



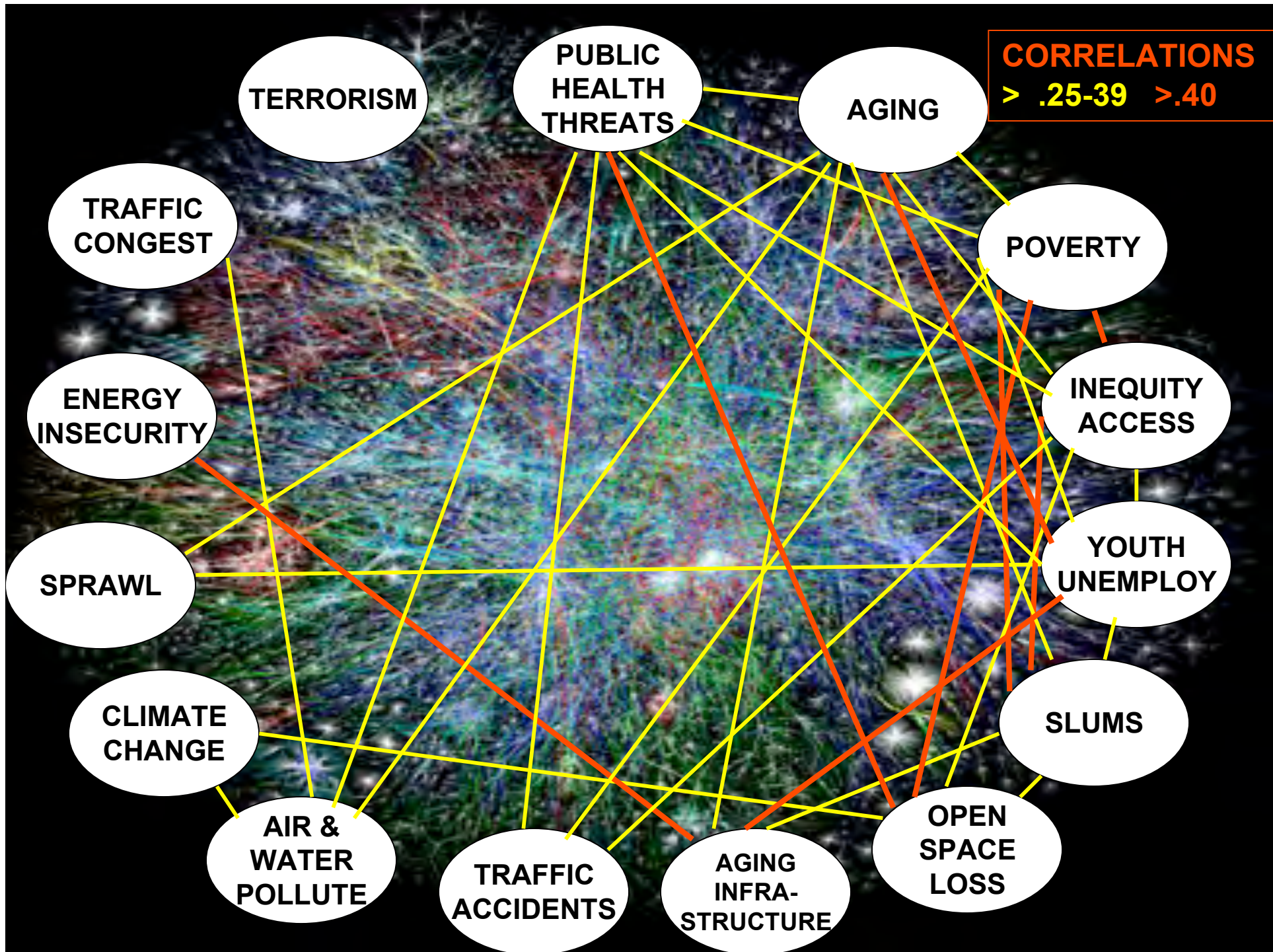
**SOME LONG TERM
MEGAFORCES
SHAPING URBAN MOBILITY**

**Tom Gladwin
University of
Michigan**

**New Mobility: The Emerging
Transportation Economy Conference
June 12, 2008 Ann Arbor, Michigan**

DRIVERS OF NEW URBAN MOBILITY (MEANS)

Factor:	Entire	Bus	Acad	Transport	Govt.
Climate Change	4.76	4.53	4.64	4.61	4.50
Energy Insecurity	4.49	4.37	4.57	4.65	4.86
Air & Water Pollution	4.32	4.47	4.36	4.28	4.38
Inequitable Access	4.14	3.95	4.25	3.76	4.00
Traffic Congestion	4.13	4.15	4.09	4.16	4.63
Low Density Sprawl	3.98	3.82	4.19	3.81	4.29
Loss of Open & Green Space	3.93	3.63	4.19	3.65	3.86
Persistent Poverty	3.91	3.61	3.90	3.31	3.57
Aging Infrastructure	3.75	3.68	3.52	3.76	4.43
Public Health Threats	3.67	3.57	3.85	3.24	3.17
Traffic Accidents & Deaths	3.61	3.74	3.57	3.71	3.43
Burgeoning Slums	3.54	3.28	3.52	3.06	3.00
Aging of Population	3.49	3.26	3.67	3.35	3.29
Youth Unemployment	3.03	3.06	2.95	2.63	3.29
Terrorist Attacks	2.71	2.74	2.67	2.94	3.29





CLIMATE CHANGE 2007

THE PHYSICAL SCIENCE BASIS

Working Group I Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change



state of world population 2007
Unleashing the Potential of Urban Growth



THE CHALLENGE OF SLUMS

GLOBAL REPORT ON HUMAN SETTLEMENTS 2007



United Nations Human Settlements Programme



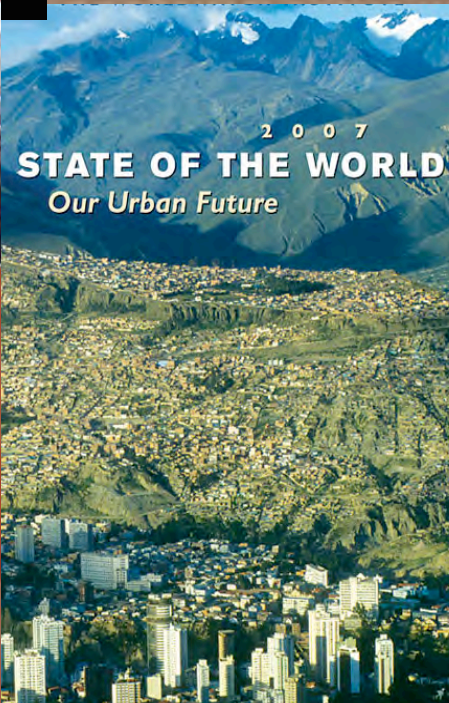
STATE OF THE WORLD 2007

Our Urban Future

GLOBAL REPORT ON HUMAN SETTLEMENTS 2007

ENHANCING URBAN SAFETY AND SECURITY

United Nations Human Settlements Programme



Global Environment Outlook

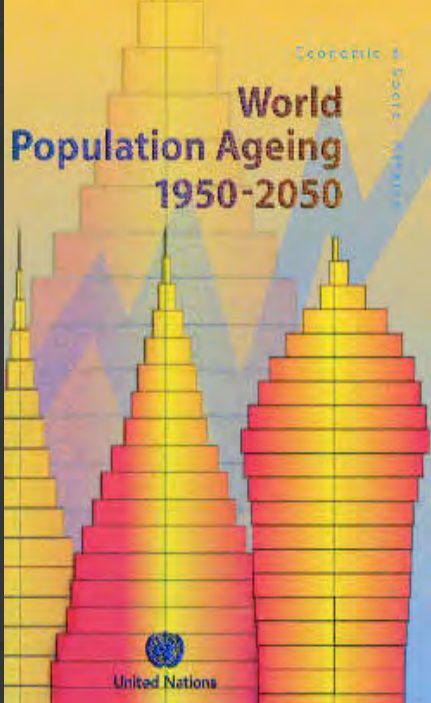
GEO 4

environment for development



United Nations Environment Programme

World Population Ageing 1950-2050



United Nations

**POPULATION
AGEING**

**COASTAL
CLIMATE
STRESS**

**ECONOMIC
GROWTH**

**TELE-
CONNECTIVITY**

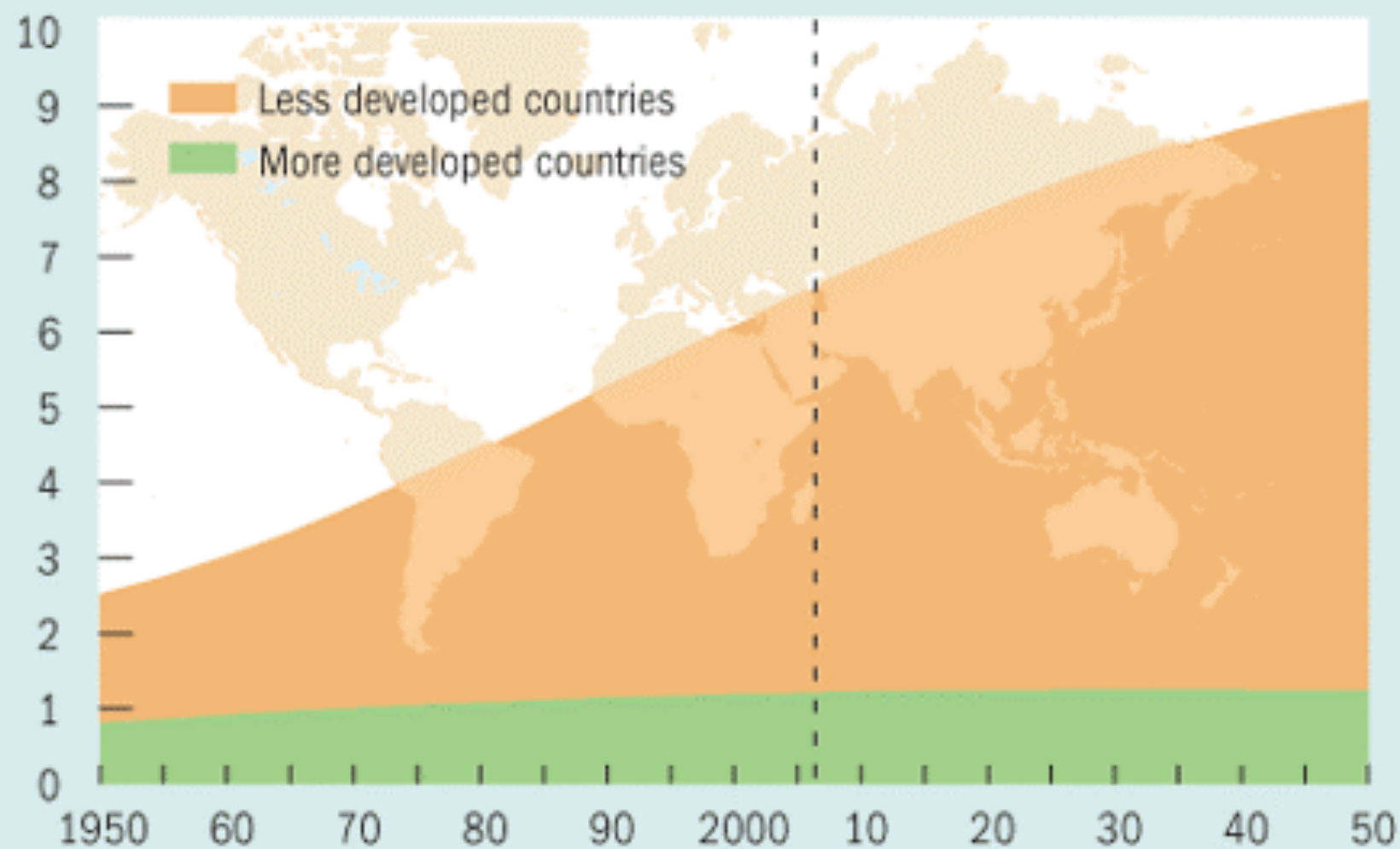


**URBAN
& SLUM
EXPANSION**

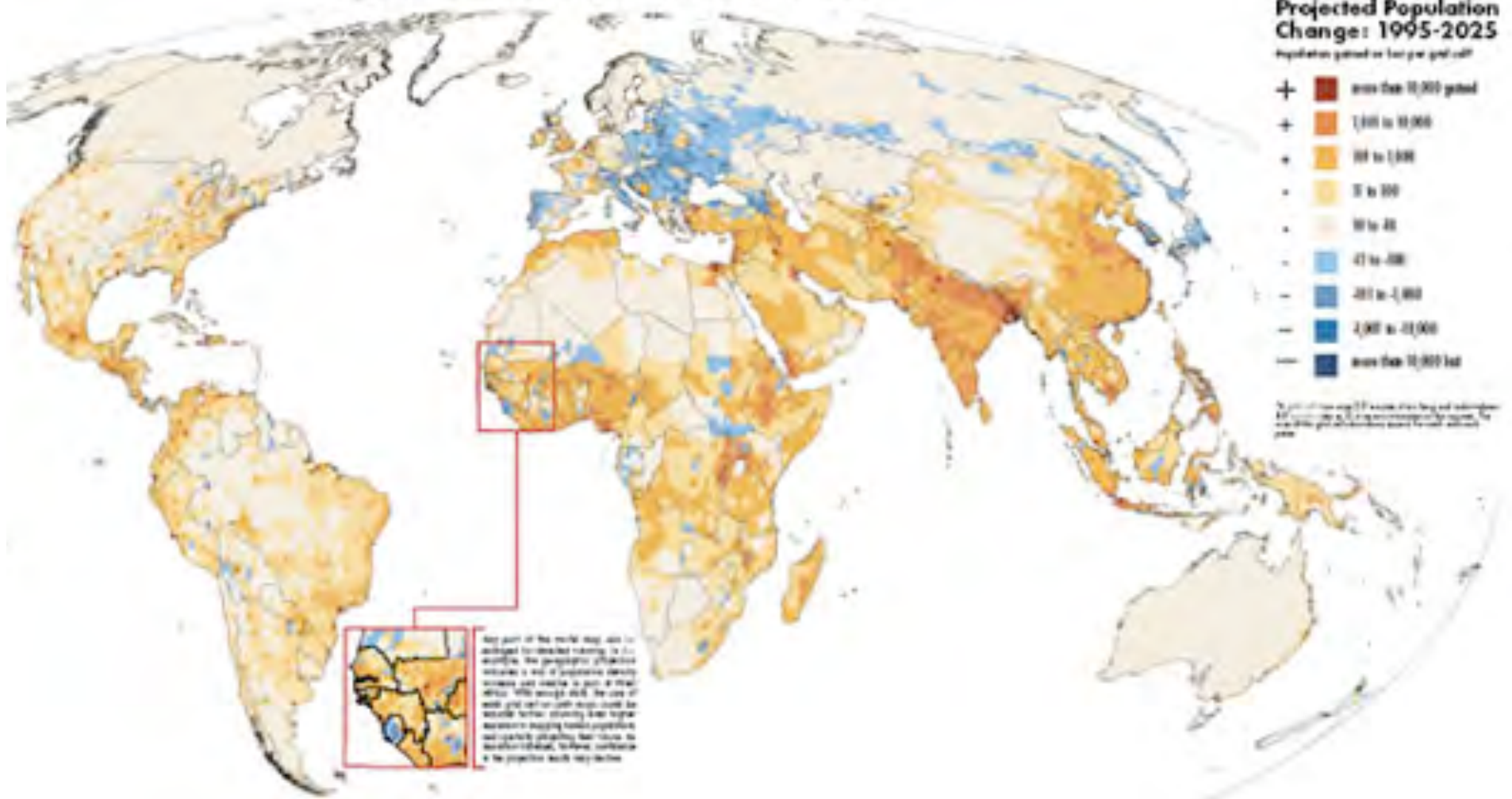
**TRANSPORT
DEMAND**

The world's population is expected to reach 9.1 billion by 2050, with virtually all population growth occurring in less developed countries.

(population, billions)



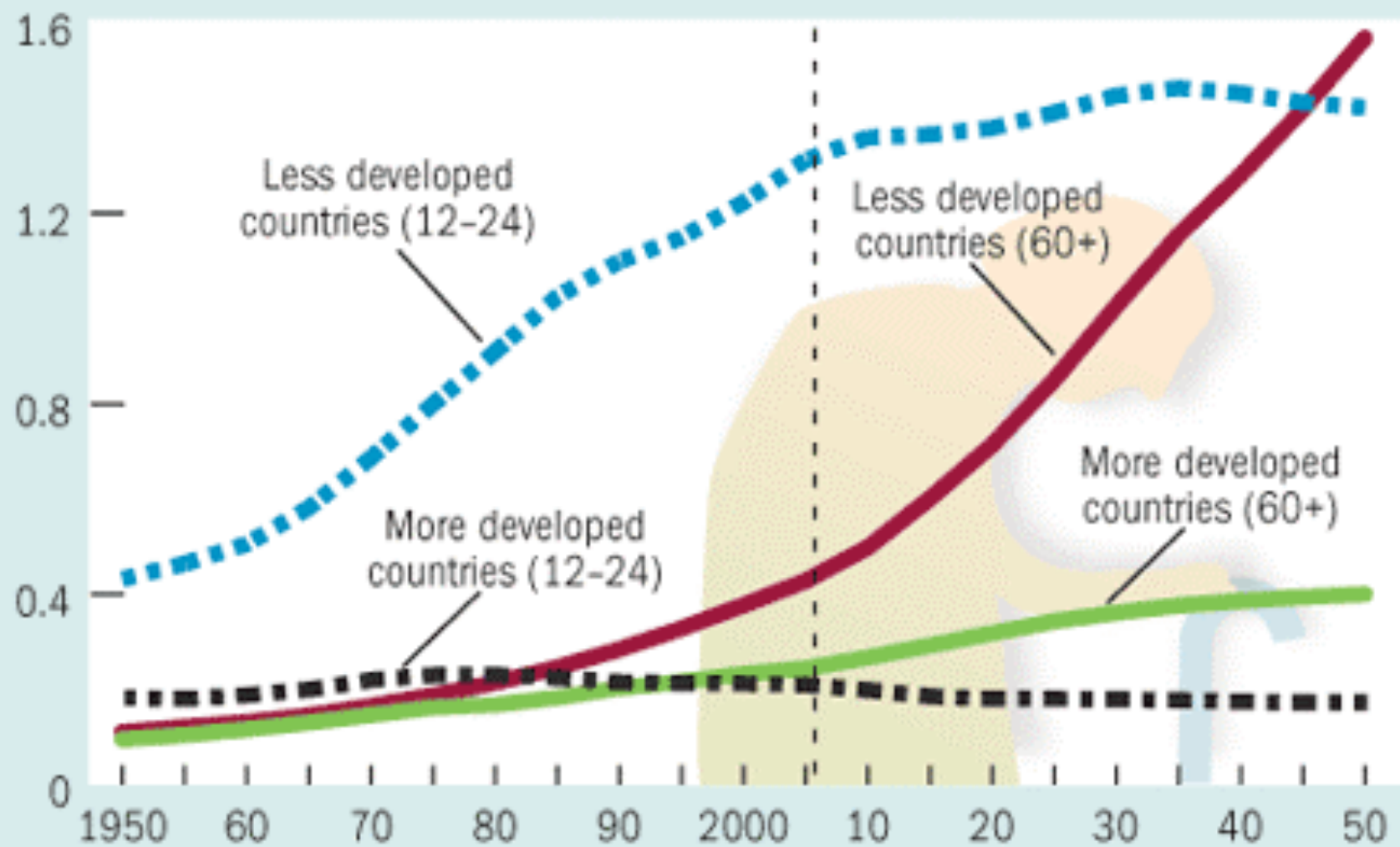
Projected Gain and Loss from 1995 to 2025



Source: Columbia University and Population Action International (2006)

The world's population is aging and, in developed countries, the size of the elderly population has already surpassed that of the 12-24 age group.

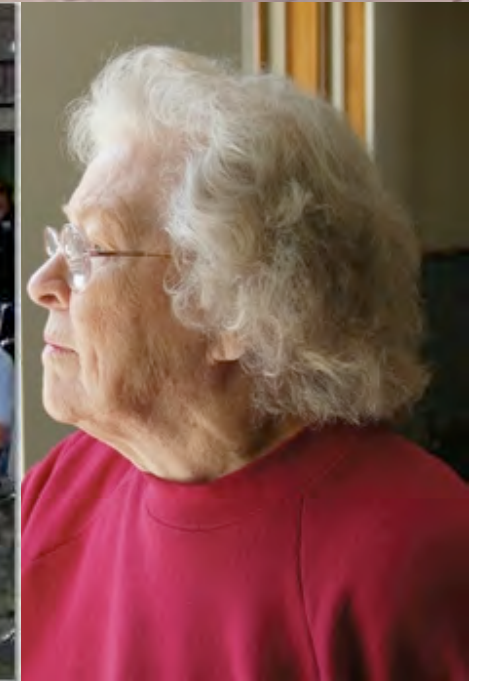
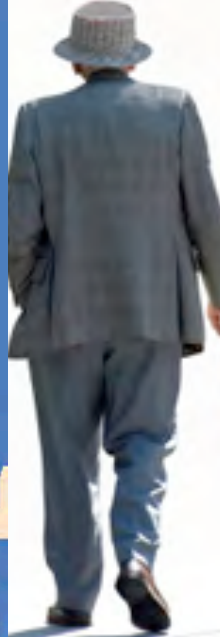
(billions)



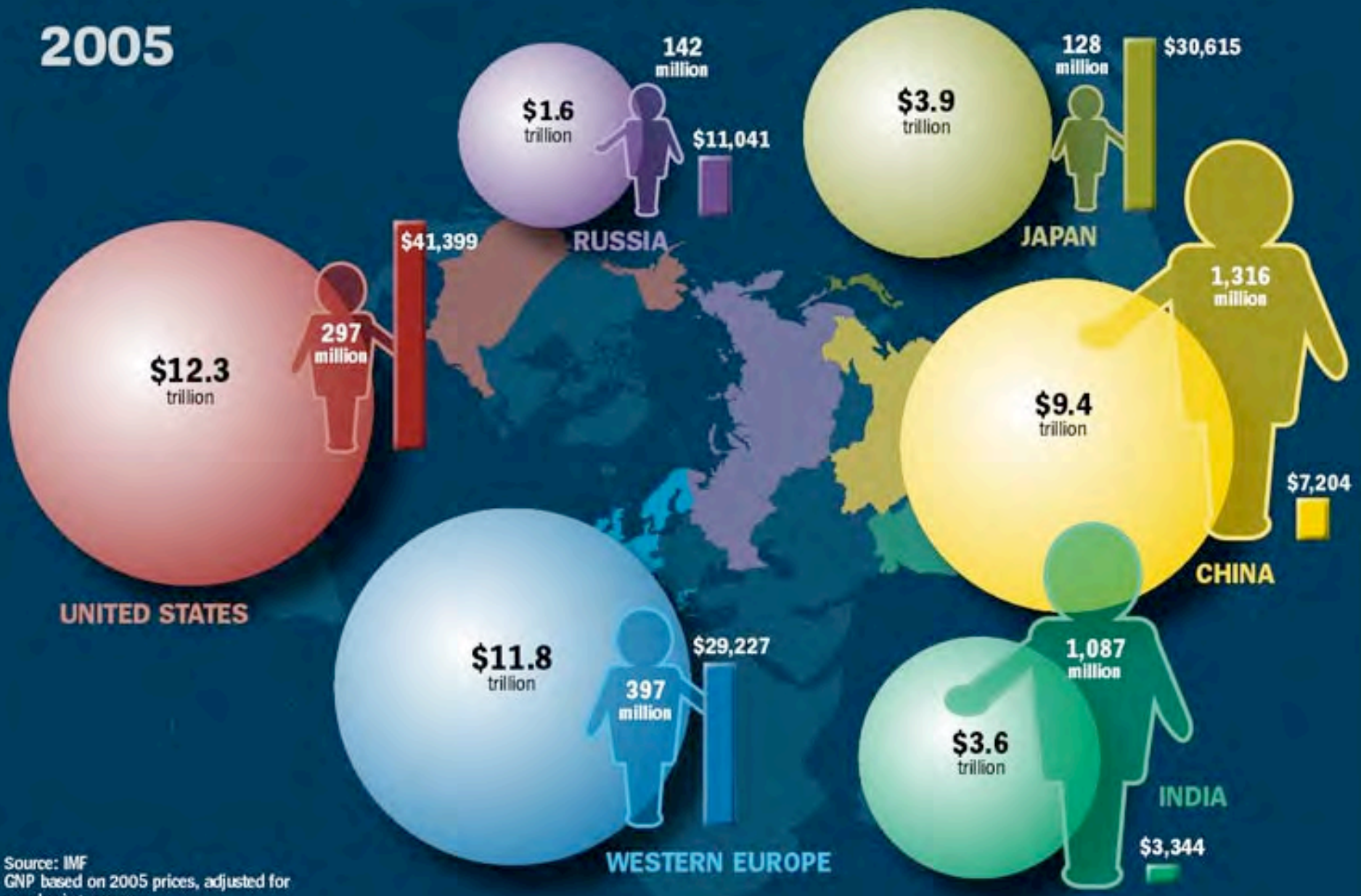
Global Age-friendly Cities: A Guide



World Health
Organization

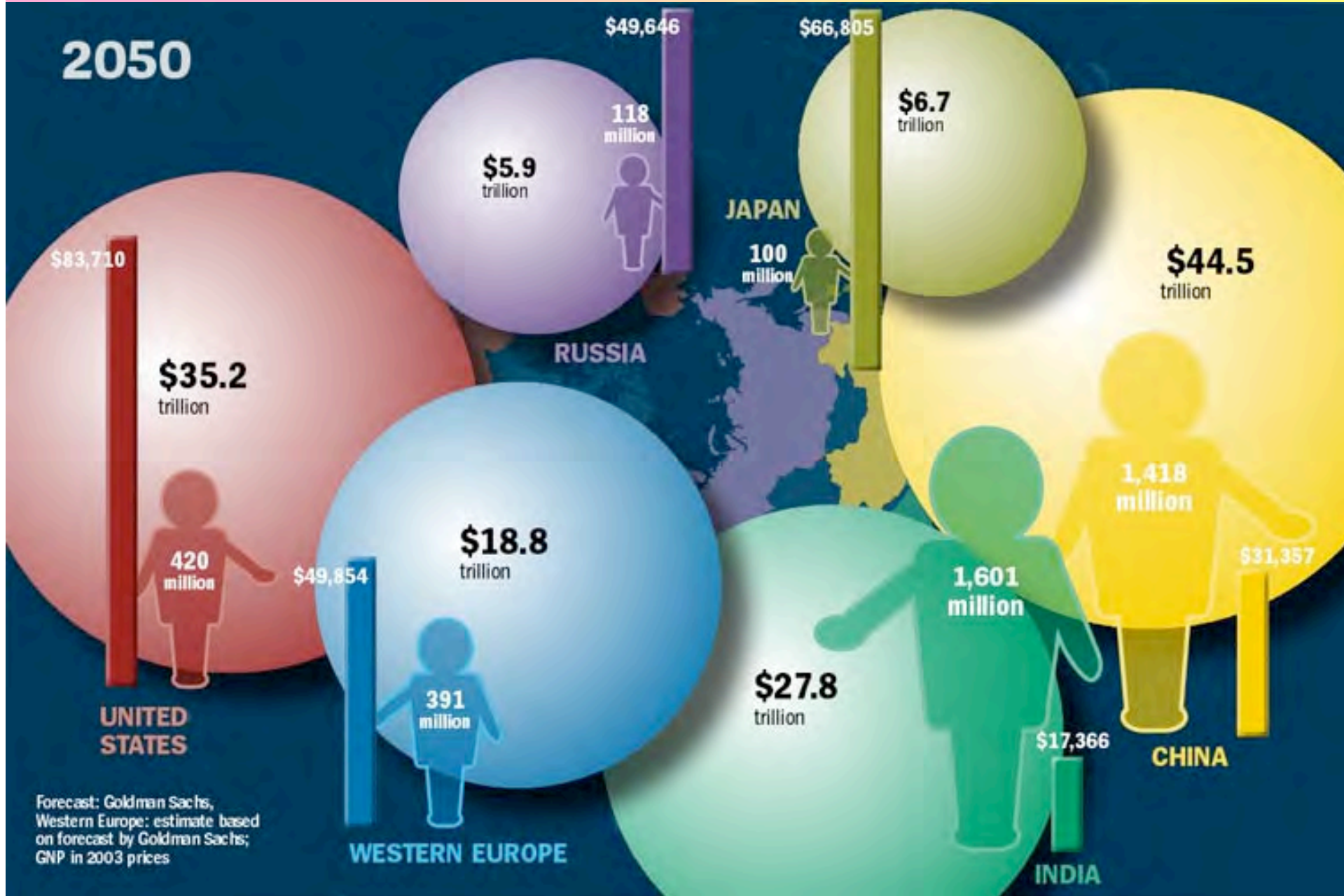


2005



Source: IMF
GNP based on 2005 prices, adjusted for purchasing power

2050



Forecast: Goldman Sachs,
Western Europe: estimate based
on forecast by Goldman Sachs;
GNP in 2003 prices

Figure 6. Urban and rural population of more developed regions and less developed regions, 1950-2030

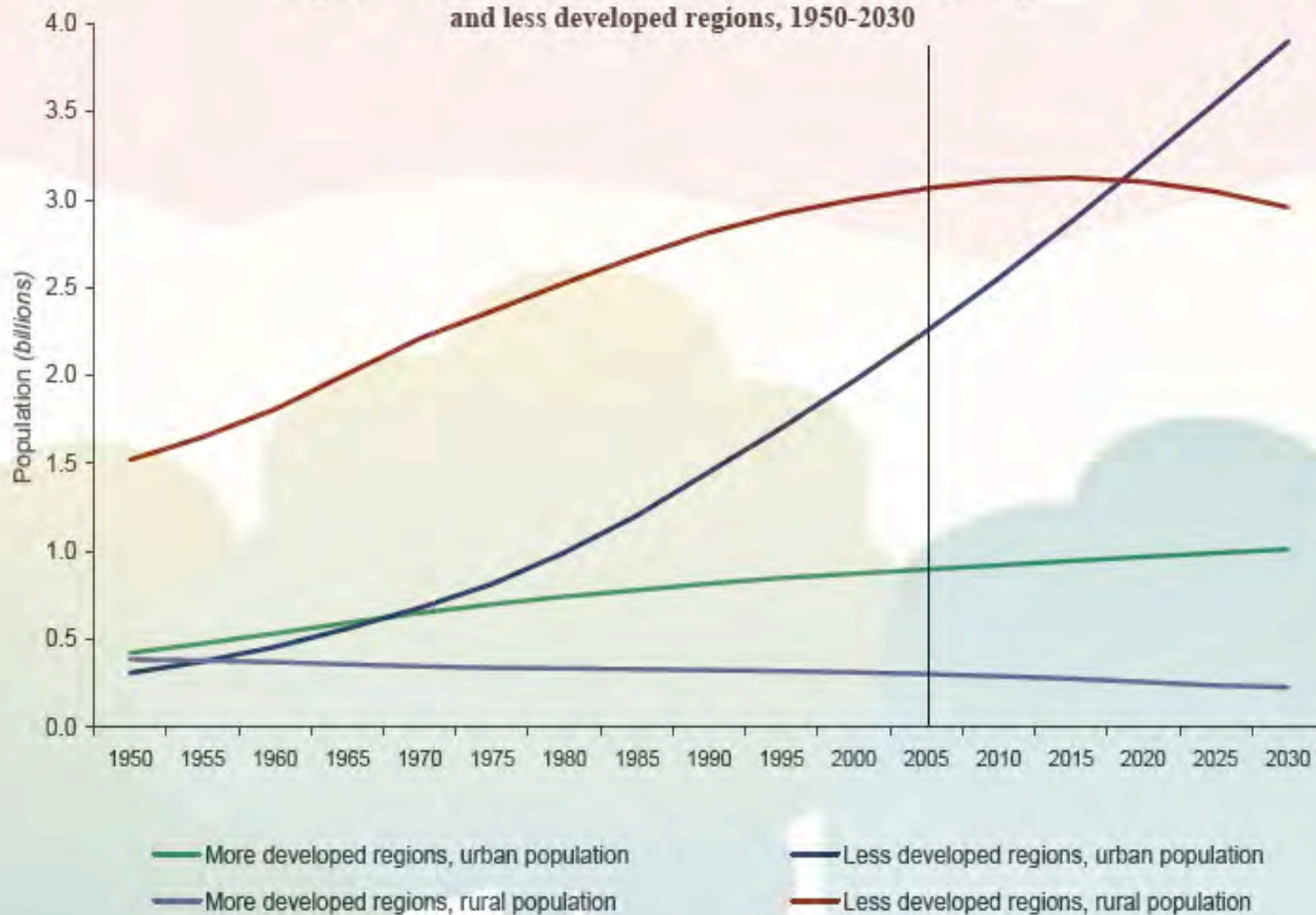
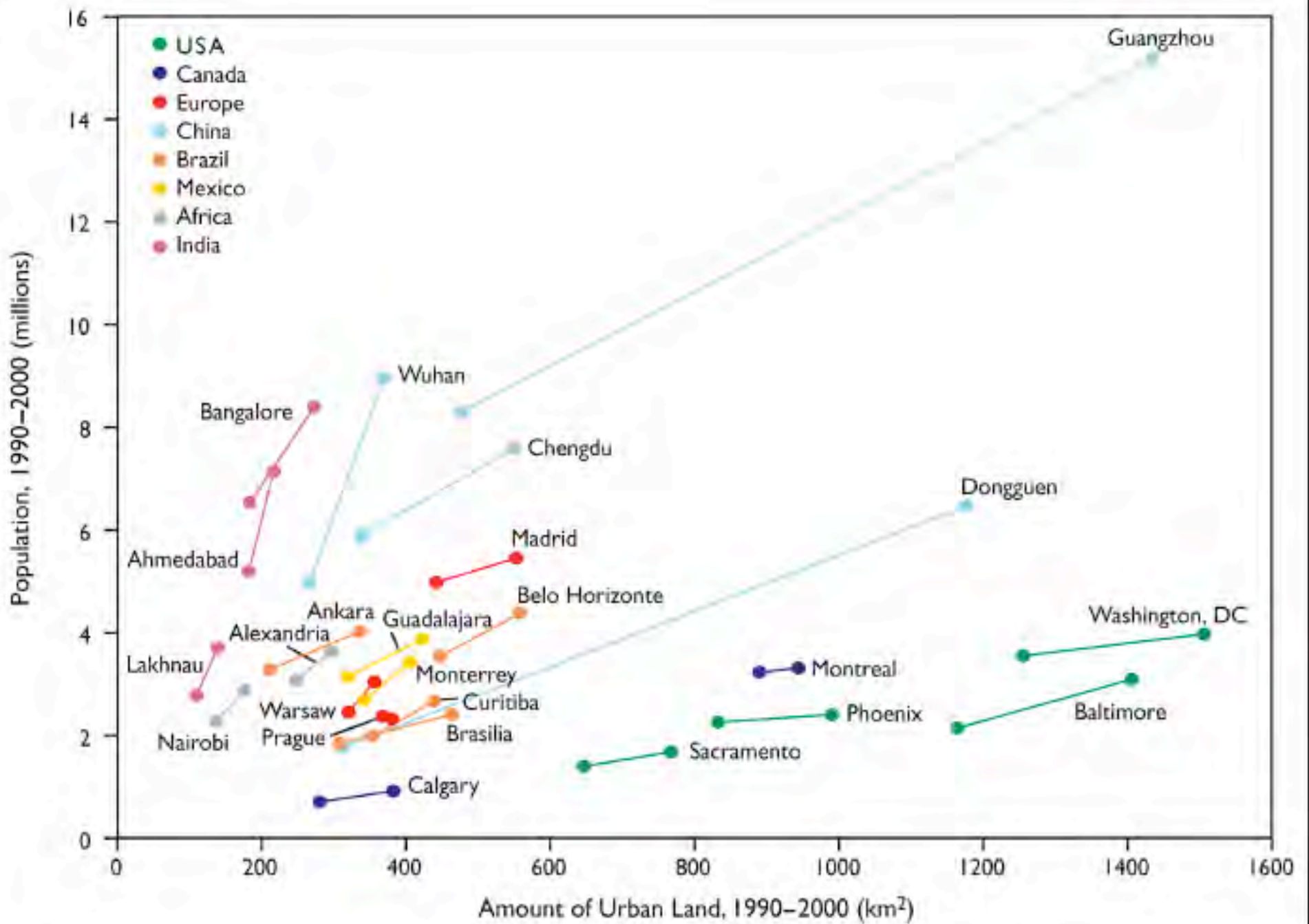


TABLE I.5. POPULATION DISTRIBUTION OF THE WORLD AND DEVELOPMENT GROUPS, BY AREA OF RESIDENCE AND SIZE CLASS OF URBAN SETTLEMENT, 1975, 2007 AND 2025

<i>Development group</i>	<i>Area of residence and size class of urban settlement (number of inhabitants)</i>	<i>Population (millions)</i>			<i>Percentage distribution</i>		
		<i>1975</i>	<i>2007</i>	<i>2025</i>	<i>1975</i>	<i>2007</i>	<i>2025</i>
World	Urban area	1 519	3 294	4 584	100.0	100.0	100.0
	10 million or more	53	286	447	3.5	8.7	9.7
	5 million to 10 million	117	214	337	7.7	6.5	7.3
	1 million to 5 million	317	760	1 058	20.9	23.1	23.1
	500,000 to 1 million	167	322	390	11.0	9.8	8.5
	Fewer than 500,000	864	1 712	2 354	56.9	52.0	51.3
More developed regions	Urban area	702	910	995	100.0	100.0	100.0
	10 million or more	42	89	103	6.1	9.8	10.3
	5 million to 10 million	50	49	69	7.1	5.4	6.9
	1 million to 5 million	137	202	203	19.6	22.2	20.4
	500,000 to 1 million	71	83	90	10.2	9.1	9.0
	Fewer than 500,000	401	487	531	57.1	53.5	53.4
Less developed regions	Urban area	817	2 384	3 590	100.0	100.0	100.0
	10 million or more	11	197	344	1.3	8.3	9.6
	5 million to 10 million	68	165	268	8.3	6.9	7.5
	1 million to 5 million	180	558	855	22.1	23.4	23.8
	500,000 to 1 million	96	239	300	11.7	10.0	8.4
	Fewer than 500,000	463	1 225	1 822	56.6	51.4	50.8
UN, World Urbanization Prospects (2007)							



World Bank, The Dynamics of Global Urban Expansion (2005)



TRANSPORT ENERGY, VEHICLE & CO2 FORECASTS

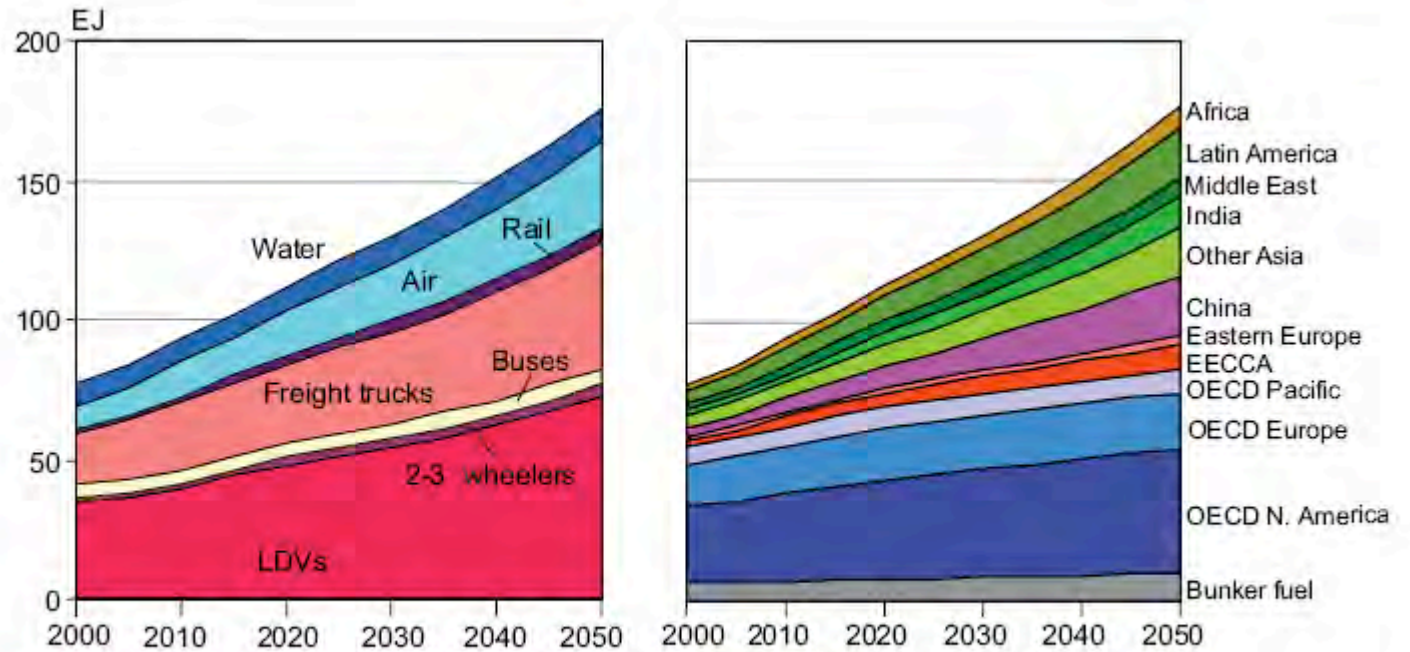


Figure 5.3: Projection of transport energy consumption by region and mode
Source: WBCSD, 2004a.

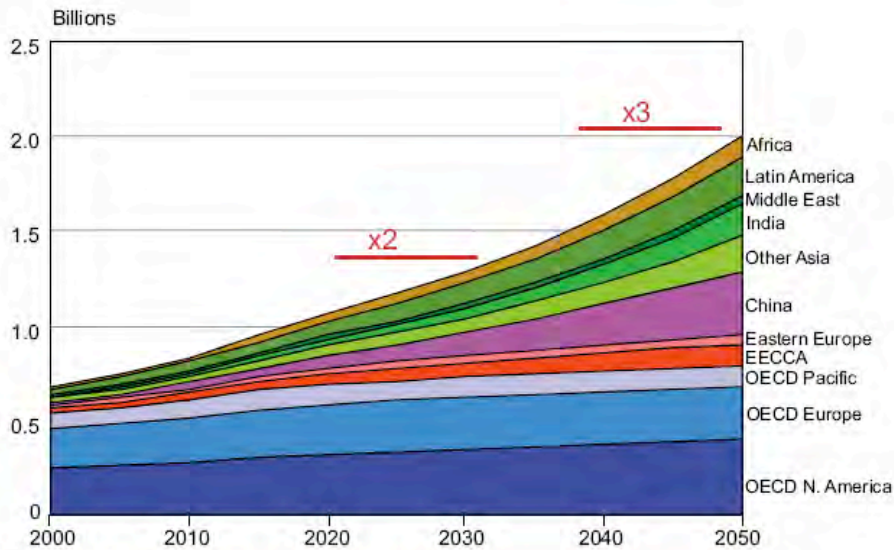


Figure 5.5: Total stock of light-duty vehicles by region
Source: WBCSD, 2004a.

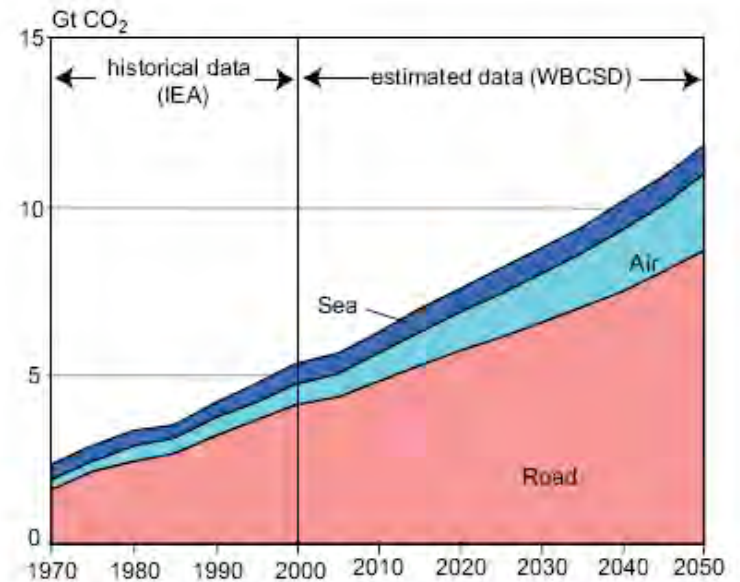
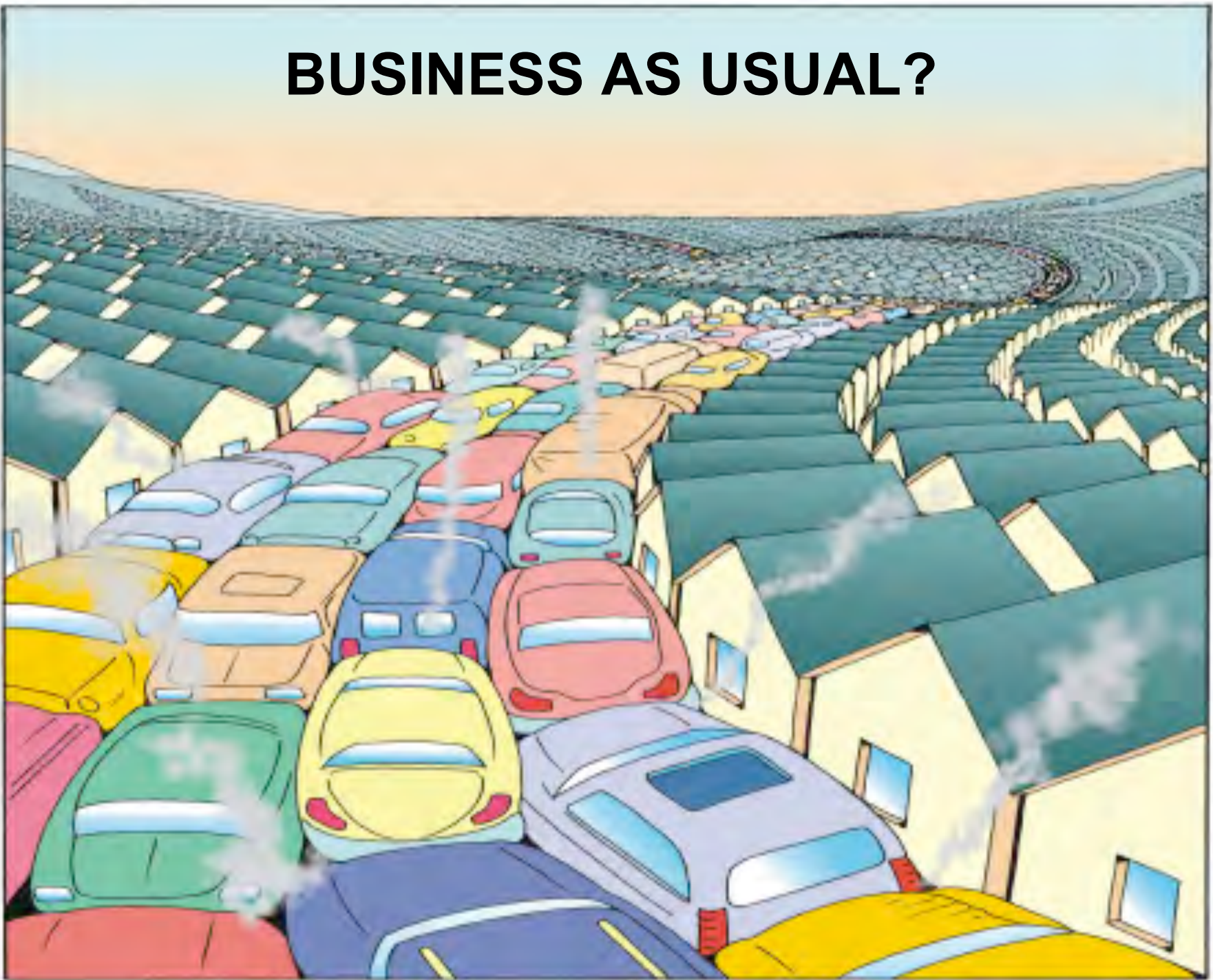


Figure 5.4: Historical and projected CO₂ emission from transport by modes, 1970-2050

Source: IEA, 2005; WBCSD, 2004b.

BUSINESS AS USUAL?

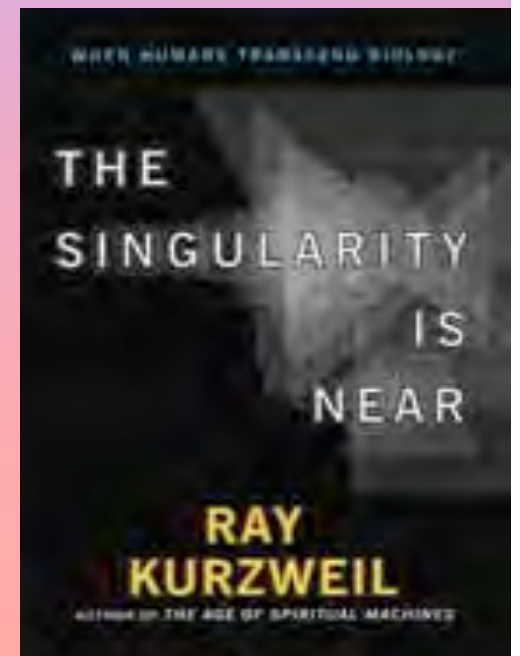


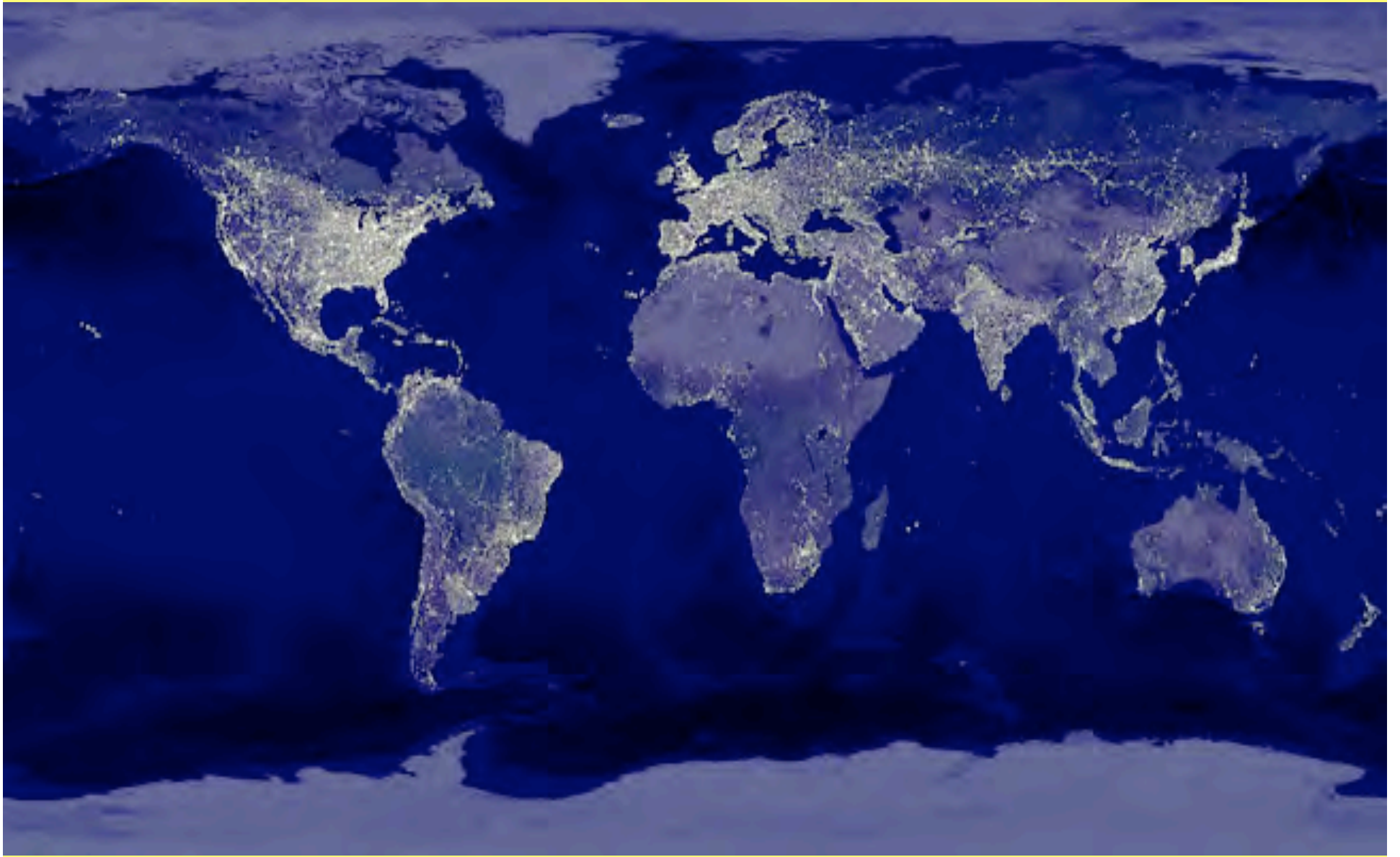




“The Law of Accelerating Returns”

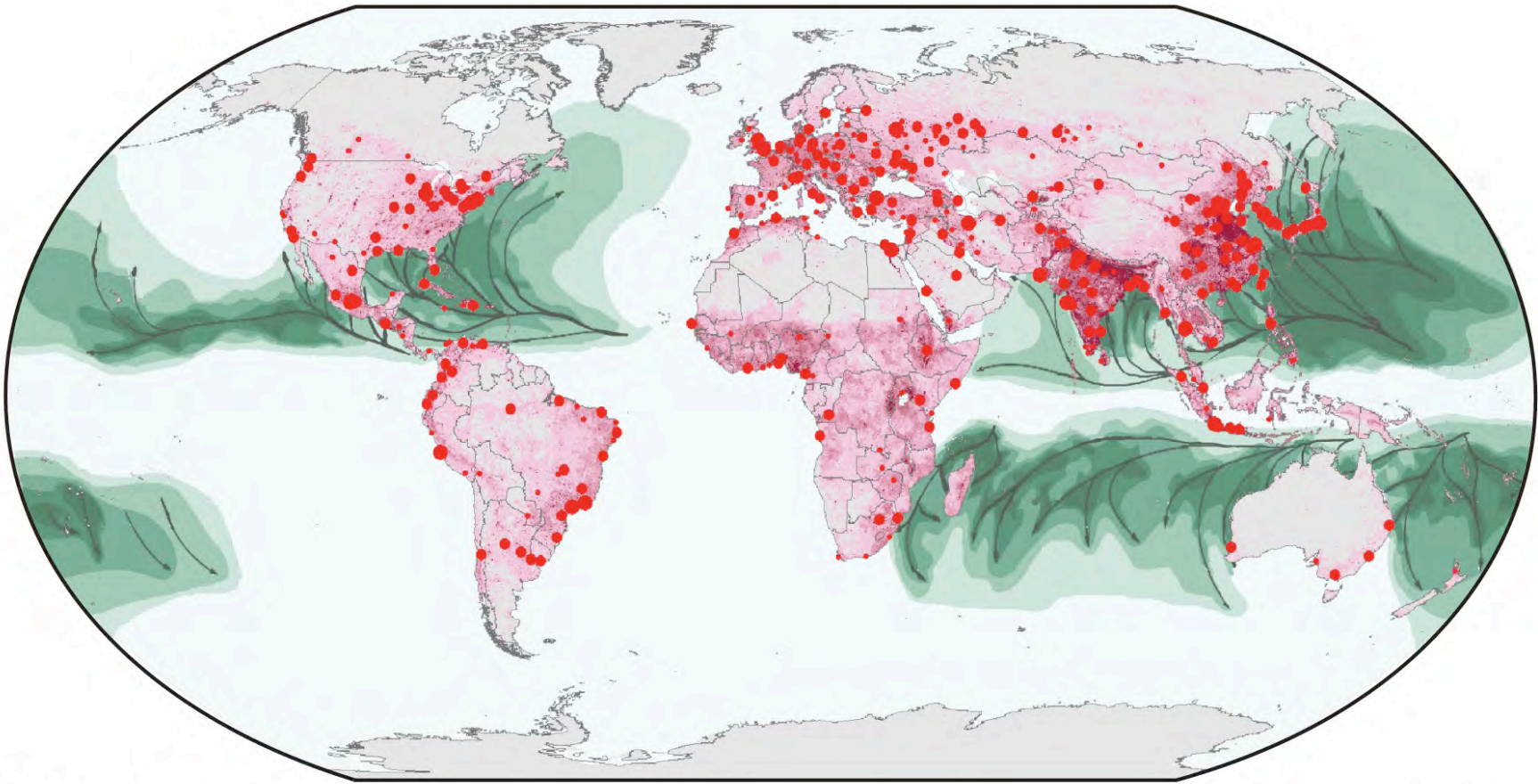
“An analysis of the history of technology shows that technological change is exponential, contrary to the common-sense “intuitive linear” view. So we won’t experience 100 years of progress in the 21st century—it will be more like 20,000 years of progress (at today’s rate). The “returns,” such as chip speed and cost-effectiveness, also increase exponentially. There’s even exponential growth in the rate of exponential growth. Within a few decades, machine intelligence will surpass human intelligence, leading to The Singularity—technological change so rapid and profound it represents a rupture in the fabric of human history.” (Ray Kurzweil)





**Hurricane Katrina
August 28, 2005**





Tropical cyclones:
rising intensity and frequency



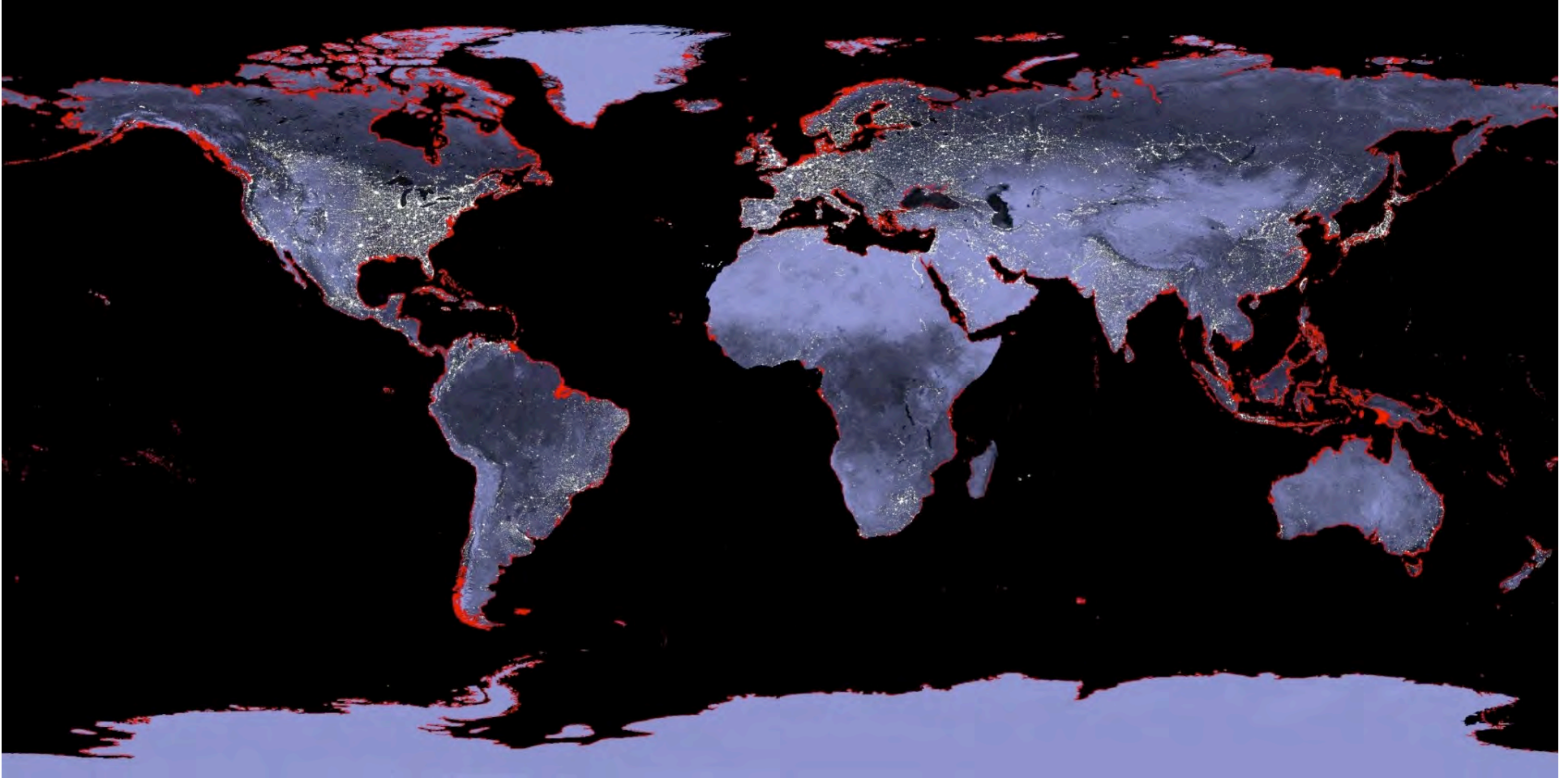
Population density, 2004



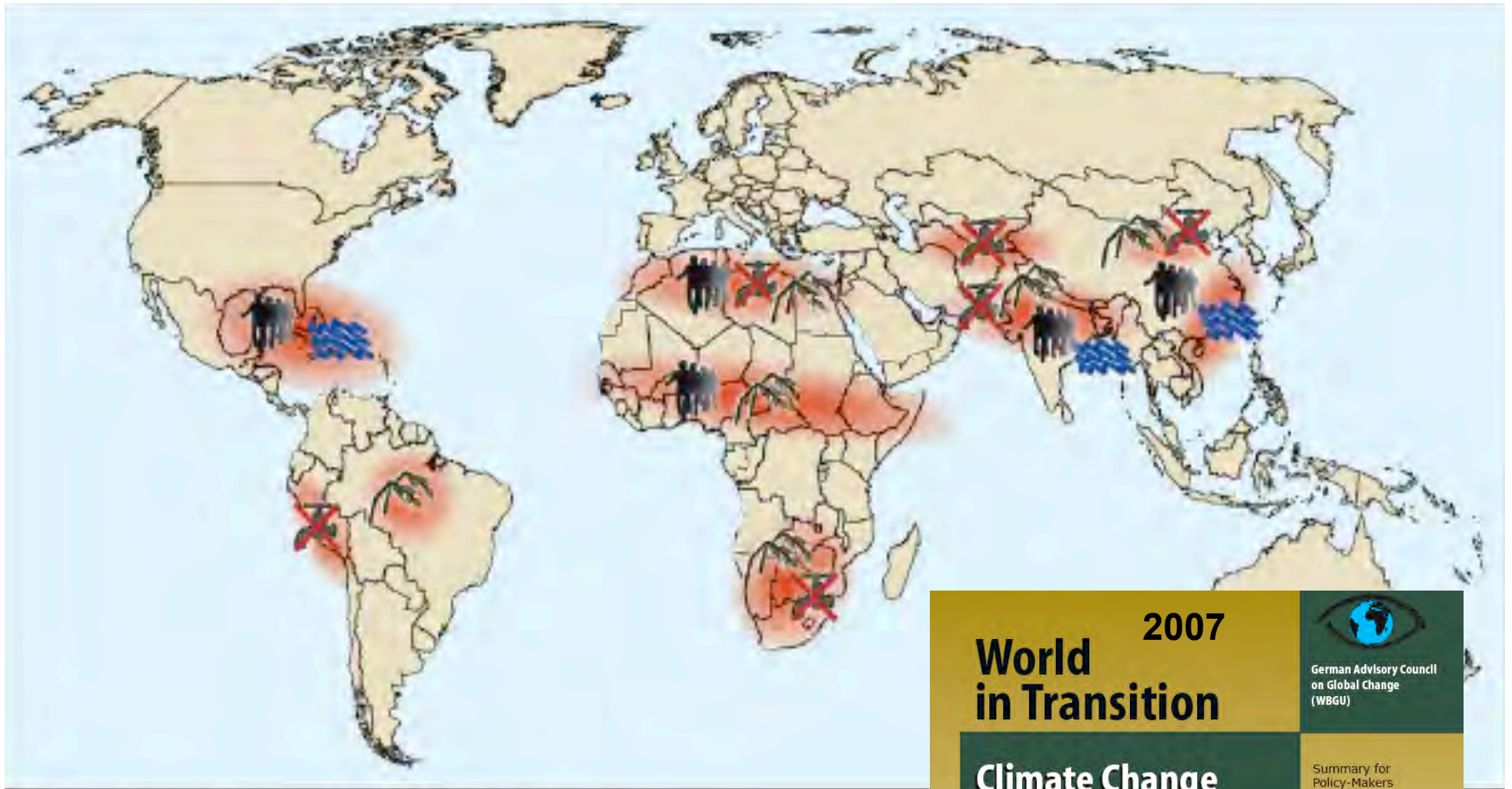
Inhabitants [millions]



SIX METER SEA LEVEL RISE





Source: NOAA Earth System Research Laboratory





2007
World in Transition
Climate Change as a Security Risk
 German Advisory Council on Global Change (WBGU)
 Summary for Policy-Makers


Conflict constellations in selected hotspots

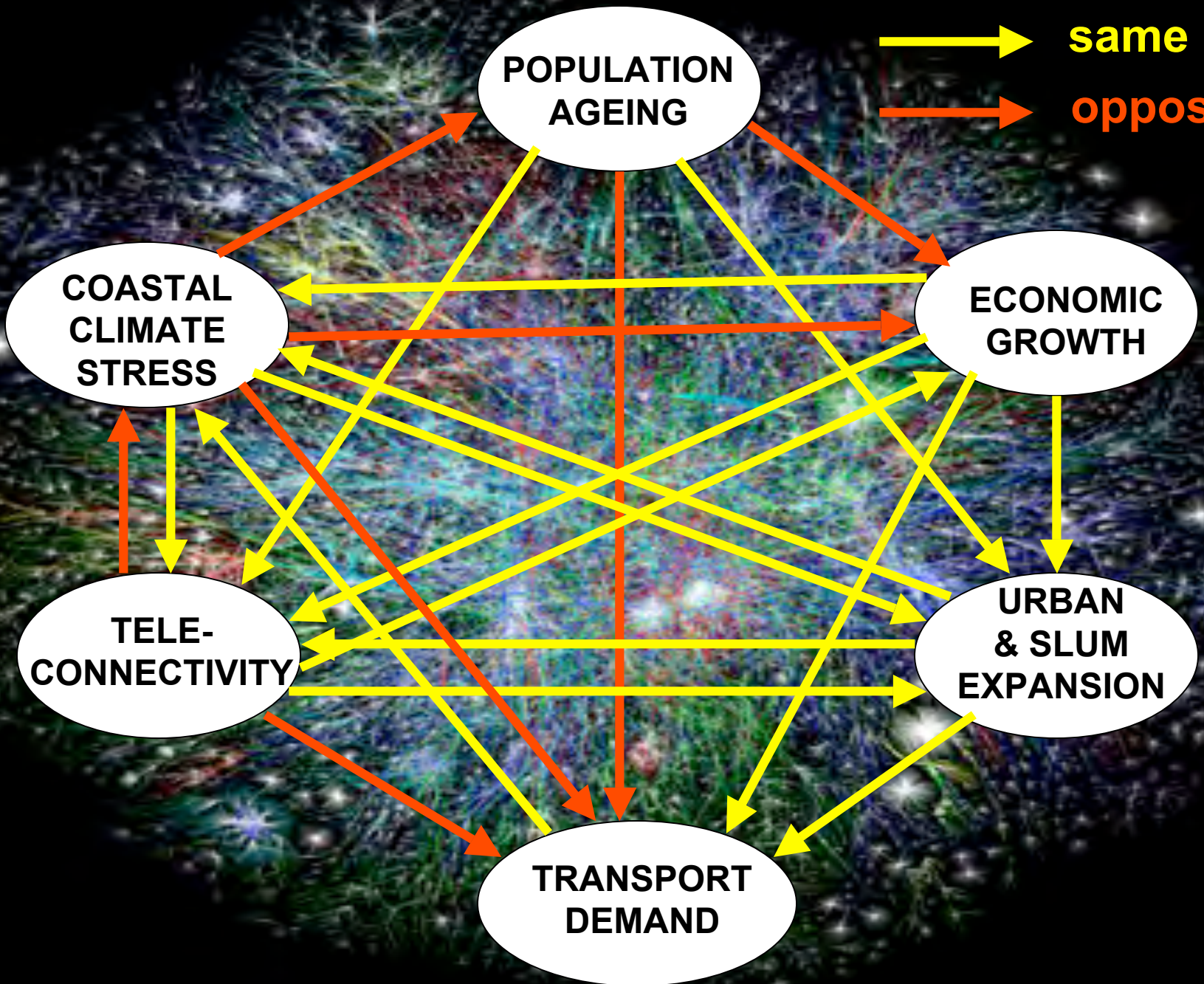
 Climate-induced degradation of freshwater resources

 Climate-induced decline in food production

 Hotspot

 Climate-induced increase in storm and flood disasters

 Environmentally-induced migration



→ same
→ opposite

THE GLOBAL MOBILITY-ACCESSIBILITY NEED

POPULATION AGEING:	AGE-FRIENDLY, ELDER CARE, UNDERSTANDABILITY, RELIABILITY
ECONOMIC GROWTH:	AFFORDABLE & EXPANDABLE INTERMODAL MASS TRANSIT
URBAN/SLUM EXPANSION:	PRO-POOR, SECURITY, FEMALE, LIVELIHOOD & DENSITY
TRANSPORT DEMAND:	ECO-FRIENDLY, RENEWABLE ENERGY POWERED TRANSIT
TELE-CONNECTIVITY:	SMART, VIRTUAL, REAL TIME, FLEXIBLE NETWORKS
COASTAL CLIMATE STRESS:	CARBON NEUTRAL, ROBUST, ADAPTIVE CAPACITY BUILDING

“Core Organizing Principles” of New Urban Mobility

[5= Extremely Important, 1= Not Important]

Accessibility	4.43	Modal Diversity	4.05
Eco-Friendly	4.42	Flexibility	4.04
Connectivity	4.34	Security & Safety	4.00
Renewability (Energy)	4.34	Public Health Enhance	3.86
Time/Space Efficiency	4.31	Community Building	3.80
Walkability/Bikeability	4.27	Collaborative	3.77
Affordability	4.22	Near Term Impacts	3.63
Social Justice/Fairness	4.17	Self-Replicating	3.53
Resilience/Robustness	4.13	Entrepreneurial	3.40
Opportunity & Freedom Enhancing	4.07	Info-Intensity	3.36