

Cities and Climate Change

The Challenges and the Opportunities

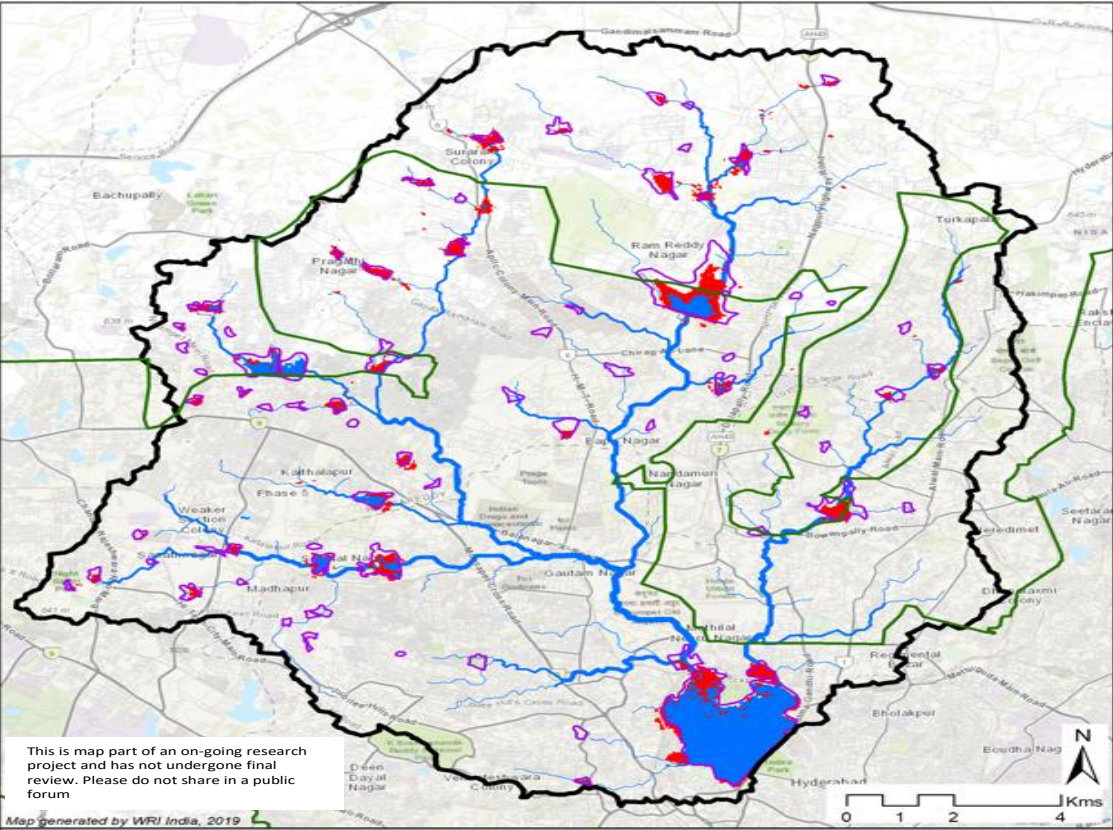
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Secretary General, Citynet

Senior Fellow World Resources Institute

- **Analysis of Challenges**
- Presentation on Opportunities
- Discussion

The Challenge of the Urban Sprawl: Hyderabad city in India

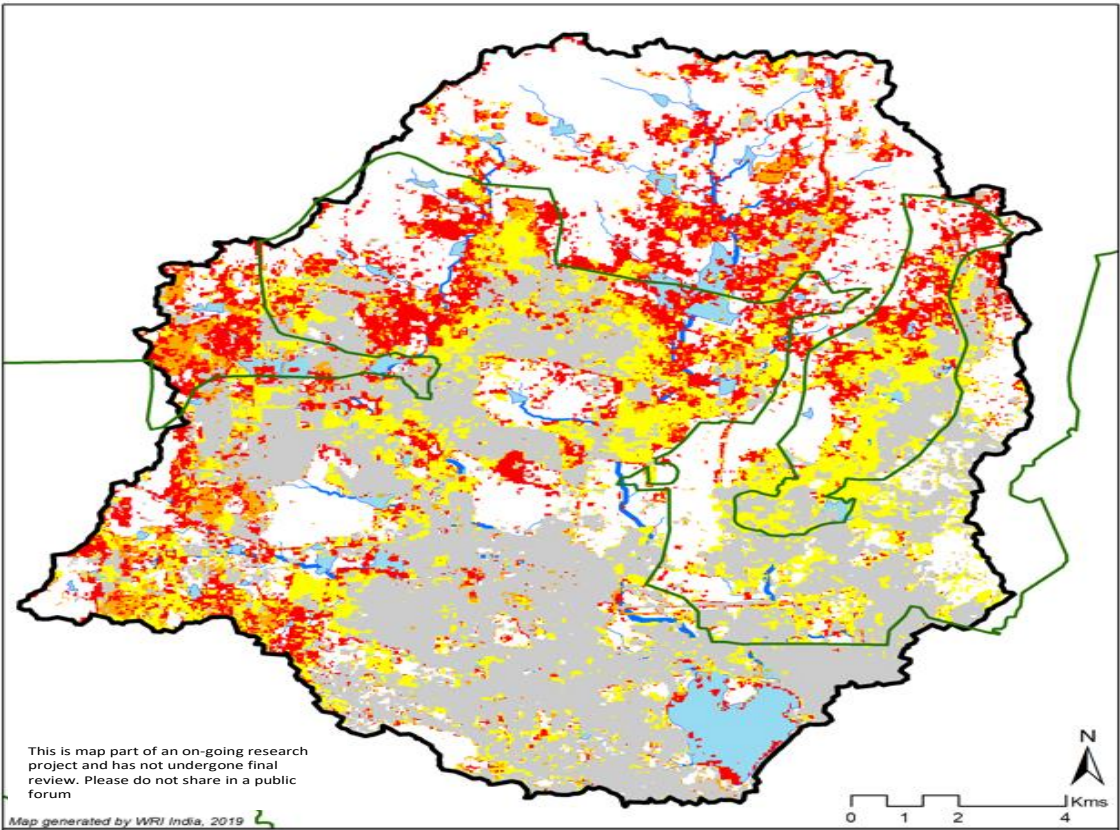


Surface water loss in the Hussain Sagar watershed

Data Source: European Commission JRC; LandSat (USGS / NASA); Bhuvan, NRSC
Disclaimer: This map is created for study purposes, jurisdictional boundaries indicated are representational only



- | | |
|---|--|
| Legend | Natural Drainage Order |
| <ul style="list-style-type: none"> Watershed Boundary Lakes Surface water extent in year 2015 Surface water extent in year 1988 ULB Boundary | <ul style="list-style-type: none"> 1 2 3 4 |



Urban development (since 1990) in the Hussain Sagar watershed

Data Source: European Commission JRC; LandSat (USGS / NASA); Bhuvan, NRSC
Disclaimer: This map is created for study purposes, jurisdictional boundaries indicated are representational only



- | | |
|---|---|
| Legend | Natural Drainage Order |
| <ul style="list-style-type: none"> Impermeable Areas in 1990 Impermeable Areas added by 2000 Impermeable Areas added by 2010 Impermeable Areas added by 2015 ULB Boundary | <ul style="list-style-type: none"> 1 2 3 4 Watershed Boundary Lakes |

The Challenge of Affordable Housing

Example: Alagados, Bahia, Brazil



Poverty Synonymous with Inadequate WS+S Services

The Challenge of Inadequate Urban Services

Example of Nairobi, Kenya

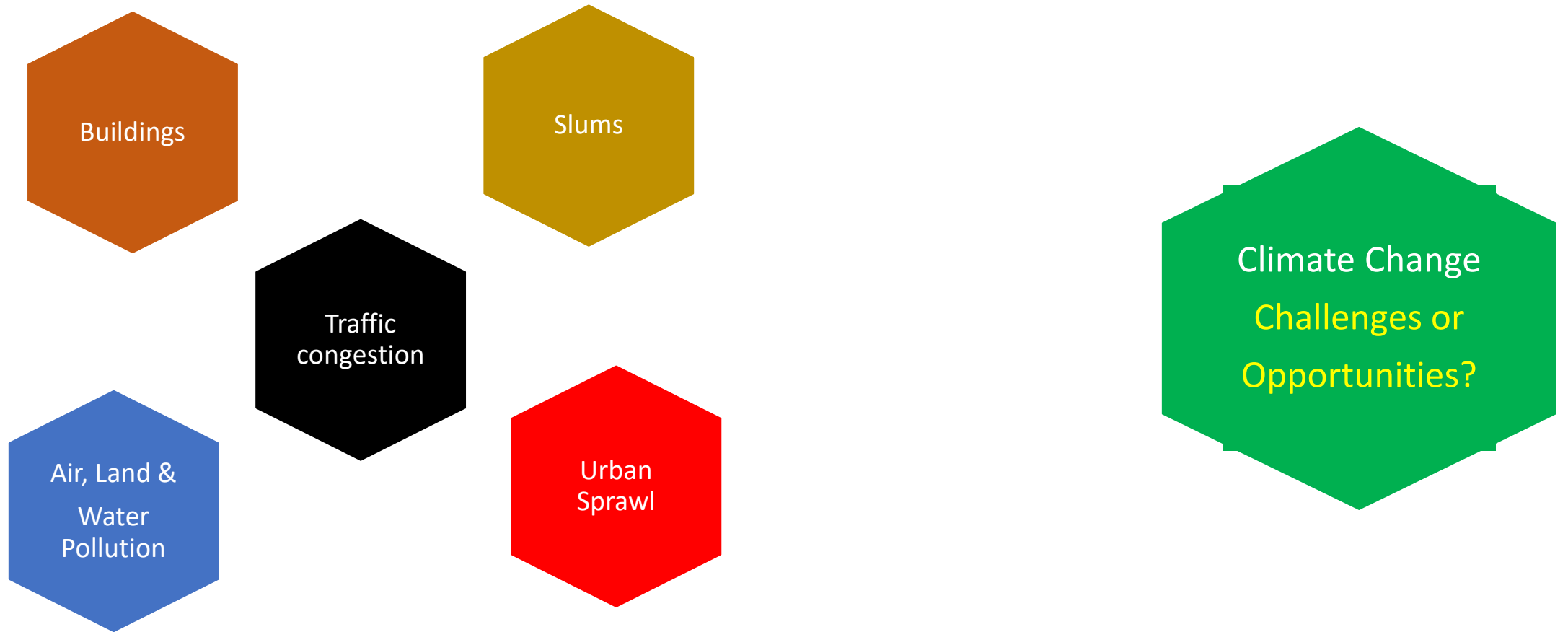


Africa: 62% of urban residents in slums with inadequate WSS

Traffic Gridlocks are Everywhere!



Climate Change: Risks and Opportunities



Risks to Cities because of Climate Change

Predictions include:

- Frequent extreme rainfall events, & increase prolonged storms
- Will stretch the present urban drainage system
- Increased potential damage of urban risk

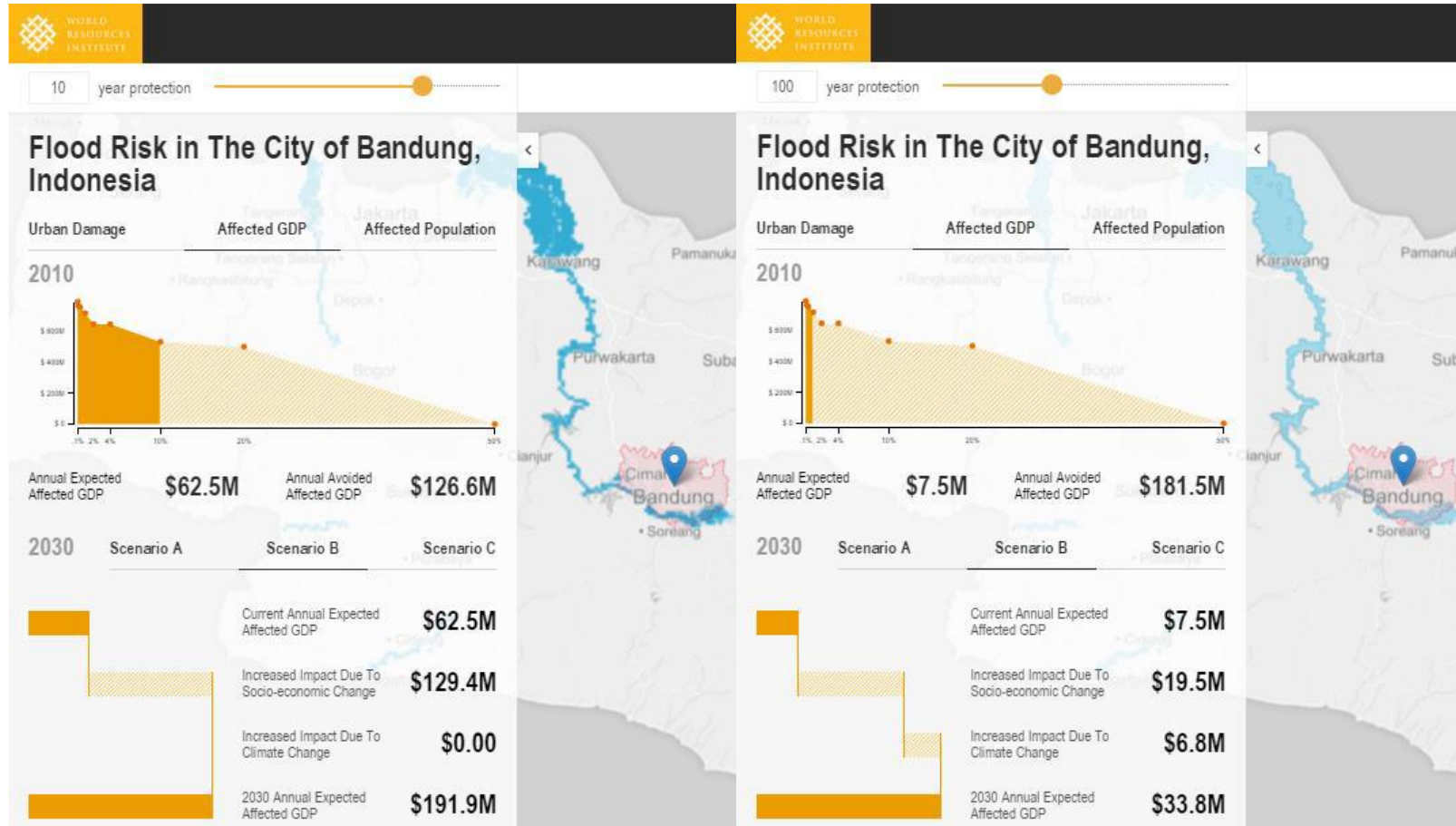
Urban economic growth without adequate governance generates more risk:

- Population & socio-economic growth increases stress on the natural resources.& impacts vulnerability
- Many slums are in flood plains without proper flood protection

Example of Jakarta

- Over the past years a subsidence rate of 10cm/year
- Increasing use of groundwater results in land subsidence.
- Impacts fluvial flood extent and flood depth.

Costs of Inaction rise with Climate Change



Low level of river flood protection : **USD 62.5 million/year** (estimated) worth of GDP affected on an annual basis

Expected to increase to **USD 192 million/ year by 2030** • Around **16,100 people** affected every year

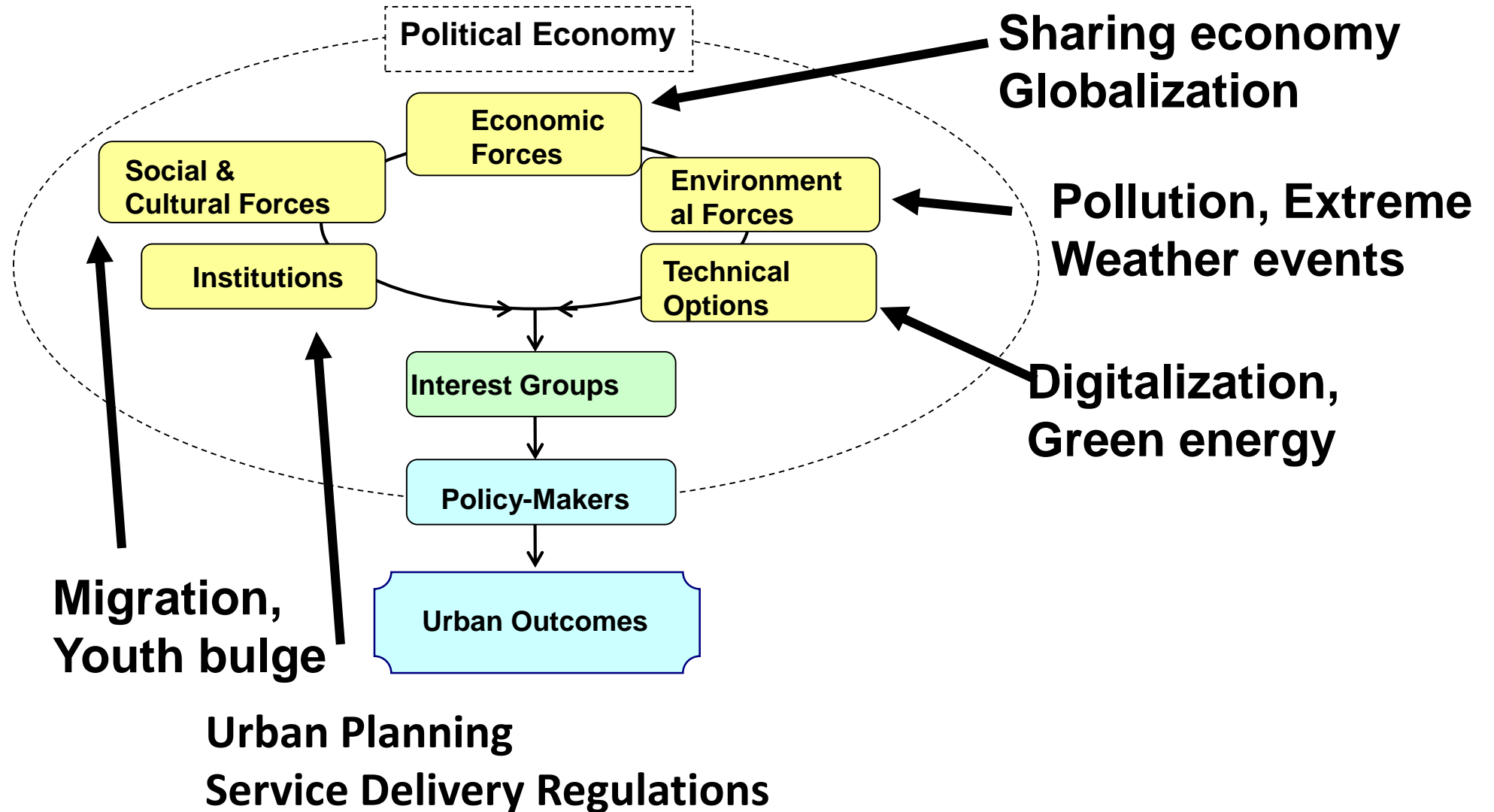
Climate Change has Adverse Impacts on Cities

Countries susceptible to adverse impacts from climate change related variability

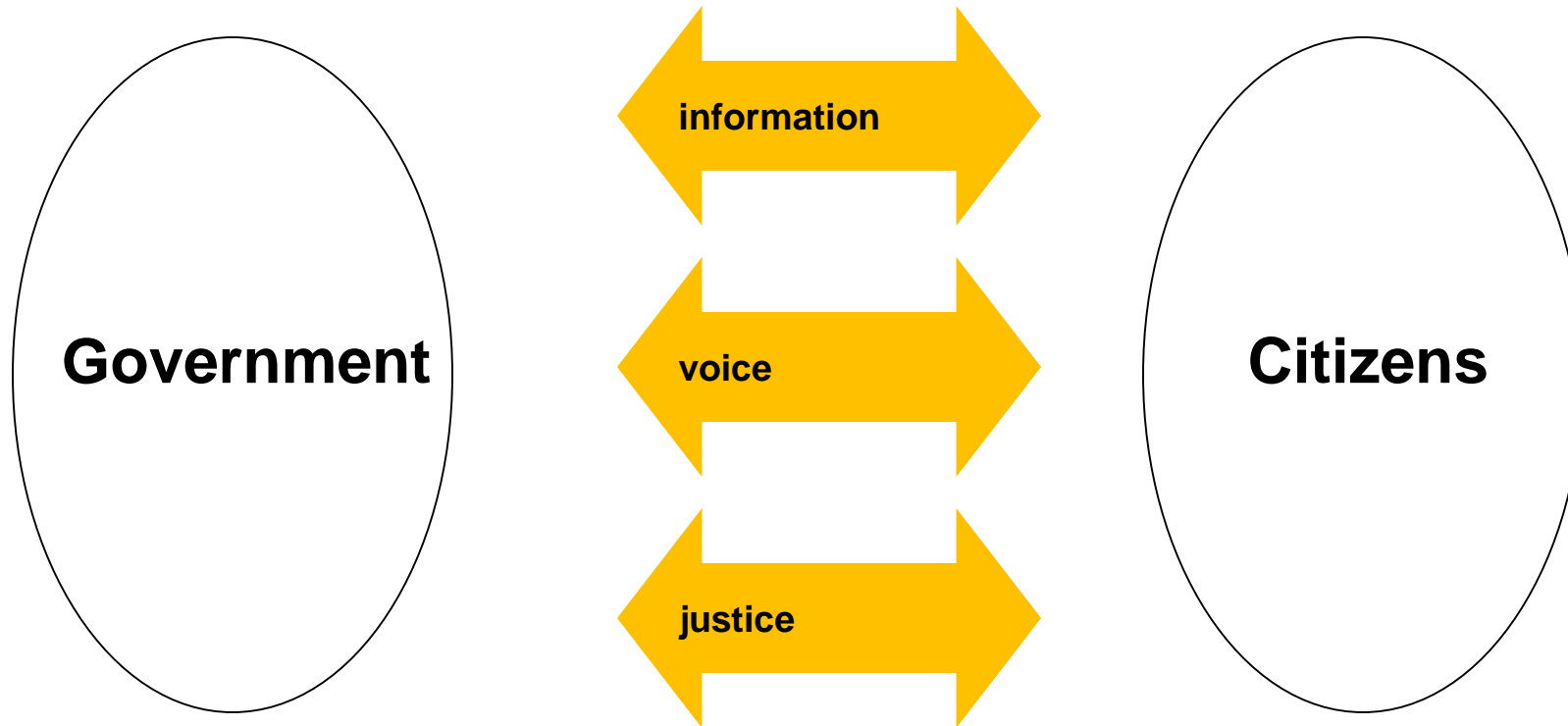
<i>Drought</i>	<i>Flood</i>	<i>Storm</i>	<i>Coastal 1m</i>	<i>Coastal 5m</i>	<i>Agriculture</i>
Malawi	Bangladesh	Philippines	All low-lying Island States	All low-lying Island States	Sudan
Ethiopia	China	Bangladesh	Vietnam	Netherlands	Senegal
Zimbabwe	India	Madagascar	Egypt	Japan	Zimbabwe
India	Cambodia	Vietnam	Tunisia	Bangladesh	Mali
Mozambique	Mozambique	Moldova	Indonesia	Philippines	Zambia
Niger	Laos	Mongolia	Mauritania	Egypt	Morocco
Mauritania	Pakistan	Haiti	China	Brazil	Niger
Eritrea	Sri Lanka	Samoa	Mexico	Venezuela	India
Sudan	Thailand	Tonga	Myanmar	Senegal	Malawi
Chad	Vietnam	China	Bangladesh	Fiji	Algeria
Kenya	Benin	Honduras	Senegal	Vietnam	Ethiopia
Iran	Rwanda	Fiji	Libya	Denmark	Pakistan

- **Analysis of Challenges**
- **Presentation on Opportunities**
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Triple Bottom Line: Achieve Economic, Environmental and Social Sustainability Outcomes



Institutional Design for Public Accountability → Citizens and Government



Institutions → Behaviors → Urban Outcomes

Policy Instruments

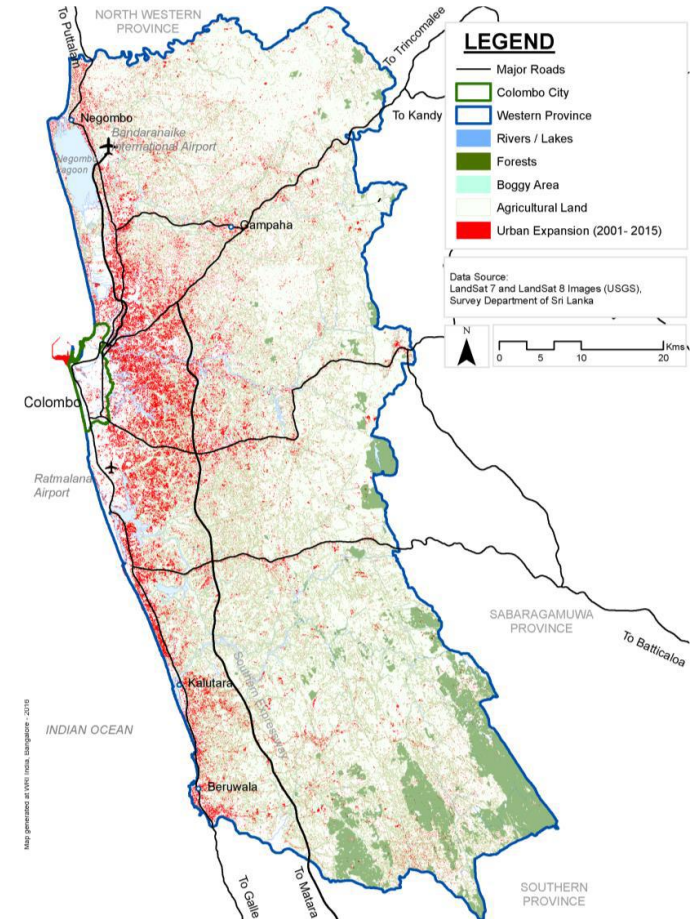
- Subsidiarity Principle
 - Manage at lowest appropriate level
- Financing Rules
- Accountability structures
 - Transparency
 - Internal accountability
 - External accountability
 - Participation
 - Communications, feedback
 - Disclosure of performance

Behaviors (individuals and Institutions)

- Free ridership
- Principal-Agent challenges
- Safeguarding of Human Rights
- Legitimization of social media

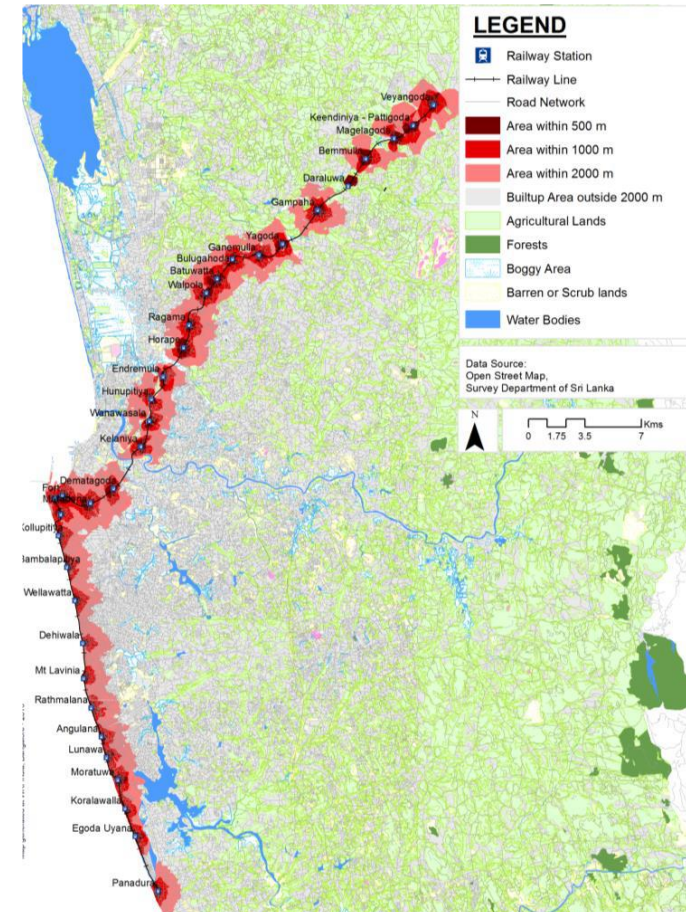
Urban Planning in Colombo: The Challenges

- **Current urban expansion in Western Province**
- Population (5.3 M -> 6.0 M) in 2001-15
- Built-up Area (283 Sq km–546 Sq km)
- Densification along corridors
- Expansion in to wetlands and agriculture
- Un-serviced expansion
- 50% of water bodies and wetlands polluted



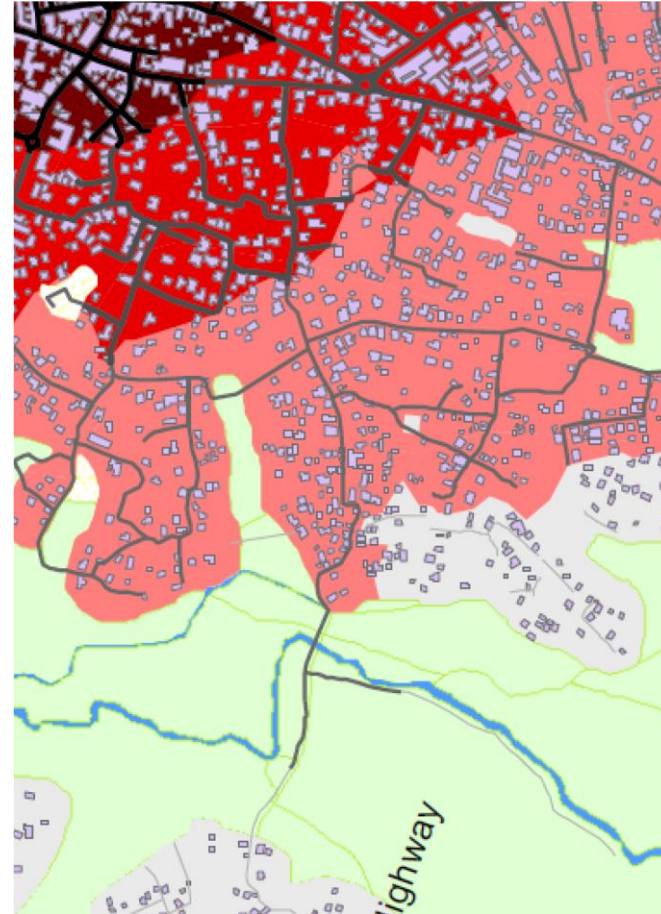
Plans for Urban Transit and Expected Outcomes

- Accommodate =900,000 more people along TOD (1/3 of total growth in WP 2030)
- Improved access for 1,200,000 by 2030
- TOD of 60 Sq km will avoid sprawl = 160 Sqkm
- Emission reduction due to reduced vehicle usage, CO2 = 88,000 MT/Year
- Lives saved = 110 Per year



Local Area Planning Processes

- TOD - Transforming station areas to walkable, dense, mixed-use development.
- Empowering the Municipal Council to develop local area plans
- Engaging Communities to Participate in developing these plans
- Revision of development control regulations (zoning codes)
- Specific Nodes to focus on affordable housing, rental housing
- Land value capture for financing



Today's Urban Agenda is Multi-dimensional

Sustainable
Development
Goals

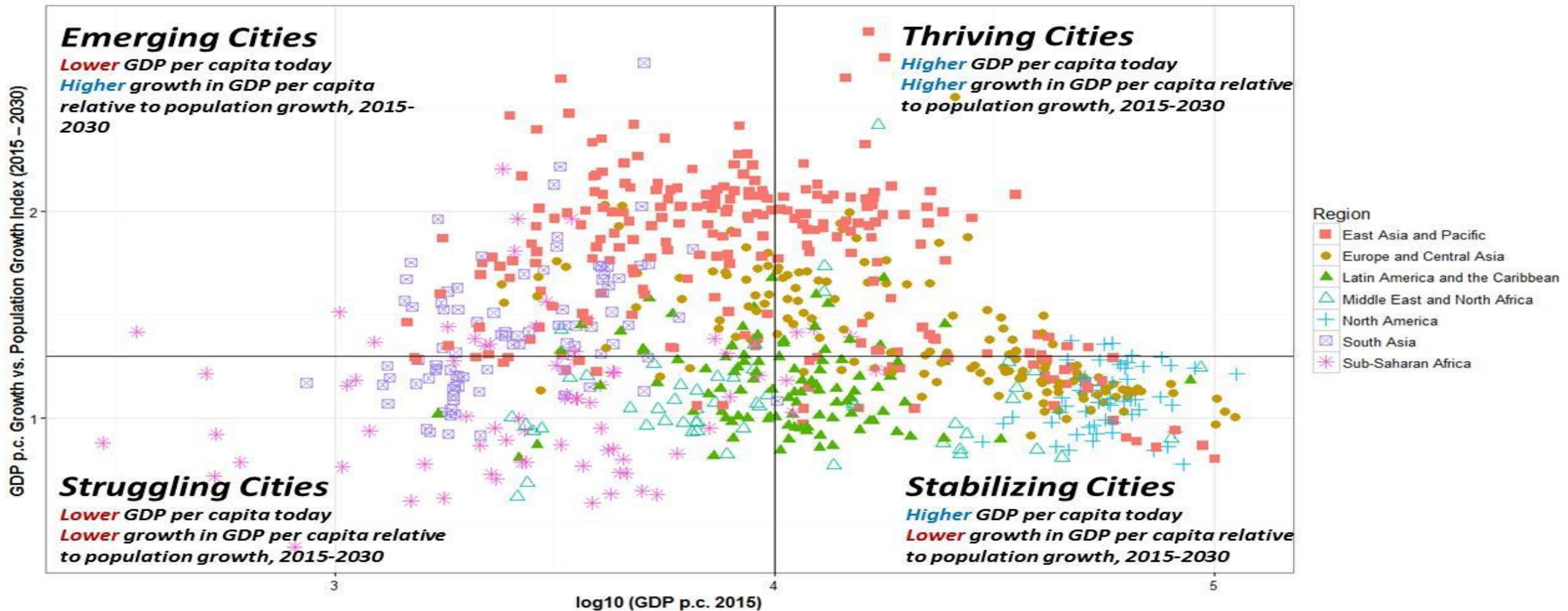
Comprehensive
Diagnostics with
data driven tools

Coalitions for
changes

Solutions around
scales & levels

Promotion of
circularity

Implications of City Typology for Urban Development



(Source: World Resources Report of WRI)

The Sharing Economy as an Opportunity Equalizer

Three Big Opportunities

- Digital economy disruptions
 - From mobility to markets
 - From Broadband to big data
 - From Cloud to Localized Apps
- Ubiquity of Sensors
 - Cloud and IoT to improve performance
- Shared Economy
 - From sidewalks to social media

How Policies need to Respond

- ✓ Institutions & Regulations
 - ✓ Land policy
 - ✓ Infrastructure policy
 - ✓ Efficient regulatory arrangements
- ✓ Respond to changing future of work
 - ✓ Skills Development
 - ✓ Support innovations
- ✓ Focus on Equitable Development
 - ✓ Affordable housing
 - ✓ Enterprise support and Finance

Focus Policies and Programs to Reflect Local Priorities



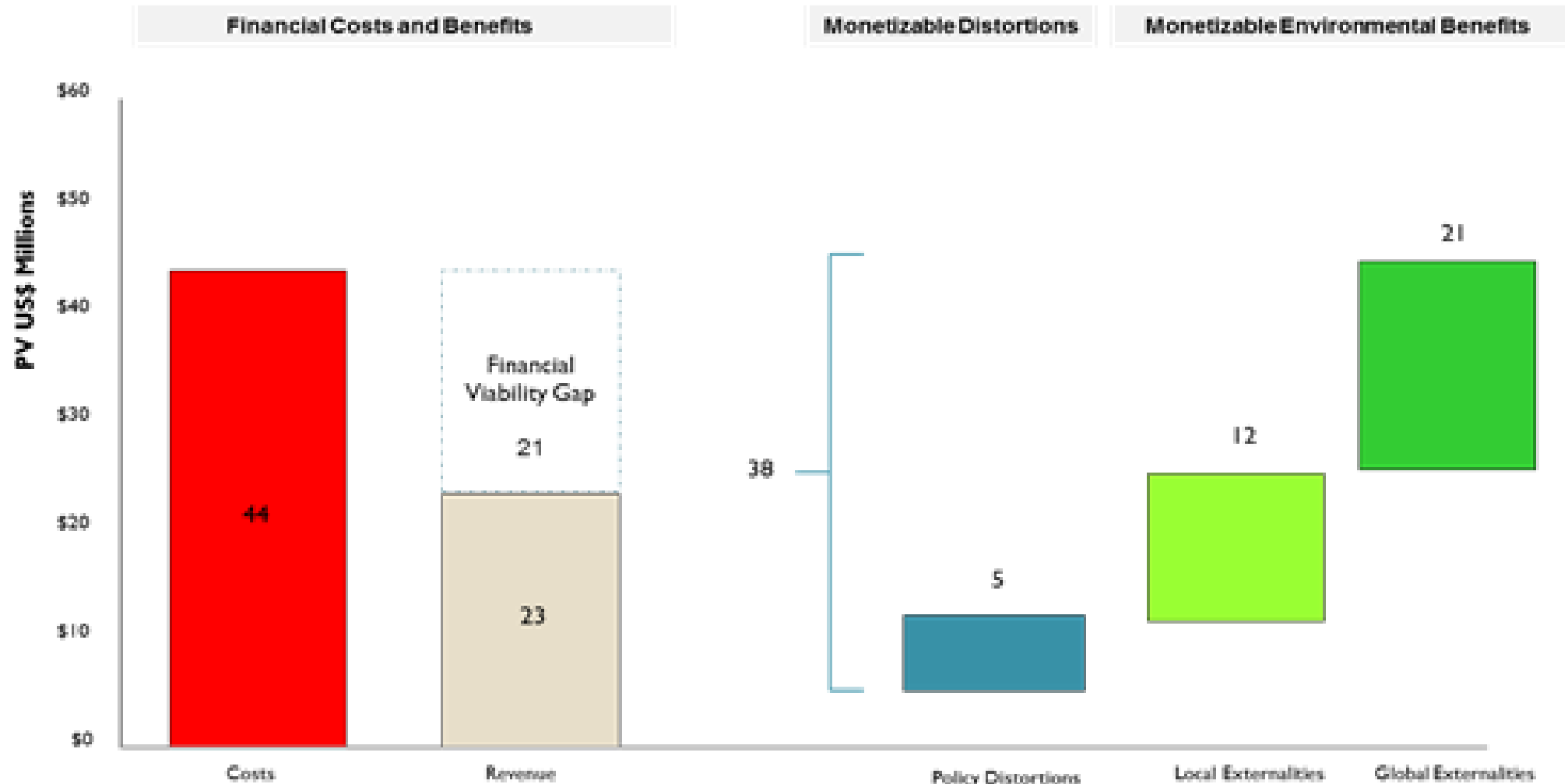
'Smart' City Instruments can be Helpful

- Leverage big data analytics, geo-spatial data and other overlays to promote transparency
 - –Promote Open Sensors Policies to integrate urban spatial data from key services
 - –Outsource Continuous Monitoring of Key Performance Indicators
 - –Build a culture of Predictive Management of Urban Infrastructural Services
- Support Social Economy as a 'third force' to complement the public and private sector
 - Co-opt CSR incentives into Enterprise-Cities alliance
 - Leverage social media to encourage feedback
- Facilitate knowledge flows, re-skilling and continuous learning
 - from academic institutions, think tanks etc.to enhance quality of urban planning and management process

Where will the infrastructure financing come from?

- Remittance flows are substantial financiers of household real estate
- Land Value Capture possible in city districts where property values are increasing
- Partner with international ratings agencies to provide ratings on securitized debt
- Issuance of Green Bonds feasible if urban climate policies are credible to markets

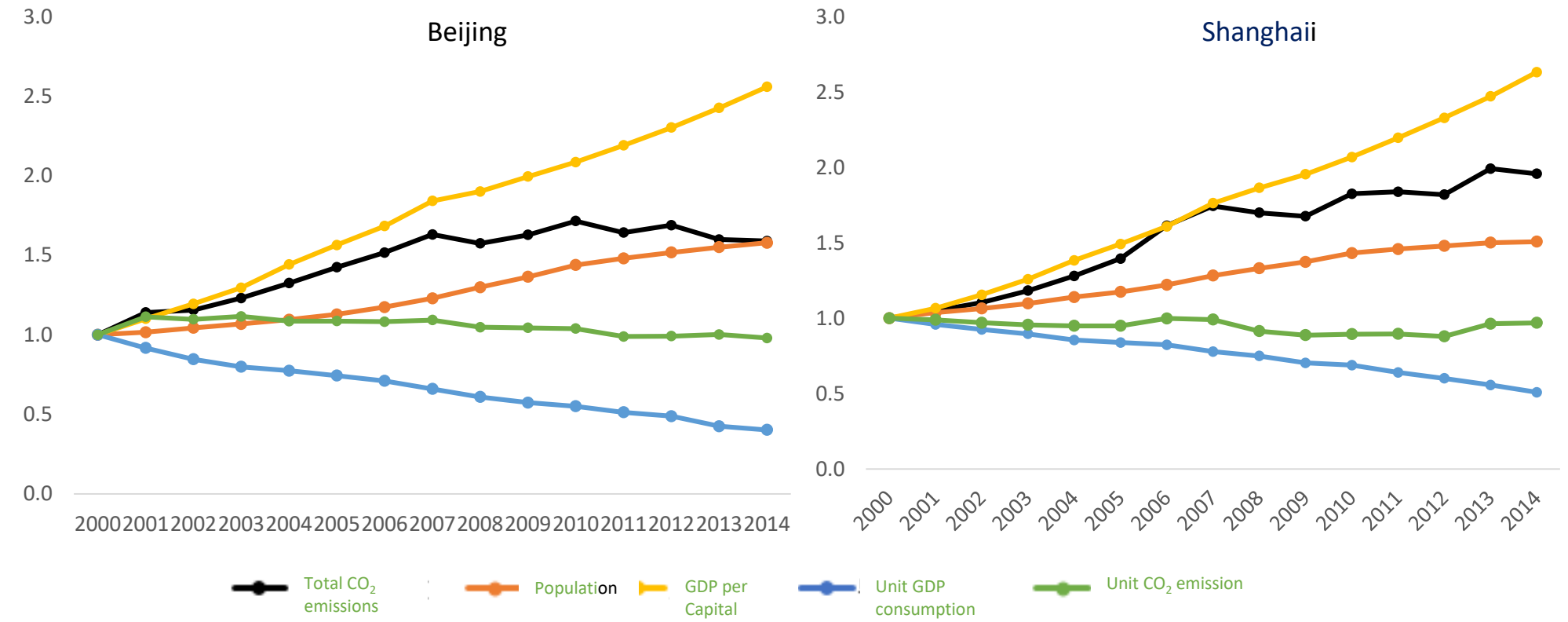
Finance is Available if Green Outcomes are Achieved



Source: Source: Aldo Baietti: Green Finance for Cities in Asian Perspectives on Urbanization, City Voices 2016

Using electronic data we can track the progress cities are making toward Green Development

Carbon emissions are affected by factors such as population, GDP per capita, energy consumption per unit of GDP, and carbon emissions per unit of energy consumption.



Note: Calculation based on public statistical data

Shape a Narrative that focuses on Quality of Urban Life



- **Growing middle class aspires for less congestion and air pollution**
- **Pressure on urban roads beyond traffic capacity, affordable housing beyond available supply**
- **Accessibility of transit stations, road safety, Right of way to Pedestrians and Cyclists**

Innovations in Nairobi: The Matatu Apps

DIGITAL MATATUS ABOUT THE MAP VISION PRESS & PUBS NEWS THE TEAM CONTACT GET INVOLVED

THE MAP

[POCKET MAP](#)

[WALL MAP](#)

[GIS DATA](#)

[GTFS DATA](#)

NAIROBI MATATU ROUTES

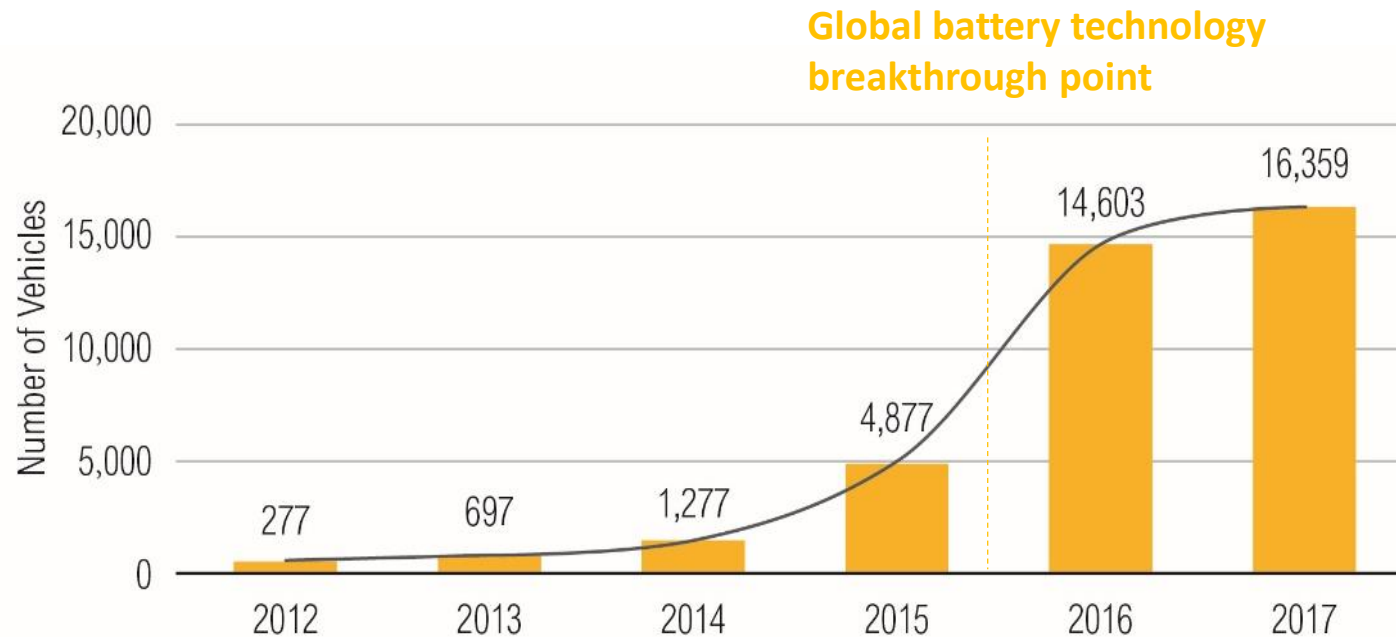
digitimatatus

The map displays a complex network of routes across Nairobi, color-coded by route. A legend on the right side of the map defines the symbols used: a blue square for 'Outbound From City Center', a pink square for 'Inbound To City Center', a red line for 'Terminus', a yellow circle for 'City Center', and a green line for 'Junction'. Below the legend, the routes are listed in vertical columns, each with a color-coded header (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z) and a corresponding line of route details. At the bottom right, there is a small text block with legal disclaimers and logos for partners like DATA LAB and others.

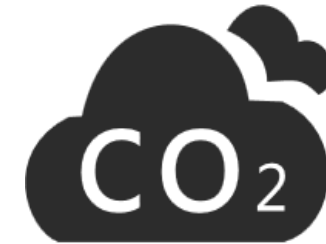
Learn from Best Practices: Shenzhen 100% E-Bus

Diesel buses in Shenzhen represented **0.5%** of the total vehicle fleet, but accounted for **23%** of transport-related emissions

- Primary e-bus model: Battery Electric buses (instead of Plug-in Hybrid Electric buses)
- Maximum battery range per charge: 250 km (A\C on)
- Capital cost: 0.2-0.3 million USD per bus, with lifelong battery warranty



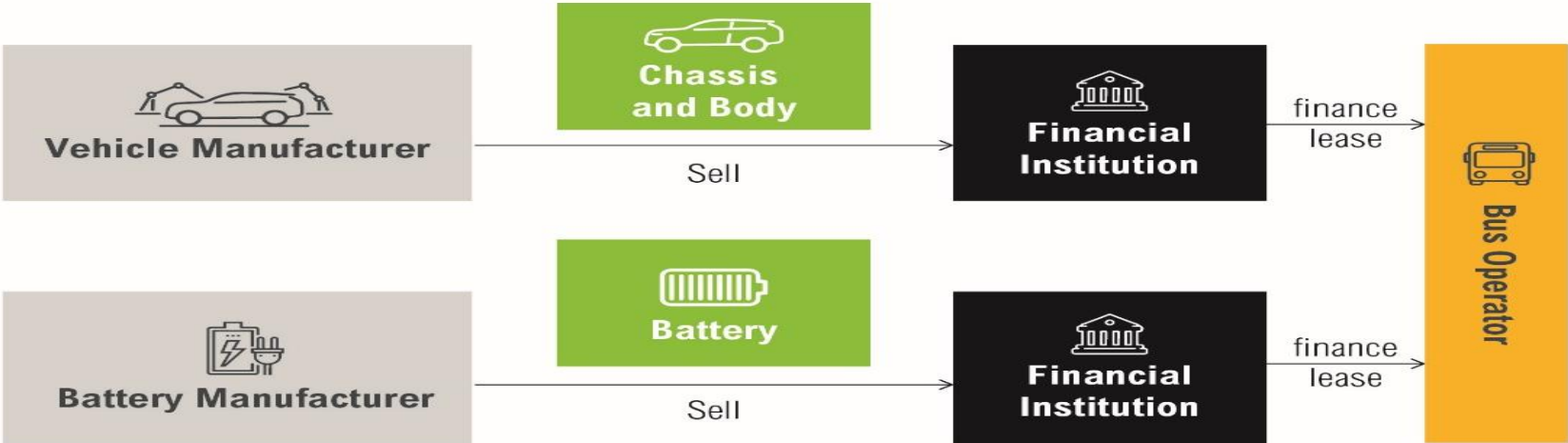
0.63 million tone CO₂ reduction in 2017, compared to diesel buses



Technology is Disrupting Service Organizations

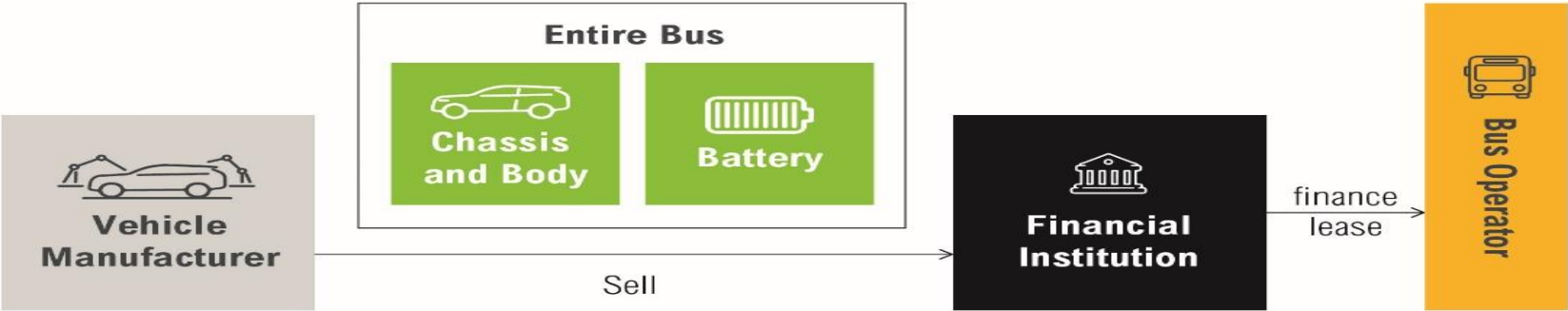
Separated Batter Lease Model:

vehicles and batteries (with charging and maintenance services combined) are leased separately.



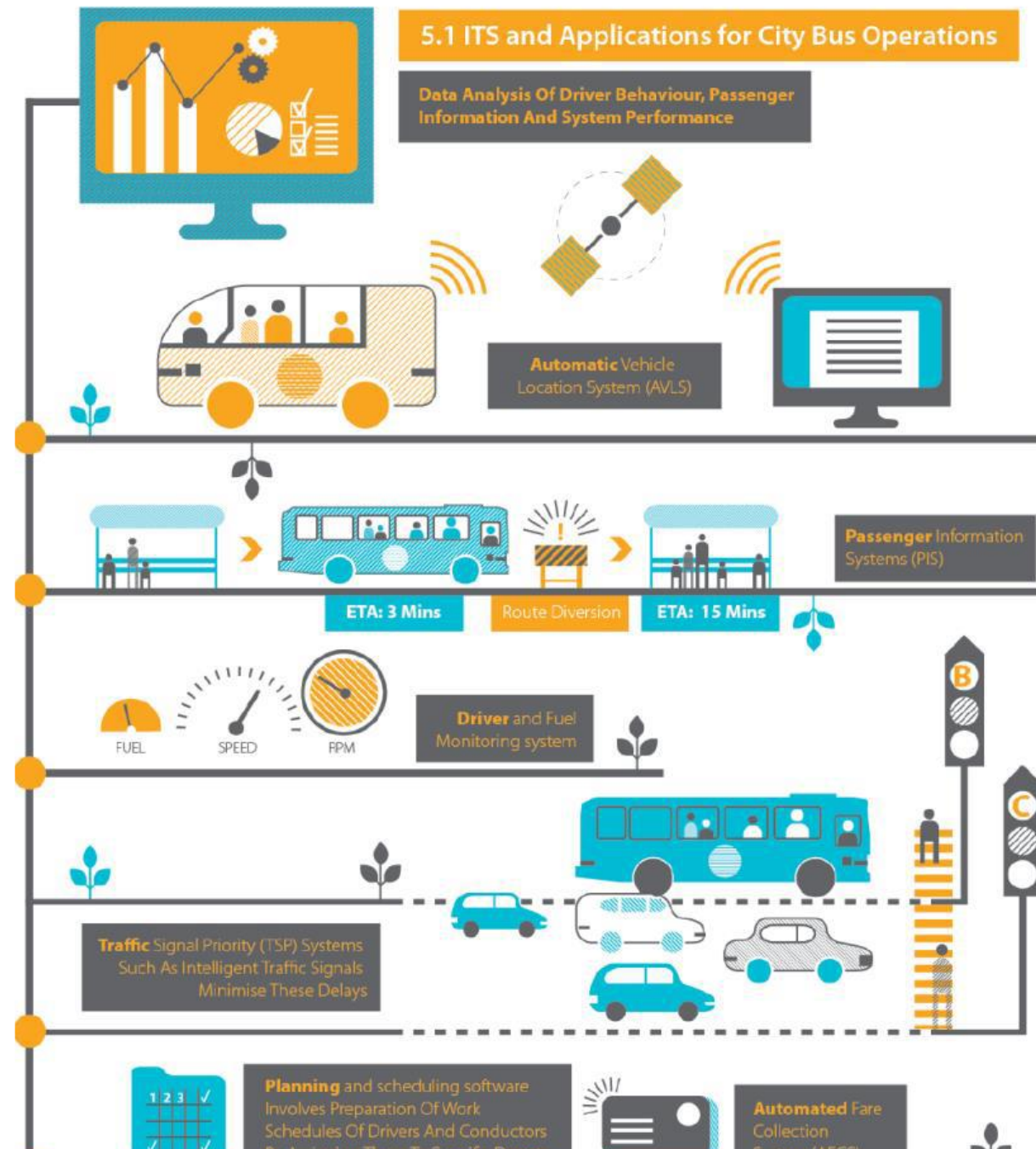
Entire Vehicle Lease Model:

Entire vehicles (with maintenance services combined) are leased together.

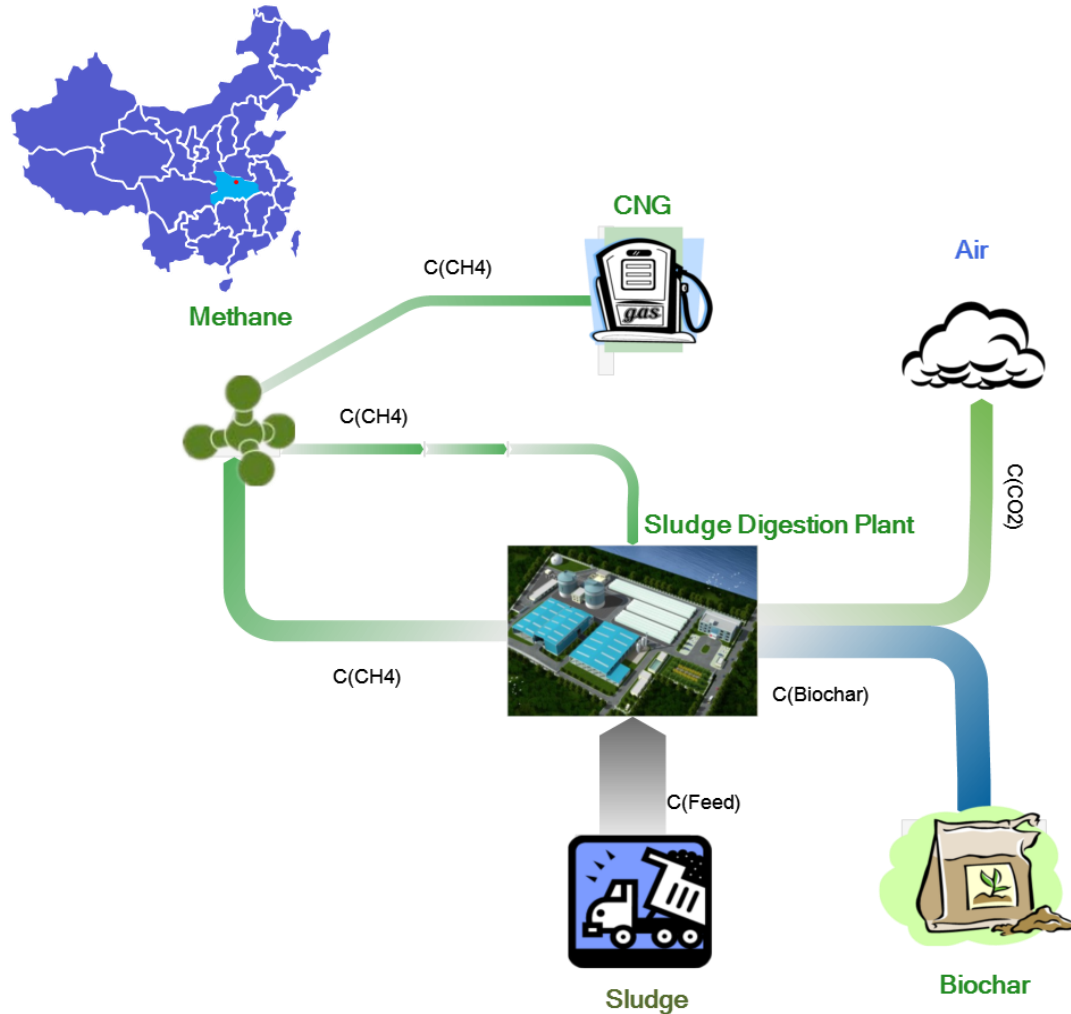


Note: Financial institution here includes not only commercial banks, but also financial arms of the manufacturers.

With Digital Platforms becoming Ubiquitous



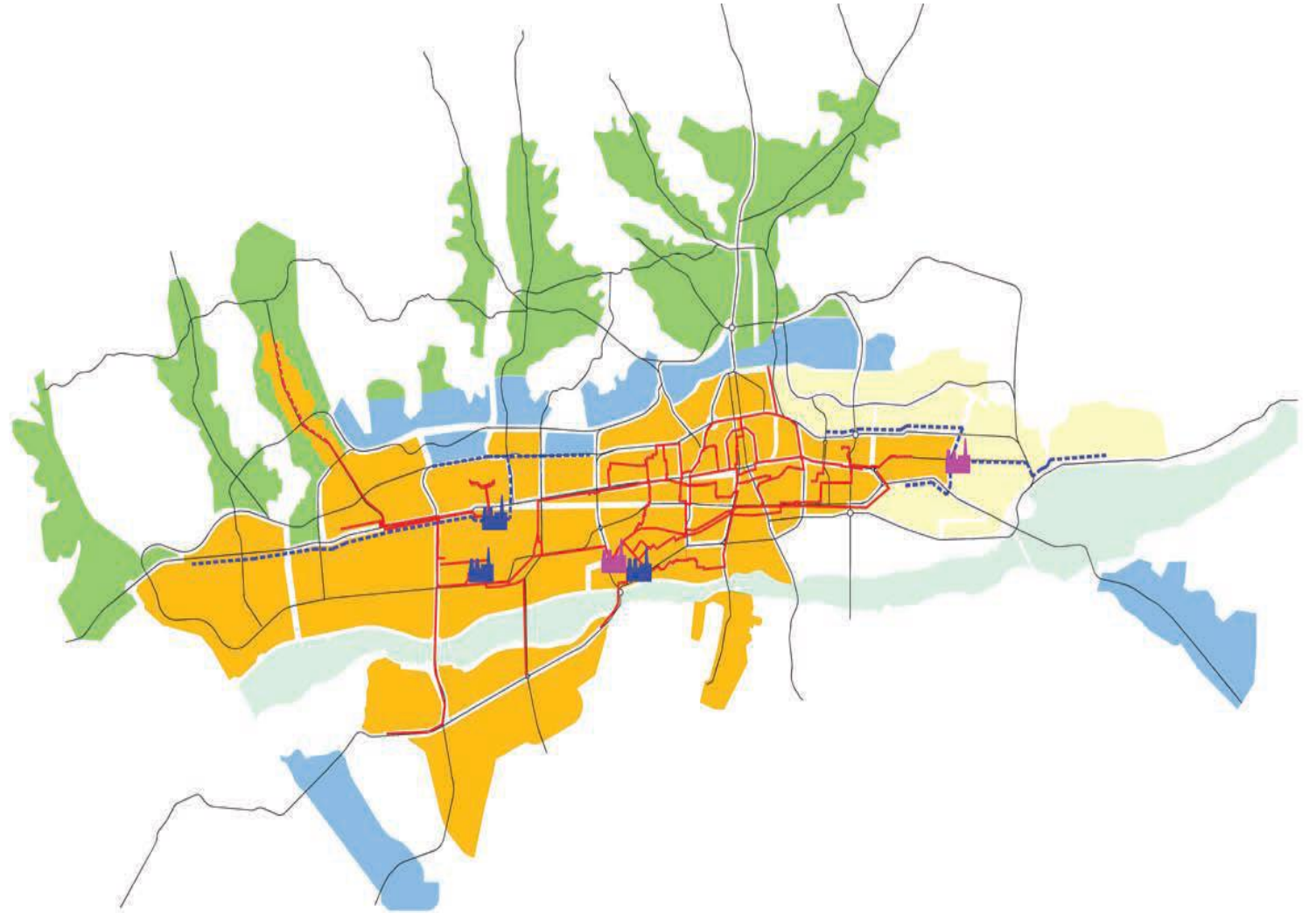
Learn from Best Practices: Methane from City Sludge in Xiangyang, China



- Capacity: 300tons/day (sludge and kitchen waste co-digestion)
- Method: thermal hydrolysis + anaerobic digestion
- Product: CNG (6000m³/day), biochar (55-60 tons/day) for seedling cultivation
- Operation mode: BOO with 23 years of concession period (2 years of construction period)

Seoul's Smart Card Policies applied in Ulaanbaatar city

- Automatic vehicle location
- Passenger information
- Planning and scheduling
- Transit signal priority
- Fare collection
- Driver and Fuel Monitoring
- Last mile connectivity to Gers



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