

Global metro challenges and the strategies to tackle them

Railway & Transport Strategy Centre at
Imperial College London

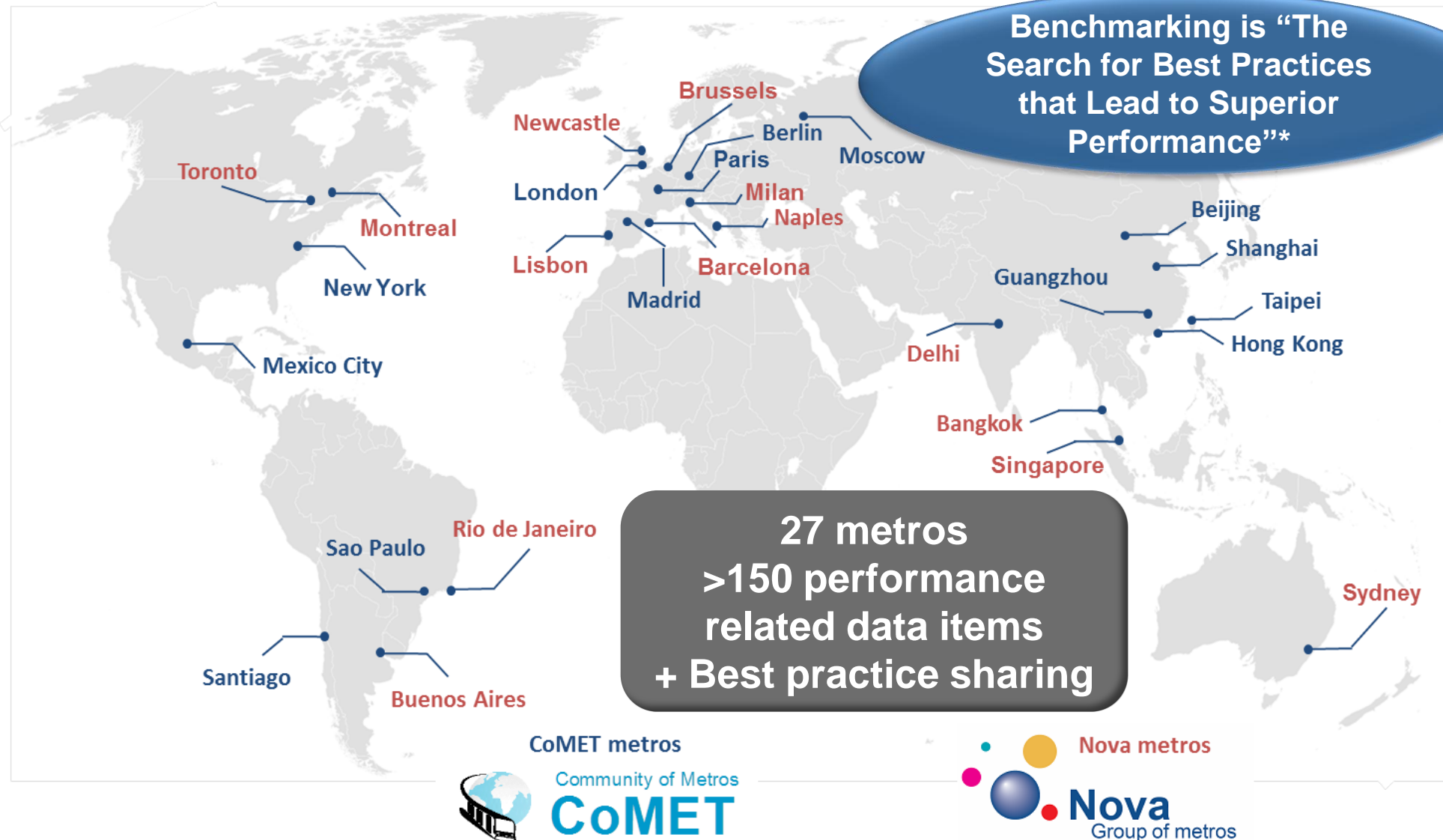
Richard Anderson, Managing Director

Alexander Barron, Nick Findlay, Dr. Roger Allport

MetroRail 2012



RTSC : independent, comparable benchmarking for the CoMET and Nova groups since 1994 , with >\$500m benefits achieved



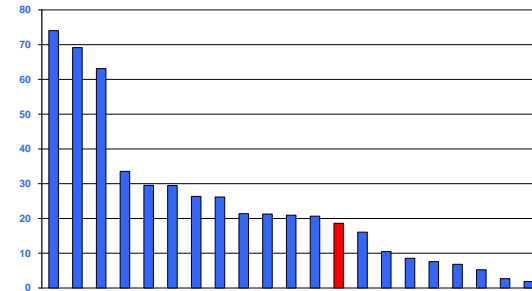
Benchmarking facilitates improvement by measuring performance and sharing rich information confidentially

KPI system - to compare performance and show where to look for best practices

Case Studies - In-depth research on topics of common interest, to identify best practices, often with **Expert Workshops**

Website with Online Forum – metros consult to each other.

2 meetings per annum, attended by senior directors



Rolling Stock Reliability

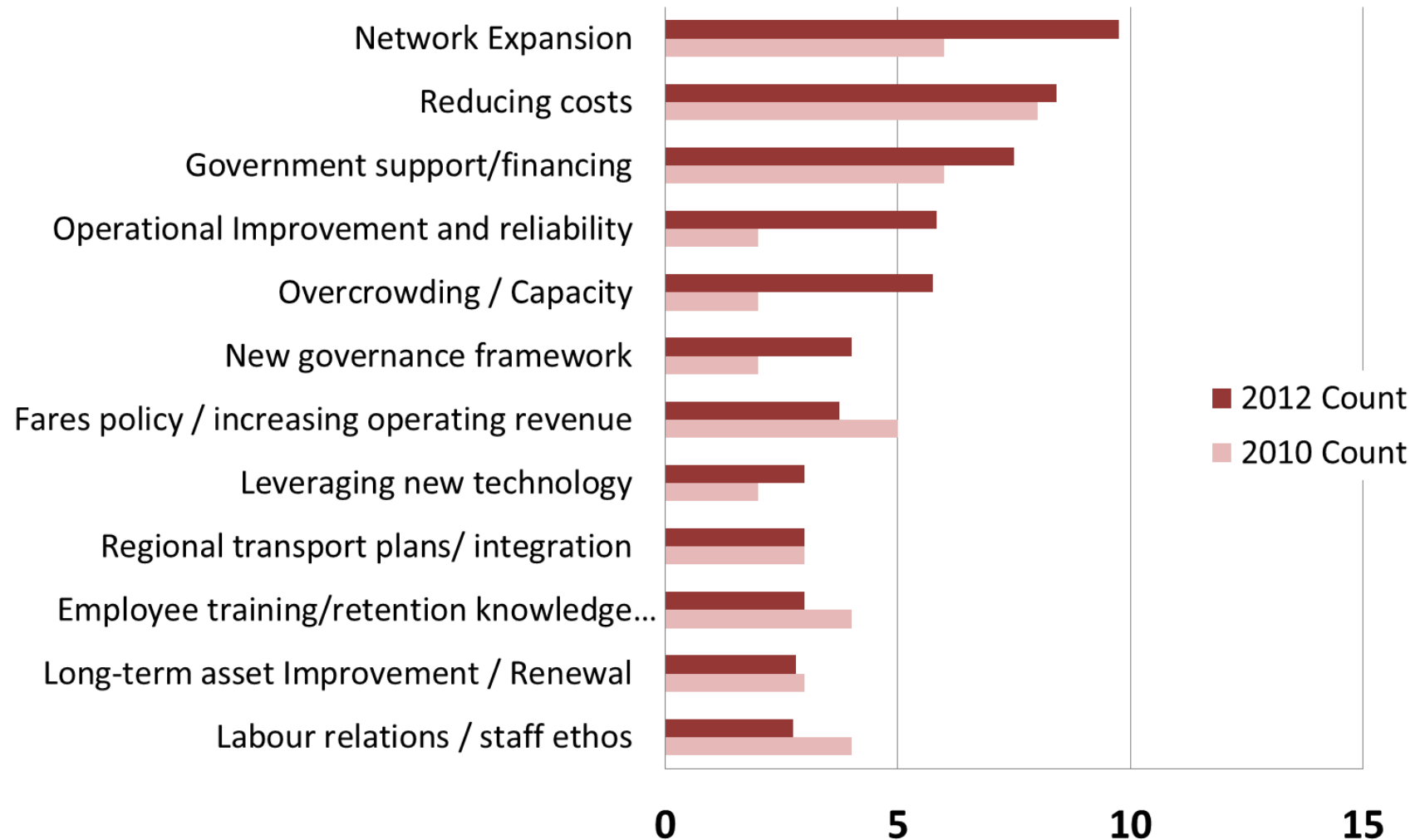
Station Management

Signalling Upgrades



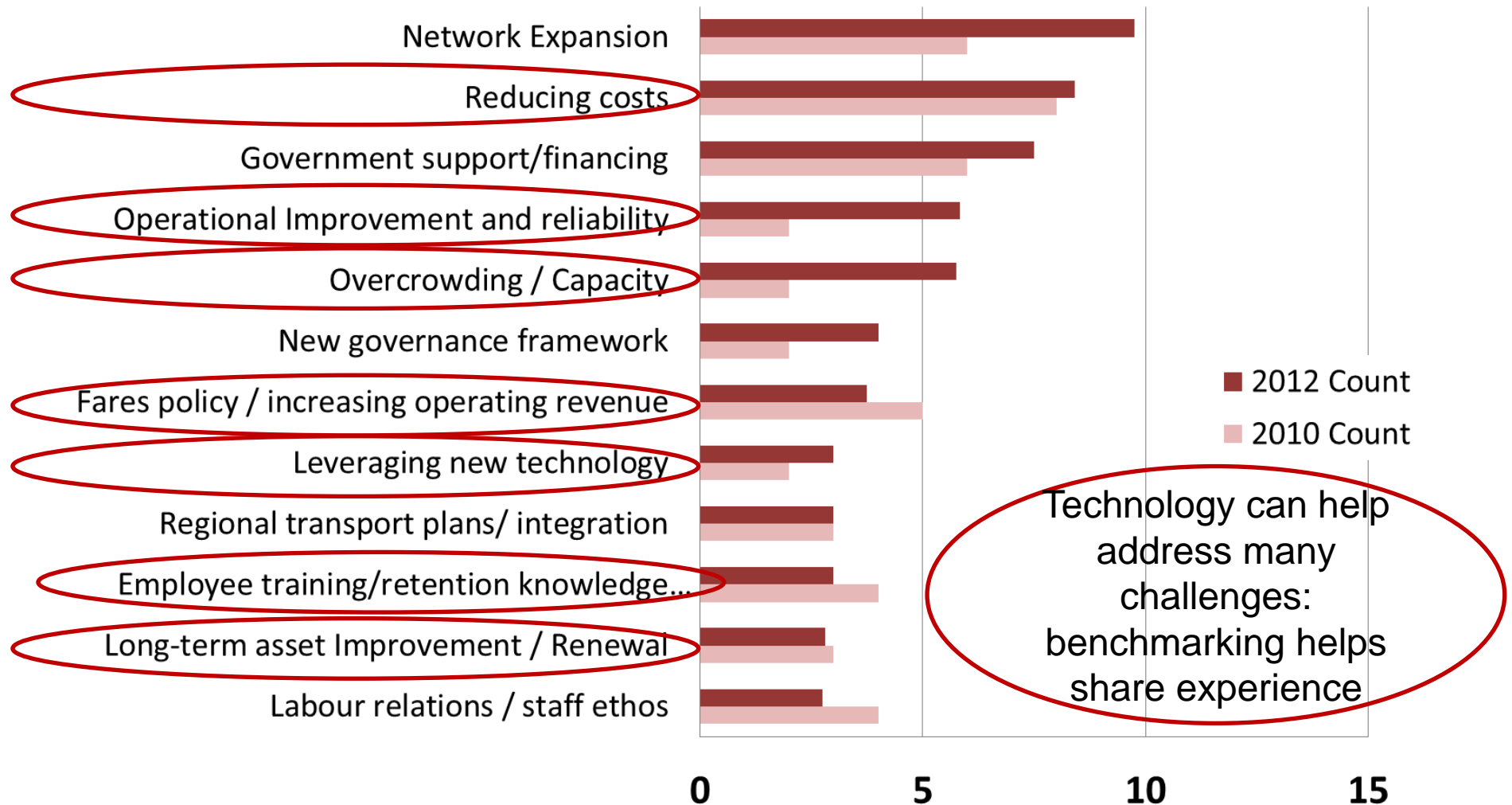
Survey of CoMET and Nova metros' strategic and technical / tactical challenges

Number of Metros with Top 3 Strategic Challenge



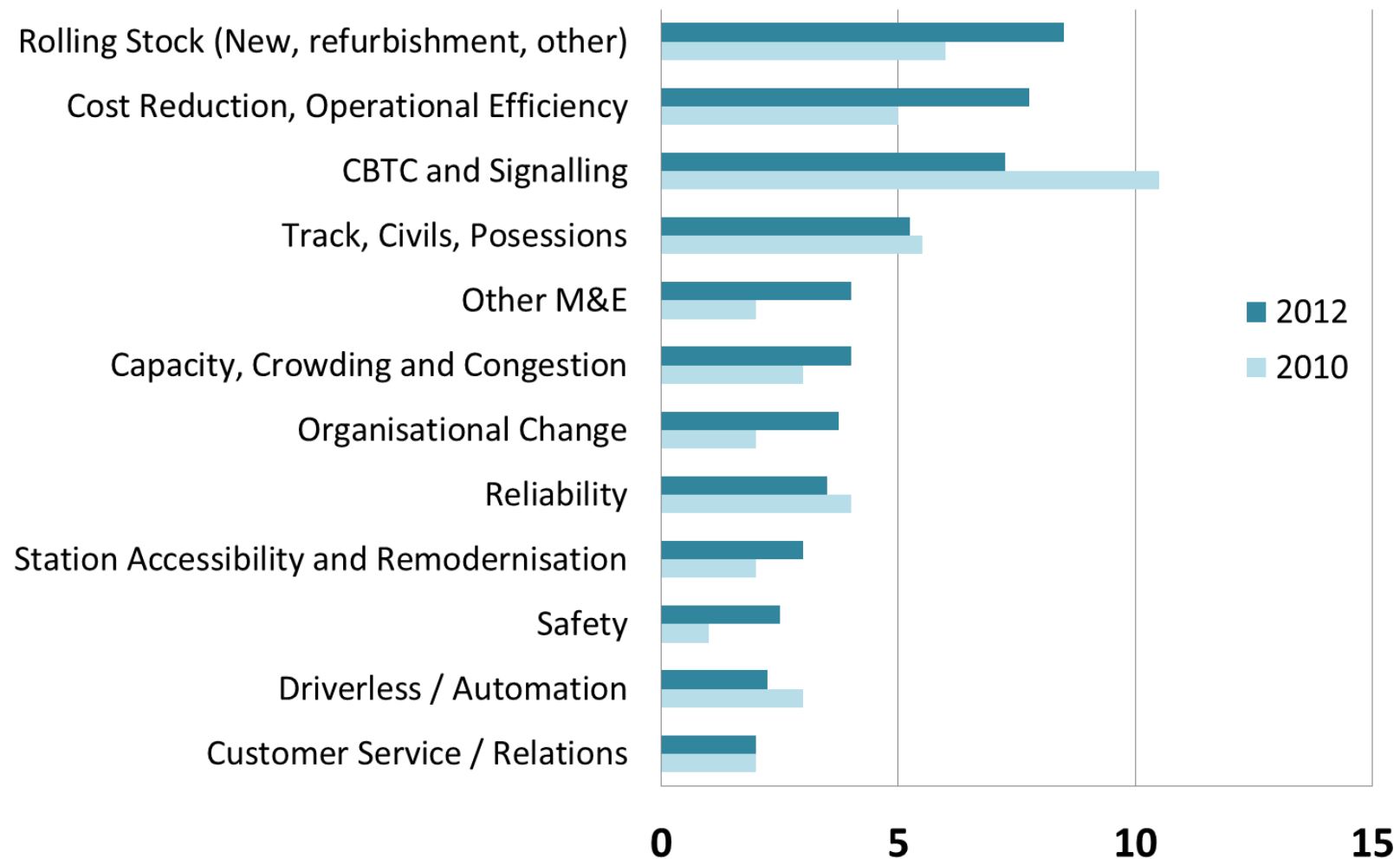
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Benchmarking is becoming essential to address strategic and technical challenges

Metros with Top 3 Technical / Tactical Challenge



When economies were strong, a cocktail of poor fares policy and rising costs set the scene for many of today's funding crises

Experience of CoMET and Nova metros, 2004-2009

**Real
Fares
Falling
60%
Metros**

**Unit
Labour
& Energy
Costs Up
65%**

**Labour
Prod.
Falling
75%
Metros***

**Demand
up for
89% of
metros**

**Cost Recovery from
Fare Income Falling
70% Metros**

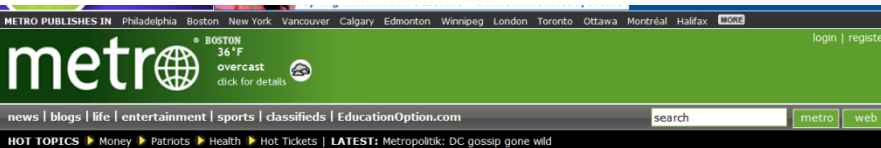
Last 2 years: Pax growth for 77% of CoMET & Nova metros

Today : sharp corrections in fares to make up for lost ground
Future: Greater use of fare formulae, as in Hong Kong



Metropolitano de Lisboa

**50% fare
increase on 1st
Feb 2012**



T fare increase, service reductions outlined

STEVE ANNEAR/METRO
 BOSTON
 Published: January 03, 2012 9:22 p.m.
 Last modified: January 03, 2012 9:27 p.m.

(4)
 Print article
 Text size

From potential fare increases to recommended Commuter Rail cuts and slashing ferry services, proposals delivered by MBTA officials yesterday to fix its looming debt could hit riders hard in all areas.

Two scenarios presented to the MBTA Board's finance subcommittee each contained significant fare spikes and drops in bus services.

Both proposals also included the option of eliminating the Green Line's



NICOLAUS CZARNECKI/METRO

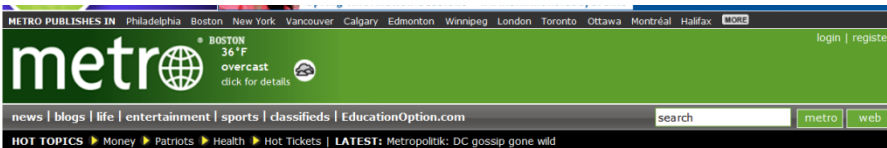
Under two MBTA proposals outlined yesterday, riders could be paying more to get to their destinations. The MBTA will hold meetings in the coming weeks for passengers to voice their thoughts.

Boston: 35% - 43% proposed fare increase

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



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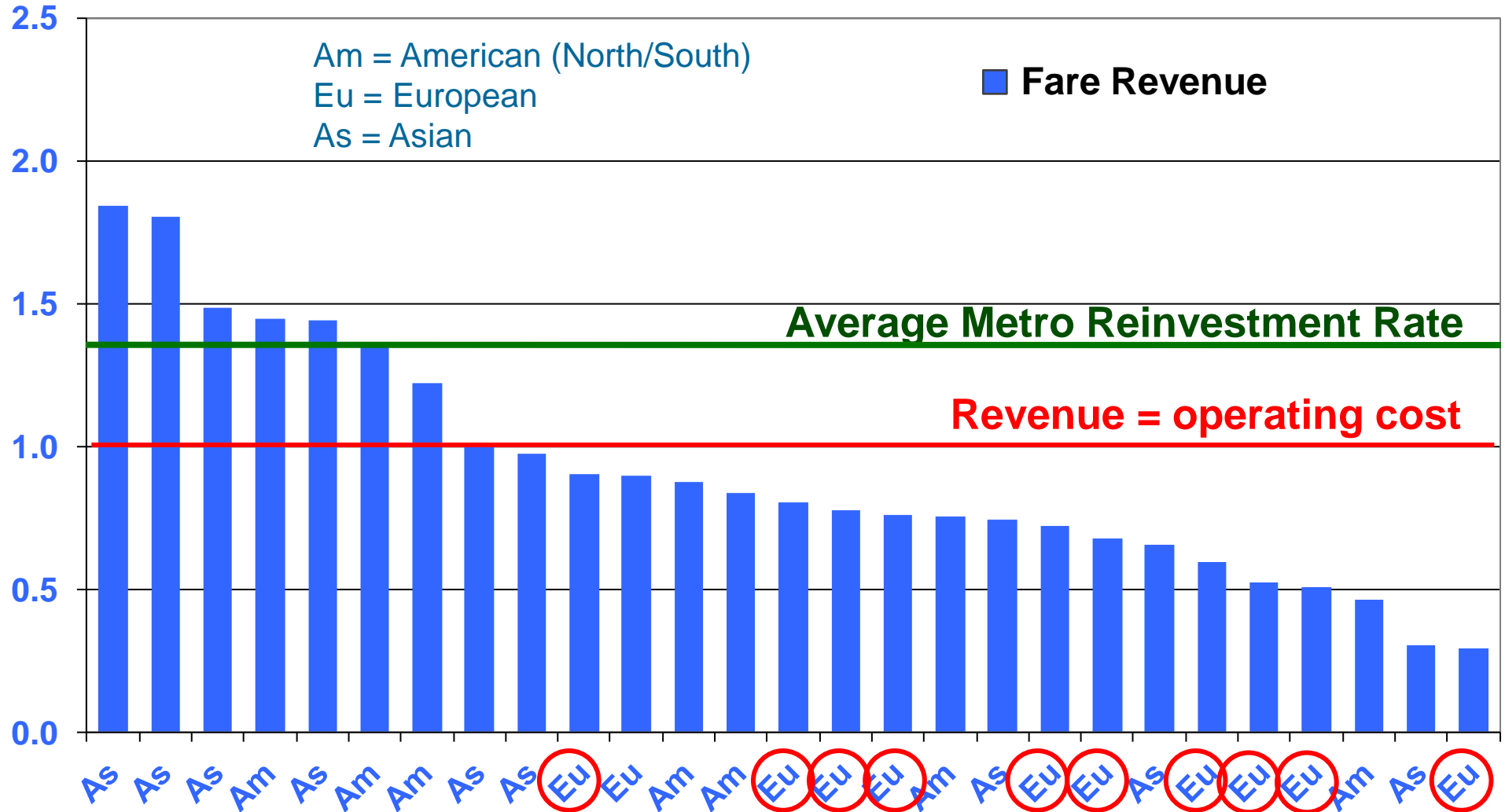
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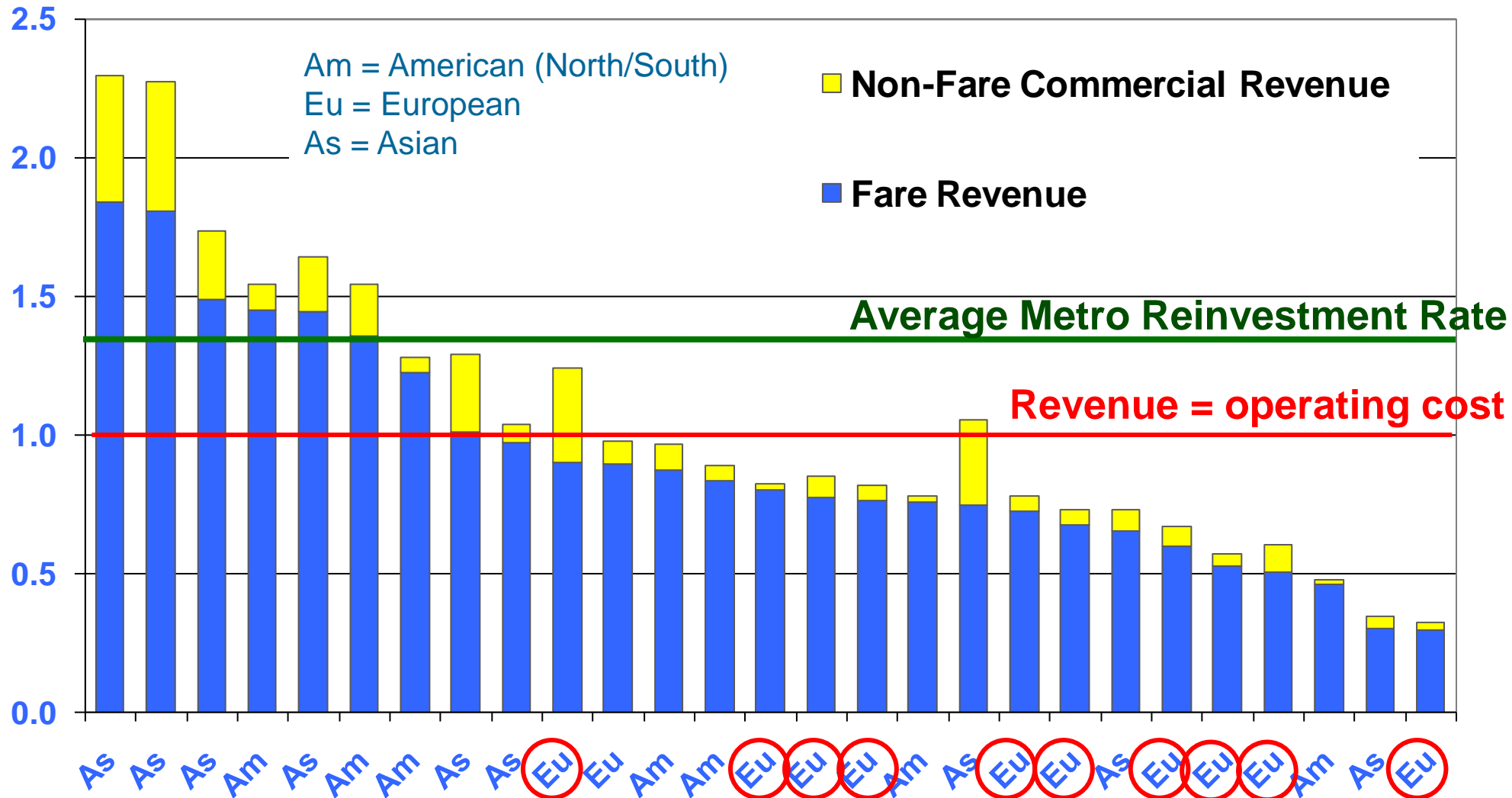
On average, operating costs +40% has been spent on reinvestment But fares revenue barely covers operating costs in Europe

Revenue per Total Operating Cost (2010)



A key strategy to fill the funding gap has been to enhance non-fare commercial revenues but this rarely fills the funding gap

Revenue per Total Operating Cost (2010)



Metro experience: reducing metro service operations costs

CoMET and Nova Experience: decreasing labour costs without compromising service quality and safety

Flexible Working



Better Deployment
of Staff



Technology



Examples of more flexible labour

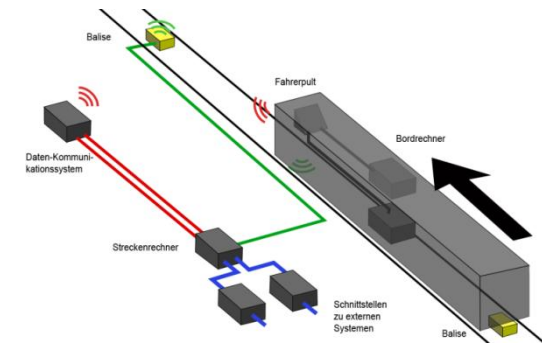
- 50/50 productivity gain shares
- Contracting out of station staff (Hong Kong)
- New contract deals for new drivers (Berlin)
- Part time staff in peak period (Santiago)
- Split Shifts (Canada)
- Multi-skilling: Drivers/ station staff (Barcelona)

Benchmarking Impact: 2 Asian metros increased driver productivity by 8% and 10 % using best practice case studies

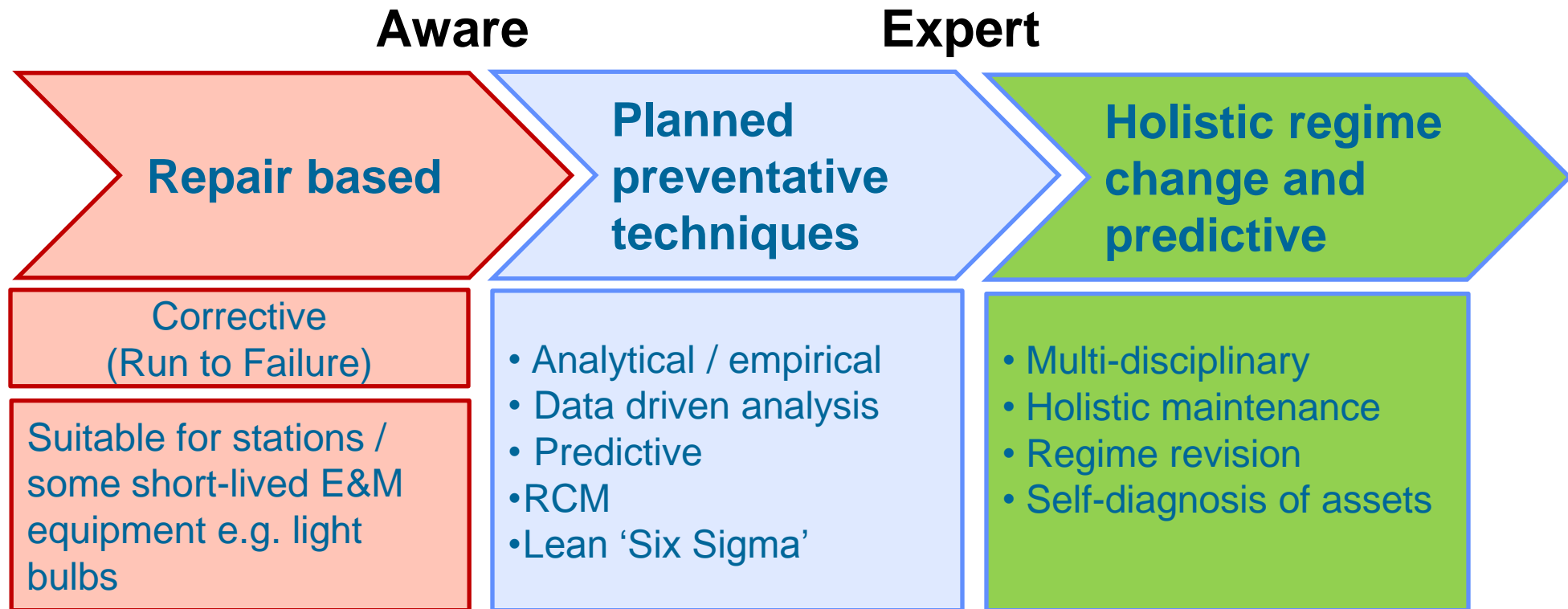


Examples of technology to improve productivity / effectiveness

- Unattended Train Operation (UTO) (Paris Line 1 & 14)
- Attended driverless train operation (Taipei)
- Automatic train turnaround (Madrid)
- Ticketing: station staff in more customer facing roles / dispatch
- CBTC: Potential for much higher energy efficiency / regeneration
- Automatic Train Operation (ATO) – higher reliability, less spare drivers
- Remote signing on for train drivers (Berlin)



Maintenance Management – Best Practice Examples from CoMET

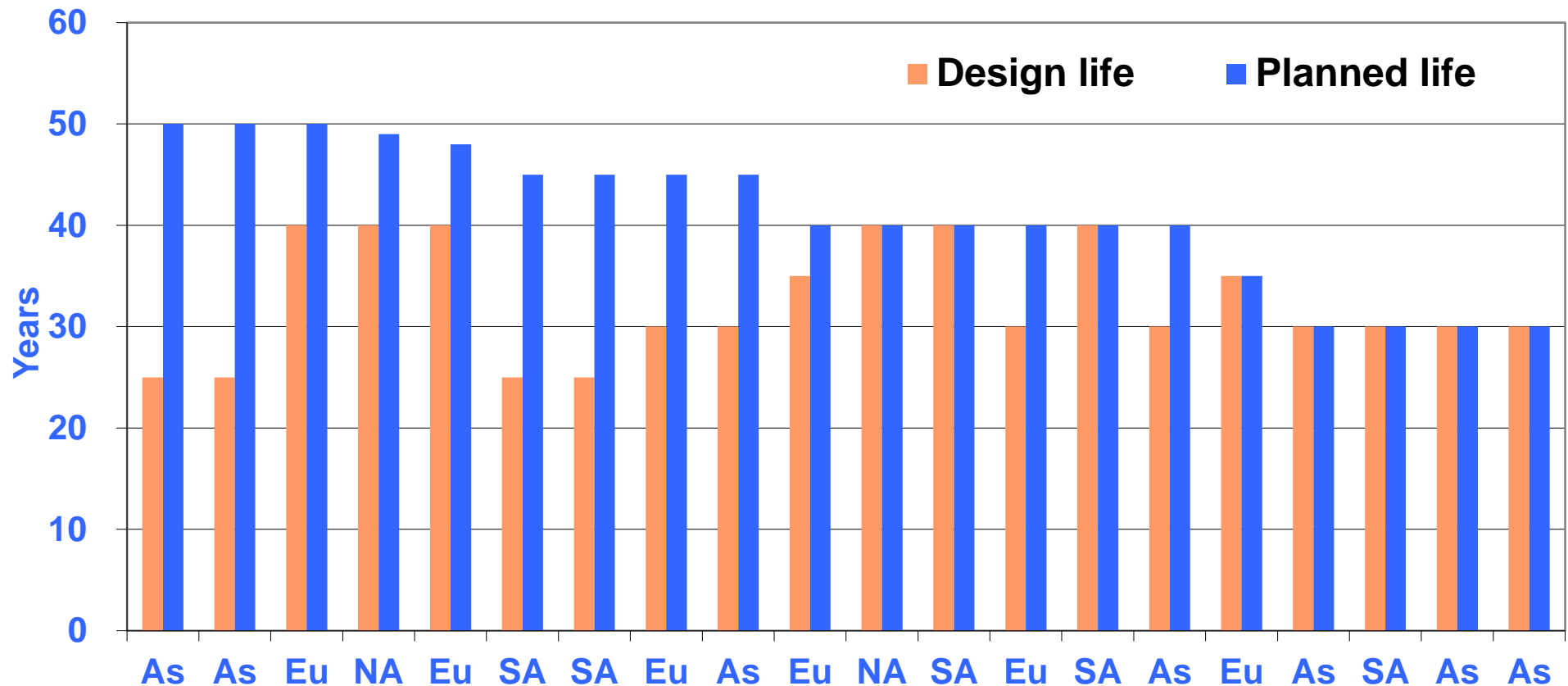


Benchmarking: 12% reduction in maintenance costs since 2007 for CoMET metros with Reliability Centred Maintenance

Benchmarking Impact: London: £100m saving in escalator maintenance costs (over 20 years): supported by CoMET

Metros with and without Capex funding challenges are finding rolling stock will last longer than originally planned

Design and Planned Life for Current Rolling Stock Fleets



Eu = European Metro

NA = North American Metro

SA= South American Metro

As = Asian Metro

Line-level econometrics benchmarking of reliability shows the impact of technology on total line MDBF

Parameter	% Change Delay incidents
+1 year rolling stock age	+ 0.7-2%
+1 peak tph	+ 3.5%
+1 tph practical capacity	- 5%
Manual > ATO	- 26%
CBTC / Driverless / UTO: Future planned analysis	



Key high-level strategies learned in CoMET and Nova

Supported by government, authorities and stakeholders, the metro needs to be:

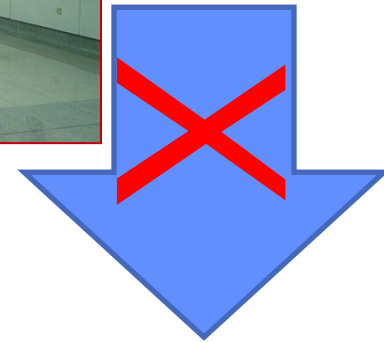
- ❑ **Flexible**, with an appropriate degree of autonomy
- ❑ A **continuous improvement** culture
- ❑ Delivering increasing **labour and energy efficiency**
- ❑ Ready to address **strategic risks & opportunities**
- ❑ **Customer facing, safe**, meeting growing expectations
- ❑ **Analytical** e.g. approach to **asset management**
- ❑ Supported by **sufficient, dependable funding**
- ❑ **Open to new ideas**, awareness of world practices



Source: BSI

Conclusions

- **Technology** plays a key role in addressing metro challenges
- **Proactive engagement** between metro and government needed to achieve **sustainability** for the long term
- **Benchmarking** is becoming an **essential and highly cost effective tool** for metro managers to meet their increasing and complex challenges



Thank you for your attention

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For its members, CoMET and Nova Benchmarking is central to proactive, effective continuous improvement



*Camp

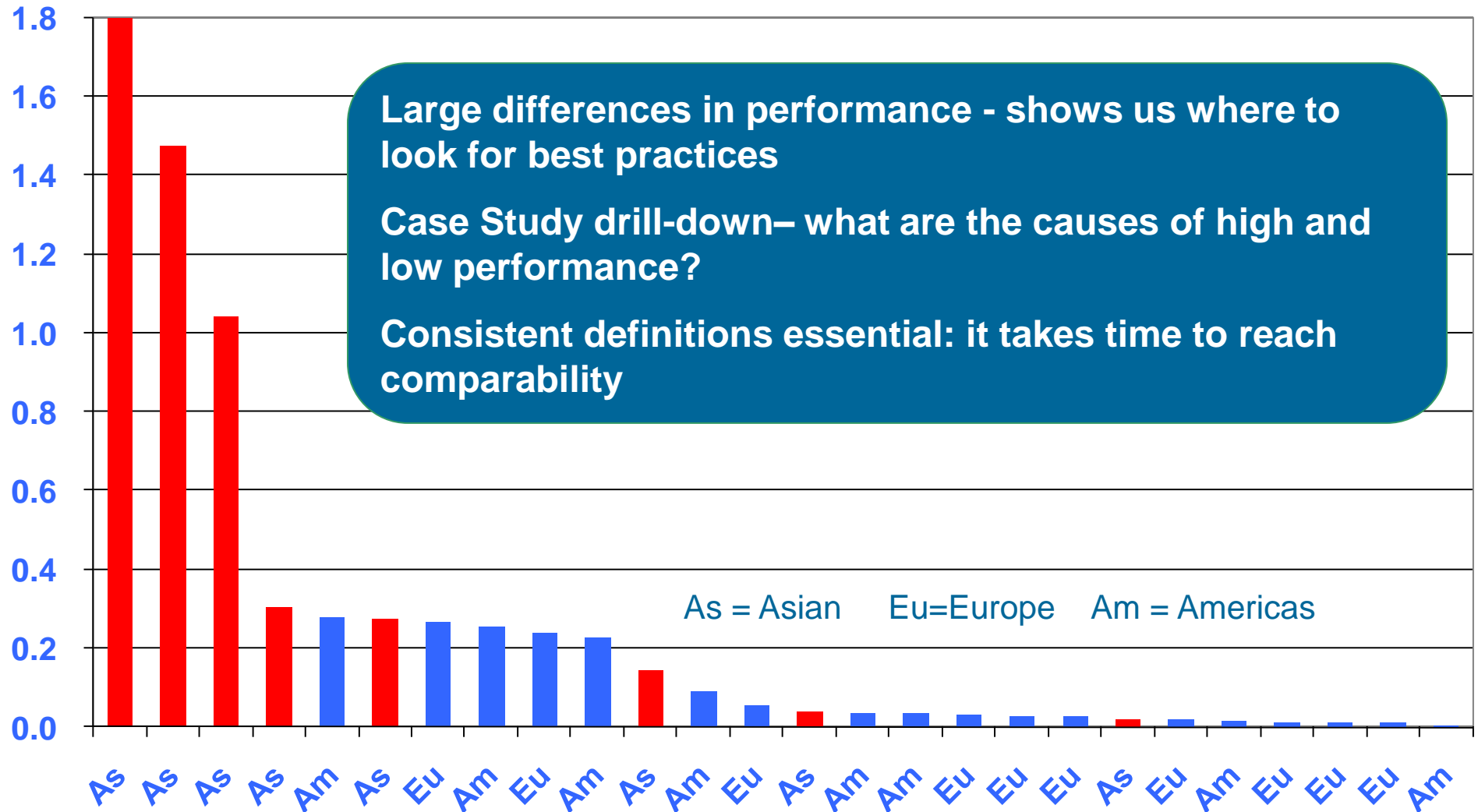
Benefits (CoMET): The quantified benefits alone, to date exceed \$500million and are currently >\$45million annually

- ❑ **London Underground:** Escalator Study to save \$150m on maintenance over 20 years, + potentially \$100s of millions on new escalators
- ❑ **American Metro:** Review of station cleaning processes following study: 10% productivity gain
- ❑ **Asian Metro:** driver productivity study: 10% saved through shift reorganization
- ❑ **South American Metro:** \$1mp.a. saved on turnstile maintenance as a result of a Forum question.
- ❑ **American Metro:** justified move from 2 car-pairs to through gangways: several million \$, improving capacity by 10%



A KPI which describes a lot about benchmarking

Car Km Between Incidents Causing a Delay > 5 Minutes to Service (2009)



Examples of Better Deployment of Staff

- Station staff: better matched to passenger demand
- More customer facing roles for station staff (Madrid)
- Intelligence and analytical based allocation of security staff (Sao Paulo)

