

Framework for Sustainable Transport

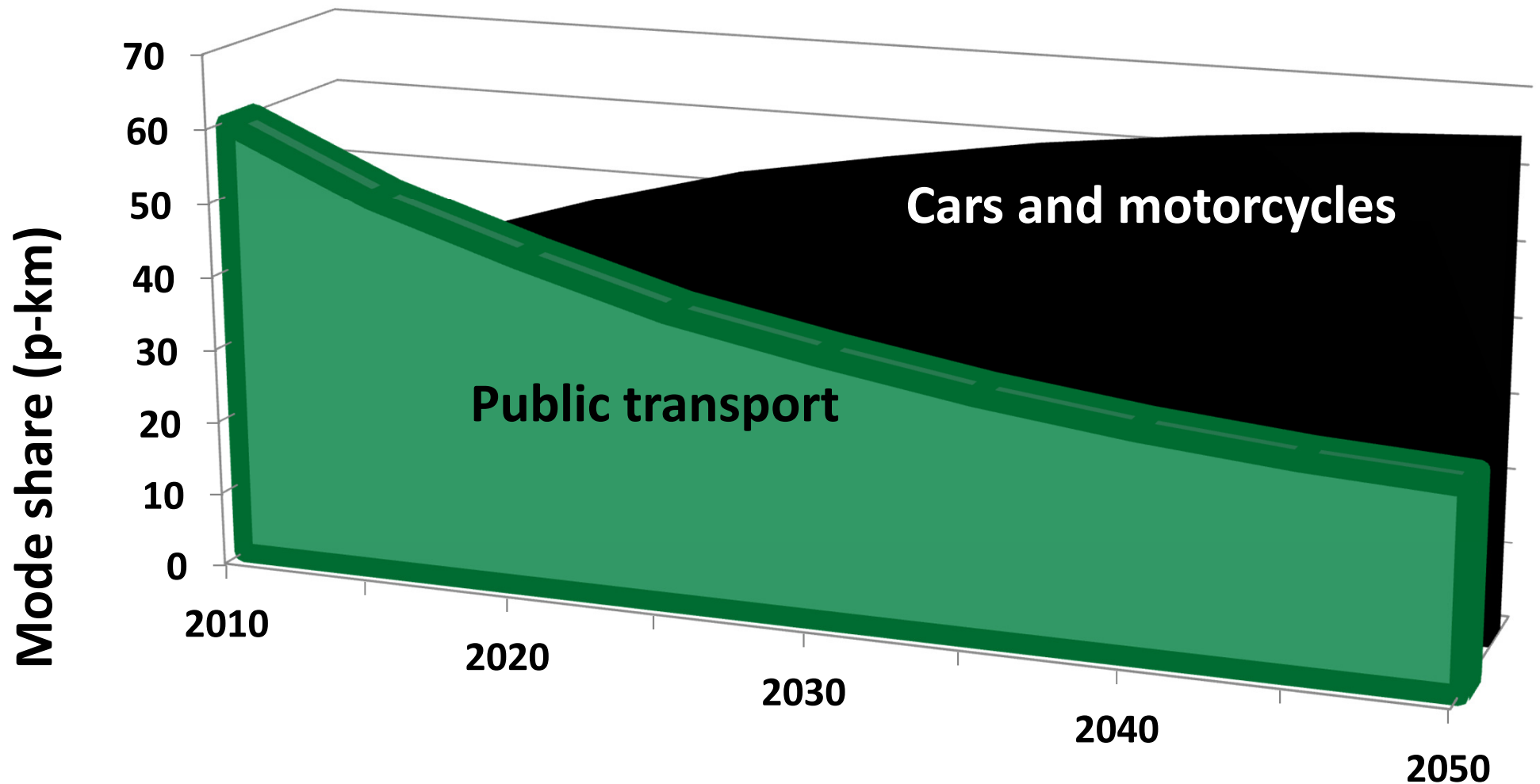


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The Sustainable Urban Transport Challenge

BUSINESS AS USUAL

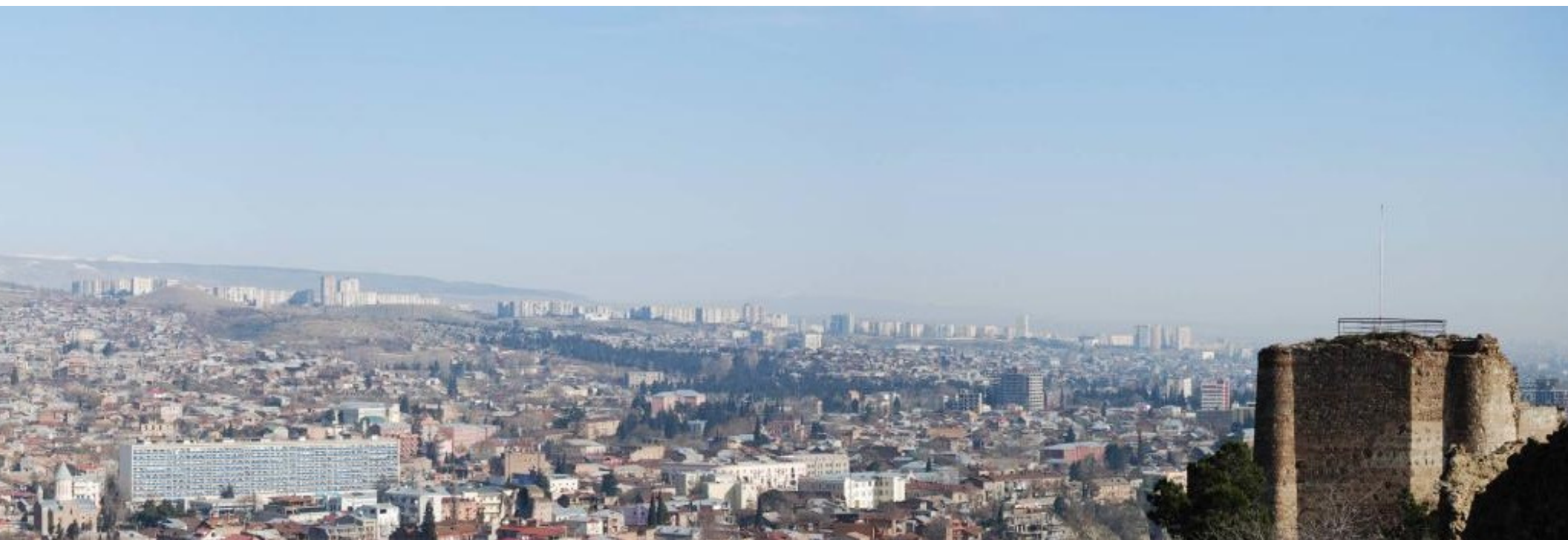


Source: ADB and IEA, 2011



TBILISI - 24 November 2014

Source: <http://www.ambebi.ge/sazogadoeba/117026-bolo-drois-yvelaze-didi-sacobi-thbilisshi.html#ixzz3K5S4ab00>



**AVOID
SHIFT
IMPROVE**

AVOID – SHIFT - IMPROVE



Avoid
unnecessary
vehicle
kilometers



Shift to the
lowest-emitting
modes



Improve vehicle
technology to
cleaner options

AVOID



“Avoid”: Transit-Oriented Development (TOD)

Concentrating development around public transport stations



“Avoid”: Efficient land use policies



The amount of space required to transport the 60 persons by different modes

“Avoid”: Information and Communications Technologies

- ☐ Telecommuting
- ☐ Video teleconferencing / Telepresence
- ☐ Teleshopping
- ☐ Telework
- ☐ Cell phones
- ☐ Broadband provision



SHIFT

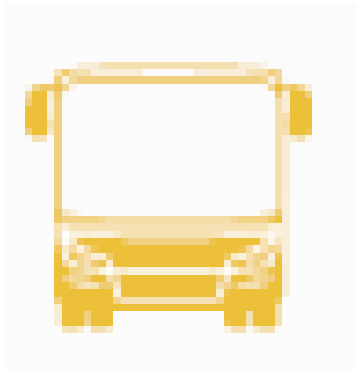


EMISSIONS

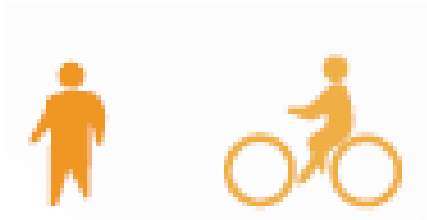
How far can I travel on 1 ton of CO₂?



28,000
passenger.km



146,000
passenger.km



“Shift”: Public Transport Systems



Heavy underground urban rail



London

Shanghai metro

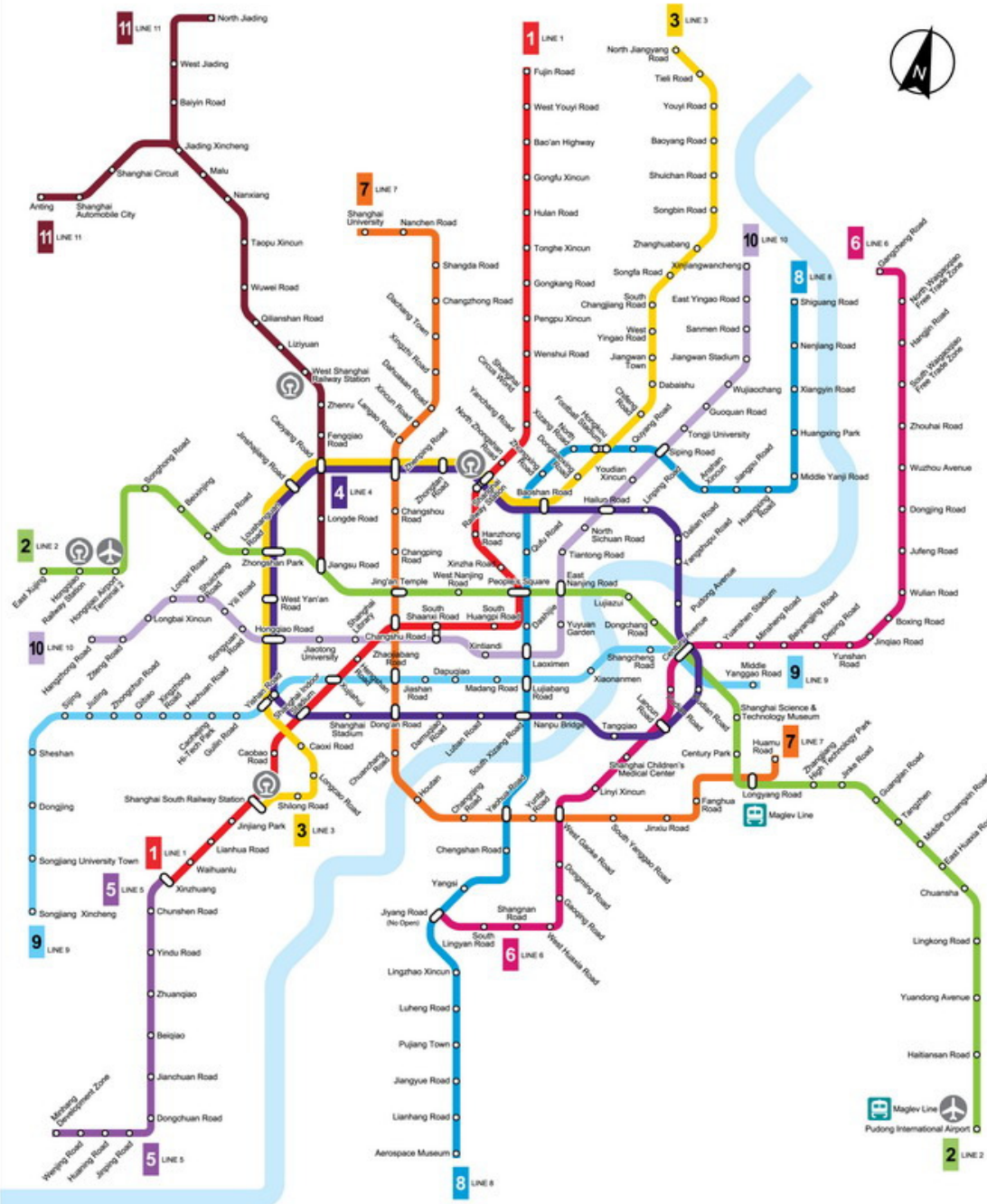
World's largest metro system

2013

- 11 lines operational
- 434 km

2020

- 22 lines
- 877 km



Heavy elevated rail



At-grade Light Rail Transit (LRT)



Bordeaux

Elevated LRT



Kuala Lumpur

Heavy Monorail



Monorail Lite



Kuala Lumpur

Cable Propelled Transit (CPT)



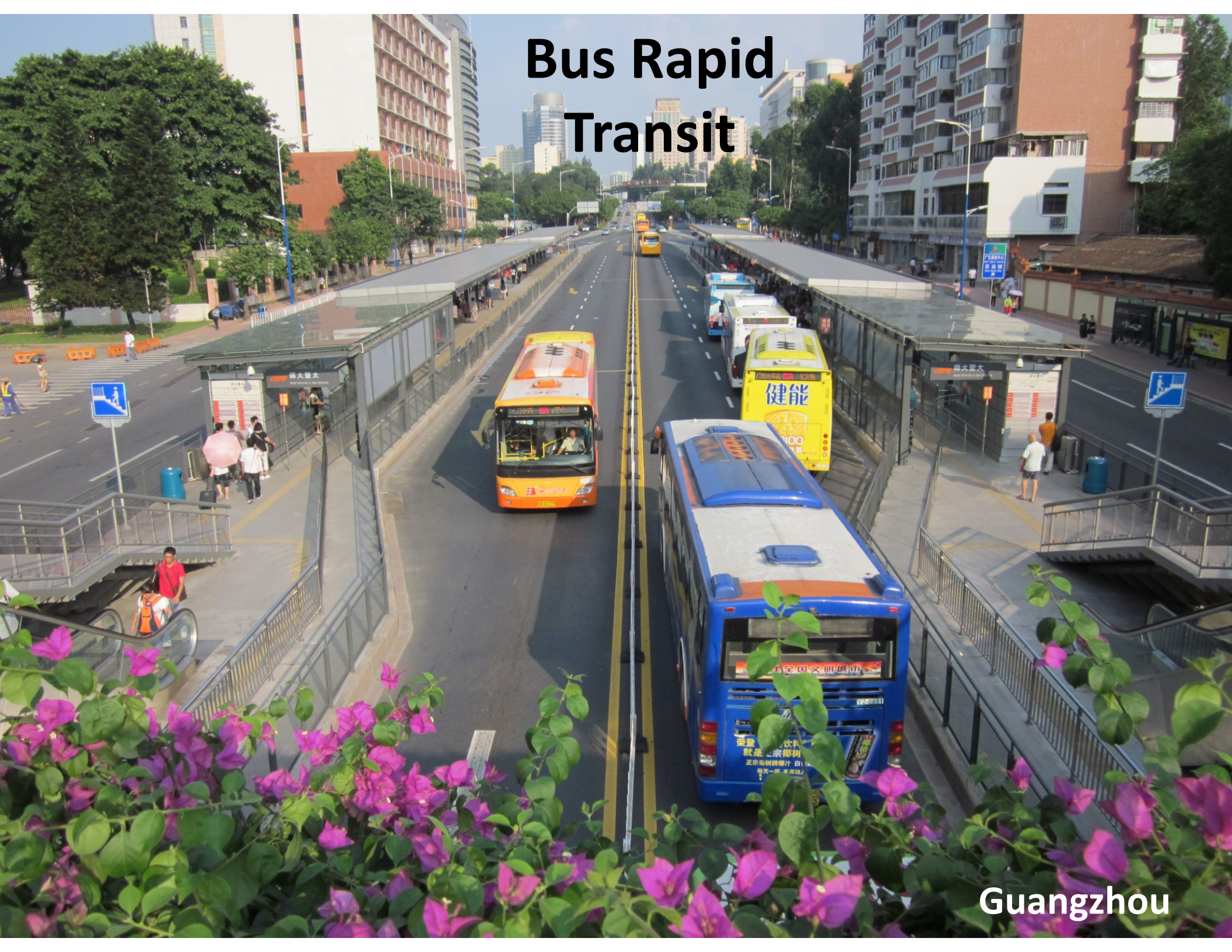
La Paz

Personal Rapid Transit (PRT)



London Heathrow

Bus Rapid Transit



Guangzhou

Bus Rapid Transit in Asia



Comparing infrastructure costs

Bus Rapid Transit (BRT)
US\$ 5 – 10 million / km



At-grade LRT
US\$ 25 – 40 million / km

Monorail Lite
US\$ 55 – 70 million / km

Elevated LRT
US\$ 65 – 110 million / km

Elevated heavy rail
US\$ 85 – 140 million / km

Full monorail
US\$ 130 – 170 million / km

Metro
US\$ 160 – 250 million / km



BRT systems in Asia

- | | |
|---------------|-----------------|
| 1. Ahmedabad | 20. Lahore |
| 2. Bangkok | 21. Lanzhou |
| 3. Beijing | 22. Lianyungang |
| 4. Bhopal | 23. Miyagi |
| 5. Changde | 24. Nagoya |
| 6. Changzhou | 25. Pune |
| 7. Chongqing | 26. Rajkot |
| 8. Dalian | 27. Seoul |
| 9. Delhi | 28. Surat |
| 10. Guangzhou | 29. Tabriz |
| 11. Haifa | 30. Taipei |
| 12. Hangzhou | 31. Tehran |
| 13. Hefei | 32. Urumqi |
| 14. Indore | 33. Xiamen |
| 15. Istanbul | 34. Xian |
| 16. Jaipur | 35. Yangcheng |
| 17. Jakarta | 36. Yinchuan |
| 18. Jinan | 37. Zaozhuang |
| 19. Kunming | 38. Zhengzhou |



Xiamen

BRT systems in development in Asia

- | | |
|----------------------|----------------------|
| 1. Almaty | 18. Johor Bahru |
| 2. Astana | 19. Karachi |
| 3. Baku | 20. Kathmandu |
| 4. Beirut | 21. Manila |
| 5. Cebu | 22. Medan |
| 6. Chennai | 23. Pimpri-Chinchwad |
| 7. Chiang Mai | 24. Peshawar |
| 8. Davao City | 25. Surabaya |
| 9. Dhaka | 26. Tel Aviv |
| 10. Guwahati | 27. Ulaanbaatar |
| 11. Ha Noi | 28. Vientiane |
| 12. Ho Chi Minh City | 29. Vijayawada |
| 13. Islamabad | 30. Vishakhapatnam |
| 14. Jiangxi Fuzhou | 31. Yerevan |
| 15. Jiangxi Ji'an | 32. Yichang |
| 16. Jiuquan | |
| 17. Jodhpur | |



Lanzhou BRT project



“Shift”: Walking and cycling upgrades



Shift:

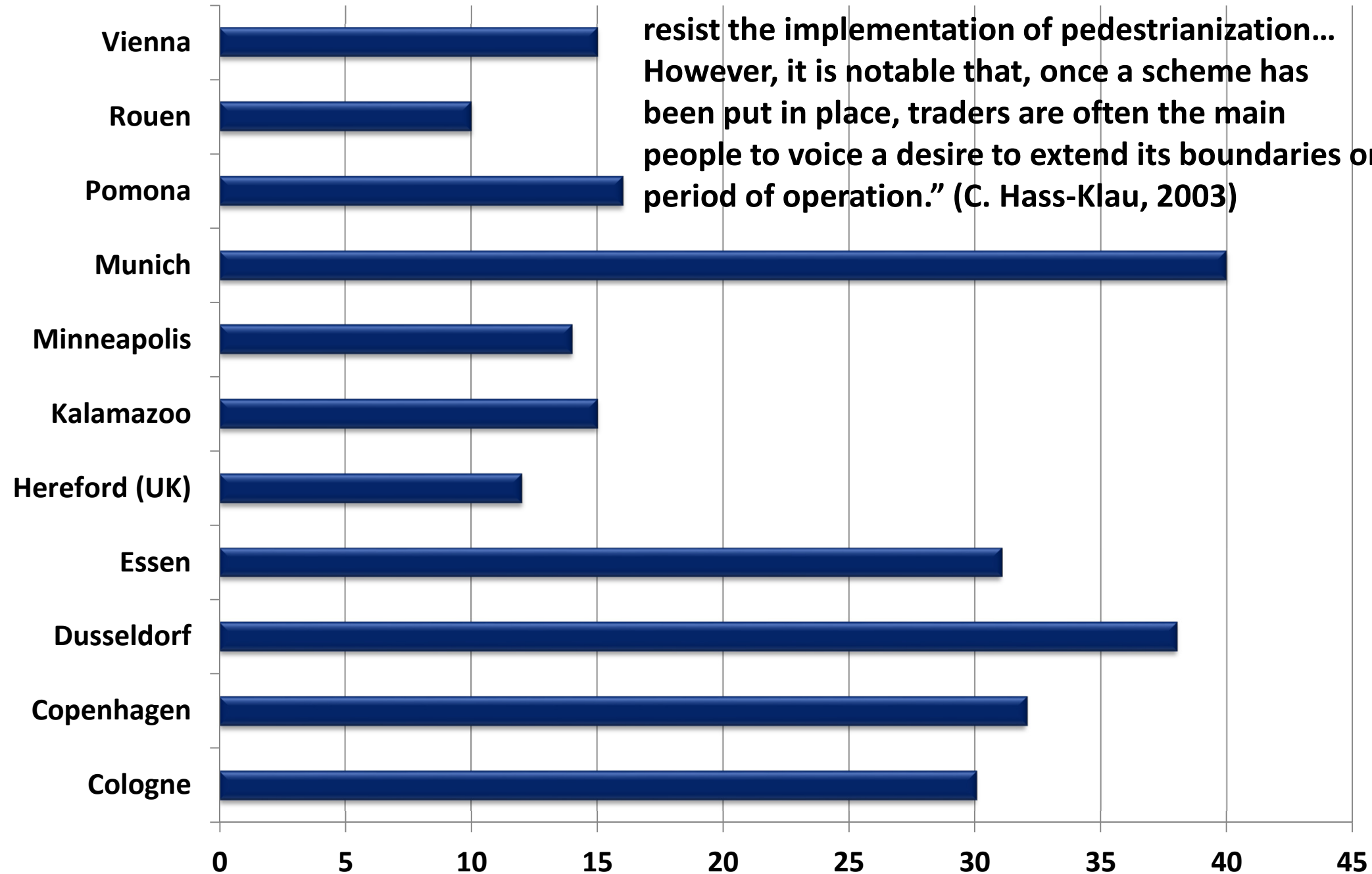
**Full street
pedestrianization**

**Nanjing Road, Shanghai:
World's busiest
pedestrian street**



Sales revenue increase after pedestrianizing

“It seems to be a law of nature that retailers will resist the implementation of pedestrianization... However, it is notable that, once a scheme has been put in place, traders are often the main people to voice a desire to extend its boundaries or period of operation.” (C. Hass-Klau, 2003)



Source: UITP

“Shift”: Shared space and complete streets

Road space that
does not restrict
cars but is
designed to give
pedestrian and
cyclist priority



Copenhagen

“Shift:” Greenways

Linear pedestrian
and cycling corridors
that incorporate
public space, street
furniture, and
activities





Seoul Cheonggyecheon



Guangzhou
2,100 km of greenways

“Shift:” Public space enhancements



Kyoto



Kobe

“Shift:” Covered walkways



Manila



Tokyo

“Shift”: Drop kerbs



Singapore

“Shift”: Car-free Day



Ginza, Tokyo

Car-free Sunday in Jakarta



“Shift:” Segregated cycle ways



“Shift”: Bicycle parking



Seoul

“Shift”: Bicycle sharing



“Shift”: Bicycle distribution

From 2007 to 2010, over 871,000 bicycles handed out for free to scholars in Bihar state, India

Drop-out numbers declined from 2.5 million girls per year to less than 1.0 million



“Shift”: **Modern pedicabs**



Nagoya, Japan

“Shift”: Congestion charging



Singapore

“Shift”: Parking management



“Shift”: **Traffic calming**



Netherlands

“Shift”: Full pedestrian phase at intersection



Tokyo

“Shift”: Speed zones



IMPROVE



“Improve”: Clean Fuels

- ☐ Clean diesel
- ☐ Bio-diesel
- ☐ CNG
- ☐ Bio-methane
- ☐ LPG
- ☐ Ethanol
- ☐ Hybrid-electric
- ☐ Electric
- ☐ Fuel cells



“Improve”: Customer Information Systems



Singapore



Beijing



Shanghai



Bangkok

“Improve”: Technology to improve parking efficiency



AVOID-SHIFT-IMPROVE

... a strategy for sustainability





AVOID – SHIFT – IMPROVE