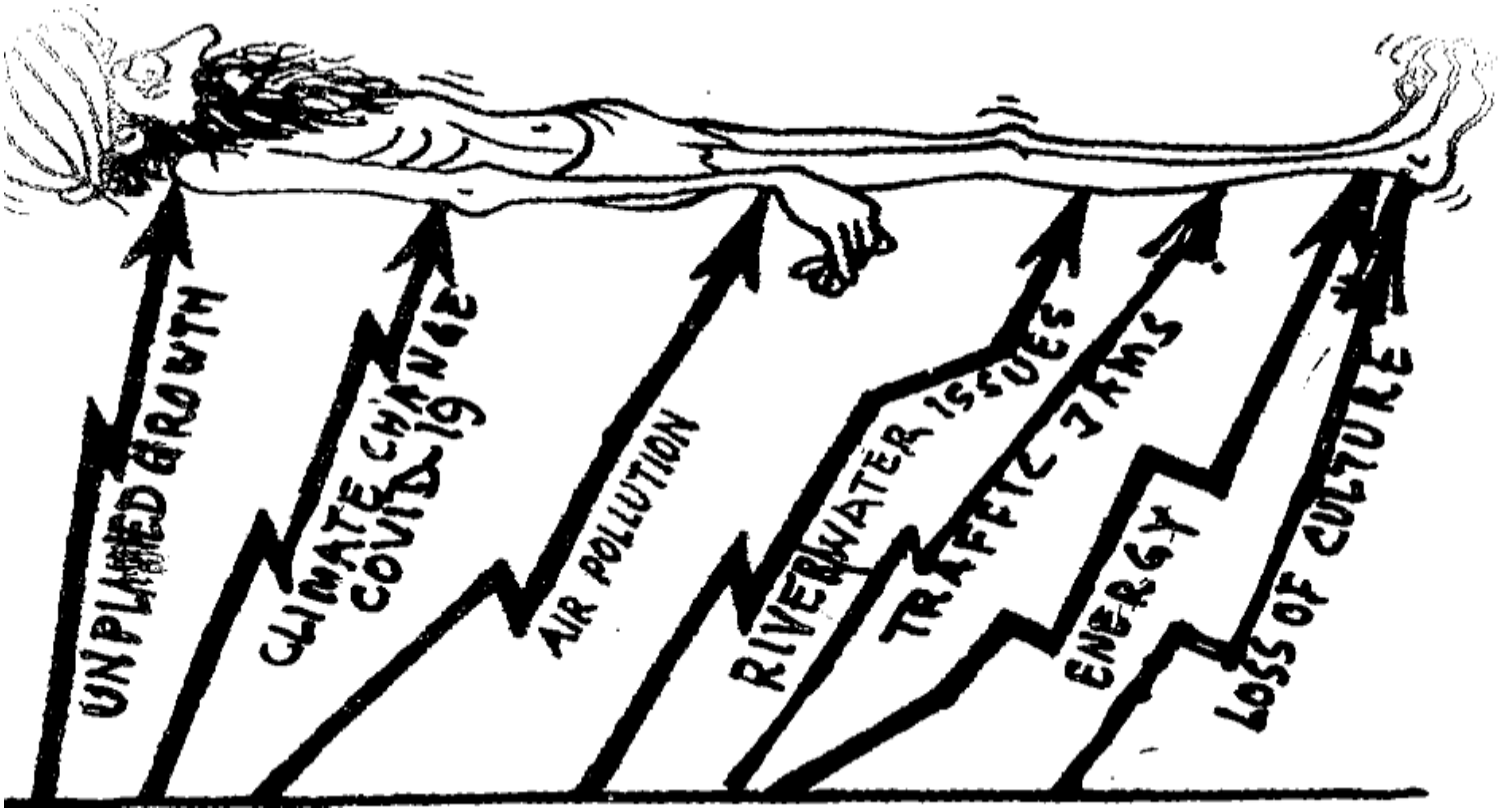
Climate Resilient and Low Carbon Urban India



A.K. Jain
Ex Commissioner (Planning) DDA
ak.jain6@gmail.com

World Environment Day, IIC, CCRI, New Delhi, 8th June 2022

World Environment Day- 2022 Theme: Only One Earth- Living Sustainably in Harmony with Nature

Climate Change Research Institute

Workshop on Awareness and Capacity Building in Hydrogen Production and Energy uses: Towards a Net-Zero strategy (ACBHPE-2022)

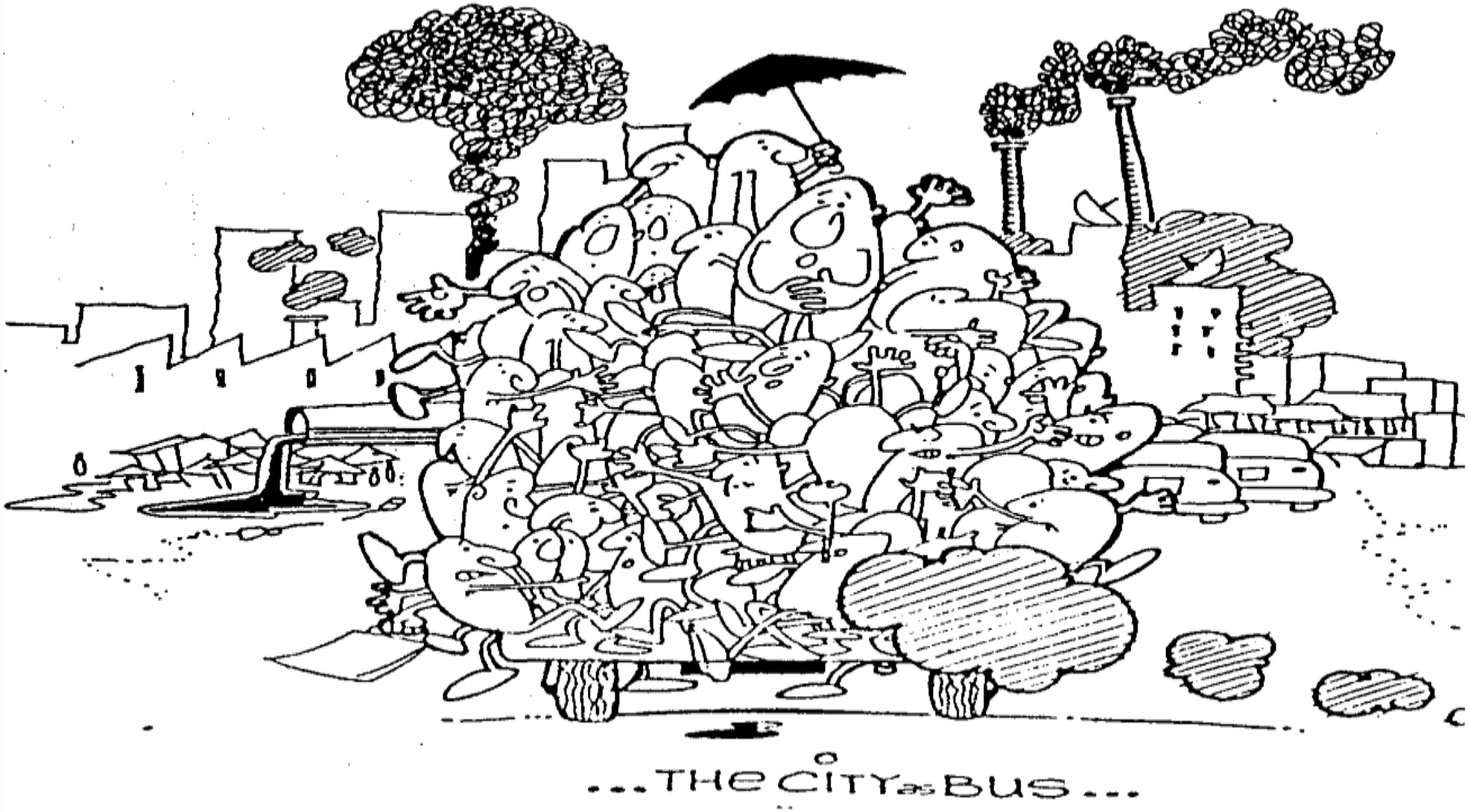
8th -10th June, 2022, New Delhi, India

India International Centre

Building in Garden, Green Building, Rainwater Harvesting, Solar Energy, Wastewater Recycling, Thermal Insulation, Energy Saving, SCADA

Population Growth, Poverty, Urbanisation, livelihoods

(Urban Population from 377m in 2011 to 600m in 2031)



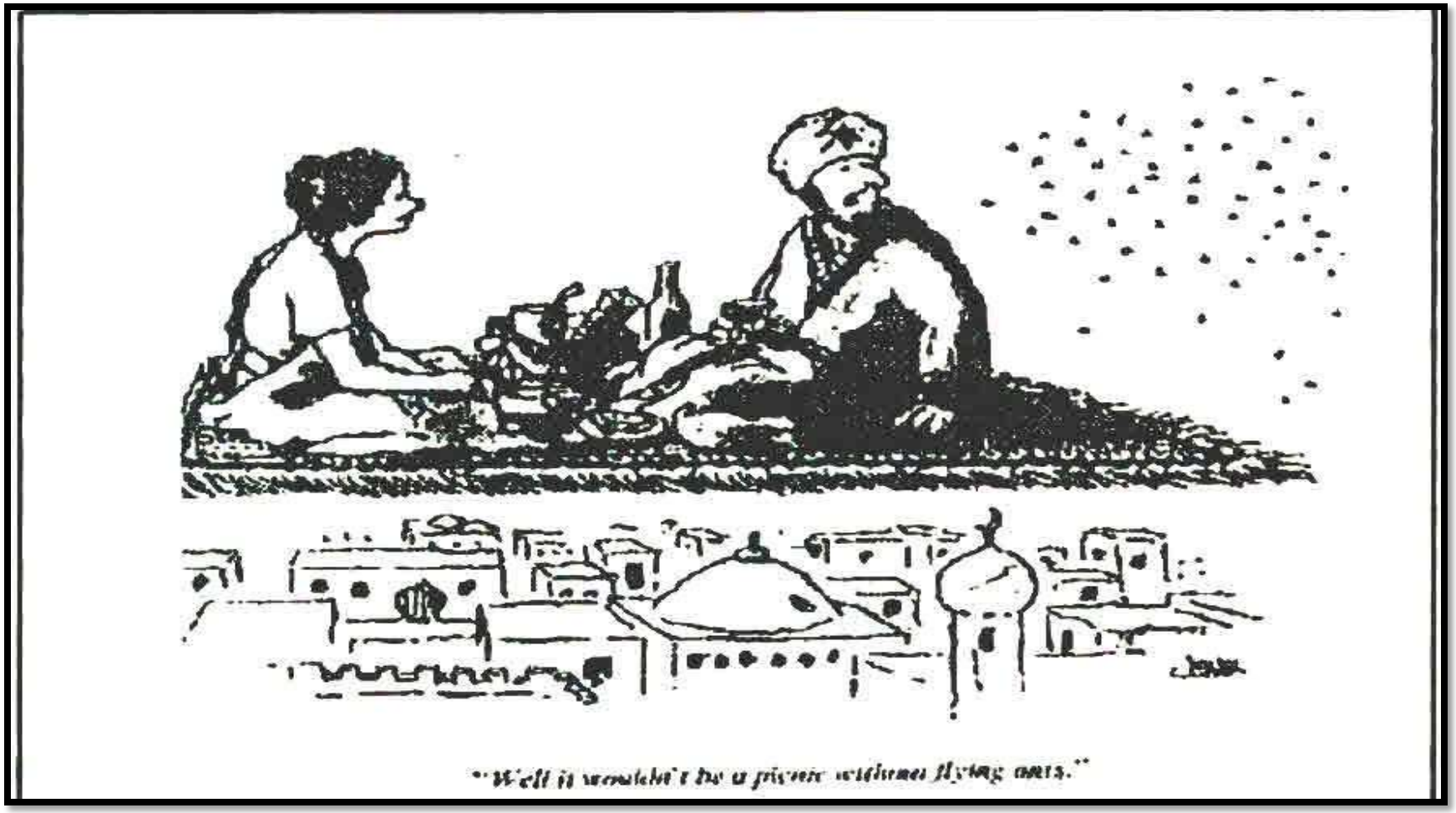
Urban Environment

.

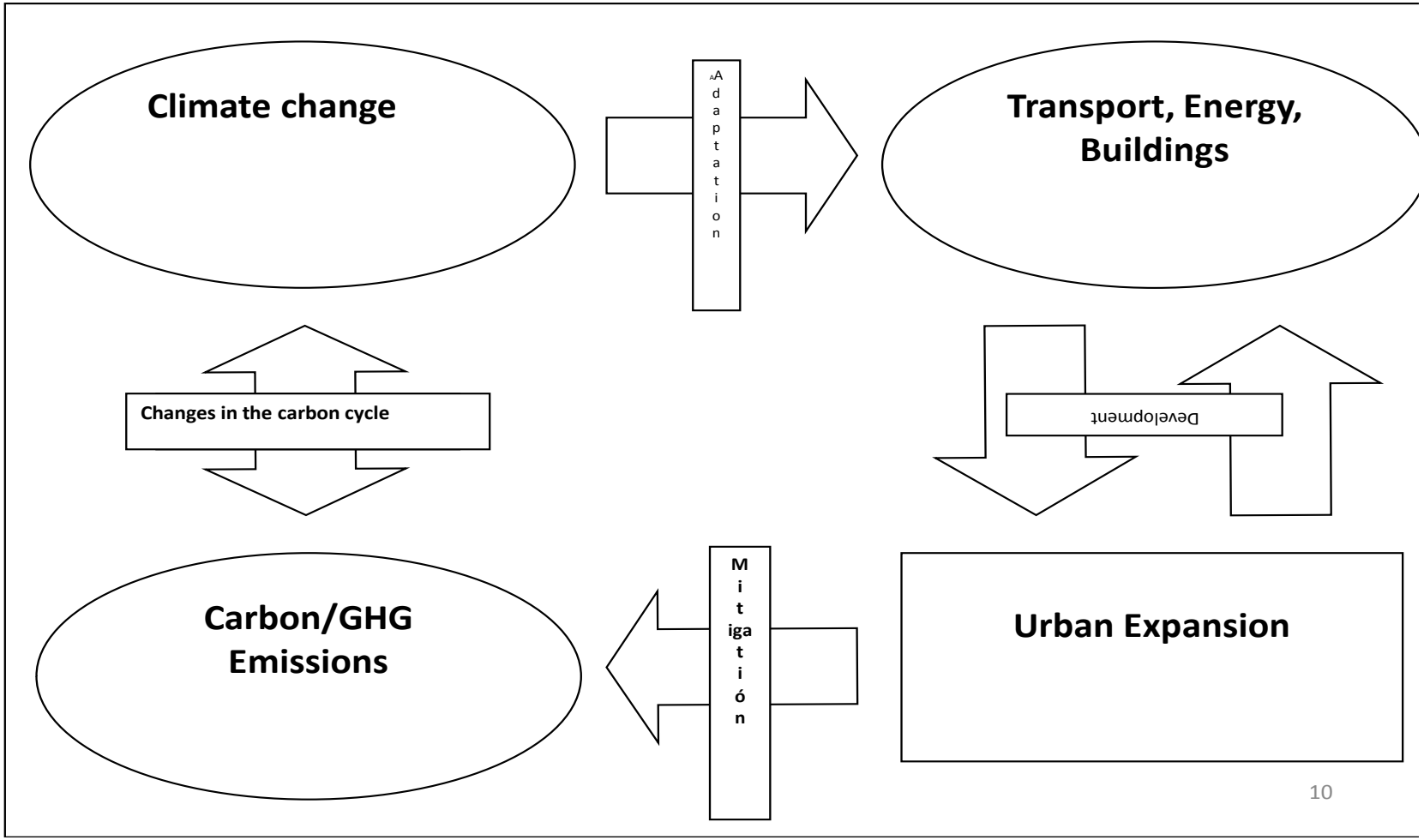
- Climate Change, Disasters and Pandemics
- Air and Water Pollution due to Transport, Fossil Fuels, Poor Infrastructure Services , etc.
- Depletion of Natural Resources
- Water Shortage
- Energy from Coal/Fossil Fuels
- Urban Sprawl
- Loss of Cultural Resources

The Dirty Planet

No Honeymoon Without Flies, Mosquitoes and Vermins

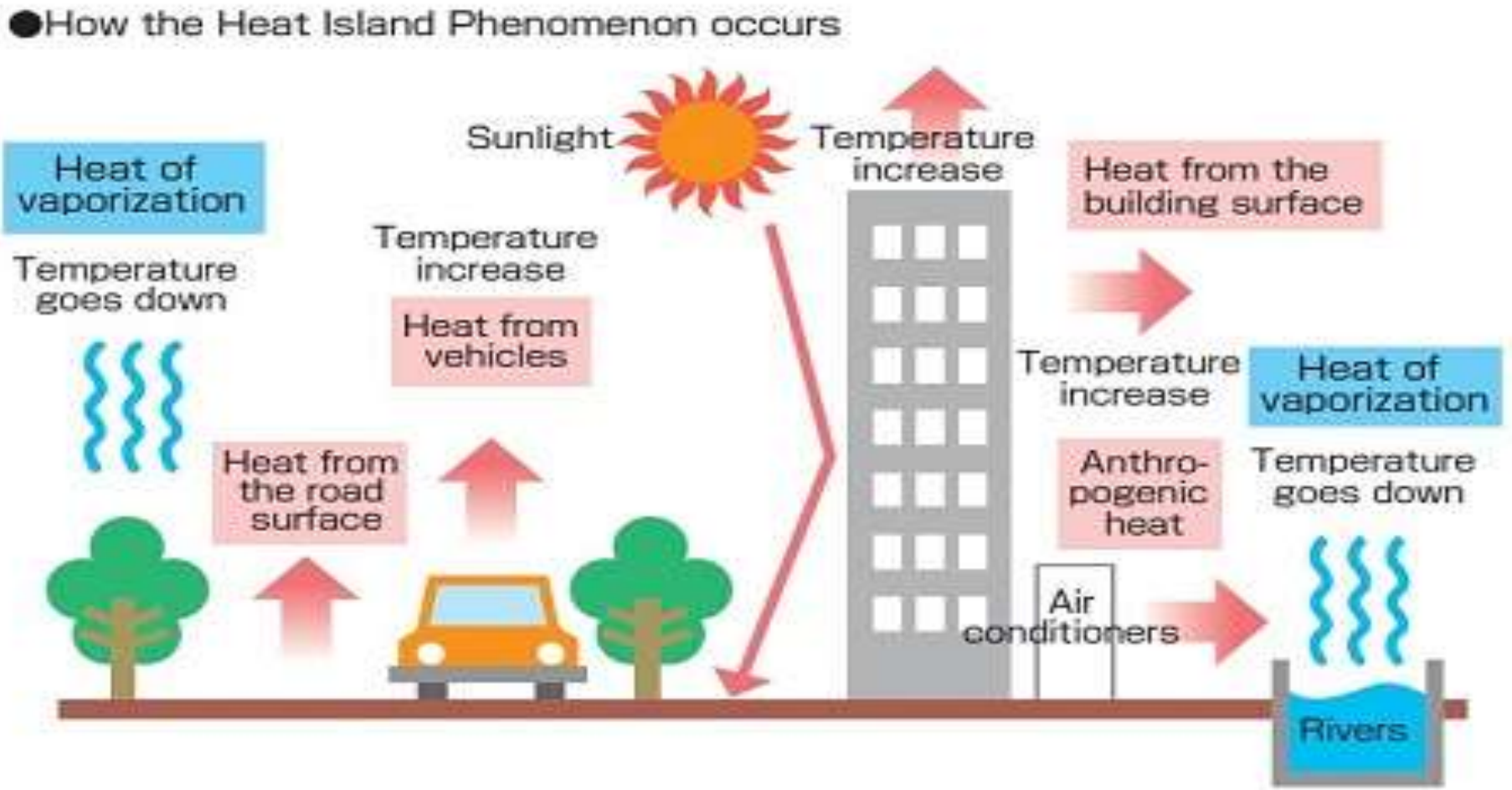


The Vicious Cycle of Climate Change

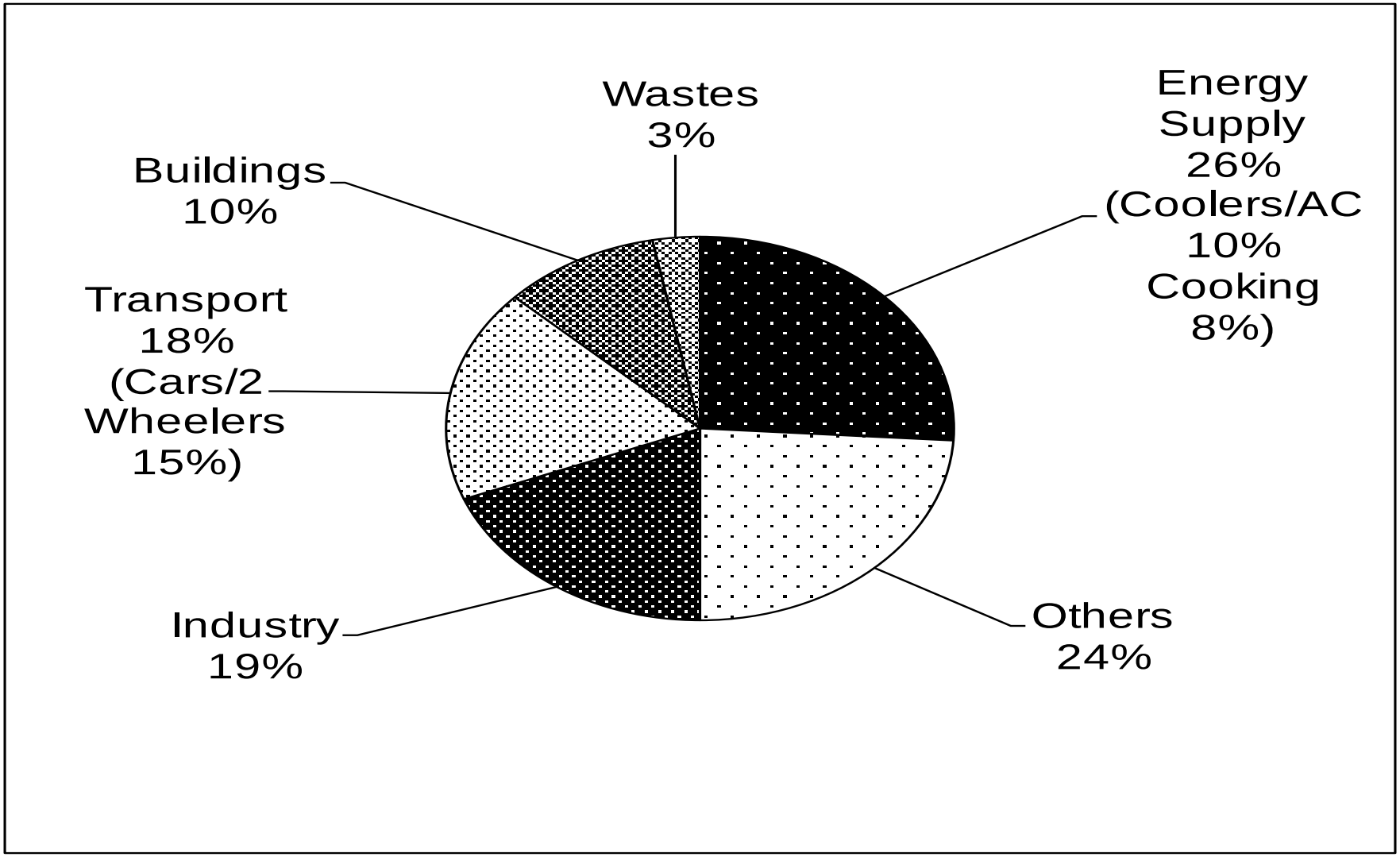


Global Temperature to Exceed by 2.3 to 4.8 degree due to projected doubling of Carbon Emissions - 6th IPCC Report

Rising Urban Heat



Rising GHG/ Carbon Emissions



Global Warming- 2.3 to 4.8 degree due to projected doubling of Carbon Emissionn

Transport Contributes 18% of Carbon Emissions & 70% of SPM

Fossil Fuels and Emissions

Reduce Carbon Emission by 50%, Achieve Net Zero Emission by 2070

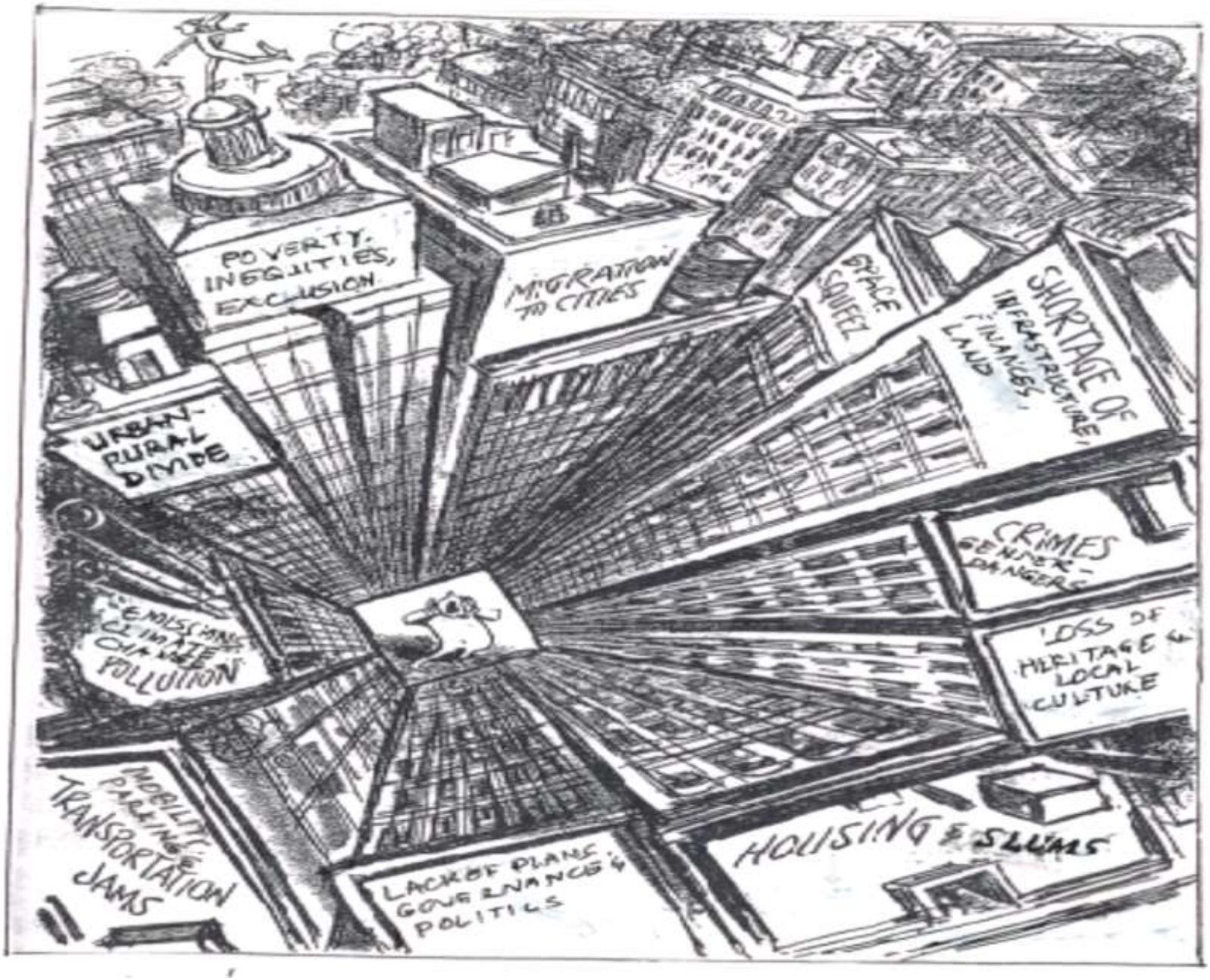
Clean Technology, Carbon Negative Transport and Construction

Electric Transport, Ethanol Blended Fuel, Solar Energy

Deficient Infrastructure Services- Energy, Water, Drainage, Sanitation, Waste Management and Transport

CHOCK-A-BLOCK: Vikas Marg (above and below) was one of the roads hit hard by the farmers' rally

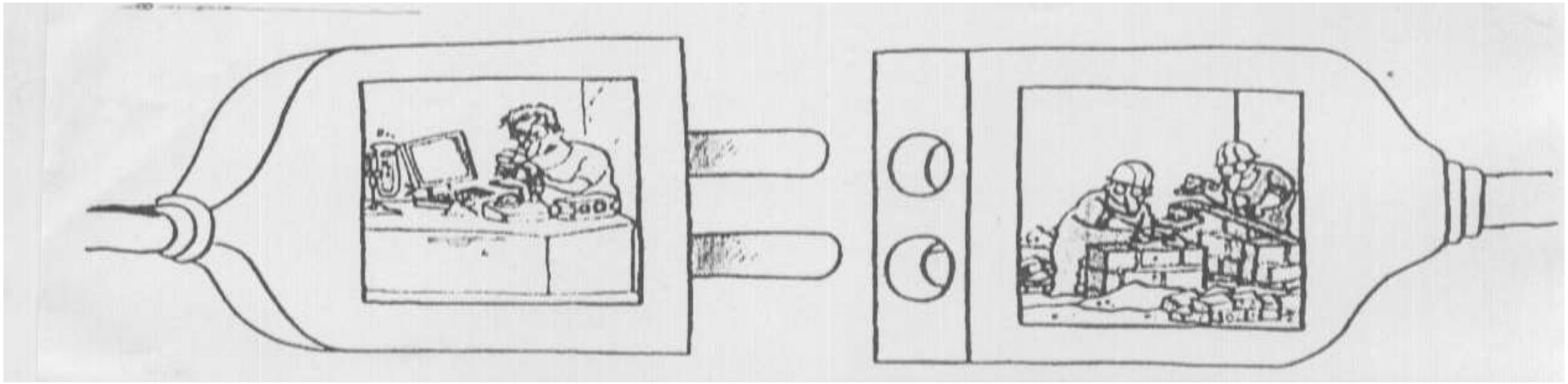
Traffic Increasing Three to Four Times Population Growth



Urban Challenges

At last I got a permanent job. I have to fill up all the potholes in this stretch of road!

The Gaps

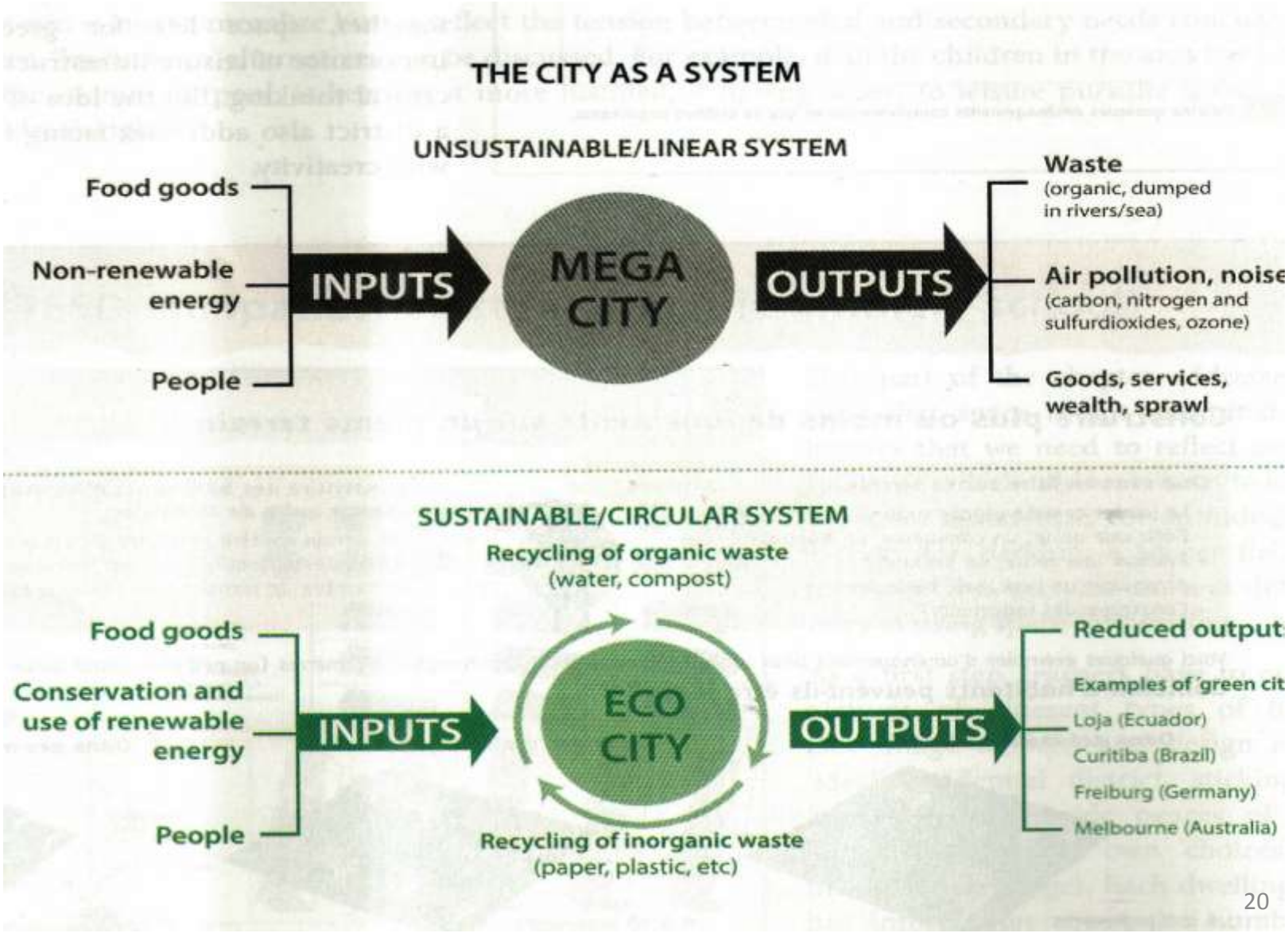


Urban	⟷	Rural
Development	⟷	Sustainability
Delays	⟷	Speed and Technology
Gender	⟷	Equity
Planning	⟷	Implementation

Dismantling The Silos

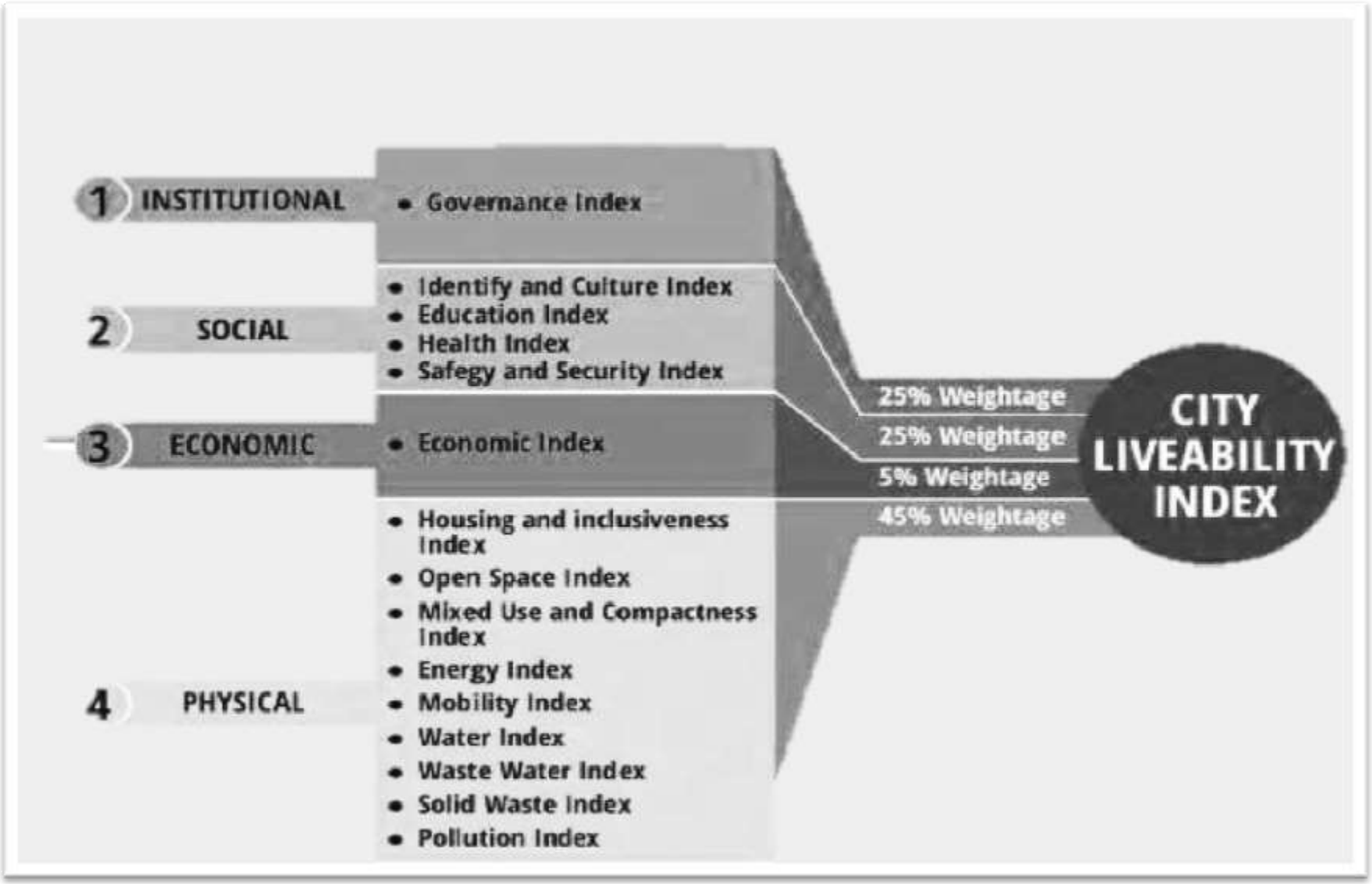
Interdependent, Interrelated and interconnected

The City as a Circular Metabolism



Parameters for a Sustainable Liveable City

Physical (45%), Economic (5%), Social (25%) and Institutional (25%)



Leave No One Behind

Localisation, Access, Leave No place Behind

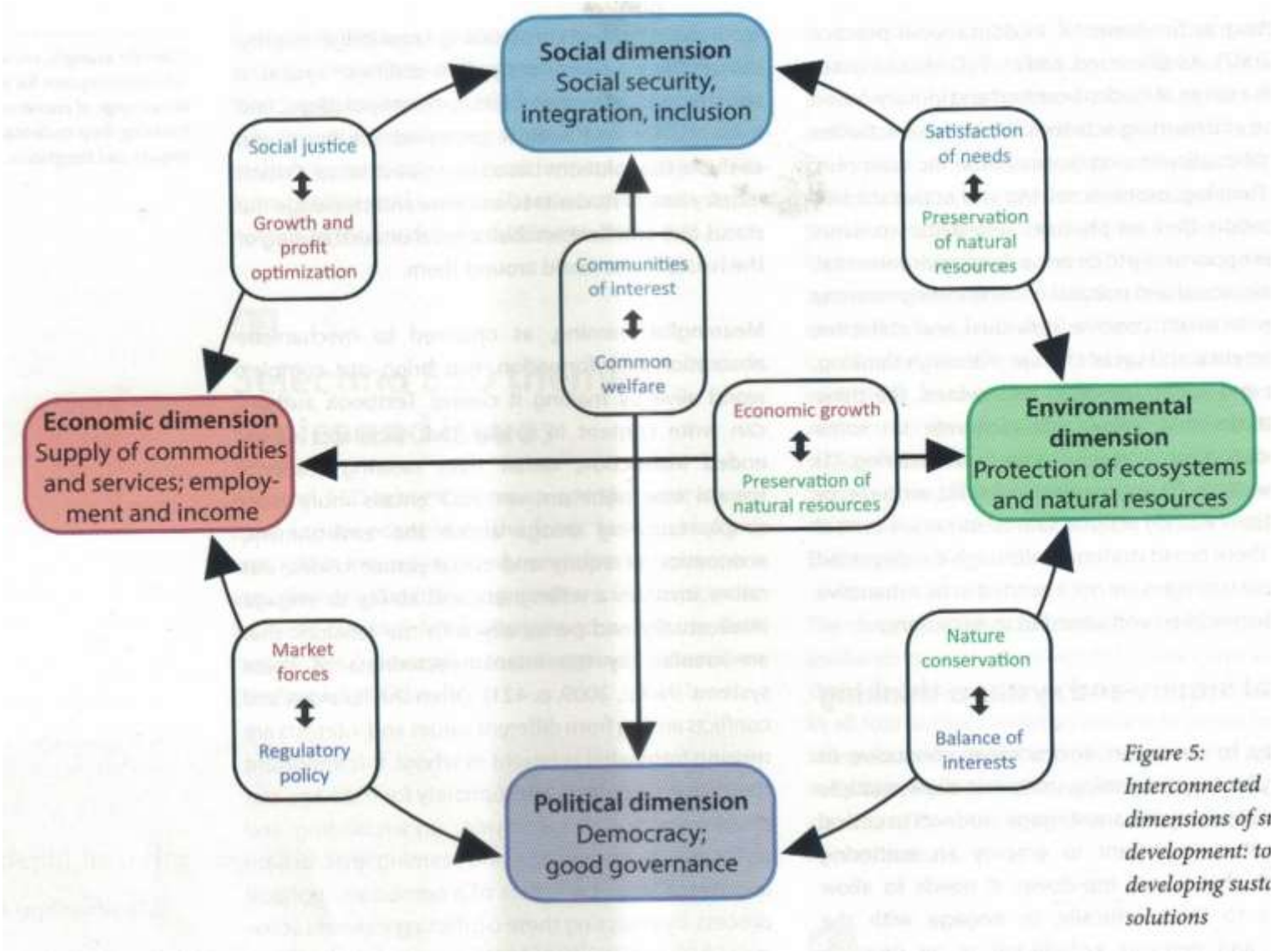
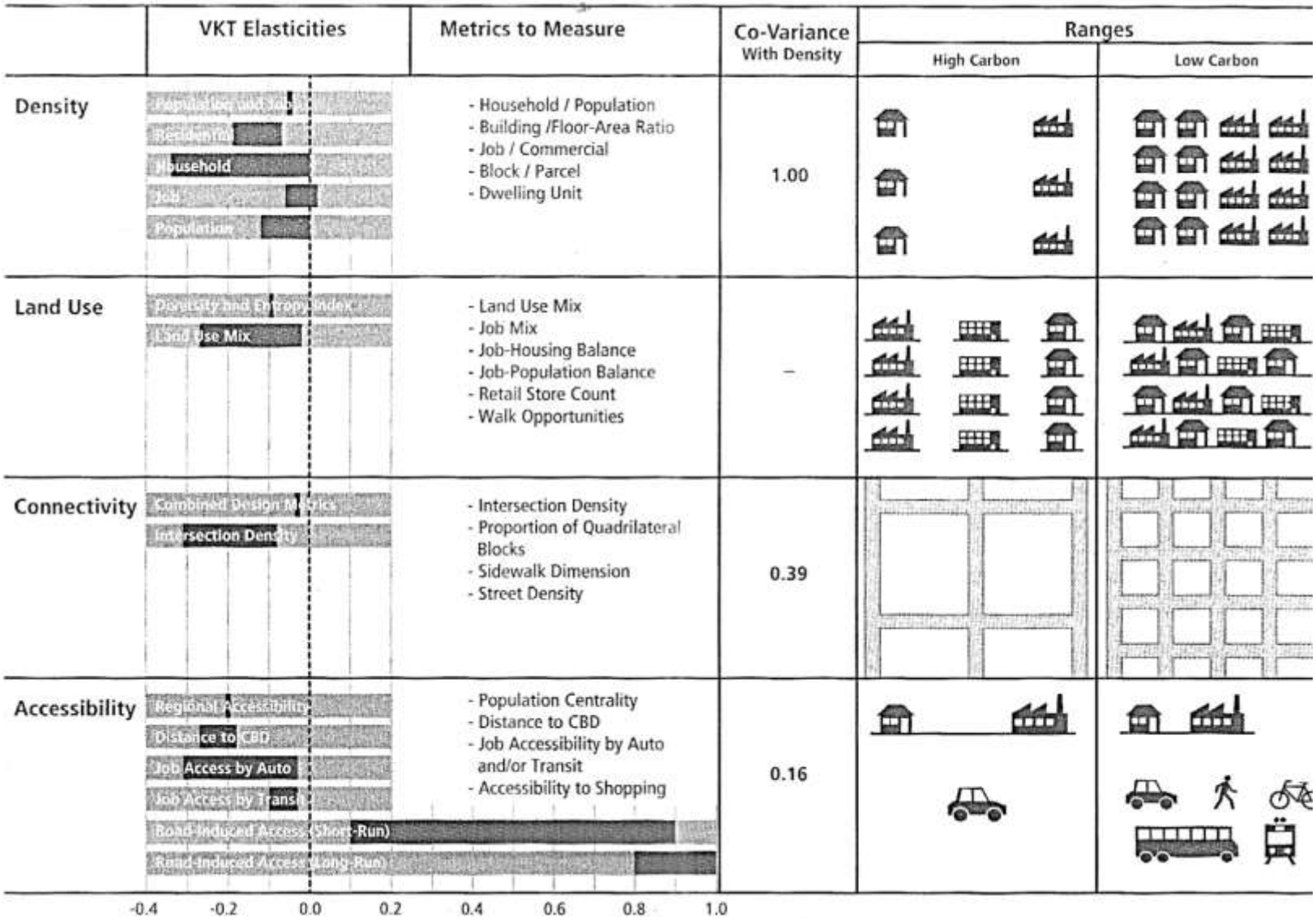
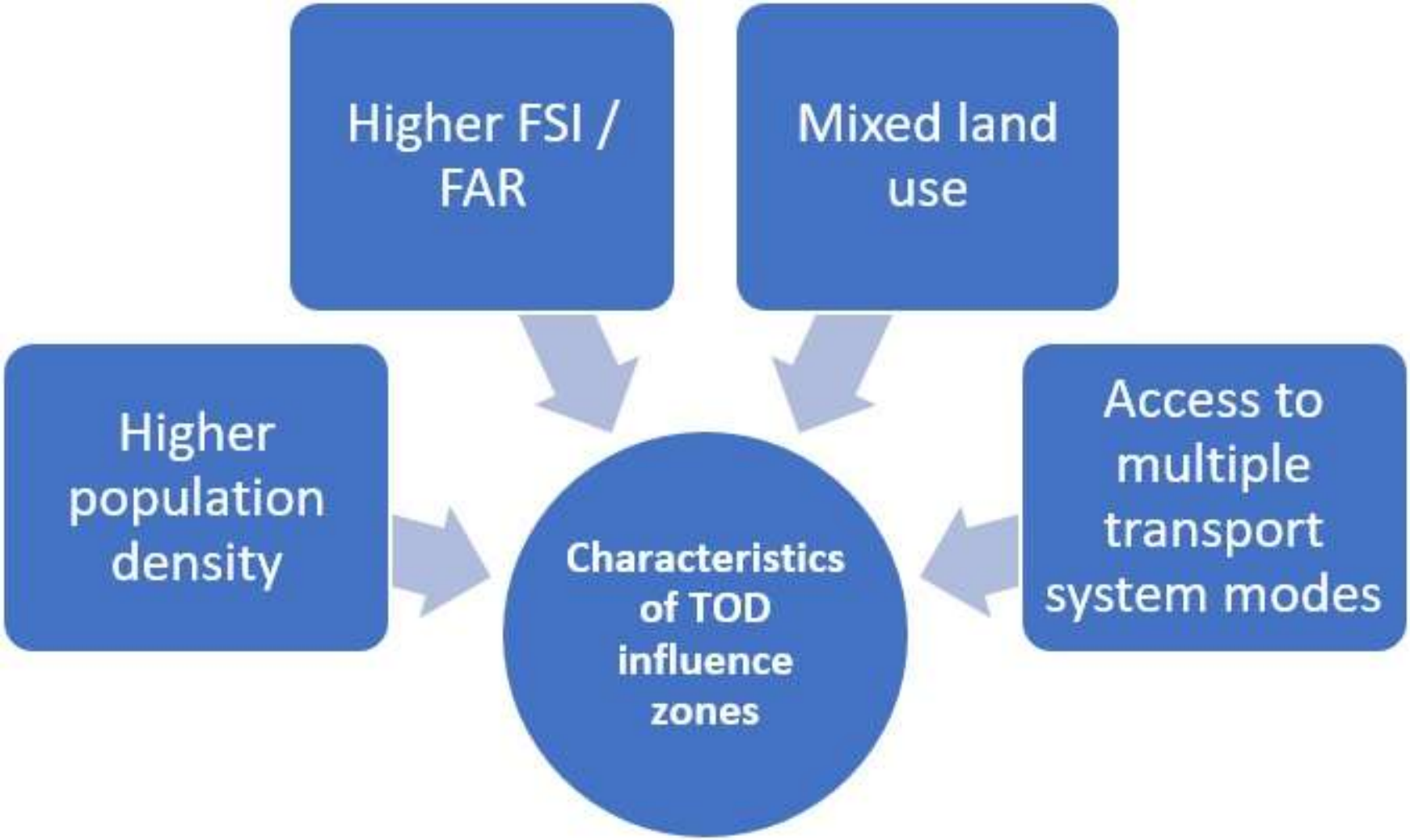


Figure 5: Interconnected dimensions of st development: to developing susta solutions

Compact Urban Form to Save Land, Forests, Greens and to Reduce Emissions



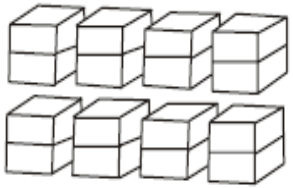
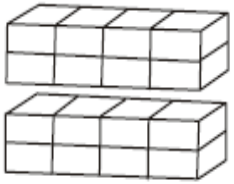
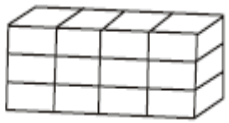
Source : IPCC, 2014



Optimum Use of Land, Mixed Land Use and Conservation of Transport

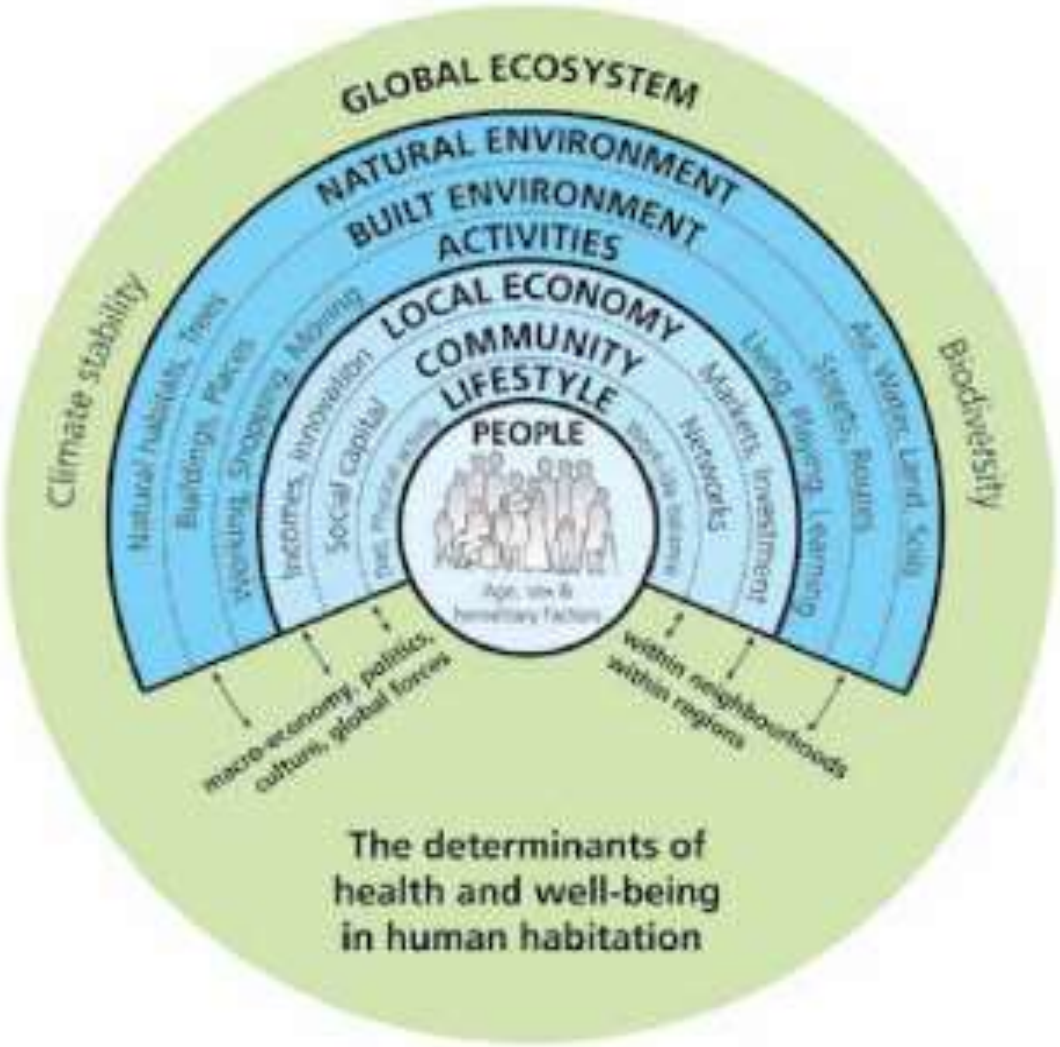
Comparison of surface areas, energy consumed and construction costs for eight housing units in different configurations

Minimise Site Footprints, Envelop Area, Energy and Costs by Composite Development

Building form	 *8 separate houses (ground floor plus basement)*	 *2 terraces of 4 house} (ground floor plus basement)*	 *block of 8 flats (2 storeys plus basement)*
Site area	100 %	70 %	34%
Envelope surface area	100%	74 %	35%
Heating energy	100 %	89 %	68 %
Construction costs	100%	87%	58 %

Covid 19 Pandemic and Public Health

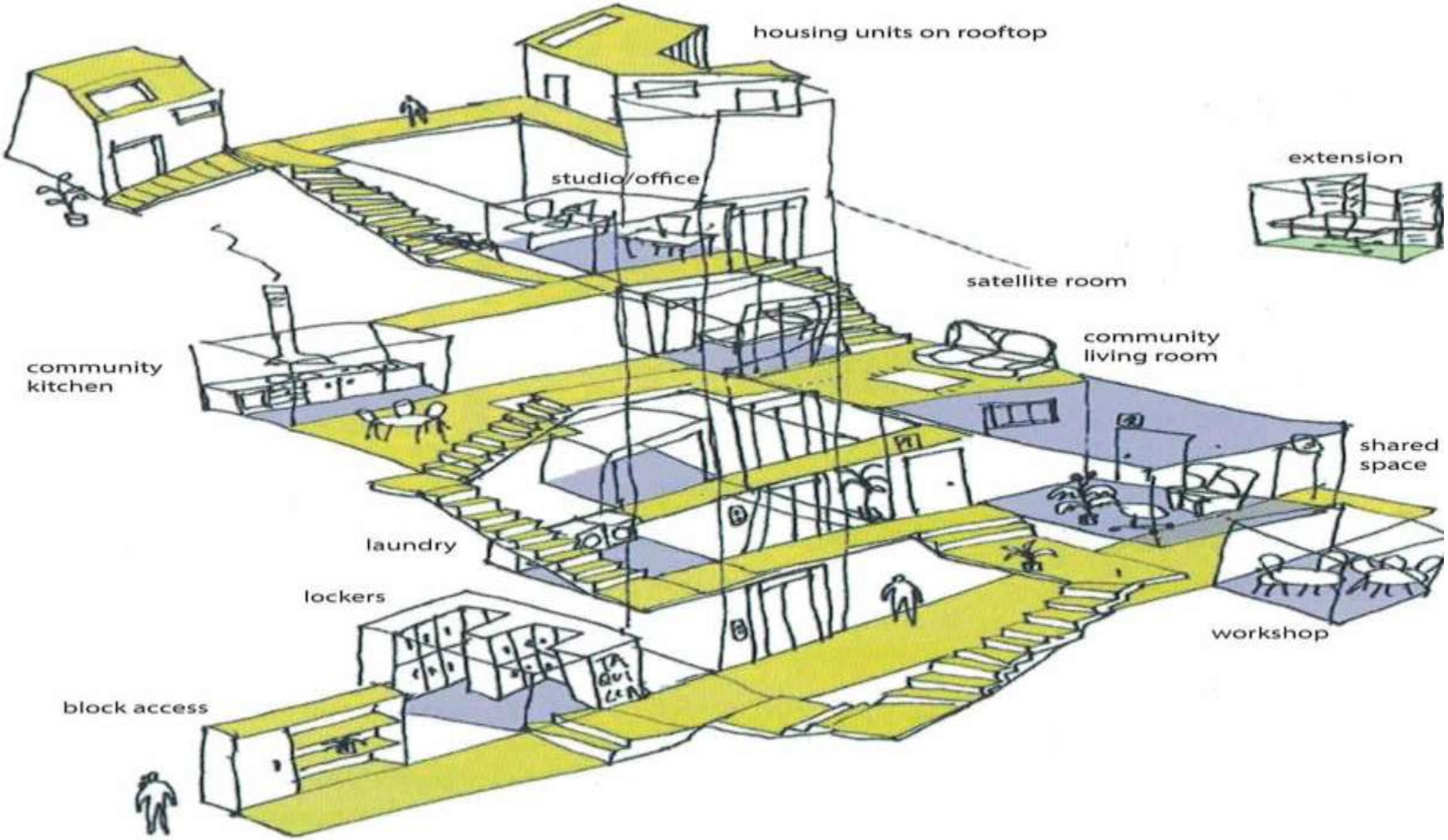
Better Health Services, Infrastructure, Clean and Green Spaces and Sanitisation, Low Energy Passive Buildings and Services



Mixed land Use for Work-Life Integration

Review Land Use Classification, Zoning and DCR based on Environment, Health, Emission, Energy and Water

Zero Polluting Public Transit/NMT, Work From Home



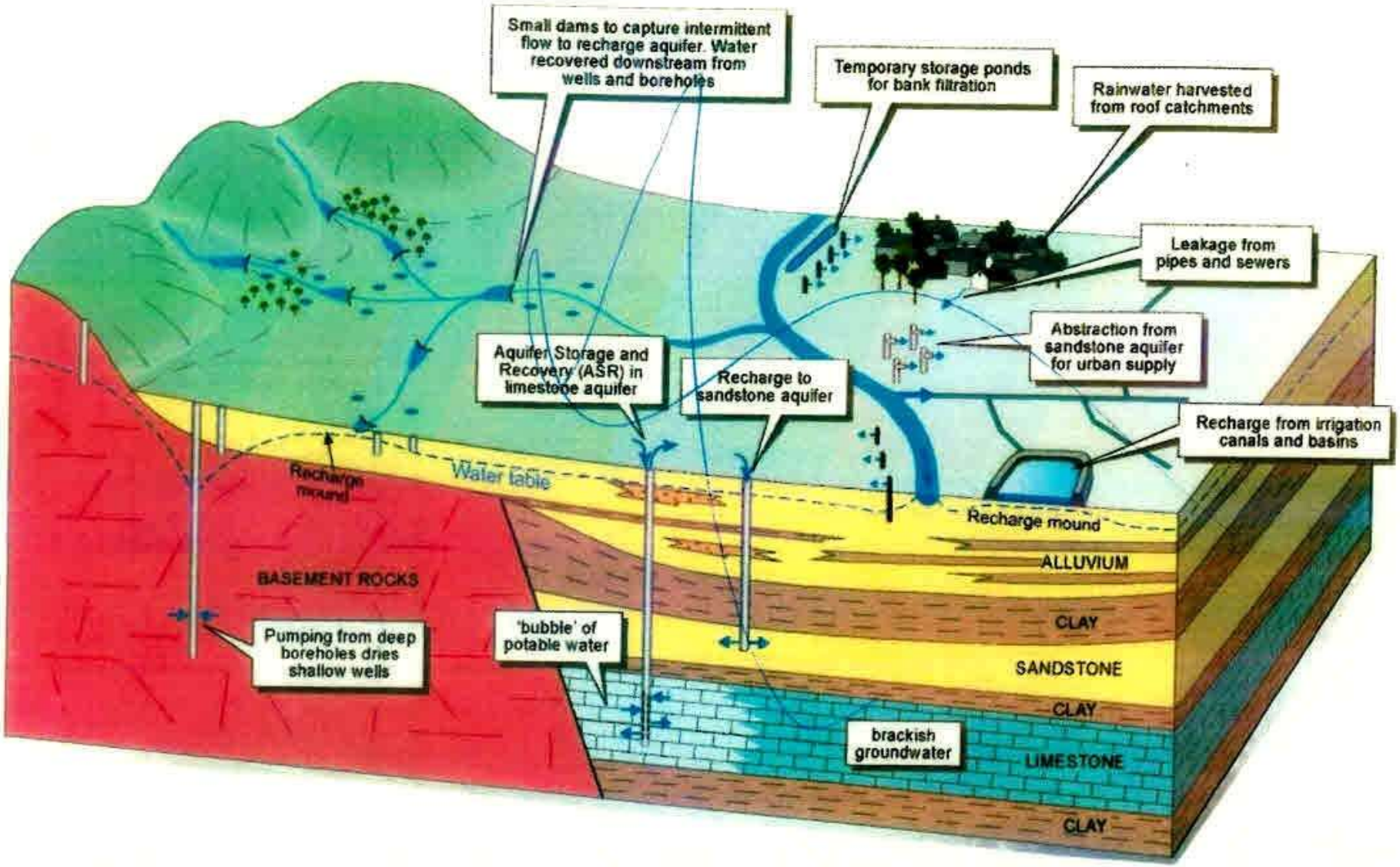
Building Materials Pyramid

Green Recycled Materials, Steel and Cement, Carbon Capture
Reducing Carbon Intensity by 50%, Energy and Water Use by 30%

Clean Air

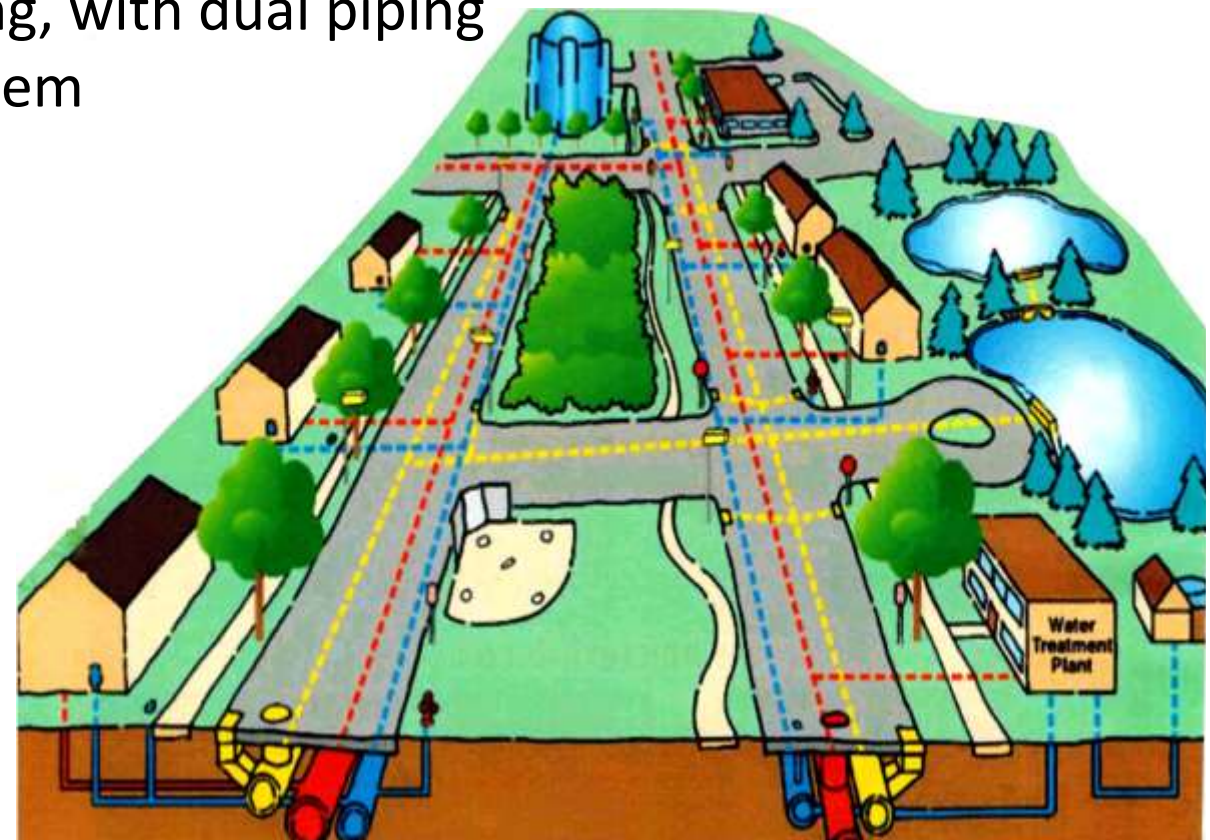
- Zero Polluting Energy/Bio-Fuels, Green Hydrogen, Renewables
- Intelligent Pollution Management
- Conserving Transport by 15 Minutes Principle
  - Walk to Work 1 km
  - Cycle 3 to 4 km
  - Public Transport 10 km
- Buildings as Respirational System, Urban Nebulisers and Detox Towers
- Minimise need for A.C. by Passive Design, Green Roof, Ventilation, Landscape, Low Energy Building Materials, etc.

Watershed Development



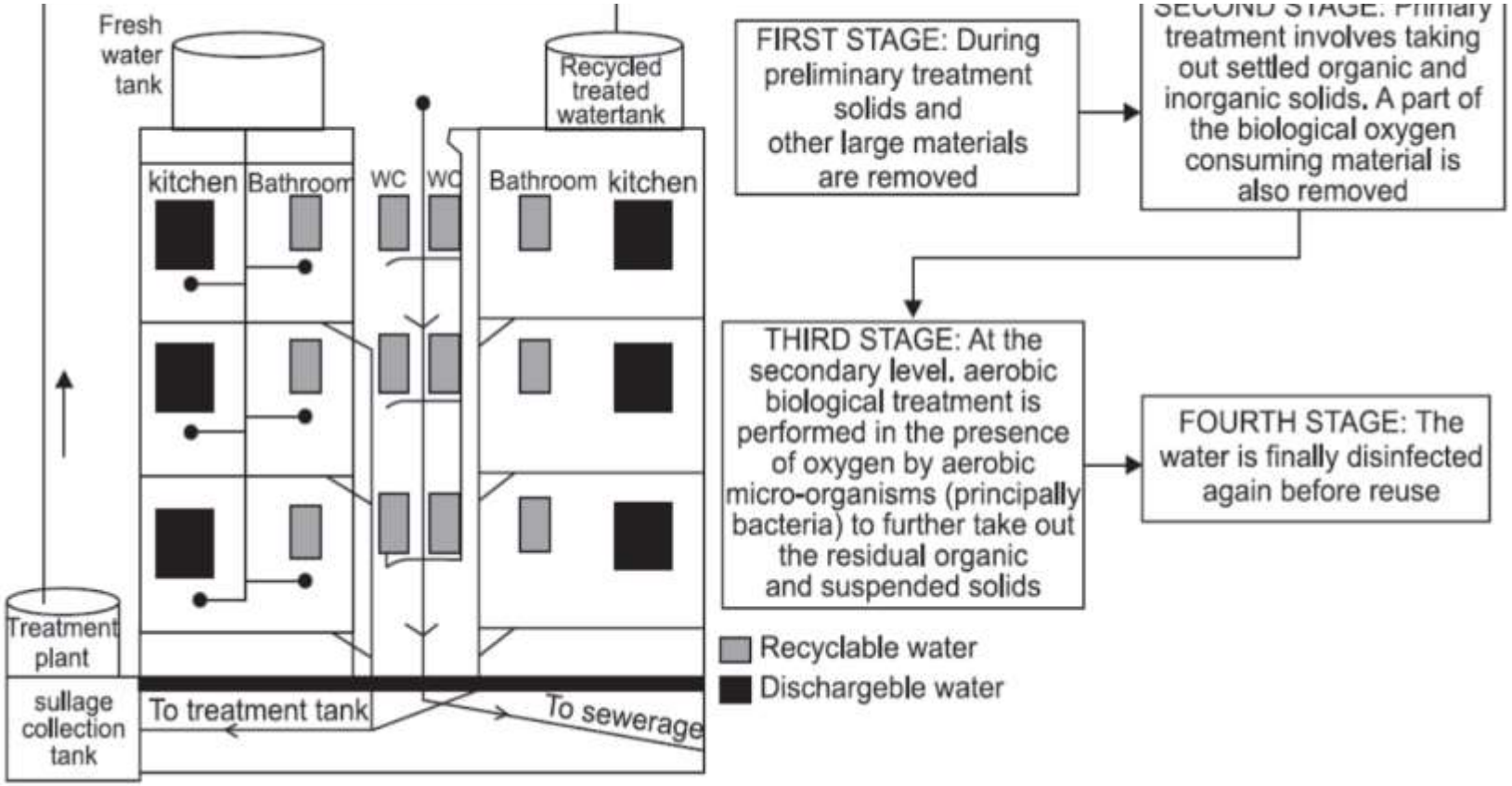
Common Utility Duct for Sustainable Development

- low carbon zones with tri-generation energy systems (combining power, cooling and heating), dual piping for recycled water and automated waste collection/utilization .
- Low-flow appliances and water saving toilets (with recycled wastewater cistern)
- Wastewater recycling, with dual piping
- Micro-irrigation system
- Vertical farms



Clean Water

24X7 Potable Water, RWH, Recycling, Dual Plumbing, Efficient Fixtures, Equity, Blockchain, Intelligent System, Curbing NRW, SCADA, LIDAR



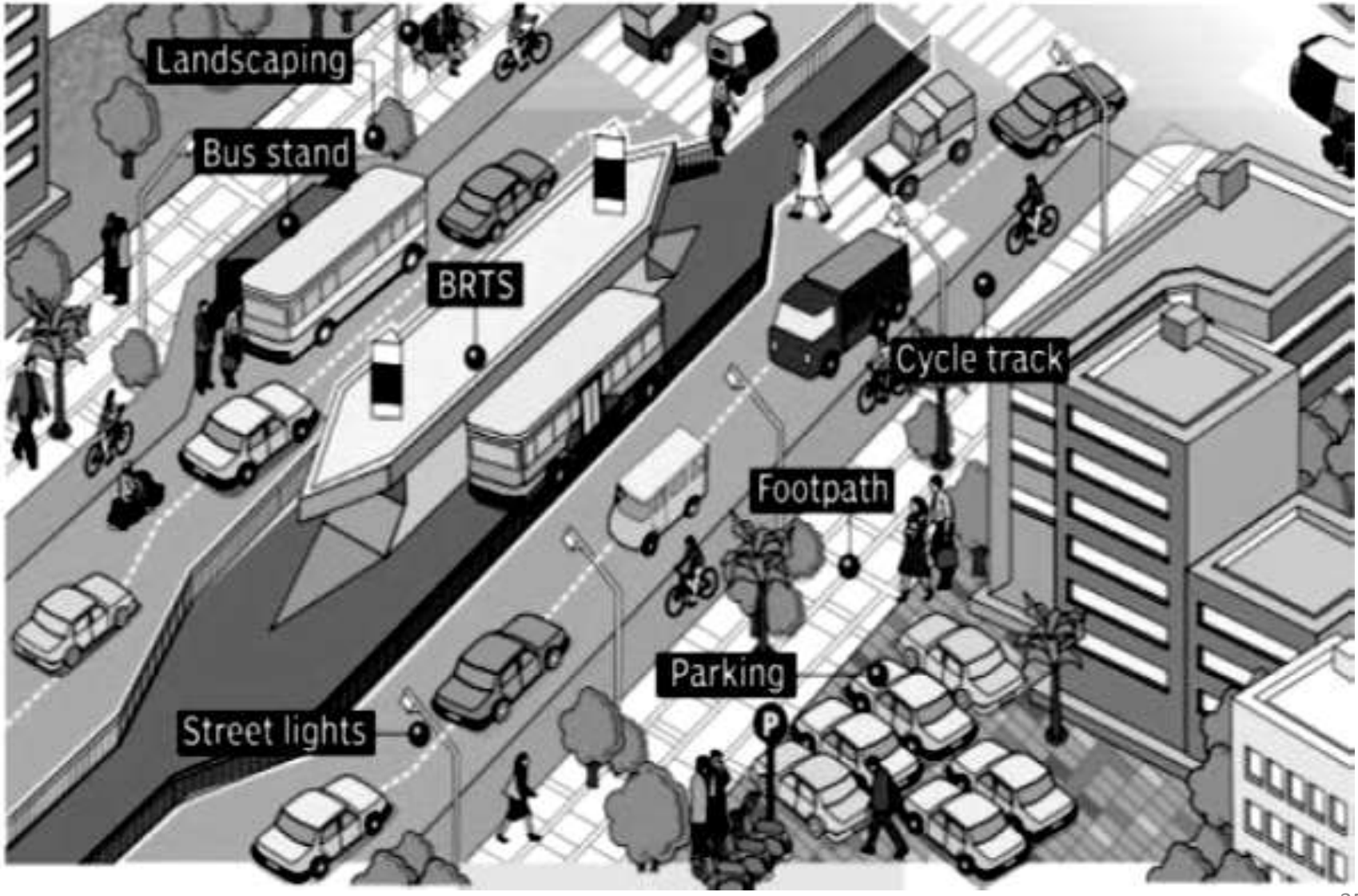
Pune: Dirty Drain Converted into Green Trail

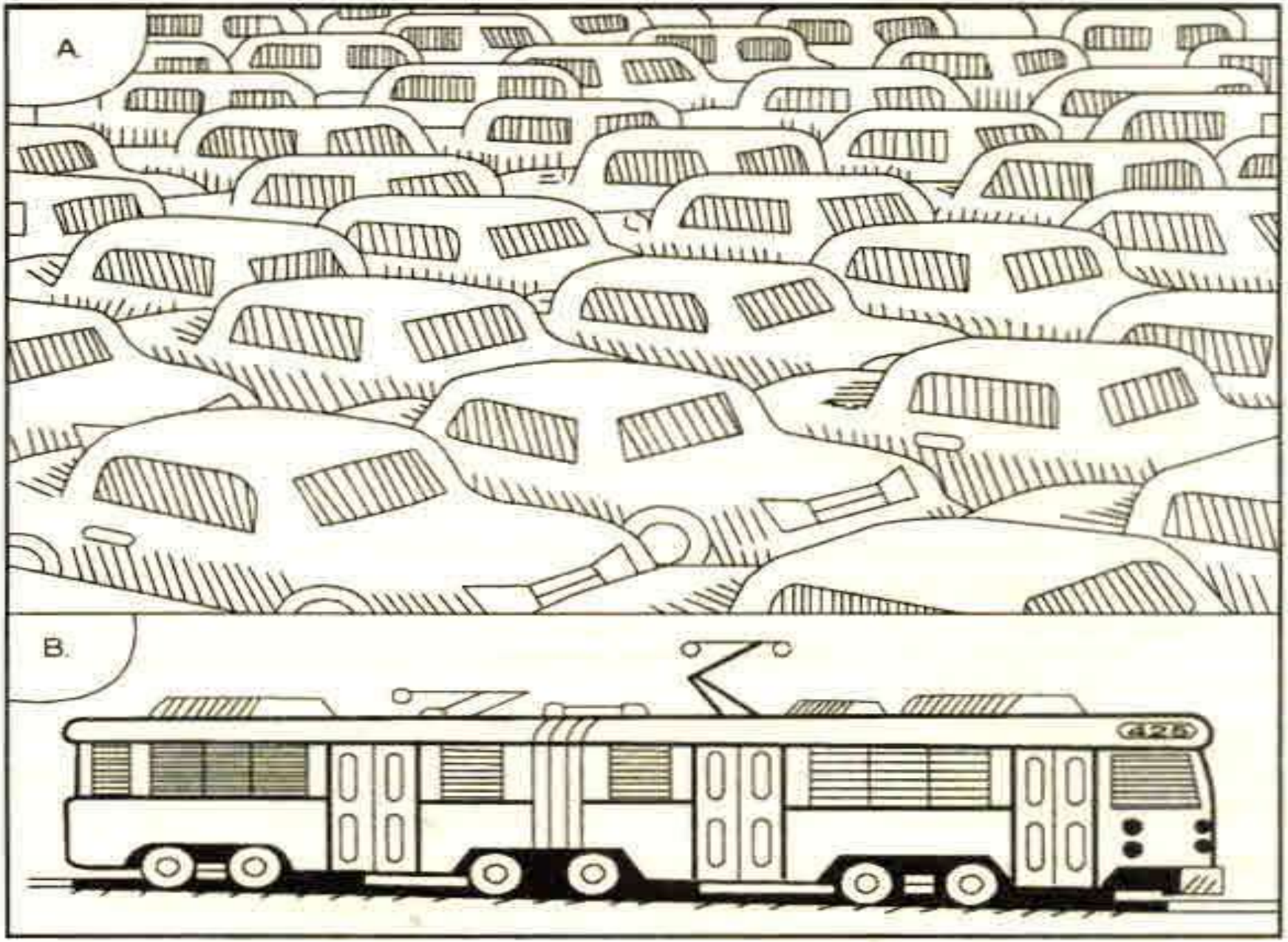
Urban Agriculture

Retrofitting Shipping Containers for Seattle's Proposed Centre for Urban Agriculture. It also cleans air and Wastewater

Sustainable Transport

18% of Emission, Fossil Fuel 70%



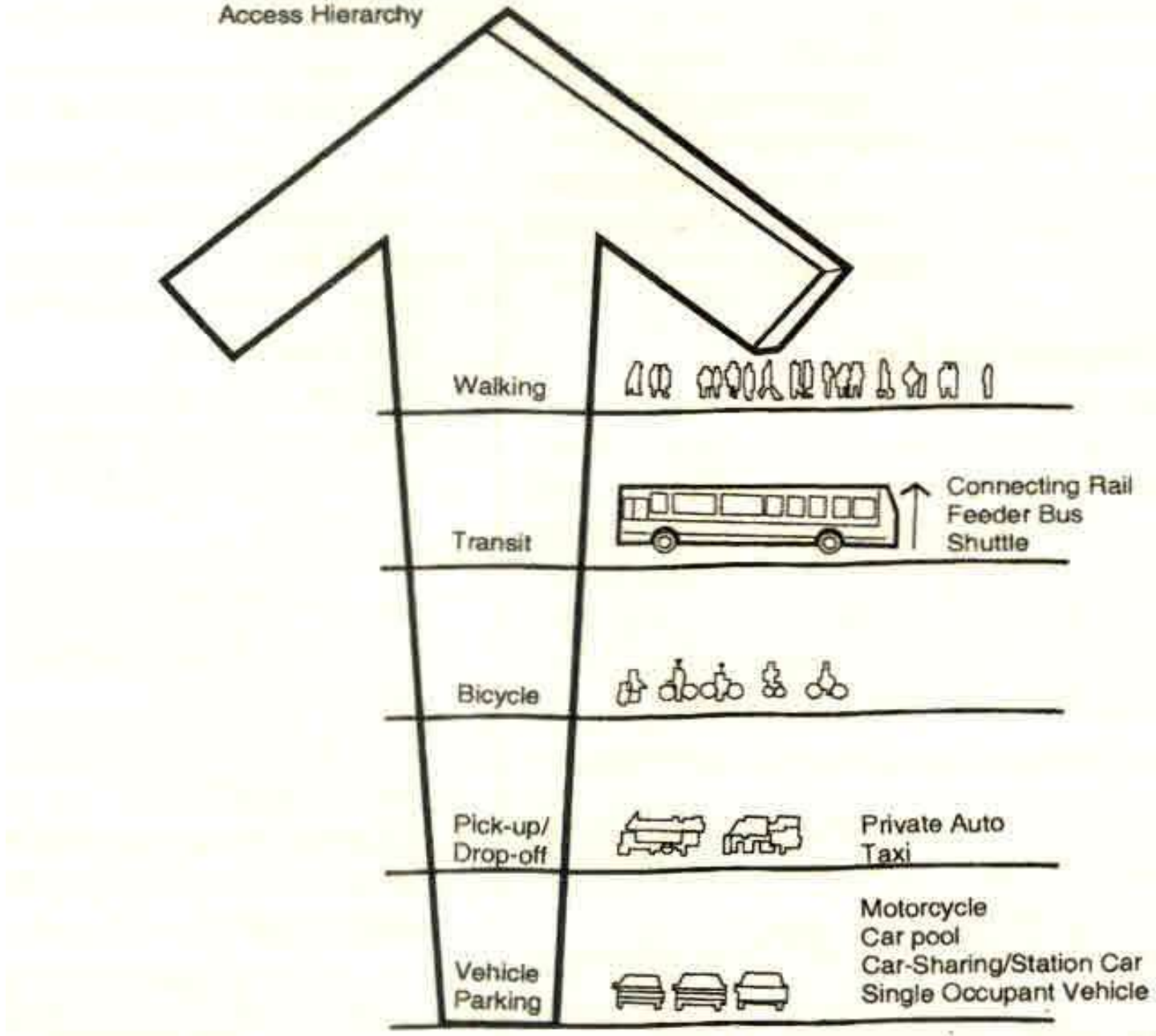


What is the most efficient way for fifty people to get to work?

50 cars = 1 tram/Bus

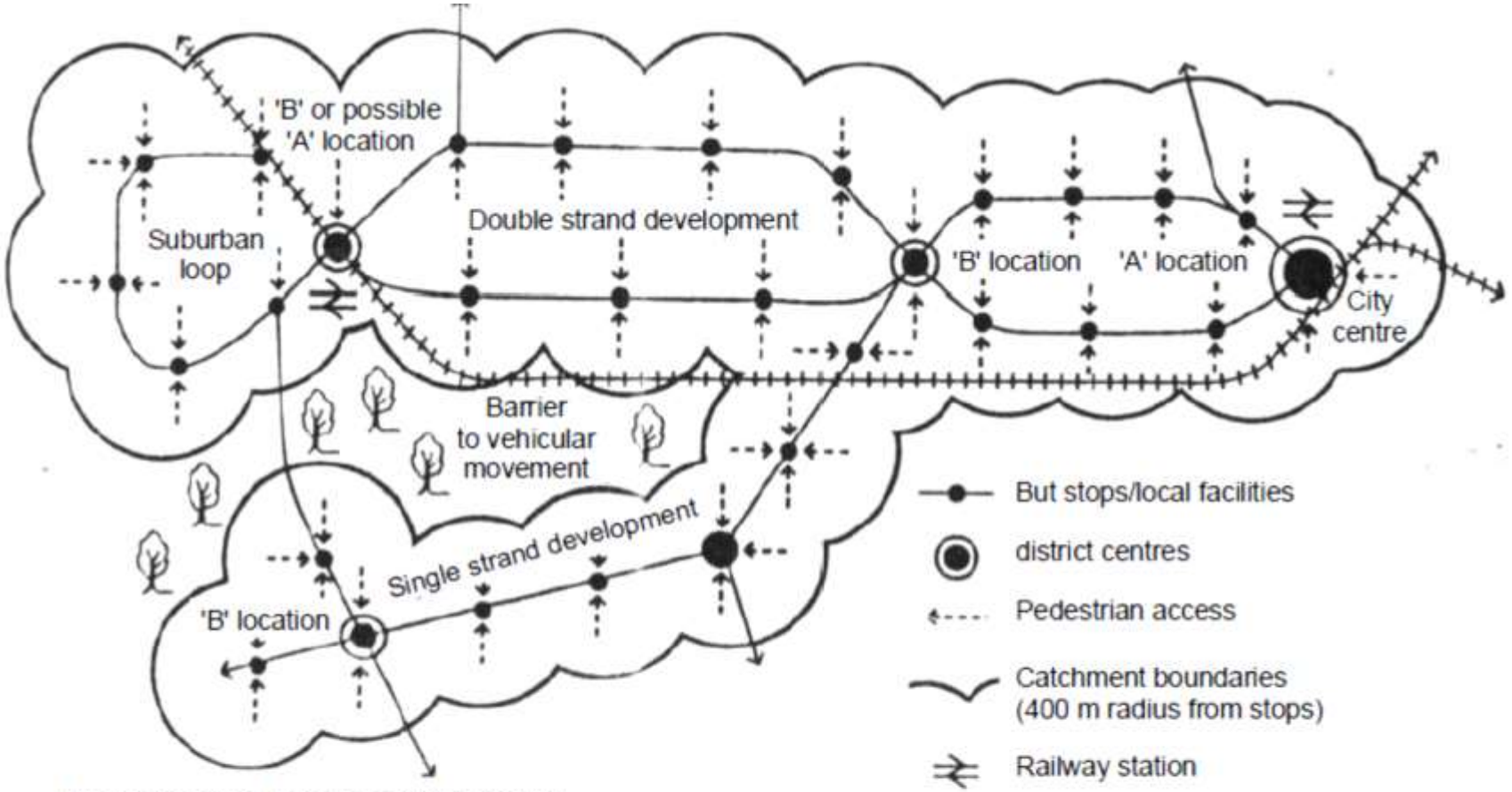
Zero Emission Green Hydrogen bus

National Hydrogen Mission- 4 MT of Green Hydrogen per year by 2030



Access vis-à-vis Modal Hierarchy

Walkable Urban Structure



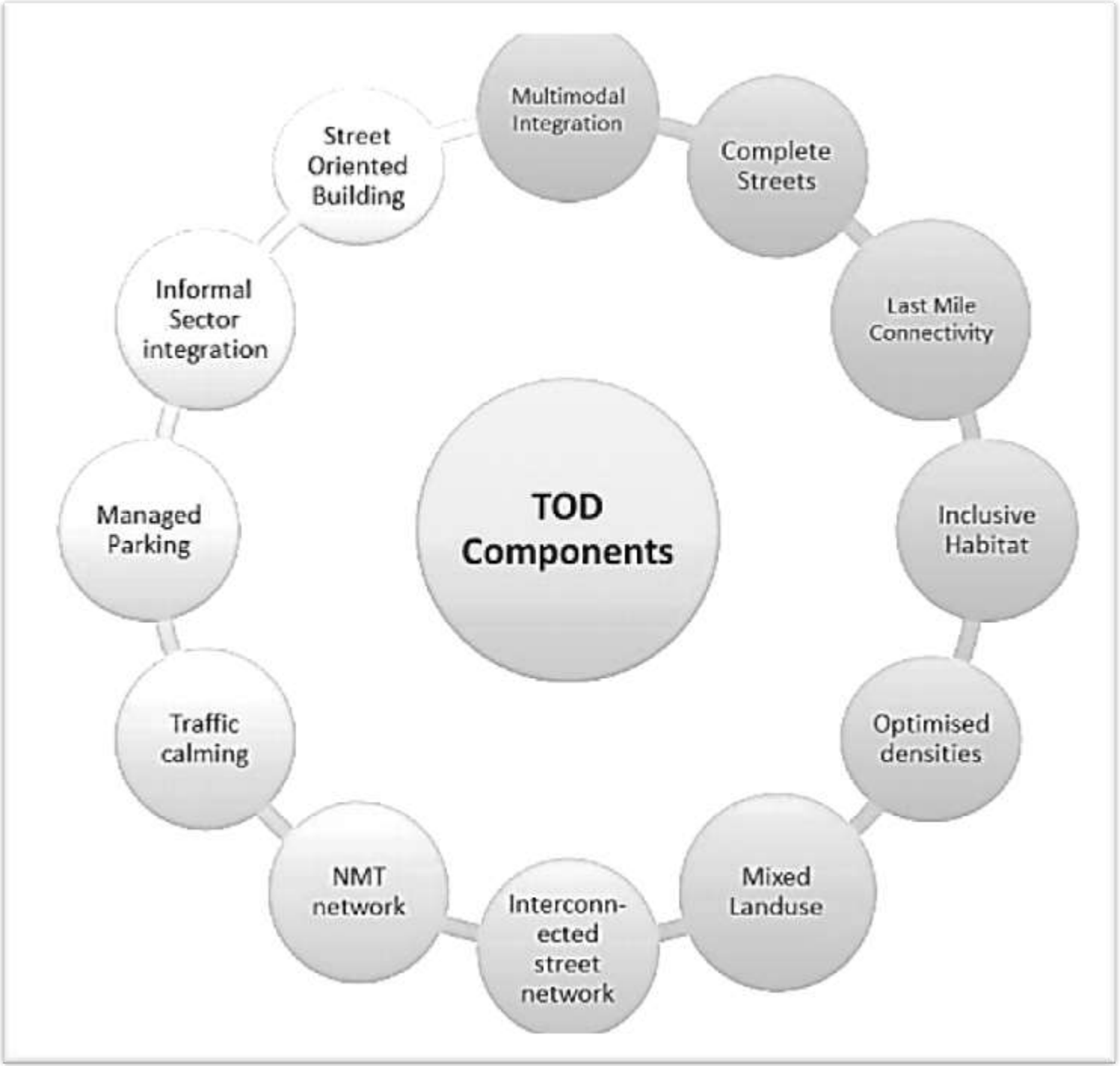
Principles of public transport planning

Illustrating :

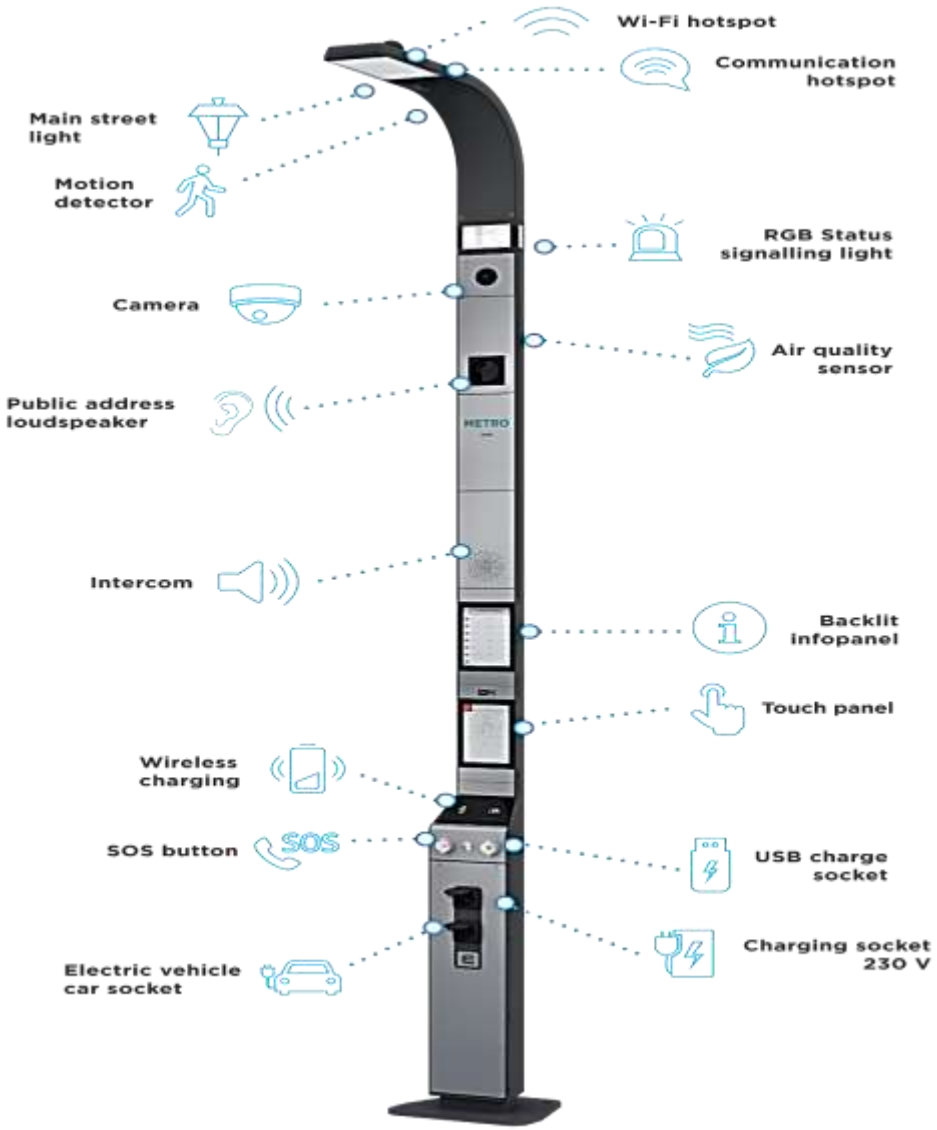
- linear catchment zones
- magnets and nodes
- limited lateral movement
- fast and stopping services

Transit Oriented Development for Optimum Use of Land and Conservation of Transport

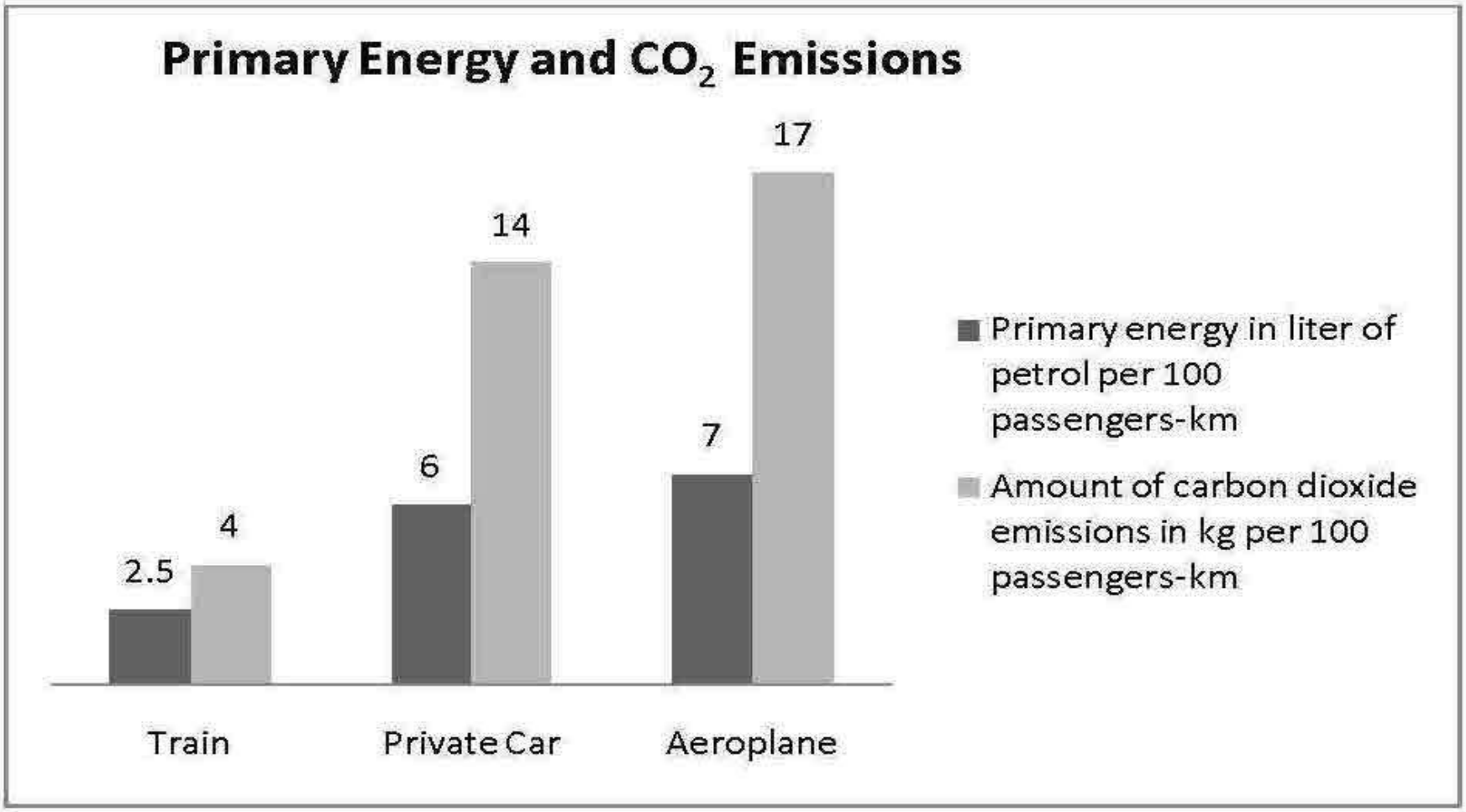
Skeleton Parking Cluster at Every Metro/Rly. Stn.

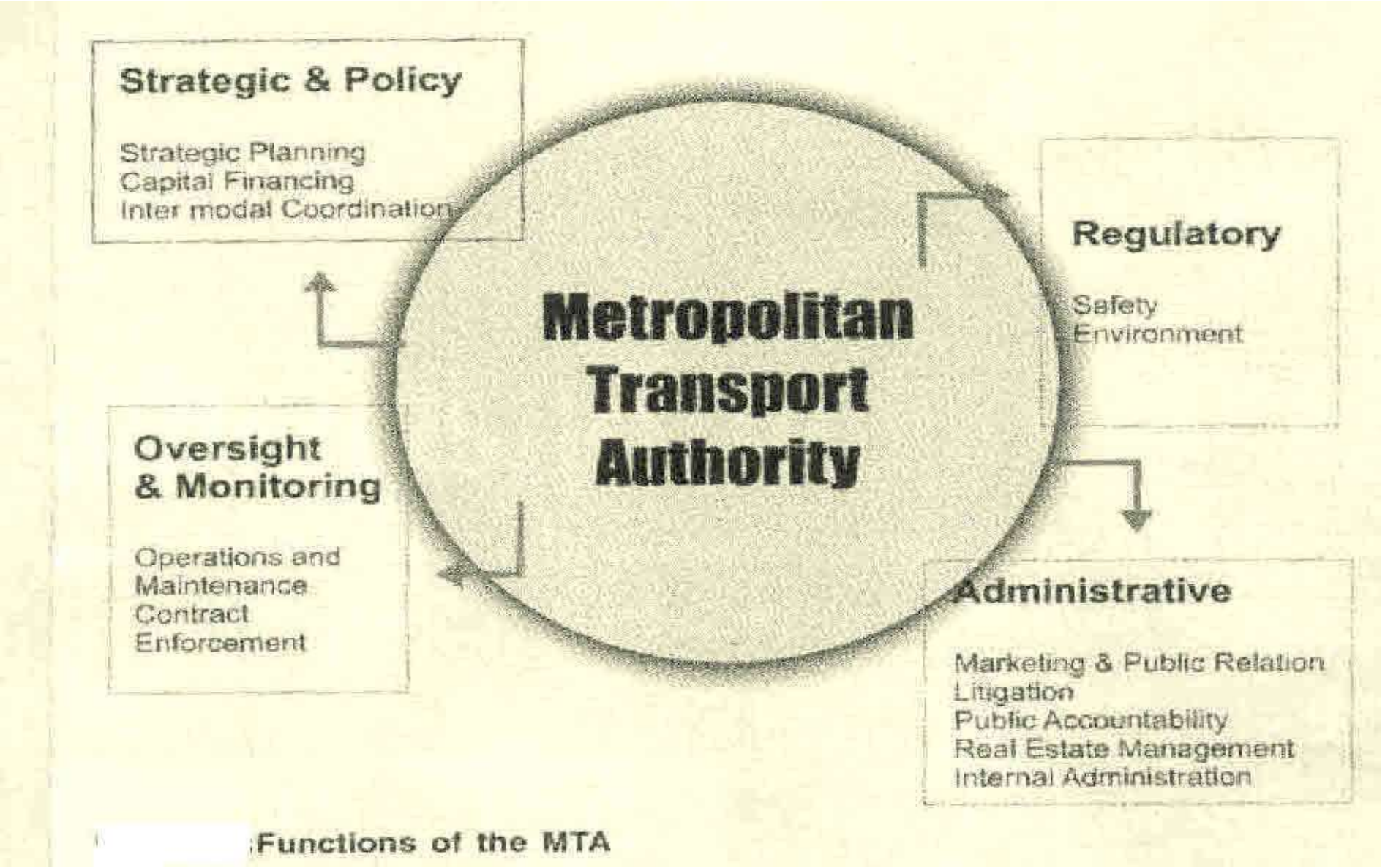

TOD Components
Multimodal Integration
Complete Streets
Last Mile Connectivity
Inclusive Habitat
Optimised densities
Mixed Landuse
Interconn-ected street network
NMT network
Traffic calming
Managed Parking
Informal Sector integration
Street Oriented Building

Intelligent, Smart Pole



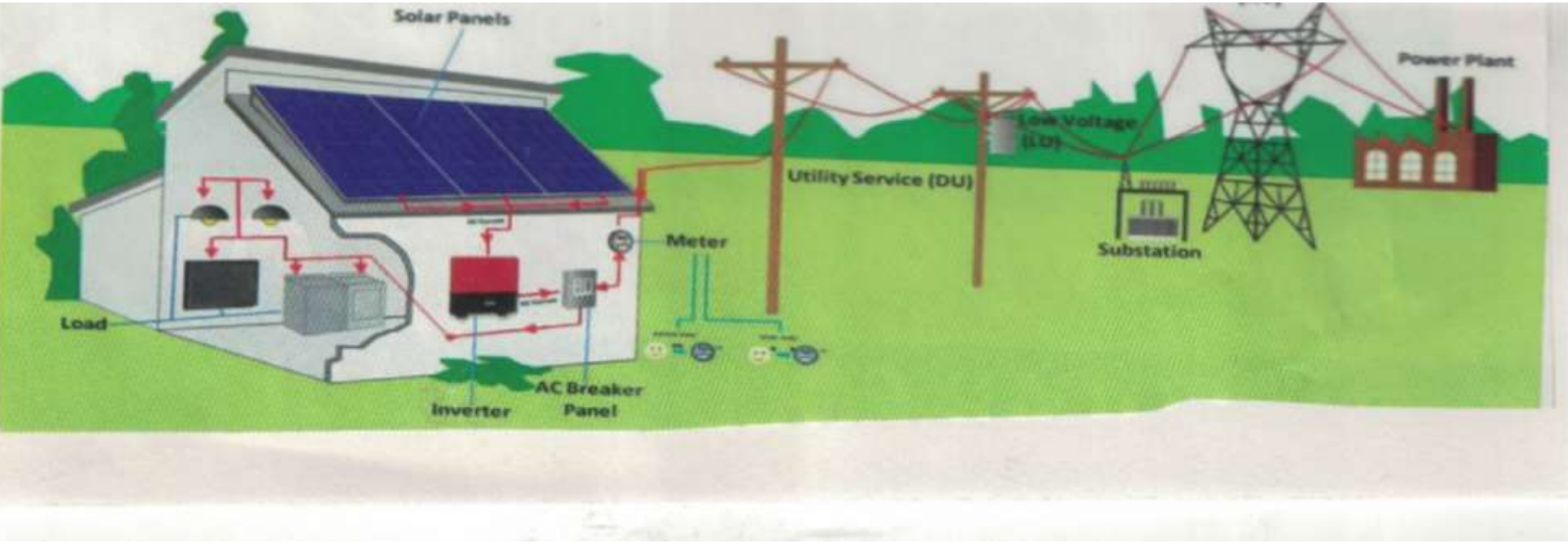
From Red to Orange to Green Transport





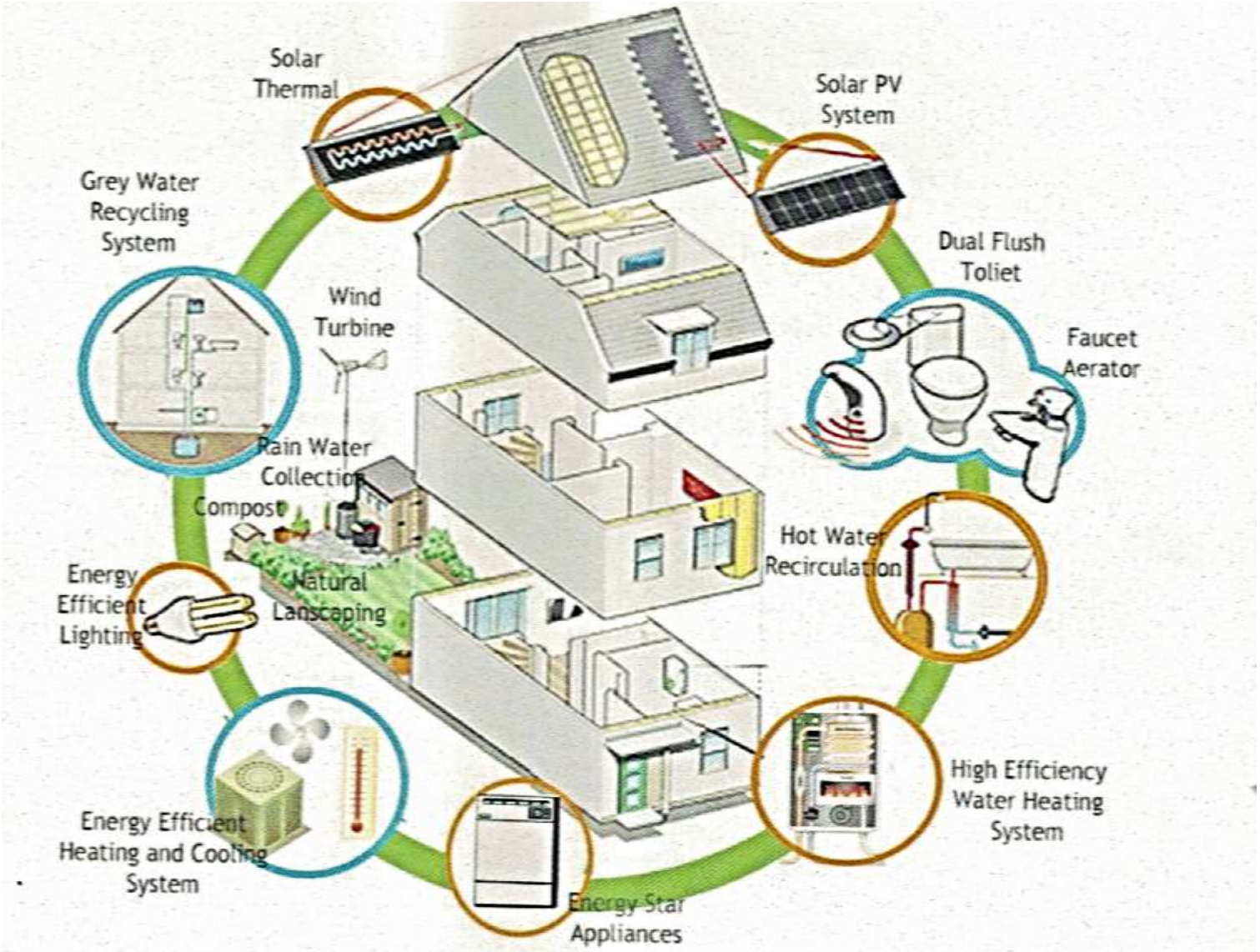
Functions of the MTA

One Sun-One Earth-One Grid
Renewable Energy 500 GW by 2030

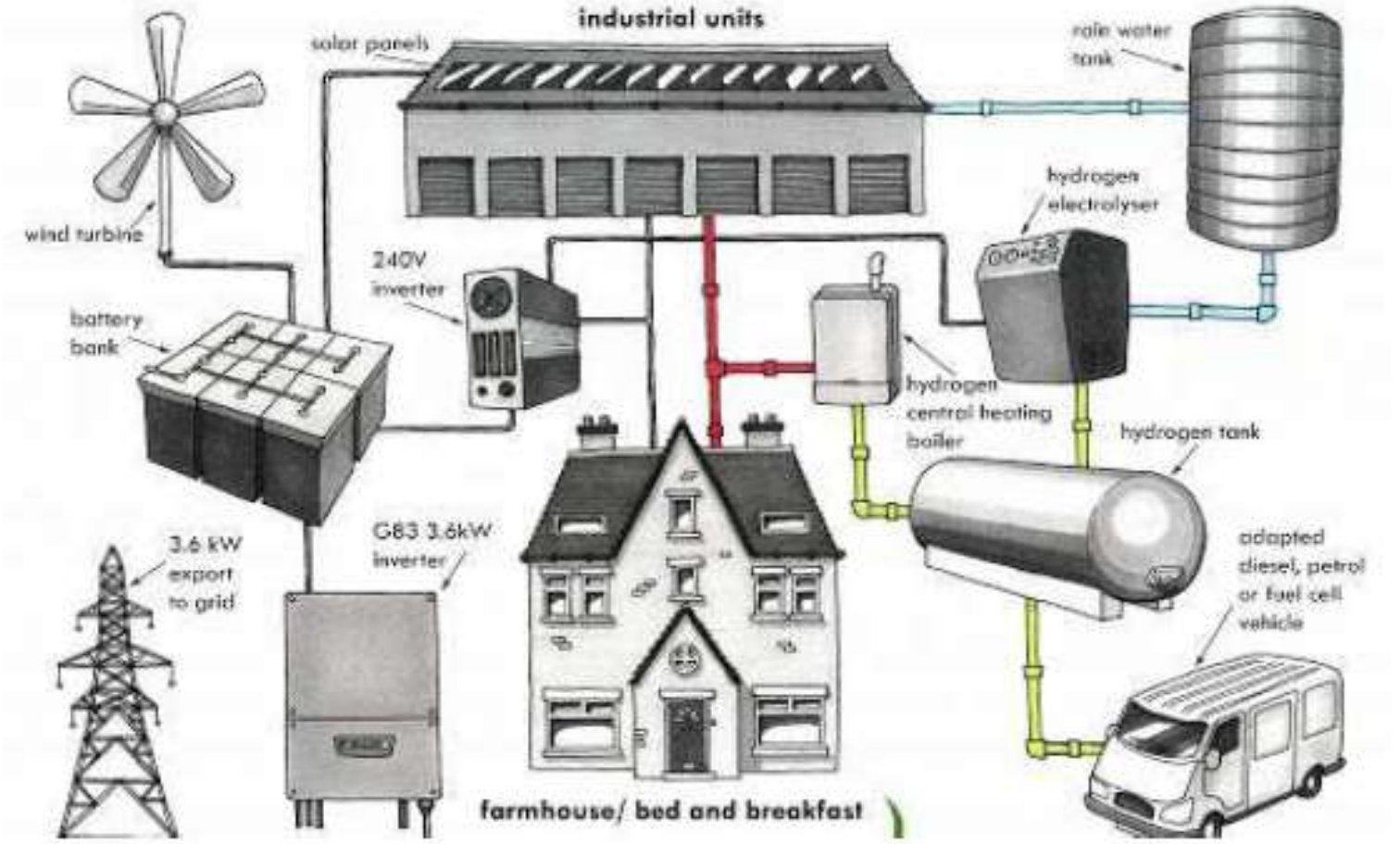


Green Hydrogen, Green Metals, Green Cement,
Solid State Batteries

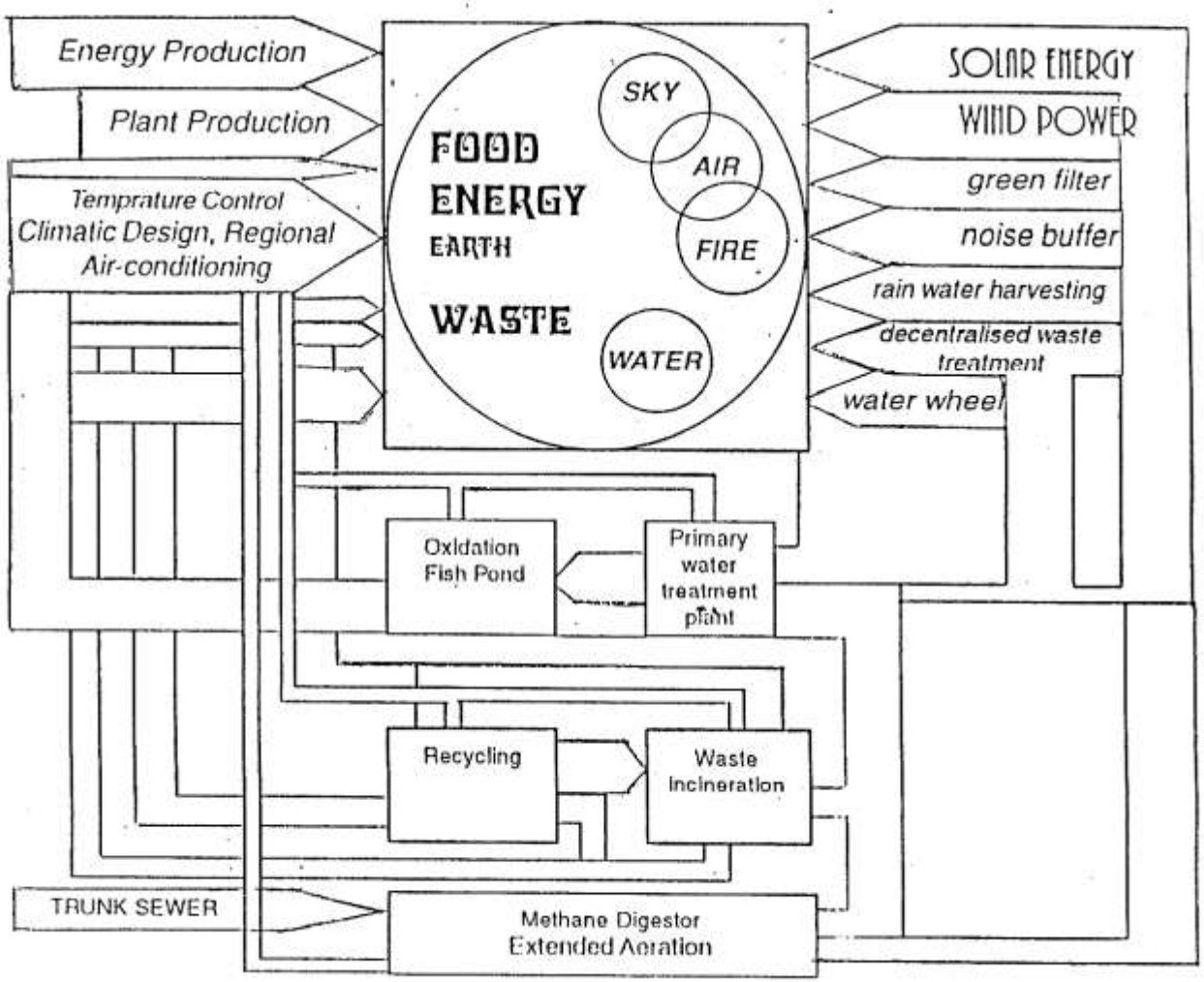
Energy Efficient Building



Wind Turbine, Solar Parabolic and Microgrid

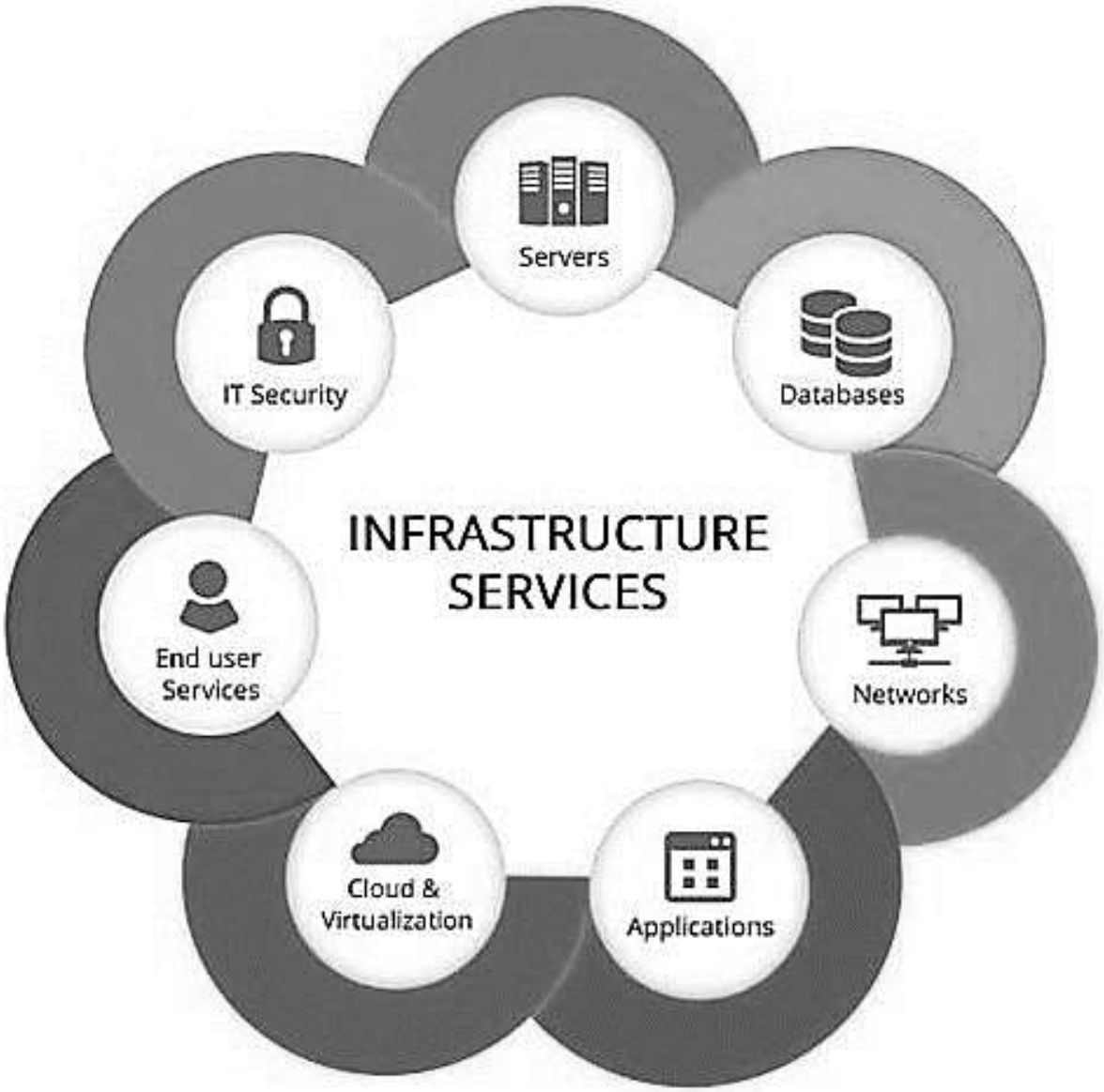


The waste management process should embody the principle of circular metabolism, which means recycling wastes to produce energy, adoption of eco-technology for zero polluting energy (wind, solar and water wheel), development of green filters, noise buffers and rainwater harvesting.



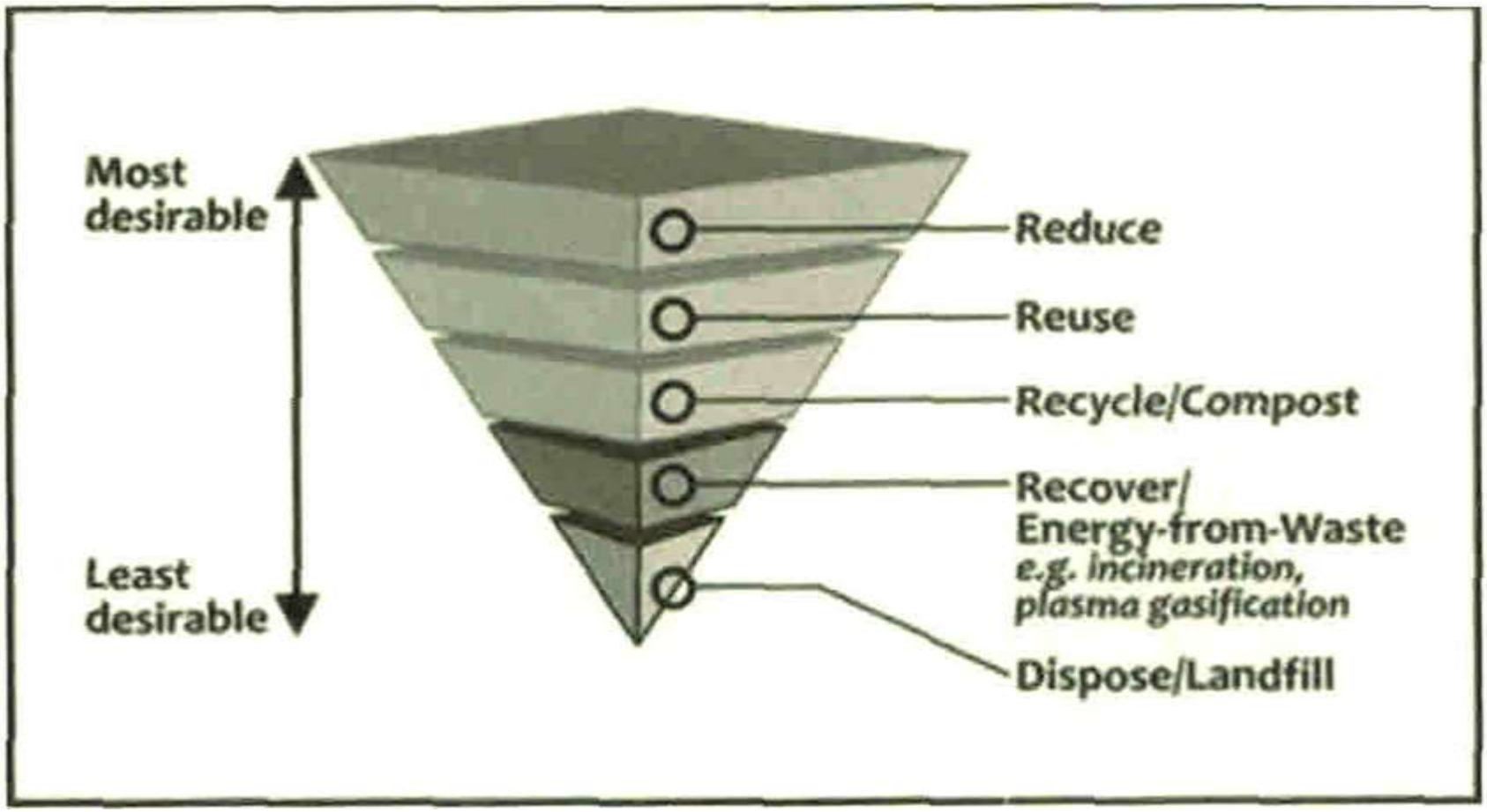
Intelligent, Integrated, Interconnected Infrastructure

Smart and Sustainable Infrastructure Services



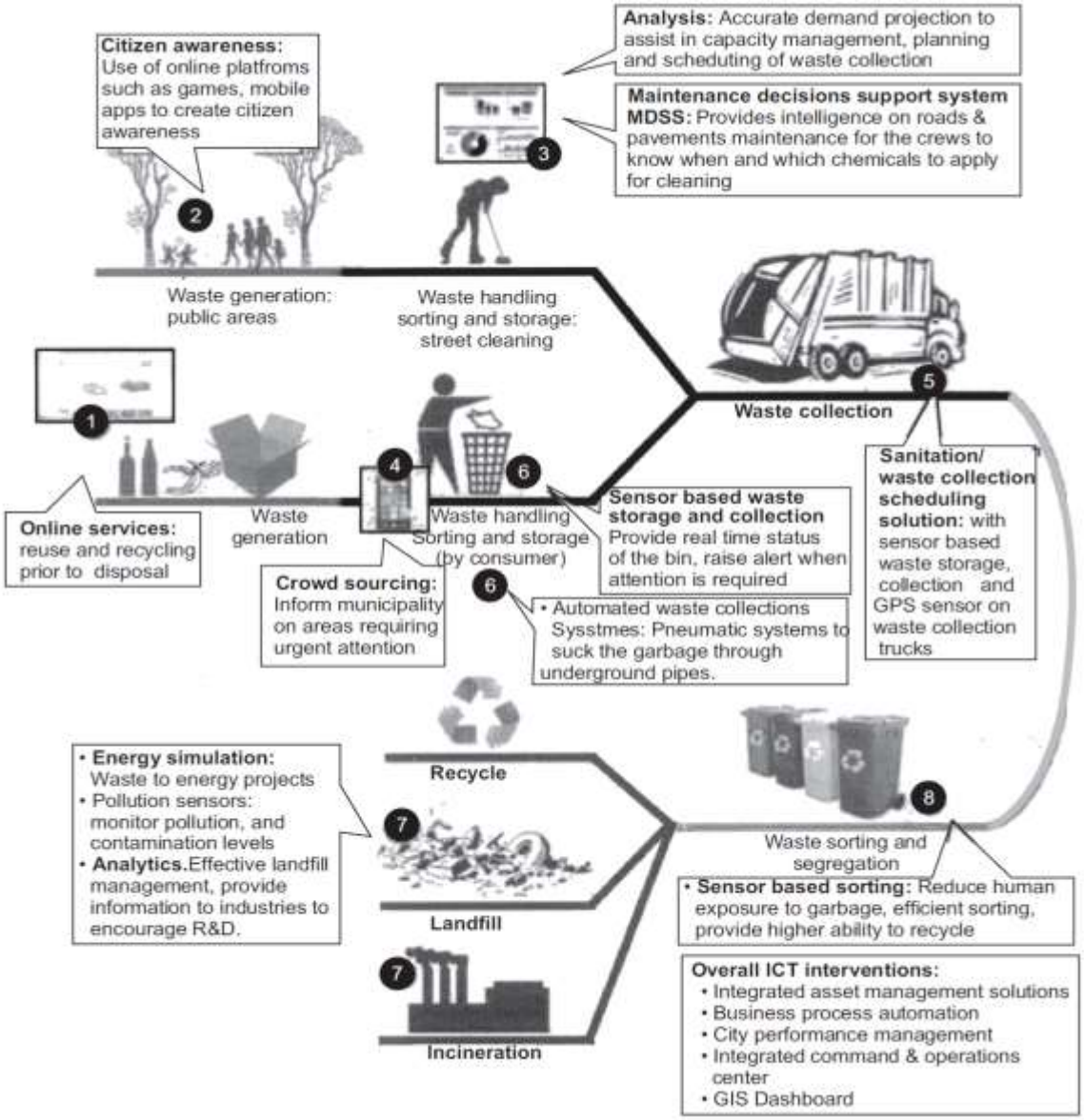
Waste-Wise City

5 R Strategy-Reduce, Refuse, Reuse, Recycle and Recover

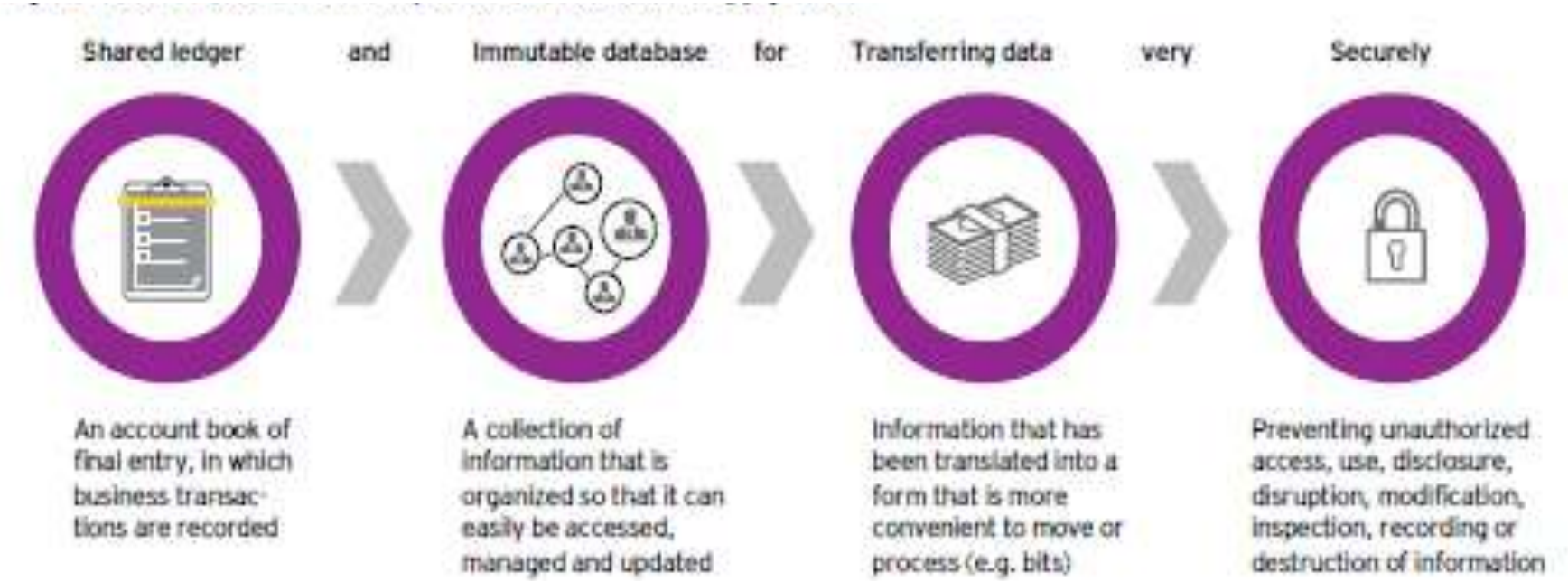


Smart Waste Management

Nassocom

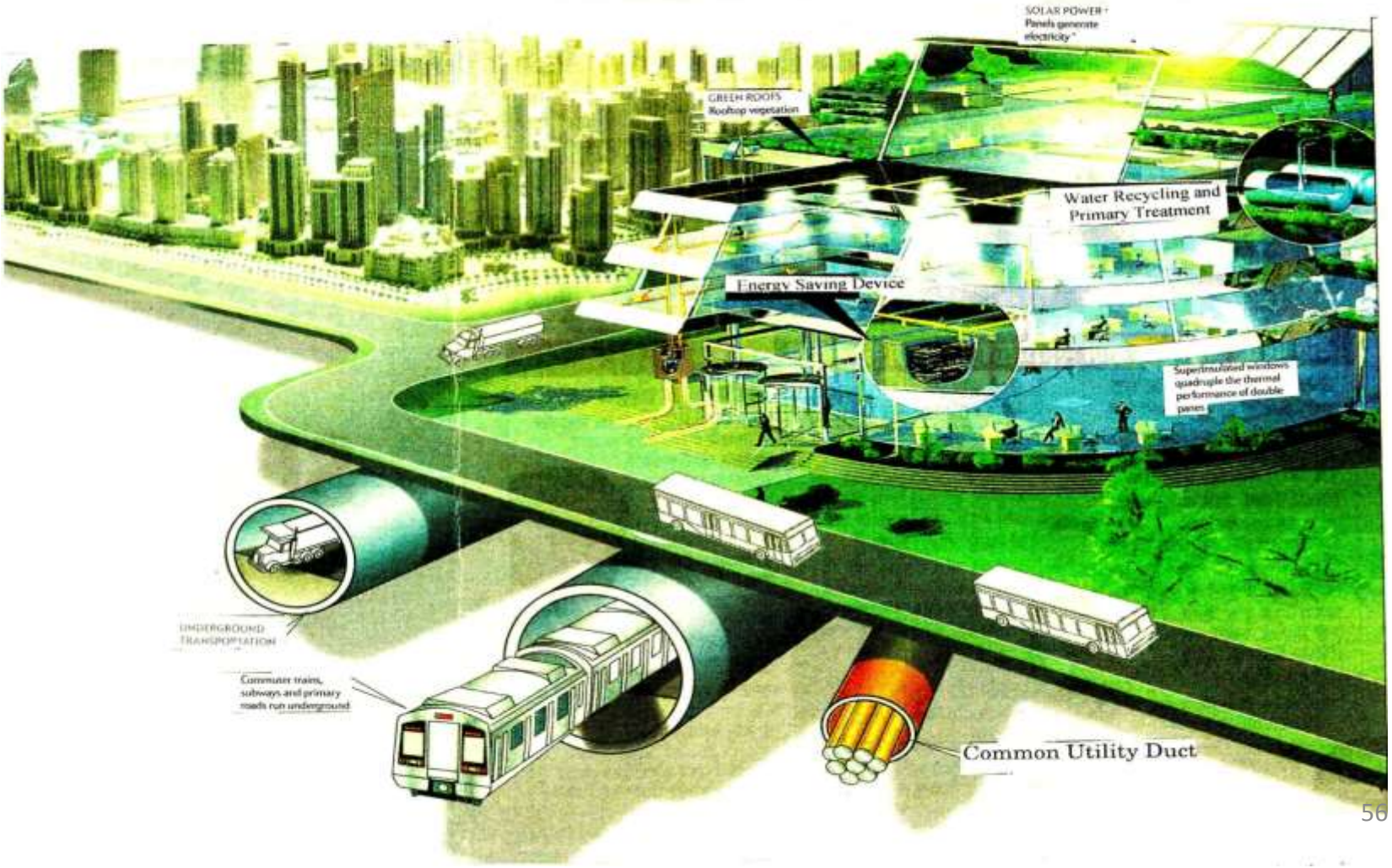


Blockchain Technology for Integration, Decentralisation and Synergy

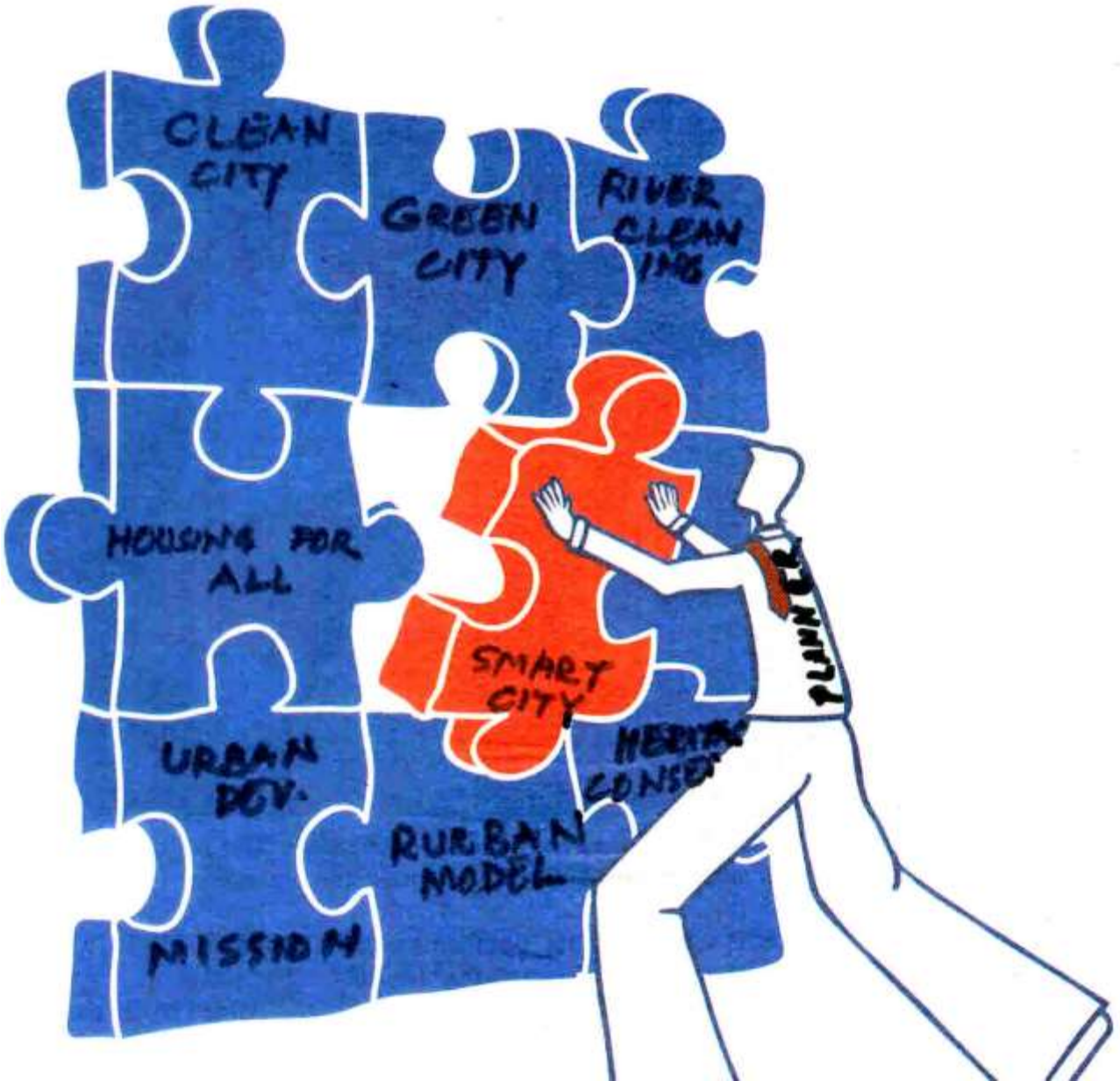


7 Cs of Sustainable Built Environment

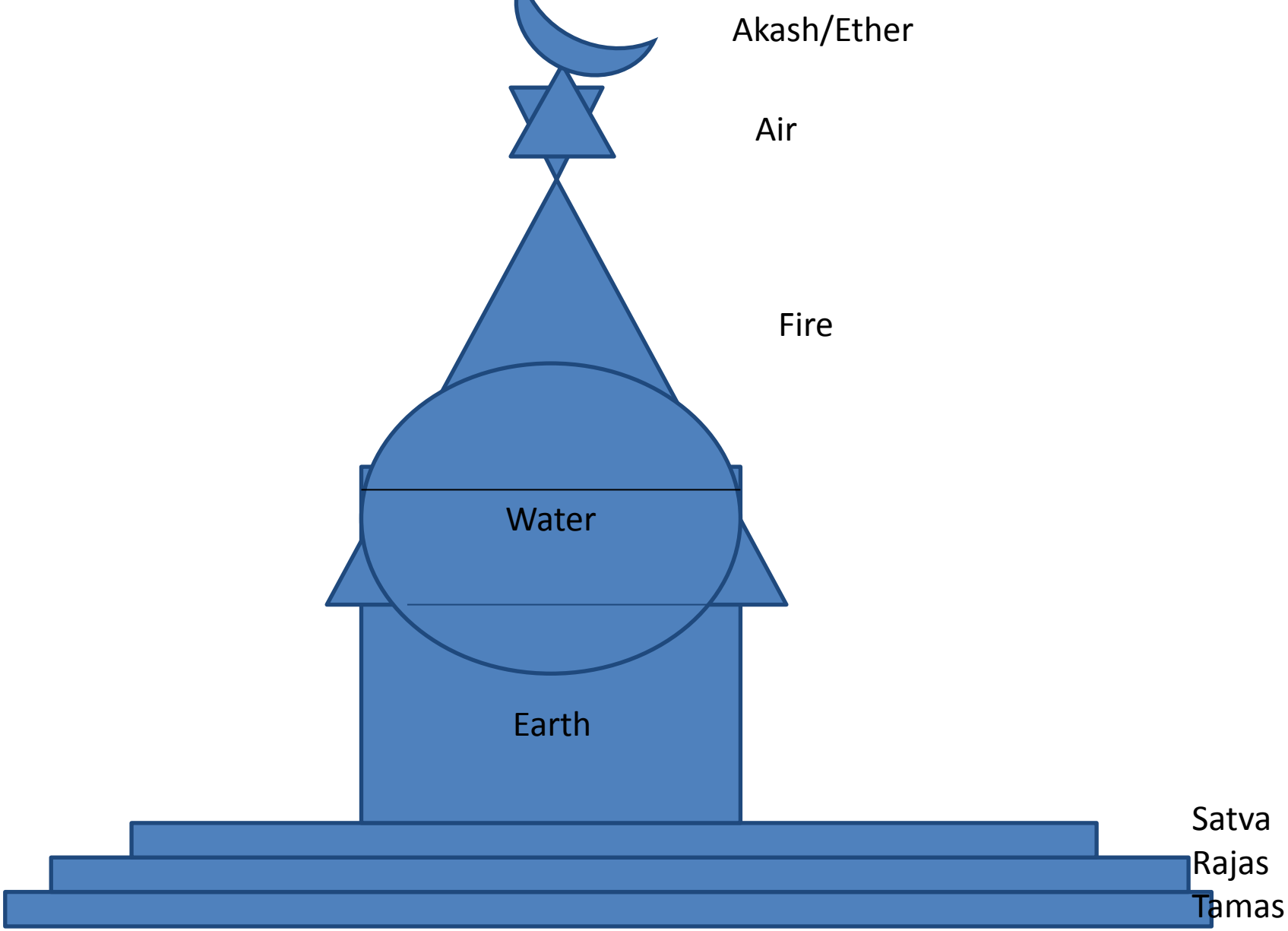
Circular Systems, Climate Resilience, Clean Air, Water, Energy & Transport, Health, Conservation of Culture and Natural Environment



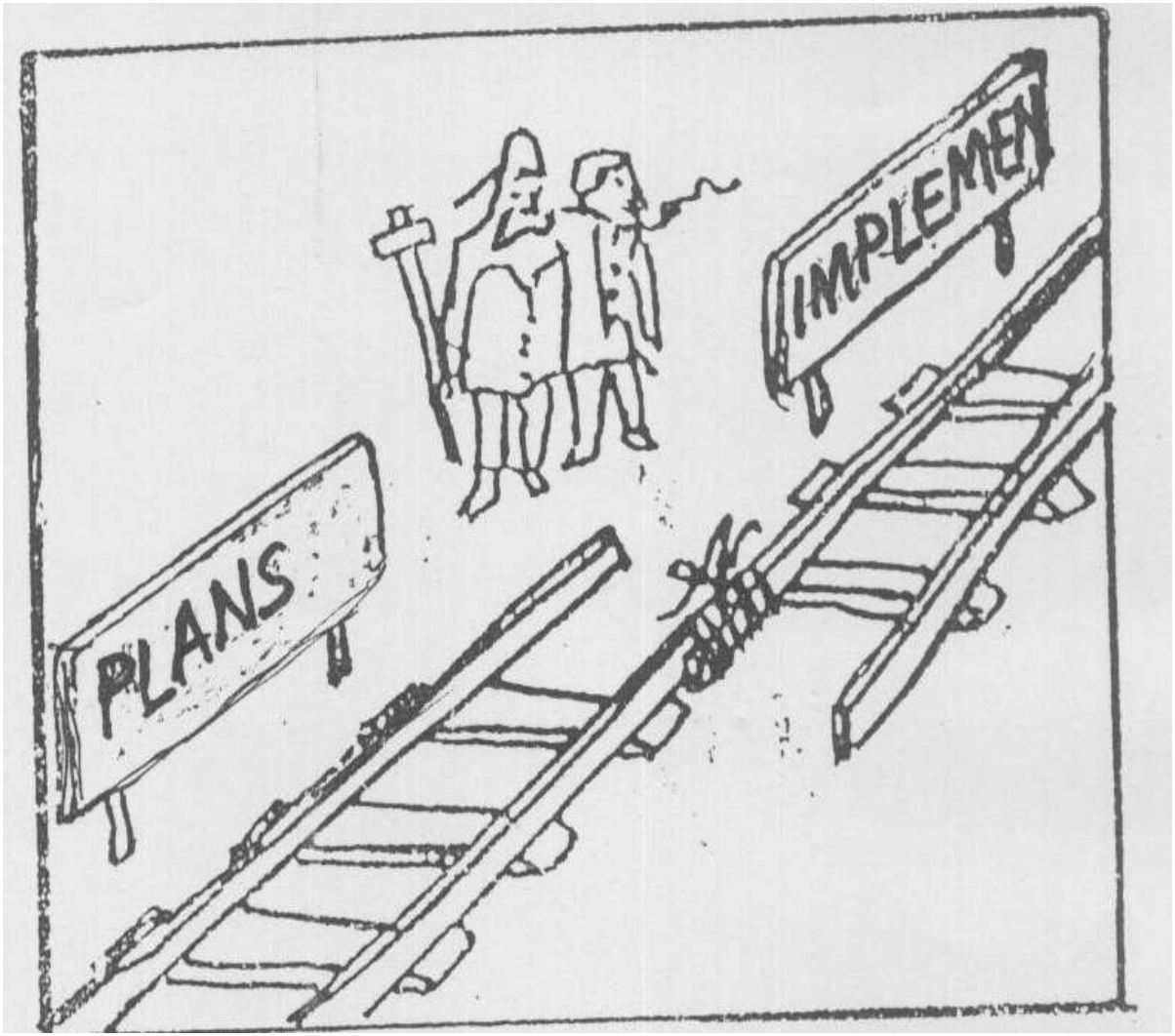
Completing the Jig-saw



5 Ps of Sustainable Development



Five Elements-Only One Earth



Continuity Between Plans and Implementation

Mission LiFE: Lifestyle for Environment, Mindful Shift Towards Minimalist Living

THANKS