

Land Use and Transport for Low Carbon Cities

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UNCRD - Environmentally Sustainable Transport (EST) Forum

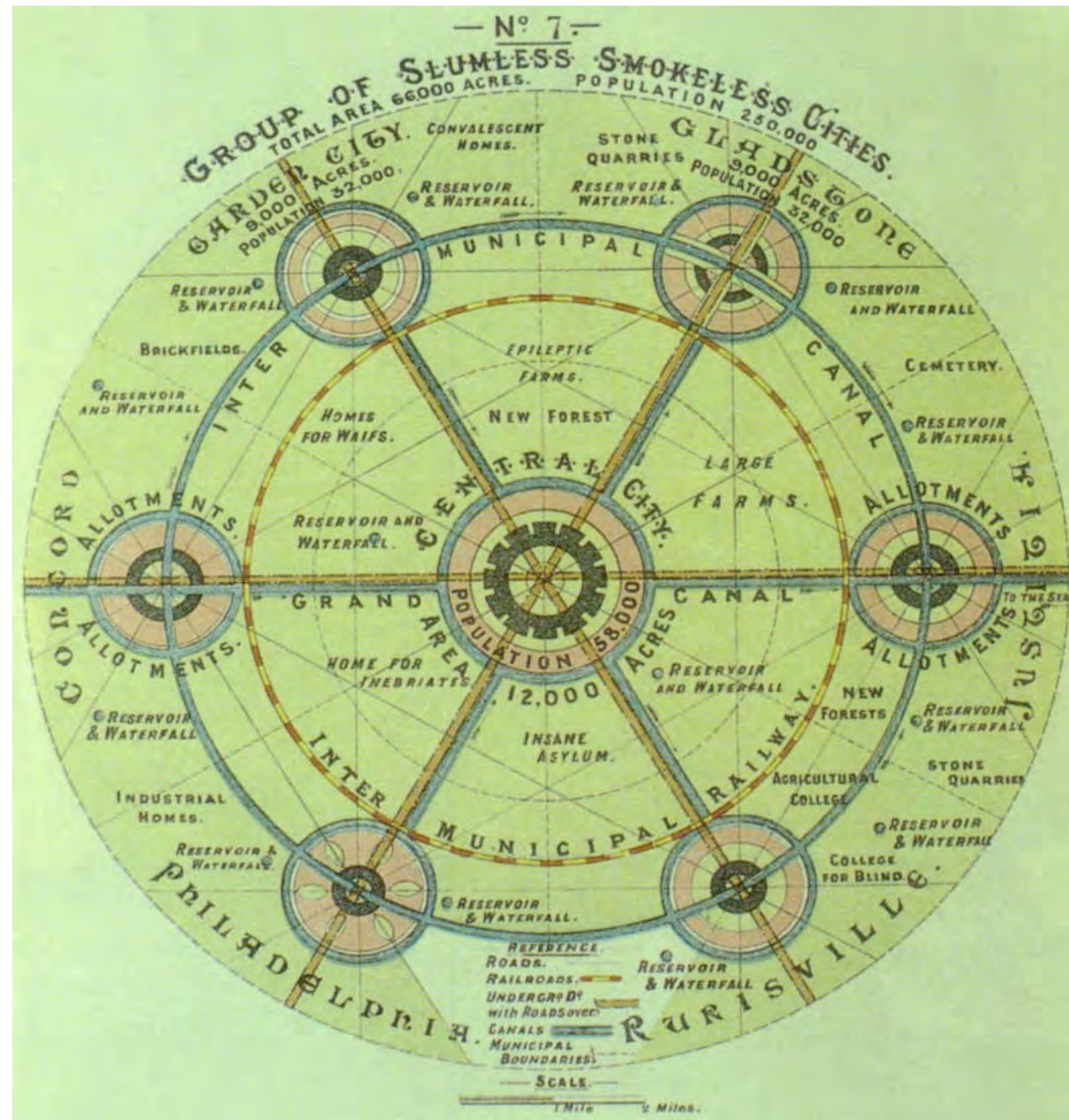
October 2018, Ulaanbataar, Mongolia

Cities

- › Cannot live without them, cannot live in them,
- › Can we adapt them?
- › Home to over 50% of the population
- › Economic centres for countries
- › Magnets for opportunities
- › Larger the cities higher the labour opportunities
- › Are also large polluters
- › Consume land and energy
- › Contribute to environmental problems at a larger scale

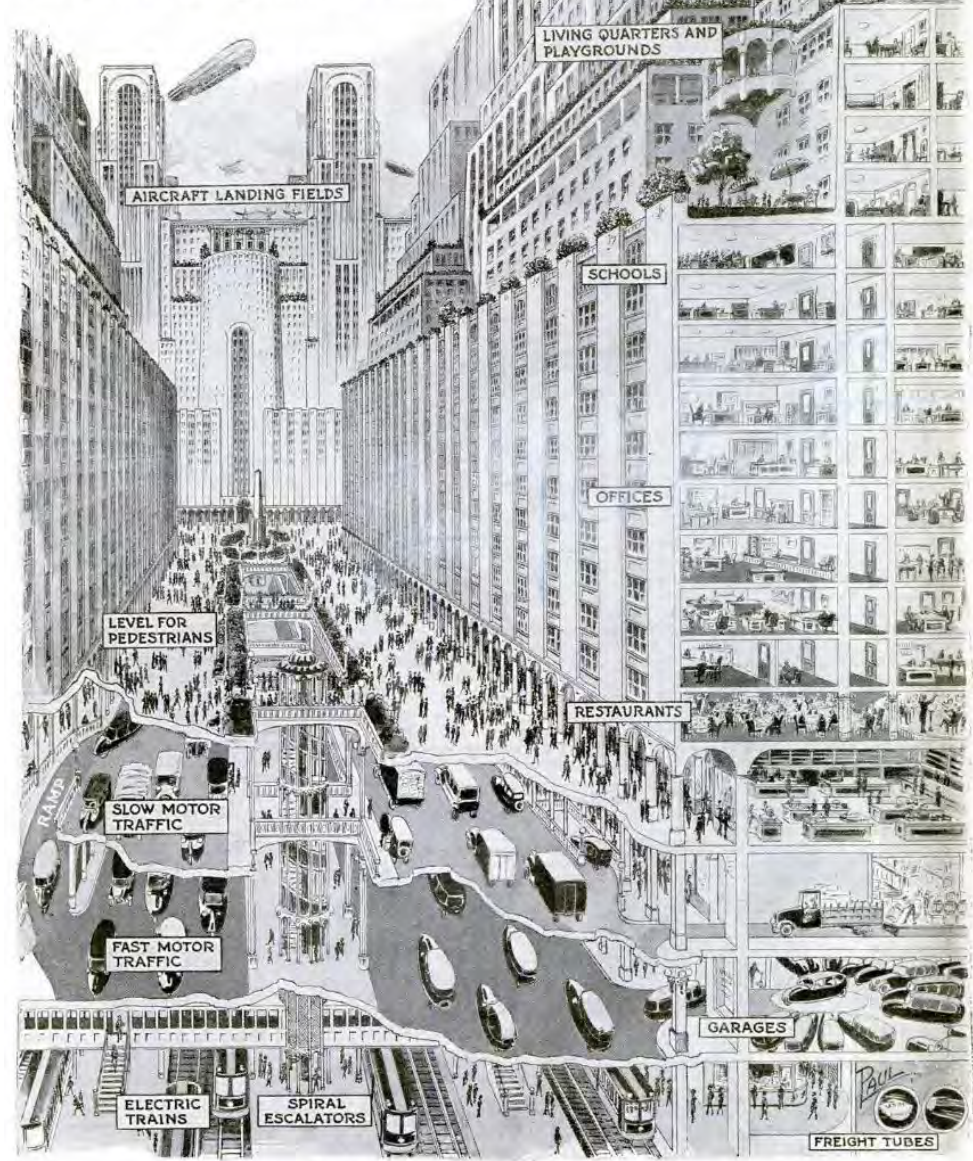
Slumless smokeless cities (1902)

- Garden city
- Green Metropolis
- Ebenezer Howard
- 2 cities built! -
Welwyn Garden
City and
Letchworth
Garden City, both
in Hertfordshire
England



May Live to See

May Solve Congestion Problems



How You May Live and Travel in the City of 1950

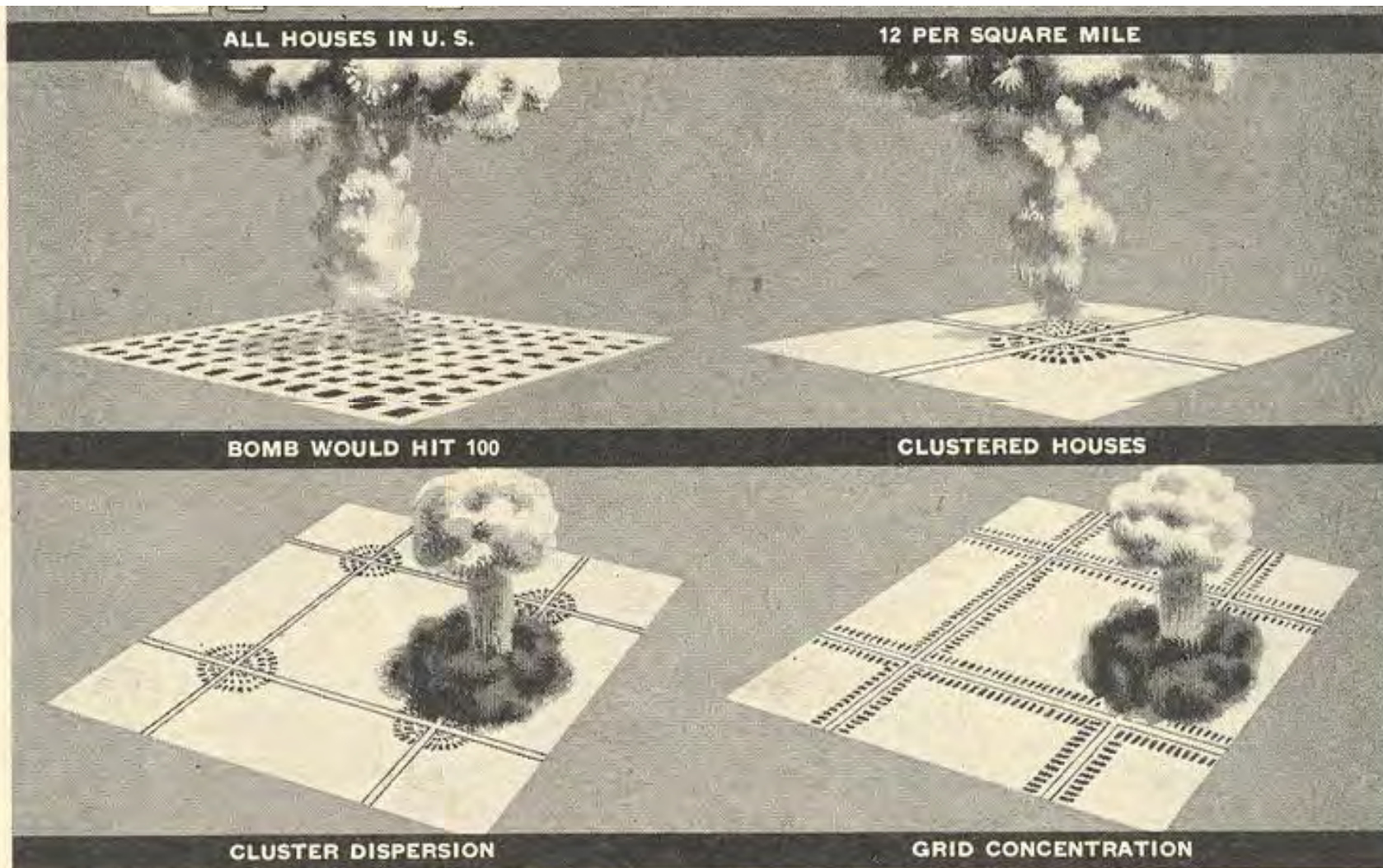
Future city streets, says Mr. Corbett, will be in four levels: The top level for pedestrians; the next lower level for slow motor traffic; the next for fast motor traffic, and the lowest for electric trains. Great

blocks of terraced skyscrapers half a mile high will house offices, schools, homes, and playgrounds in successive levels, while the roofs will be aircraft landing-fields, according to the architect's plan

The 1925 view of a 1950 city

<http://arsivendi.tumblr.com/post/17195781121>

Atomurbia (1946)



FULL DISPERSION of 40 million houses in the U.S. puts 12 units in each habitable square mile (*top*). If they are spread evenly (*left center*) or in spaced clusters (*right*

center), each bomb will then destroy only 100. But both plans are far too expensive, as are the variations of them at bottom left and right. For compromise plan, see below.

The Le Corbusier Model

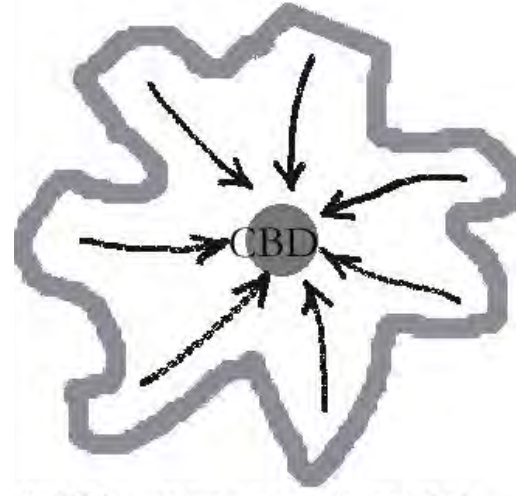


<https://io9.gizmodo.com/10-failed-utopian-cities-that-influenced-the-future-1511695279>

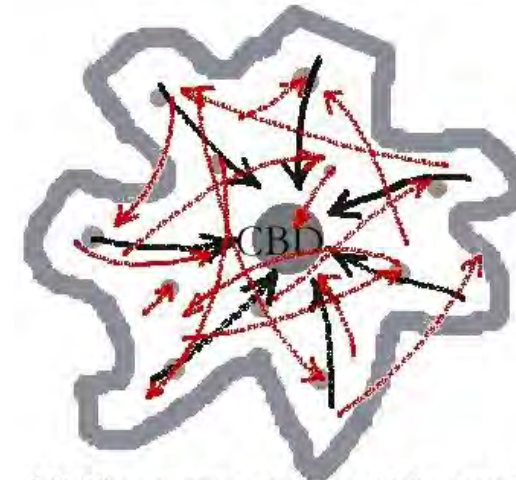
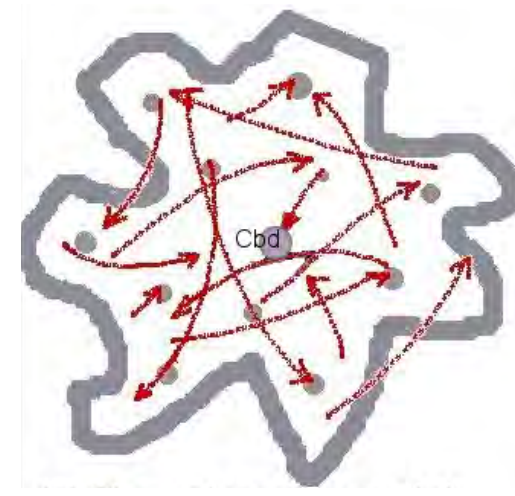
Kinds of cities

> Or how cities evolved and how we want them

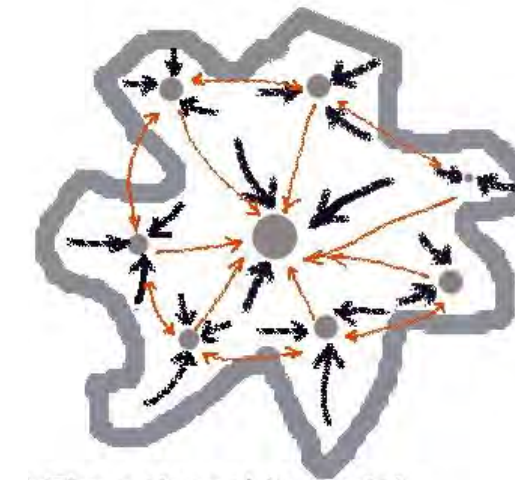
1: Monocentric city



2: Dispersed city



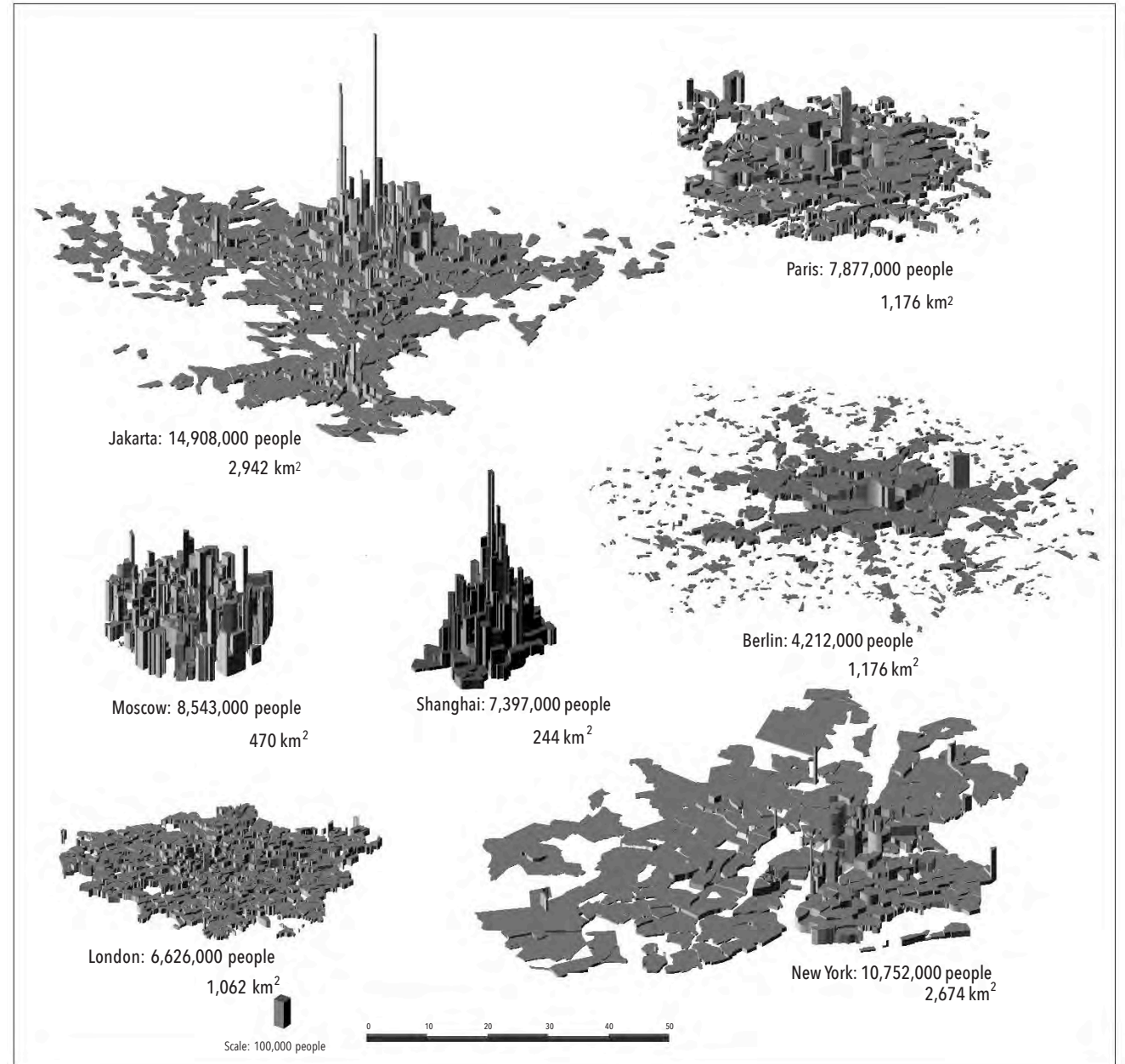
3: Composite city



4: Urban Village

- Black arrows are strong links
- Brown arrows are weak links

Way we live

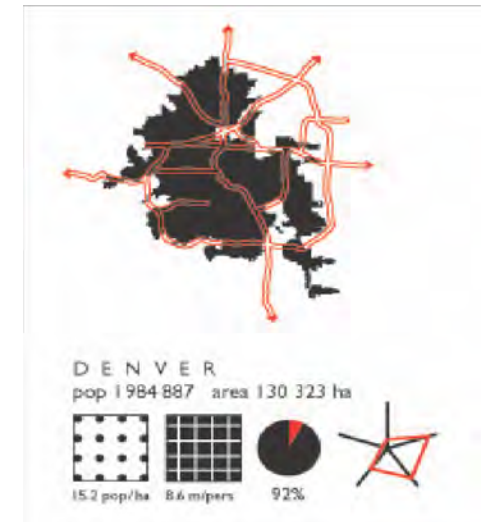
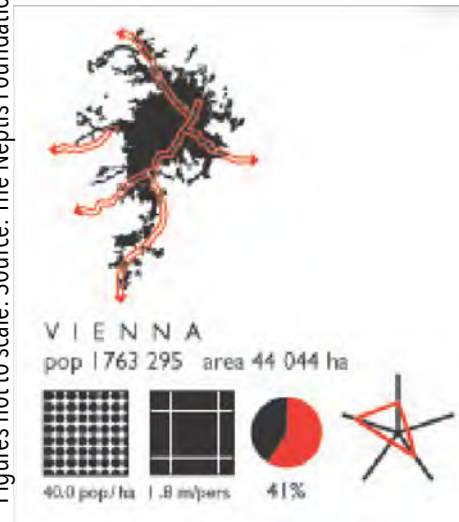
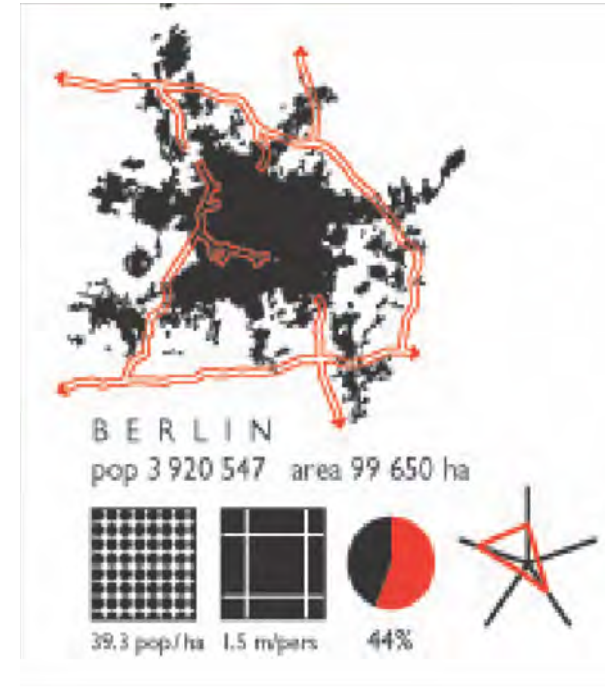
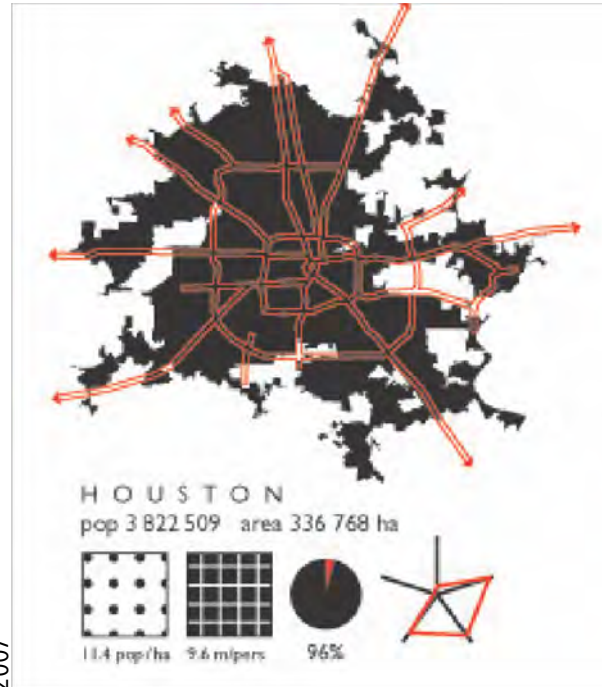


Alain Bertaud, 2001

Way we move

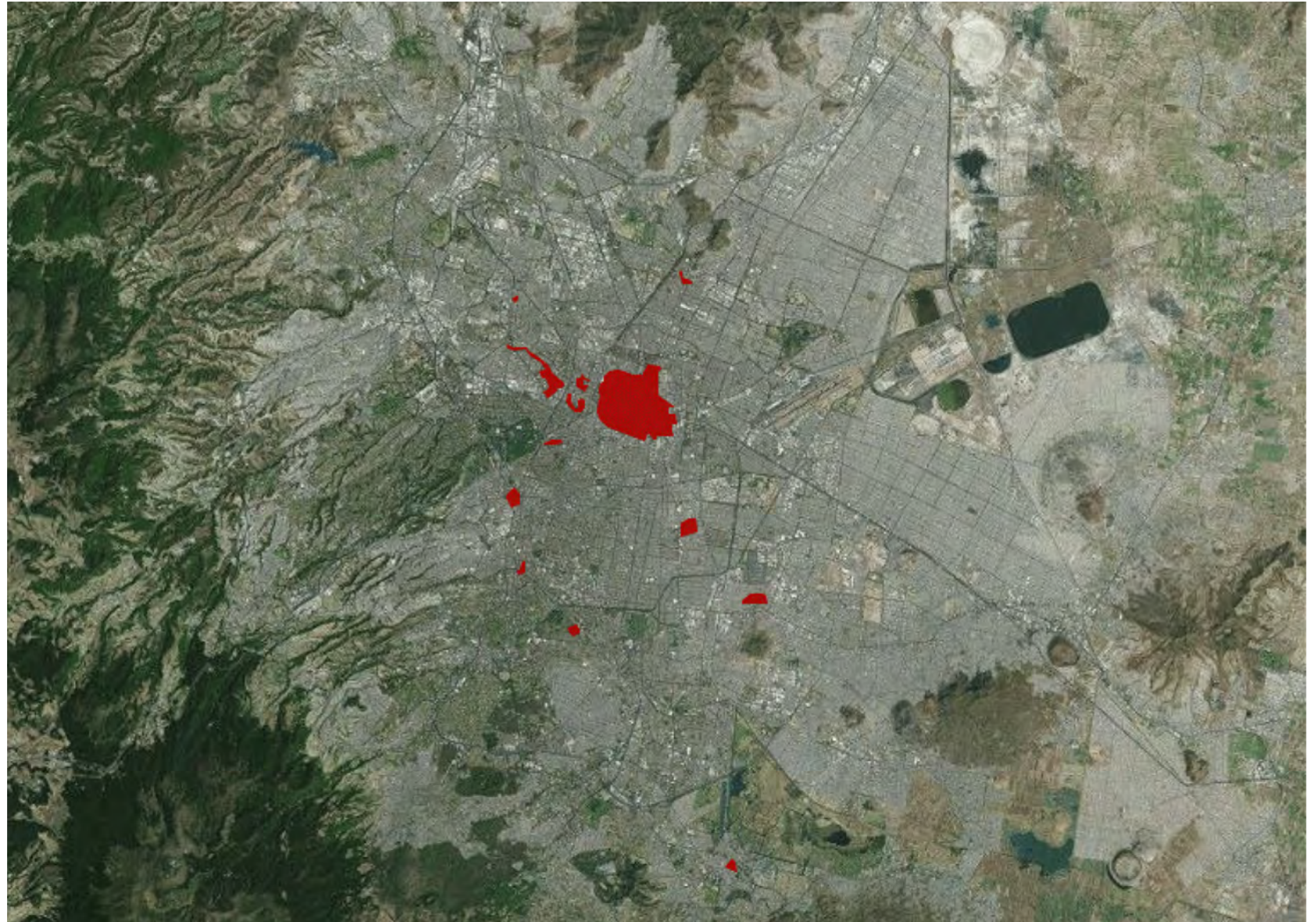
- > Cities with similar population and the use of private transport

Figures not to scale. Source: The Neptis Foundation, 2007



Mexico city

> Change from
1910 until date



What it does to our cities

Photo by Santhosh Kodukula, 2011



**Still we like
our cars and
we give them
what they
want**



Precious space



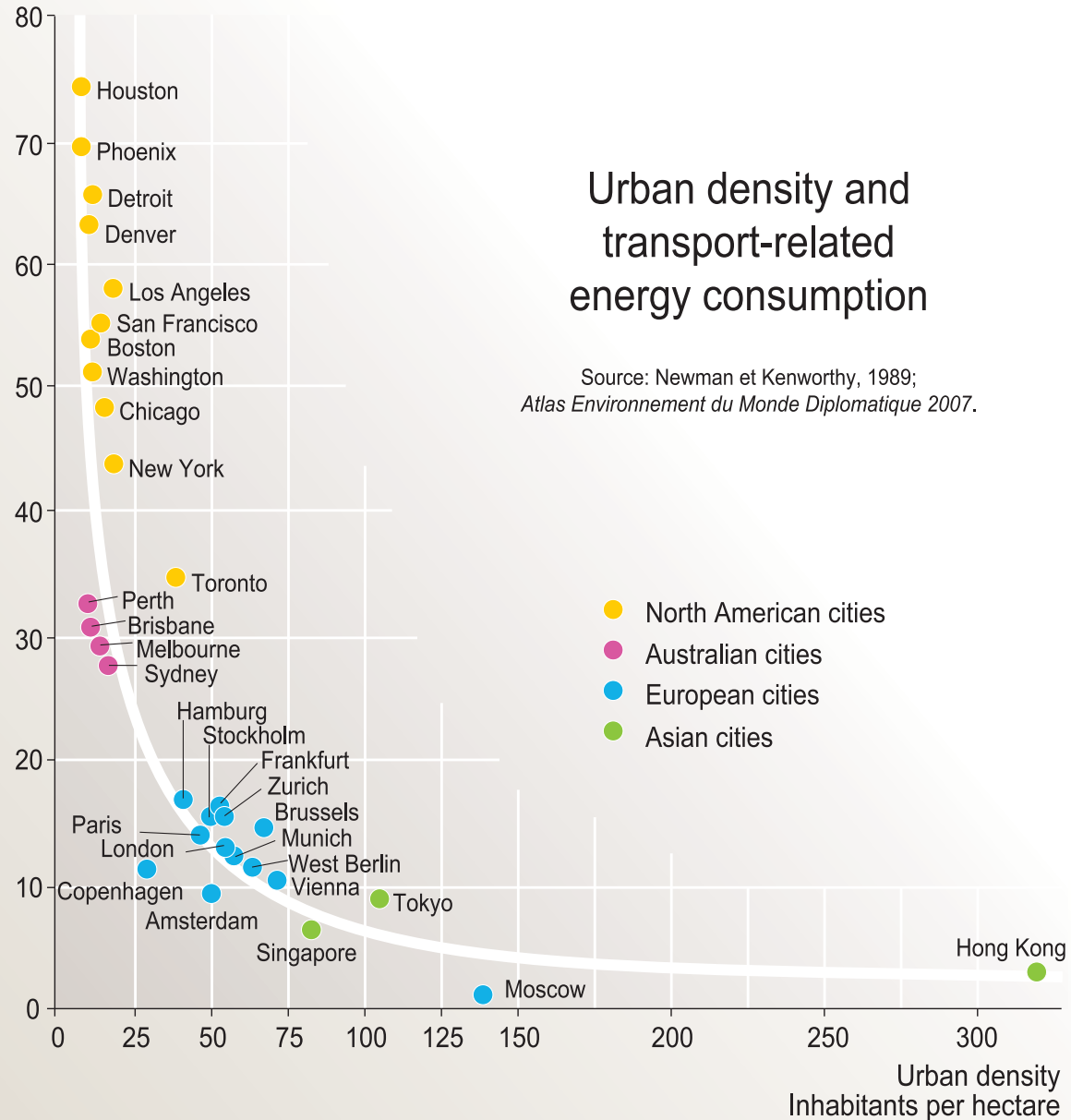
Resulting in

...

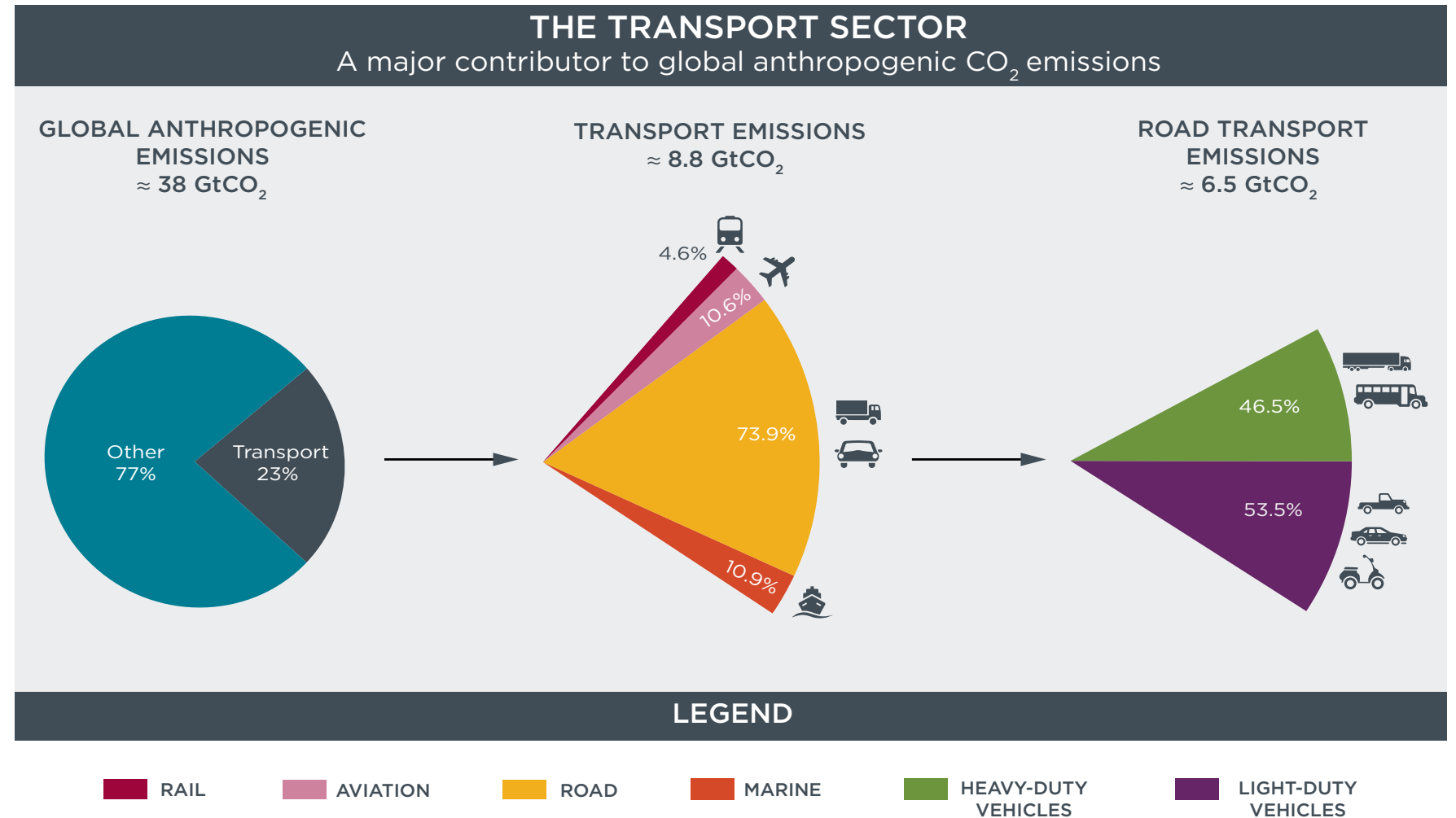


Transport and energy demand

Transport-related energy consumption
Gigajoules per capita per year



Global emissions



Source: Kodjak D, 2015, Policies To Reduce Fuel Consumption, Air Pollution, and Carbon Emissions from vehicles in G20 Nations, May 2015, The International Council for Clean Transportation (ICCT)

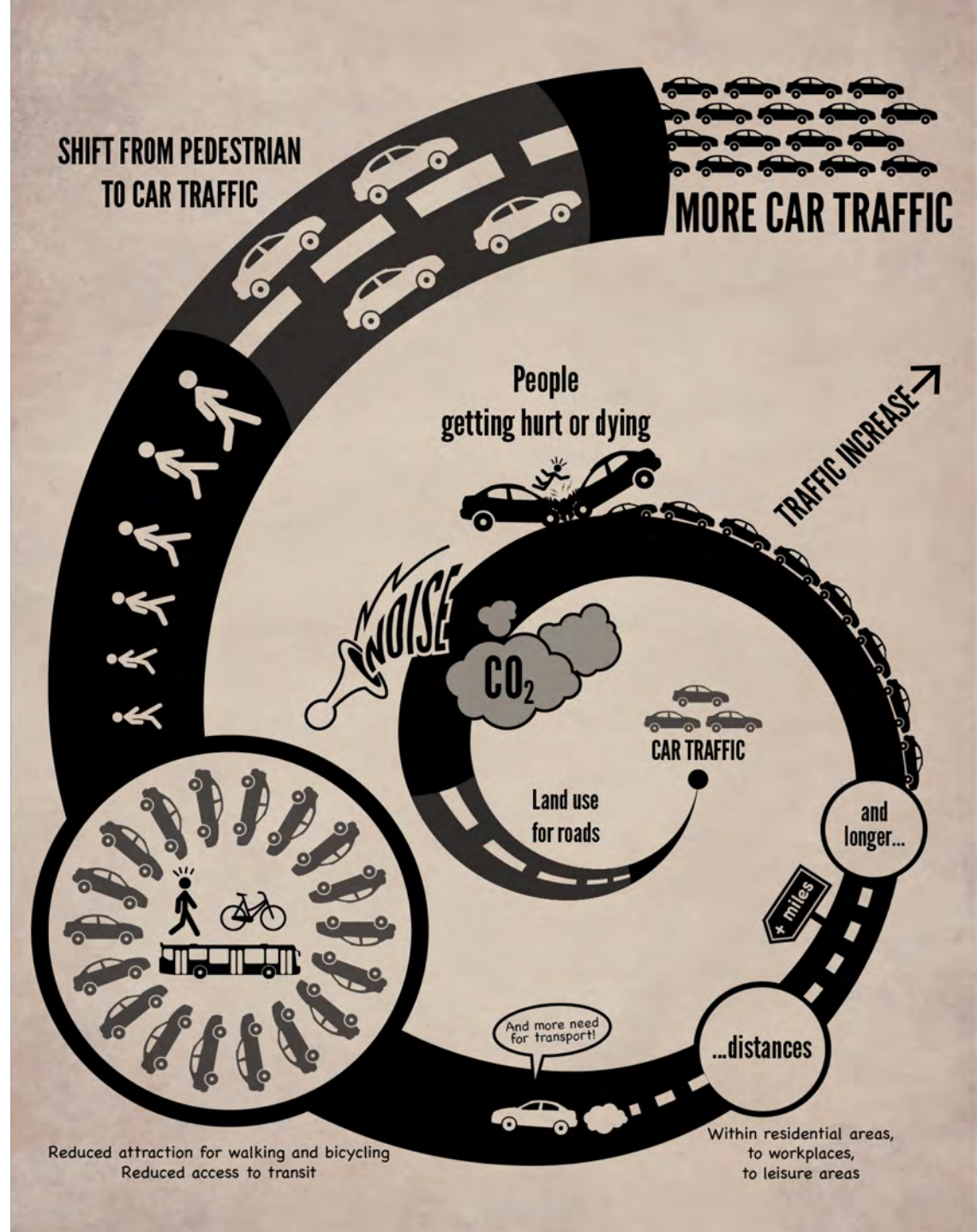
Air Quality

- › In most of the developing cities
- › India and China are getting worse
- › Majority of urban emissions from transport

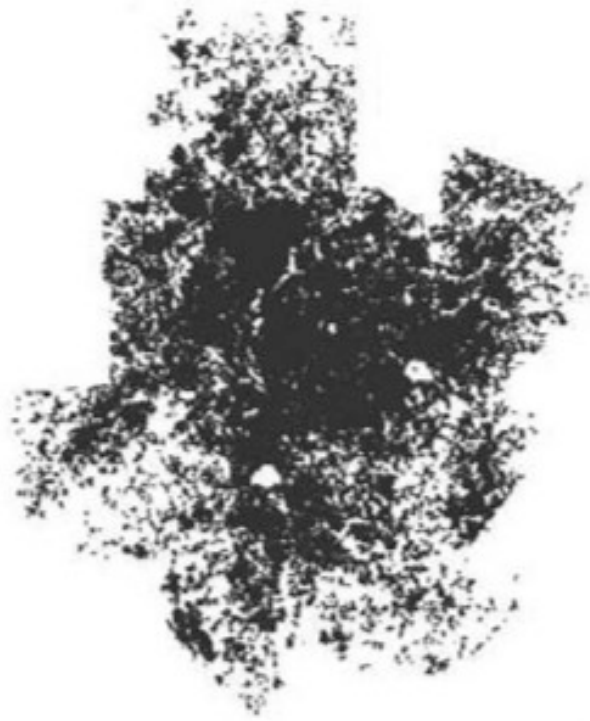


Induced Demand

- > Greater
 - Demand for space
 - Impact on health
 - Deterioration of environment
 - Impact on traffic
 - Demand for travel



Tale of two cities



Atlanta, GA, USA

- > Population: 5.25 million
- > Urban area: 4,280 km²
- > CO₂ Emissions from urban transport: 7.5 T CO₂ /ha/yr (public + private transport)
- > About 500,000 public transport trips / weekday

> Population: 5.33 million

> Urban area: 162 km²

- > CO₂ Emissions from urban transport: 0.7 T CO₂ /ha/yr (public + private transport)
 - > About 2.6 million trips / day
 - > 953 million boardings/year



Barcelona, Spain

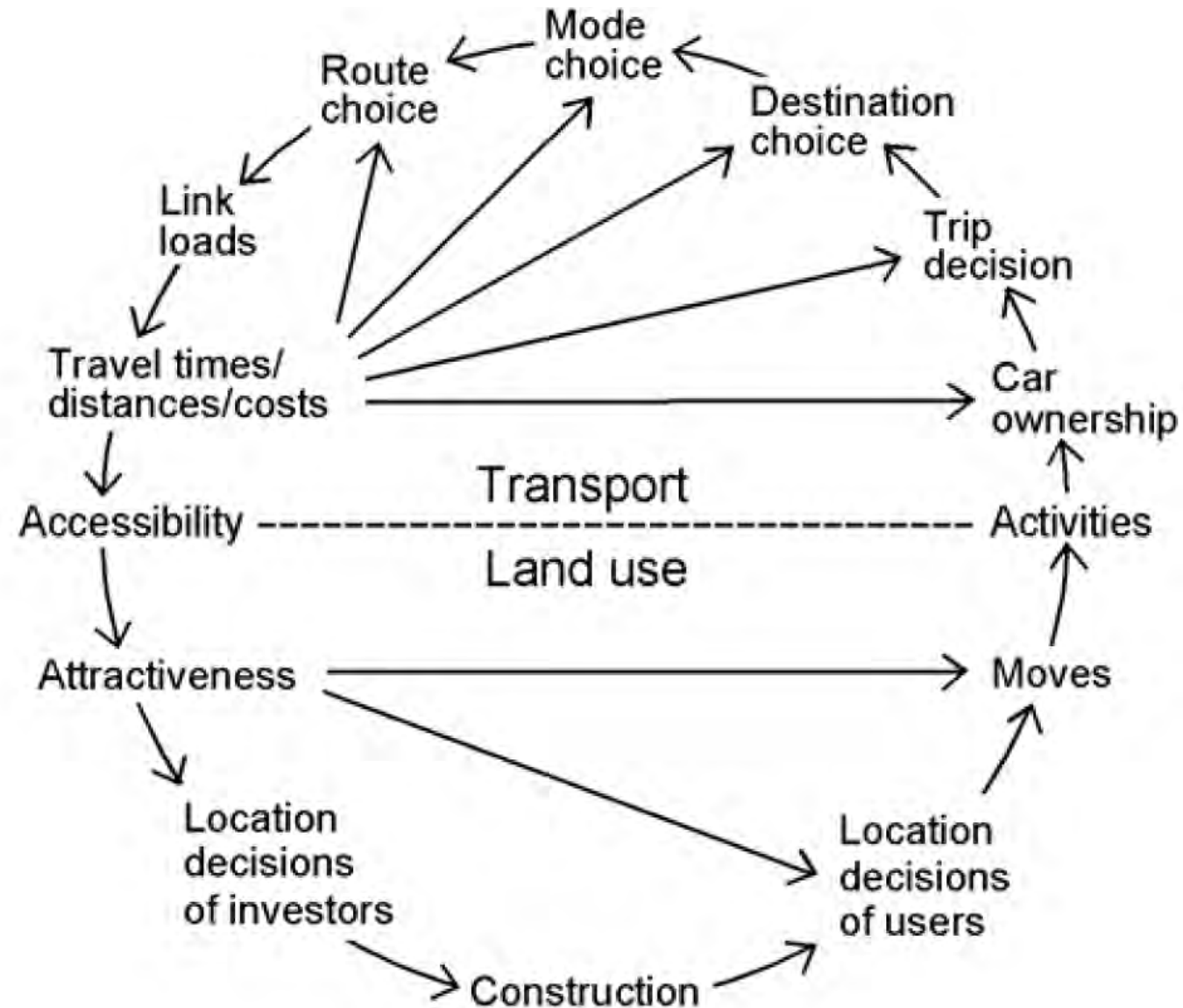
Car oriented planning

- › Low Density
- › Segregated Land Use
- › Excessive road infrastructure
- › Preference to mobility over accessibility



Why do cities grow?

- > What is land use/transport?
- > What influences it?
- > What does it influence?

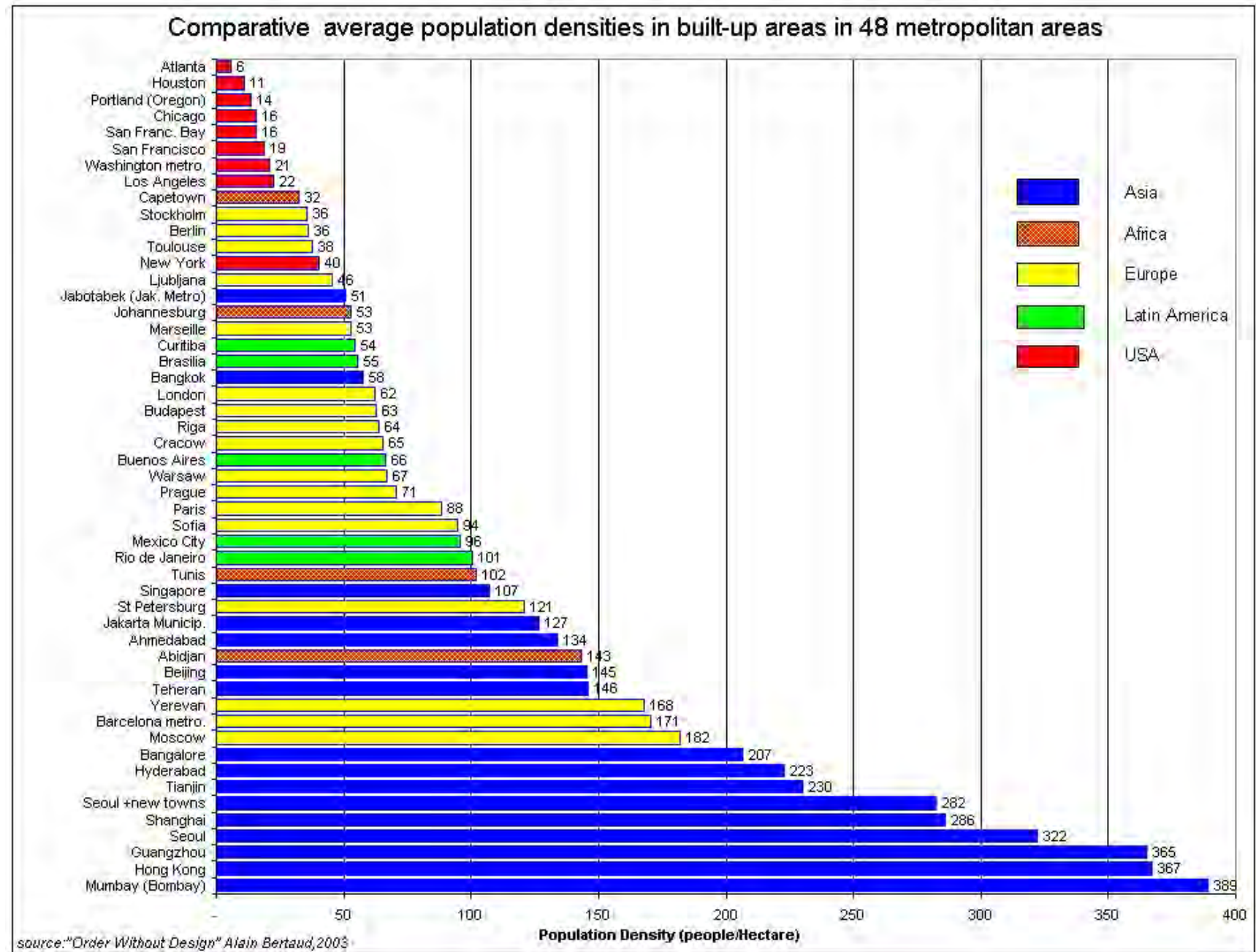


The 3Ds of land-use

- › Density
 - › Diversity / mixed land use
 - › Design
-
- › Destinations (availability of jobs etc.)
 - › Distance to transit



Density



Density: How not to...

- Inhuman scale
 - Not integrated with transit
 - Segregated zoning
- *What is the problem with a downtown?*

Houston, TX, USA - Source: <http://www.photohome.com/pictures/texas-pictures/houston/downtown-houston-4a.jpg>



Source: <http://travelingcolors.net/post/24217917137/urban-sprawl-las-vegas-nevada-by-cocoim>

Diversity

> Is this
diversity?



Diversity

- Mixed Land-use reduces the necessity to make some trips
- Distance travelled is greatly reduced
- Complemented by a good public realm with space for walking and cycling



Design: Who do we give the space?



Who do we design the spaces for

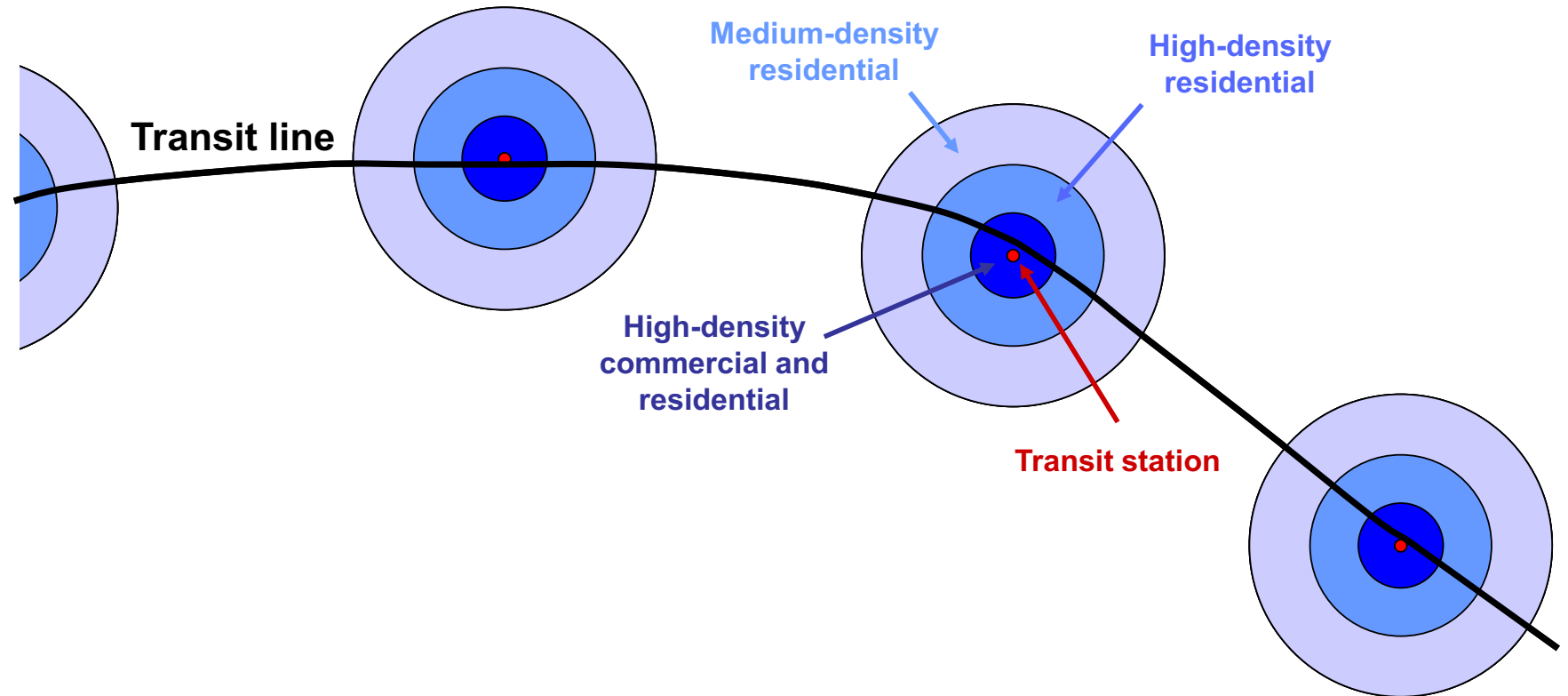


Intersección Gascón, Costa Rica y J. Álvarez - Antes y después

Source: City of Buenos Aires, 2015

Transit Oriented Development

- > A transit spine
- > Core high density
- > Decreasing densities

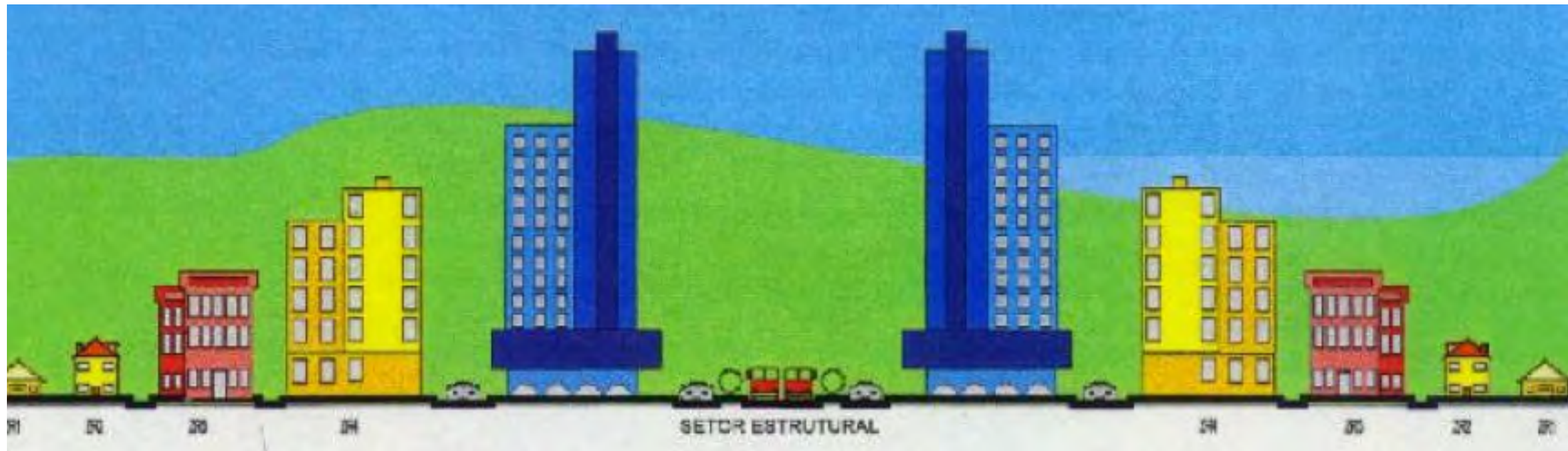


In the TOD

- > Core is Transit bound
- > Walking at 200 m
- > Cycling upto 800 m



Example from Curitiba



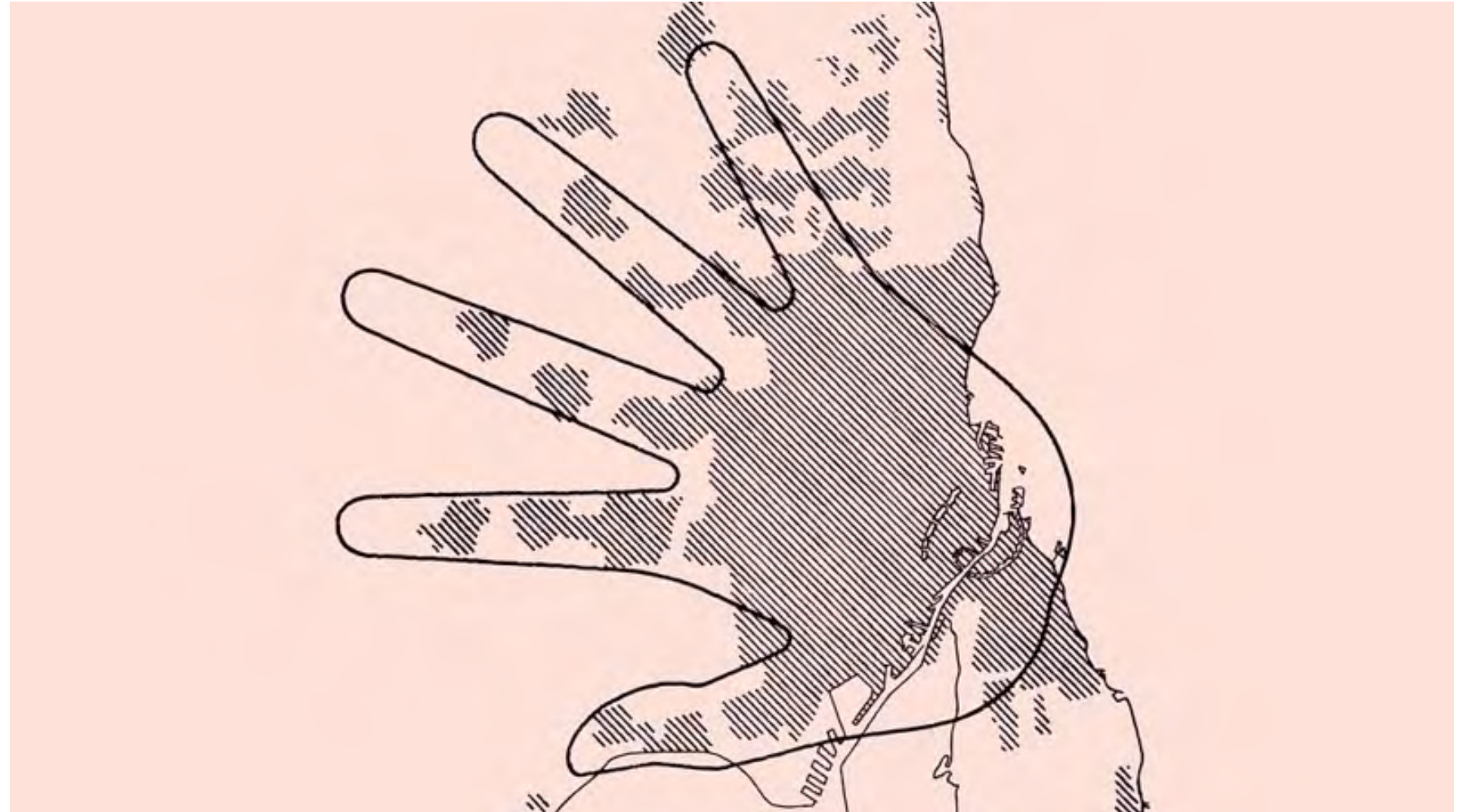
Intervention from Bogota

- › Govt. to locate public facilities (schools, colleges, recreational centers, etc.) along PT corridors
- › Bogota built several schools along TransMilenio corridor



Copenhagen

- › Concept of 1947
- › Over 170 kms of s-tog train lines
- › Over 400 km of bicycle lanes















Barcelona

Current Model



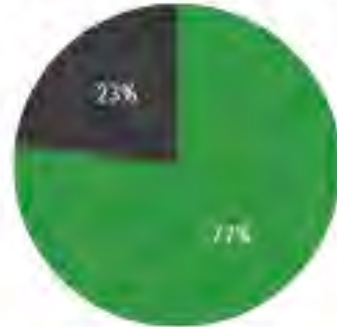
Superblocks Model



- | | | | | | |
|---|--|---|------------------------------|---|--|
|  | PUBLIC TRANSPORT NETWORK |  | PRIVATE VEHICLE PASSING |  | DUM PROXIMITY AREA |
|  | BICYCLES MAIN NETWORK (BIKE LANE) |  | RESIDENTS VEHICLES |  | ACCESS CONTROL |
|  | BICYCLES SIGNPOSTS (REVERSE DIRECTION) |  | URBAN SERVICES AND EMERGENCY |  | BASIC TRAFFIC NETWORK |
|  | FREE PASSAGE OF BICYCLES |  | DUM CARRIERS |  | SINGLE PLATFORM (PEDESTRIANS PRIORITY) |

Superblocks benefits

Superblocks model



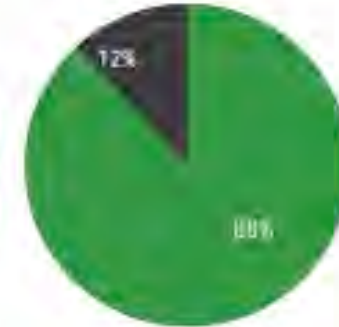
Space for
pedestrians
(versus road)



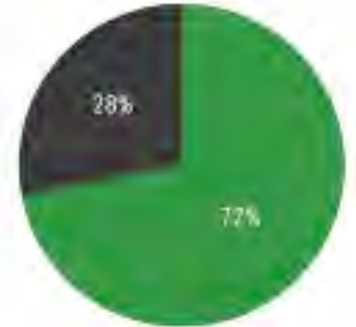
Accessibility
(sidewalks >2,5m)



Air quality
(immission
<40µg/m3 any)



Acoustic
comfort
(Ld <65dB(A))



Liveability
index in
public space



In conclusion

Growing Economy

- Car ownership | Traffic volumes

Urban Sprawl

- Longer trips | Time lost in traffic | Higher infrastructure costs

Climate Change

- Higher emissions | Air pollution

Road Safety

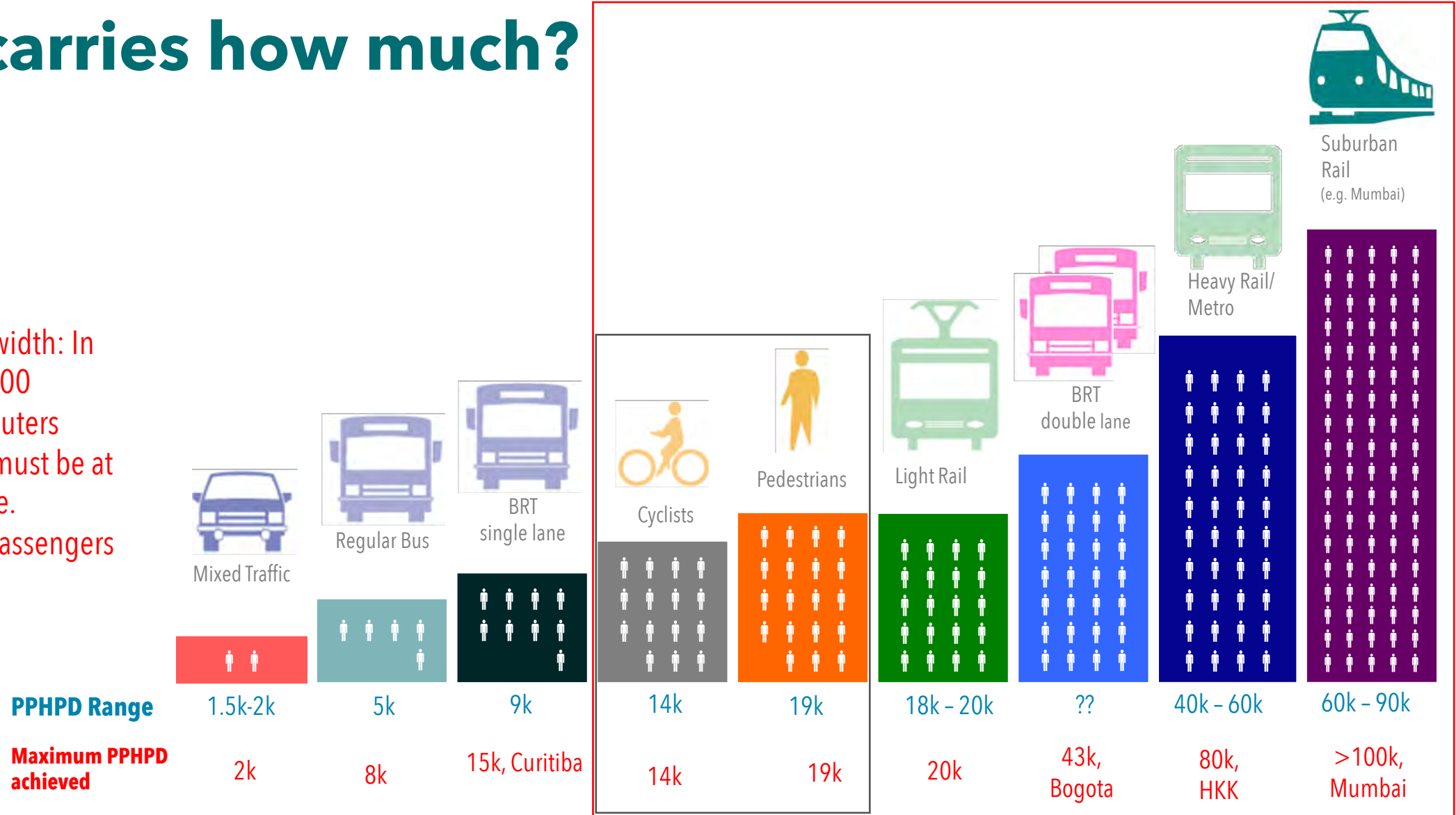
- Higher speeds | Increased Fatalities | Conflict among modes

Energy Consumption

- Transport consumes about 30% of energy | GHG Emissions

What carries how much?

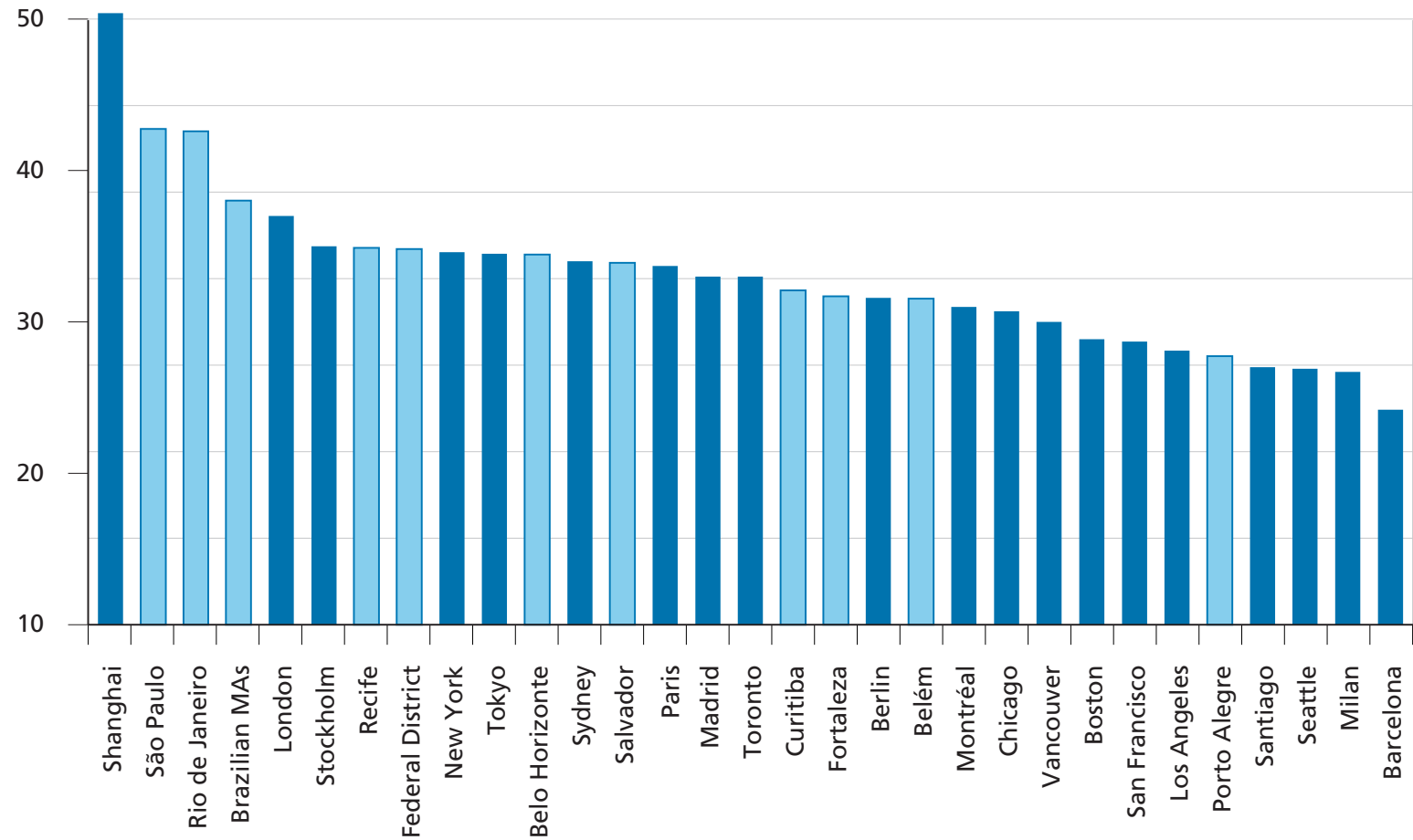
Equivalency road width: In order to carry 20,000 automobile commuters PHPD, a highway must be at least 18 lanes wide.
(assumption 1.2 passengers per automobile)



We know it is bad...but

Average time spent commuting to work in selected metropolitan areas in Brazil and other countries^{1,2}

(In minutes)



Source: Brazil - National Household Sample Survey (PNAD/IBGE); Santiago (Chile) – data available at: <<http://www.sectra.gob.cl>>; data from all other metropolitan areas from Toronto Board of Trade (2012).

Notes: ¹ Tokyo: 2005; Santiago and Europe: 2006; Brazil: 2009; Australia, Canada, Shanghai and USA: 2010.

² Commute time data from Eurostat is available only at the regional level. However, the delimitation of these boundaries is not strictly defined and may vary greatly across European MAs. Data from the USA is based on Metropolitan Statistical Area.

What to prioritise

> Cities for People

OR

> City for cars



How do we do it?

- › Integrate land use and transport
- › Don't focus on single corridor solutions
- › Integrate, integrate, integrate
- › Don't control land prices but guide urban development
- › **Know what kind of city you want!**



Questions for you.

- › Land Value Capture
- › Any other alternatives to TOD?
- › What is being done in your city?

**Thanks for
the attention**

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