

# Getting towards Zero Waste, 100% Involvement - Growing a Green Community

How Battery Park City created a green  
community in the heart of New York City

Susan Kaplan, LEED Fellow  
Principal, BuildingWrx



# IT'S ALL ABOUT CHOICES

“What if every single act of design and construction made the world a better place?”

—Living Building Challenge, v2.0





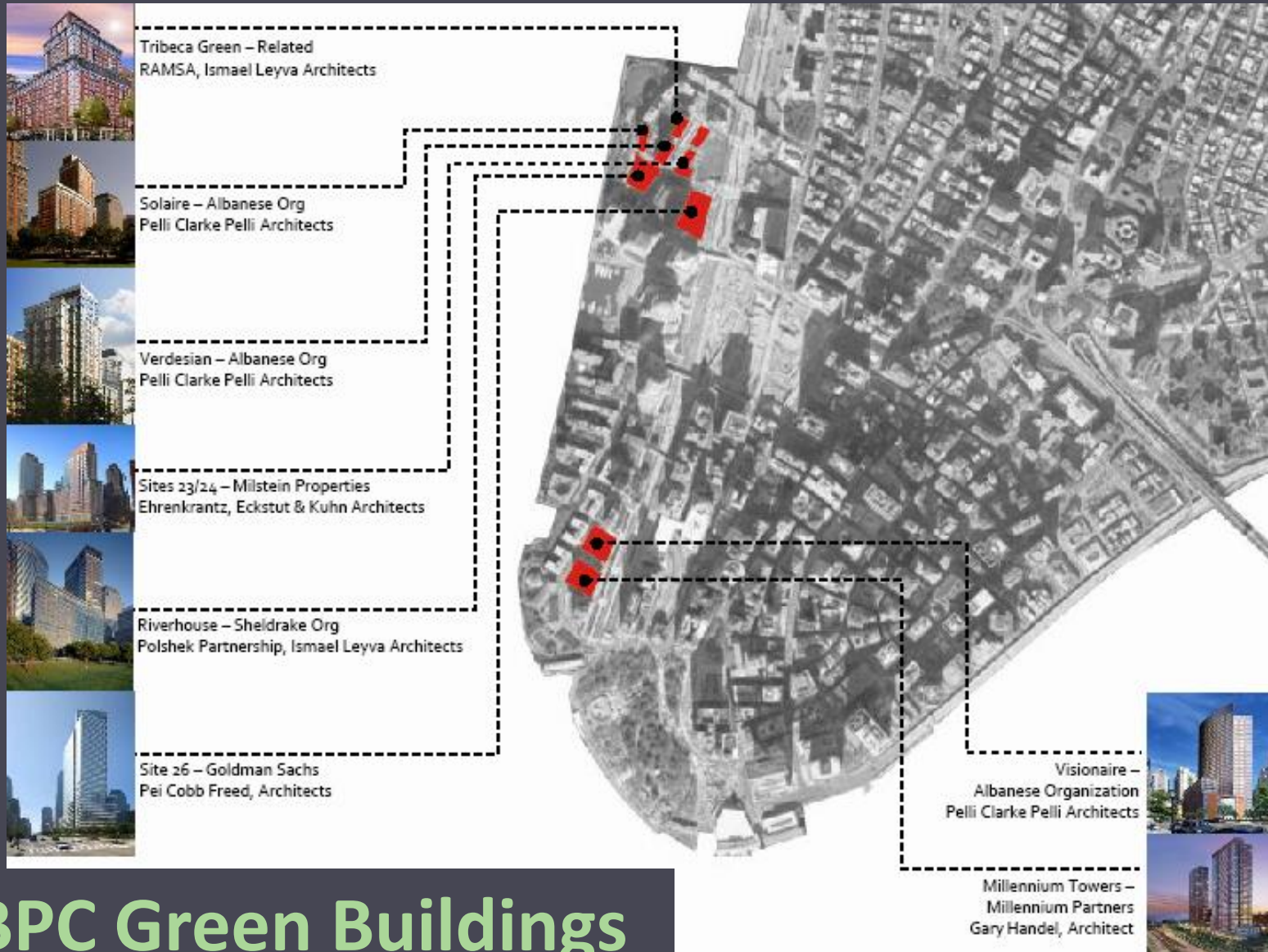








# GREEN DEVELOPMENT



# PUBLIC GOOD

## New Vision

“In 2000, ... developed a **new vision** for **Battery Park City**, one that was greener, if you will, to build **sustainable** buildings. A vision of utilizing that **public-private partnership** that Battery Park City so embodies...We wanted to build **healthier buildings**, we wanted to build greener buildings...buildings that paid attention to **indoor air quality**...were more **energy-efficient**, that **recycled water**...that **recycled building materials**...”

Tim Carey, 2001



# WHY DID BPCA BUILD GREEN?

## A city vulnerable to climate change

- ◎ NYS: **+1.1°C - 4.5°C** by 2100
- ◎ Rises in **sea level** to impact subway & power generation
- ◎ **10-20%** increase in precipitation to further test strained waste collection & wastewater management
- ◎ Probability of “100-year flood” now once in every 80 yrs.  
**2020s**: once in every 43 yrs.  
**2050s**: once in every 19 yrs.
- ◎ Summer days **>90°F** to rise from 14\* to 40-89 by 2080s
- ◎ More than proportional increases in **ground level ozone**





# GREEN GUIDELINES

## Collaborative Team Process

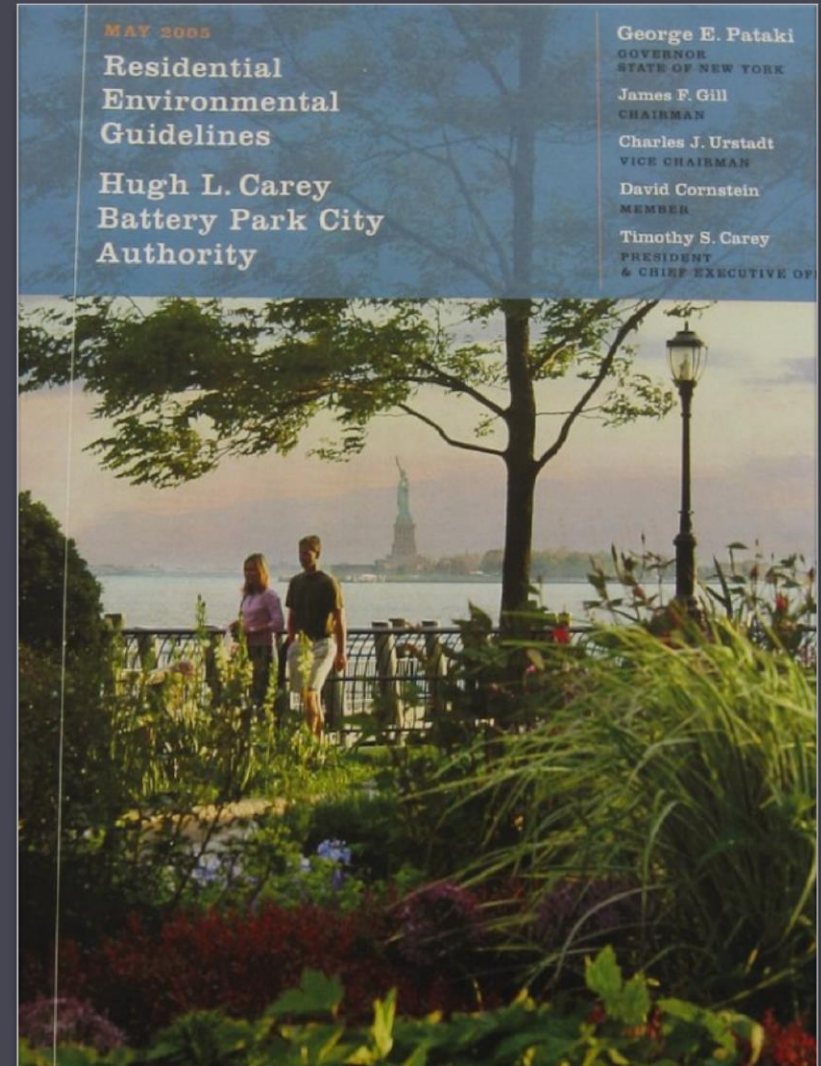
Battery Park City  
Authority  
Fox & Fowle  
Architects  
Flack & Kurtz  
Green October  
Rocky Mountain  
Institute  
Carrier Corporation  
Barney Skanska  
NYSERDA



# GREEN GUIDELINES

The **purpose** of these guidelines is to establish a **process** for the creation of **environmentally responsible** residential buildings that are appreciably **ahead of current** standards and practices for **development**.

A '**total system approach**' is the backbone of the **guidelines** and the **best** approach to achieving the desired **result** in a **cost effective** manner over a building's **lifetime**.





# GREEN DEVELOPMENT

## First BPC Green Building: The Solaire

### Developer:

Albanese Development Corp.

### Architects:

Cesar Pelli, Design Architect  
SLCE, Architect of Record

### Engineer:

Cosentini Engineers





# ENVIRONMENTAL GUIDELINES

## Categories

- 1.0** Energy Efficiency
- 2.0** Enhanced Indoor Environment Quality (IEQ)
- 3.0** Conserving Materials & Resources
- 4.0** Education, Operations & Maintenance
- 5.0** Water Conservation & Site Management



# Net Zero Opportunity 1: Energy



# 1.0 Energy Efficiency

### 1.3 Renewable & Green Power Sources





# ENVIRONMENTAL GUIDELINES

## 1.0 Energy Efficiency

### Ice Storage

- ◎ Hybrid cooling system, includes thermal-energy storage tanks & chillers
- ◎ Makes and stores ice at night during off-peak times, when utility rates are far less expensive and when cleaner baseload plants are used



# ENVIRONMENTAL GUIDELINES

## 1.0 Energy Efficiency

### Co-Generation / Microturbines

©NYC passed first U.S. standard for microturbines in December 2007, following task force set up to evaluate installation requests for BPCA buildings

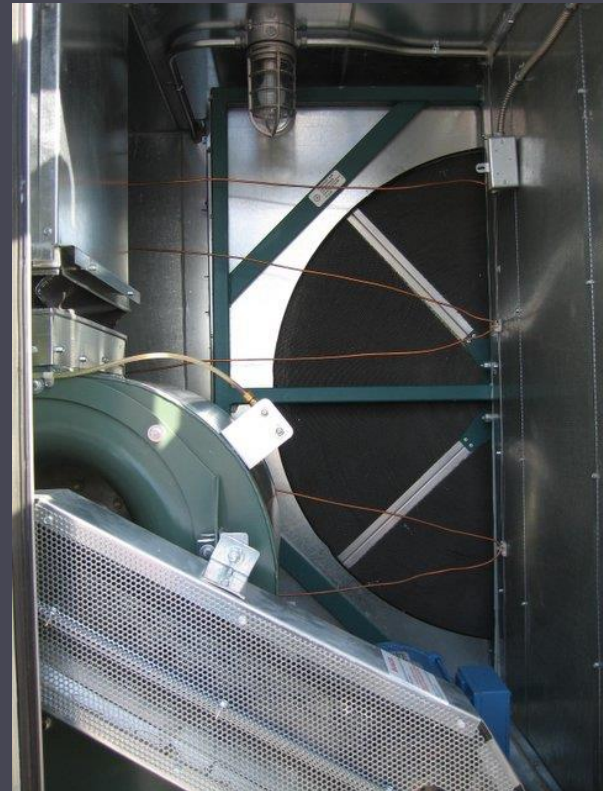


# ENVIRONMENTAL GUIDELINES

## 1.0 Energy Efficiency

### Enthalpy Wheels

Energy recovery heat exchangers

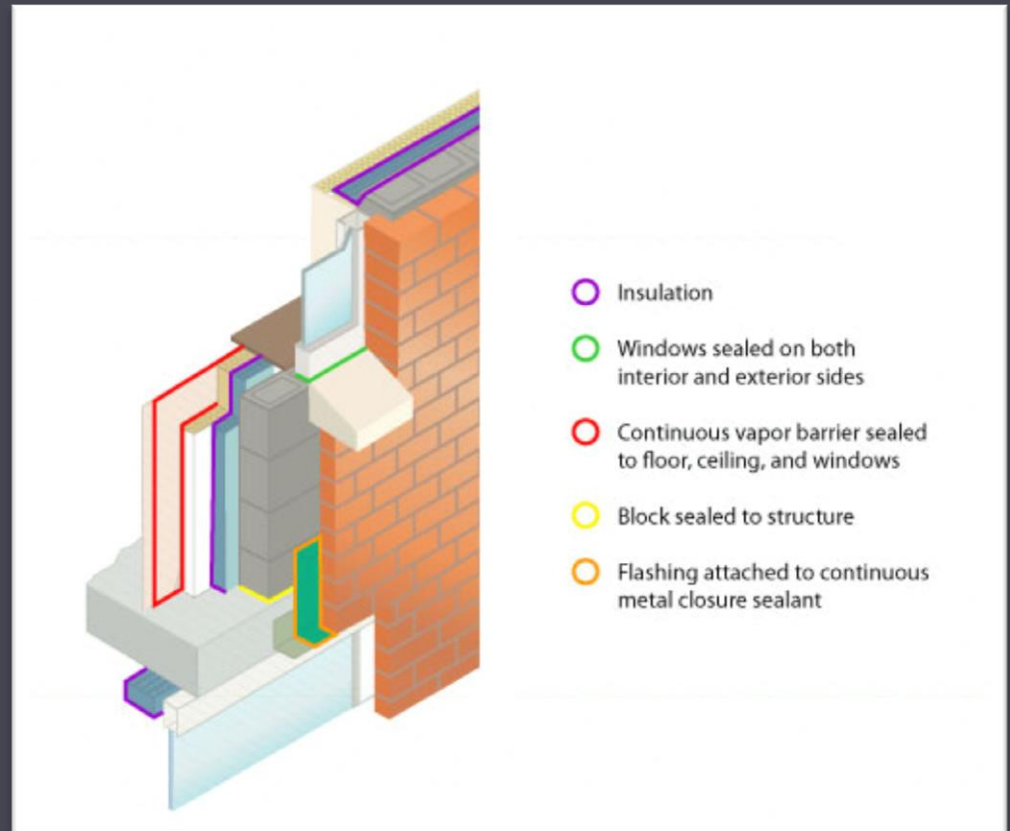




# ENVIRONMENTAL GUIDELINES

## 1.0 Energy Efficiency

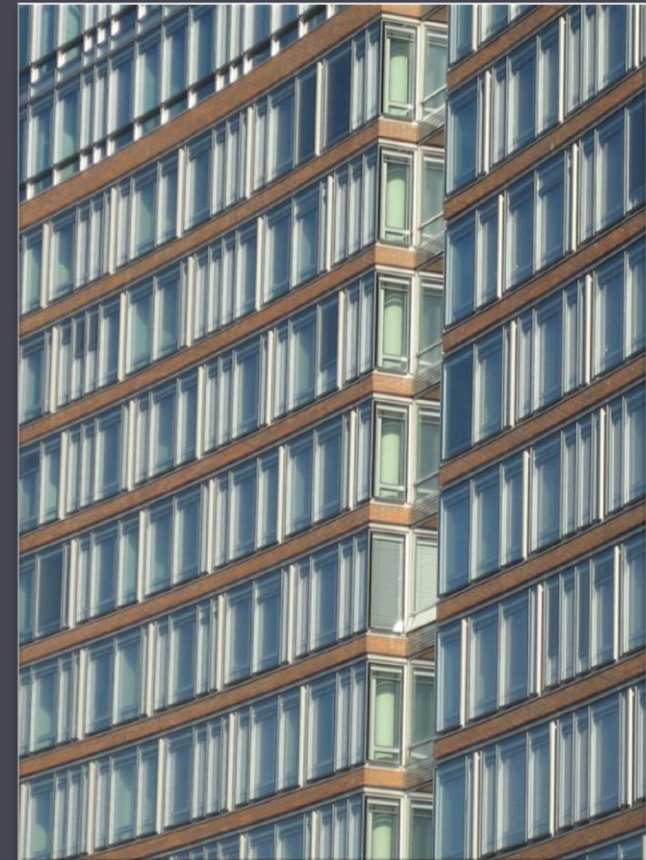
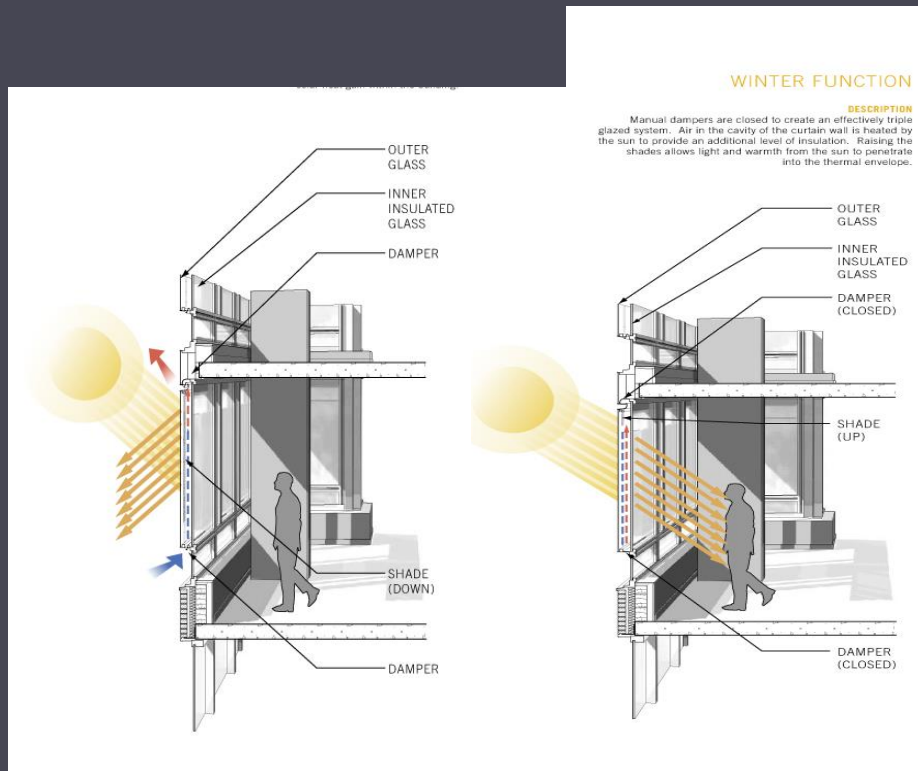
### Building Envelope



# ENVIRONMENTAL GUIDELINES

## 1.0 Energy Efficiency

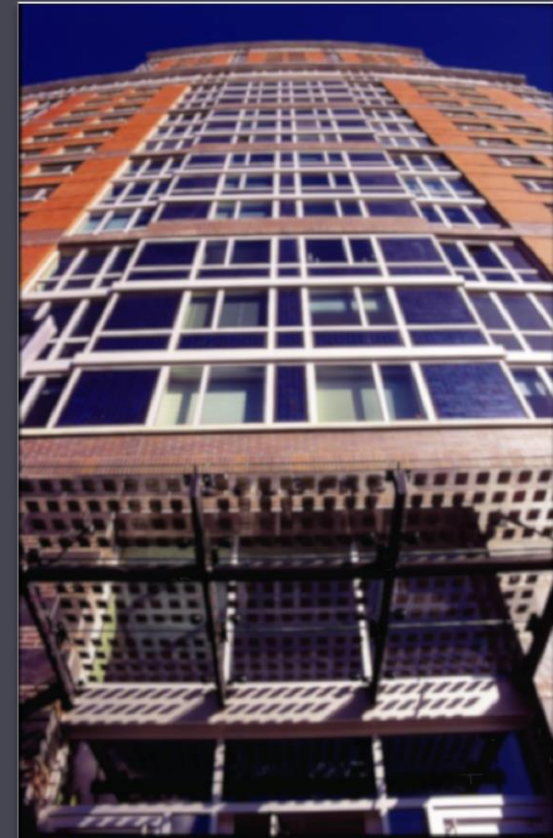
### Double Façade



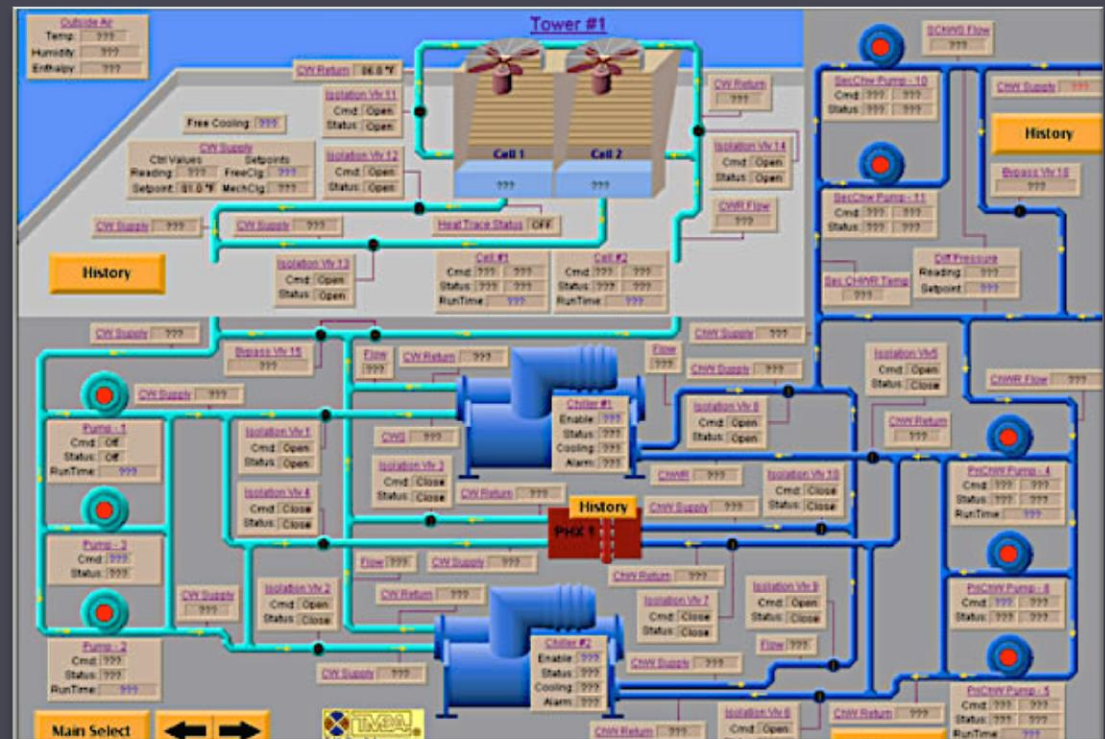
# ENVIRONMENTAL GUIDELINES

## 1.0 Energy Efficiency

### Photovoltaics







# ENVIRONMENTAL GUIDELINES

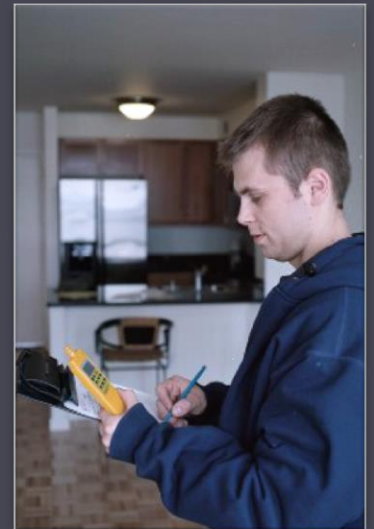
## 4.0 Education, Operations & Maintenance

4.1 Maintenance Accountability

4.2 Commissioning

4.3 Building Monitoring Systems

4.4 Education



# Net Zero Opportunity 2:

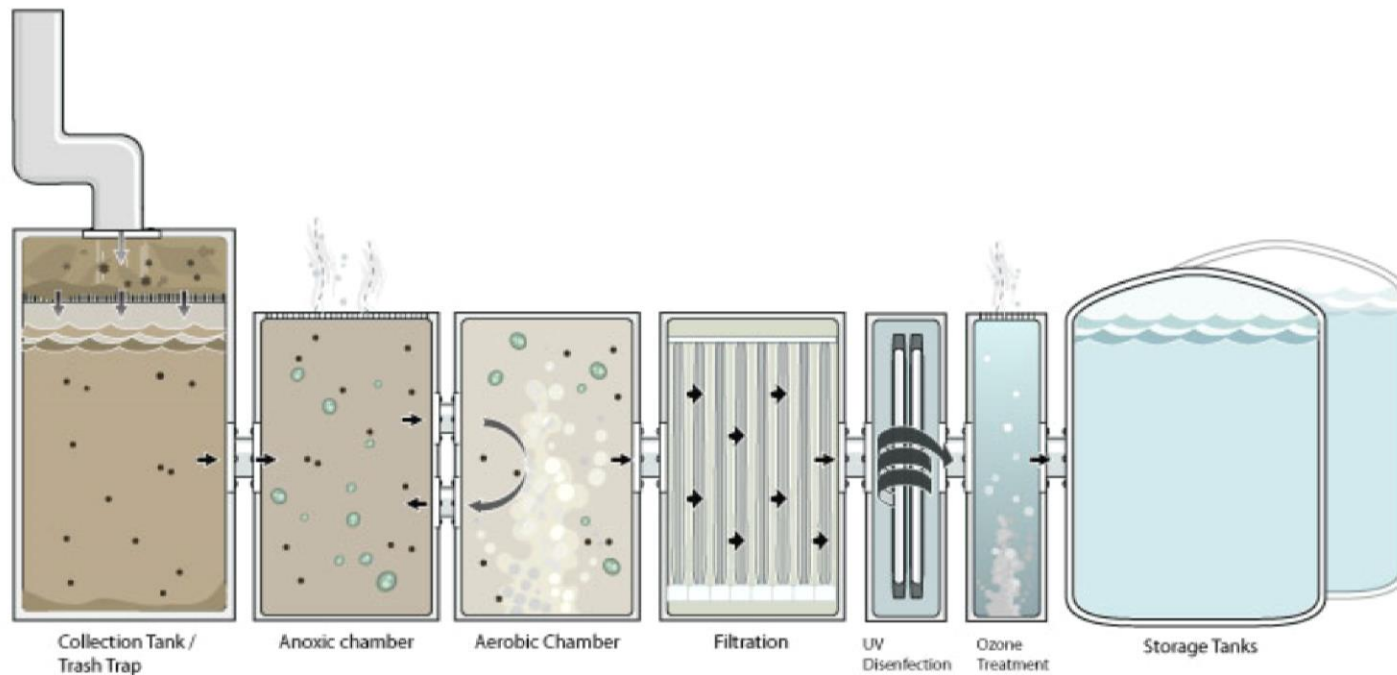
## Water



# ENVIRONMENTAL GUIDELINES

## 5.0 Water Conservation & Site Management

### Water Reclamation System





# ENVIRONMENTAL GUIDELINES

## 5.0 Water Conservation & Site Management

### Water Reclamation System

- ◎ Dramatically reduces fresh potable water taken from the city's water supply
- ◎ Decreases energy used to pump wastewater to city treatment facility
- ◎ The Solaire's system led to NYC Water Board's Comprehensive Water Re-Use Program, which provides a 25% cut in water rates to buildings with water reclamation systems



# ENVIRONMENTAL GUIDELINES

## 5.0 Water Conservation & Site Management

### Waterless Urinals

- ◎ Less costly to install, as water supply line is not needed
- ◎ Produce significant water and maintenance savings, as there are no mechanical components to repair and no clogged drains
- ◎ Hands-free operation provides a more sanitary environment



# ENVIRONMENTAL GUIDELINES

## 5.0 Water Conservation & Site Management

### Green Roofs





# Net Zero Opportunity 3: Waste



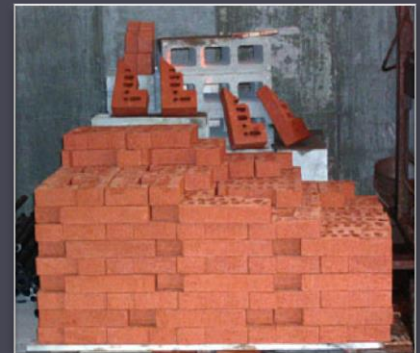
# Waste Recycling/ Reuse



# ENVIRONMENTAL GUIDELINES

## 3.0 Conserving Materials & Resources

- 3.1 Storage & Collection of Recyclables
- 3.2 Construction Waste & Resource Reuse
- 3.3 Recycled Content
- 3.4 Local/Regional Materials
- 3.5 Renewable & Rapidly Renewable Materials
- 3.6 CFC Elimination
- 3.7 Alternative Transportation
- 3.8 Certified Wood
- 3.9 Low-Pollution Fuels





# ENVIRONMENTAL GUIDELINES

## 2.0 Enhanced Indoor Environment Quality

- 2.1 Indoor Air Quality (IAQ)
- 2.2 Low-Emitting Materials
- 2.3 Controllability of Systems
- 2.4 Lighting & Daylighting
- 2.5 Indoor Pest Control
- 2.6 Construction IAQ Management



# Net Zero Opportunity 4: No One Uninvolved



# COMMUNITY SPACES

## Poets House





# COMMUNITY SPACES

## Museums



# COMMUNITY SPACES

## Community Gardens





# COMMUNITY SPACES

## Parks





# PUBLIC GOOD

## Stewardship and Community





# LEED

## Battery Park City Green Projects

- © First LEED residential high-rise in the U.S.
- © 2,200 Green residential units
- © 18 LEED projects



# WHAT CAN THE FUTURE LOOK LIKE?

## Net-Zero Buildings

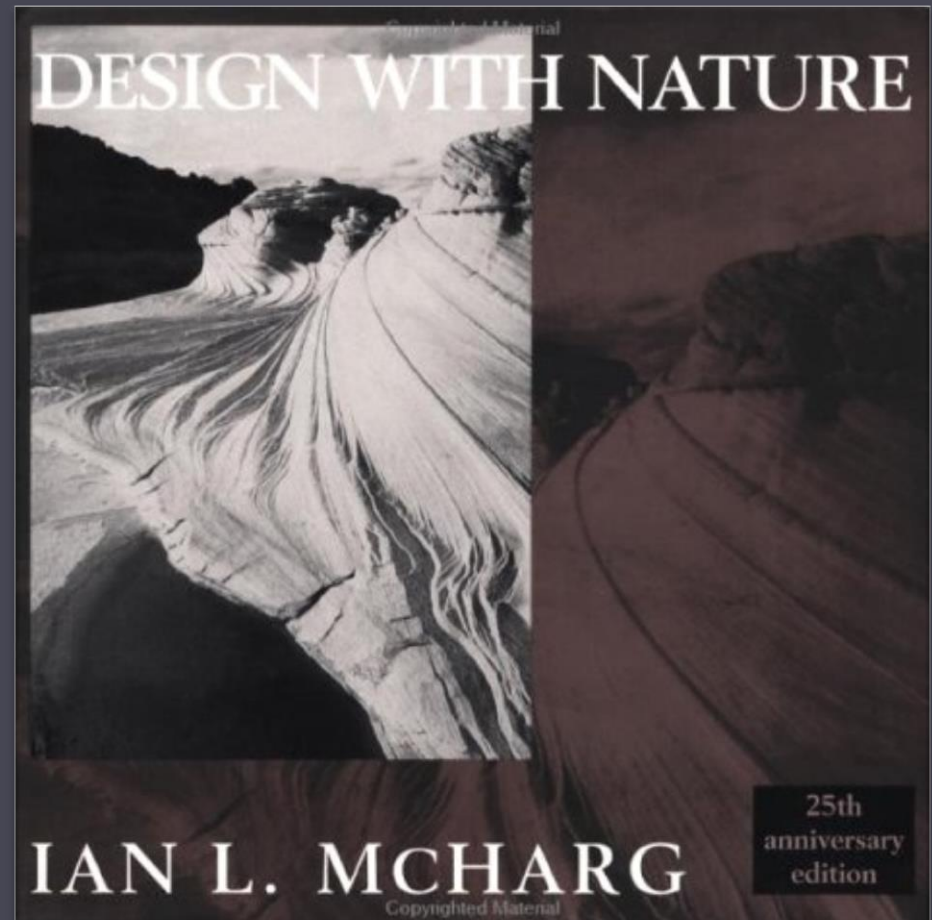
A residential or commercial building with greatly **reduced needs for energy** through efficiency gains (**60% to 70% less** than conventional practice), with the balance of energy needs supplied by **renewable technologies**.



# WHAT CAN THE FUTURE LOOK LIKE?

## Design With Nature

Trapped by our own **behavioral demands**, limited knowledge and socioeconomic **considerations** the human **transformation** of the planet through urban, **agricultural** and industrial **land-use** and land-use **changes** threatens the long-term **existence** of human society unless we apply a **rigorous knowledge** based understanding of **ecology** to our daily affairs, industrial design and **patterns** of resource **exploitation**.



# WHAT CAN THE FUTURE LOOK LIKE?

## Ken Yeang: Bioclimatic Skyscrapers

Use environmentally and **climatically sensitive** forms and means of construction, including: **variability in façade** and building performance in response to **climate** and **location**, alignment of building along the **solar path**, flexibility to adjust to different **climatic needs** throughout the year, use of entirely **passive** means of **lighting** and **ventilation** whenever possible, and material selection based on **ecologically sound** principles.





# WHAT CAN THE FUTURE LOOK LIKE?

## Vertical Farming

Dickson Despommier, a professor at Columbia University, created the vertical farm concept with 82 graduate students. He says that the skyscrapers could protect a city's food supply from floods and droughts, and from pathogens that attack crops.



# WHAT CAN THE FUTURE LOOK LIKE?

## Building as Tree

**Growing** the trees around a conventional **support structure**, the Arbo-architecture grafts young willow **trees**, from **trunk to top**, to support the structure. As soon as the trees become **strong** enough to **support** the tower on their own, the **roots** are cut off to turn the architecture into a **single organism**.



# IT'S ALL ABOUT CHOICES

“What if every single act of design and construction made the world a better place?”

—Living Building Challenge, v2.0

