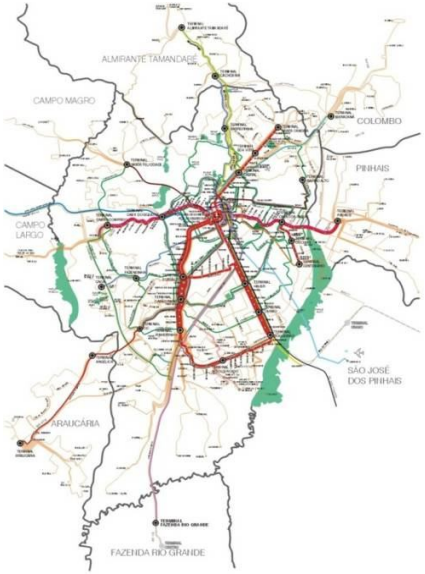
THE WORLD BANK

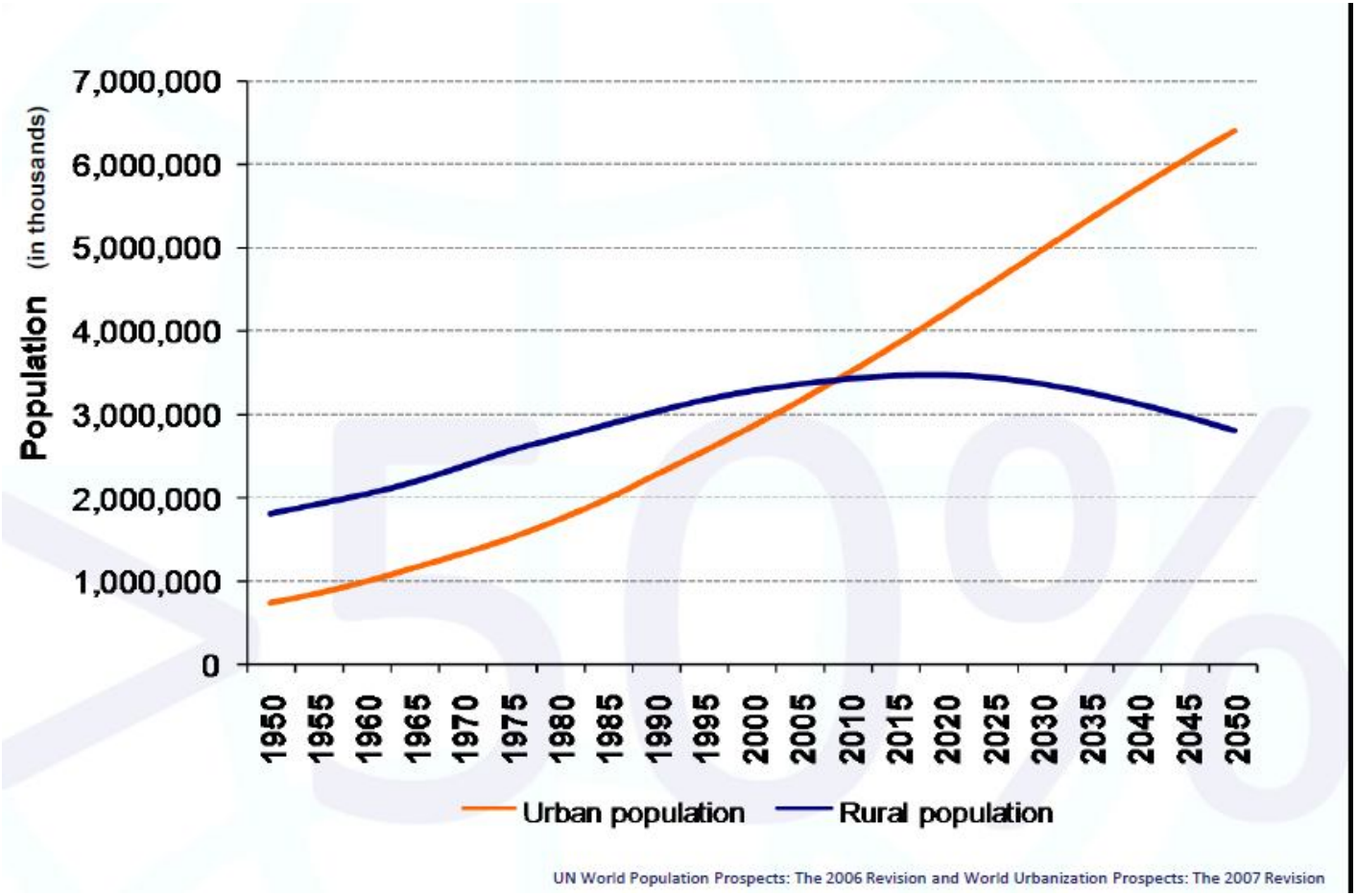
Eco2Cities
Ecological Cities as Economic Cities

Overall Framework of Eco² Cities

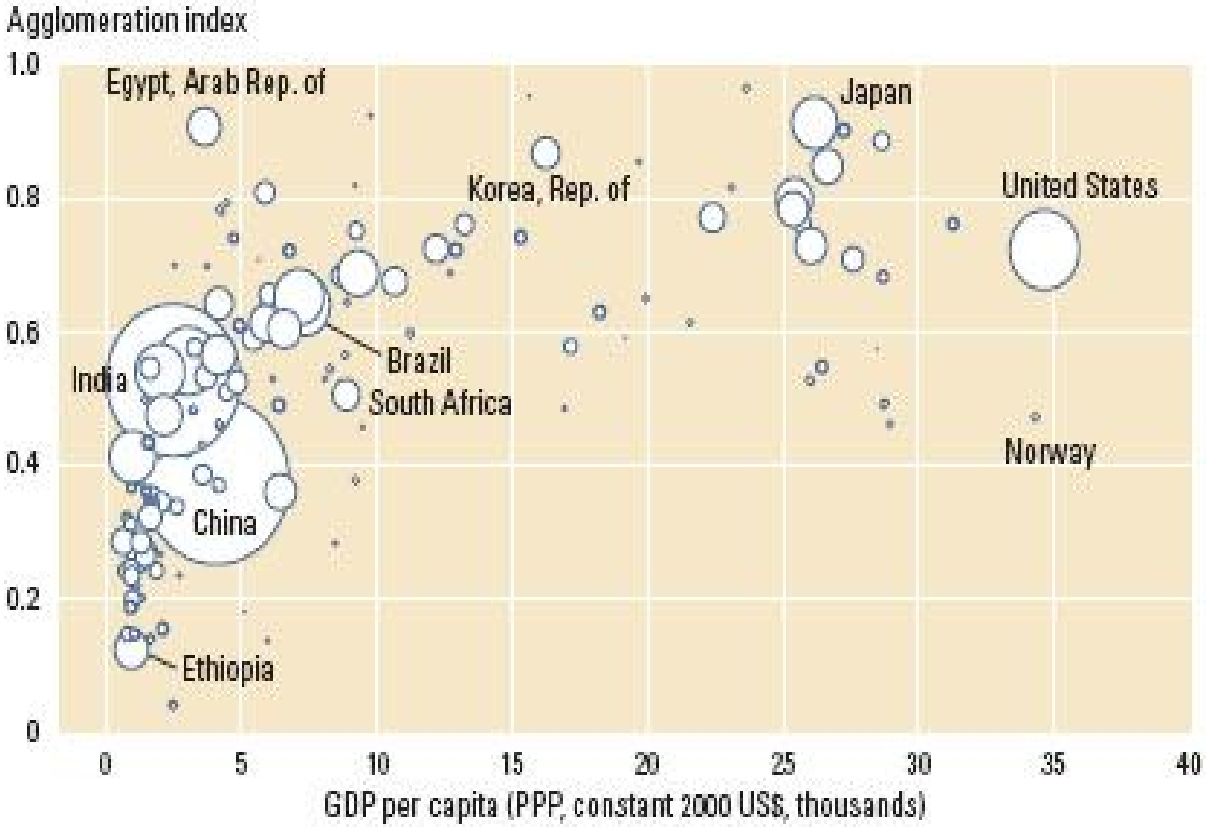


Keshav Varma
World Bank Institute

The World Urbanizes



Cities as Engines of Economic Growth



World Bank World Development Report 2009

Environmental Pressures Can Turn into Limits to Growth

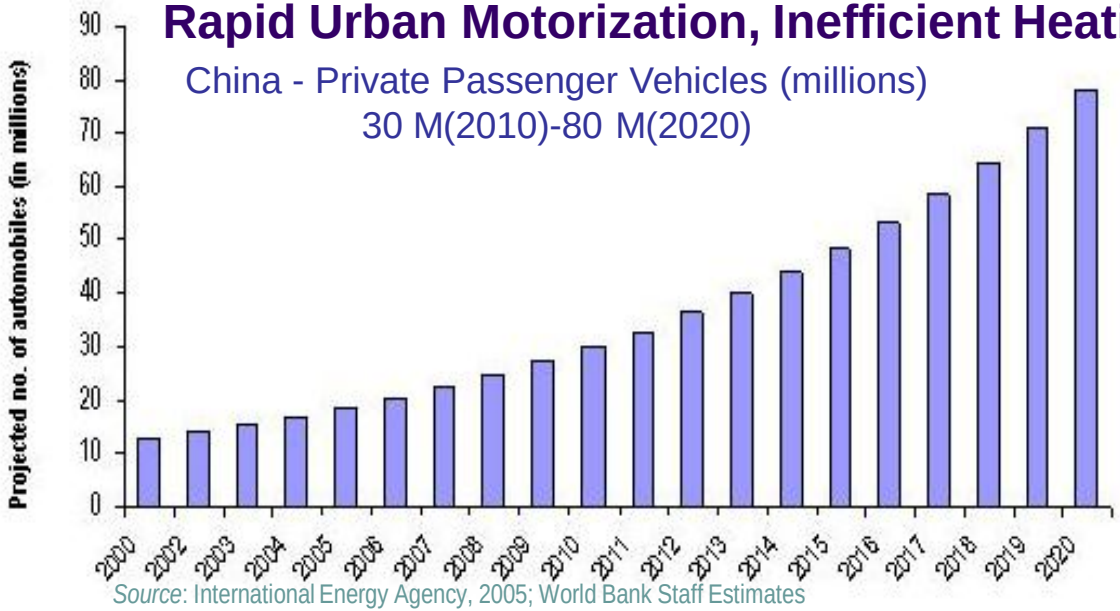
Scarce Water Resources

Untreated Wastewater

Increasing Solid Waste

Rapid Urban Motorization, Inefficient Heating/Cooling and Air Pollution

China - Private Passenger Vehicles (millions)
30 M(2010)-80 M(2020)

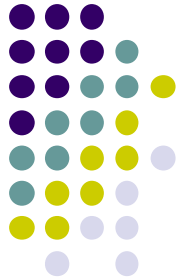


Source: International Energy Agency, 2005; World Bank Staff Estimates

Unsustainable Growth

- Projected new urban built up area in developing countries alone is 400,000 km² (2000 – 2030)
- This equals the total urban built up area of the 'entire world' as of the year 2001 – ***we are building a 'whole new world!'***
- ***4 Earths (Ecological Footprint)*** required if developing country cities urbanize following the models of developed country cities

What do we mean by an Ecological City?

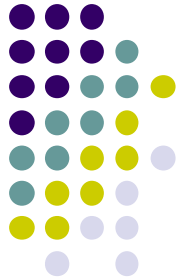


- Harness the benefits of ecological systems
- Protect and nurture ecological assets
- Reduce damage and regenerate nature as they improve overall wellbeing of citizens
- Adopt solutions from the self-organizing, efficient strategies used by nature

What do we mean by an Economic City?

- Create value and opportunity by efficiently using all assets, tangible and intangible
- Enable productive, inclusive, and sustainable economic activity
- Create reserves of wealth that allow for rapid recovery and resilience

The fusion ... The Eco^2 City



- Explicitly builds on the positive synergy and increasing interdependence of ecological and economic sustainability
- Enhances resource efficient in ways that also enhance quality of life, competitiveness, and resilience
- Uses these benefits to help the urban poor
- Makes long-term and sustainable investments that serve to
  - strengthen fiscal capacity, and
  - create an enduring ‘culture of sustainability’

How did we arrive at our solutions?

By focusing on global best practice cities:

- Curitiba, Brazil
- Stockholm, Sweden
- Yokohama, Japan
- Singapore
- Vancouver, Canada
- Auckland, New Zealand
- Brisbane, Australia

Eco Cities – Global Experiences (1)
Curitiba, Brazil

Integrated Land & Transport Development

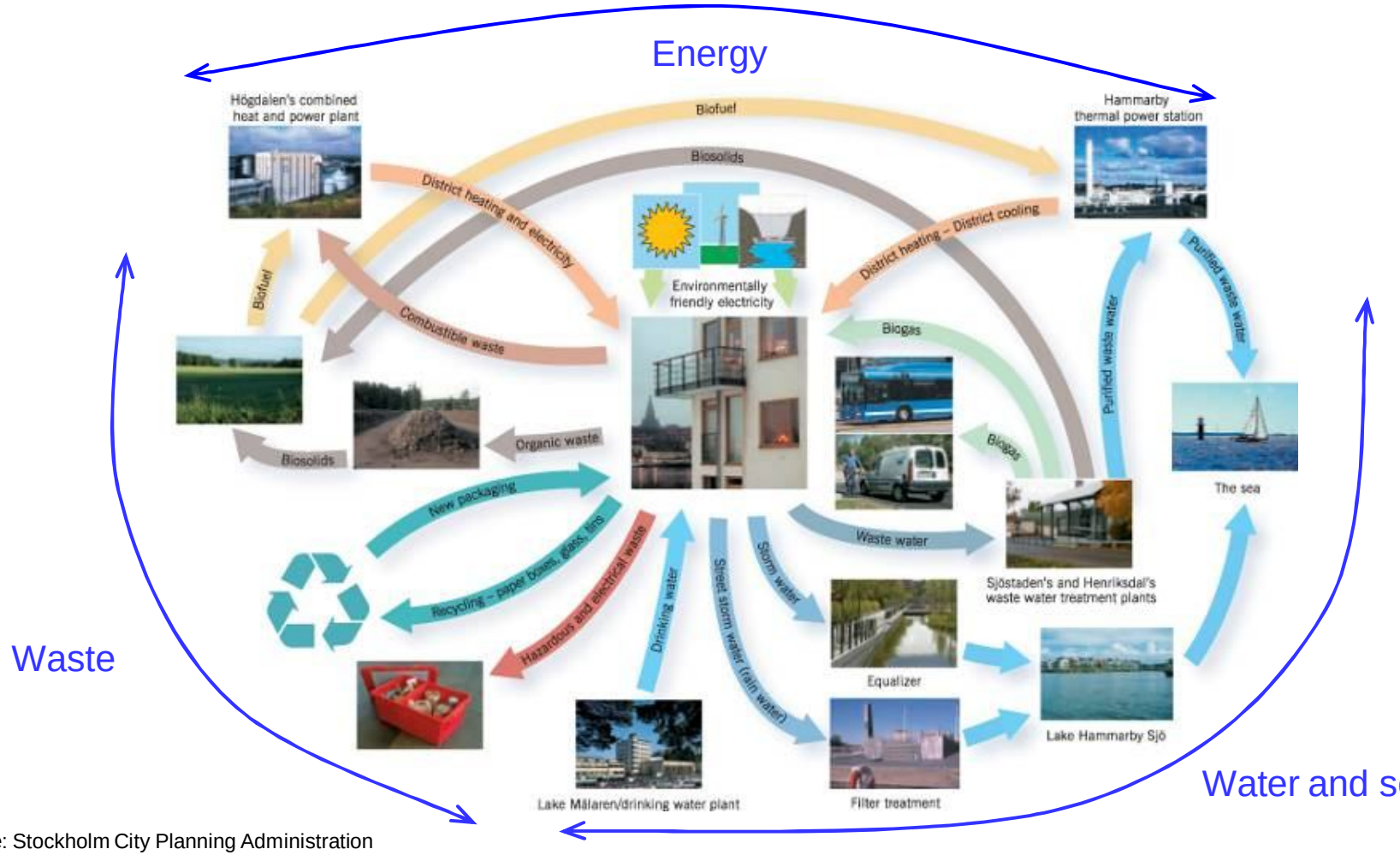
- Innovative Land Use Management
  - Urban Planning Institute of Curitiba (IPPUC) for integrated planning
  - Linear urban growth along five strategic axes with highly dense commercial/ residential development to absorb rapid population growth
  - Flood control with enhanced green space

- Affordable and Integrated Bus System
  - Bus Rapid Transit lane along the five strategic axes
  - Investment cost – about US$ 3 mil/km (about 3-6% of underground metro)
  - 45% Bus ridership
  - Less traffic congestion

Eco Cities – Global Experiences (2)
Stockholm, Sweden

Integrated Utility Management & Resource Management

- Redevelopment of southern district in Stockholm, Sweden

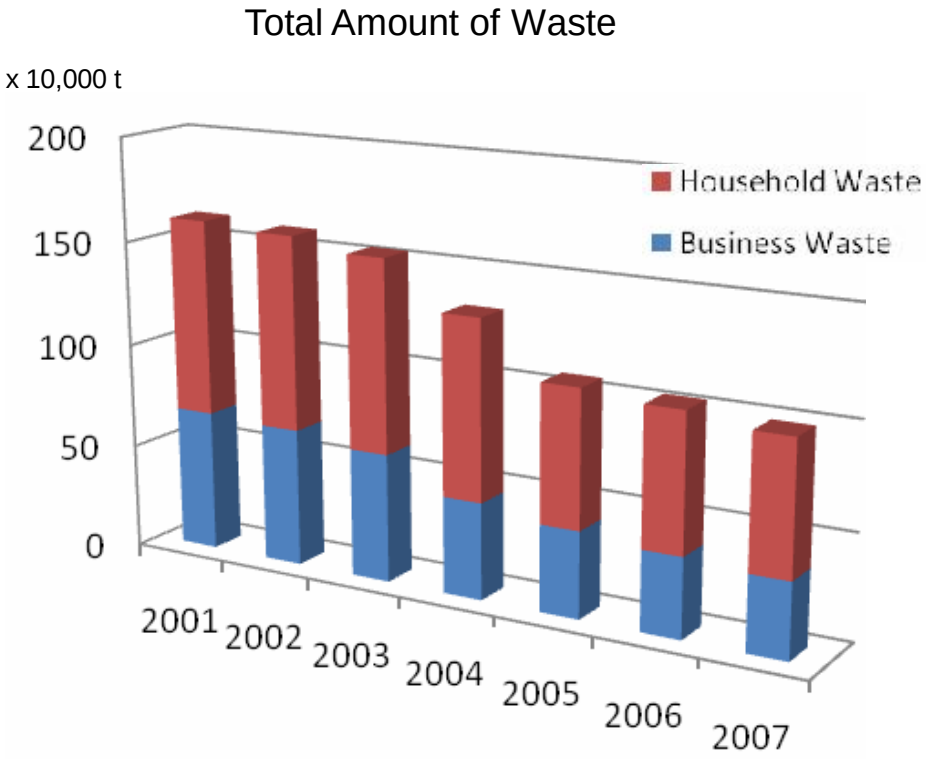


Source: Stockholm City Planning Administration

Eco Cities – Global Experiences (3)
City of Yokohama, Japan

- Solid Waste Reduction
  - Implementation of 3R (Reduce, Reuse, Recycle) with citizen's collaboration
  - Achieved 38.7% reduction in six years (2001-2007)

- Cost Saving and Revenue from Recycling
  - Closure of two incinerators because of reduced waste
  - Saved about US$ 1.1 billion capital costs of incinerator reconstruction, US $ 6 million from reduced operation and maintenance costs.
  - Longer life of landfill sites



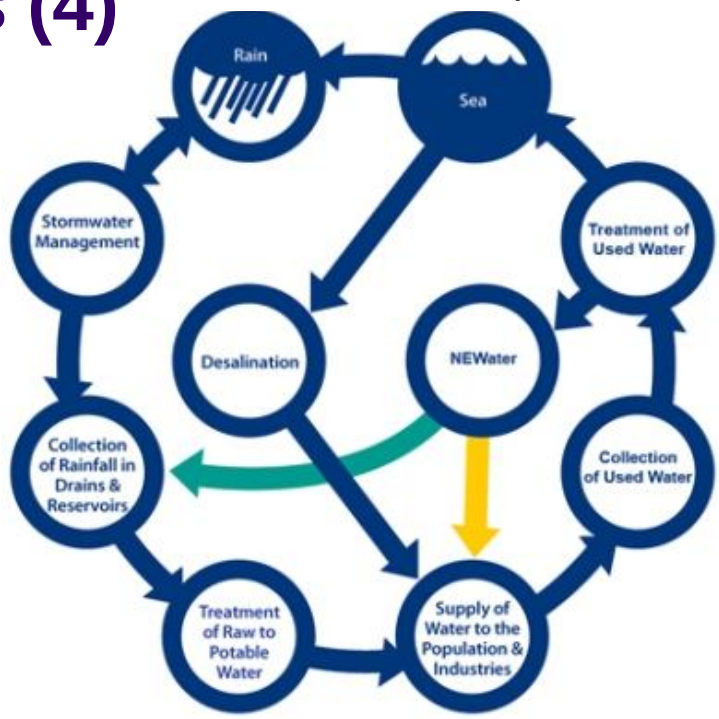
Source: City of Yokohama Website

Eco Cities – Global Experiences (4) Singapore

Integrated Water Resource Management

- Closed Water Loop
- Entire Water Cycle Managed by One Organization
- Water Security
  - Water Catchment
  - Wastewater reclamation
  - Desalination
- Demand Management
  - Tariff: Financial incentive to reduce water consumption

Closed Water Loop



Source: PUB website, Singapore

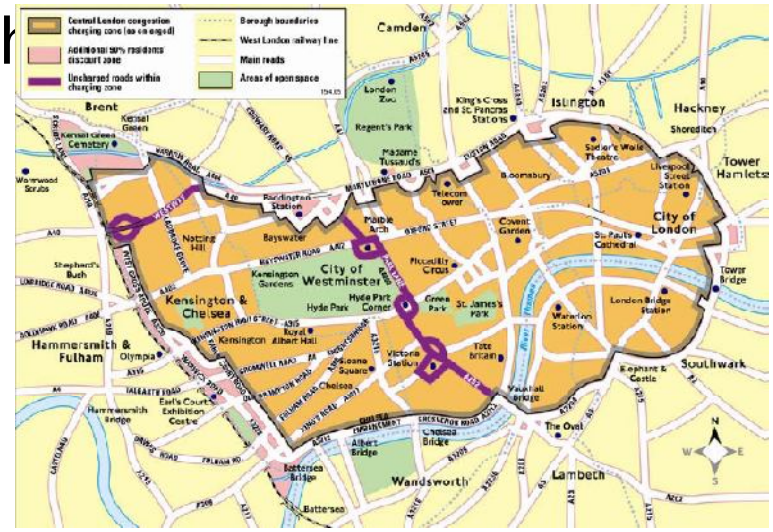
Demand Control and Water Consumption

Year	2000	2004
Population ('000)	4,028	4,167
GDP (US$ mil.)	92,720	109,157
National Water Consumption (mil. m^3)	454	440
Average Monthly Household Water Consumption (m^3)	20.5	19.3
Average Monthly Household Water Bill (Singapore$)	31.0	29.4

Eco Cities – Global Experiences (5)
London, Stockholm, Milan, Singapore

Congestion Pricing – Urban Transport Management

- Ease of Traffic Congestion with
  - London
  - Singapore
  - Stockholm
  - Milan



London:

- £137m being raised, in the financial year 2007/08, to invest back into improving public transport in London.
- Reduced traffic 21% lower than pre-charge levels (70,000 fewer cars/ day) within the charging zone.
- Increased usage of bus and cycle.

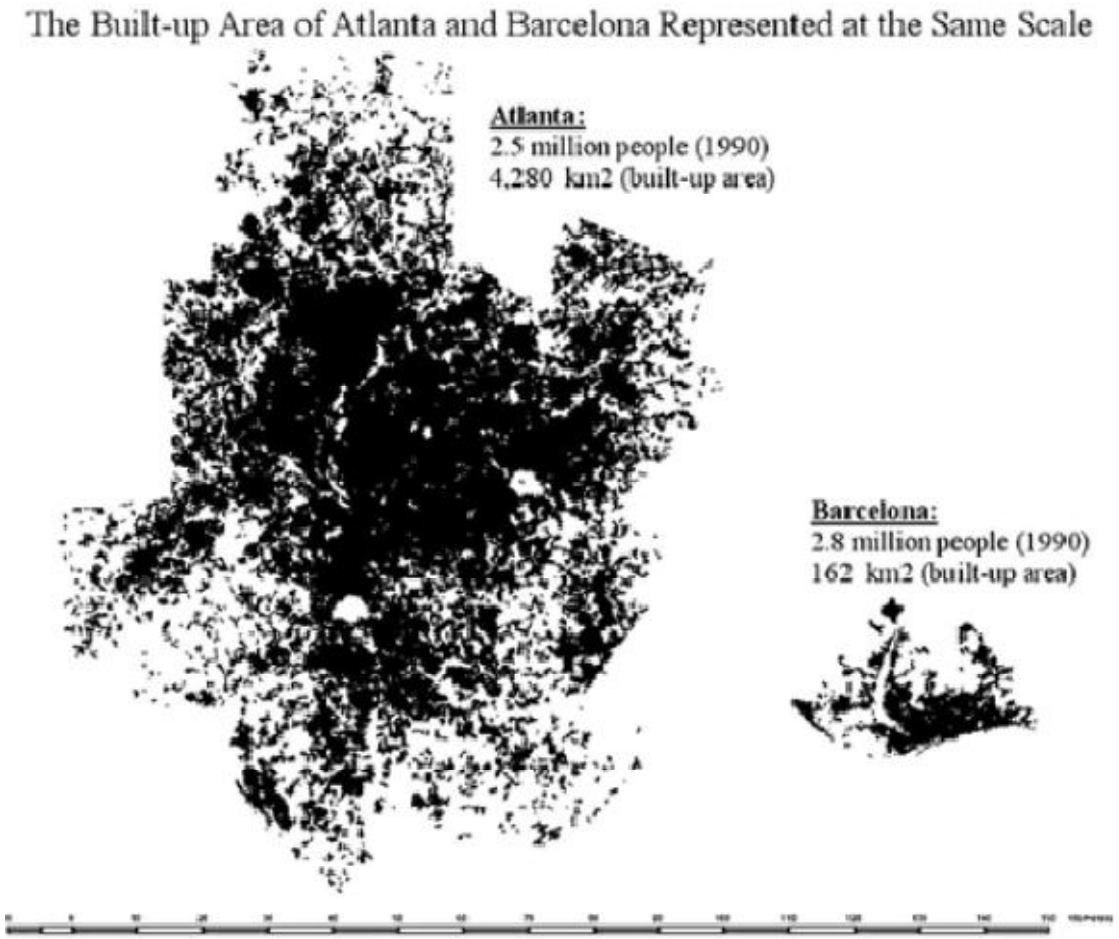
Source: Transport for London website

Public Transport v.s. Cars

Seattle/King County. Washington State USA

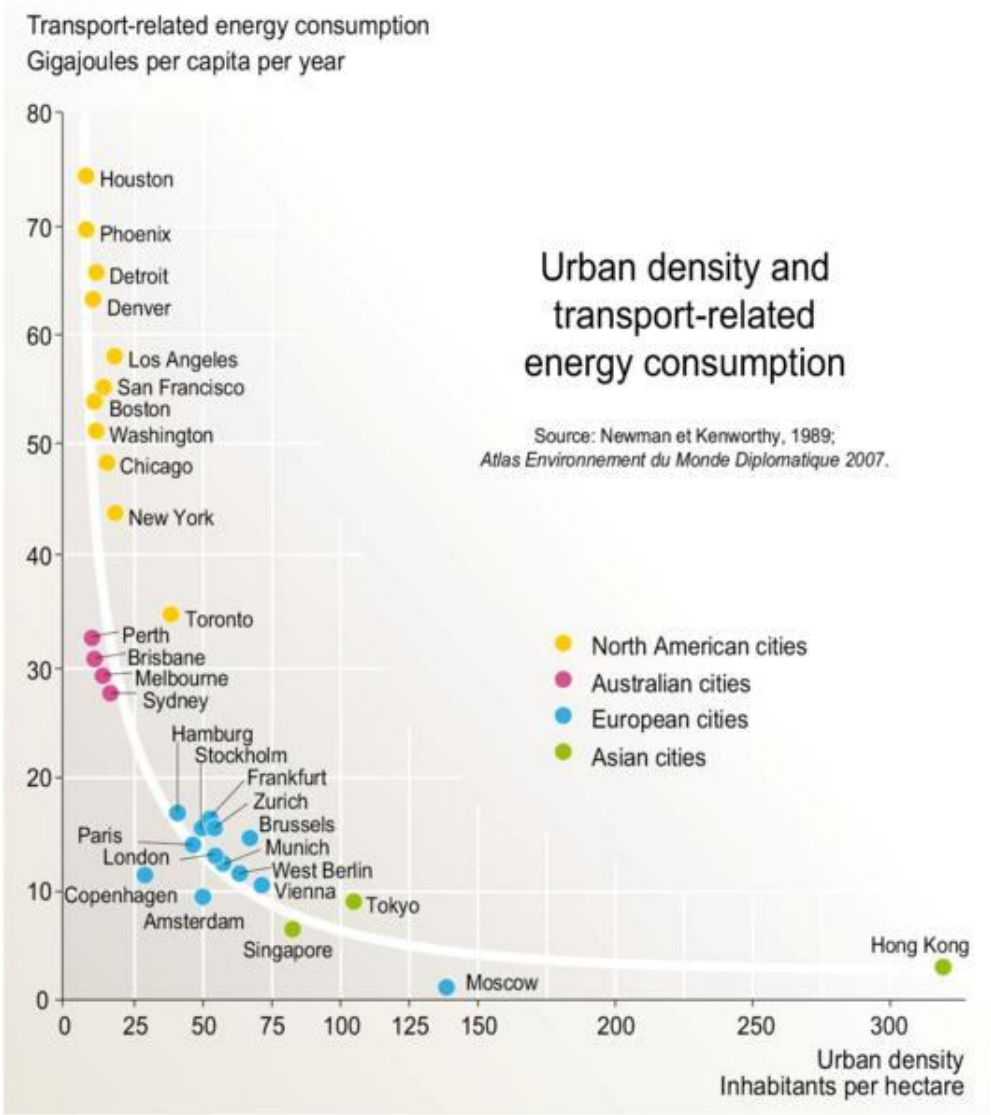
Spatial & Urban Form Determine Cities' Energy Efficiency

Decisions today are limited by decisions in the past



Source: Bertaud, A., and T. Pode, Jr., *Density in Atlanta: Implications for Traffic and Transit* (Los Angeles: Reason Founcation, 2007).

Spatial & Urban Form Determine Cities' Energy Efficiency

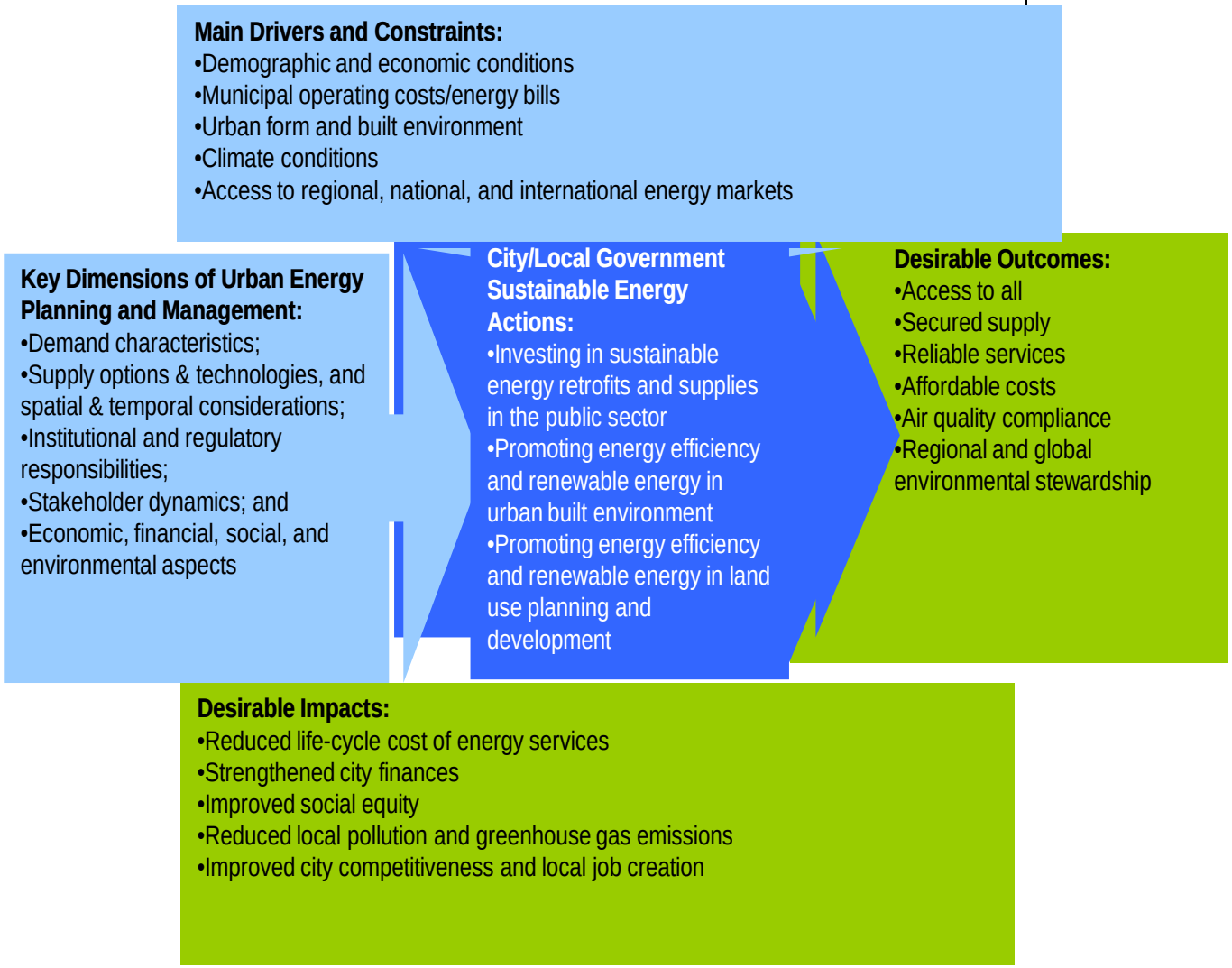


- Urban form and density significantly impact energy consumption for transportation.

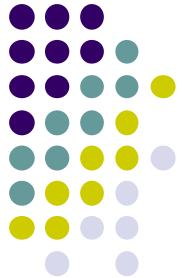
Source: Adopted from Kick the Habit: A UN Guide to Climate Neutrality

We also drew upon experience of World Bank Sector Operations

- Energy
- Water
- Waste
- Transport
- Spatial



Best practices were used to establish ‘Core Principles’



Core principles are strategies that are:

1. Universally applicable
2. Critical to success
3. Under-appreciated, uncommon

The Four Core Principles of Eco^2

1. A City-based Approach

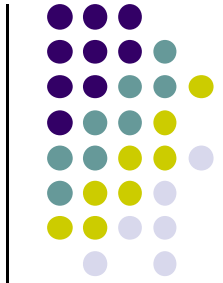
2. An Expanded Platform for Collaborative Design and Decision-making

3. A One-System Approach

4. A Framework for Investing in Sustainability and Resiliency

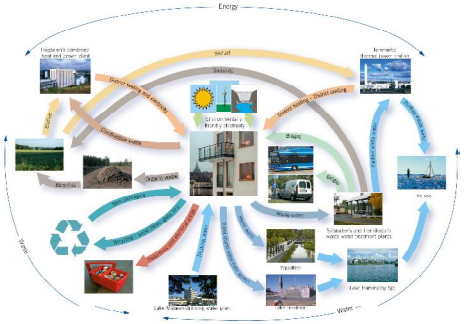
Eco2 Principle 1

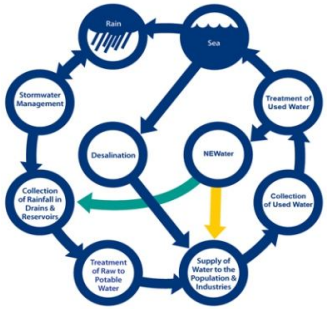
A City-based Approach

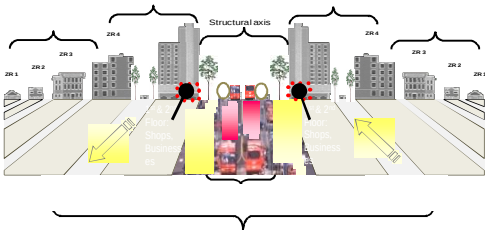


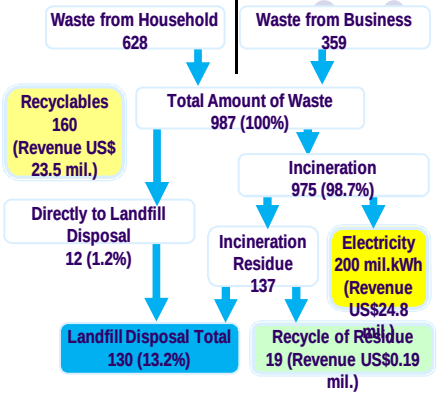
- Cities on the Frontline of Development (Economic, Environment and Social)
  - Population: more than half population in urban
  - GDP: 75% /Job Creation
  - Urban Poverty Spreading Slums
  - Energy Consumption: 67%,GHG Emission: 70% other Environmental Externality
- Decentralized Functional and Financial Responsibilities/accountable to tax payers
- City specific strategy and development plans, considering local ecological, geographical and socio-economic conditions
- Strong Leadership is the Key

How do we define a City-based Approach?





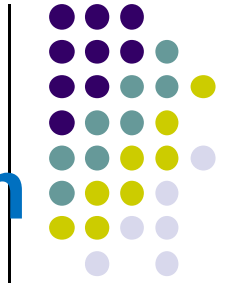




1. Leadership from local governments
2. An action-oriented network provides support
3. Special emphasis is given to the local ecological context
4. Methods and tools are adapted and used to enhance capacity of cities

Eco2 Principle 2

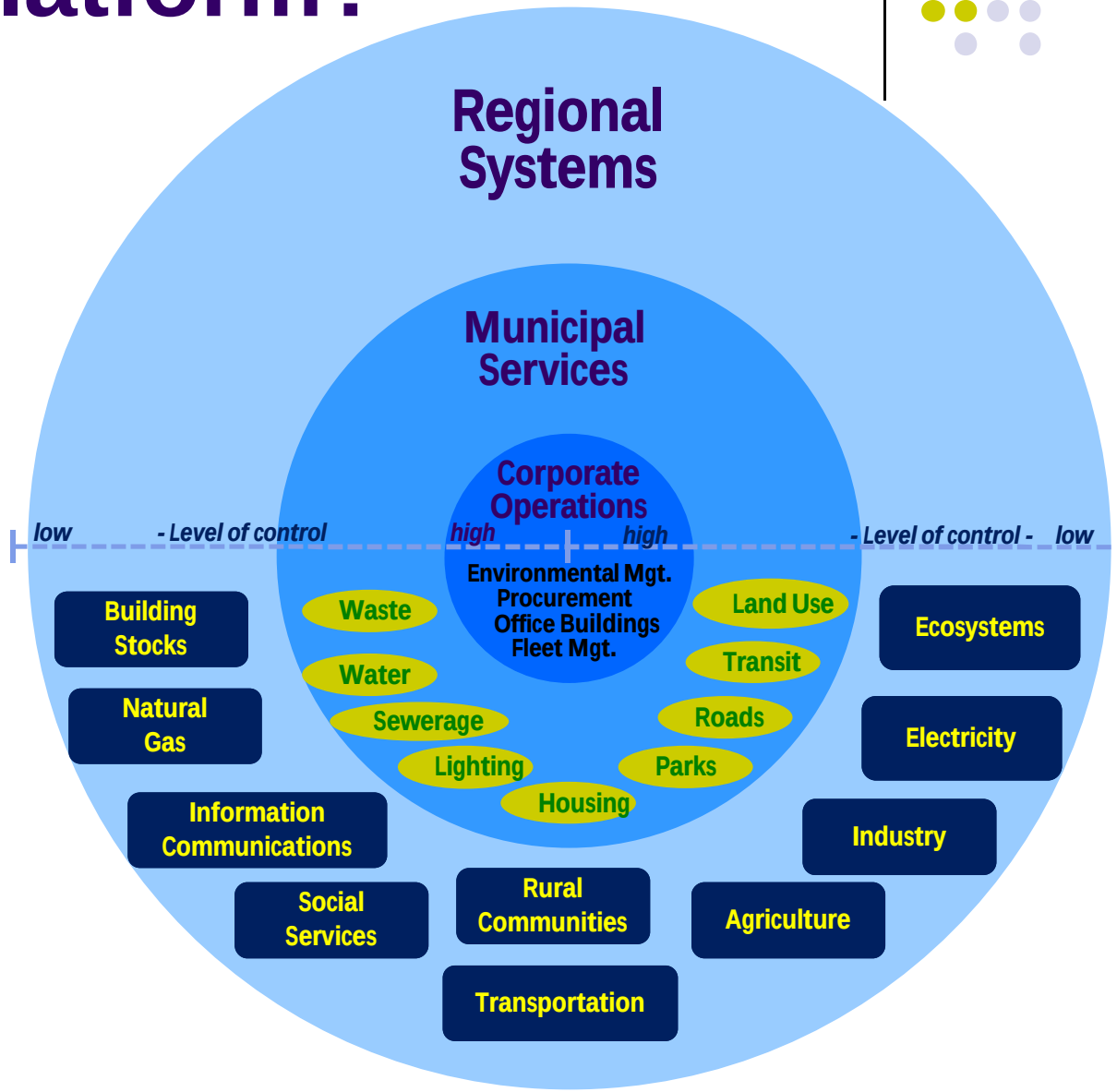
An Expanded Platform for Collaboration



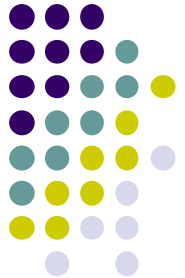
- Administrative boundaries and mandates are often inappropriate
- Involvement of stakeholders in long-term planning helps to overcome the short-termism of election cycles
- Collaboration provides a context for involving professionals in a more integrated approach to design and implementation

How do we define an Expanded Platform?

1. Formal collaboration on three tiers
2. A shared planning framework
3. Integrated Design Process

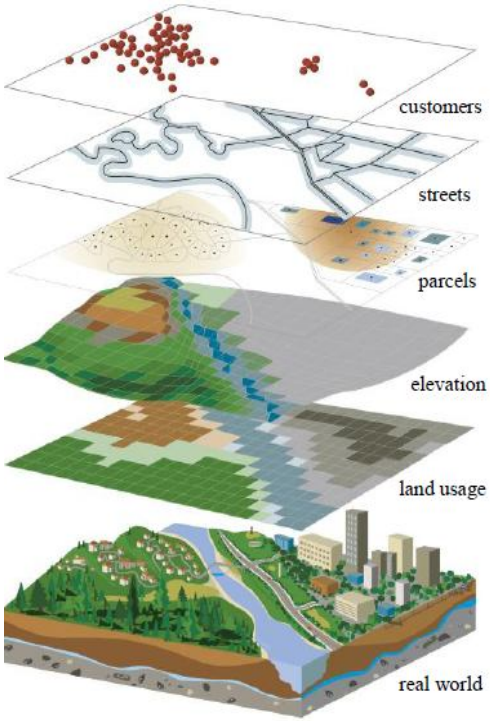


Eco2 Principle 3:
A One-System Approach

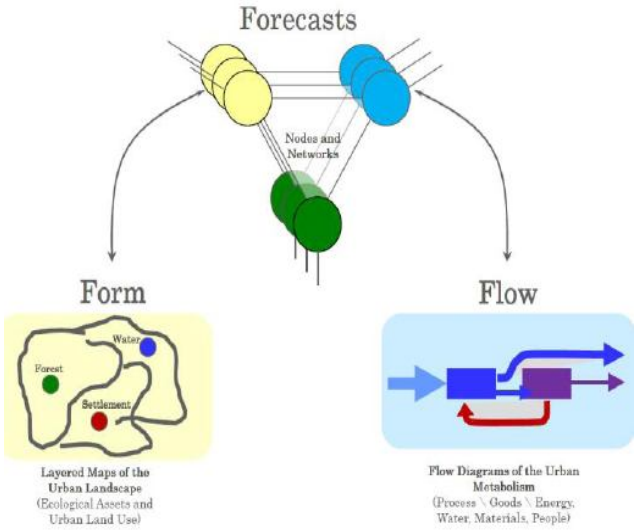


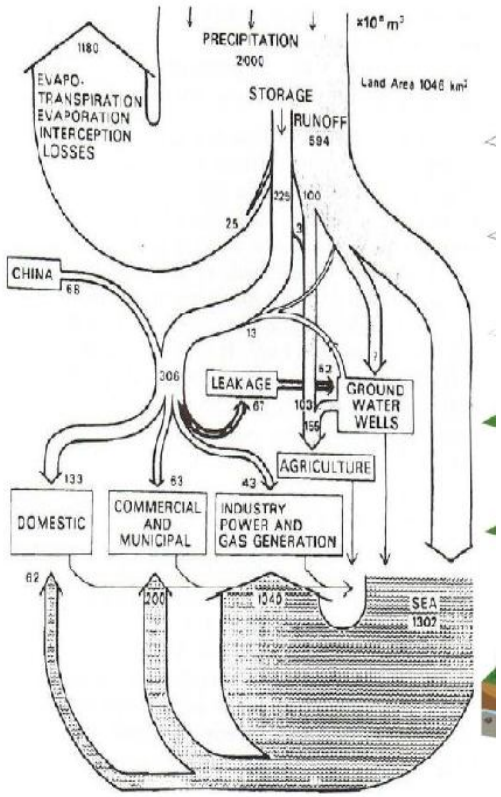
- Huge benefits in capturing positive synergies
- Many problems can be solved by taking the right path at the beginning
- More distributed systems can provide many economic and social benefits

How do we define a One-System Approach?



s FORMS: Layering of Information Maps

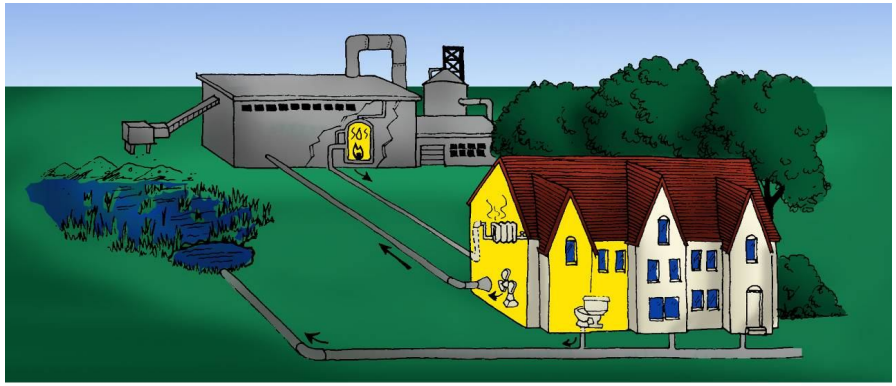




OWS: Materials Flow Analysis and Sankey Diagrams

How do we define a One-System Approach?

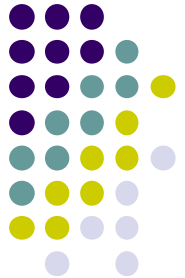
Cascading



Looping

Layering

How do we define an Investment Framework



- Lifecycle Cost Accounting
  - e.g. Building:

Capital Investment Cost + Lifetime Operating & Maintenance Cost

(10 - 20%) (80 – 90%)

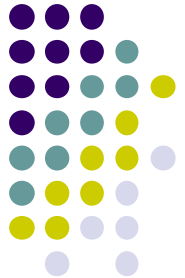
- Cost Benefit Analysis of Four Capital Assets
  - Manufactured Capital (too much focus on MC)
  - Natural Capital
  - Social capital
  - Human (Cultural) Capital
- Proactive Attention to Managing All Kind of Risk
  - e.g. Natural eg. Flood as Result of Sea Level Rising due to Climate Change, Global Financial Crisis, etc

Eco2 Principle 4

An Investment Framework that values sustainability and resiliency

- Full cost accounting leads to more effective use of public and private funds
- Life cycle costs represent a very large portion of product costs

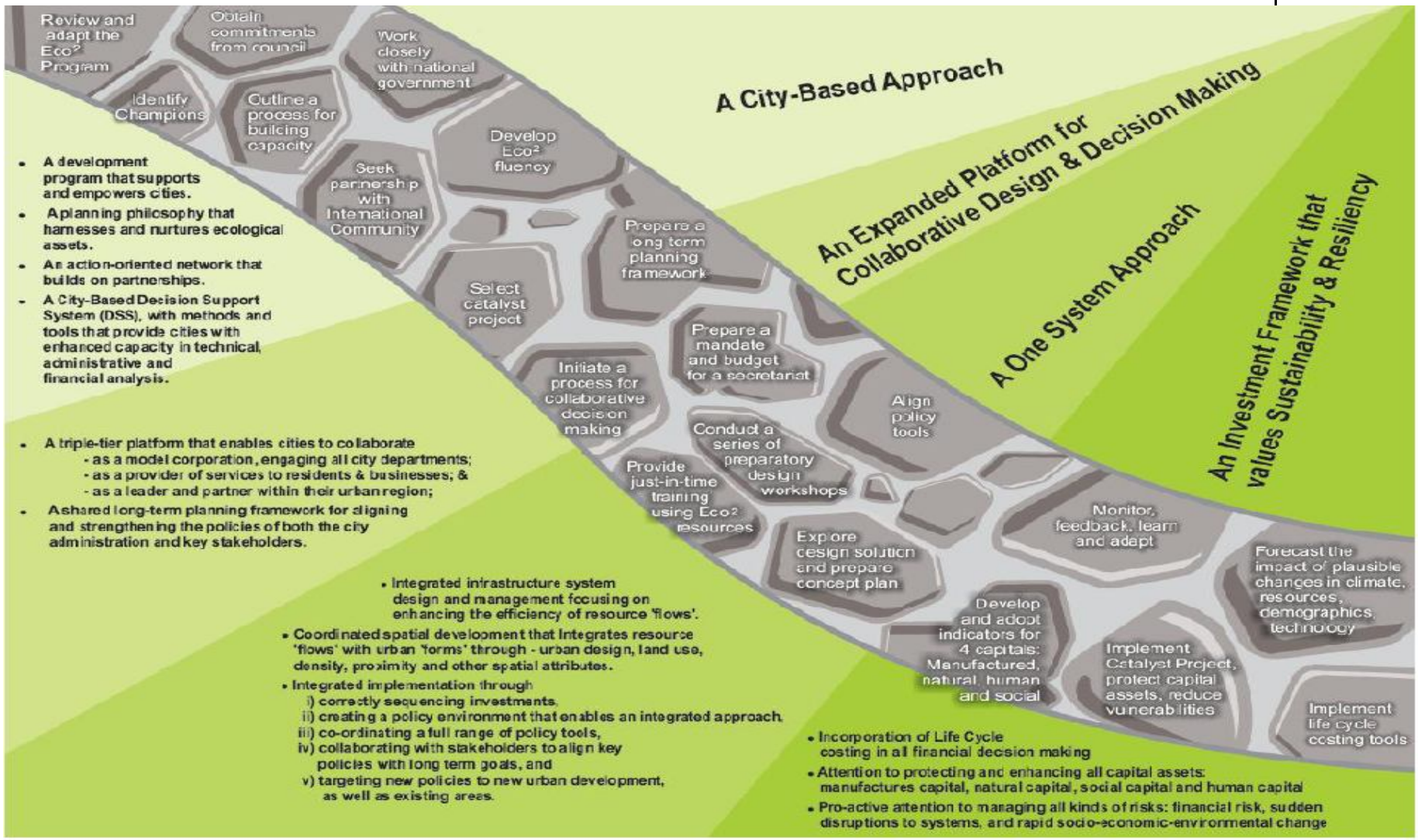
Principles are mutually reinforcing



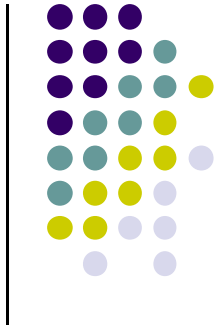
Example:

- Collaborative platform can greatly facilitate the design and implementation of integrated solutions and the one-system approach

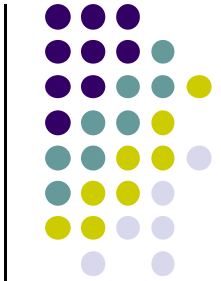
Principles are used to create a unique Eco2 Pathway:



Eco^2 Process & Timeline



Phase 1: A Book in 3 Parts



1

Analytical and Operating Framework

2

City-Based Decision Support System

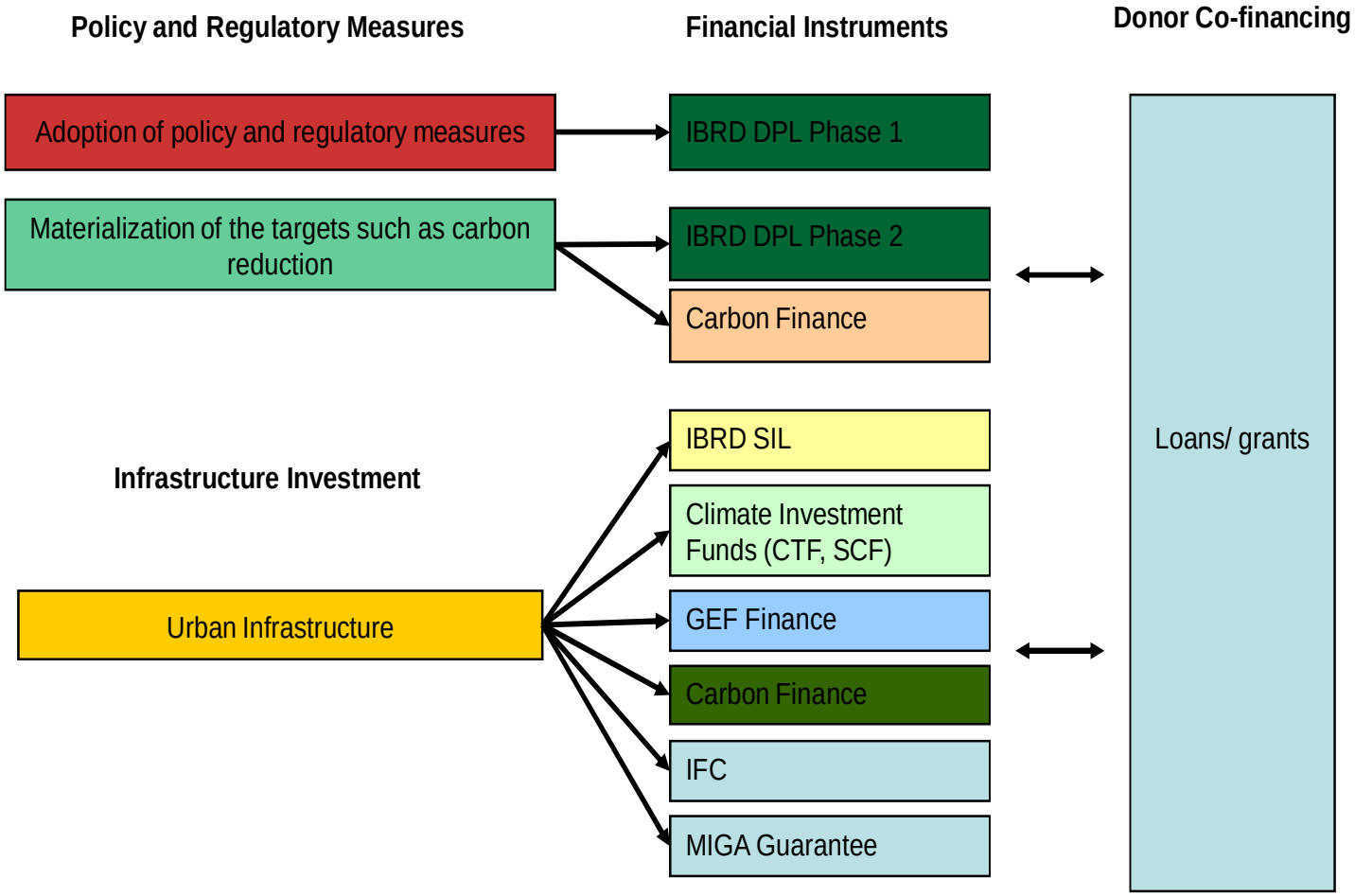
3

Case Studies from Mentor Cities & Sector Papers

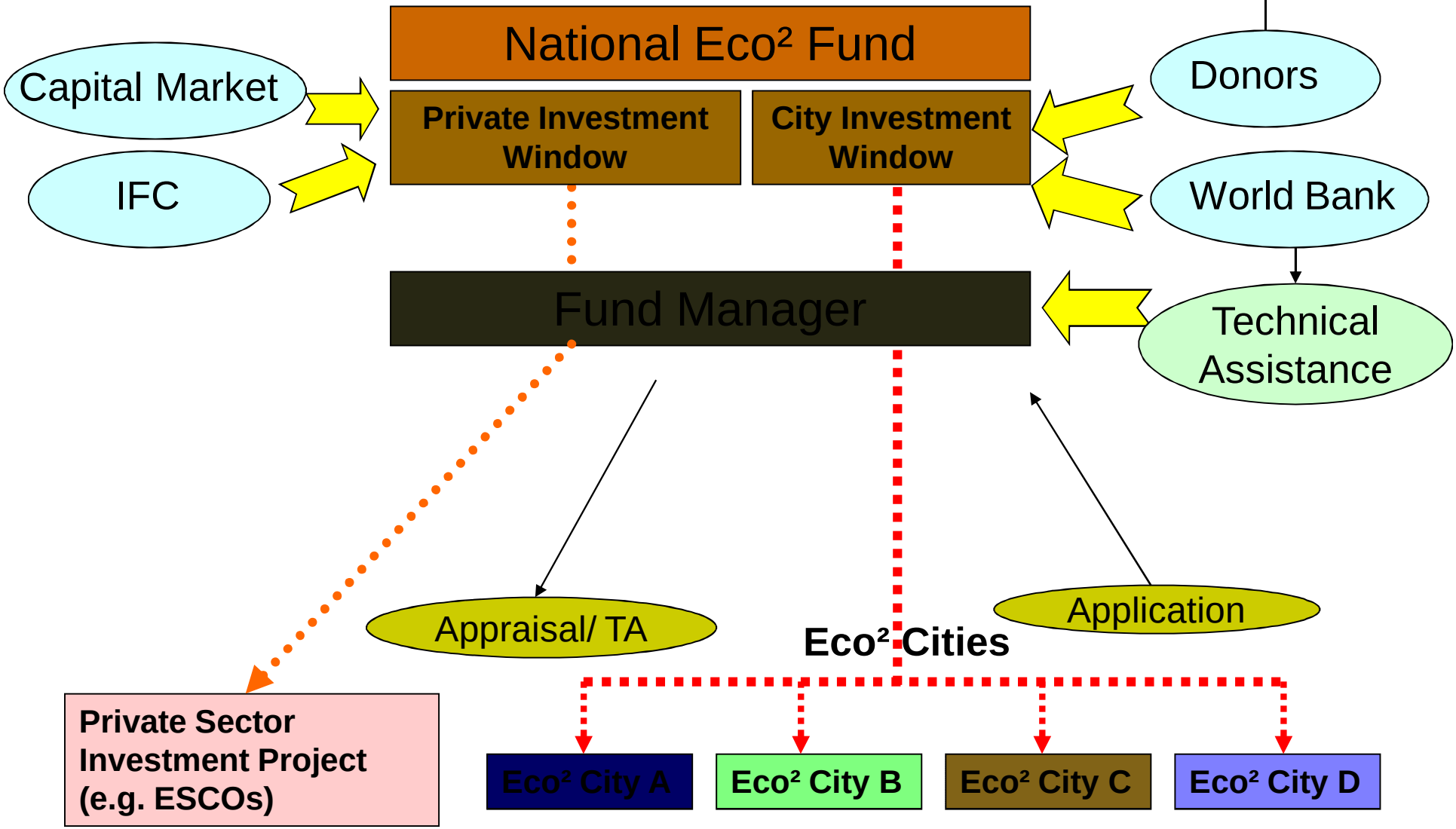
Comprehensive:	**Builds Capacity:**	**Bottom Up:**
- process; - analysis; - financing.	basic methods, - operationalized with scalable tools	derived from experience of best practice cities

Phase 2: Pilot Cities

- Capacity building
- Alignment of World Bank financing instruments:



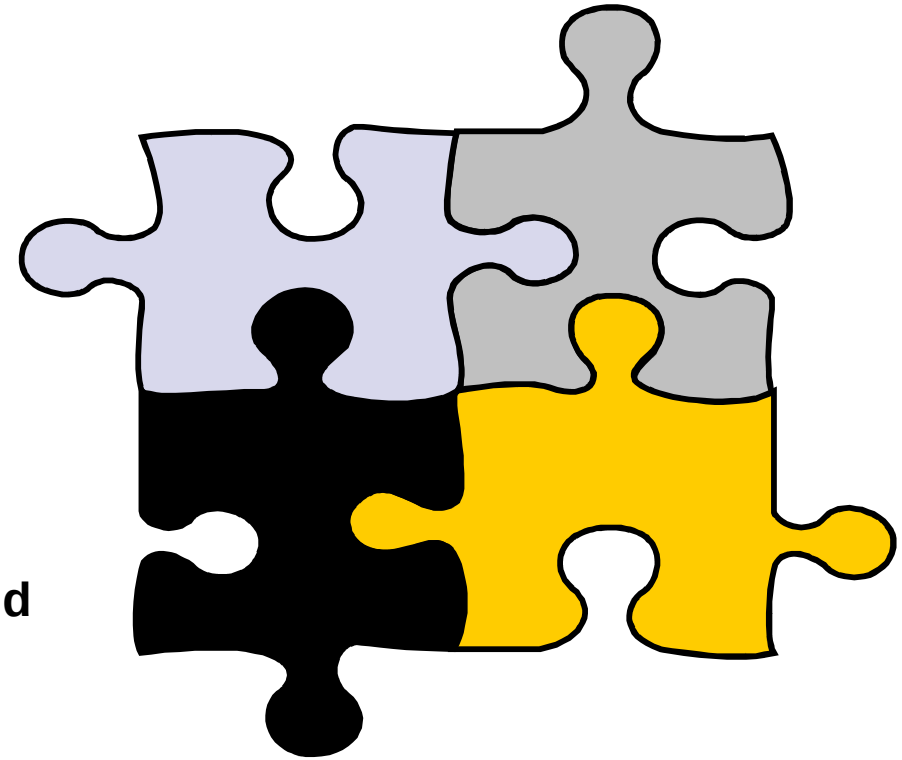
Possible Scaling-up of support in partnership with national governments



Eco^2 Partnership: Each of you have a place to participate in Eco^2 Cities Program

National and municipal governments

Research institutes and academics



Donors

Financial Institutions

Private sector Investors

Households