

SUSTAINABLE CITIES



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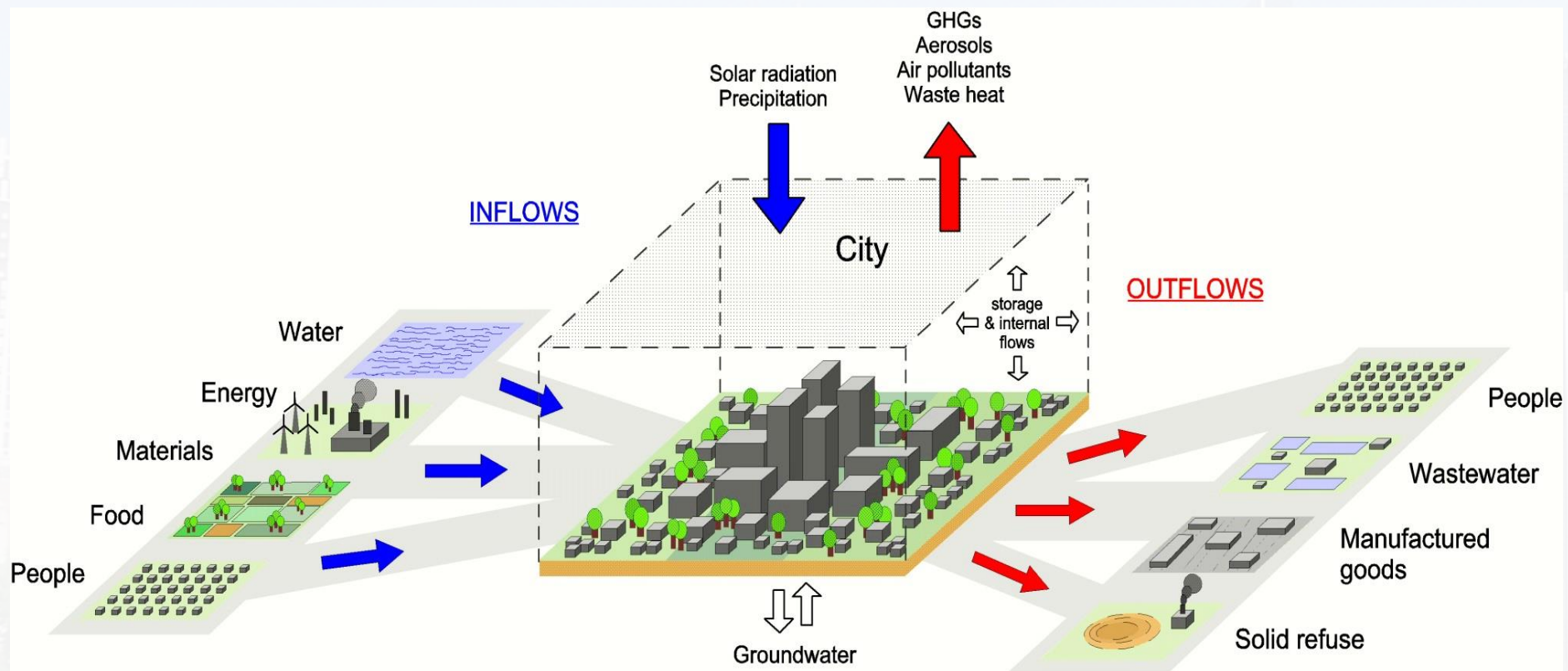
Immediate Past President, APRSCP

Presentation outline

- I. Energy and material flows of megacities
- II. Pillars for achieving sustainability of cities
- III. Initiatives and projects of UNEP on cities and bldgs.
- IV. The Global Initiative for Resource Efficient Cities



Energy and material flows of megacities : Urban Metabolism Framework



Energy and material flows of megacities :

Data collection

1. Definition of megacity

- spatial boundaries
- constituent cities
- population
- economy

2. Biophysical descriptors

- climate
- latitude
- population density
- building stock

3. Urban metabolism

- energy (all types)
- water
- materials
- waste

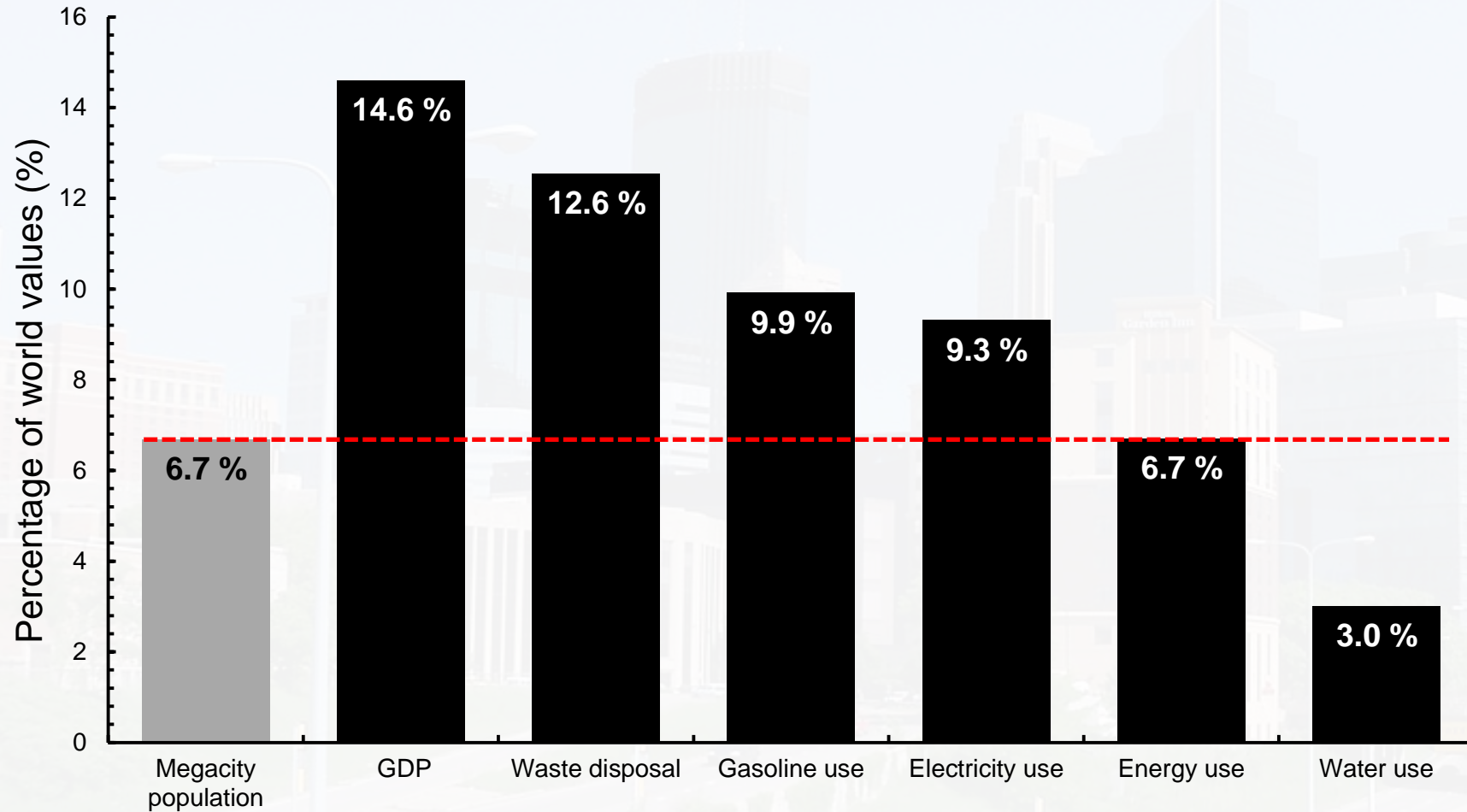
4. Role of utilities

- access of households to basic services;
- potential to provide new services



Energy and material flows of megacities :

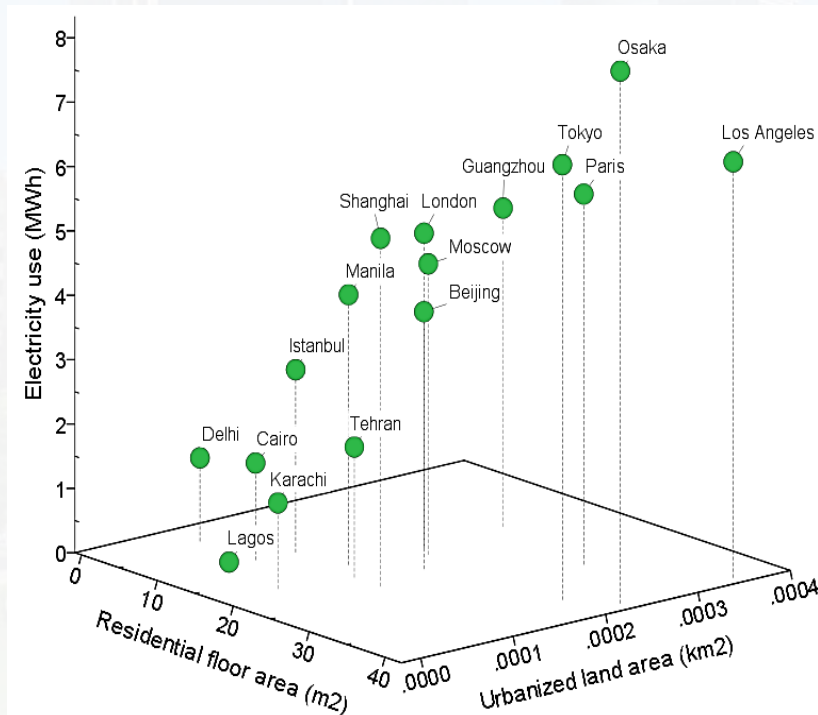
Resource consumption as percentage of world values



Energy and material flows of megacities : Macroscale regression results for factors in 2011

Variable	R ²	n	t _{0.95}	t-stat	P-value	Coefficient
Energy and Material Flows for 2011						
Electricity consumption	0.88	27	2.056			
Urbanized area per person				13.55	2.71E-13	21614
Heating and Industrial fuel use	0.85	27	2.056			
HDD				5.87	4.01E-6	0.02
Urbanized area per person				2.50	0.02	57722
Ground transportation fuels	0.83	27	2.056			
Urbanized area per person				11.40	1.30E-11	92858
Water consumption	0.78	27	2.056			
Urbanized area per person				9.62	4.75E-10	953201
Solid waste production	0.87	20	2.093			
GDP				5.98	1.19E-5	7.41E-6
10-y GDP growth rate, %				5.17	6.40E-5	0.0002
Steel consumption	0.88	9	2.306			
10-y pop growth, no. of people				7.67	5.93E-5	0.002
Regressions with gross building floor area						
Urbanized area per person	0.84	13	2.179			
Total gross floor area				8.09	3.36E-6	4.02E-6
Urbanized area per person	0.87	16	2.131			
Residential gross floor area				9.84	6.2E-8	7.47E-6
Electricity consumption	0.93	16	2.131			
Residential gross floor area				14.05	4.86E-10	0.19
Electricity consumption	0.95	16	2.131			
Residential gross floor area				3.66	0.003	0.12
Urbanized area per person				2.46	0.03	9726
Changes in energy flows, 2001-2011						
Electricity, 10-y growth rate, %	0.80	16	2.131			
GDP, 10-y growth rate, %				7.80	1.17E-6	0.56
Ground transportation, 10-y growth, %	0.67	13	2.179			
GDP, 10-y growth rate, %				4.89	0.0004	0.61

Urbanized land area per person correlates strongly with energy use in megacities at the macro-level



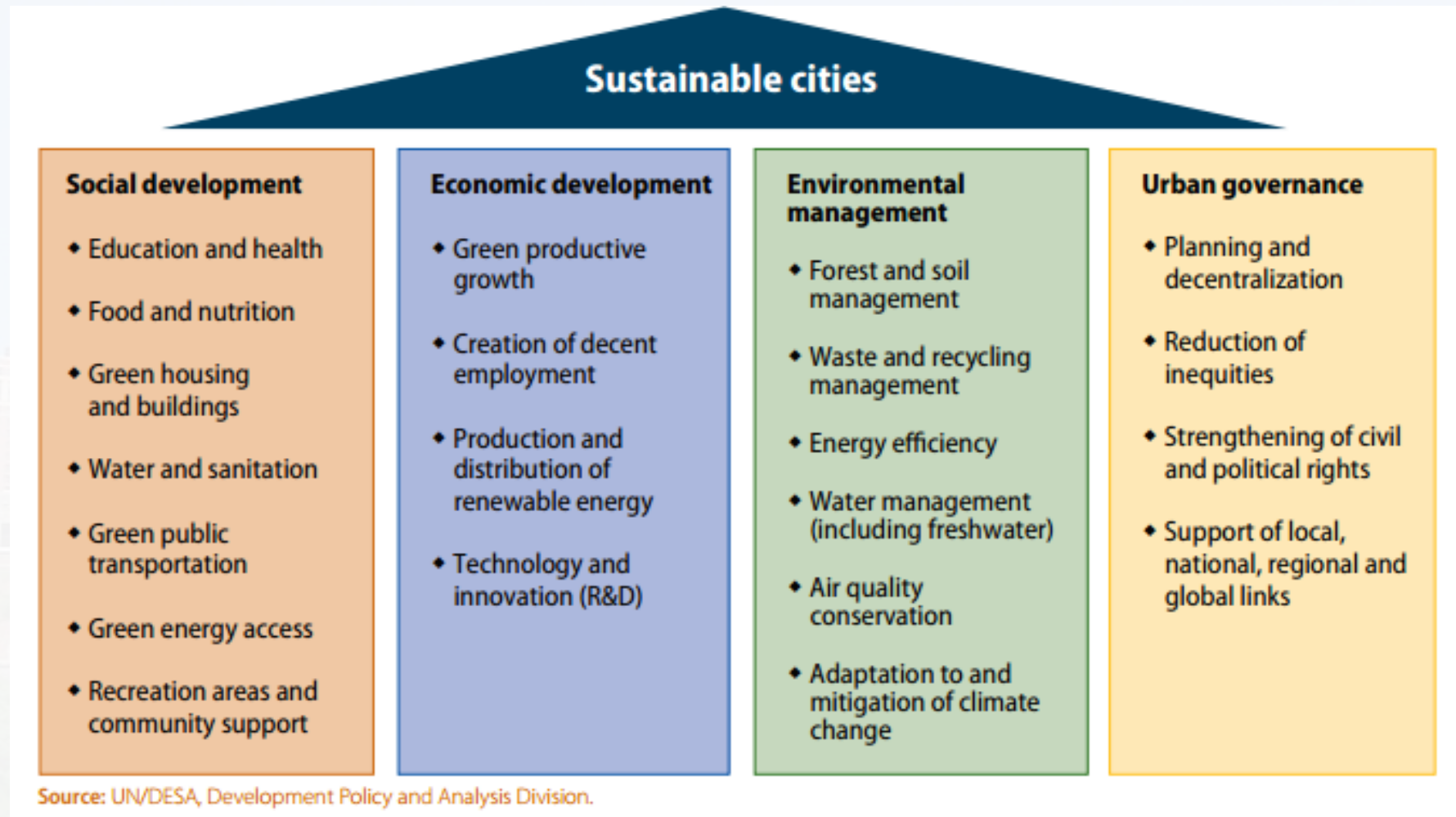
Energy and material flows of megacities :

Conclusions

1. Wealth effects dominating efficiency.
2. Building Floor area explains correlation between electricity and urban area per capita.
3. High correlation of area/cap., GDP, and energy.



Pillars for achieving the sustainability of cities



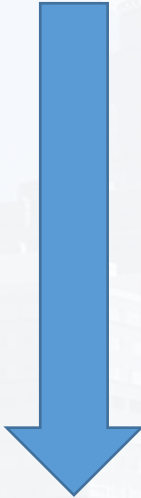
UNEP initiatives and projects on cities and buildings

1. **Global initiative for resource efficient cities (GI-REC)**

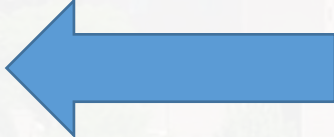
2. Integrated environmental planning
3. Partnership on cities and climate change
4. Linking global agenda to local action
5. Sustainable building and climate initiative (SBCI)
6. Sustainable social housing initiative (SUSHI)
7. Sustainable building policies in developing countries (SPoD)
8. Urban clean development mechanism (CDM)

Key Facts on Cities Consumption and Production

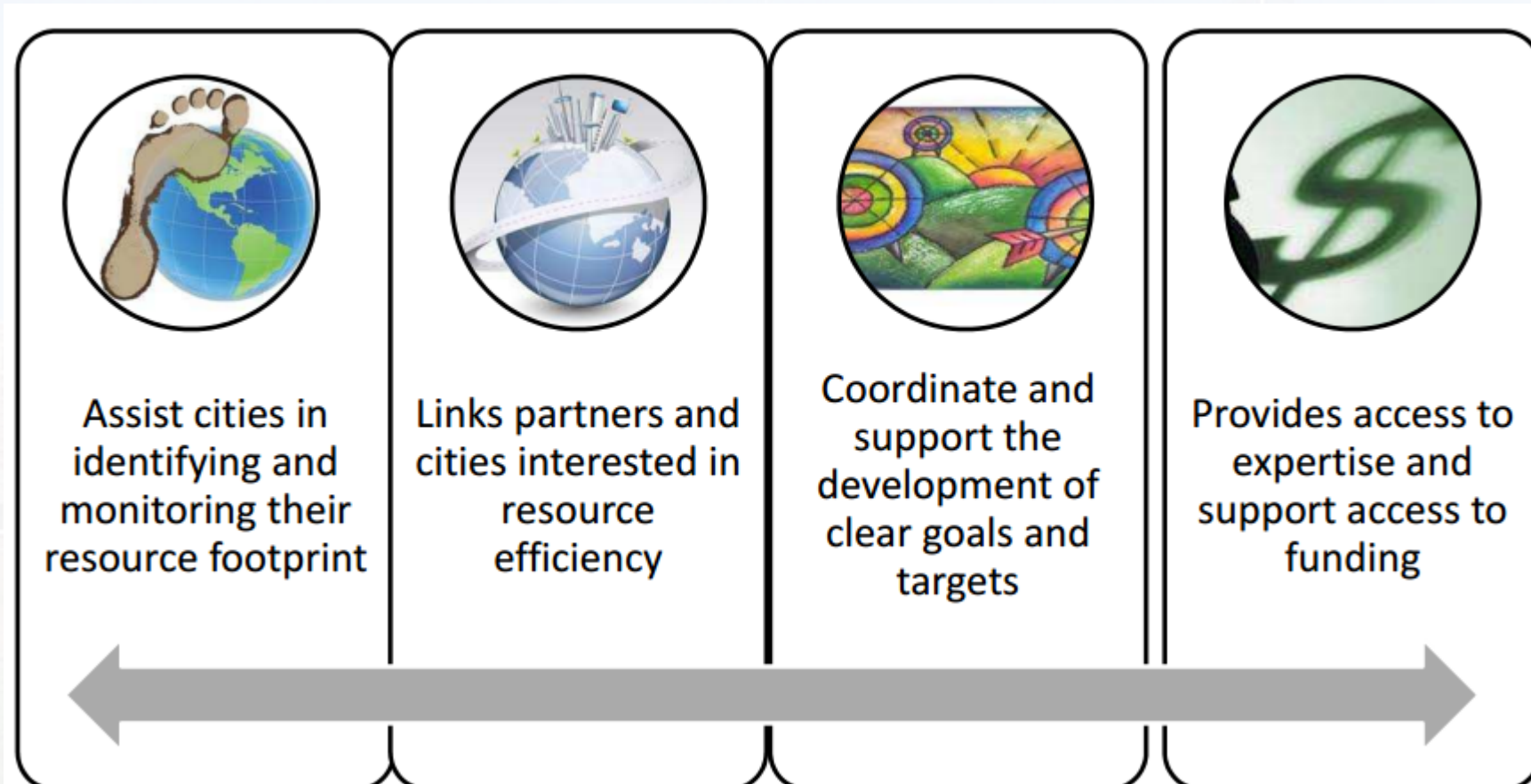
Cities occupy 3% of the total land surface
Cities produce 50% of global waste
Cities account for 60-80% of global GHG emissions
Cities consume 75% of natural resources
Cities produce 80% of global GDP



Why resource efficiency in cities?



Global Initiative for Resource Efficient Cities (GI-REC)



Suggested Roadmap

2012

1. **Preparatory work and launch of GI-REC at Rio+20** United Nations Conference on Sustainable Development

2012

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2013

2. **City's Survey** - undertaking a survey of about 300 cities to help them understand, identify and manage their resource footprint and potential efficiency gains.

2013

3. **Operationalize the GI-REC** - using UNEP's convening ability to mobilize partners, connect cities and source funding.

>>GI-REC to attract 200 cities by 2015 & 400 by 2020
>>GI-REC to join forces with 50 partners from public and private sector by 2015 & 100 partners by 2020

2013

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2014

4. **Develop a Research Agenda** - Inventory of UNEP's and partners' initiatives and expertise on resource efficiency. Developing relevant methodologies and establishing a set of criteria and targets for a model resource efficient city.

2013

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2014

5. **Establish Network Platform** - for facilitating exchange of experiences and best practices through regular meetings, conferences and roundtables and the set up of a peer-review process across cities.

2015

Leading to the development of a resource footprint of cities together with partner cities and partners towards more resource efficient cities.

Source: <http://www.unep.org>

How will GI-REC operate?



Targets to achieve through GI-REC

- ✓ By 2015, 20 partner cities to have access to financial mechanisms to support energy efficient and cost effective sustainable buildings.
- ✓ By 2017, 50 partner cities to apply Sustainable Building Standards and Global City Environmental Assessment Frameworks together with regular reporting on progress.
- ✓ By 2020, 100 partner cities to improve recycling rates of solid waste by 50%.
- ✓ By 2020 to improve energy and water efficiency in buildings, industries and cities by 50%

