

Funding Sustainable Mass Transit

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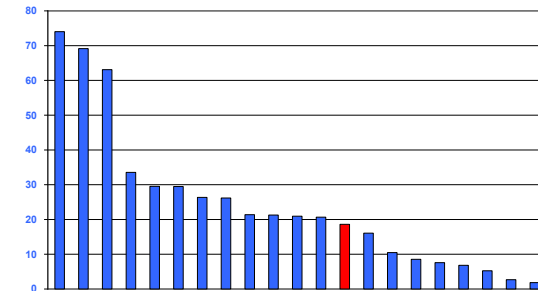
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Presentation Structure

- 1 Introduction
- 2 Mass transit cost and revenue structures
- 3 The importance of fares policy in funding
- 4 Public Private Partnerships and other mechanisms
- 5 Conclusions



1 – Introduction

The Railway and Transport Strategy Centre at Imperial College London

- ❑ **Three key research themes:**
 - Benchmarking & performance measurement
 - Urban public transport operations
 - Transport economics & policy

- ❑ **RTSC** undertakes applied and academic research, consultancy, teaching

- ❑ **Independent, comparable benchmarking**
 - For 28 metro operators including ML
 - 10 suburban rail ways
 - 13 large bus operators (including Carris)



**Imperial College
London**

Why is public transport funding and fare regulation and so important?

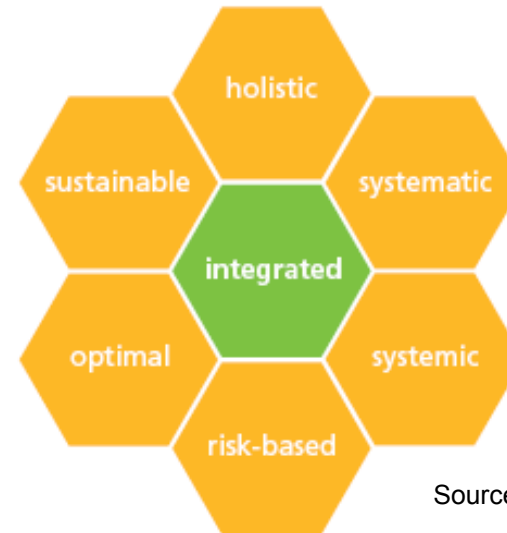
Without stable fares and funding:

- Long-term planning for investment will be difficult (for rail in particular)
- Quality will fail to meet the rising expectations of the public
- Many operators risk a spiral of decline in quality of service due to falling real fares and insecure funding regimes



INNOVATIVE DISPLAY MODES

Source: MTR



Source: BSI

28 metro systems compare performance to identify & share best practices



New Suburban Rail Benchmarking Group: Phase 1 Members

**DSB S-Tog
(Copenhagen)**

**London
Rail**

**Metro Trains
(Melbourne)**

**S-Bahn
(Munich)**



**JR East
(Tokyo)**

**Metro-North
(New York)**

**CPTM
(Sao Paulo)**

**LIRR
(New York)**

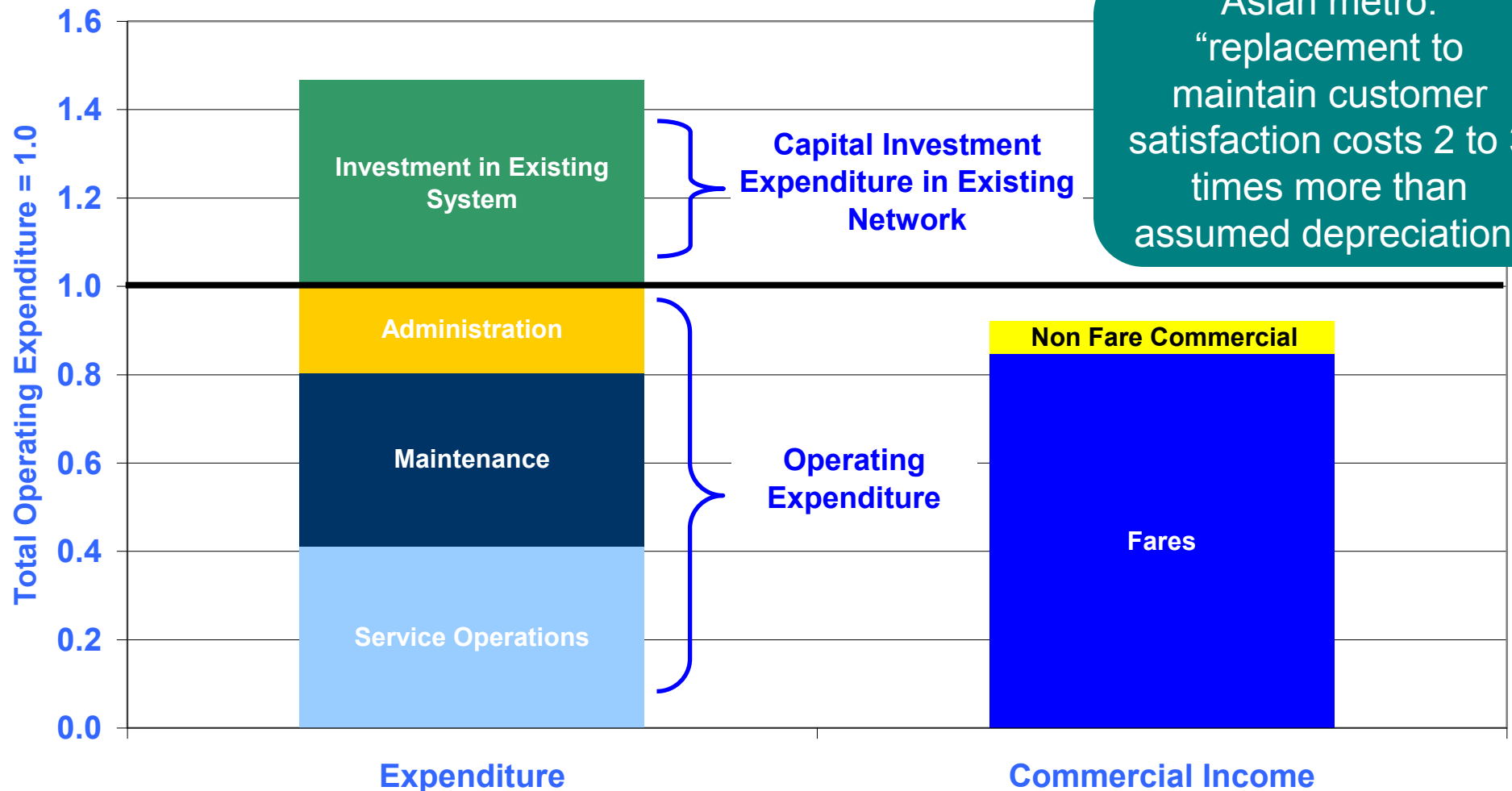
**NSB
(Oslo)**

**BART
(San Francisco)**

2. Sustainable metro funding through the farebox

The evidence from 27 metros, over 15 years: in aggregate an extra 47% has been spent on reinvestment in the existing system.

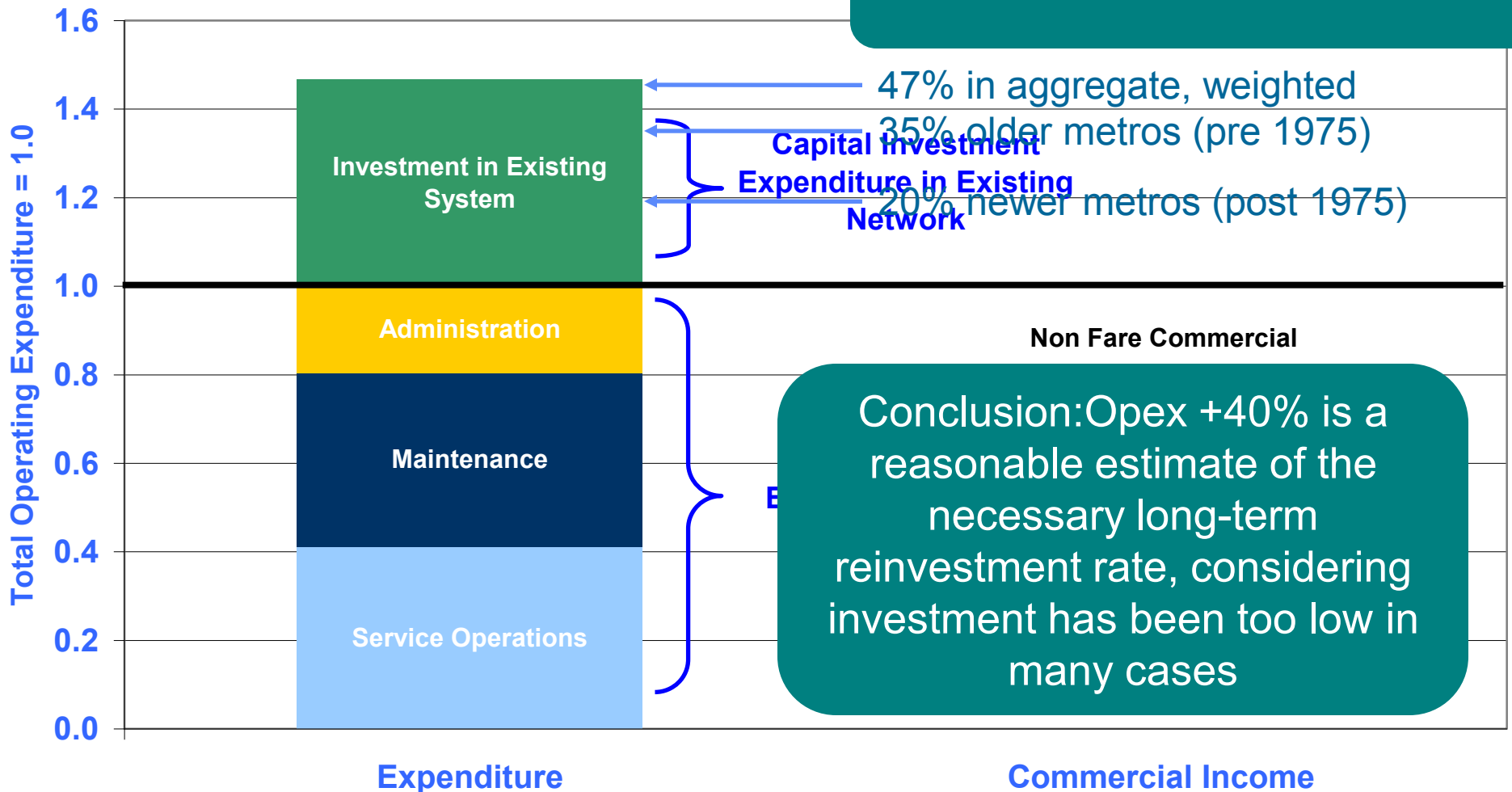
Total Metro Expenditure and Income from CoMET and Nova Metros (Using Available Data, 1994 - 2008)



30%: Average reinvestment rate, counting each metro once regardless of size

Total Metro Expenditure and Income from CoMET and New Metro
(Using Available

Big old metros like have had very high levels of reinvestment, resulting in the higher figure or 47%.



What is needed to secure economic sustainability for rail and metros?

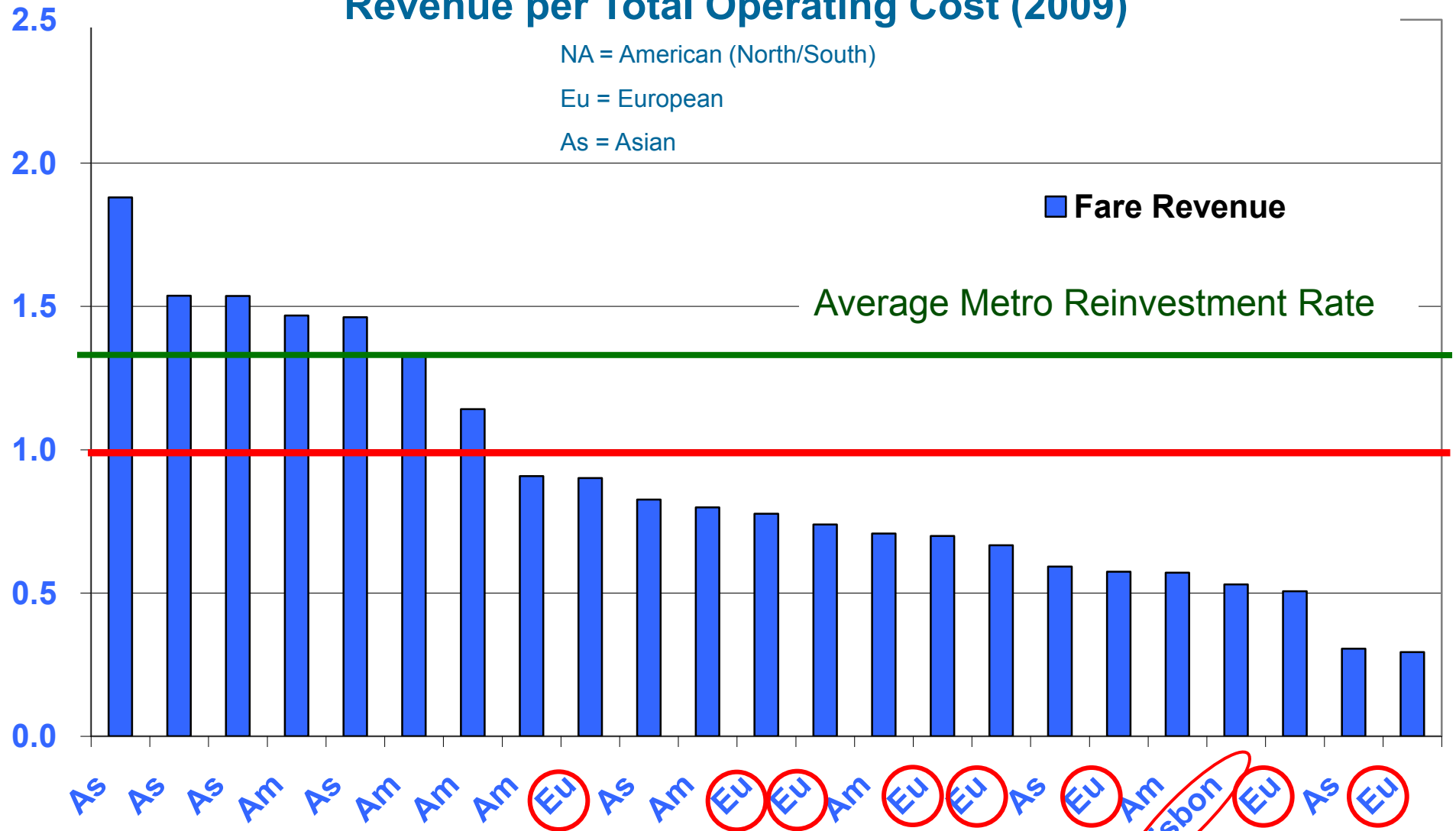
- ❑ **Fares that grow in real terms with agreed formulae**
- ❑ **Sensible network growth & design for low opex**
- ❑ Continuous growth in **labour** productivity & energy efficiency
- ❑ Contracts + correct level of **autonomy** from government
- ❑ A sophisticated & whole life approach to **asset management**
- ❑ Sufficient income for a long-term **re-investment** rate of > 40% of opex (metros) that allows for enhancement as well as replacement
- ❑ **Communication with and understanding of these facts with Government**



Source: BSI

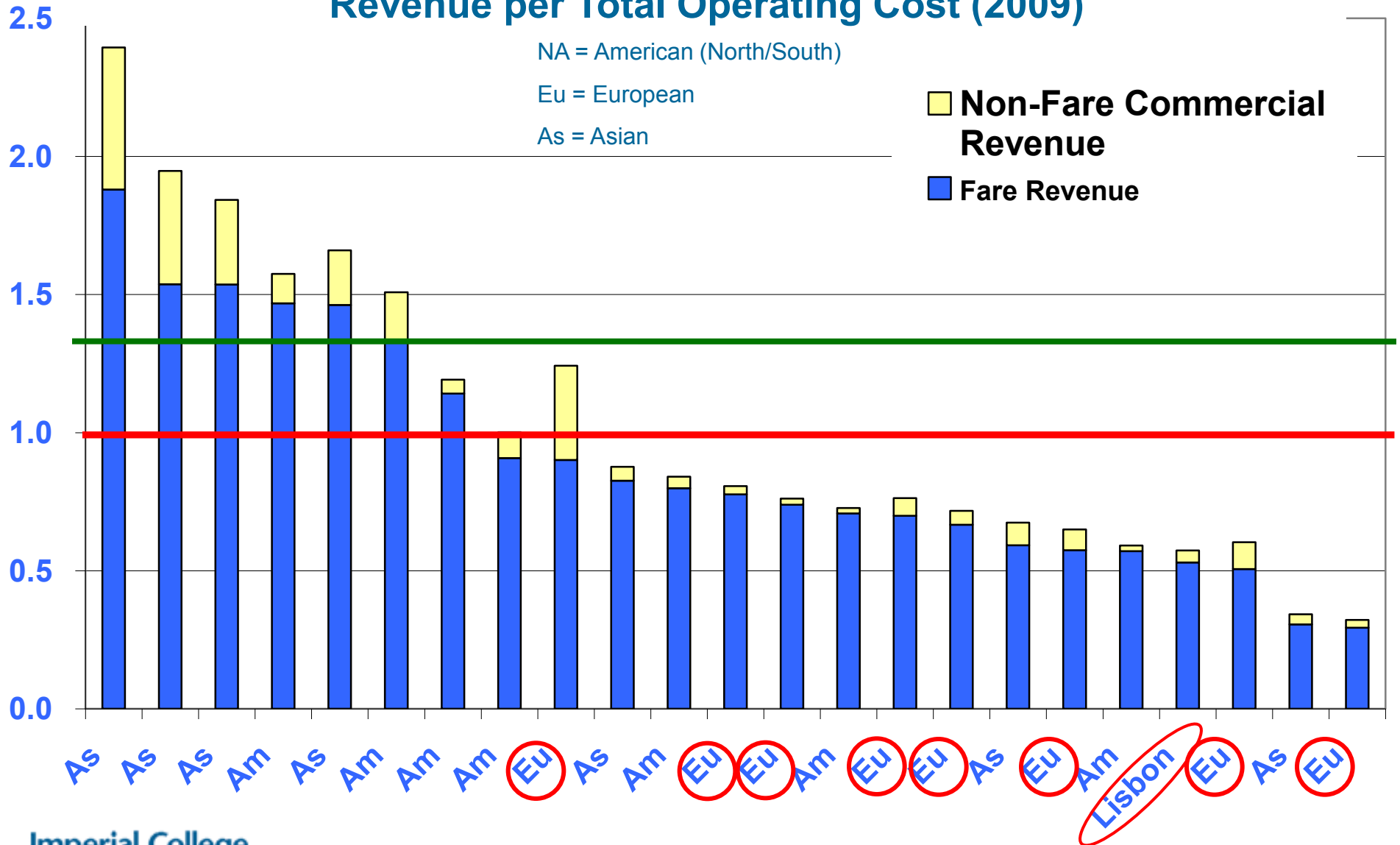
More metros are „profitable“ than are commonly reported

Revenue per Total Operating Cost (2009)



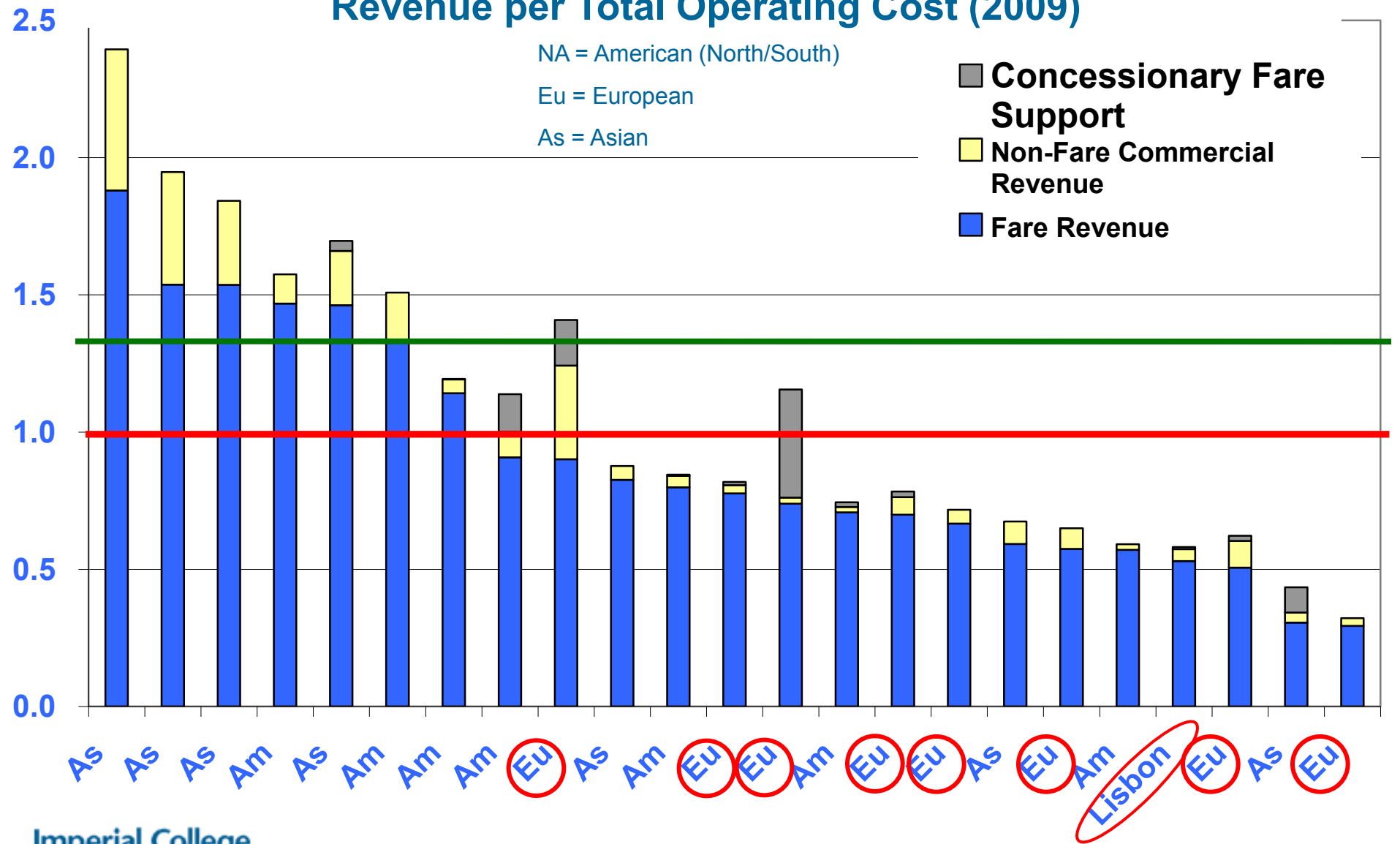
Additional Income from Non-Fare Commercial Revenue

Revenue per Total Operating Cost (2009)



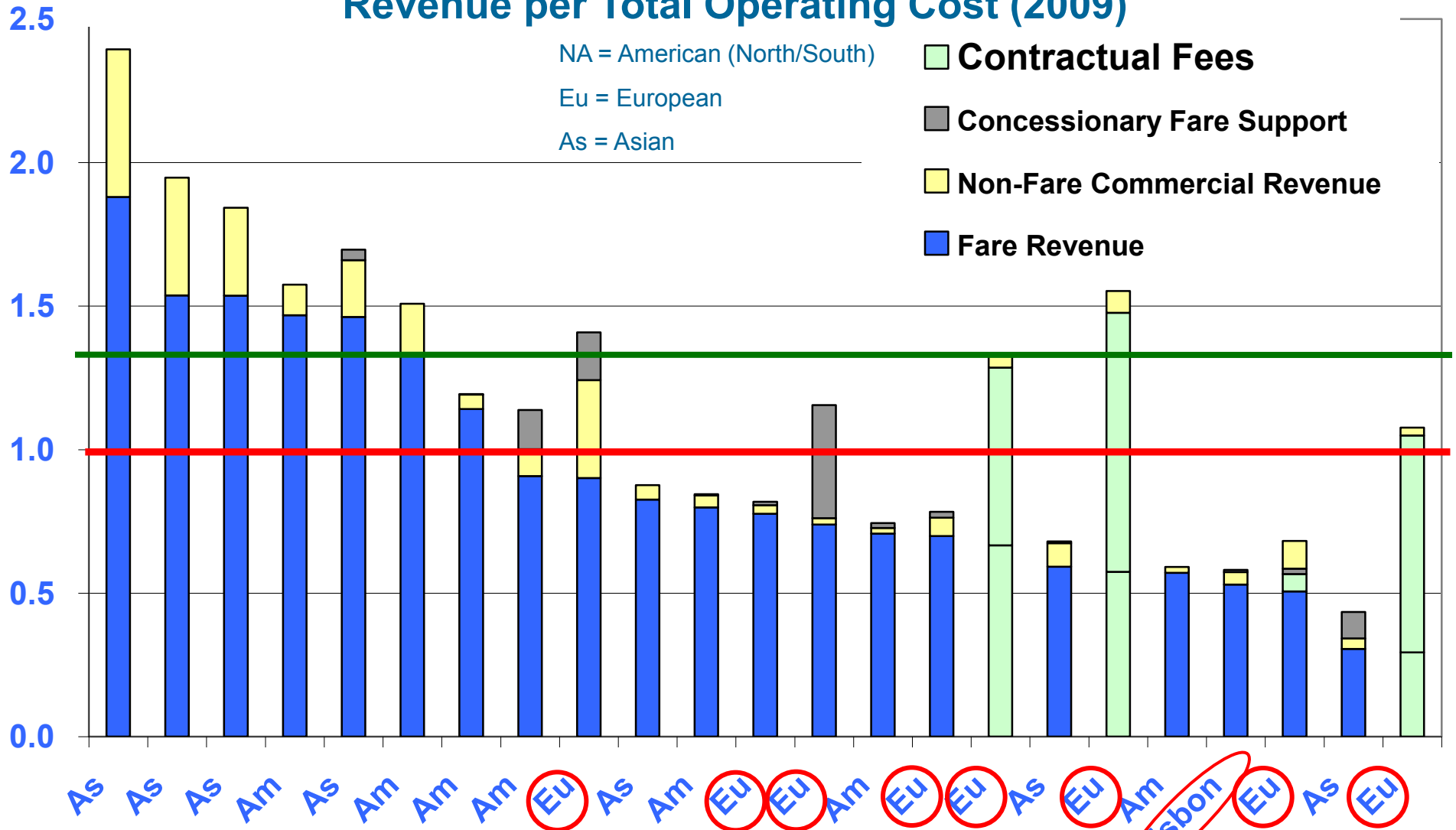
+ Concessionary Fare Support: Governments sometimes compensate for lower fares for the elderly, children and poor

Revenue per Total Operating Cost (2009)



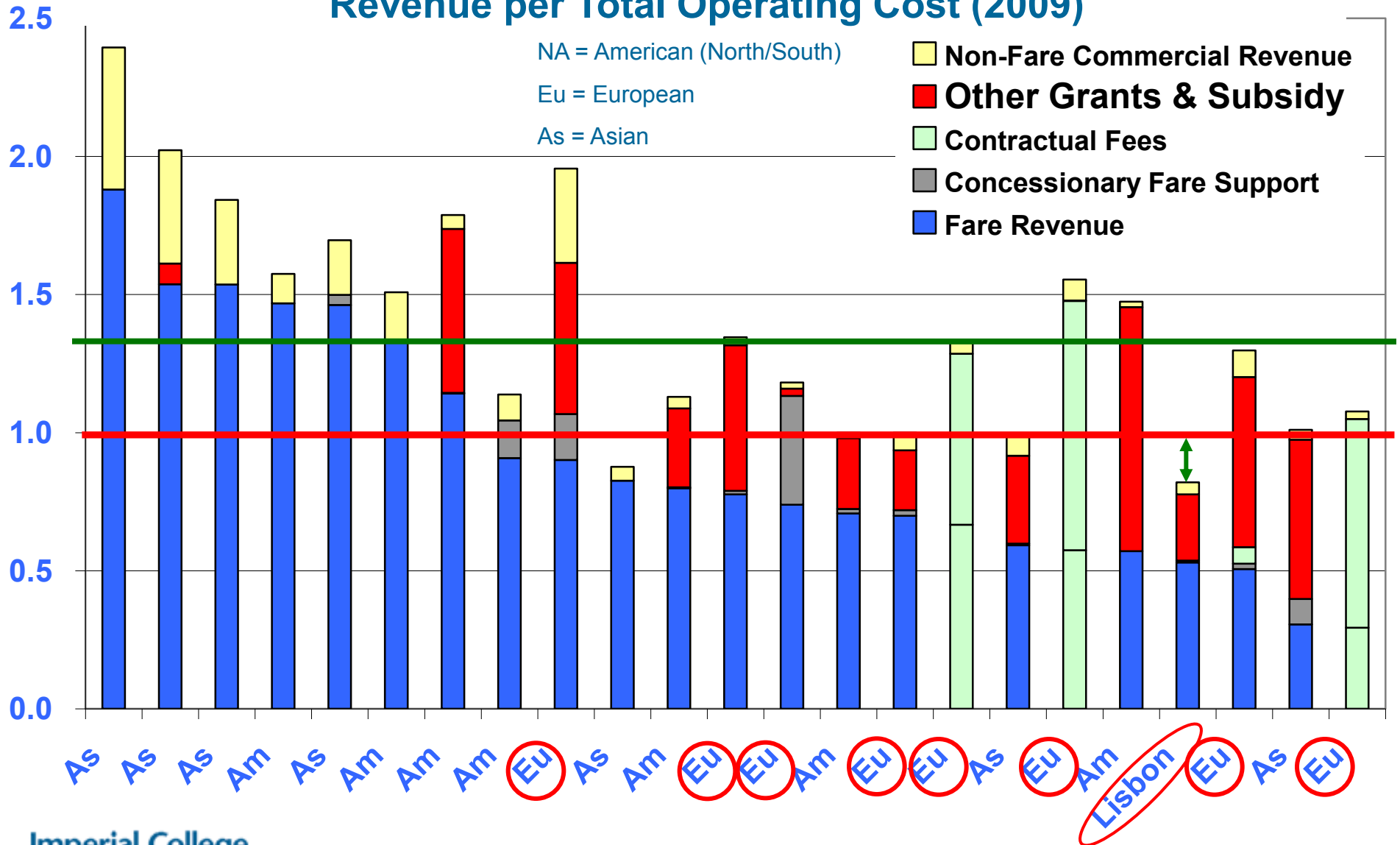
Operating contracts in some European metros to remove subsidy uncertainty

Revenue per Total Operating Cost (2009)



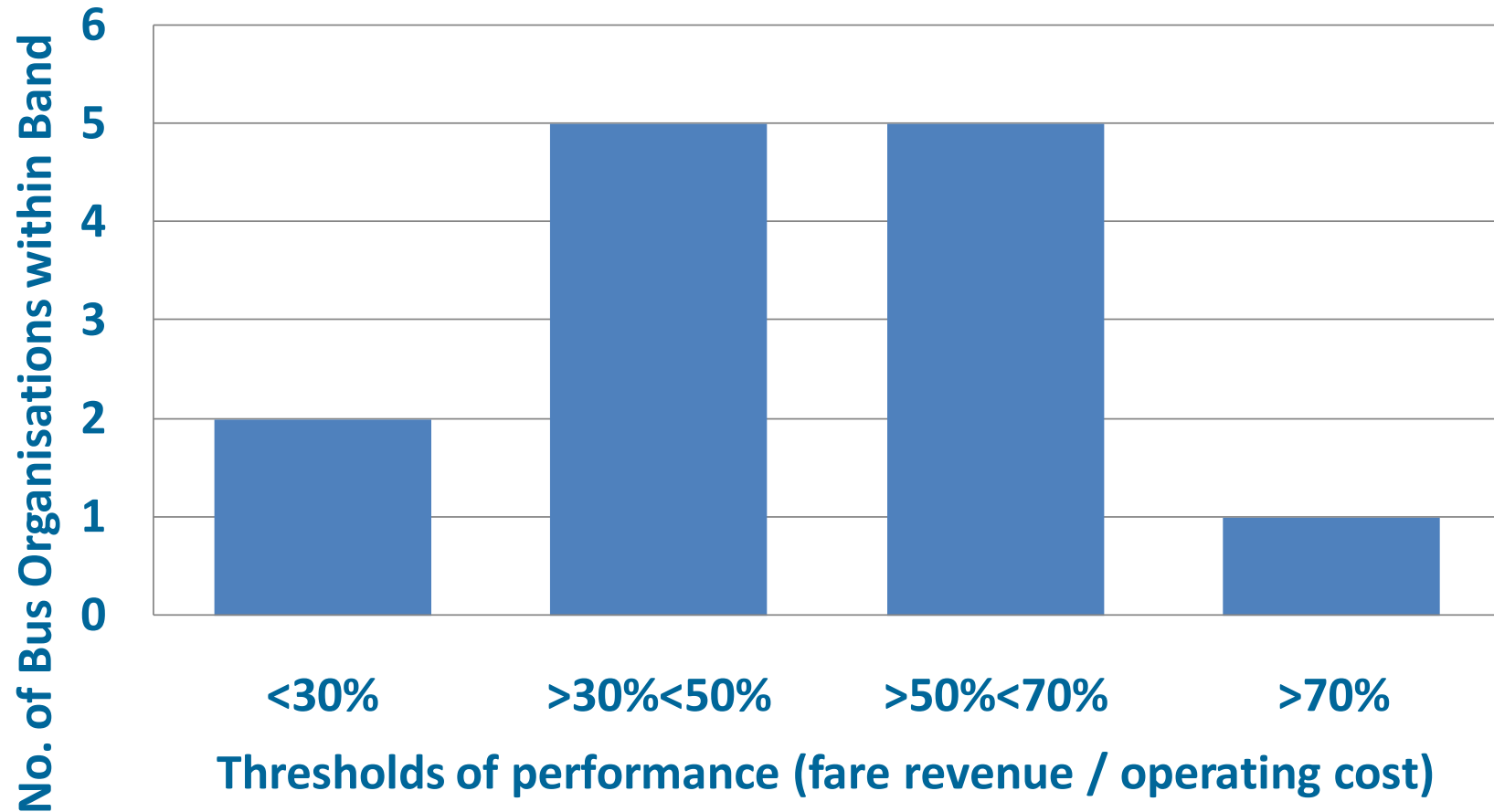
Grants and subsidies (or debt) to meet the funding gap in many European and North American metros

Revenue per Total Operating Cost (2009)



Urban bus operators generally require higher levels of public support

Bus Benchmarking Group: Distribution of Performance: Fare Revenue / Operating Cost

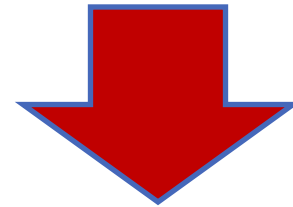


3. The importance of fares policy in funding

Metro fares and funding policy: Common problems also experienced by bus and rail sectors

Fares charged are politically sensitive and directly affect the burden on taxpayers

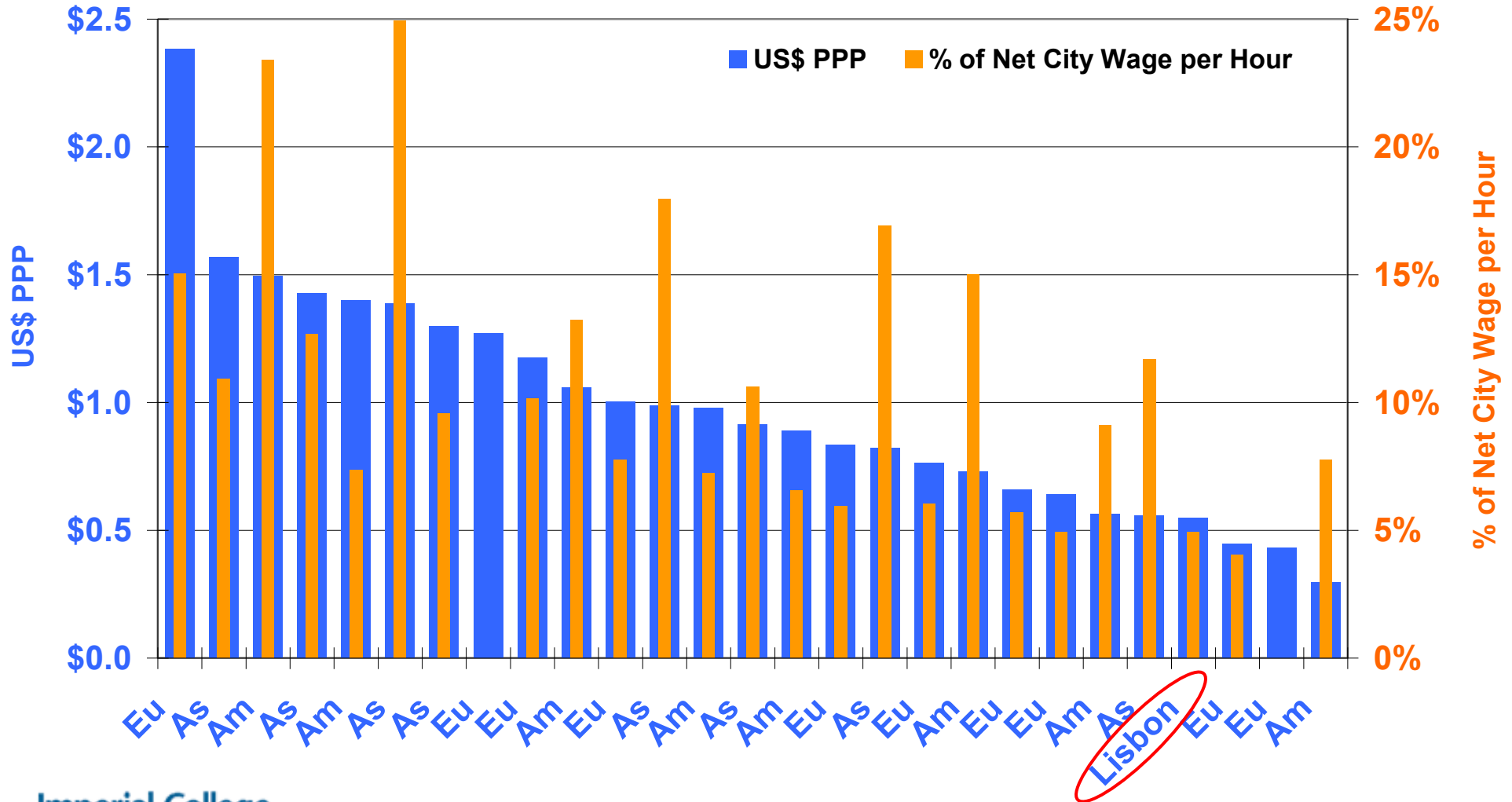
- Government usually sets fares but inconsistently / often no long view
- Fares are falling in real terms for **60%*** of metros
- Unit labour & energy costs are rising faster than inflation..
- but labour productivity is falling for most metros (**75%*** Eu N. America)
- Cost recovery from fare income falling for **70%*** of metros, but subsidy is inherently unstable



Poor fares policy has had a corrosive effect on metro funding and long term sustainability

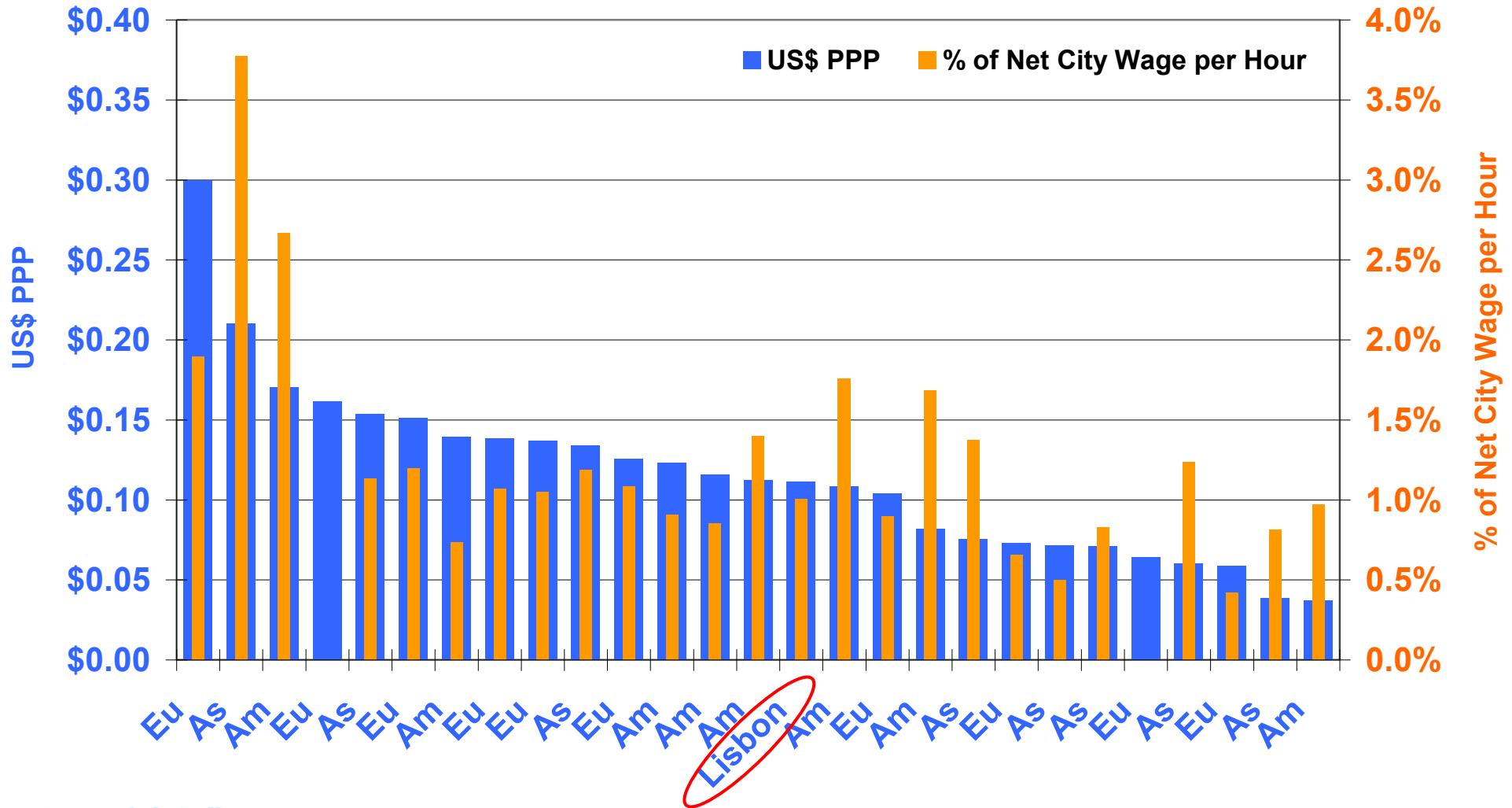
Even adjusting for affordability, metro fares vary by a factor of 10. ML average fare is particularly low

Fare Revenue per Passenger Journey (2009)
(2009 US\$ PPP and as a % of Net City Wage per Hour)



ML metro fares per passenger kilometre are average, adjusting for affordability

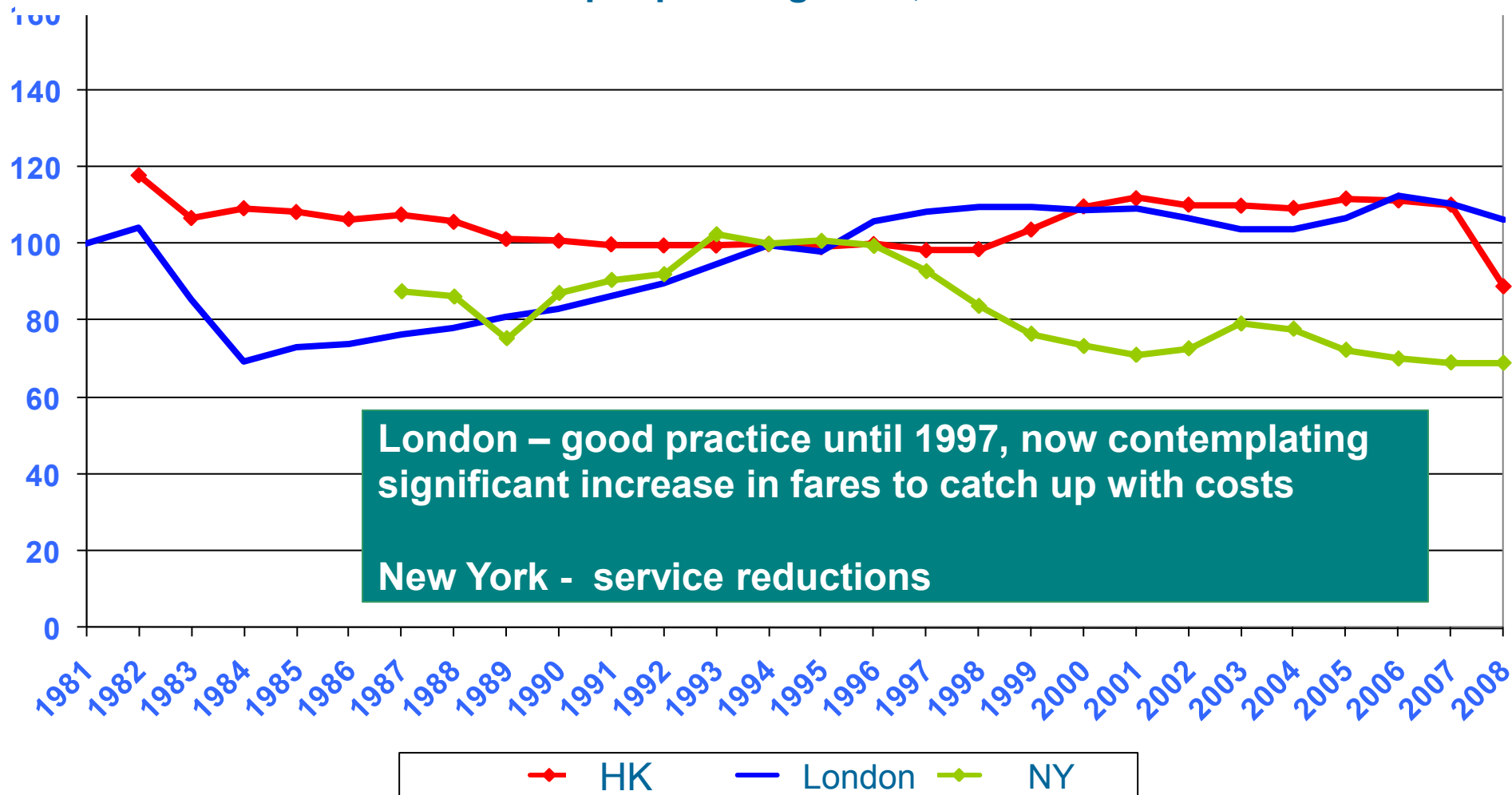
Fare Revenue per Passenger Kilometre (2009)
(2009 US\$ PPP and as a % of Net City Wage per Hour)



A decline in real fares in some cities has contributed to budget crises

Average real fares (adjusted for inflation) in 3 cities

Fare revenue per passenger km, index 1994=100



Recent Academic Research using all CoMET and Nova data: Graham, Crotte, Anderson, 2009

Demand with respect to..	Elasticity
Income	+0.18
Fares	-0.33
Service Capacity (Frequency, train capacity)	0.51

- Conclusion: **Quality of service improvements, rather than fare reductions, may be more effective in increasing metro patronage**
- **This agrees with any strategy of increasing fares in line with wages to fund service frequency / capacity improvements on the existing network**



Basis of good practice price regulation employed in rail, water, gas, electricity, but rarely in urban transport

- Balances the interests of government, taxpayers, consumers, the industry and shareholders
- Prevents price increases which are unaffordable to the public
- Incentivises efficiency and productivity
- Recognises the need to invest in capacity and quality
- Fairly reflects changing price of inputs (notably labour, energy)
- Automatic annual adjustments with an appropriate review period (5 years)
- Free from political intervention between review periods

Good Practice Fare Formulae

$$\text{Annual } \Delta \text{ Fare Adjustment} = \Delta [\text{Cost Index}] - P + K$$

Where:

[Cost Index] is mainly a function of unit price of wages and energy

P = Productivity Factor: Recognises the need/ability to progressively reduce inputs over time through technology or other means

K provides a mechanism to invest in enhancements and capacity

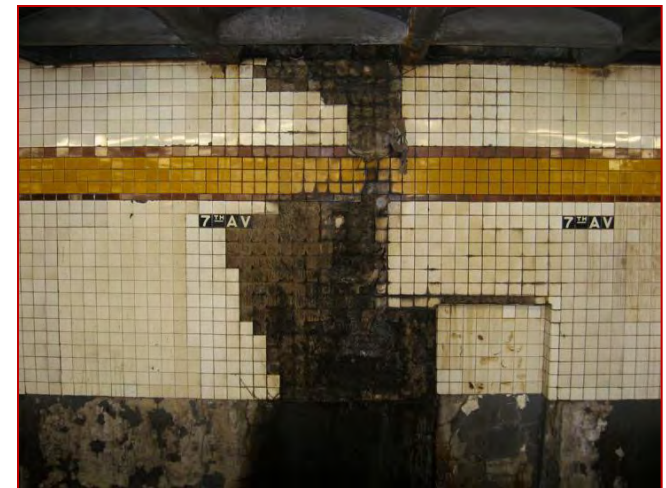
$$\text{Overall fare adjustment rate} = 0.5 * \Delta \text{CCPI} + 0.5 * \Delta \text{Wage Index} - \text{Productivity Factor,}$$



No “+K” in Hong Kong but otherwise a good practice formula that allows the metro to be a good asset steward

Poor fare and funding regulation reduces quality

- If prices / funding are unstable, without a contract, formula or annual adjustment:
 - Management can only manage the short term (many European metros)
 - Asset management impossible, reduces service quality (America)



4 – Public Private Partnerships and other mechanisms

Public Private Partnerships – Key Principles and Facts

- ❑ Commercial revenues **will not be** sufficient to wholly pay for urban rail construction costs (with one exception – HK)
- ❑ At best, commercial revenues pay for opex + renewals where fares and/or densities are high
- ❑ **Purpose of PPP:** to secure private sector innovation / efficiency / to raise financing to allow implementation **today**
- ❑ **PPP is a financing mechanism, not free funding**–the fare / tax payer ultimately pays, **tomorrow** and with interest!
- ❑ The heart of PPP is a **contract that is enforceable, clearly allocates and transfers risks**, provides **incentives to perform**, and encourages **long-term decision-making** (often poorly achieved), allows for flexible labour



Public Private Partnerships in Existing Metros - Experience

- **Private operators** – success in delivering customer facing railways / continuous improvement particularly where there is upside revenue risk
- **PPP for long term asset maintenance and renewal** in UK has been unsuccessful
- **Renewals and maintenance:** railways have benefited from a mix of outsourced and in-house contracts as a useful internal benchmark
- **PPPs – stories of both success and disaster** – private sector will not automatically deliver higher performance at a reasonable cost
- There are **examples of public sector bus operators and metros delivering strong efficiency** growth and high levels of labour productivity



Hypothecated Taxation Sources

- The gasoline tax in the Toronto, Montreal and New York is dedicated to the funding of transportation infrastructure
- Toronto & New York: Property Tax supports operating and capital subsidies
- A dedicated employment tax, such as the *Versement Transport* in Paris has been successful in securing long term revenue
- London – success with congestion charging



5. Conclusions

Conclusions

- Public transport funding regimes **and the fares policies that underpin it** will dictate long term economic sustainability and quality
- There are many examples of long term decline in quality of service due to falling real fares and insecure funding regimes



Conclusions

- **Required funding for sustainable reinvestment in railways far exceeds assumed depreciation**
- **Revenue from advertising, retail etc. is no substitute for poor fares policy**
- **Fares need to rise above inflation** for sustainable funding – adjustment formulae are good practice
- **Hypothecation** – success in Paris, London, Canada
- **PPP is a financing not a funding mechanism** and requires good enforceable contracts with risk transfer to be successful
- **Contracts**, incentives, regulation determine whether the public or private sectors can deliver efficiency

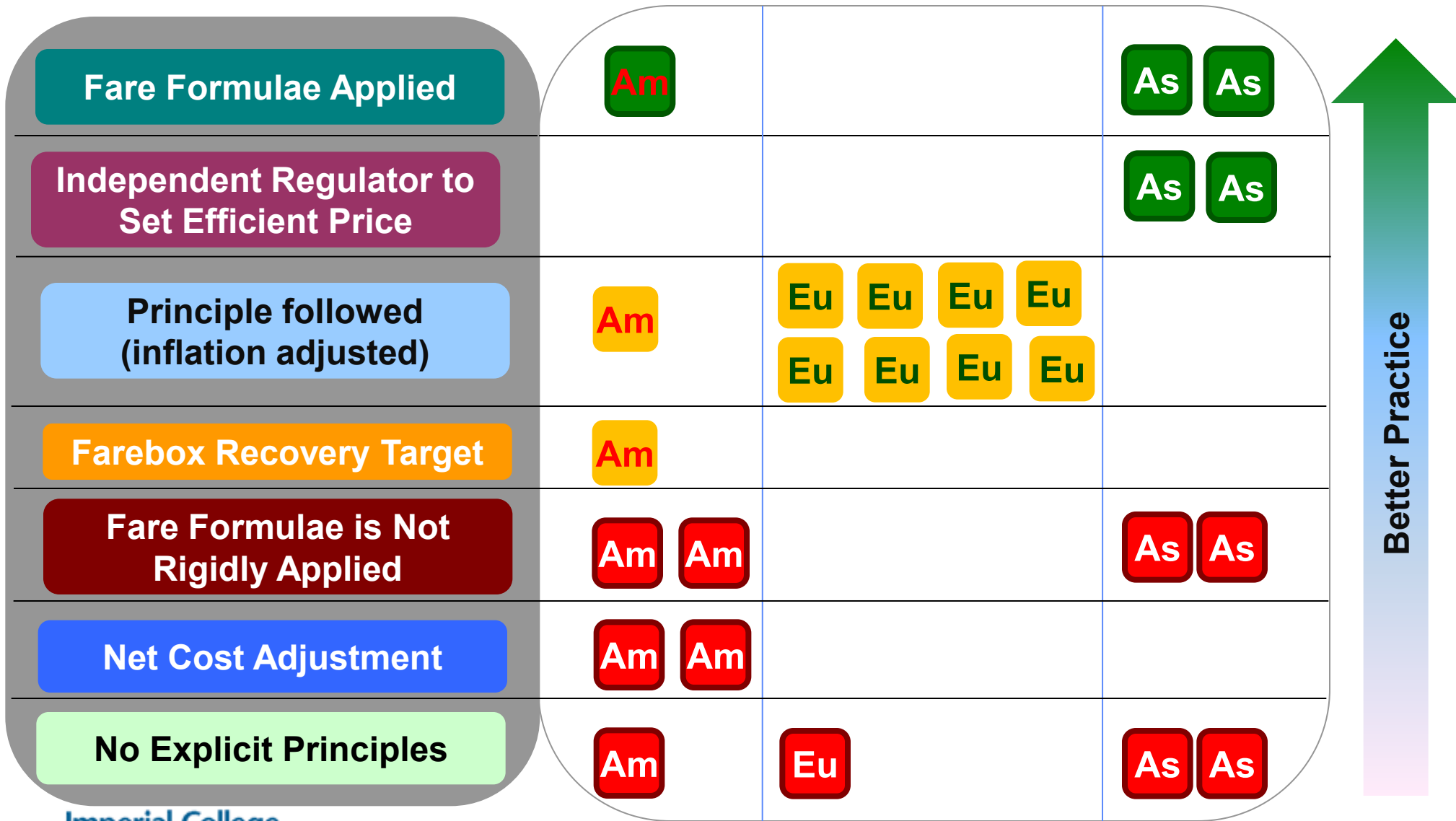


Thank you for your attention

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Extra Slides

Methods for fare adjustments and regulation



CoMET and Nova are metro benchmarking groups

CoMET and Nova Objectives

- To share knowledge and identify best practices in a confidential environment
- To build systems of measures for use by management and to establish metro best practice
- To provide comparative information both for the metro board and the government
- To prioritise areas for improvement



Community of Metros

CoMET

Less than 500 million passengers p.a.

More than 500 million passengers p.a.

International Bus Benchmarking Group: 13 urban bus operators share data and ideas within a confidentiality agreement



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If PPPs - essential that government objectives are clear

- Reduce unit costs?
- Improve service quality?
- Put pressure on productivity and terms & conditions of existing workforce?
- Whole-life costing?
- Innovation?
- Promoting domestic supply industry?
- **Avoid up-front public borrowing?**
- **Hide public expenditure?**
- **Fetter freedom of future politicians?**