Global Advances in Green Buildings and Eco-Cities

Successful Cities of the 21st Century Will Be Green

Mark Ginsberg,
USGBC Senior Fellow
Principal, Ginsberg Green Strategies

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Guiding Principles

- Leave a Place Better Than You Found It
- One Person Can Make a Difference
- Green is good:
  - 3Es: Energy, Environment, Economy
  - Triple Bottom Line: People, Planet, and yes, Profit

Economic Development is a guarantee for today…

Advanced Technologies are a guarantee for tomorrow….

The Green Economy and Eco-Cities are a guarantee *forever*

Cities of the Future…

Will be successful….

only if they are GREEN

To be Competitive in the 21st Century, Cities Must Be:

- Efficient
- Affordable
- Resilient

They Must Depend On:

- Energy Efficiency
- Renewable Energy
- Smart Grid
- Integrated Urban Design

Cities are built:

- Building by building
- Districts and Neighborhoods
- City-wide policies and design
- With transportation, municipal services, industry and buildings all integrated

Eco-Cities embrace all these elements

Leading to The Concept of Zero Energy Communities and Eco-Cities

"Everything is a resource…nothing is waste."

Bill McDonough

1. **Integrating Energy Technologies**

   Municipal "waste" is a resource → Biofuels and Power

   Buildings as Power Plants → Solar, Geothermal

2. **Applying Advanced Technologies**

   Zero or Positive Energy Buildings, Zero Water

   Industrial Processes, Municipal Operations

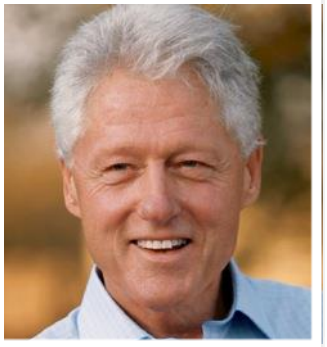
   Smart Transportation

Global Focus on Green Cities

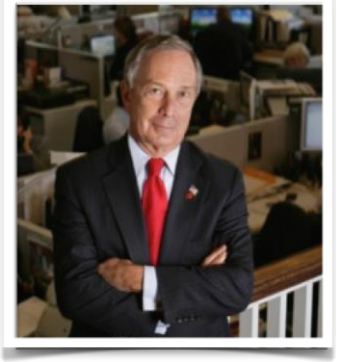
C40 CITIES:
CLIMATE LEADERSHIP GROUP

- **Bill Clinton and NY Mayor Michael Bloomberg**
- **World Bank, ICLEI, ARUP, WGBC**
- **Beijing, Shanghai, Delhi and Mumbai have been participants**

- **U.S. Green Building Council's Greenbuild 2013 – Philadelphia**
- **IGBC Green Cities and Townships April 25-26 2013 – Mumbai**
- **China Urban Planning Conference July 17-18 – Zhuhai**



BILL CLINTON



NY MAYOR
MICHAEL BLOOMBERG

US Eco-City Council

- To work collaboratively with the CSUS Eco-City Council
- To help assure quality and “no greenwash”
- To serve as a forum for discussion
- To provide technical support such as model guidelines, policies, incentives
- To create a database of Eco-City projects
- To focus on 1-2 Eco-City pilot projects

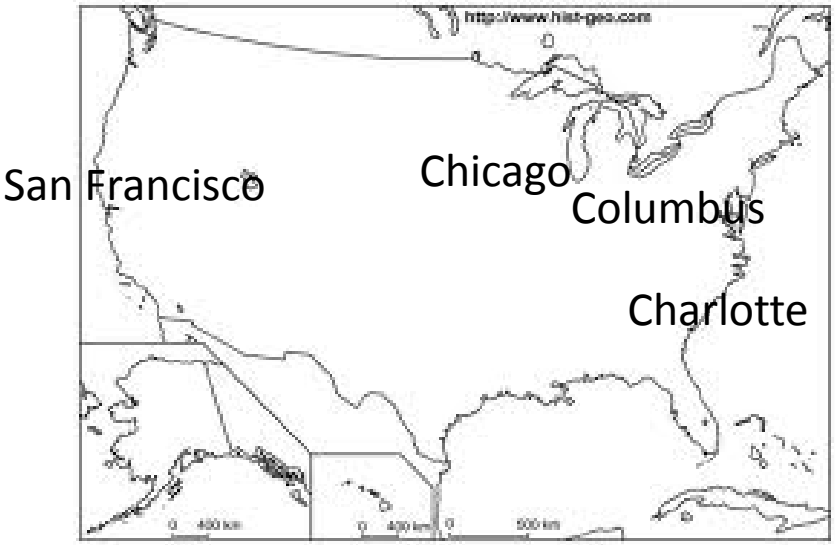
CITIES ARE PARTNERING

合肥 - 哥伦布
廊坊 - 夏洛特
上海 - 芝加哥

Hefei - Columbus

Langfang - Charlotte

Shanghai - Chicago



ADVANCED TECHNOLOGIES LEAD TO GREENER BUILDINGS

ADVANCED TECHNOLOGIES LEAD TO GREENER BUILDINGS

- **Advances in Lighting, Sensors, Controls, Windows, Insulation, Appliances**
- **Exciting Developments in Zero Energy Buildings**
- **Systems Integration and Smart Grid**

All Leading to Zero Energy Buildings, Green Cities and Eco-Cities

4 Times Square in New York City

With thin film technology, photovoltaic power panels were integrated in the outer layer of the building. The 48-floor skyscraper has a layer of photovoltaic "skin"-- thin film photovoltaic panels from the 35th to the 48th floor on the south and east side, constituting a photovoltaic curtain wall.

There is a Fuel Cell on the 4th Floor and dozens of energy efficiency features.

Solar on DOE's Roof

2008 Olympic Village in Beijing

First LEED-ND Gold in China

Micro-Energy Welcome Center at the 2008 Olympic Village

CII-IGBC Green Business Center

First LEED Platinum in India

Beautiful Eco-Cities of the Future are Built on Eco-City Guidelines

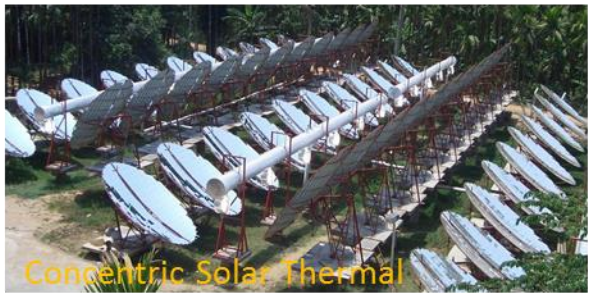
Eco-cities Guidelines

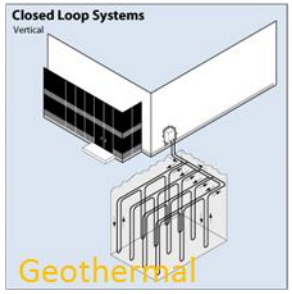
1. Integrate existing stock, future availability and accessibility of all resources, sectors, components and subsystems and their interconnection for ***comprehensive energy planning*** for the city and surrounding communities
2. Develop efficient, ecologically responsible and ***compact mixed-use communities*** with walkable, bikeable and transit oriented transport reducing vehicle miles travelled
3. Design and maintain residential, commercial and public buildings with gradually improving ***green building standards***
   - Construct all new government buildings showcasing green guidelines
   - Designate and incentivize near-zero energy townships and development zones
   - Progressively incorporate improving green guidelines in development regulations

Sources: bustler.com, calacademy.org, sfweekly.com, newyorkcityfeelings.com

Eco-cities Guidelines

4. Promote city and customer utilized ***renewable energy*** based on local resource availability, including;
   - photovoltaics,
   - solar thermal,
   - wind,
   - geothermal,
   - biofuels
   - co-generation,
   - landfill gas or waste -water methane
   - local smart grid for integration


Concentric Solar Thermal



Geothermal


Rooftop Wind


Solar Photovoltaics


Solaire - Building Integrated PV

Smart Grid Applications

5. Establish ***clean and efficient public/private transportation*** services interconnected with neighborhood no-emission pooled vehicles using locally produced renewable fuels


Metro


Bus Rapid Transit System

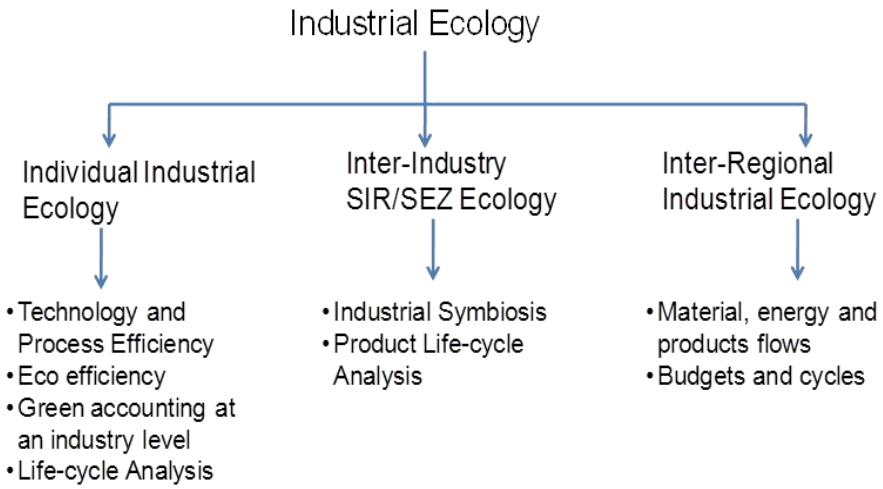
Plug-in Hybrids


Shared Bikes

Sources: gadhia-solar.com, eere.doe.gov, avinc.com, oe.energy.gov, mmrdamumbai.org, ahmedabadbrts.com

Eco-cities Guidelines

6. Encourage ***industrial symbiosis***, energy efficiency and green accounting at firm/industry/zone/regional level



7. Promote energy efficiency and distributed energy/electricity/heat generation from ***water supply, waste water and solid waste systems***; including maximum water and waste recycling

Solidwaste methane to energy

Waste-water methane to energy

8. Establish management frameworks for ***effective operation*** of urban infrastructure and services and develop frameworks for ***continuous improvements*** in the plans based on the performance of actual systems

Sources: eere.energy.gov, methanetomarkets.org, suratmunicipal.org

Eco-City Projects in San Francisco

Candlestick Point
Hunters Point Shipyard
Treasure Island

San Francisco‘s Newest Sustainable Neighborhoods

Clean Energy & Green Buildings

Goals:

- ***Renewable Energy: 100% Renewable by 2020***
- ***Energy Efficiency: Reduce 400,000 tons CO_2/year***

- **Municipal electricity (170 MW) = 100% renewable**
- **20 MW solar PV (2500 installations, incl. 5 MW Sunset Res.)**
- **3 MW methane from wastewater treatment**
- **8,200 small/med businesses & multifamily buildings**
- **Reduced energy consumption by 45 MW**
- **Saved SF residents & businesses $30 M on utility bills/yr**
- **LEED Gold required for all new construction, lg. retrofits**

Treasure Island (CCI) & Hunters Point Developments

Clean Transportation

Goals:

- ***<u>Carbon neutral</u> transportation system by 2030***
- ***20% trips by bicycle by 2020***
- **100% of public transit is electric or B20 biodiesel**
- **Largest municipal electric fleet in country**
- **Largest municipal biodiesel (B20) fleet in country**
- **78% taxis run on alternative fuels**
- **7% trips by bike**

Guilin Olympic City:

Guo'Ao Investment Group Plans to Apply the Lessons Learned from the Olympic Village to a Large Project in Guilin, China

Benefits to Cities

- Reduce energy costs for the government…and citizens
- Reduce urban pollution and resulting improved health
- Mitigate global climate change
- Assistance in achieving the National and City Energy Goals
- Reduce power grid congestion
- Help assure reliable energy supplies
- Foster economic development
- Produce jobs in new and emerging technologies
- Increase community pride and reputation

Successful Cities of the Future Will Be Built On…

- Eco-City Guidelines
- Policies that Advance Clean Energy and Green Development
- Leaders Who Embrace Eco-City Policies and Practices

Will Your City Succeed?

It’s Up To YOU !

Working together, we can create the successful cities of the future.

And All of Us Working Together.

We Can Achieve a Better World

Points of Contact and Resources

U.S. Green Building Council www.usgbc.org
India Green Building Council www.igbc.in
C40 Cities www.c40cities.org
Sister Cities International www.sci.org
U.S. Department of Energy www.energy.gov

Mark Ginsberg mark.ginsberg35@gmail.com