

Cities & Sustainability: A Midcourse Correction

The Evolving Urban Form
Development Profiles of
World Urban Areas

12 Nov. 2012

Wendell Cox

DEMOGRAPHIA

Lafayette College

Web-seminar





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LAFAYETTE vs. LEHIGH TELECAST PARTIES • NOVEMBER 17, 2012 • 1 P.M. EST KICKOFF AT LAFAYETTE



**Cairo to Madrid:
 2100 Miles**
**Cairo to Mumbai:
 2700 Miles**

OUTLINE

Cities in Perspective

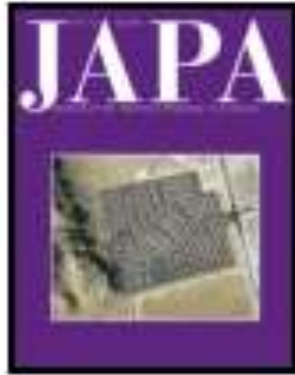
The Evolving Urban Form

Cities & Transport

The Dimensions of Sustainability

Current Urban Planning Myths

Conclusion: Poverty not an Option



Growing Cities Sustainably

Does Urban Form Really Matter?

***... compact development
should not automatically
be associated with the
preferred spatial growth
strategy.***

CITIES IN PERSPECTIVE

Chongqing

DEMOGRAPHIA



Global Scaling Research

*The city is
like an
elephant:
The bigger,
the more
productive*

City
(Urban Organism)

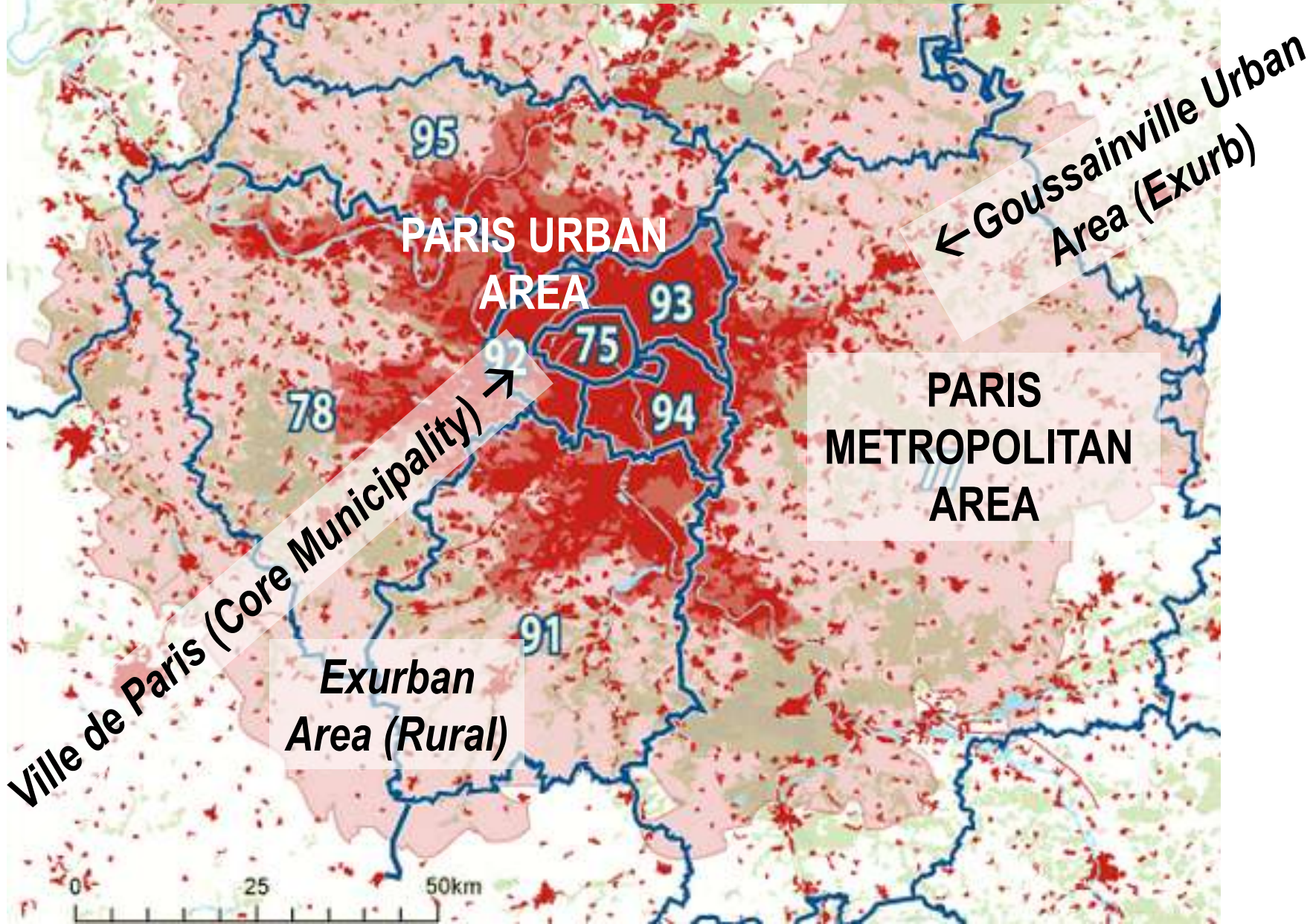
```
graph TD; A[City (Urban Organism)] --- B[Metropolitan Area or Labor Market (Functional Expanse)]; A --- C[Urban Area or Agglomeration (Physical Expanse)];
```

Metropolitan Area or
Labor Market
(Functional Expanse)

Urban Area or
Agglomeration
(Physical Expanse)

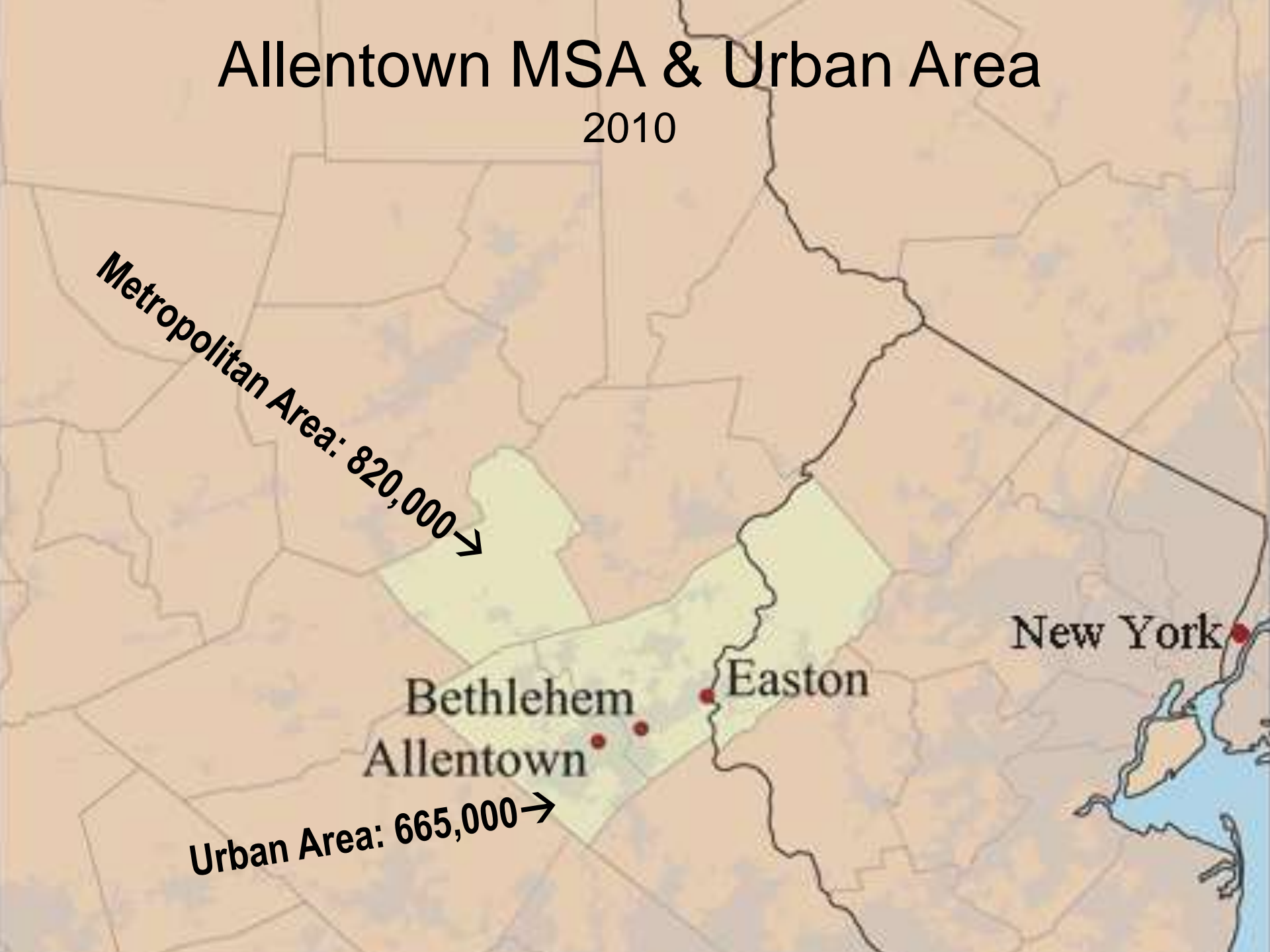
Definition of Urban Terms

PARIS METROPOLITAN AREA (AIRE URBAINE)



Allentown MSA & Urban Area

2010



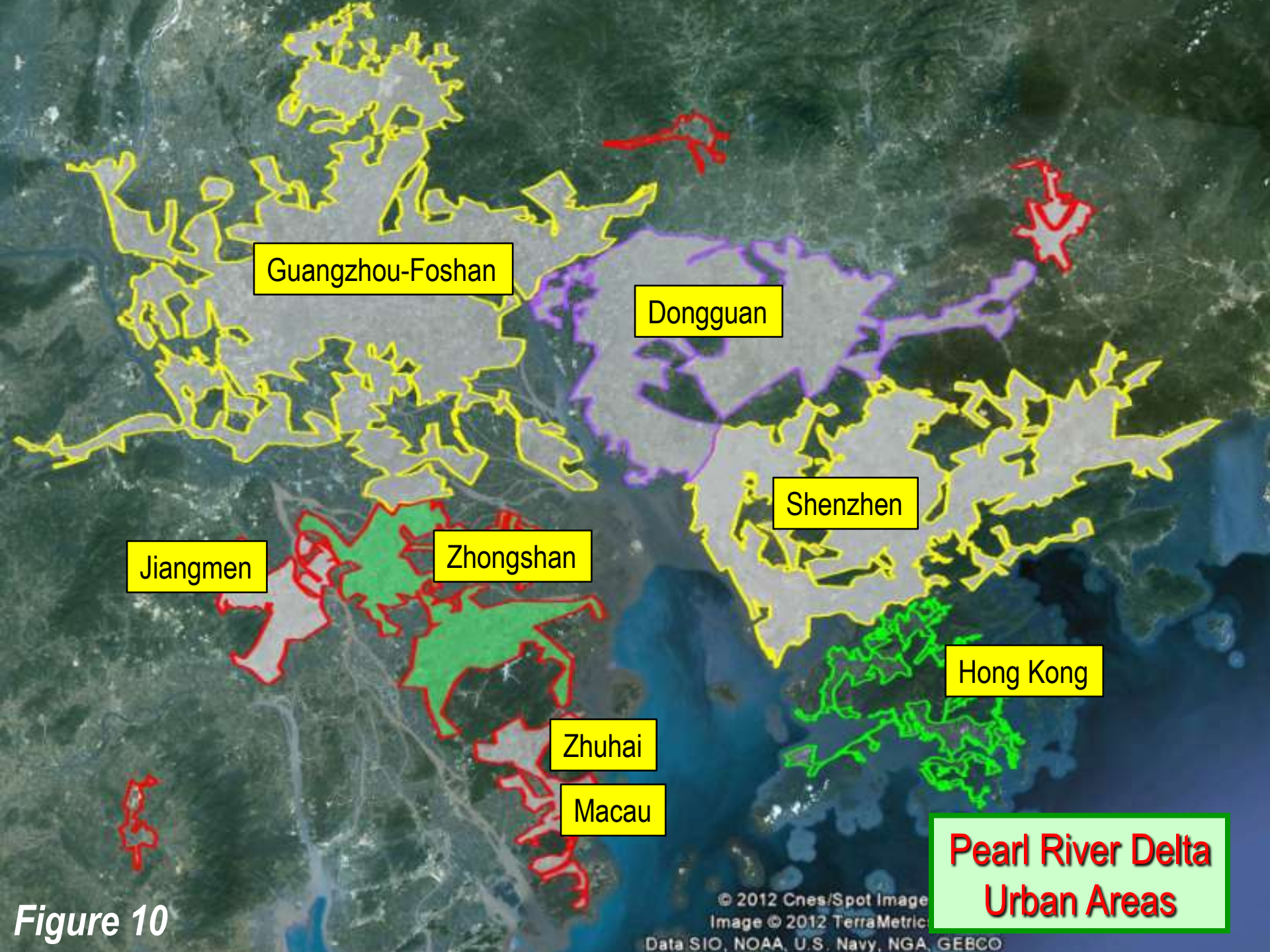
Metropolitan Area: 820,000 →

Bethlehem
Allentown

Easton

New York

Urban Area: 665,000 →



Guangzhou-Foshan

Dongguan

Shenzhen

Jiangmen

Zhongshan

Hong Kong

Zhuhai

Macau

**Pearl River Delta
Urban Areas**

© 2012 Cnes/Spot Image
Image © 2012 TerraMetric
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Figure 10



Why Cities Grow: Economics

PEOPLE MOVE THERE FOR BETTER LIVES

The raison d'être of large cities is the increasing return to scale inherent to large labor markets. The cities' economic efficiency requires, therefore, avoiding any spatial fragmentation of labor markets.

Shanghai

Jobs-Housing Balance (UK)

BALANCED ACHIEVED, BUT NOT IN COMMUTING

Example

Average Work Trip Distance
(Exurban London)
2x Town Diameter

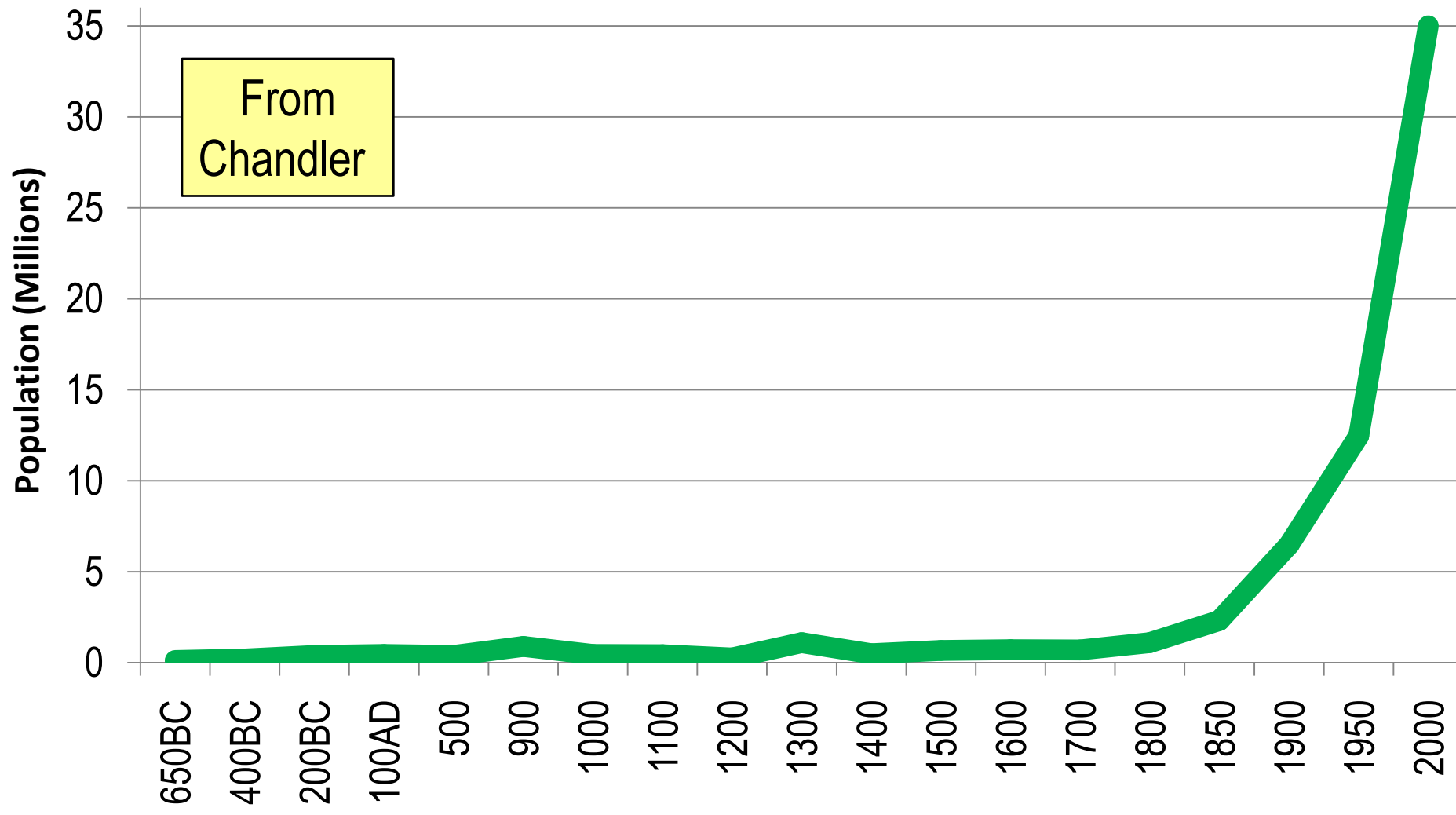
Welwyn

← Average Work Trip Length: 2001 →



World's Largest Cities (Urban Areas)

650 BC TO PRESENT



From
Chandler

Year: (Irregular Scale)

Figure 13

Highest National GDPs: 1500-2000

650 BC TO PRESENT

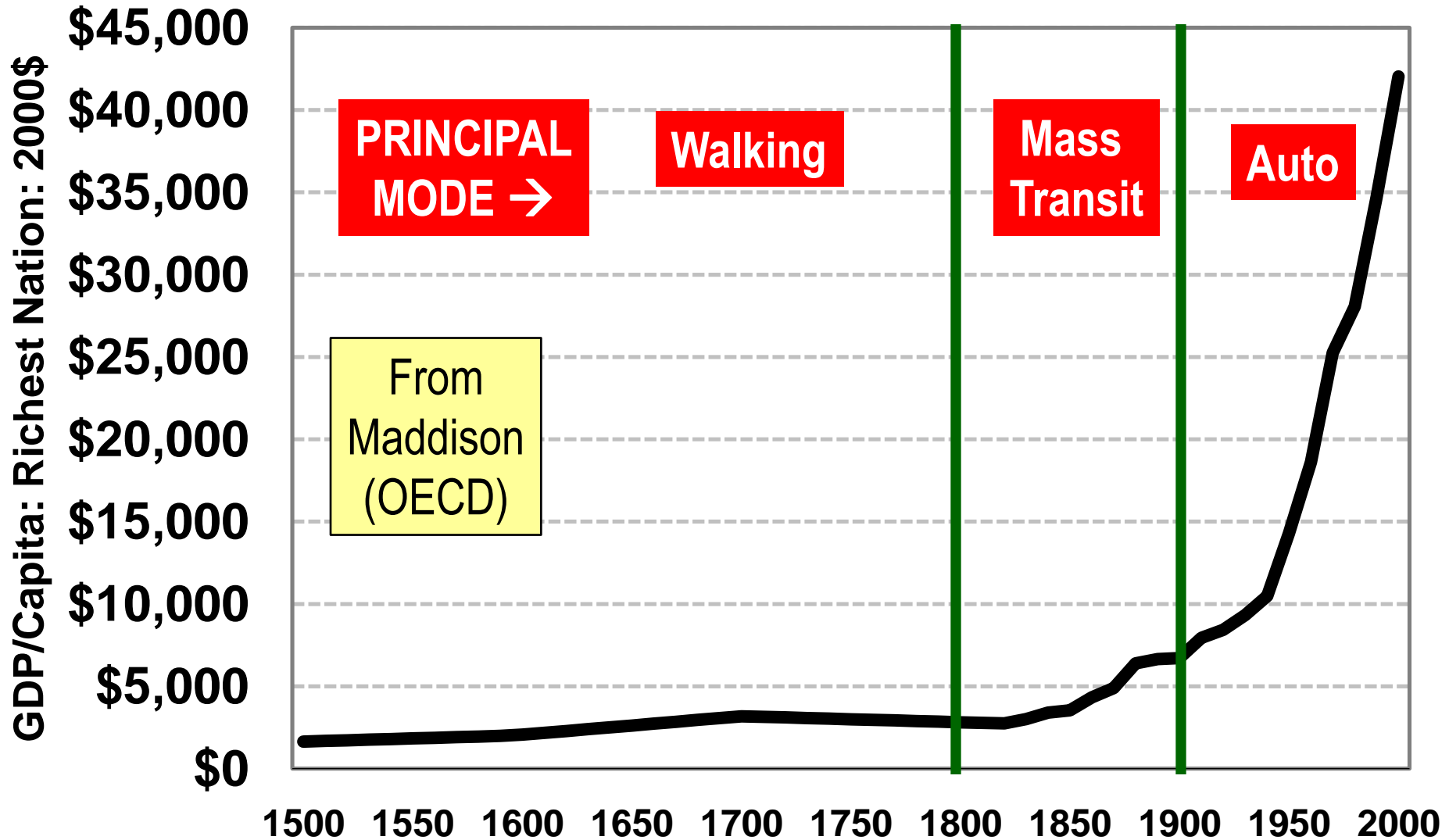


Figure 14

Economics: A History of Poverty

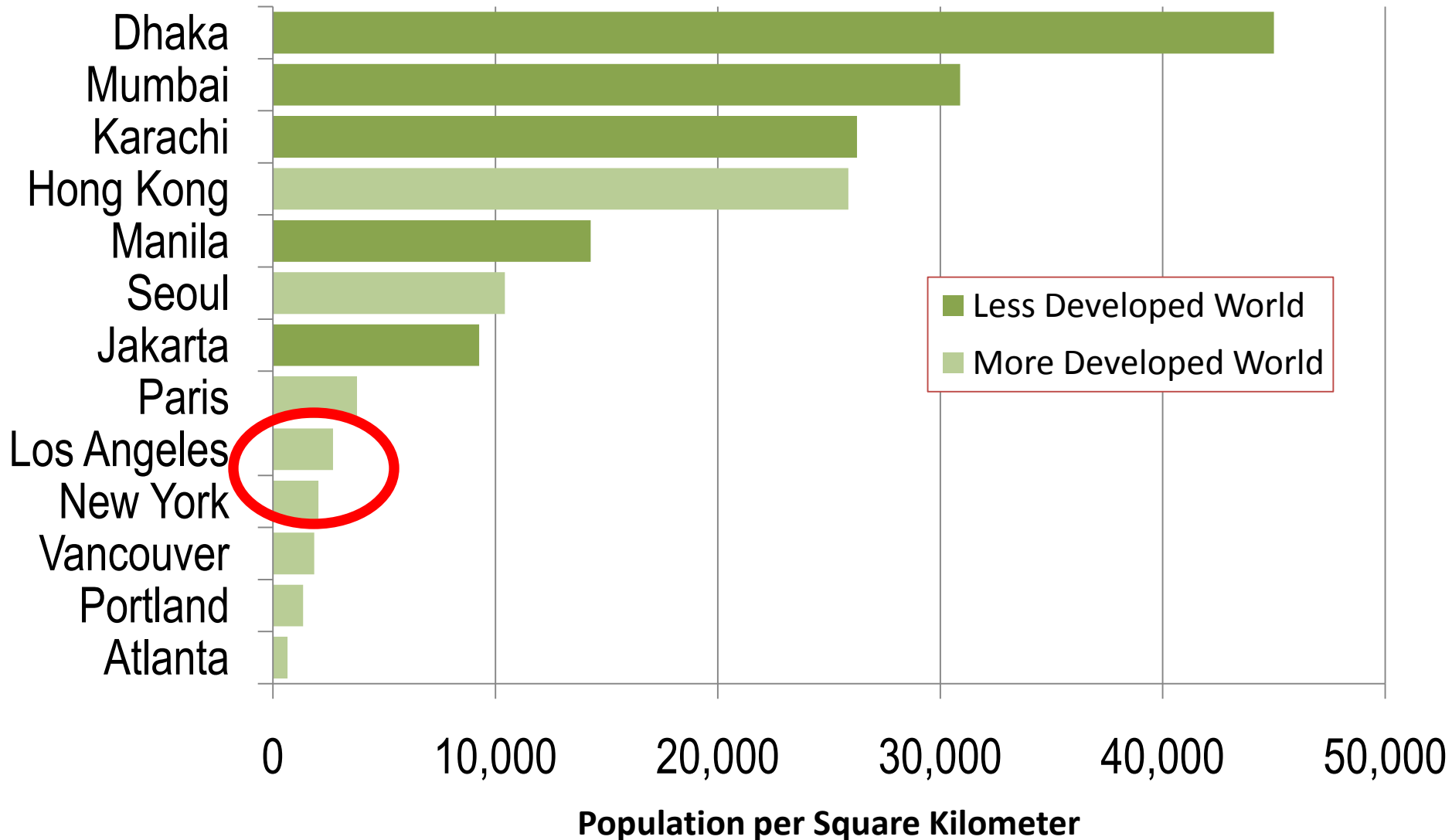
CANNOT TAKE AFFLUENCE FOR GRANTED



Mumbai: Airport East Slum

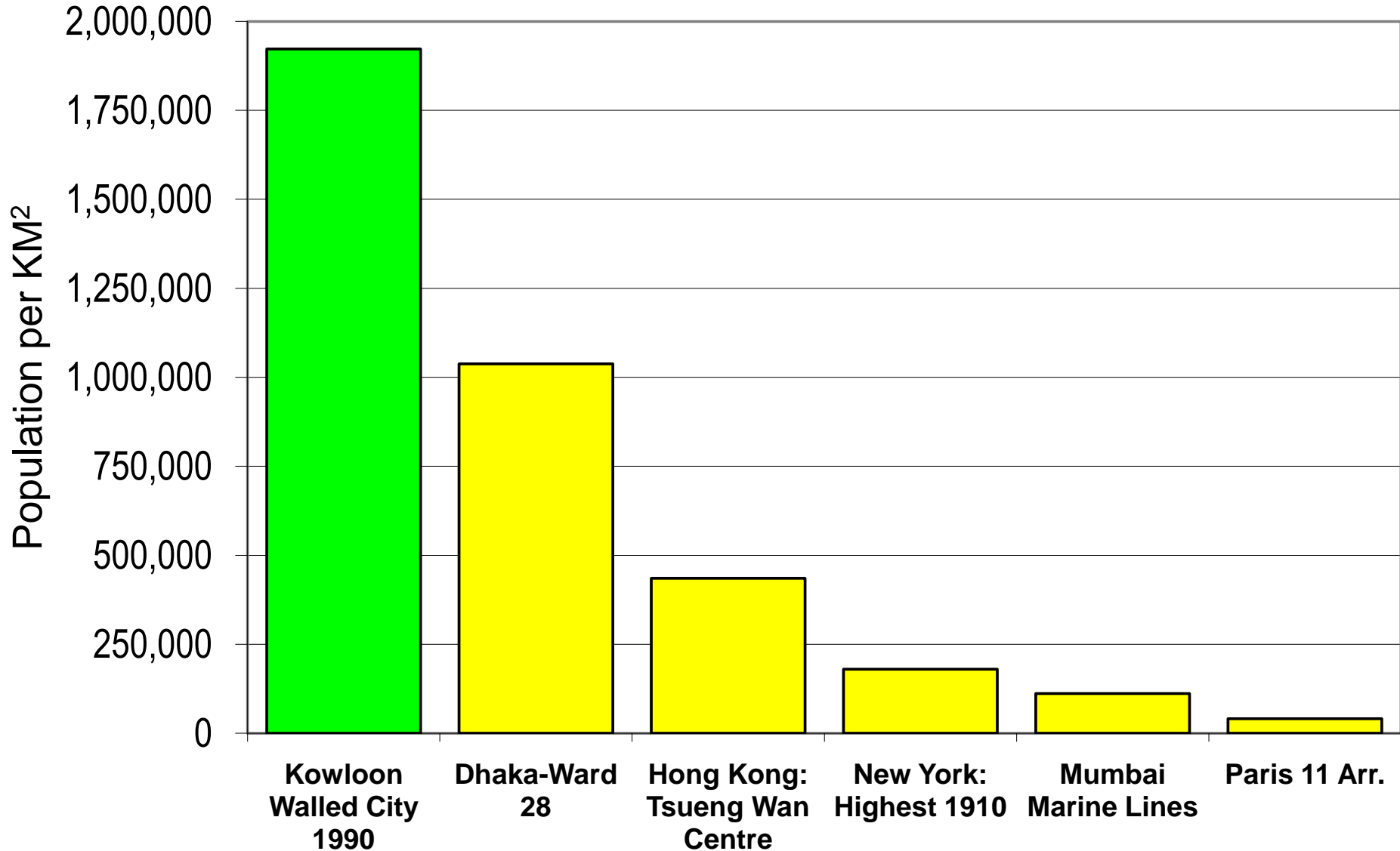
Urban Area Average Population Densities

DHAKA & SELECTED (METRIC MEASURE)



Neighborhood Densities: Examples

(WITHIN CITIES)





**Kowloon Walled City
(Hong Kong)
Nearly 5M/Square Mile**

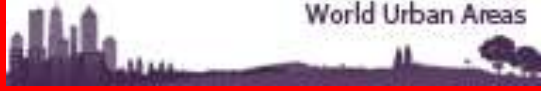
**Dhaka Shantytown
Up to
2M/Square Mile**

Dhaka



The Evolving Urban Form

Development Profiles of
World Urban Areas



Shenyang

DEMOGRAPHIA

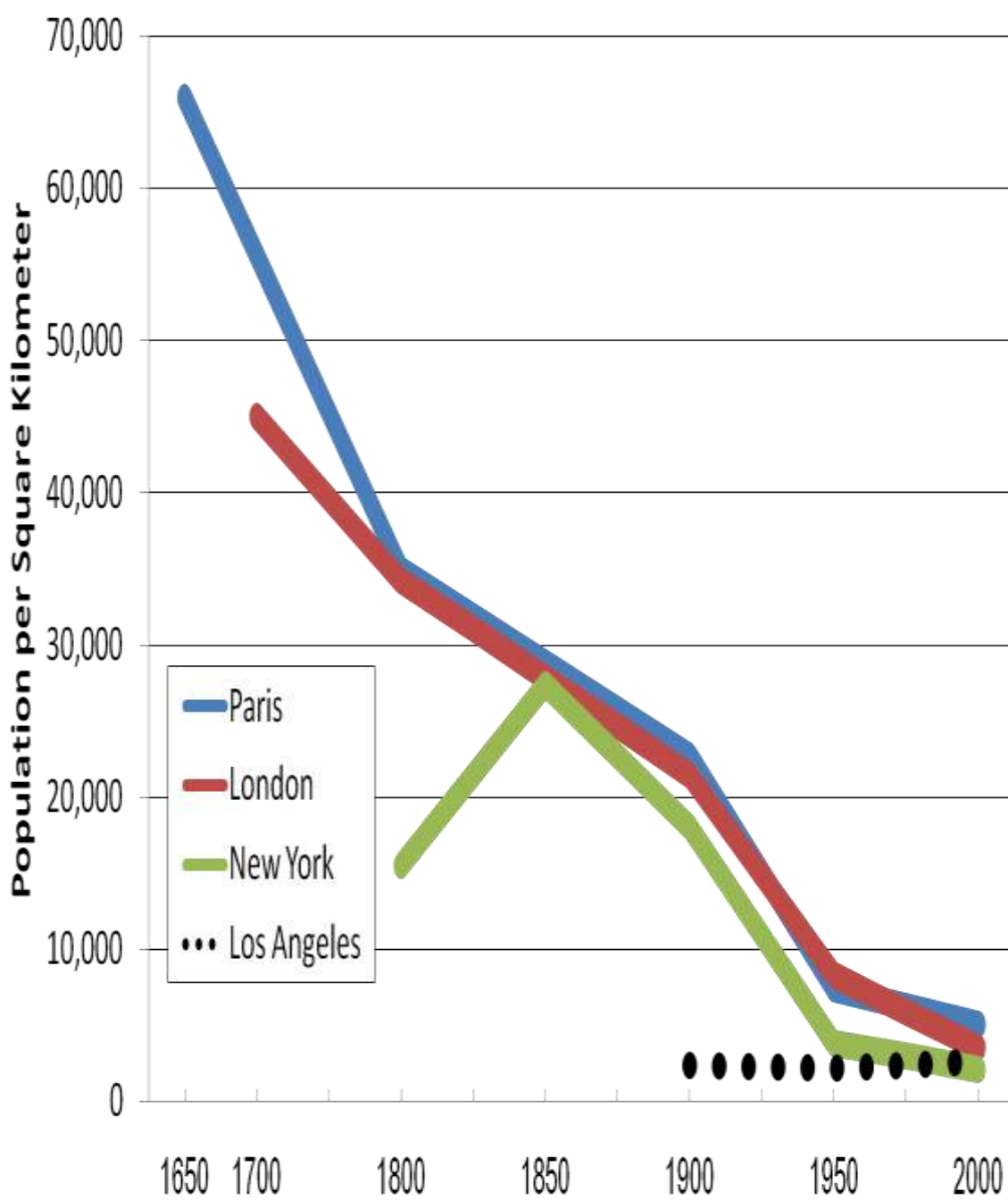
THE EVOLVING URBAN FORM





Global Scaling Research

*Double city
size, 15%
productivity
improvement
(density not
an issue)*



**As Cities
Become
Larger
They Become
Less Dense**

Planet of Cities



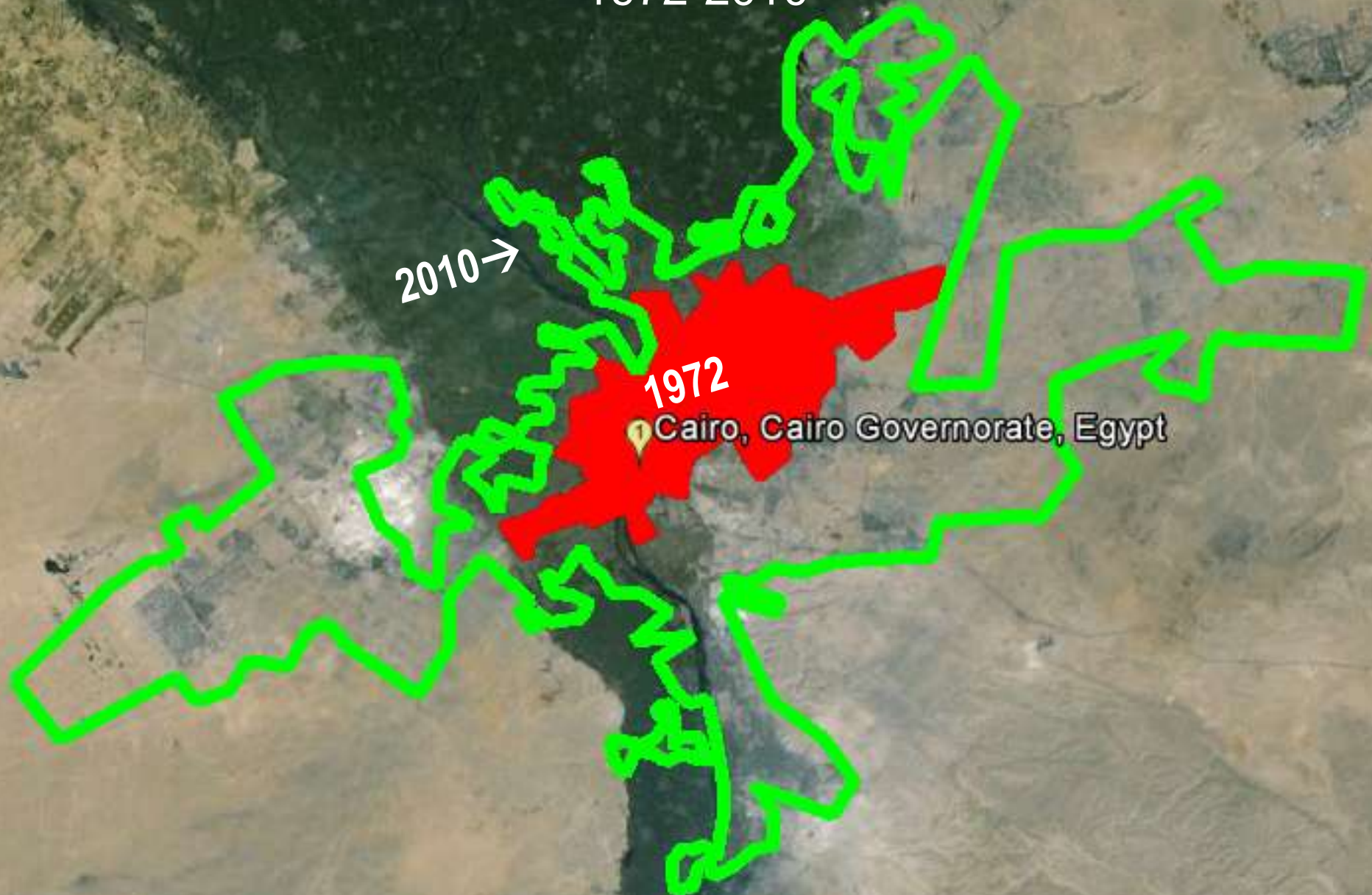
SHLOMO ANGEL

Coming to
Terms with
Global Urban
Expansion



Cairo Urban Area: Evolution

1972-2010



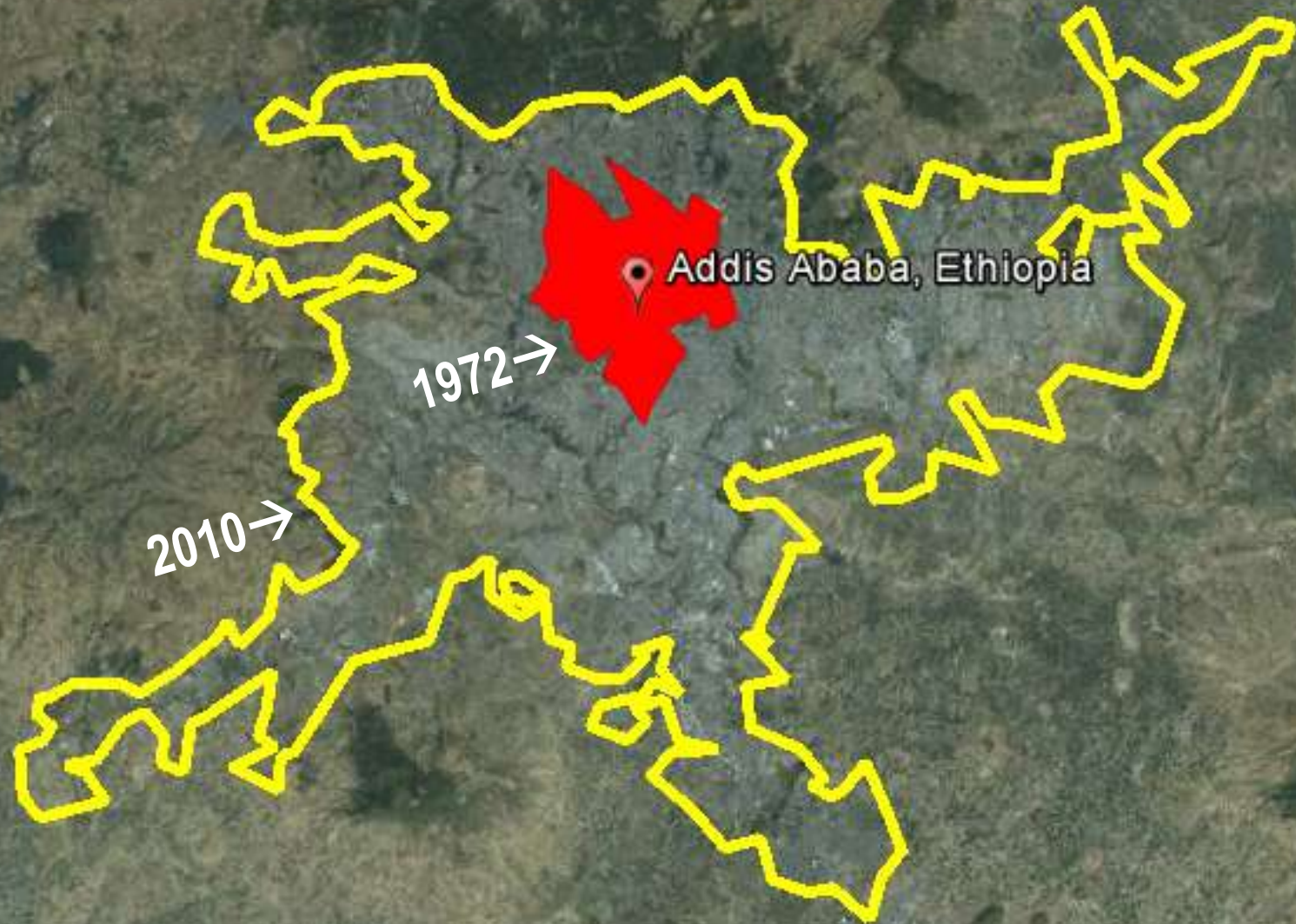
2010 →

1972

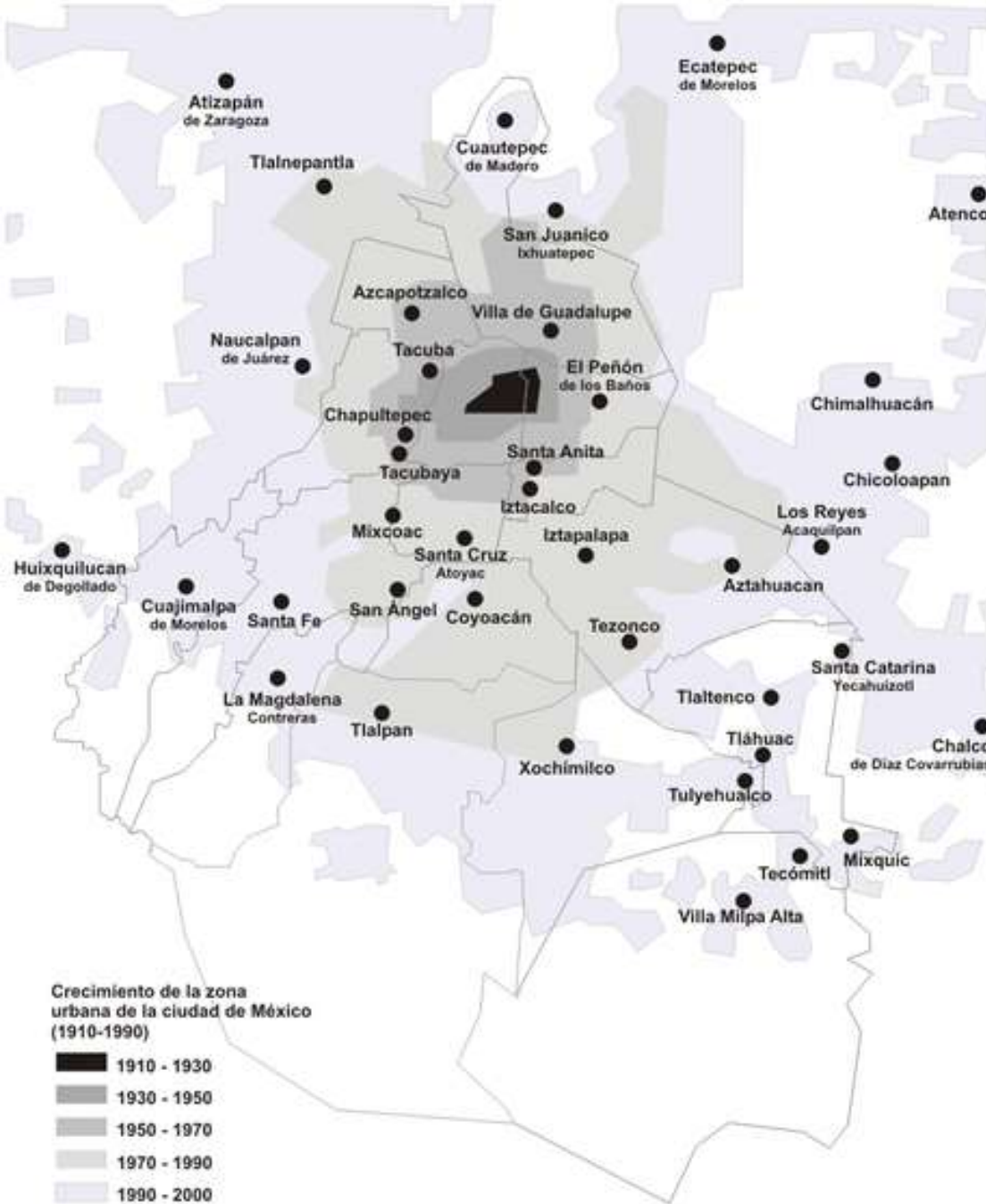
Cairo, Cairo Governorate, Egypt

Addis Abeba Urban Area: Evolution

1972-2010



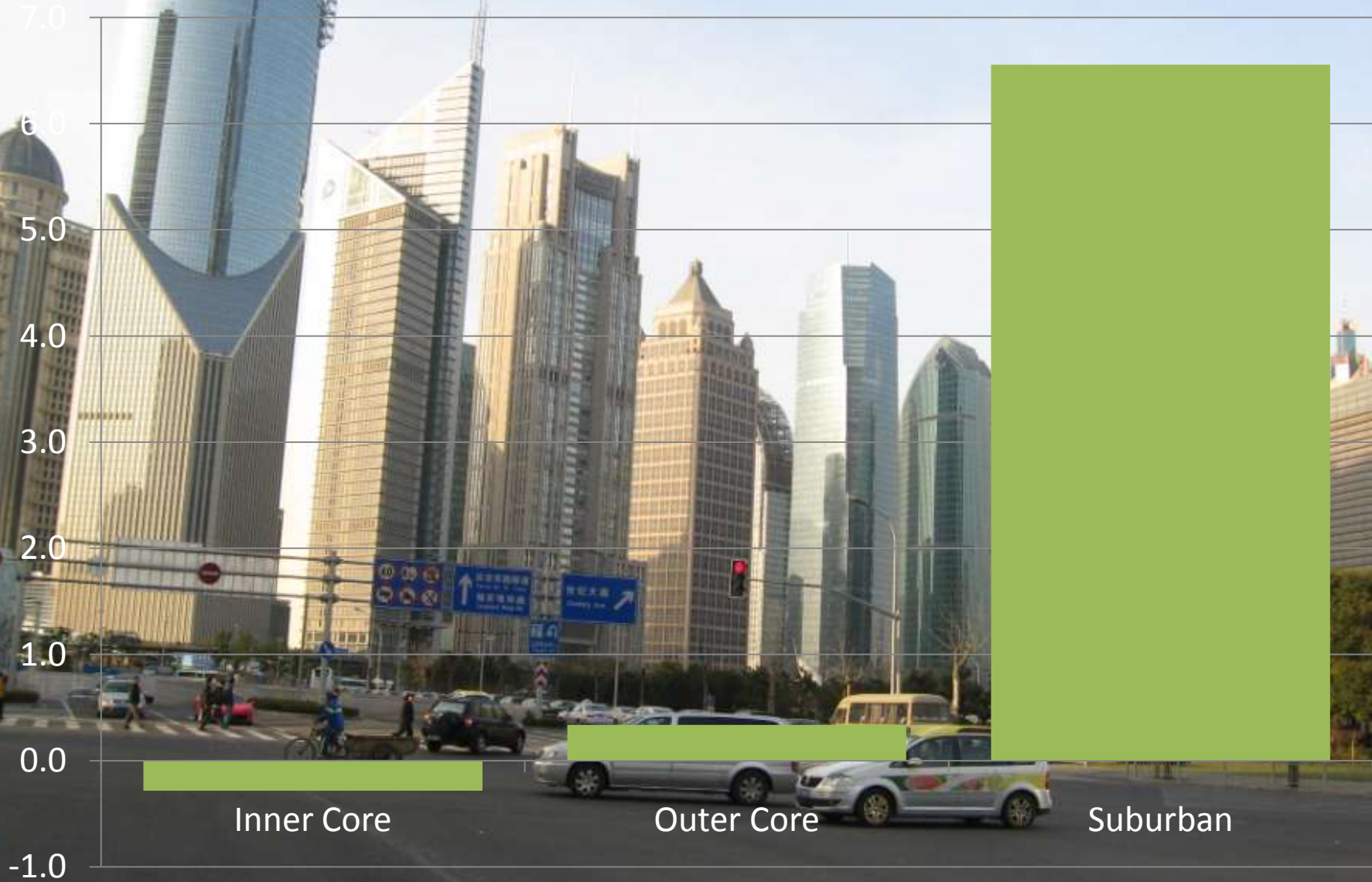
Mexico City Spatial Expansion: 1910-2000



Shanghai Population by Sector

CHANGE: 2000-2010

Population Increase in Millions



Shenzhen Inner & Outer Area Population

1982 - 2010

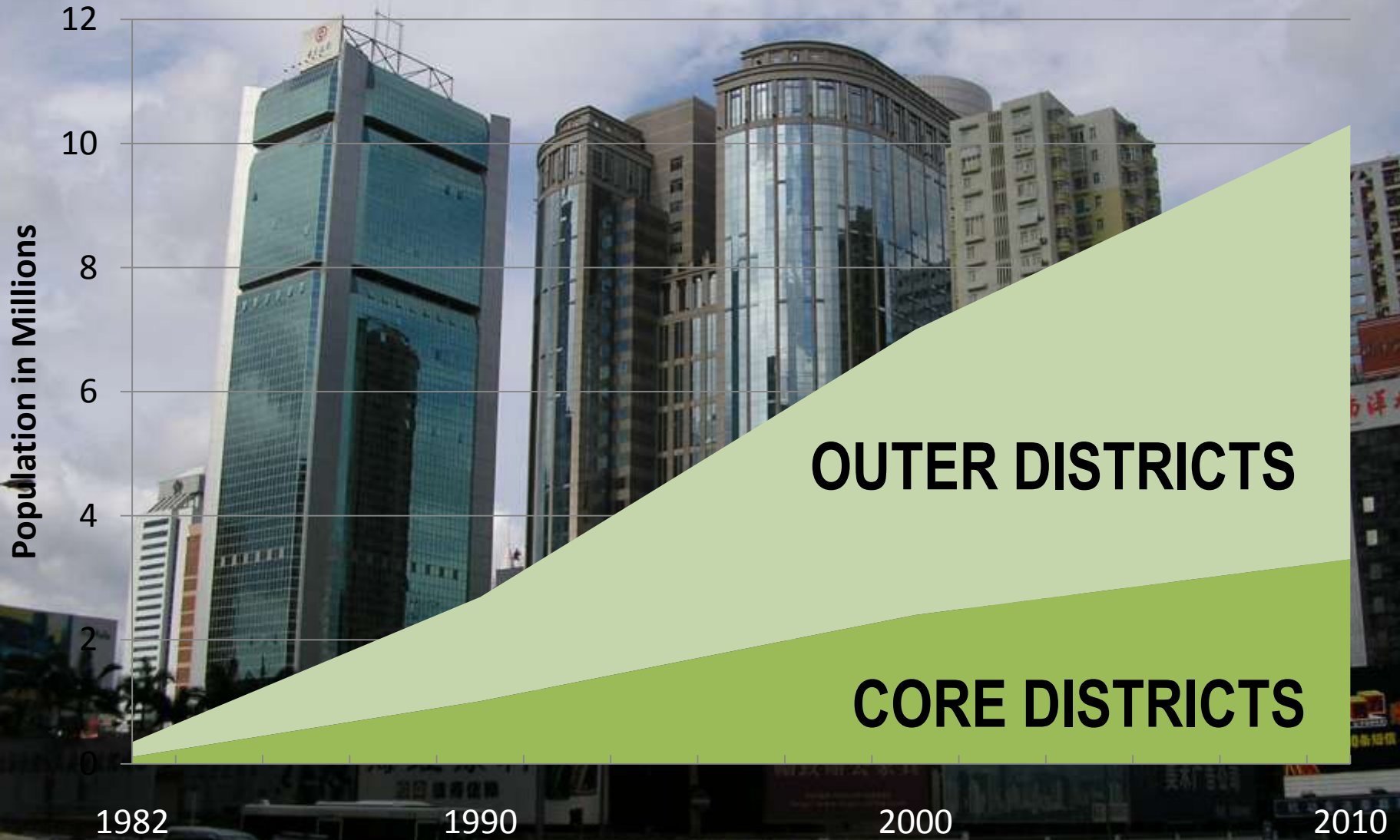
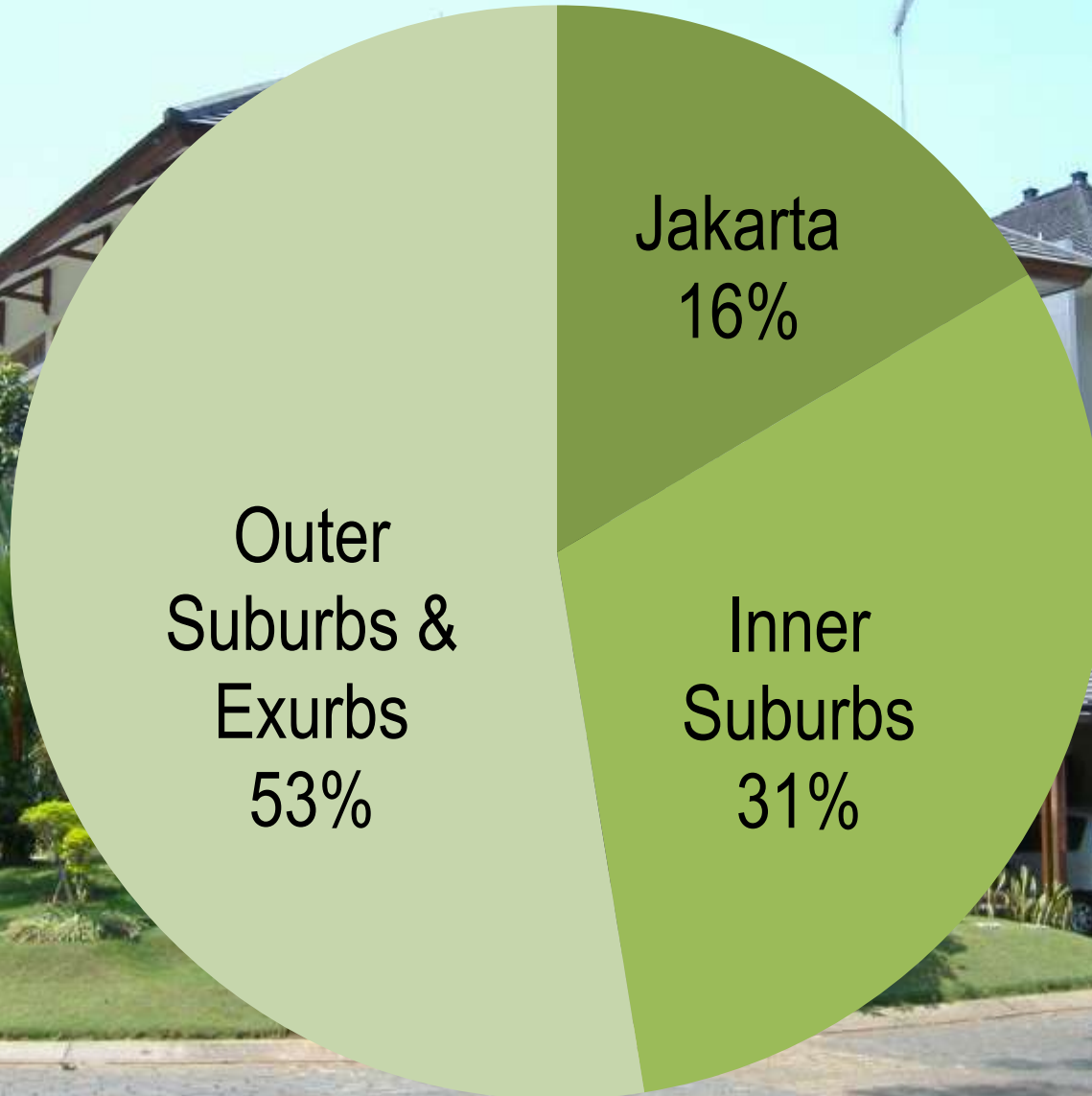


Figure 28

Jakarta: Growth by Sector

2000-2010



Population by District: 1901-2011

MUMBAI METROPOLITAN REGION



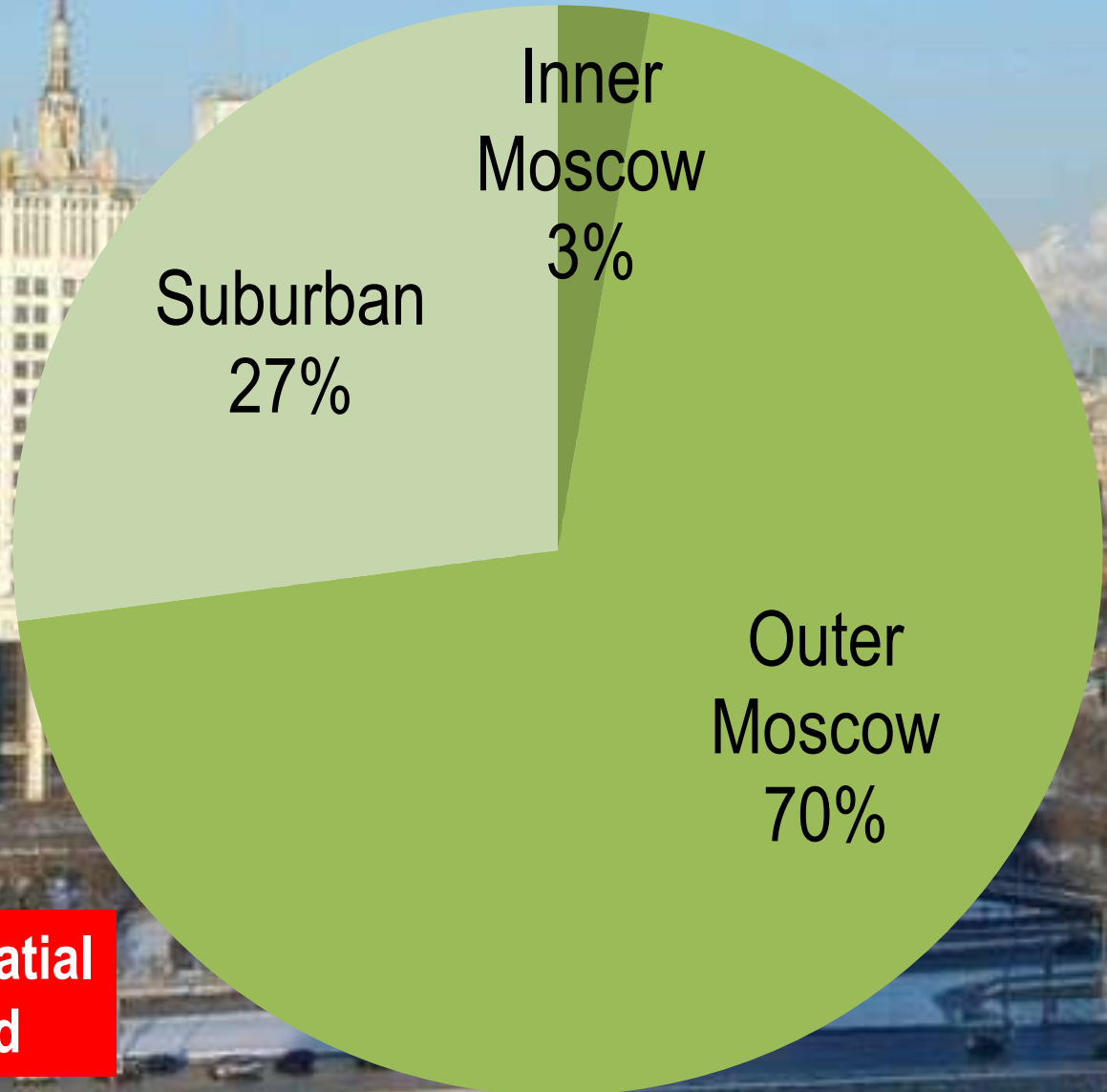
Core & Suburban Population: 1950-2010

MANILA URBAN AREA



Moscow Area Population Growth by Sector

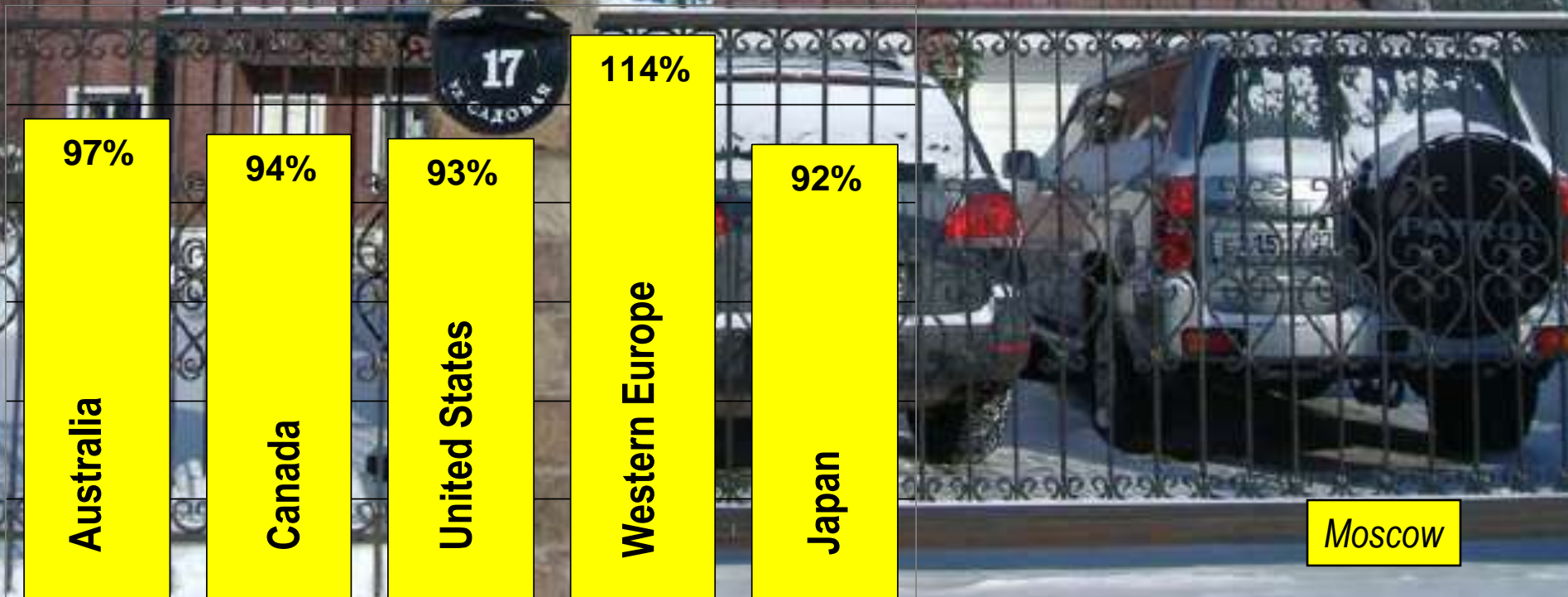
2002-2010



**Substantial Urban Spatial
Expansion Planned**

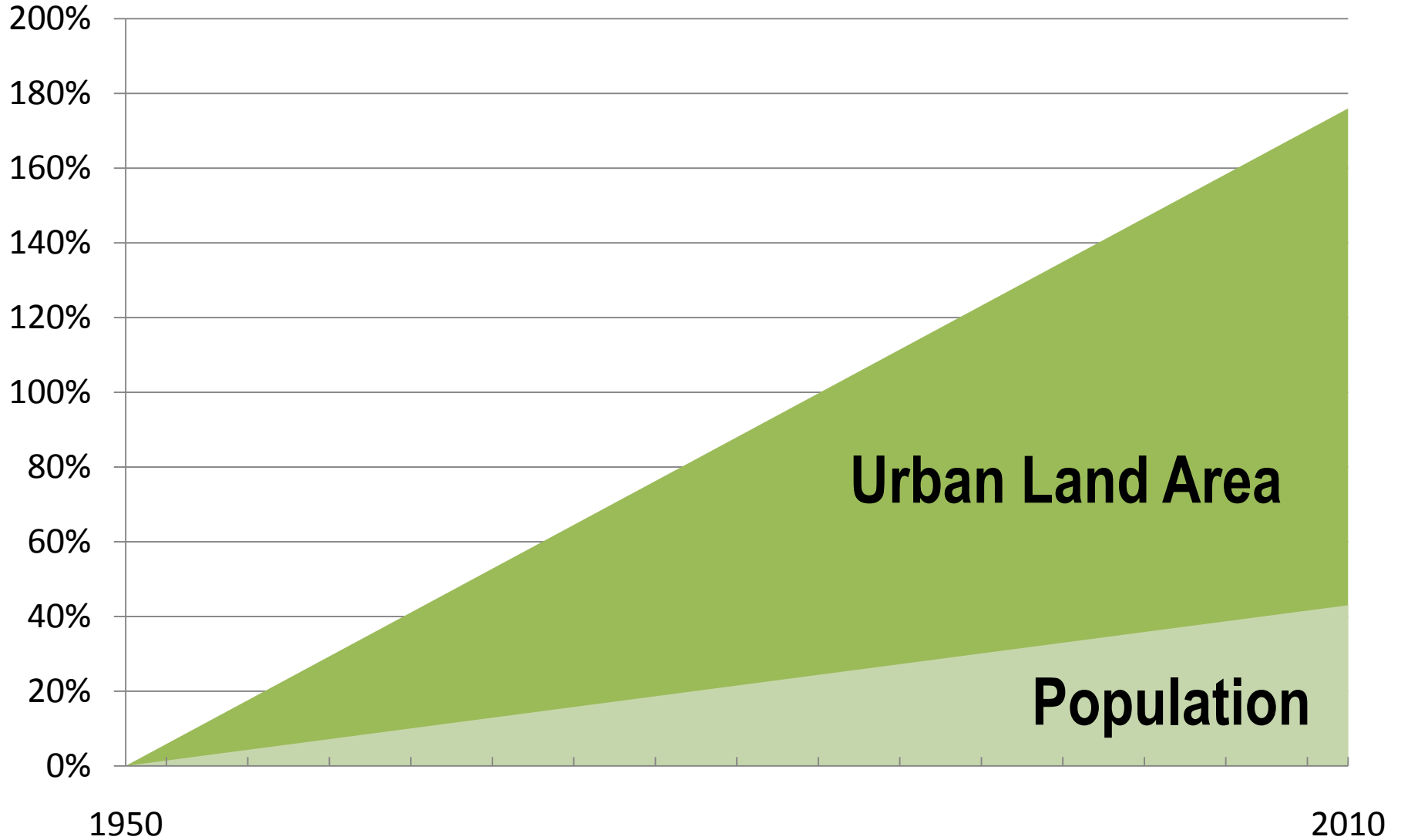
High Income World: 1960s-2000s

NEARLY ALL URBAN GROWTH IN SUBURBS: 35+YEARS



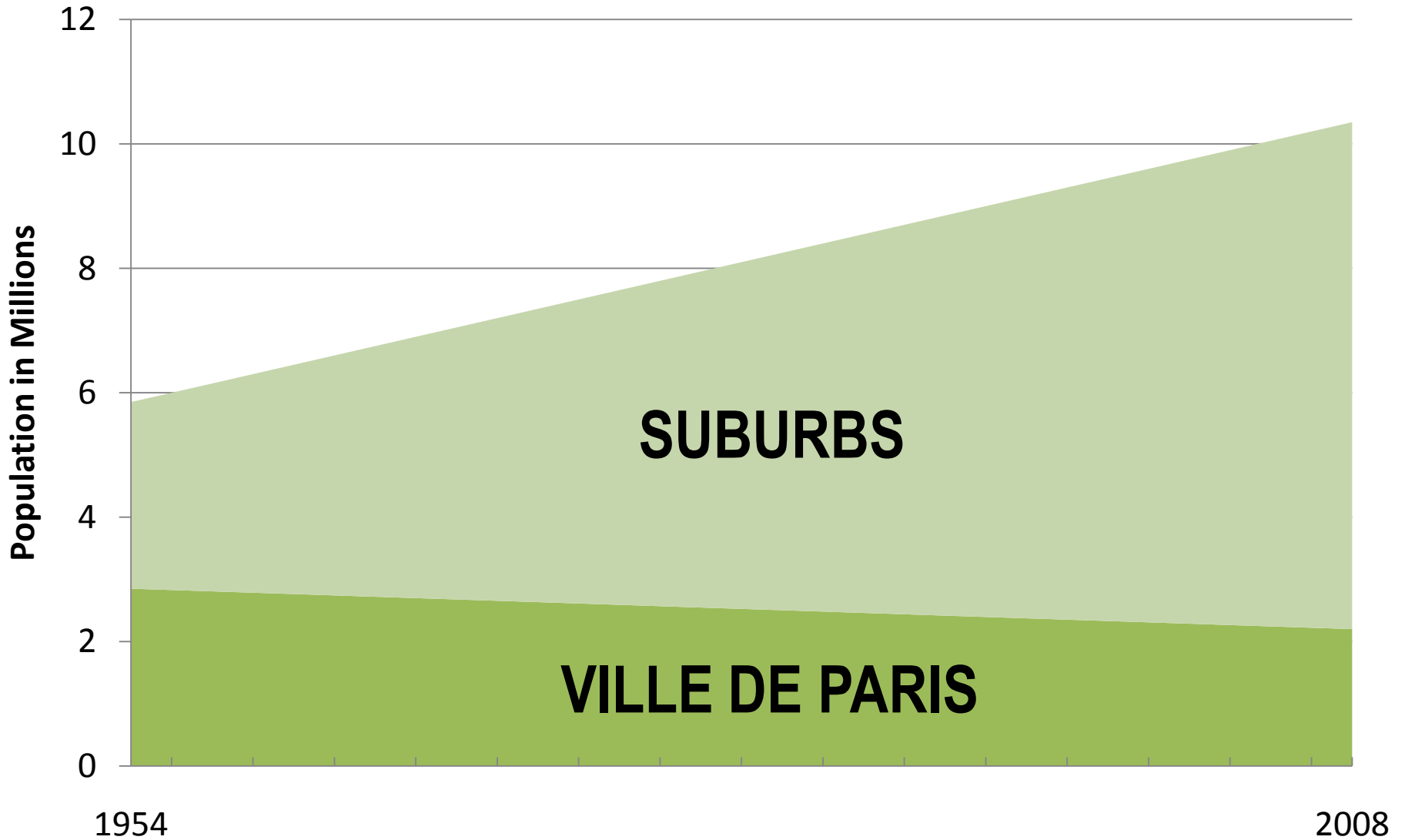
New York Urban Area Expansion

POPULATION & URBAN LAND AREA 1950 - 2010



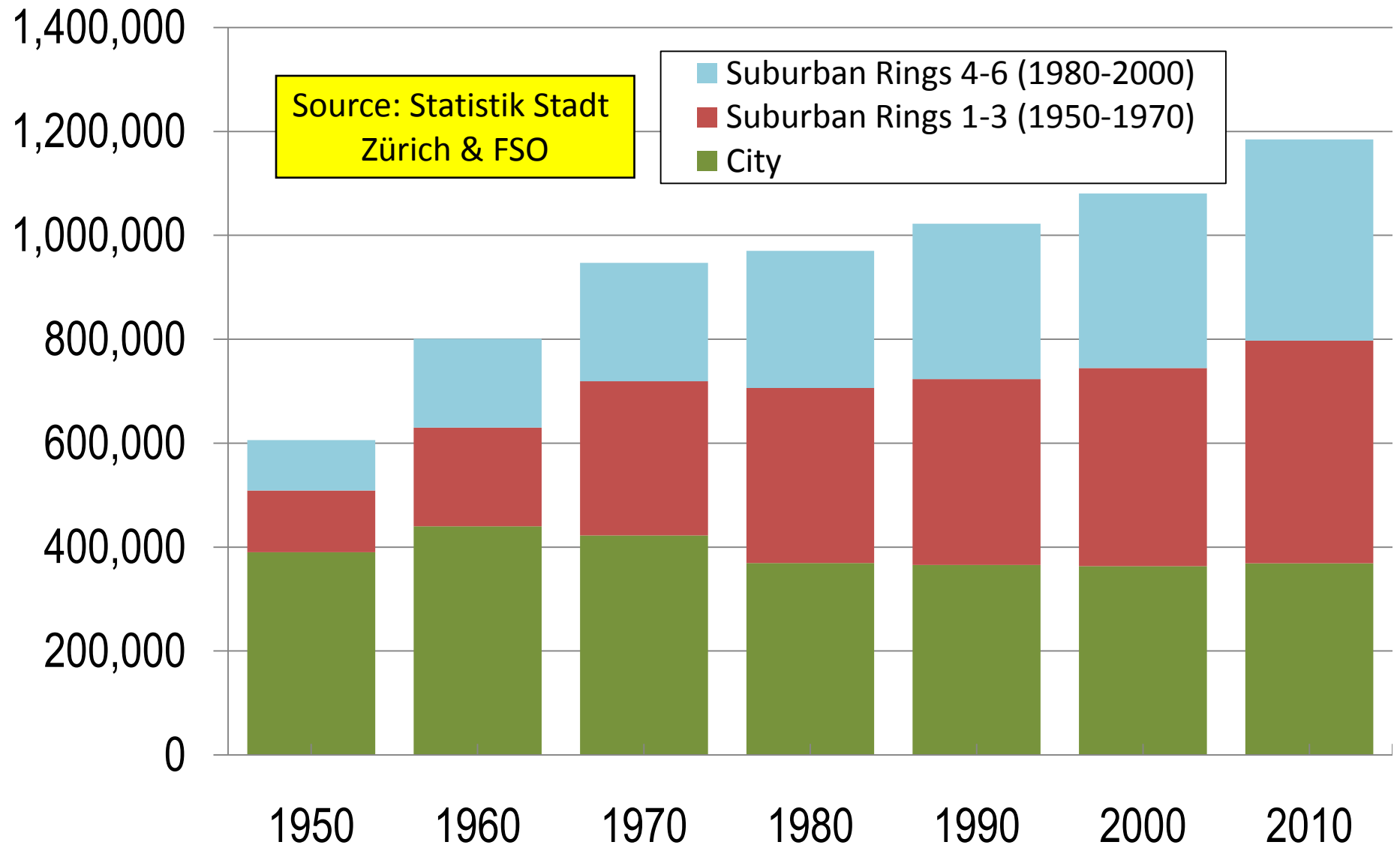
Paris Urban Area Population Growth

1950 - 2010



Zürich Urban Area Population Growth

CITY & SUBURBAN RINGS: 1950-2010

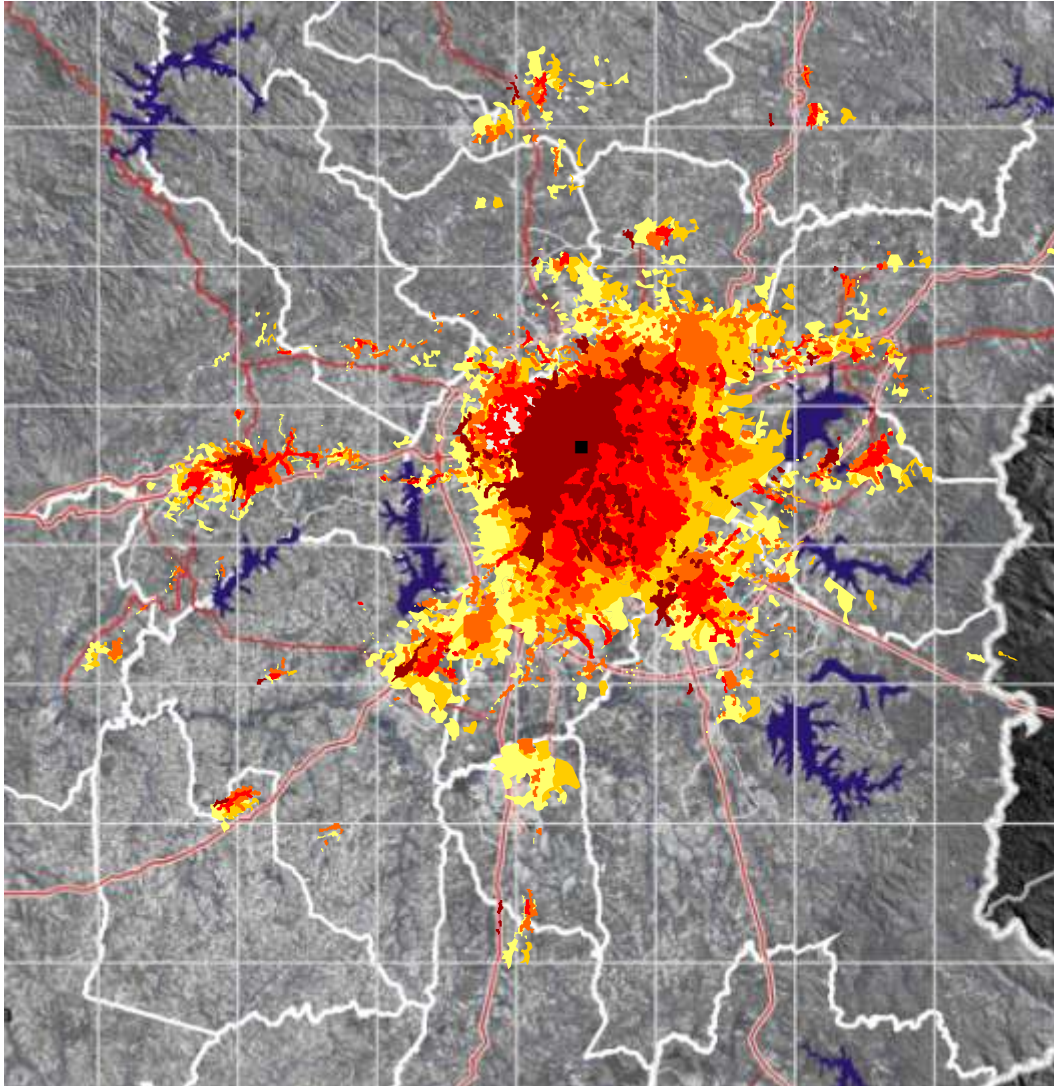


Largest Employment Center in Canada

EDGE CITY: TORONTO PEARSON AIRPORT AREA

Mexico City: Santa Fe (#3)
Sao Paulo: Luis Berrini (#3)
Addis Abeba: Bole

The Organic Growth of Cities



Curitiba and
Metropolitan Region

YEAR	POPULATION
1955	360.000
1965	550.000
1975	1.140.000
1985	1.700.000
2000	2.700.000
2010	3.224.286
2020	3.758.358

CURRENT URBAN PLANNING MYTHS

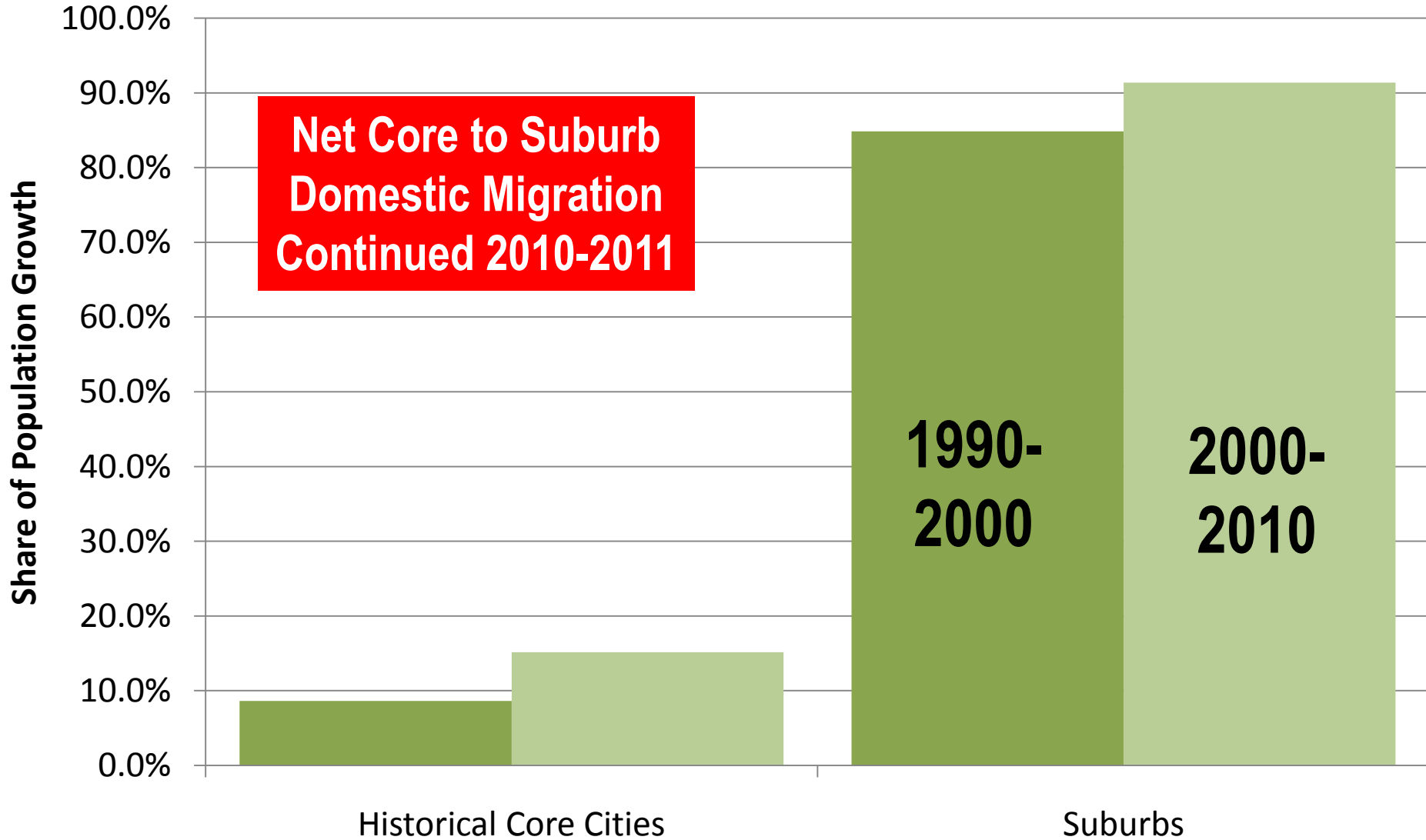


DEMOGRAPHIA

Chicago

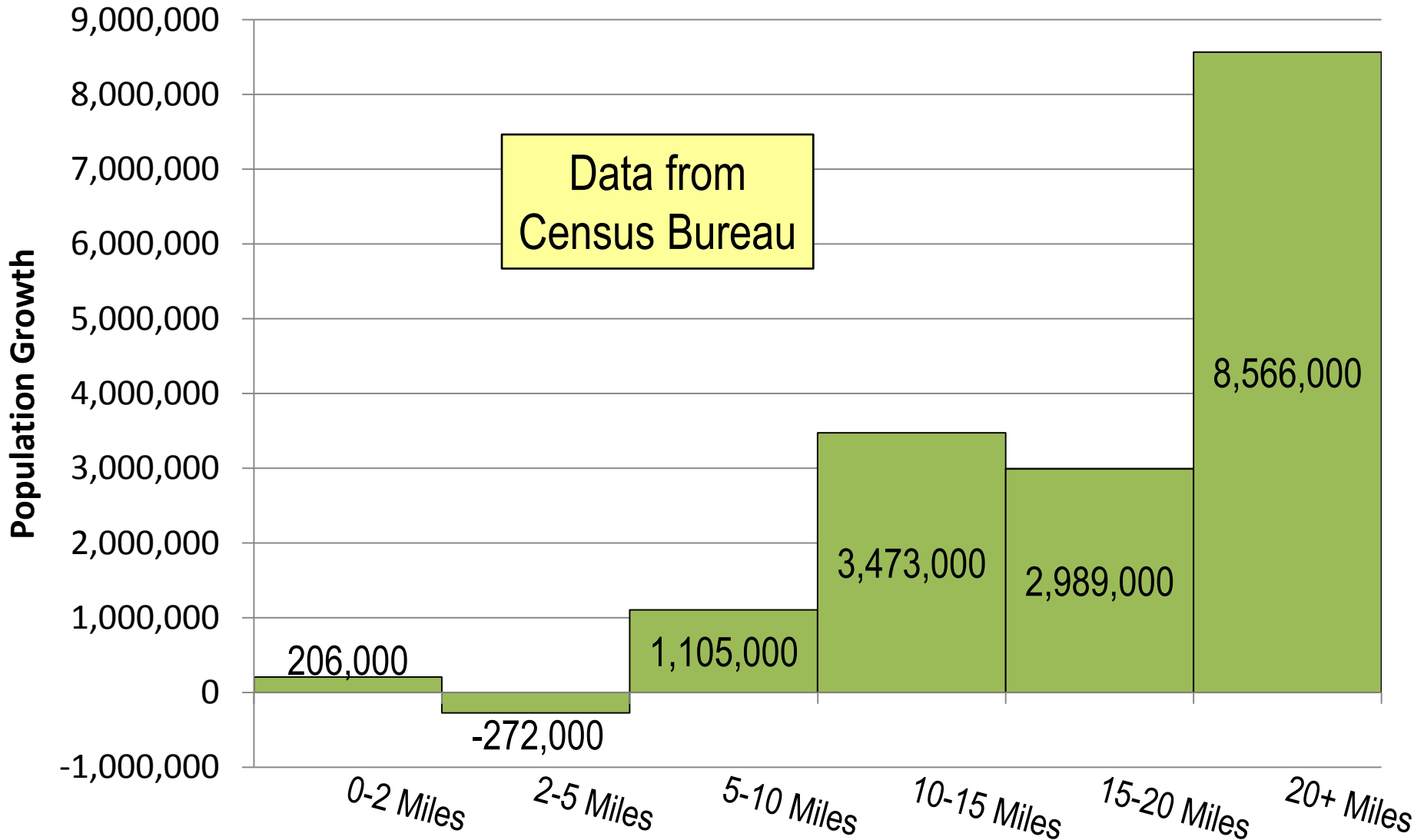
Not “Returning to the Cities”

MAJOR METROPOLITAN AREAS: CORE & SUBURBAN



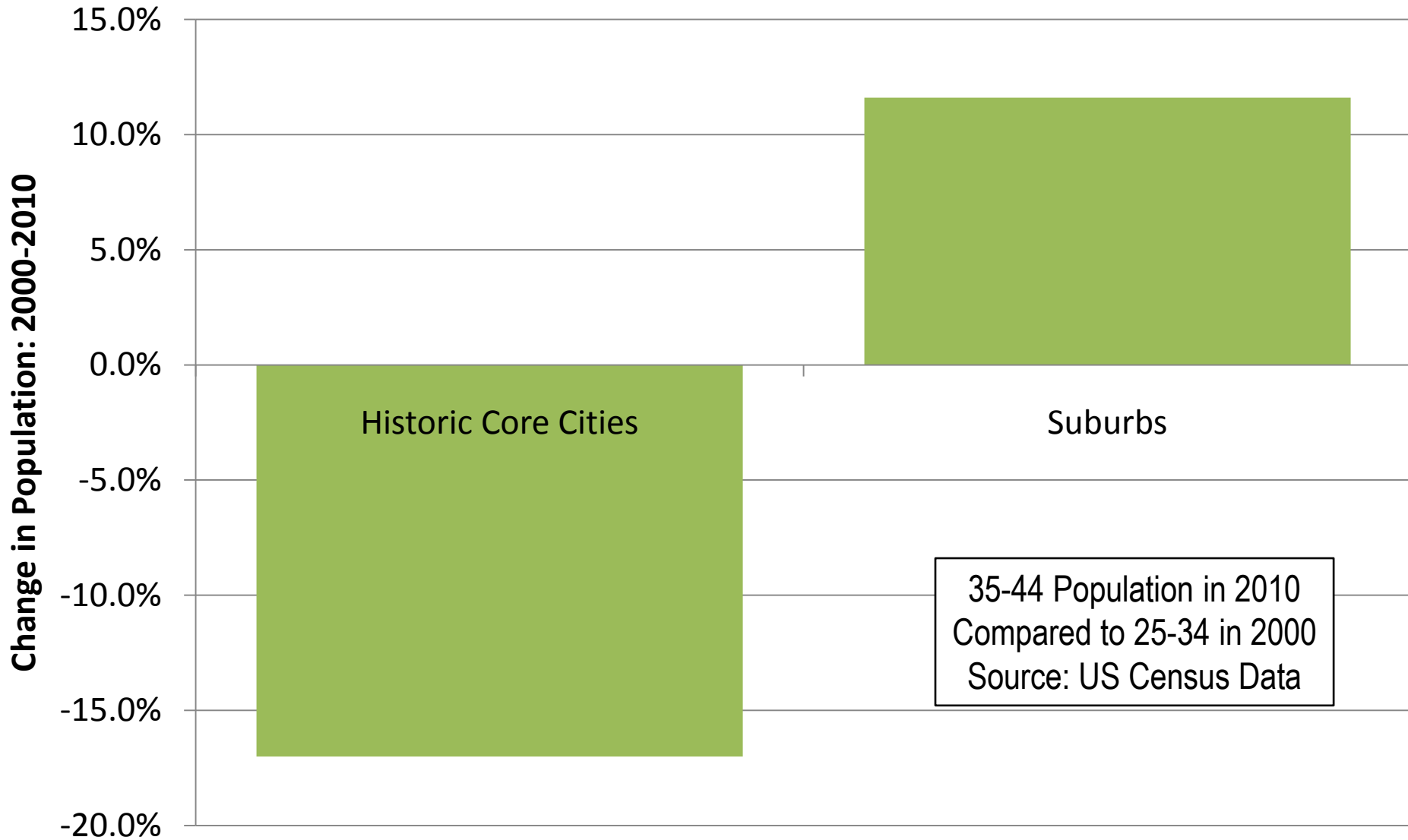
No Move from Suburbs to Core

US MAJOR METROPOLITAN AREAS: 2000-2010



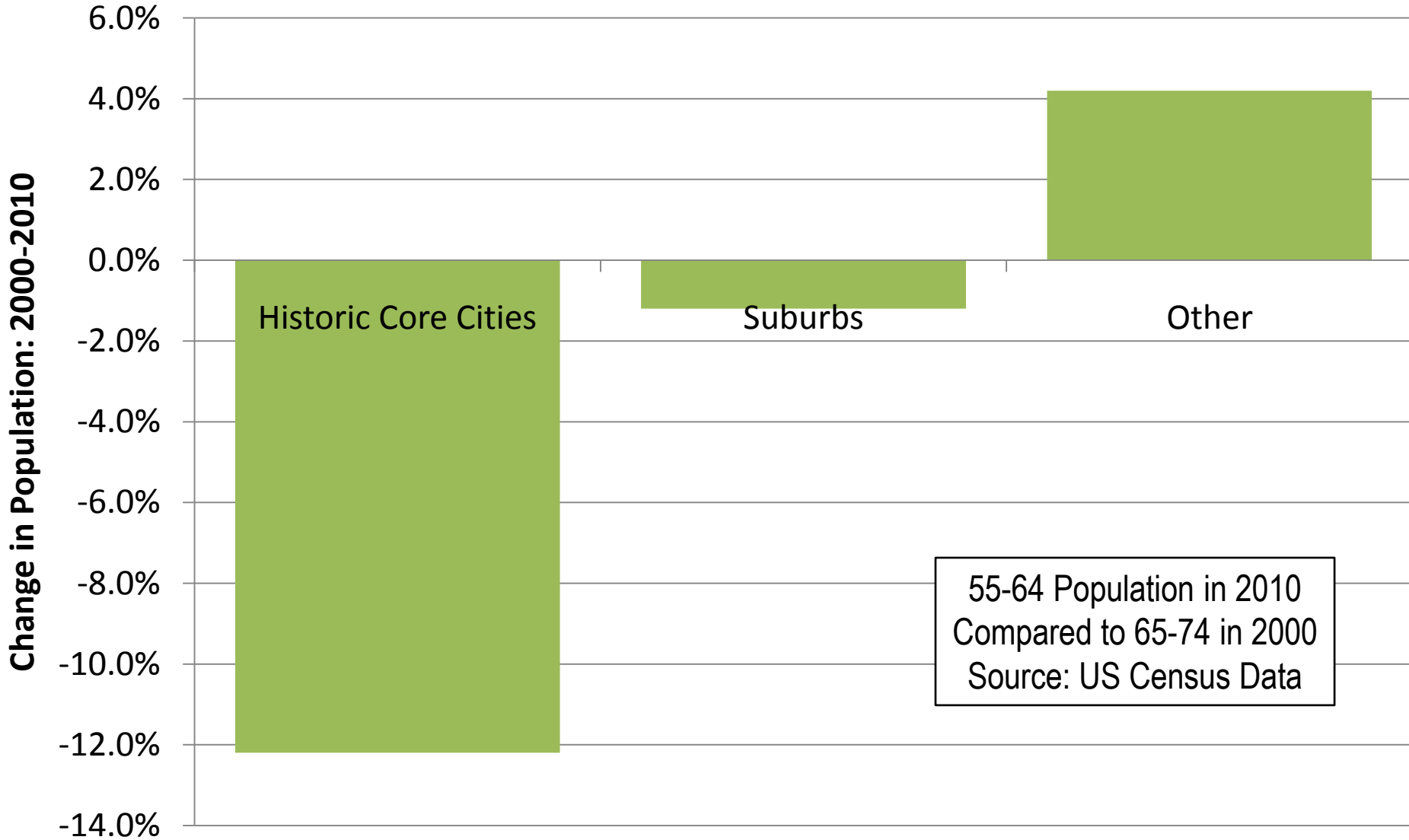
Younger Not Moving to Cities

MAJOR METROPOLITAN AREAS: CORE & SUBURBAN



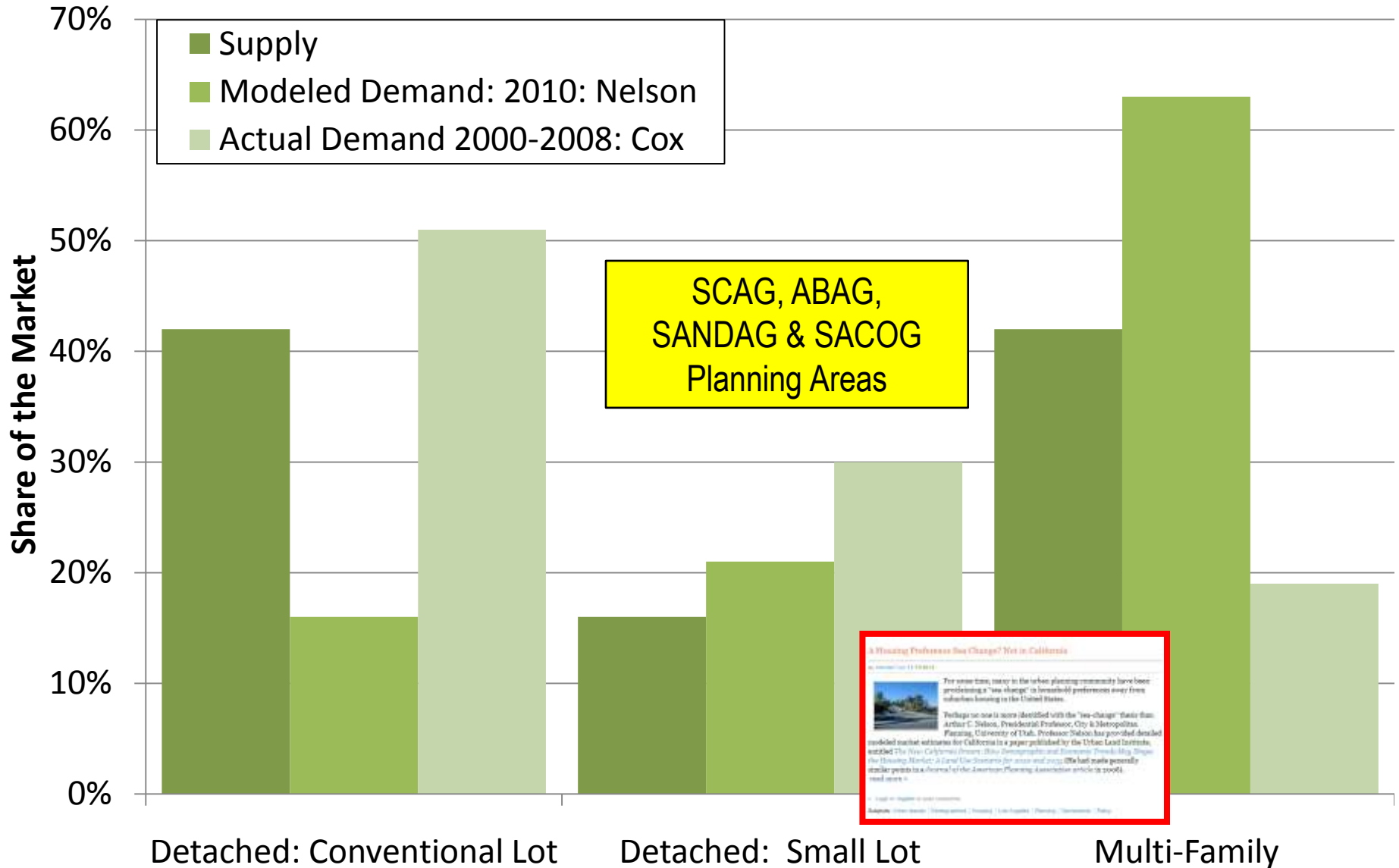
Age 55-64 Not Moving to Cities

MAJOR METROPOLITAN AREAS: CORE & SUBURBAN



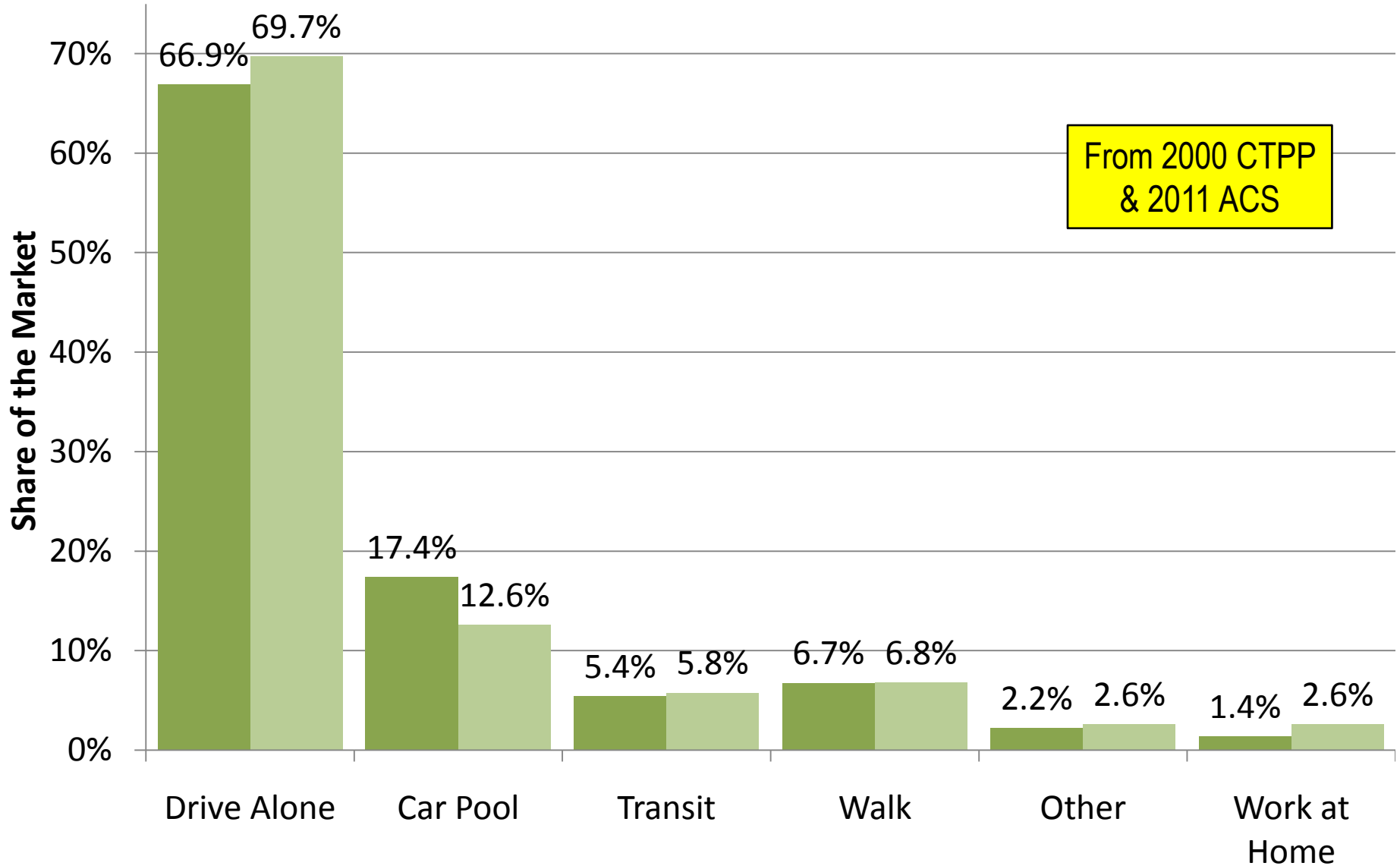
Housing Preferences: Not Changing

CALIFORNIA (2000s)



Driving Down: 16-25: But Not to Work

UNITED STATES: 2000 & 2011



Dubai

DEMOGRAPHIA

CITIES & TRANSPORT



Democratization of Prosperity

ASSOCIATION BETWEEN MOBILITY & AFFLUENCE

Chicago

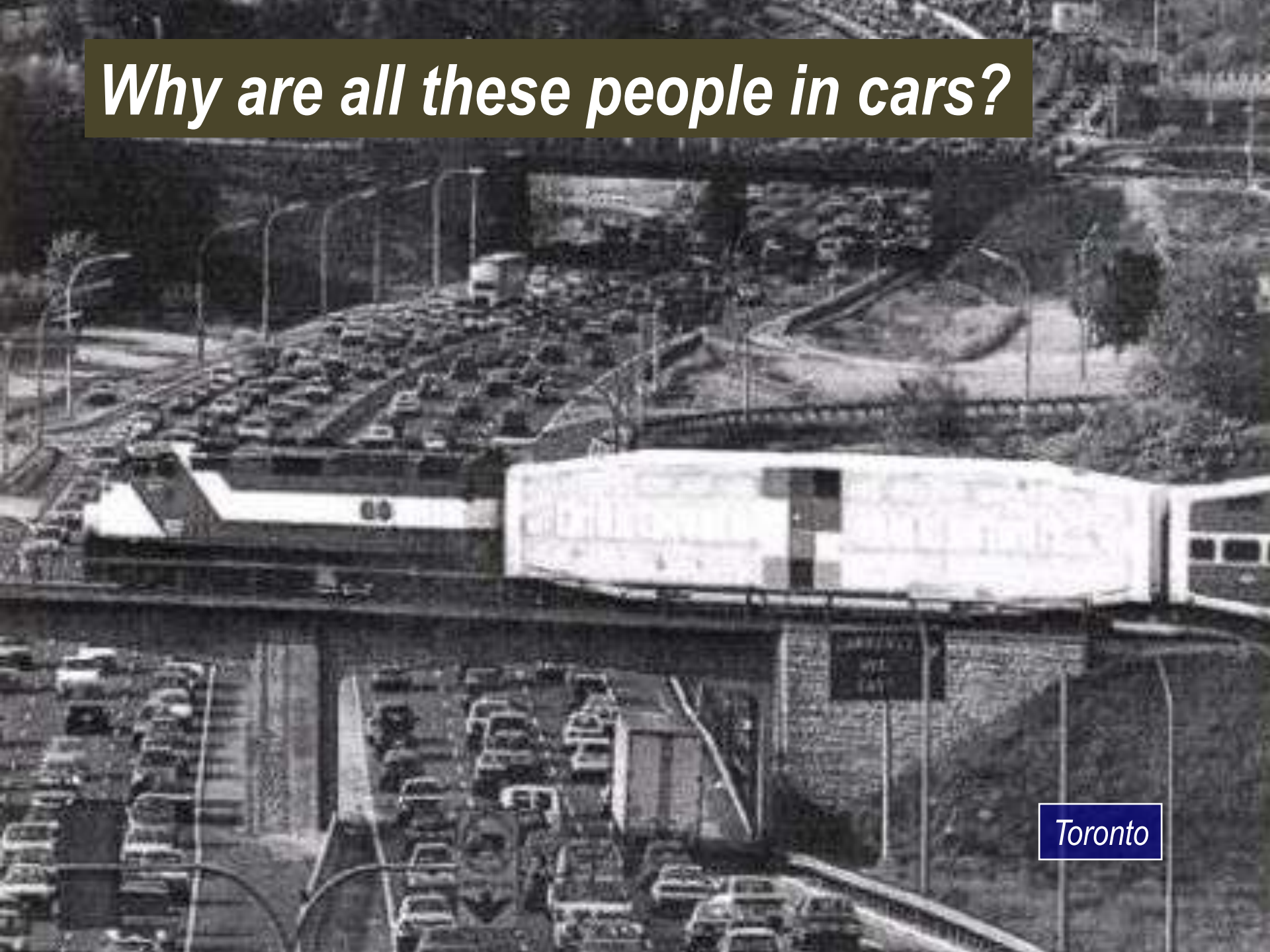
“Time is Money”

Reduced Minority
Unemployment
With Cars
U. of California

PRUD’HOMME
Mobility Improves
Productivity
U. Of Paris

HARTGEN-FIELDS
Mobility Improves
Productivity

Why are all these people in cars?

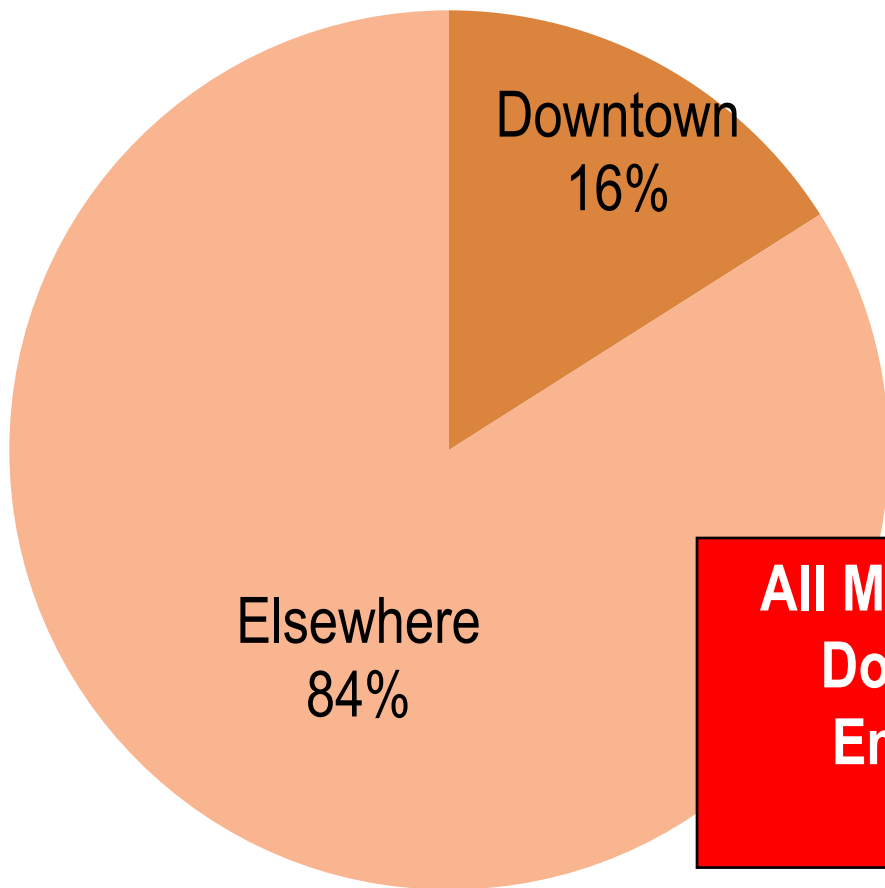


Toronto

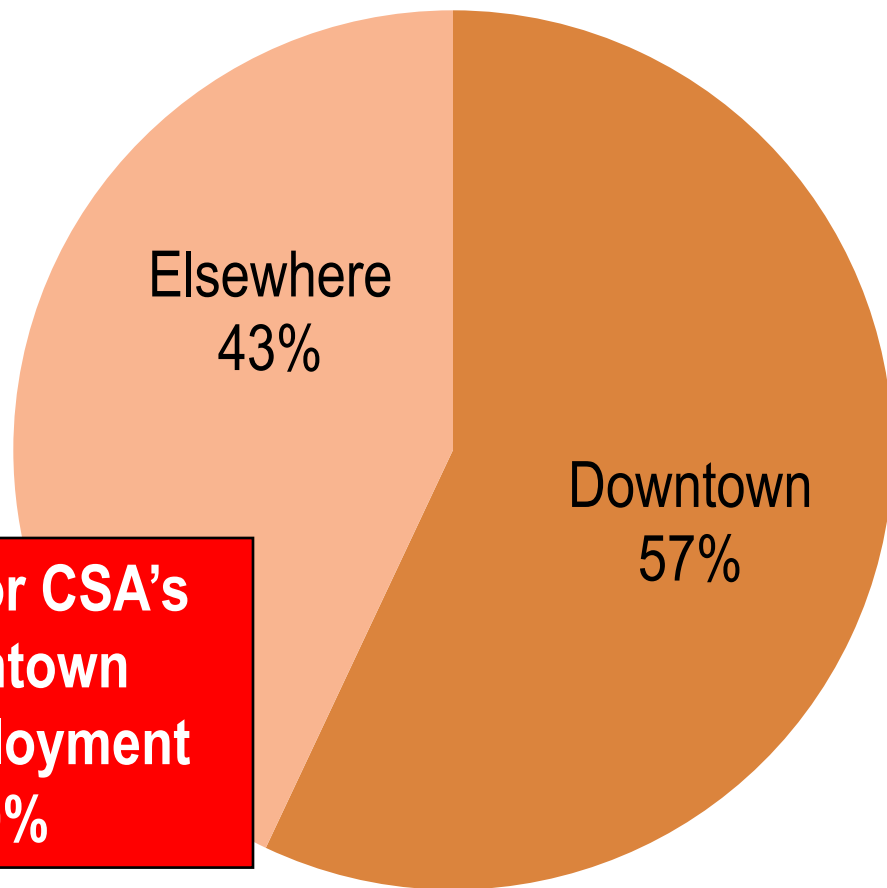
Transit: Strong Downtown: Weak Elsewhere

6 CSA'S WITH STRONGEST DOWNTOWNS: 2000

EMPLOYMENT



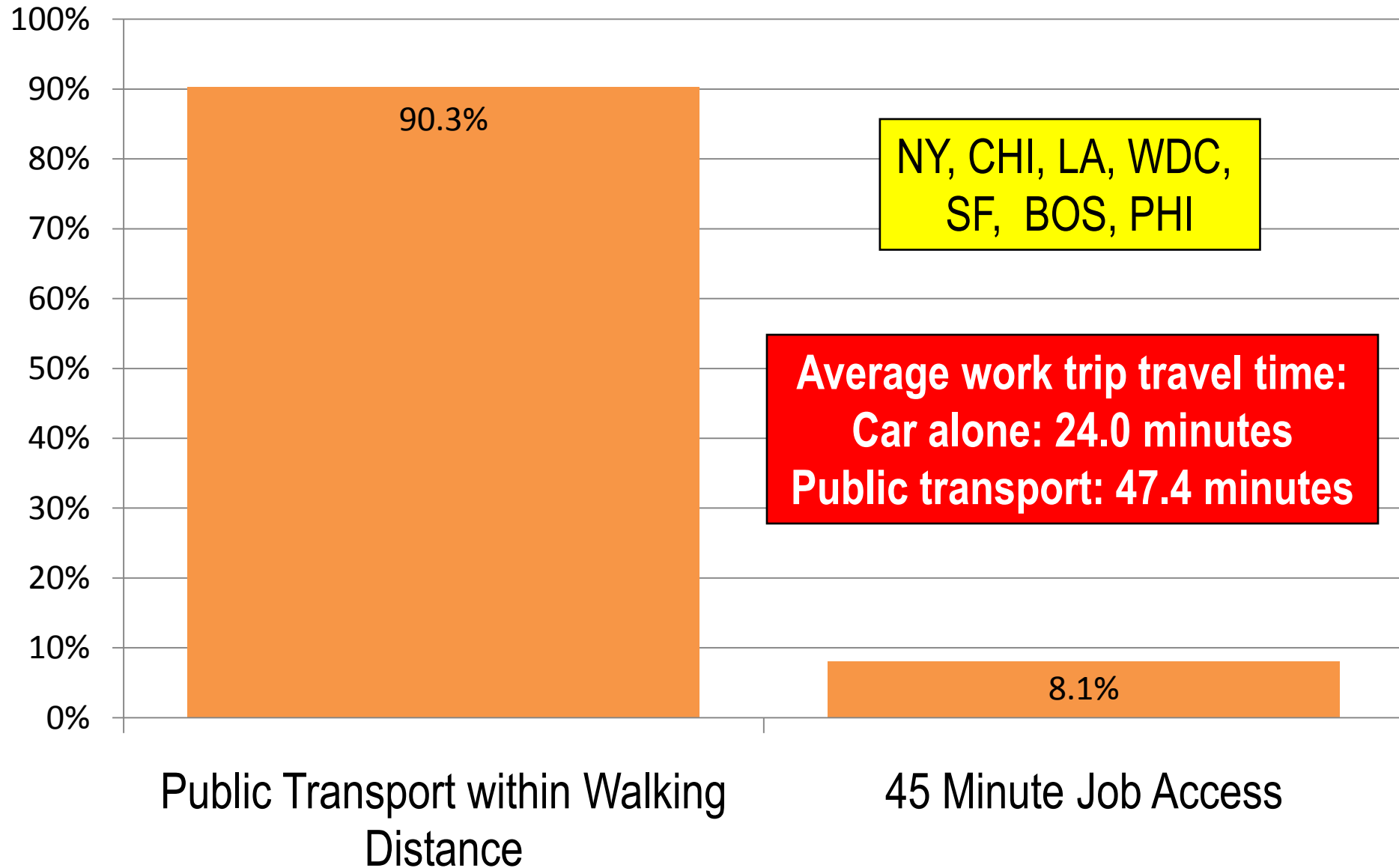
OF TRANSIT COMMUTERS



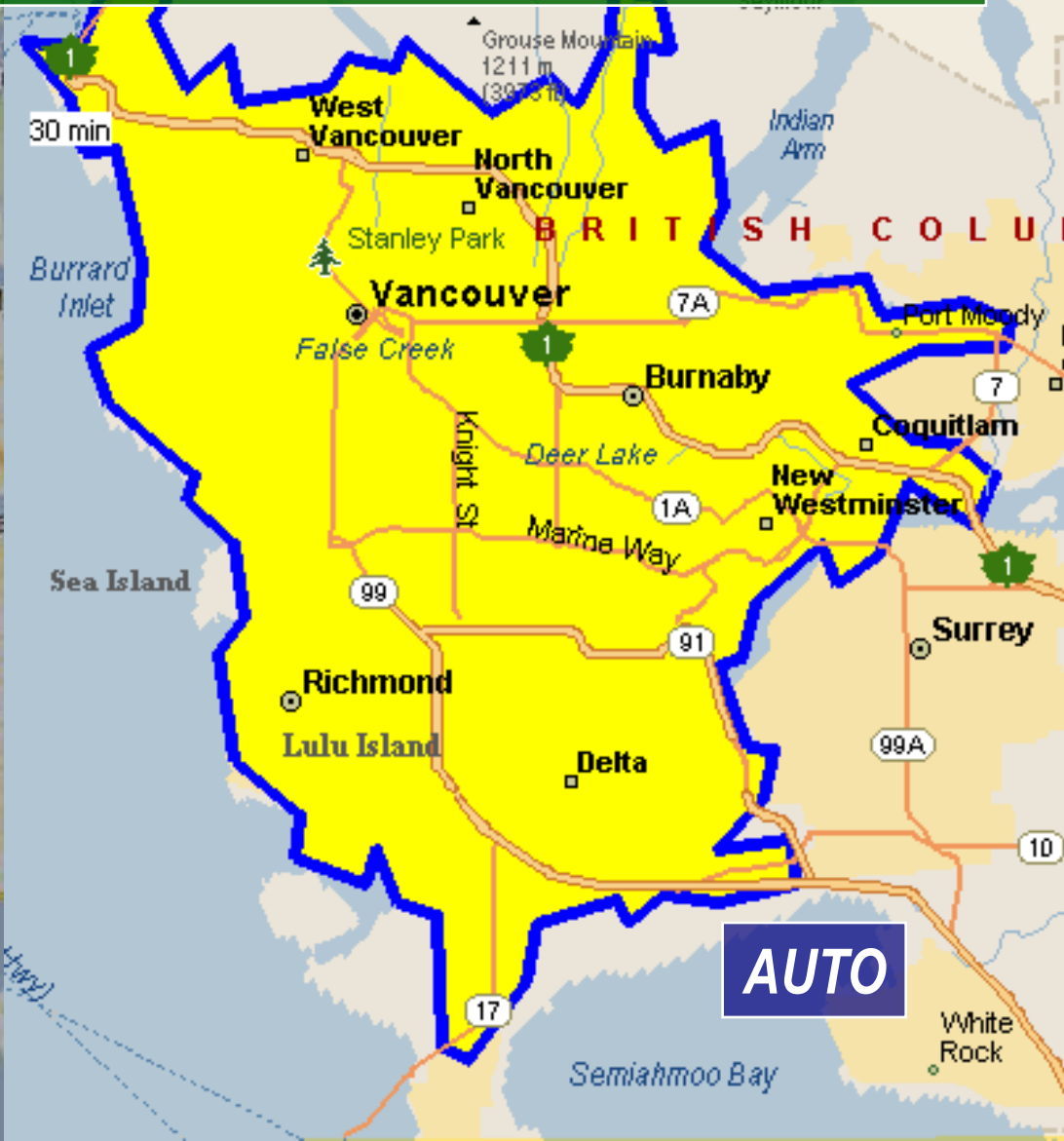
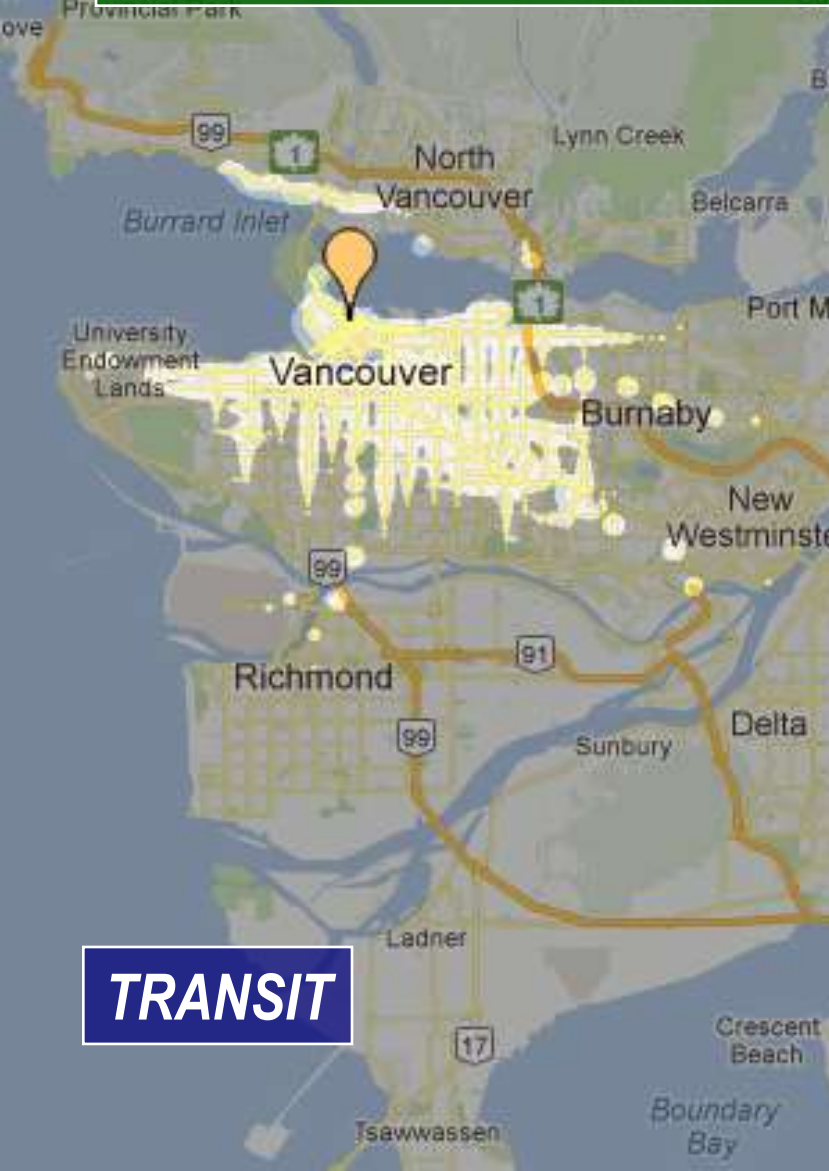
**All Major CSA's
Downtown
Employment
10%**

Public Transport: 7 US Largest Markets

ACCESS TO TRANSIT STOPS/ACCESS TO JOBS



Transit & Auto Access: 30 Minutes FROM CENTRAL VANCOUVER



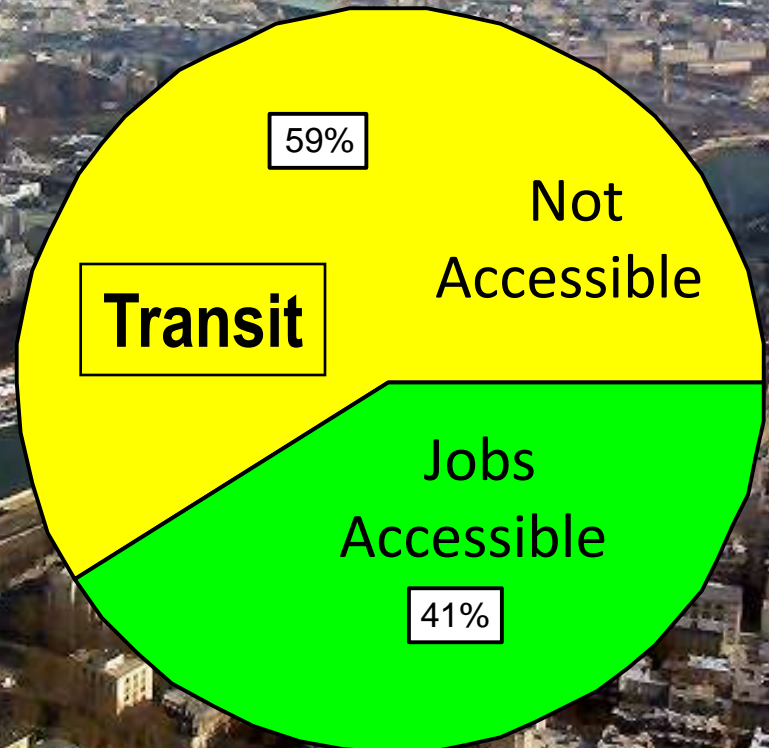
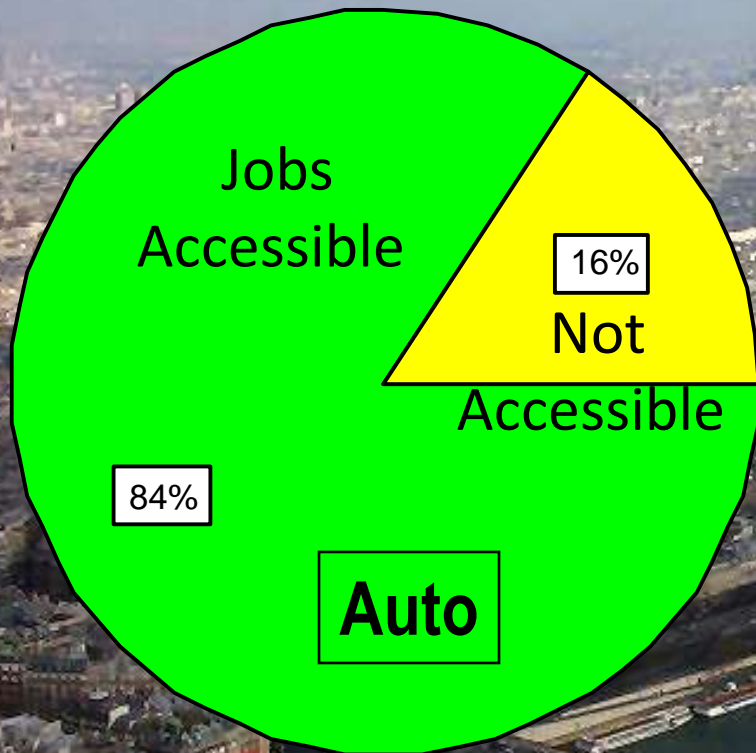
TRANSIT

AUTO

Paris Suburbs: Cars Provide Quicker Travel

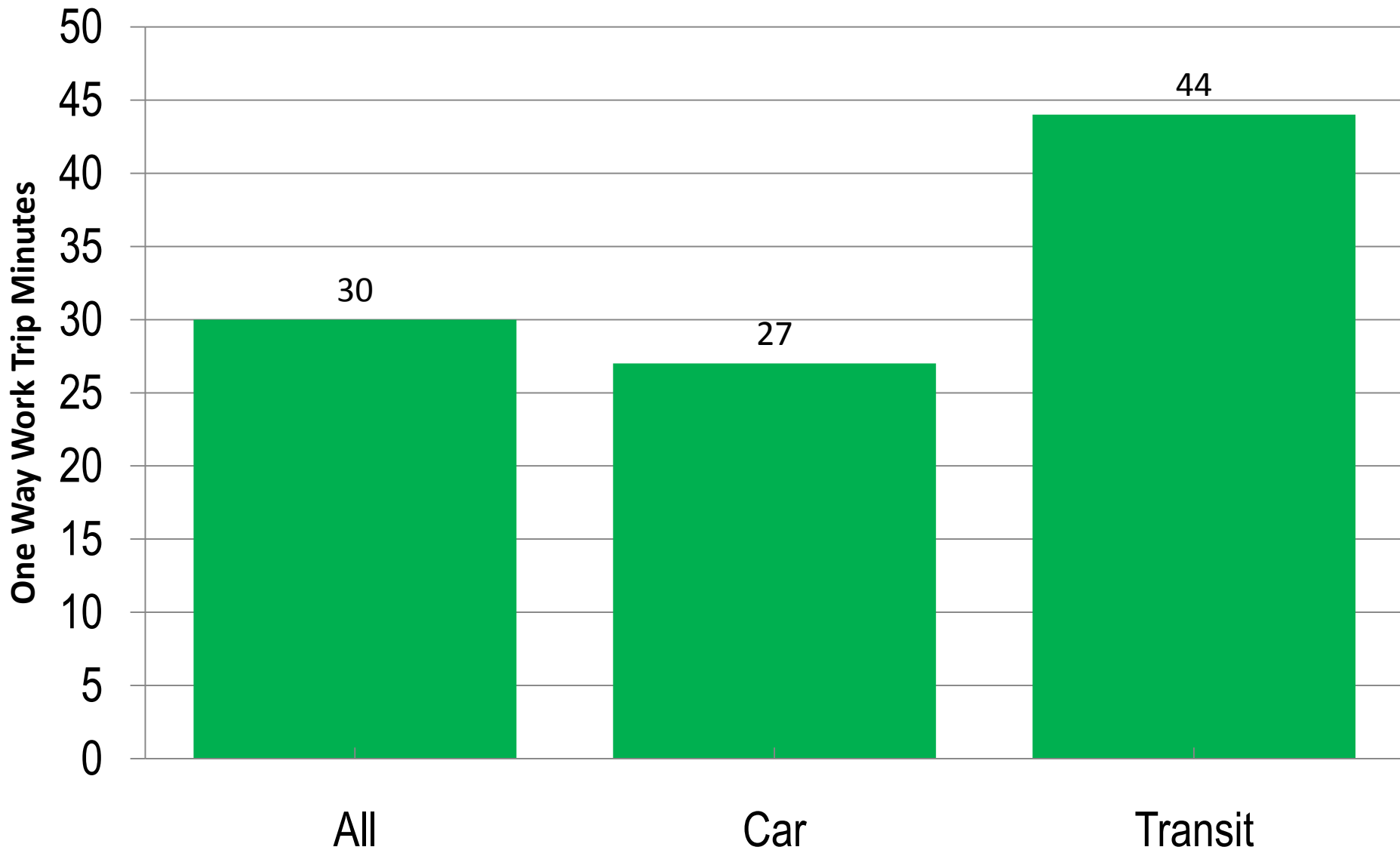
FROM MAJOR SUBURBAN RAIL STATIONS: 1 HR TO JOBS

Paris



Travel by Transit Takes Longer

6 MAJOR METROPOLITAN AREAS: CANADA



Autos in Western Europe & North America

MAJORITY OF MOTORIZED TRAVEL IS AUTO IN ALL CITIES

Example

PORTLAND

Transit +Cycle+Walk

Market Share Down

9% 1980-2011



Transit's "Last Kilometer" Problem

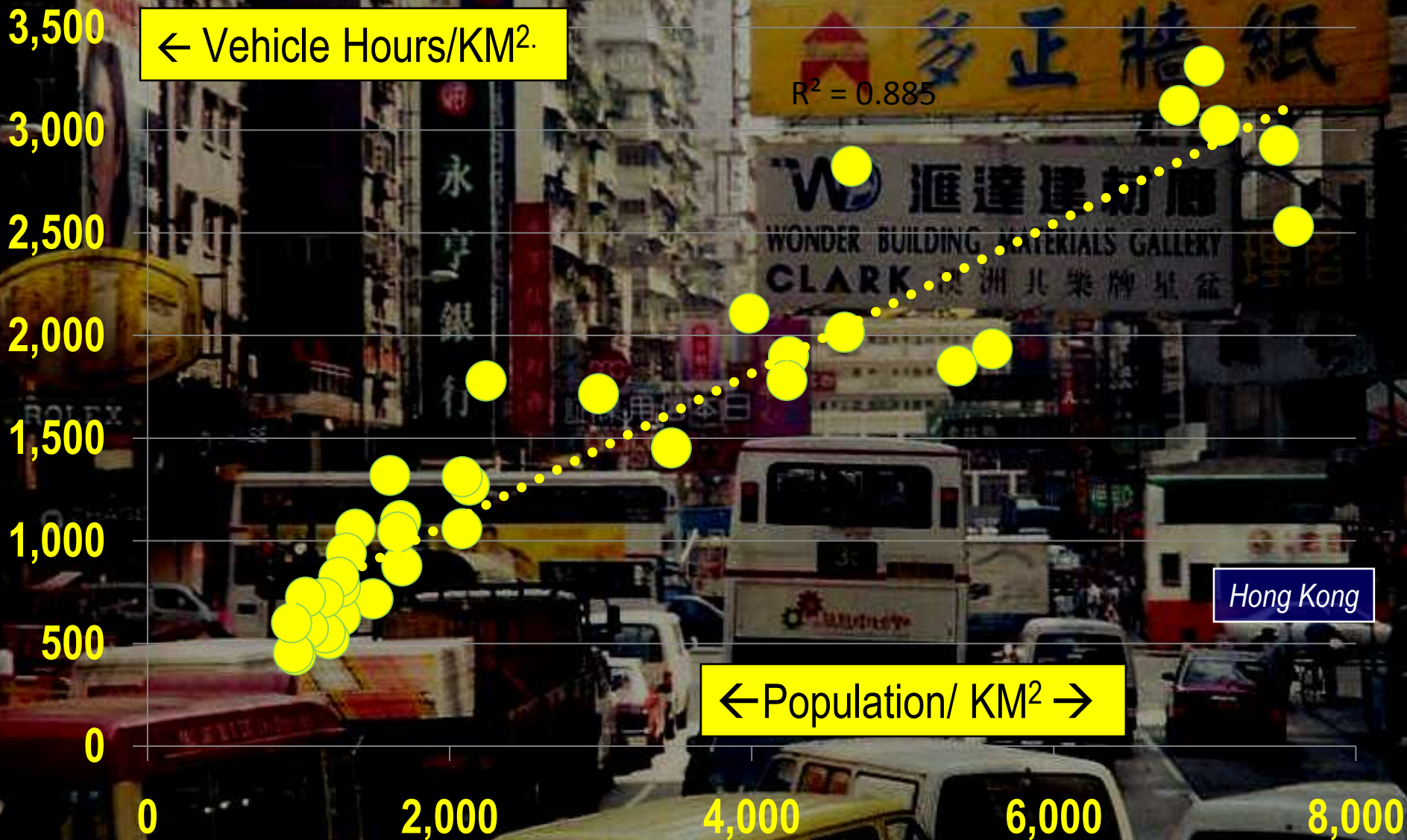
ELSEWHERE TRANSIT IS SLOWER FOR MORE TRIPS

Annual Cost:
More than gross
annual income of
metropolitan area

An auto competitive
system for Portland?
 $\frac{1}{2}$ Mile Metro
Grid Required

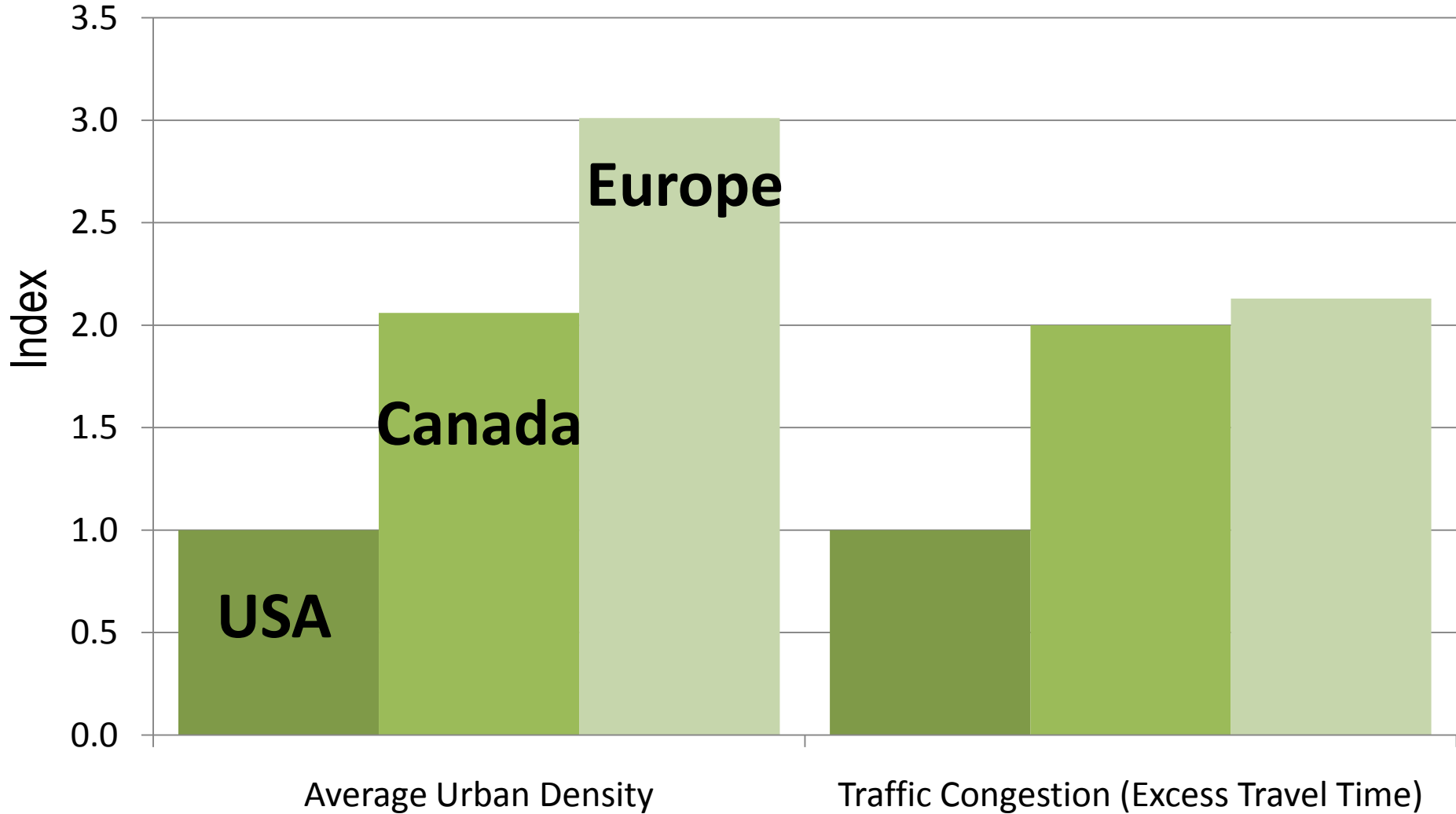
Higher Density Means More Traffic Congestion

DENSITY & TRAFFIC VOLUMES: INTERNATIONAL



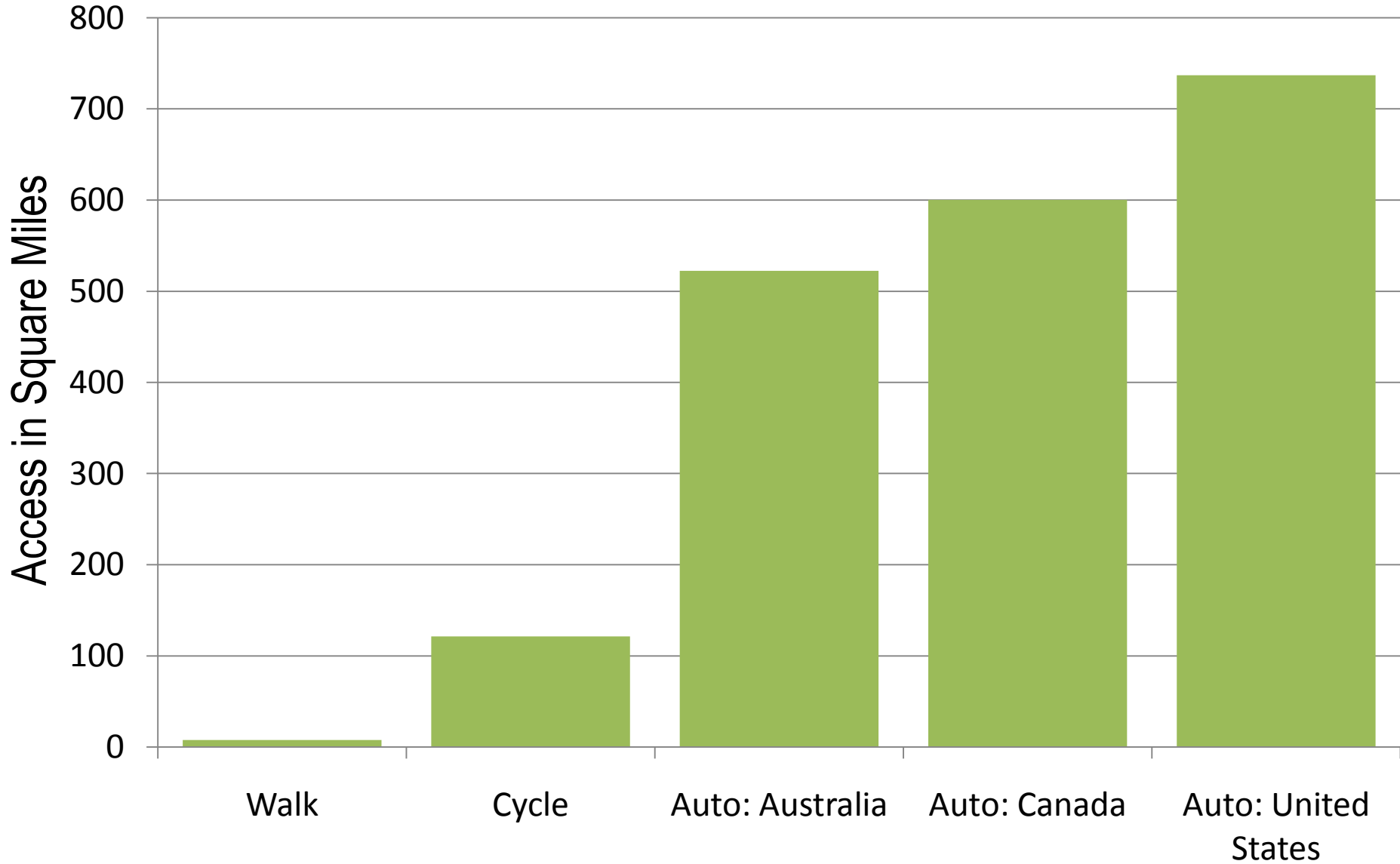
Density & Traffic Congestion

UNITED STATES, CANADA & EUROPE



30-Minute Access by Mode

CAR, CYCLING AND WALKING



THE DIMENSIONS OF SUSTAINABILITY

1. POVERTY ALLEVIATION

Does the strategy contribute to poverty alleviation?

2. COST EFFECTIVE SUSTAINABILITY

Can the strategy reduce GHG emissions at a cost within the \$50 ceiling per ton?

3. ECONOMIC SUSTAINABILITY

Is the strategy without serious potential for reducing economic growth or increasing poverty?

4. POLITICAL SUSTAINABILITY (ACCEPTABILITY)

Is the strategy without serious potential for public rejection or evasion?

5. ENVIRONMENTAL SUSTAINABILITY

Does the strategy have the potential to achieve the GHG emission reduction objective?

POVERTY ALLEVIATION

An aerial photograph of a vast, arid, mountainous landscape. The terrain is characterized by numerous small, rounded hills and valleys, some of which are covered in sparse, dry vegetation. The overall color palette is dominated by earthy tones of brown, tan, and beige, contrasting with the clear, bright blue sky above. The perspective is from a high altitude, looking down across the entire scene.

Rio +20 Declaration

Eradicating poverty is the greatest global challenge facing the world today and an indispensable requirement for sustainable development.



COST EFFECTIVE SUSTAINABILITY

Not an Issue of Fair Share

The most cost effective means

Must be used regardless of sector

Cost Effectiveness is Crucial

UN IPCC MAXIMUM RANGE PER METRIC TON

Shenyang,
China

\$20

\$50

Market
Less than
\$15

Above \$50 is wasteful
Detracts from efforts to reduce GHGs
& unnecessarily reduces
employment & economic growth

McKinsey
Average
\$17



THE ORANGE COUNTY REGISTER

OPINION

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Published: Nov. 11, 2012 Updated: 9:54 p.m.

Wendell Cox: Global warming bill could become big pork barrel

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By **WENDELL COX** / Principal of Demographia, an international public policy firm in the St. Louis, Mo., area



McKinsey & Conference Board

NO RADICAL LIFESTYLE CHANGES NEEDED

Reducing U.S. Greenhouse Gas Emissions: *How Much at What Cost?*



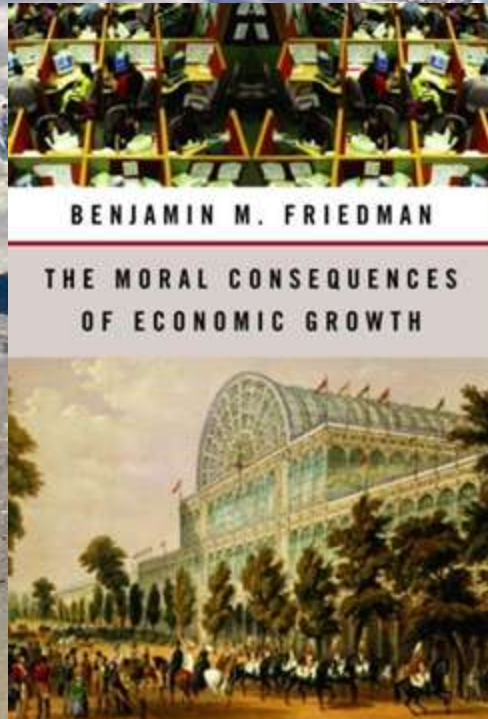
...no change in thermostat settings or appliance use, no downsizing of vehicles, home or commercial space and traveling the same mileage

...no shift to denser housing

U.S. Greenhouse Gas Abatement Mapping Initiative
Executive Report
December 2007

**Co-sponsors included:
NRDC, EDF, Shell**

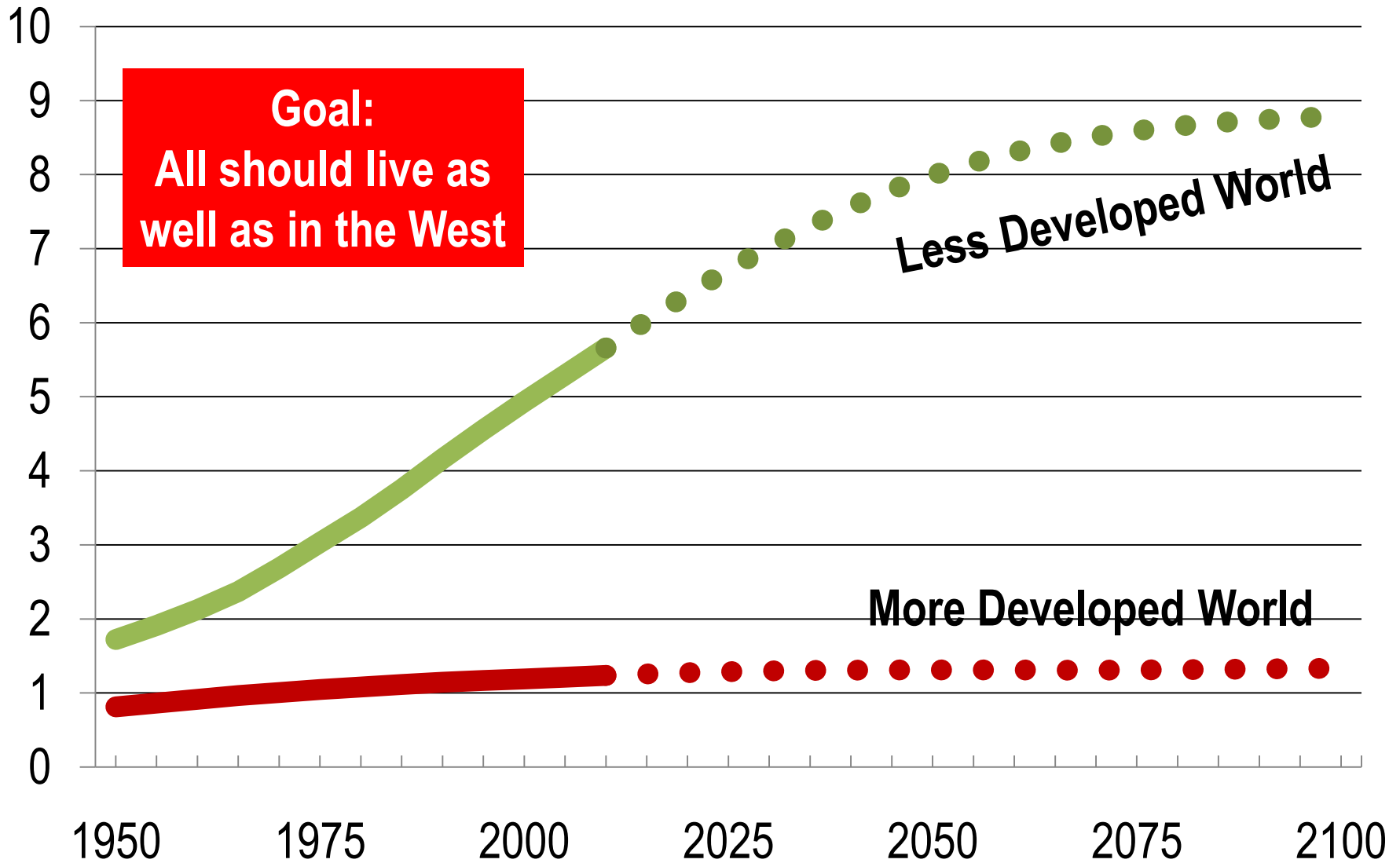
ECONOMIC SUSTAINABILITY



**Economic
Growth:
Required
For
Social
Cohesion**

World Population: 1950-2100

BY INCOME: ACTUAL AND PROJECTED



POLITICAL SUSTAINABILITY (ACCEPTABILITY)

Rajendra K. Pachauri, Chair, IPCC

*Can you imagine 400 million people who do not have a light bulb in their homes?" ... You cannot, in a democracy, ignore some of these realities and as it happens with the resources of coal that India has, **we really don't have any choice but to use coal.***



Europe: Protests Against Austerity

ATHENS: 18 OCTOBER 2012

Protests Against Raising Retirement Age

FRANCE: 18 OCTOBER 2012



5: ENVIRONMENTAL SUSTAINABILITY

Cannot be achieved without 1-4

1. POVERTY ALLEVIATION

Does the strategy contribute to poverty alleviation?

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5. ENVIRONMENTAL SUSTAINABILITY

Does the strategy have the potential to achieve the GHG emission reduction objective?

Planning Realities



Seoul

Reducing VMT: Diminishing Returns

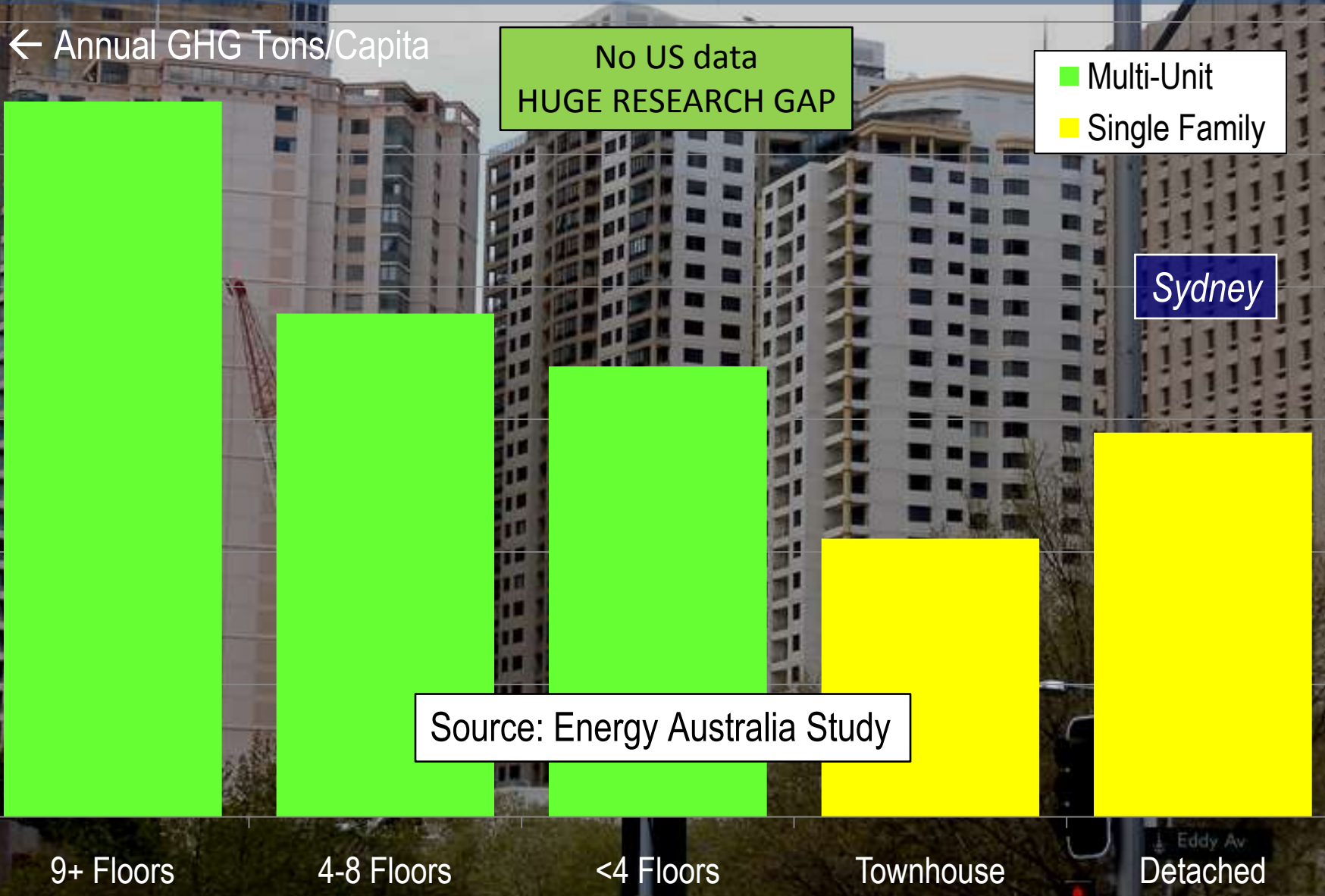
SLOWER SPEEDS, CONGESTION RAISE GHGS/VMT

Table 2. Canadian Fleet Representative Penalty Function

Driving Cycle	Approximate Average Speed (km/h)	AQ Emission (g/veh-km)			Fuel (ml/veh-km)
		CO	HC	NO _x	
Arterial LOS A-B	45	8.99	0.81	0.55	81.98
Arterial LOS C-D	30	10.70	1.01	0.60	95.92
Arterial LOS E-F	20	15.48	1.49	0.78	141.59
Freeway High-Speed	105	9.48	0.59	0.65	65.22
Freeway LOS A-C	95	9.29	0.55	0.61	63.79
Freeway LOS D	85	9.25	0.67	0.59	62.81
Freeway LOS E	50	8.63	0.82	0.52	71.84
Freeway LOS F	30	10.56	1.00	0.62	98.28
Freeway LOS G	20	11.28	1.09	0.54	113.13

Source: Simulation results using CMEM model coefficients

Density: GHG's May Not be Lower INCLUDING COMMON ENERGY EMISSIONS



Higher Suburban Density: Travel the Same

TRAVEL PATTERNS NO DIFFERENT THAN LOW DENSITY

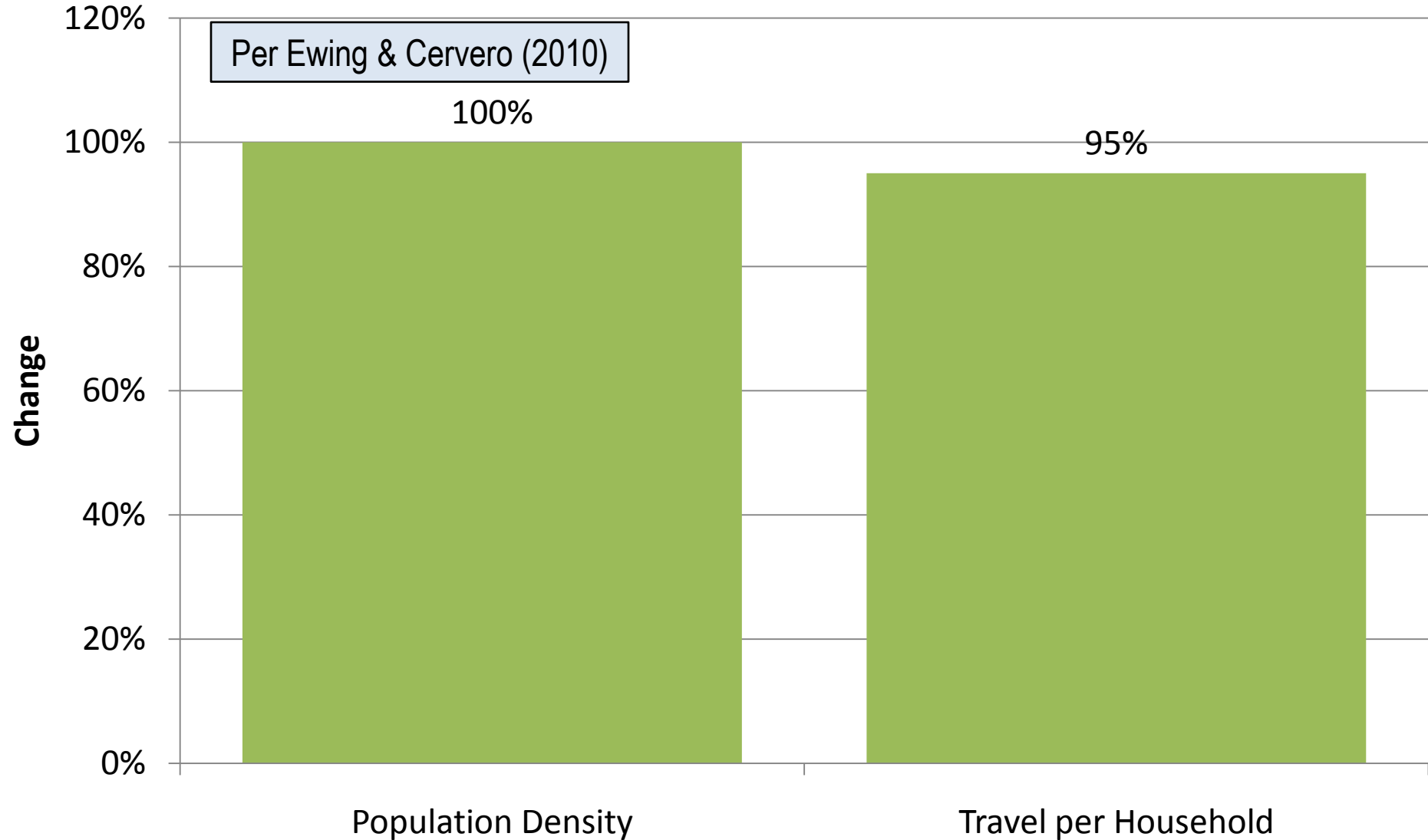
Statistics Canada:
High Density 6+ Miles
From Downtown
Relies on Cars

Suburban Toronto (Newmarket)



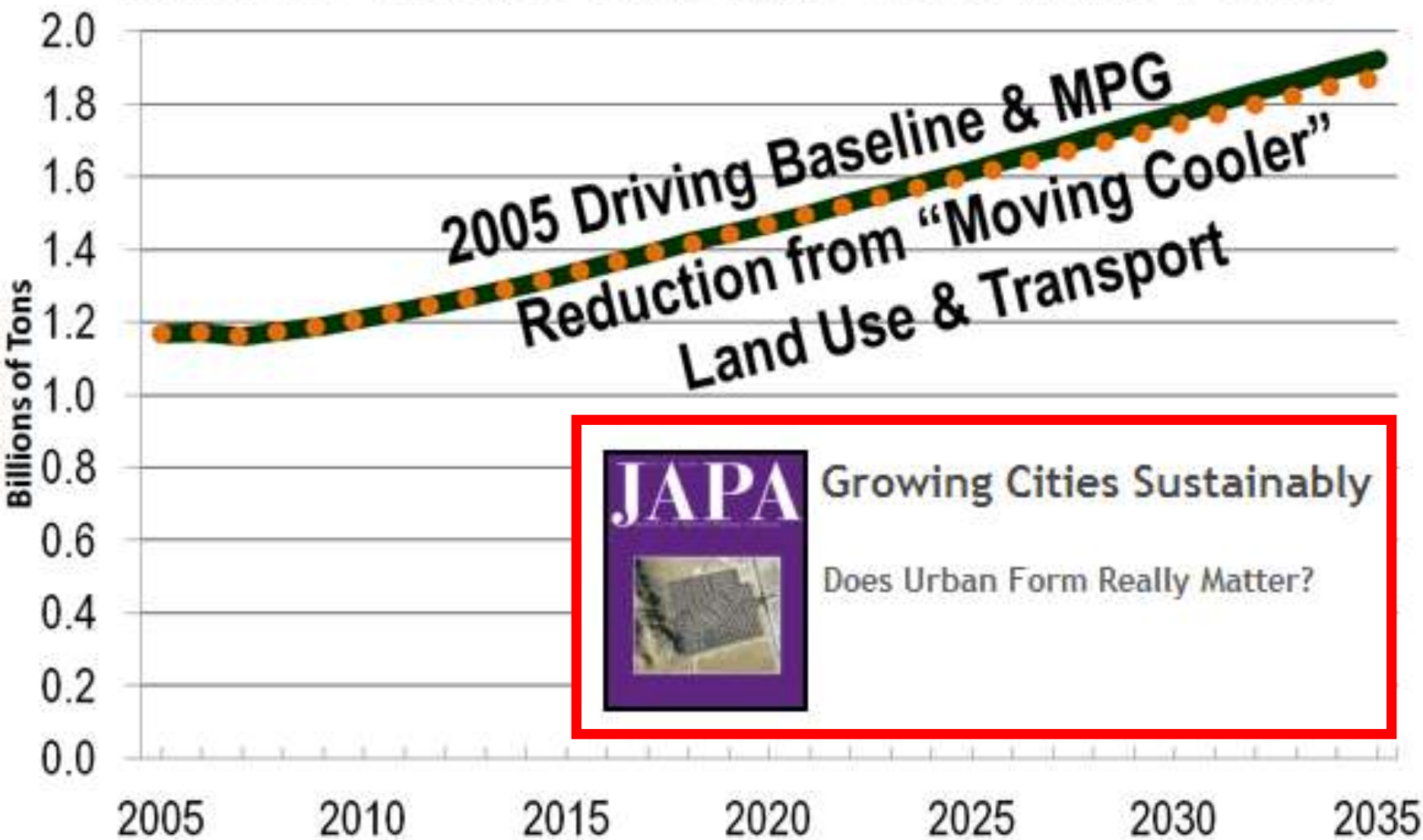
Densification and Travel

US RESEARCH



CO₂ Emissions: Impact of Smart Growth

2005-2035 DRIVING & MOVING COOLER MID-POINT



A photograph of an OPEC meeting. In the foreground, a long wooden conference table is visible with the word "OPEC" written in large, blue, sans-serif capital letters on a dark panel below it. Several men in suits are seated at the table, some looking towards the camera and others looking down. In the background, several national flags are displayed, and a large OPEC logo is visible on the wall. A semi-transparent grey box is overlaid on the upper portion of the image, containing white text in a cursive font.

*How Compact City
Policy Destroys
Housing Affordability*

OPEC

DEMOGRAPHIA

8th Annual
Demographia
International Housing
Affordability
Survey:
2012
Ratings for Metropolitan Markets

Australia • Canada • China (Hong Kong) • Ireland
New Zealand • United Kingdom • United States

(Data for 3rd Quarter 2011)

exploring solutions...

www.PerformanceUrbanPlanning.org

Performance Urban Planning

Anthony Downs
*(Brookings Institution
Economist)*

Principle of
a
Competitive
Land Supply



Planet of Cities



SHLOMO ANGEL

LAND PRICES....

....that in the absence of ample and accessible land for expansion on the urban periphery, artificial shortages of residential land will quickly extinguish any hope that housing will remain affordable, especially for the urban poor..."

Land Rationing is the Issue

DESTROYS HOUSING AFFORDABILITY



... the affordability of housing is overwhelmingly a function of just one thing, the extent to which governments place artificial restrictions on the supply of residential land.

Donald Brash, Governor,
Reserve Bank of New Zealand
1988-2002

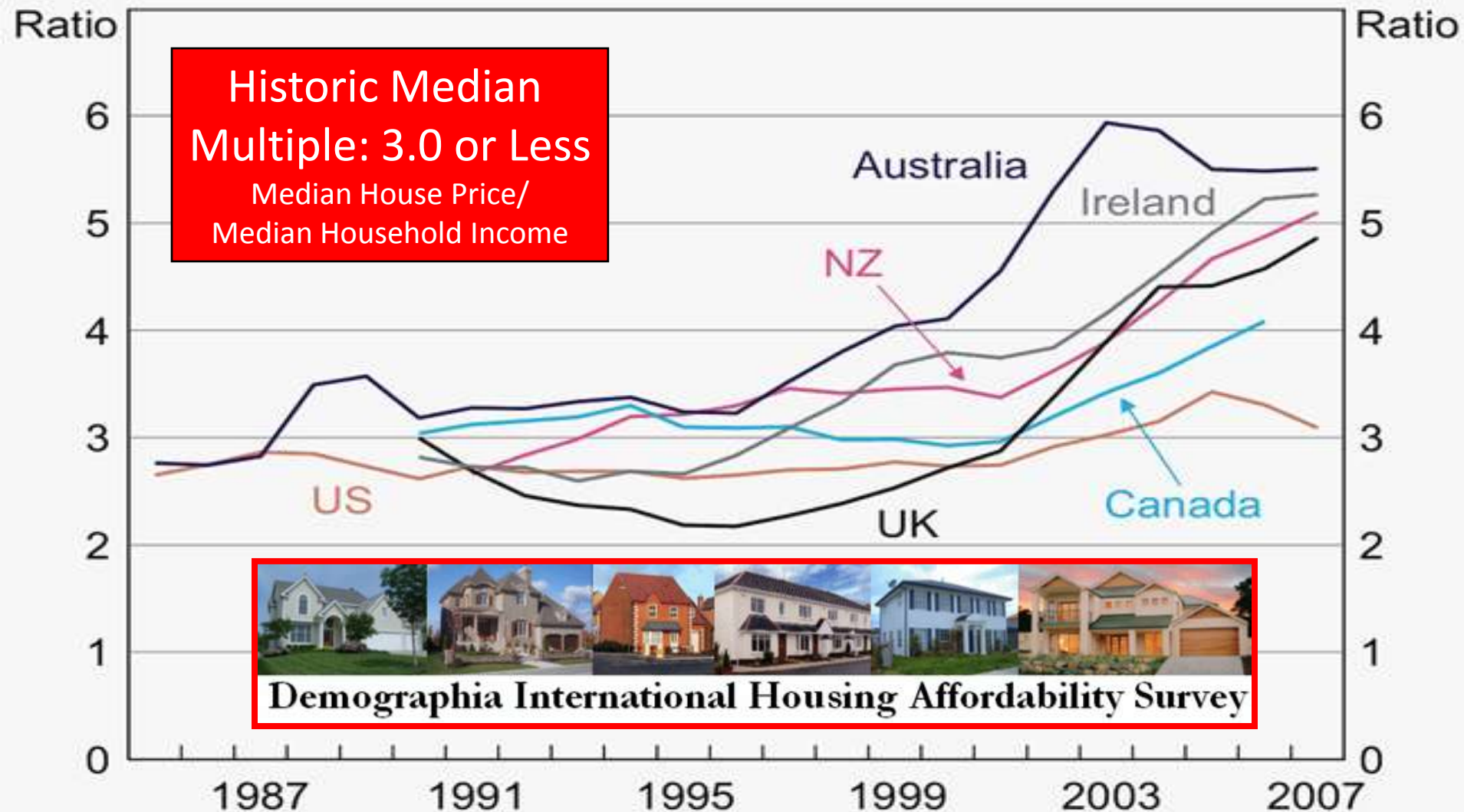
Introduction to

4th Annual Demographia International Housing Affordability Survey



Demographia International Housing Affordability Survey

House Price to Income Ratios*

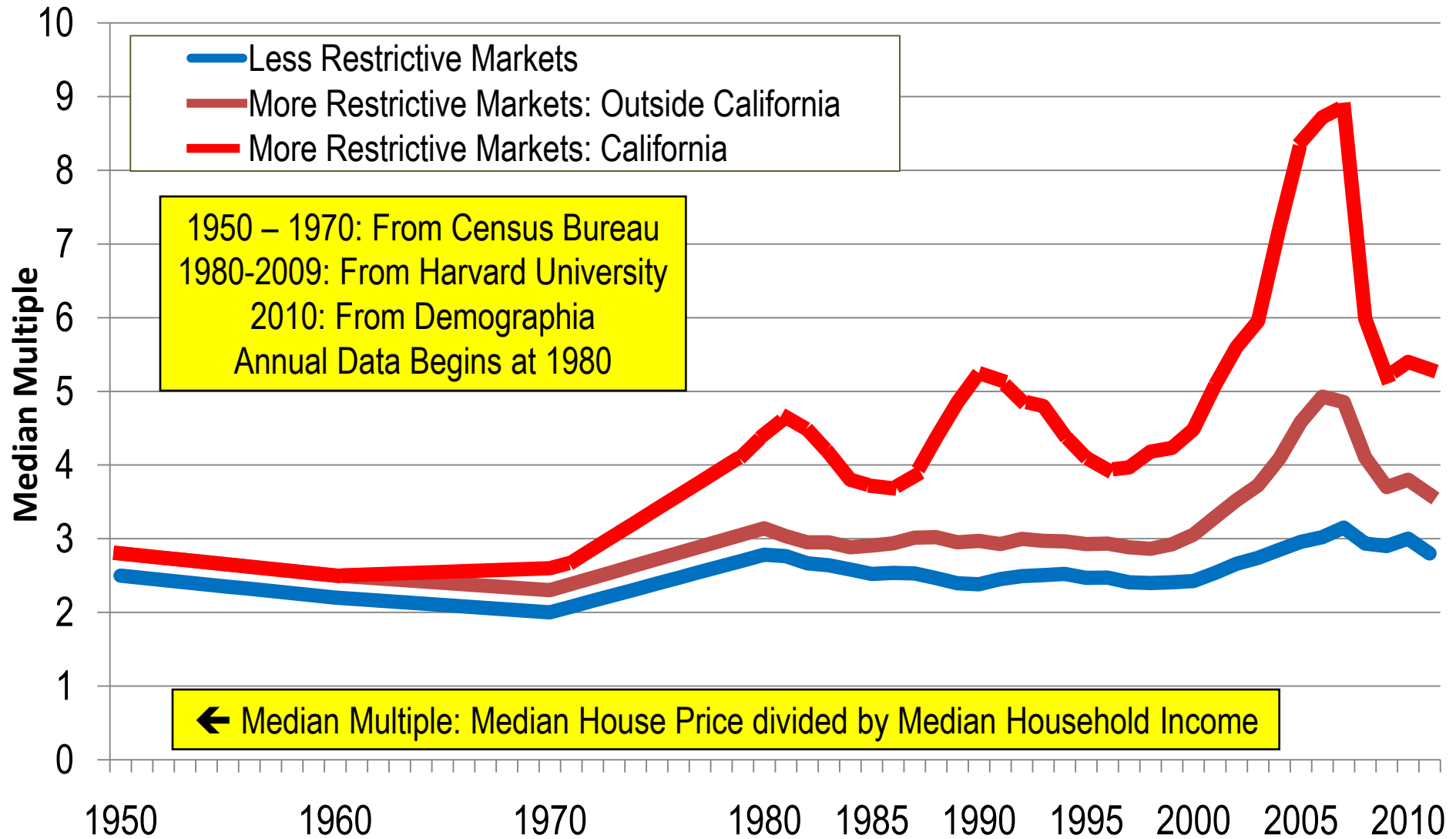


* Various combinations of median and mean measures of house prices and incomes used depending on availability

Sources: ABS; BIS; Bureau of Economic Analysis; Central Statistics Office Ireland; Communications and Local Government (UK); National Statistics website; OECD; REIA; Reserve Bank of New Zealand; Statistics Canada; Statistics New Zealand; Thomson Financial

Housing Affordability 1950-2011

MAJOR US METROPOLITAN AREAS: MEDIAN MULTIPLE



Strong Land Regulation: Less Growth

EUROPEAN & US RESEARCH

London

20% less job growth
than expected in
metropolitan areas
with strongest
land use regulation

-Raven Saks
US Federal Reserve Board

Reduced employment
in Amsterdam/Rotterdam

-Vermuelen & Ommeren
Netherlands Bureau of Econ. Rsch.

Higher unemployment
in the UK

-Mayo & Angel
World Bank

Planet of Cities



SHLOMO ANGEL

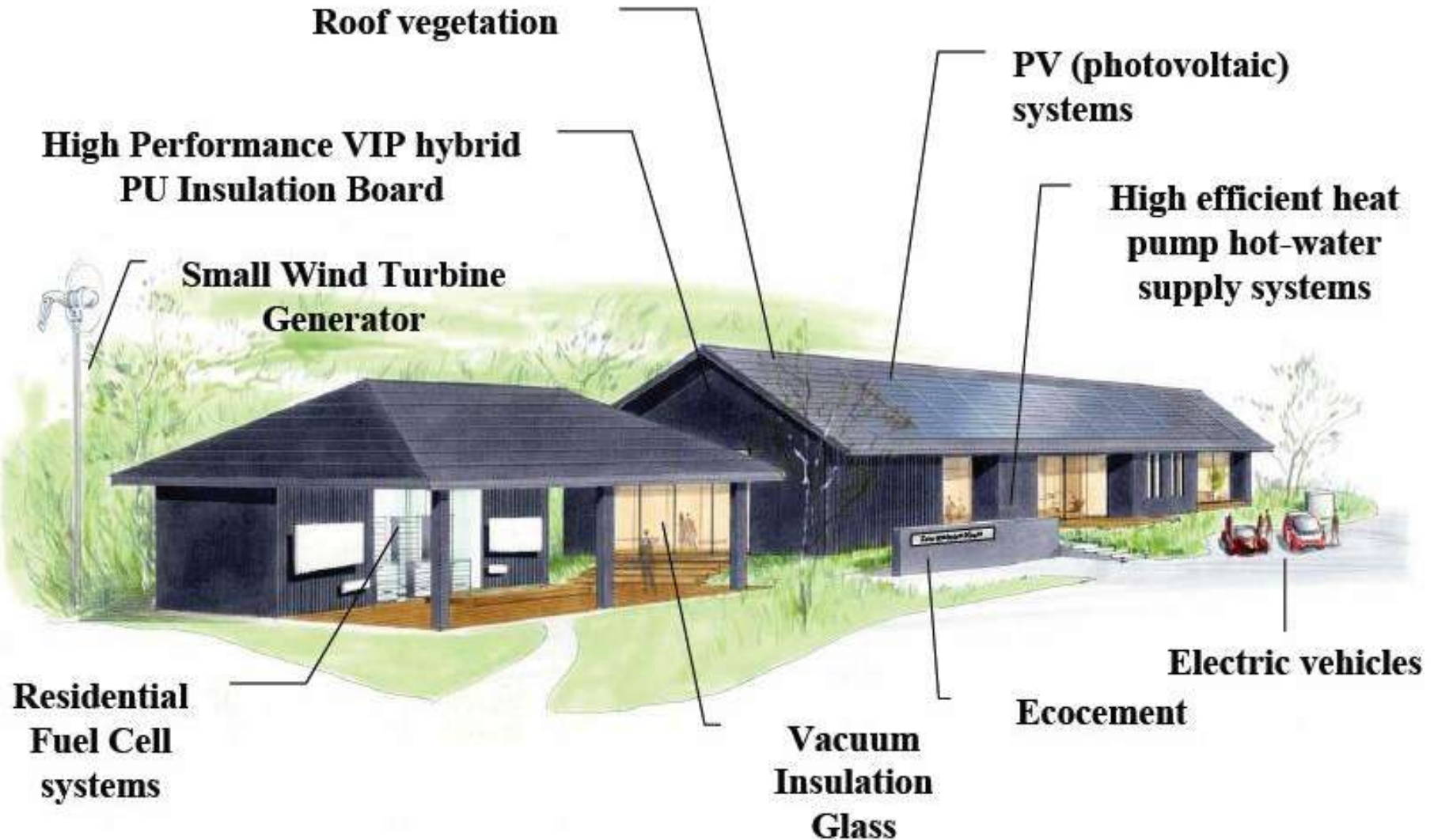
AGRICULTURE

even with urban expansion, there are

"adequate reserves of cultivatable land sufficient to feed the planet in perpetuity"

Zero Emission House: Japan

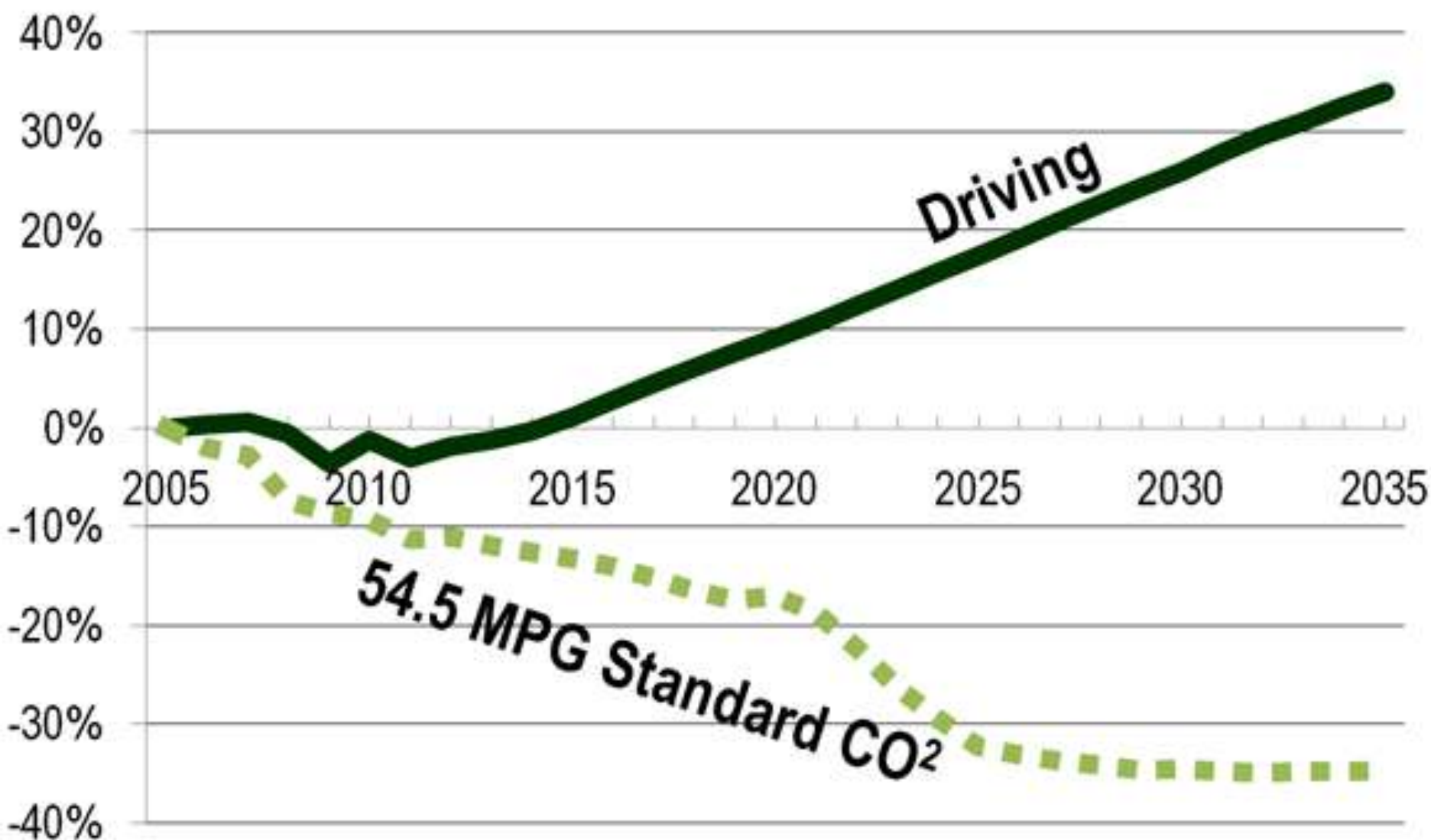
2,100 SQUARE FEET: DETACHED



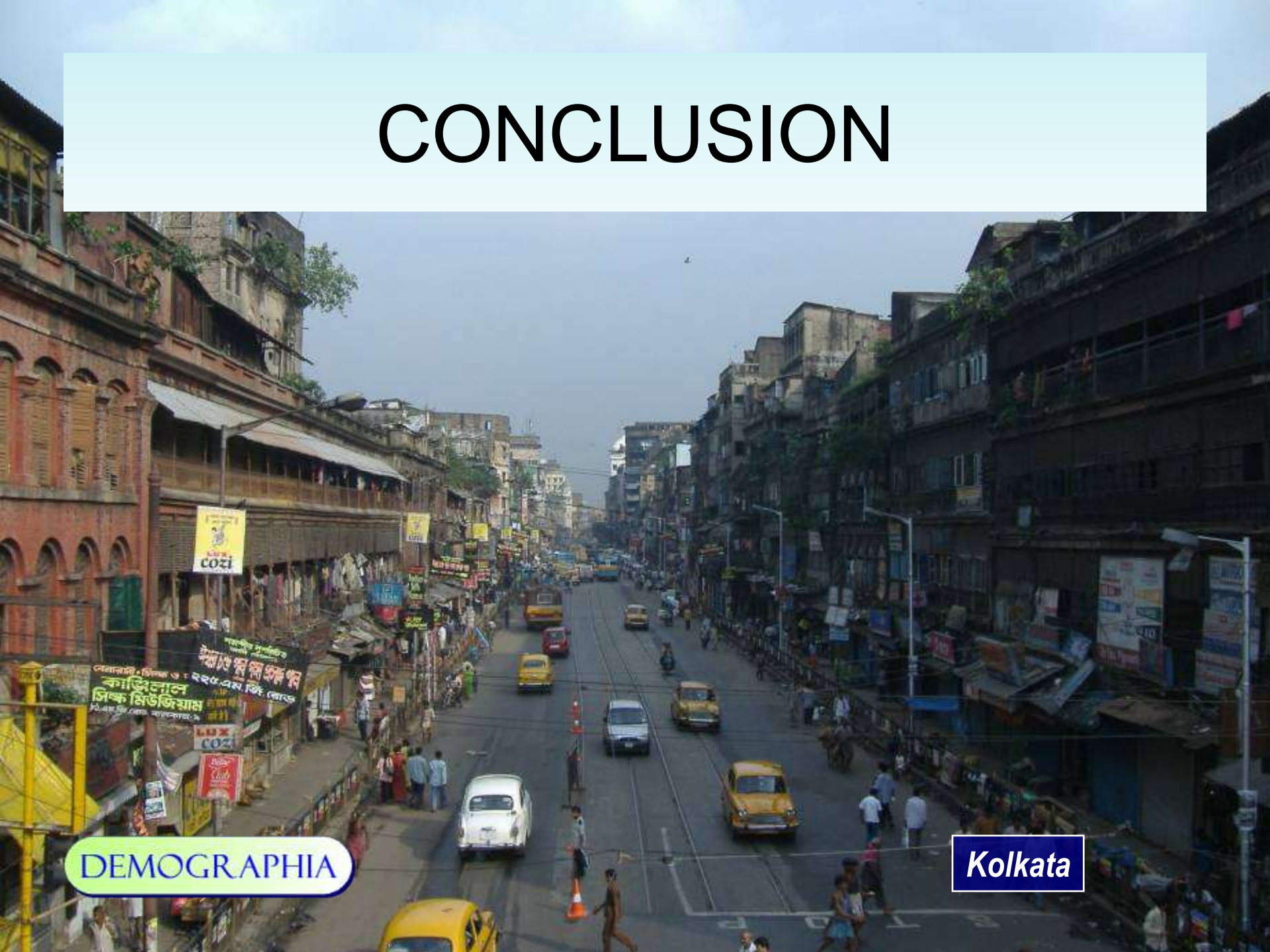
http://www.meti.go.jp/english/press/data/nBackIssue20080617_01.html

Driving & CO₂ Emissions: 2005-2035

2005-2035



CONCLUSION



DEMOGRAPHIA

Kolkata

Manila

DEMOGRAPHIA

POVERTY IS NOT
AN OPTION

Why Cities Grow: Economics

PEOPLE MOVE THERE FOR BETTER LIVES



The raison d'être of large cities is the increasing return to scale inherent to large labor markets. The cities' Economic efficiency requires, therefore, avoiding any spatial fragmentation of labor markets.

Shanghai



Shenzhen

A well governed city delivers:

**Economic growth
(mobility facilitates)**

**Higher discretionary
incomes (housing
affordability)**

Comparing Toronto & Dallas-Fort Worth

URBAN AREAS COMPARED (2010 & 2011)

	Toronto	Dallas-Ft. Worth	Toronto/ DFW
Population (Population Centre/Urban Area)	5,132,794	5,121,892	0.2%
Land Area (KM ²)	1,751	4,606	-62.0%
Density	2,931	1,112	163.6%
One Way Work Trip (Min.)	33	26	26.9%
Reach Work in 30 Minutes	48%	59%	-18.6%
Median Multiple (House Price/Household Income)	5.5	2.9	89.7%
Transit Work Trip Share	21%	2%	935.0%

Planning: Facilitating the How People Want to Live



People →

← *The Plan*

Rail Station: Suburban Paris