good enough” place**

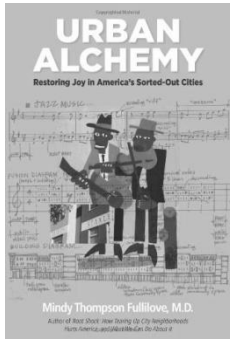
People **feel settled** in home, neighborhood, and region

People **contribute to caretaking** of the personal and shared portions of the environment

People **know their neighbors** and interact with them to solve problems

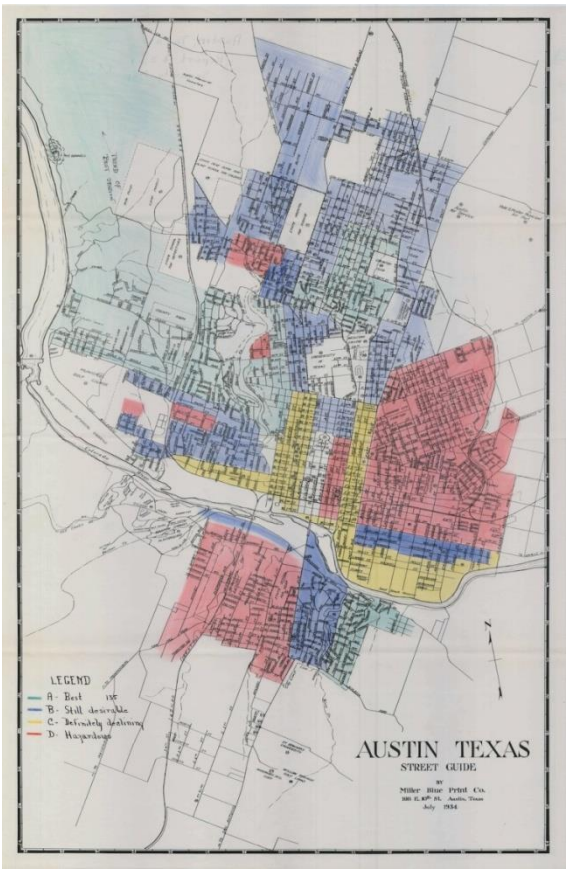
Mindy Thompson Fullilove

Urban Alchemy



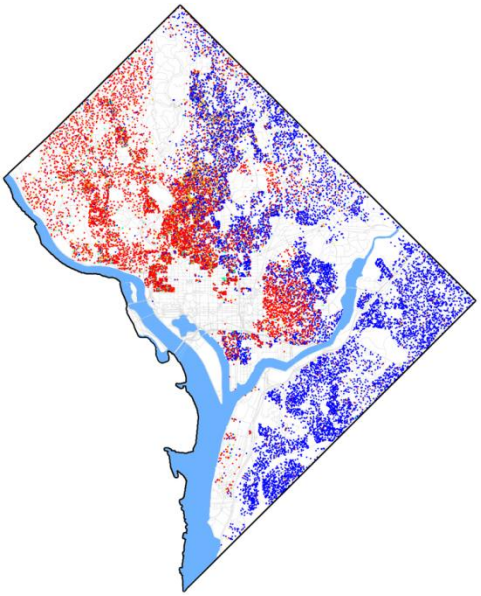
Built Environment Impacts Urban Policy

Urban Renewal?
Hill District, Pittsburgh

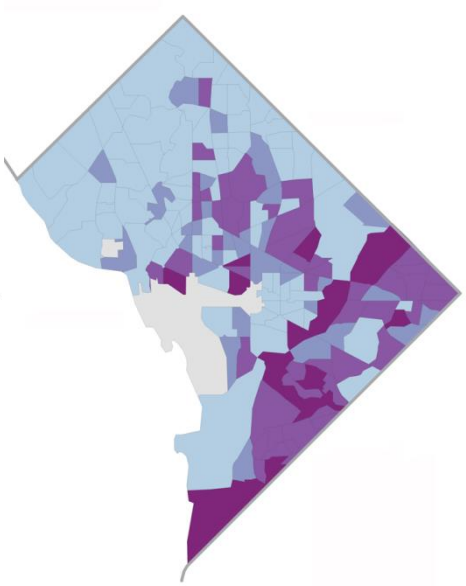


Redlining Map
Austin, Texas

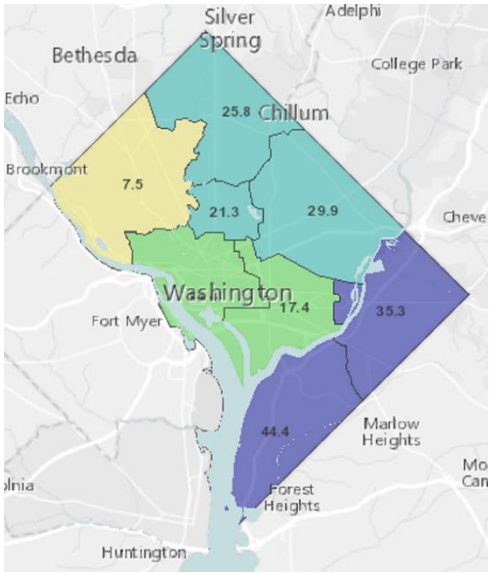
Built Environment Impacts Design + Health



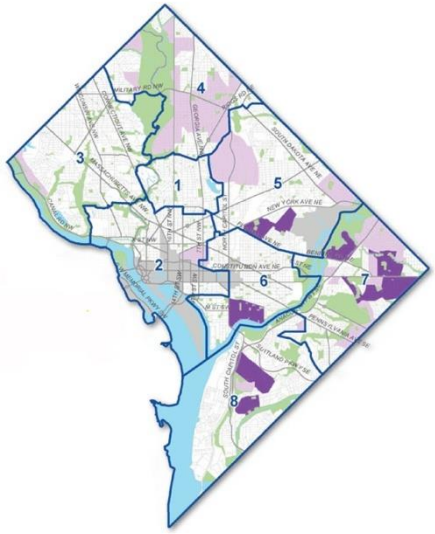
Race



Poverty



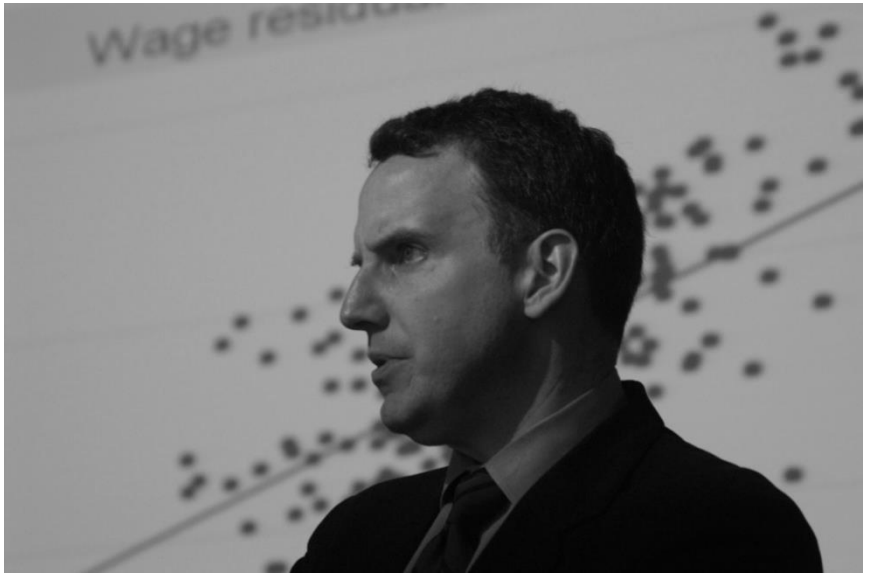
Obesity



Food Deserts

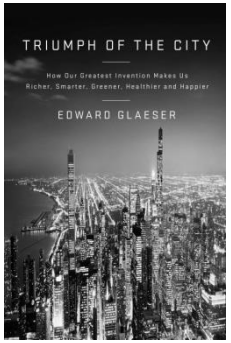
Built Environment Impact Human Progress

“Cities…have been engines of innovation since Plato and Socrates bickered in an Athenian marketplace.



Edward Glaeser

Triumph of the City



Habitat III
The New Urban Agenda

Urban Impacts

2% Land

70% GDP

60% Energy

70 % GHG Emissions

70% Waste

Population Growth

1.35 Billion by 2030 (19%)

3.3 Billion by 2050 (47%)

Joan Clos


United Nations A/CONF.226/4
General Assembly
Distr.: General
29 September 2016
Original: English

United Nations Conference on Housing and Sustainable Urban Development (Habitat III)
Quito, 17-20 October 2016
Item 10 of the provisional agenda*
Adoption of the final outcome of the Conference

Draft outcome document of the United Nations Conference on Housing and Sustainable Urban Development (Habitat III)

Note by the secretariat

Habitat III
The New Urban Agenda

Habitat III
Issue Papers

- Social Cohesion and Equity
- Urban Frameworks
- Spatial Development
- Urban Economy
- Urban Ecology and Environment
- Urban Housing and Basic Services

Joan Clos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Note by the secretariat

Conference of the Parties 21
The Paris Agreement

Paris Agreement Targets

Cap Global Temperature Rise to:

2°C

above pre-industrial levels

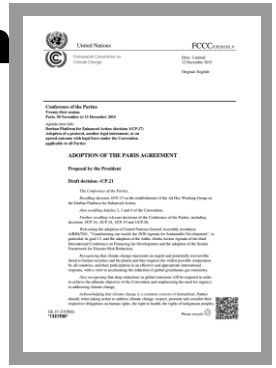
1.5°C

preferred target

Reach Zero Net Carbon (ZNC)

2050

Karen Christiana Figueres Olsen



United Nations

FCCC/CP/2015/L.9

Framework Convention on Climate Change

Distr.: Limited
12 December 2015

Original: English

Conference of the Parties
Twenty-first session
Paris, 30 November to 11 December 2015

Agenda item 4(b)
Durban Platform for Enhanced Action (decision 1/CP.17)
Adoption of a protocol, another legal instrument, or an agreed outcome with legal force under the Convention applicable to all Parties

ADOPTION OF THE PARIS AGREEMENT

Proposal by the President

Draft decision -/CP.21

The Conference of the Parties,

Recalling decision 1/CP.17 on the establishment of the Ad Hoc Working Group on the Durban Platform for Enhanced Action,

Also recalling Articles 2, 3 and 4 of the Convention,

Further recalling relevant decisions of the Conference of the Parties, including decisions 1/CP.16, 2/CP.18, 1/CP.19 and 1/CP.20,

Welcoming the adoption of United Nations General Assembly resolution A/RES/70/1, "Transforming our world: the 2030 Agenda for Sustainable Development", in which the Assembly adopted, inter alia, the outcomes of the Third International Conference on Financing for Development and the adoption of the Sendai Framework for Disaster Risk Reduction,

Recognizing that climate change represents an urgent and potentially irreversible threat to human societies and the planet and thus requires the widest possible cooperation by all countries, and their participation in an effective and appropriate international response, with a view to accelerating the reduction of global greenhouse gas emissions,

Also recognizing that deep reductions in global emissions will be required in order to achieve the ultimate objective of the Convention and emphasizing the need for urgency in addressing climate change,

Acknowledging that climate change is a common concern of humankind, Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples,

GE.15-21932(E)
151970

Please recycle

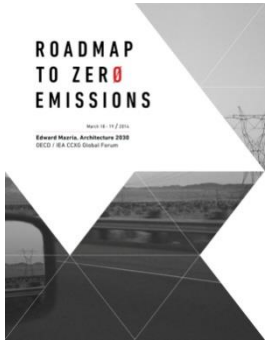
2050 Roadmap

Roadmap to Zero Emissions – Paris 2015

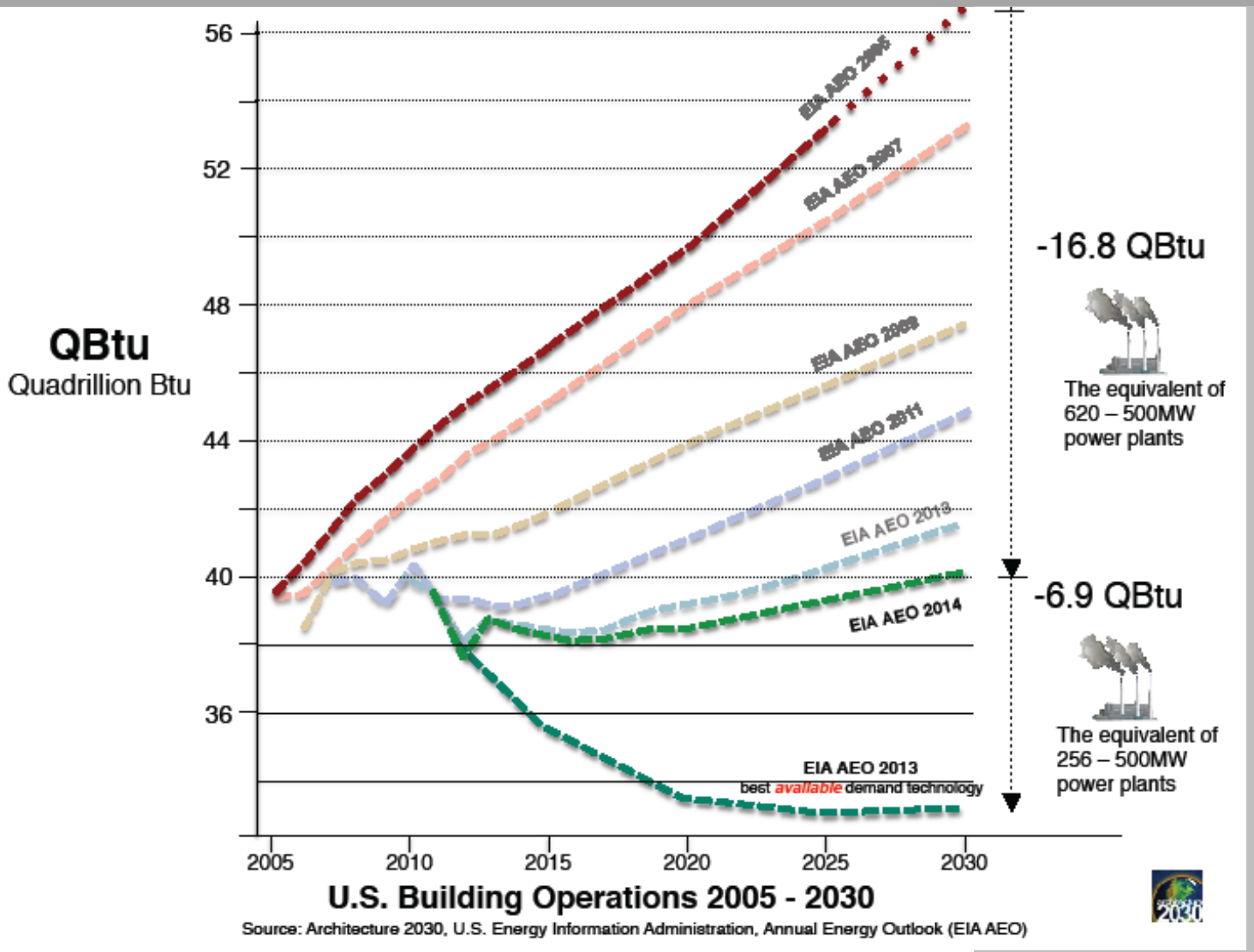
- The building sector is the most reliable path to predictable carbon reduction
- The building sector holds the potential for the largest carbon reductions within the 2050 timeframe
- Holistic life-cycle carbon accounting is required to achieve carbon reduction targets

Ed Mazria

Architecture 2030



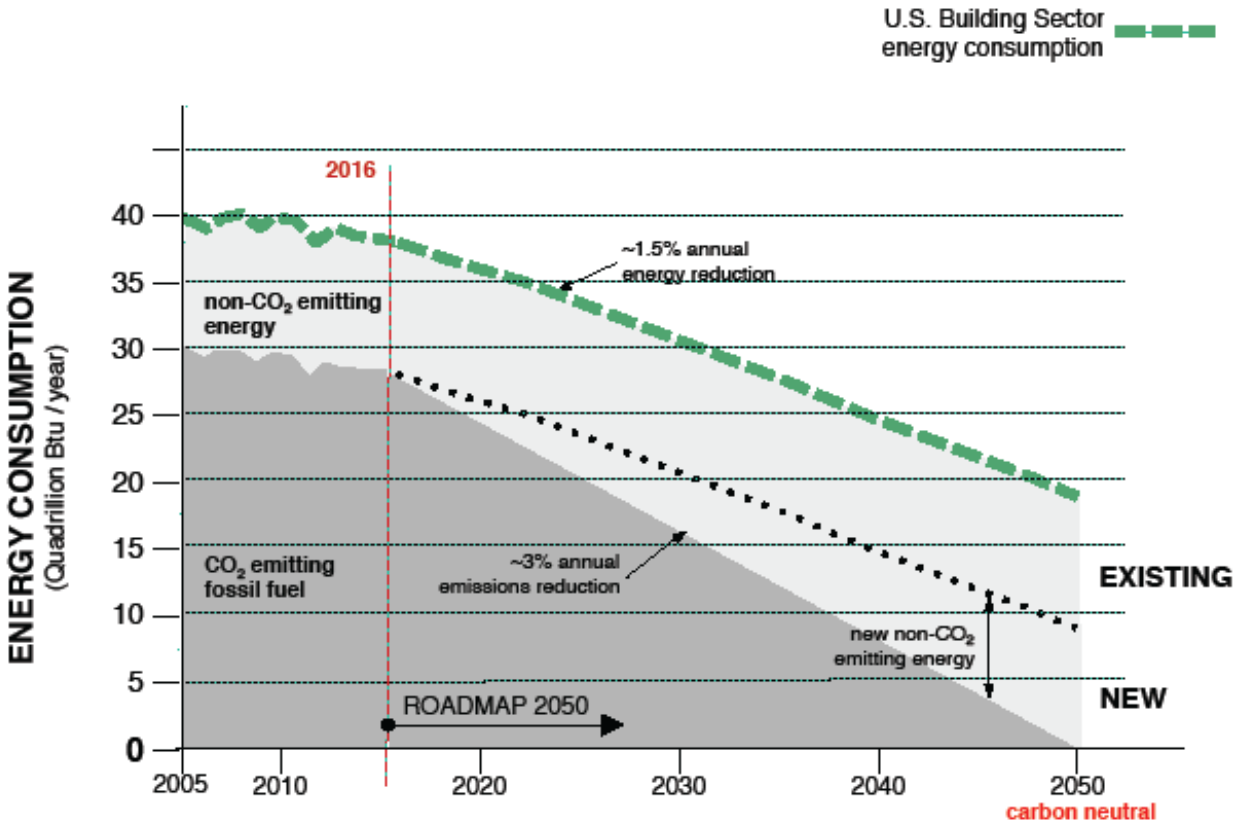
2050 Roadmap
US Building Sector Achievement



Since 2006 the US building sector has added **20 billion sf** without increasing carbon output

Architecture 2030
Roadmap to Zero Emissions
2014

2050 Roadmap
US Building Sector Plan



Roadmap 2050

U.S. Building Sector Targets 2016 - 2050

Source: Architecture 2030; Data adapted from the EIA Annual Energy Outlook 2014

architecture2030.org

US targets can be achieved by:

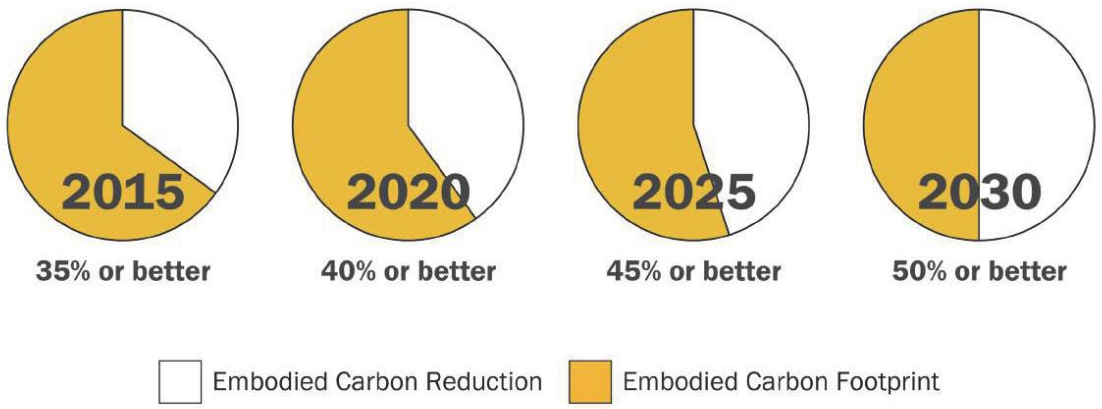
Using best-available technology

Reducing Current Emissions by 50%

Doubling current renewables

Architecture 2030
Roadmap to Zero Emissions
2014

2050 Roadmap



The 2030 Challenge for Products

Holistic carbon accounting means the "embodied" carbon **MUST** be addressed

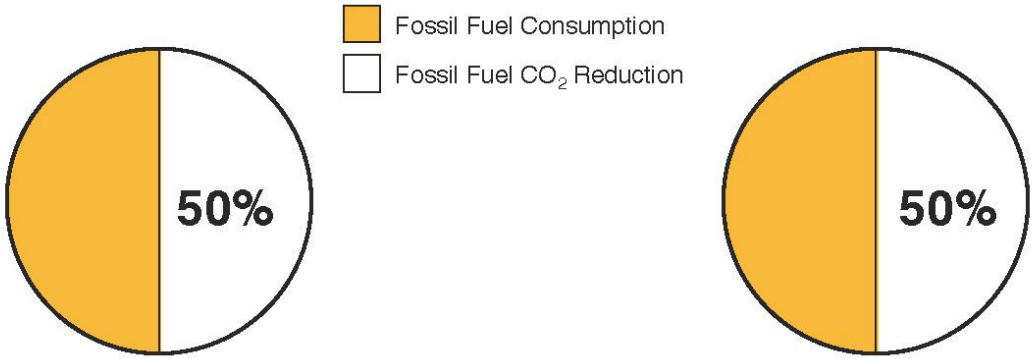
architecture2030.org/2030_challenge/products

Architecture 2030
Roadmap to Zero Emissions
2014

The Greenest Building is… One That is Already Built

"Building Re-use almost always yields fewer environmental impacts than new construction when comparing buildings of similar size and functionality."

2050 Roadmap



2% to 3%
(annual building stock renovation)

Developed Countries
Renovate a *minimum* of 2% to 3% of the total existing building stock each year to a 50% fossil fuel operating energy consumption reduction.

1.5% to 2%
(annual building stock renovation)

Developing Countries
Renovate a *minimum* of 1.5% to 2% of the total existing building stock each year to a 50% fossil fuel operating energy consumption reduction.

Roadmap 2050

(ACTION ITEMS)

2. Existing Buildings Fossil Fuel CO_2 Reduction Targets

Source: Architecture 2030

architecture2030.org

2050 Roadmap includes targets for deep energy retrofits

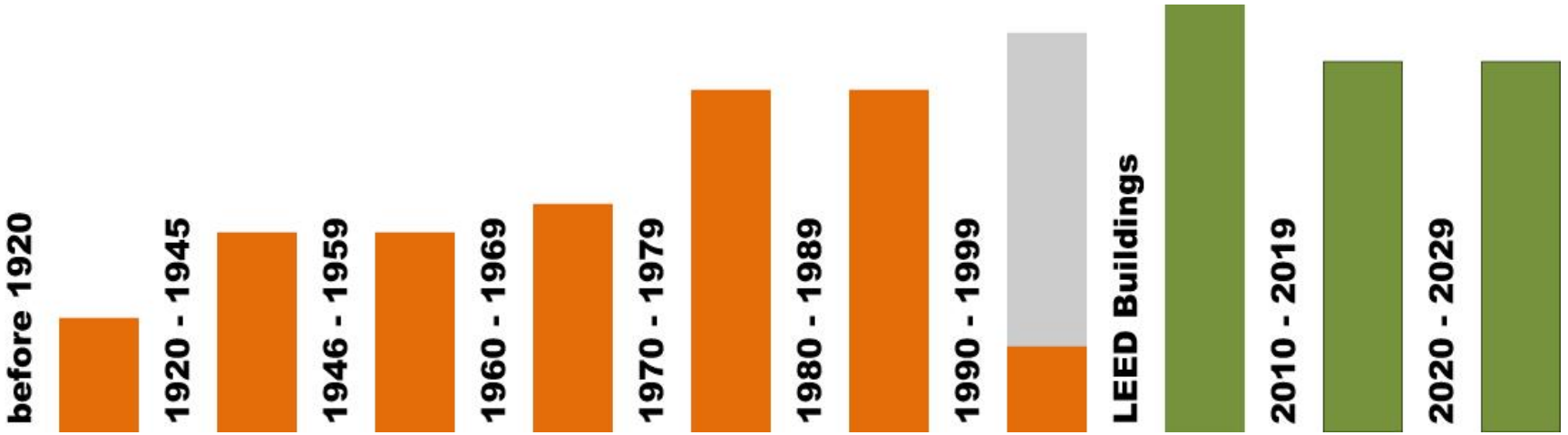
For US to meet its target, **3x** to **4x** current rate of renovation must be achieved

Architecture 2030
Roadmap to Zero Emissions
2014

Projected Growth
Projected Rehab

Millions of Square Feet

35% **28 Billion Sq Ft**



75% **54 Billion Sq Ft**

2006 Architect Magazine
The Boom to Come – America Circa 2030

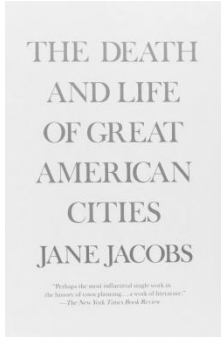
Valuing Existing Resources

The Importance of Older Places

"…the economic value of old buildings is irreplaceable…It is created by time…"

Jane Jacobs

The Death and Life of Great American Cities



The Importance of Older Places

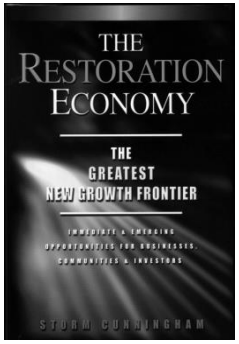
Re-investment Driven

over **$1 trillion** annually

over **$100 trillion** inventory

Storm Cunningham

The Restoration Economy



The Importance of Older Places

Minimal **Material** Expenditure

Minimal **Energy** Expenditure

Skill and **Craft** Intensive

Creates **Good Jobs**

Cycles Money Through **Local Economy**

Donovan Rypkema

The Economics of Historic Preservation

The Greenest Building is… One That is Already Built

2.16.2017

COG Built Environment and
Energy Advisory Committee

Energy Efficiency, Sustainability, and Green Building Practices in Historic Buildings

Carl Elefante FAIA
Principal
Director of Sustainability

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ARCHITECTS