

# **LESSONS FROM HONG KONG, THE MOST SUSTAINABLE AFFLUENT CITY**

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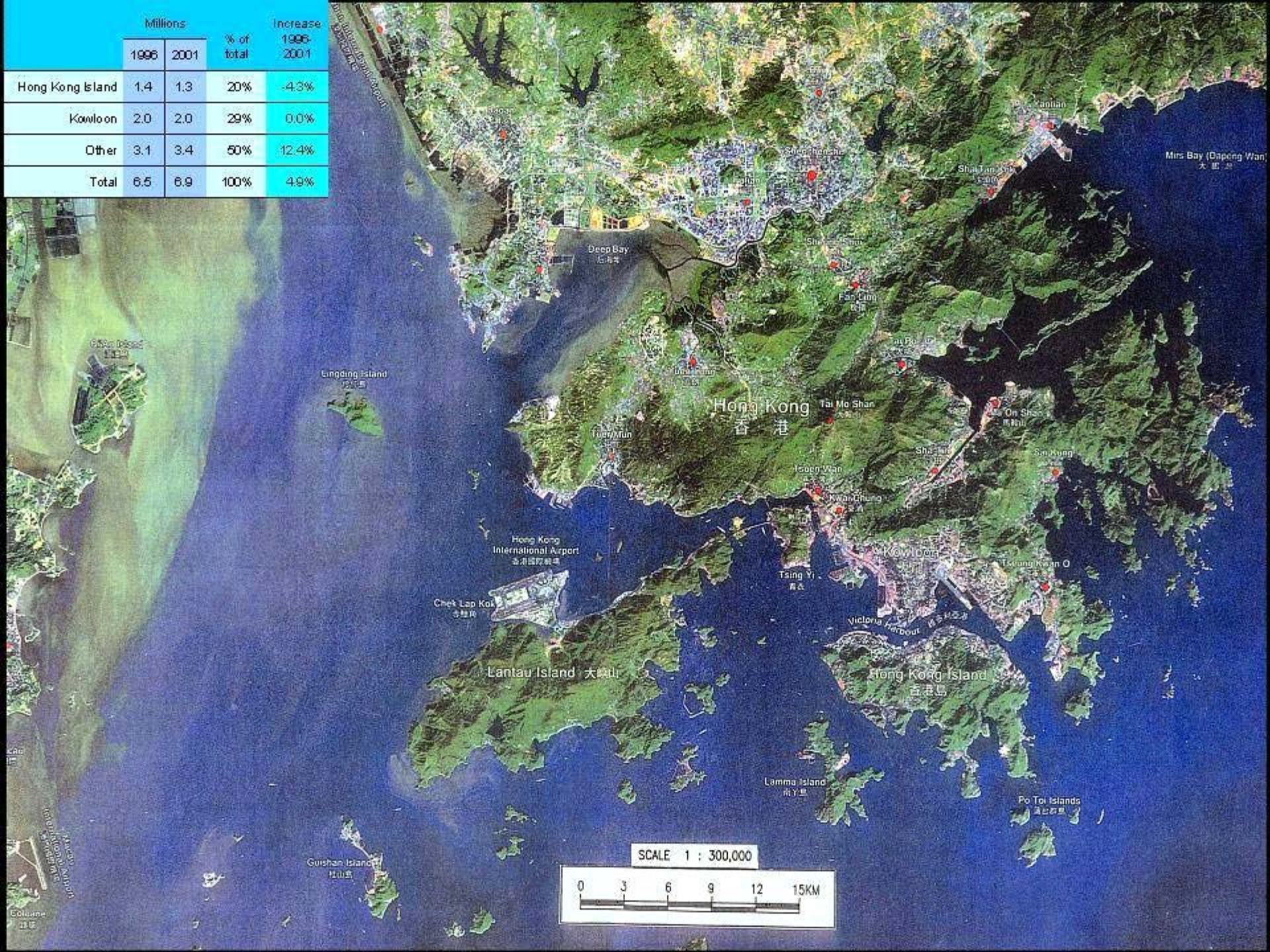
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**Held at the University of British Columbia**  
**Robson Square Campus, Vancouver**  
**March 14, 2003**







	Millions		% of total	Increase 1996-2001
	1996	2001		
Hong Kong Island	1.4	1.3	20%	-4.3%
Kowloon	2.0	2.0	29%	0.0%
Other	3.1	3.4	50%	12.4%
Total	6.5	6.9	100%	4.9%





# Hong Kong

Presentation by Richard Gilbert  
Royal Society of Canada symposium  
University of British Columbia  
March 14, 2003

香港

- Extreme, affluent large urban region in Asia-Pacific ('affluent' = >US\$10,000 GDP/cap. In 1995)
- Special Administrative Region of China since July 1997 ("one country; two systems")
- One of two affluent large urban regions not in a OECD Member country (other is Singapore)
- 'Extreme' mainly because of high settlement density
- Nevertheless, provides several lessons for other urban regions.

# Hong Kong's distinctiveness 1

Among the world's affluent cities, Hong Kong has the:

- highest residential and employment densities
- greatest intensity and use of public transport
- second highest rate of taxicab use (after Singapore)
- highest cost of car use (per kilometre)
- most expensive roads
- highest spatial intensity of transport emissions

# Hong Kong's distinctiveness 2

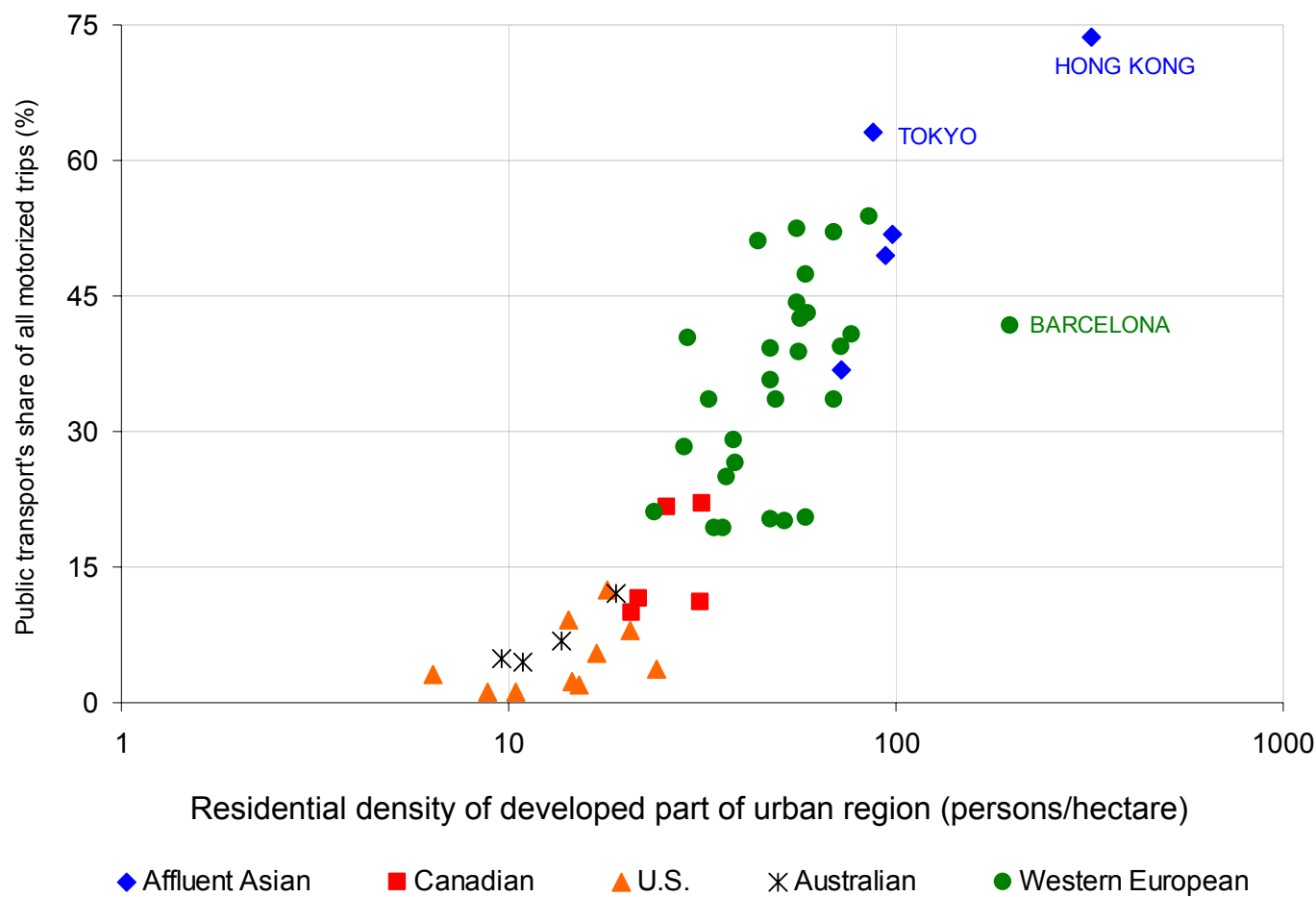
Among the world's affluent cities, Hong Kong has the:

- lowest length of heavy rail network (per capita)
- lowest length of road (per capita)
- lowest rates of car ownership and use
- second-lowest expenditures on moving people
- lowest transit costs
- lowest rate of energy use for transport of people within the urban region (and likely the lowest rate of overall energy use, even if air travel is included)



# Hong Kong's distinctiveness 3b

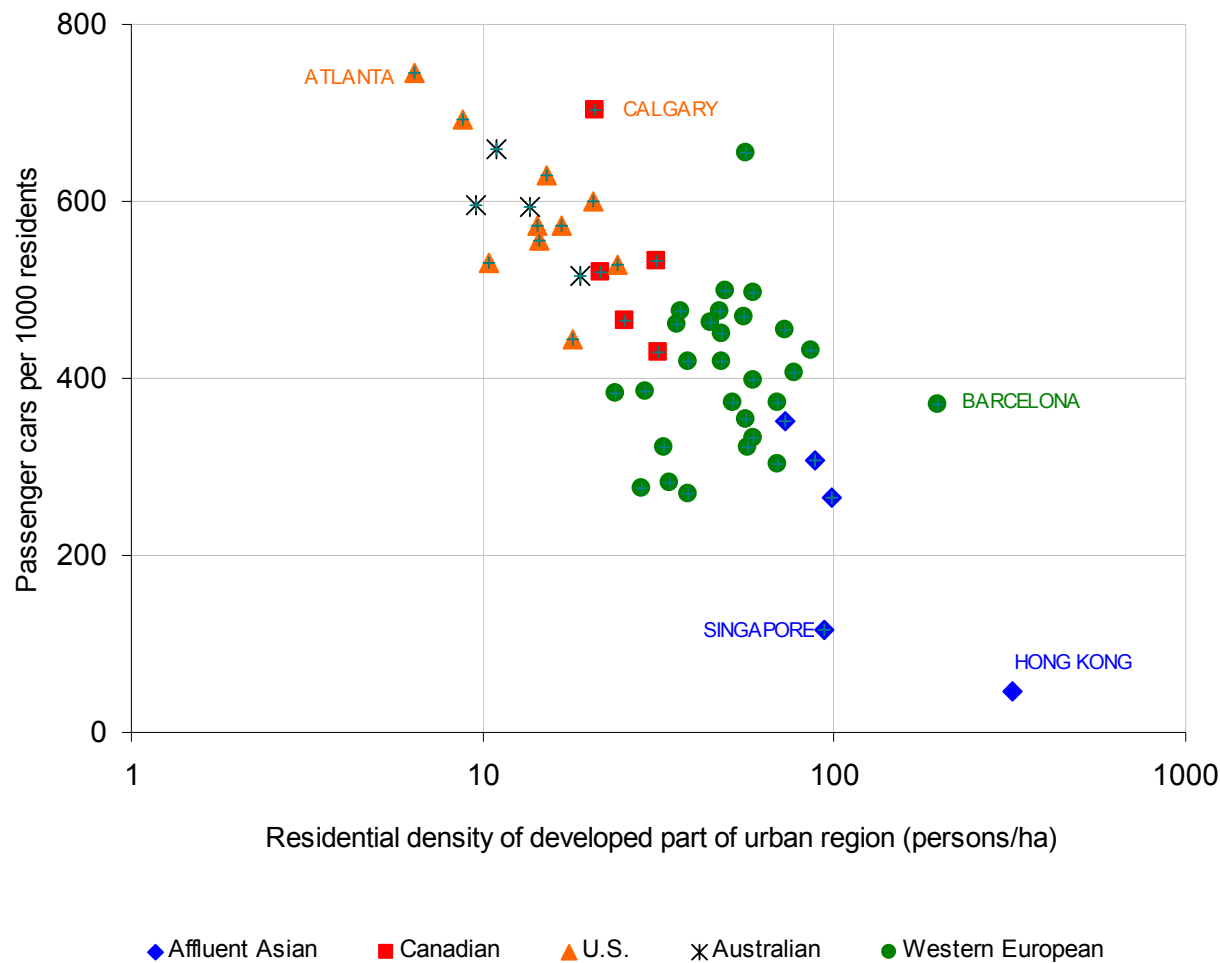
“highest public transit use and residential density”





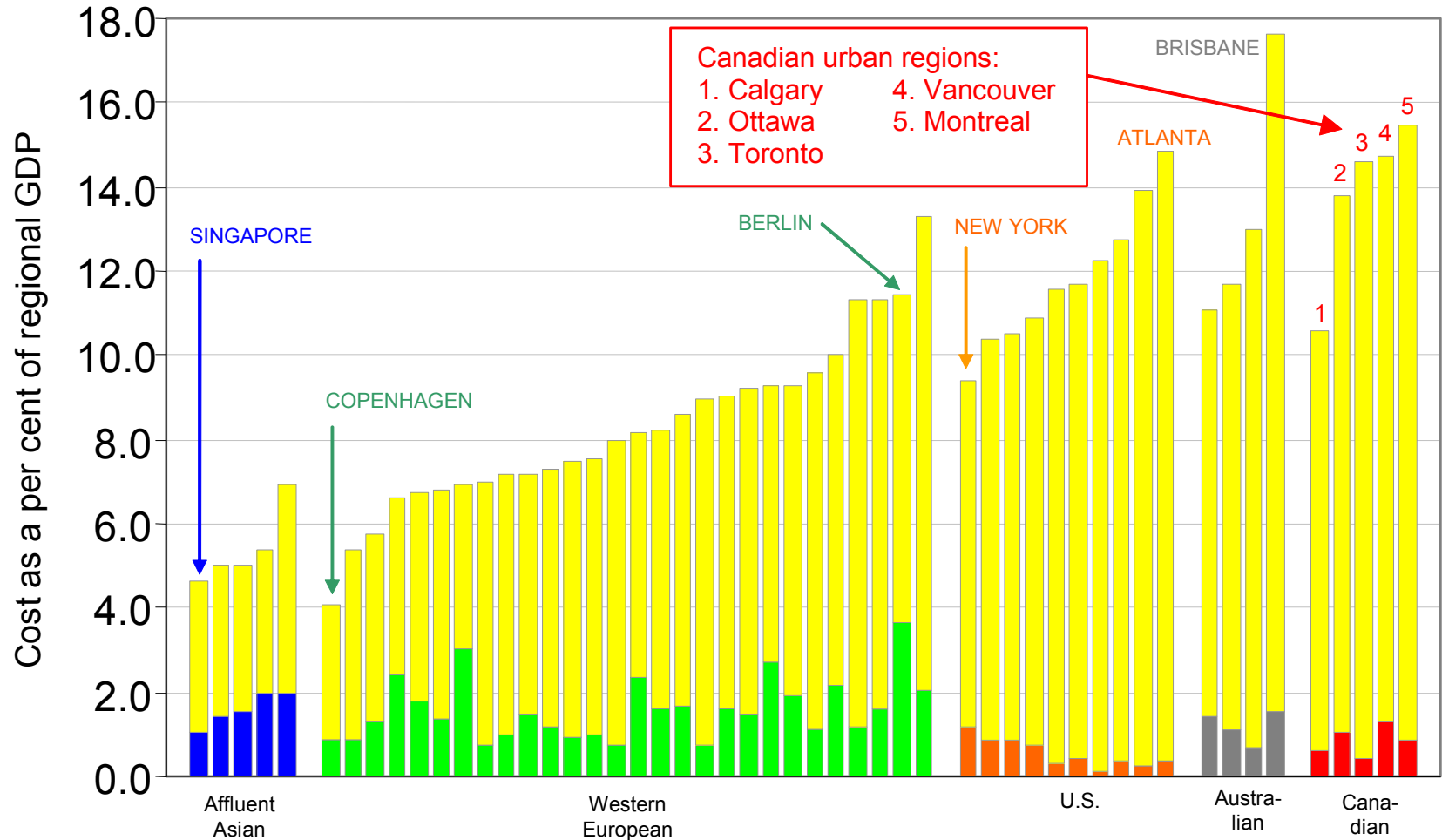
# Hong Kong's distinctiveness 4

"lowest car ownership"



# Hong Kong's distinctiveness 5

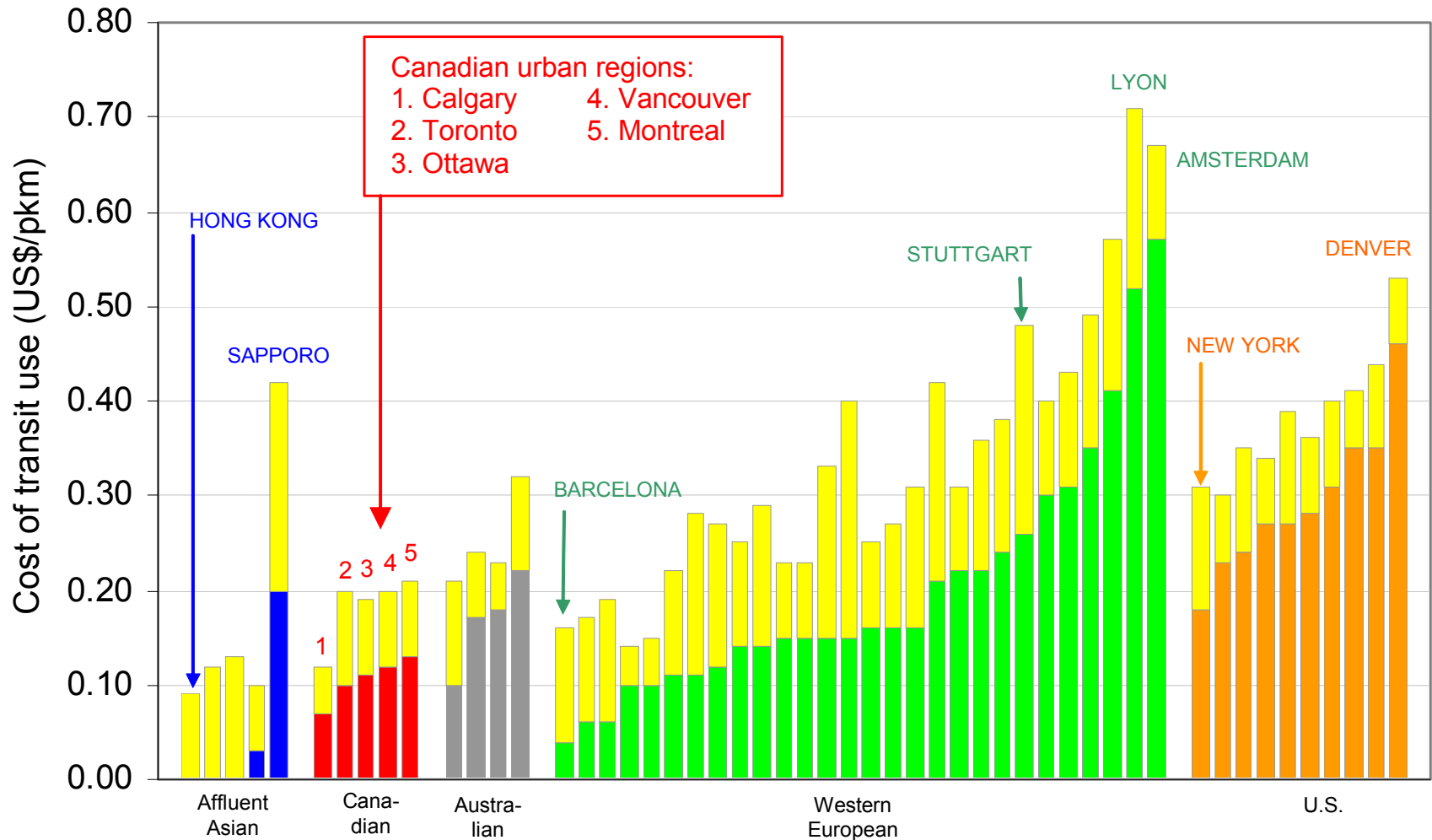
"second-lowest proportion of GDP spent on moving people"





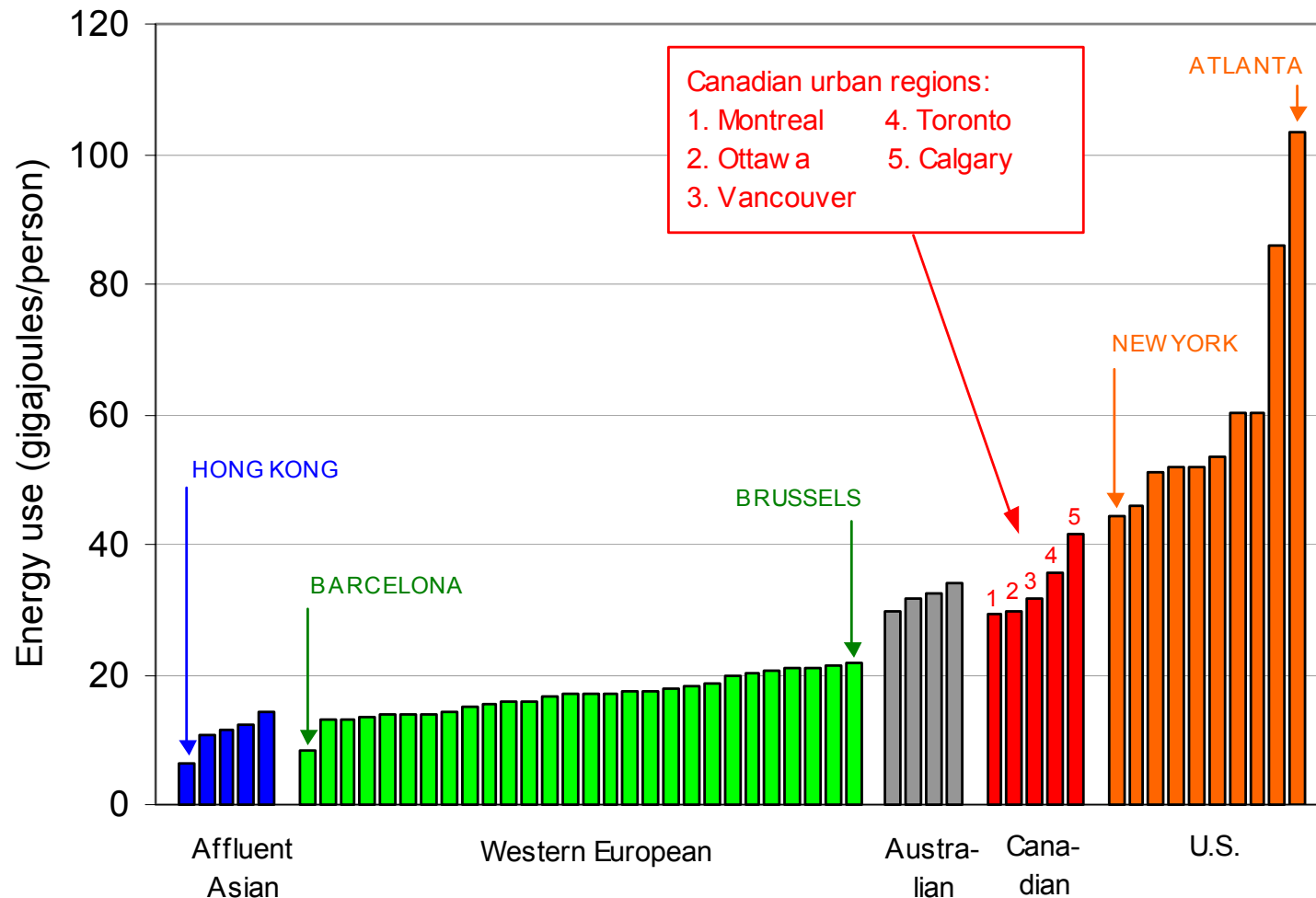
# Hong Kong's distinctiveness 6

"lowest transit costs"



# Hong Kong's distinctiveness 7

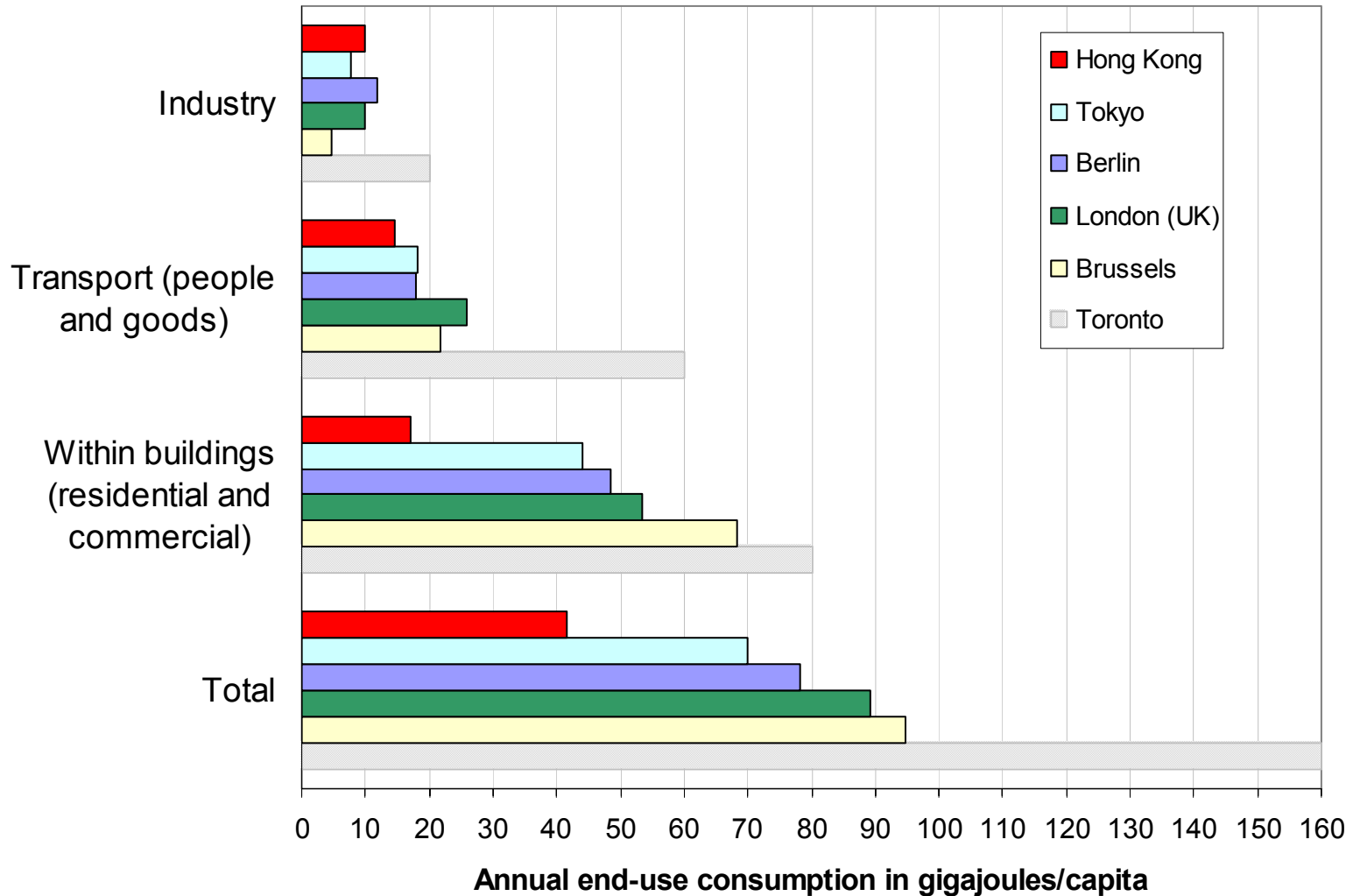
"lowest per-capita energy use for transport of people"





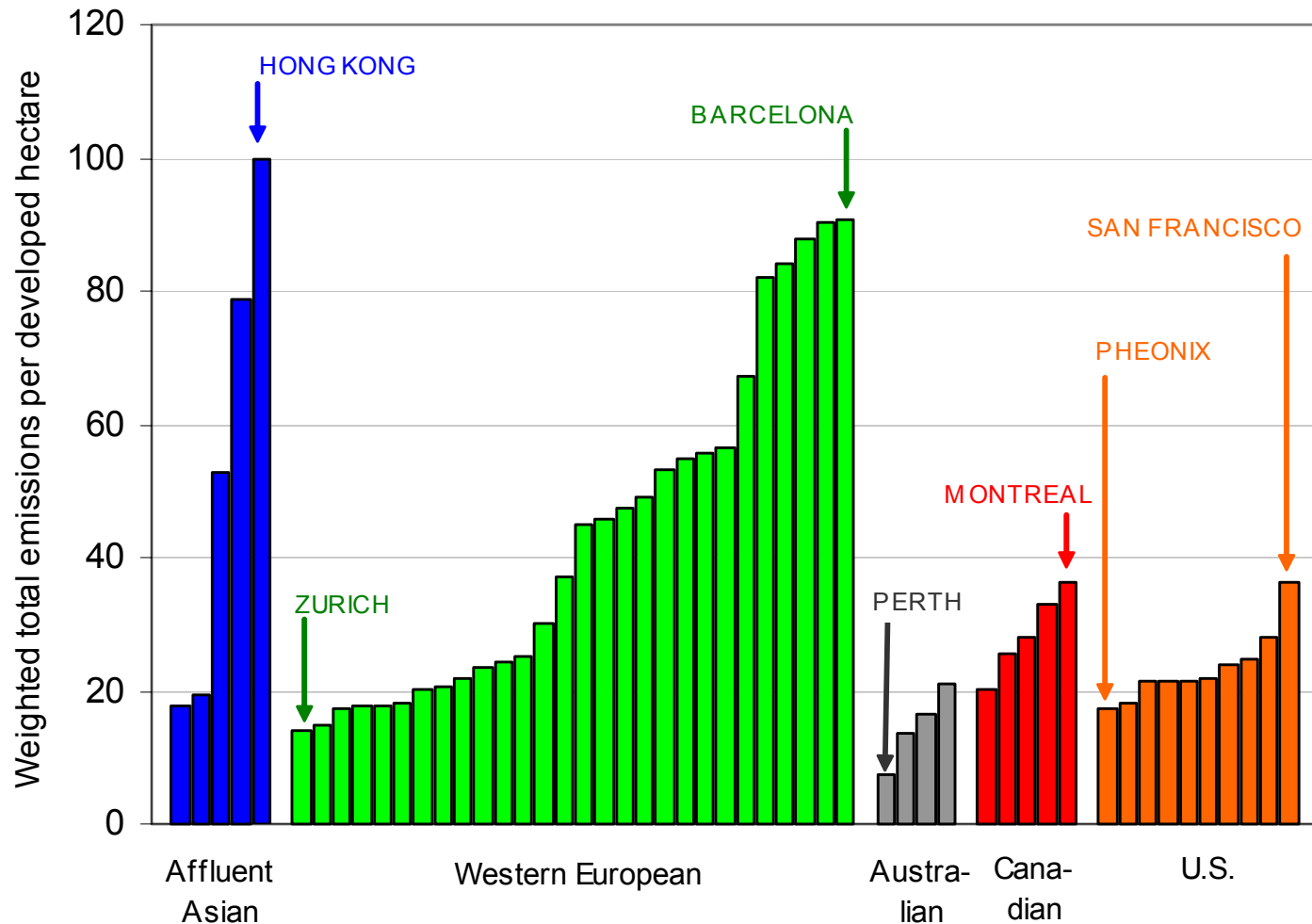
# Hong Kong's distinctiveness 8

“likely the lowest overall energy use per capita”



# Hong Kong's distinctiveness 9

"highest spatial intensity of emissions from transport"



























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一天必將到來。江澤民、一窩金雞鐵嘴鷹，  
其血脈的罪人，將因“滅絕野蠻罪”和  
種族仇、從而不滿。無數的事實已經證明，  
都要為自己犯下的罪行去承擔。其中性  
利權起點索賄犯，南南斯拉夫薩拉耶  
屠殺案等，都沒有逃脫法律的制裁或人  
類每個中國人的切身利益。為了中華民族  
的權利禁止這種民族仇恨。







# Comparing Hong Kong, the GTA, and the GVRD

Data for 1995

	Hong Kong	GTA	GVRD	
Population	6.31	4.63	1.90	millions
GDP/person	22,968	19,456	25,793	US\$
Area	1,096	7,075	2,821	square kilometres
Developed area	18	25	31	% of total area
Density	320	26	22	persons/hectare developed area
Car ownership	47	464	530	cars/1000 persons
Total trips	2.81	1.97	3.14	daily trips/person
Motorized trips	1.85	1.73	2.65	daily trips/person
Car/motorcycle trips	8	86	79	% of all motorized trips
Annual cost of transport	964	2,490	2,618	US\$ per person
Energy use for transport	6.5	35.7	31.8	gigajoules per person/year



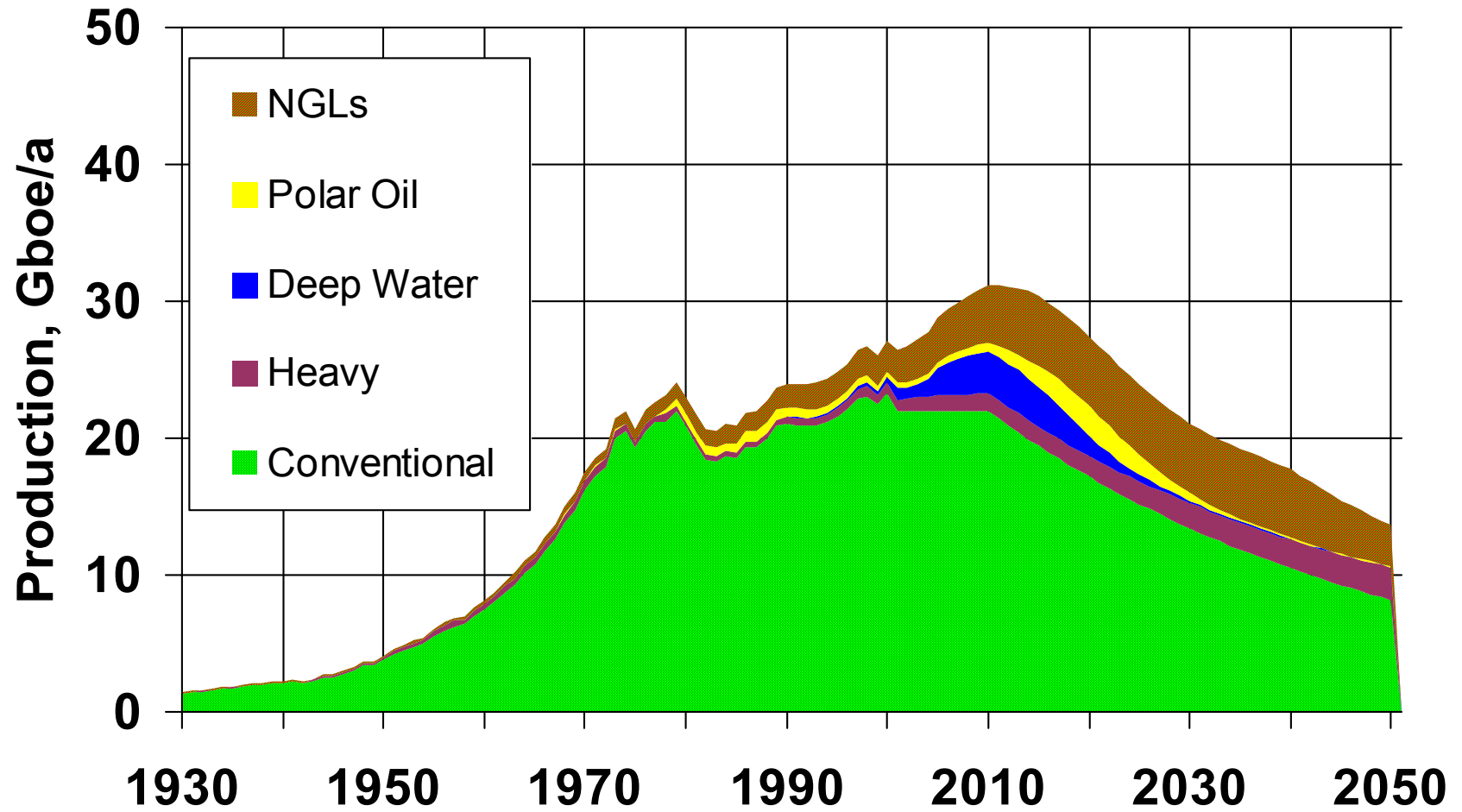
# Moving freight

It's hard to be precise about freight movement because:

- Data on freight movement are poor
- There are many unknowns about trade with the Mainland
- Plans for rail freight for the next decade or so are much less clear than plans for passenger rail
- There has been less experience with trolley lorries than with trolley buses
- Independently mobile vehicles could be needed for the last sections of many deliveries and pick-ups, and it's not clear how they would be coordinated with tethered freight vehicles

Freight movement by tethered vehicles could rise from its present <3% (by rail) perhaps to about 80% (by rail and trolley lorry).

## Central issue in sustainability: oil (and NG)





# Proposal for moving people sustainably

	2002		2032	
	Trips (millions)	Per cent of total	Trips (millions)	Per cent of total
Motorised trips by:				
Personal vehicles	1.1	8%	1.0	4%
Taxis	1.3	10%	1.0	4%
Buses	6.5	47%	7.4	32%
Rail	4.7	35%	14.1	60%
Total motorised trips	13.6	100%	23.5	100%
Population (millions)	7.0		10.0	
Trips/person	1.95		2.35	



# Why *electric* vehicles?

- Because for transport to be sustainable it will have to use *renewable energy*, i.e., energy from wind, sun, tide, etc.
- In any case, worldwide *production of oil and natural gas is likely to start declining* before 2032, with resulting major increases in prices.
- The best way to *distribute* renewable energy may be through the electric power grid. Distribution of hydrogen, a frequently discussed alternative, seems less feasible.
- Moreover, electric vehicles meet Hong Kong's need for *quiet, pollution-free transport* in populated areas.



# Why *tethered* electric vehicles?

- Because tethered systems require **much lower overall energy input** than fuel-cell systems or battery systems.
- Because, in any case, **fuel-cell systems may not be sufficiently reliable and affordable** by 2032.
- Because **battery power is inherently short-lived**; batteries could never be suitable as the main power source for large vehicles.

# Offshore wind is the most promising but not the only renewable energy source

- It's the only source that's near price-competitive.
- Hong Kong waters are a suitable place for a massive wind farm that could meet just about all the SAR's energy needs. (China Power says 750 GW of wind power is feasible from the whole continental shelf.)
- Other renewable energy should be explored too.





# Lessons from Hong Kong for Canadian urban regions 1

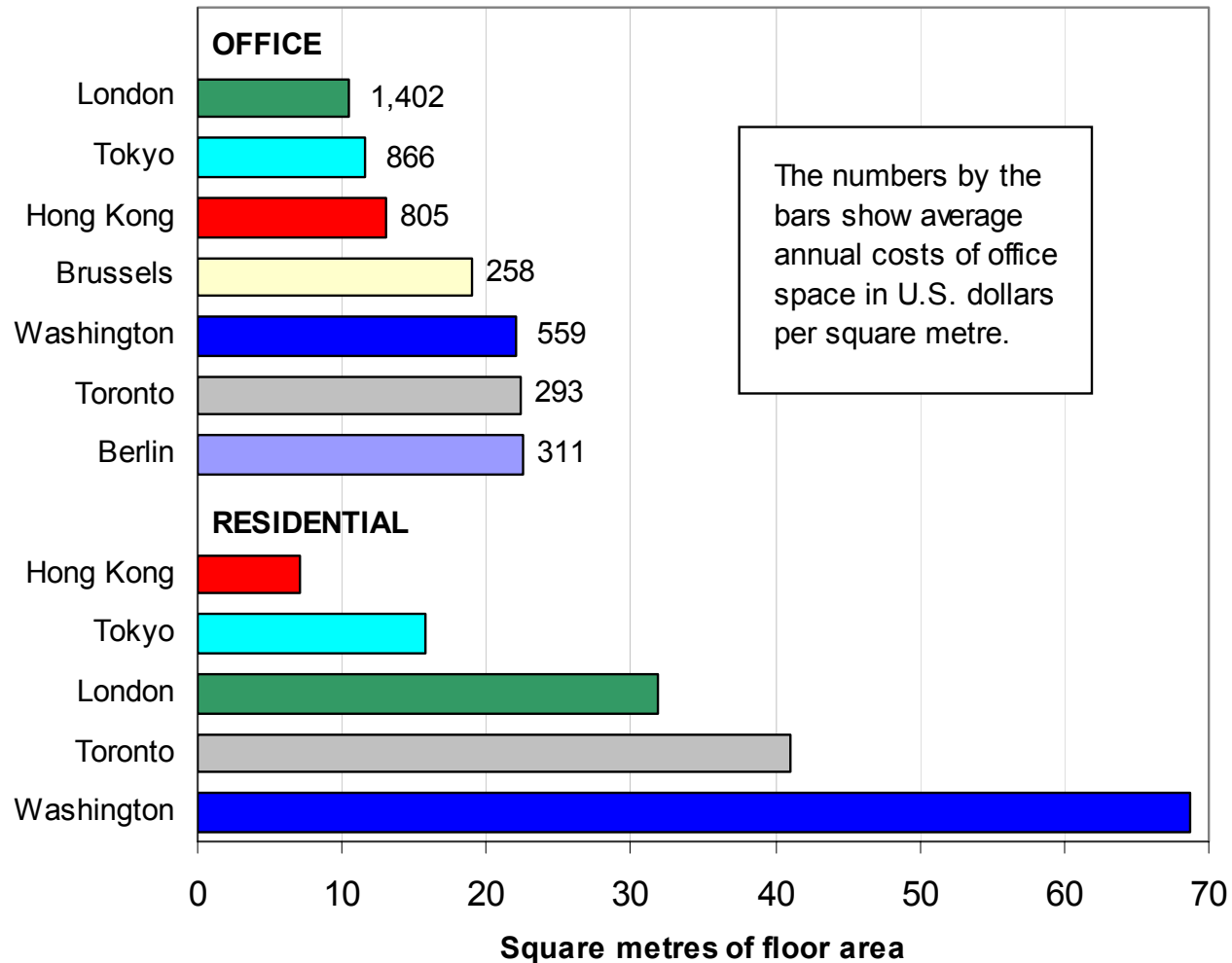
- Transport in Canada's urban regions is dramatically farther away from sustainability than transport in Hong Kong, and yet there is more concern about sustainability there. **Being more sustainable may help acceptance of the need for sustainability.**
- True sustainable transport requires sustainable energy. **A region's land use and transport plans should be set within the framework of its energy plan.**
- Very high densities make low automobile use and profitable transit possible in Hong Kong. **Perhaps nothing is more important for sustainability than achieving higher densities.**
- The downside of high density can be high local concentrations of pollutants. **Transport with zero emissions at source is essential for high density development.**

## Lessons from Hong Kong for Canadian urban regions 2

- Very high levels of use of public transport can be sustained with a bus-based system, but resulting pollution levels can be unacceptable. **It's better to have diesel buses than nothing, but the long-term plan should be for electric vehicles.**
- The efficiency and convenience of Hong Kong's astonishing Octopus Card help sustain regard for public transport. **But the real value is to public transport operators, who know what is happening and in the train stations with powerful precision.**
- The individual excellence of the individual public transport operators in Hong Kong has a down side: poor cooperation. **Society needs to strike a difficult balance in this respect.**
- Freight transport is Hong Kong's Achilles heel. **This is true almost everywhere, but more so for Hong Kong and the solutions will be of special significance.**



# The downside: space per person



But, Hong Kong rates well in many objective social indicators, for example:

- Hong Kong has the second-highest **life expectancy** (after Japan)
- Hong Kong has the second-lowest **infant mortality and morbidity** (just after Sweden)