

2010 MULTIMODAL OPERATIONS PLANNING WORKSHOP

NEW YORK CITY

Lessons and Experiences from New York City Transit's Participation in the CoMET Metro Benchmarking and the International Bus Benchmarking Groups

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Improving Transit Through Benchmarking

- Understand:
 - agency strengths and weaknesses
 - where improvements most likely achievable
 - what has/hasn't worked elsewhere
 - how good ideas can be implemented
- Benchmarking can provide this information.
There is rarely a challenge that another member hasn't also faced.

Community of Metros (CoMET) and Nova Metro Benchmarking Groups

- CoMET and Nova are the world's metro (heavy rail) benchmarking groups
 - 27 metros provide a wealth of knowledge for operators to provide better service



Fewer than 500 million trips/year



More than 500 million trips/year

27 metros compare metro performance to identify and share best practices



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Why do CoMET and Nova exist? Urban railways share similar problems and challenges and can share solutions



Communication between metros is essential for generating ideas to achieve world class performance and to improve service quality at a reasonable cost

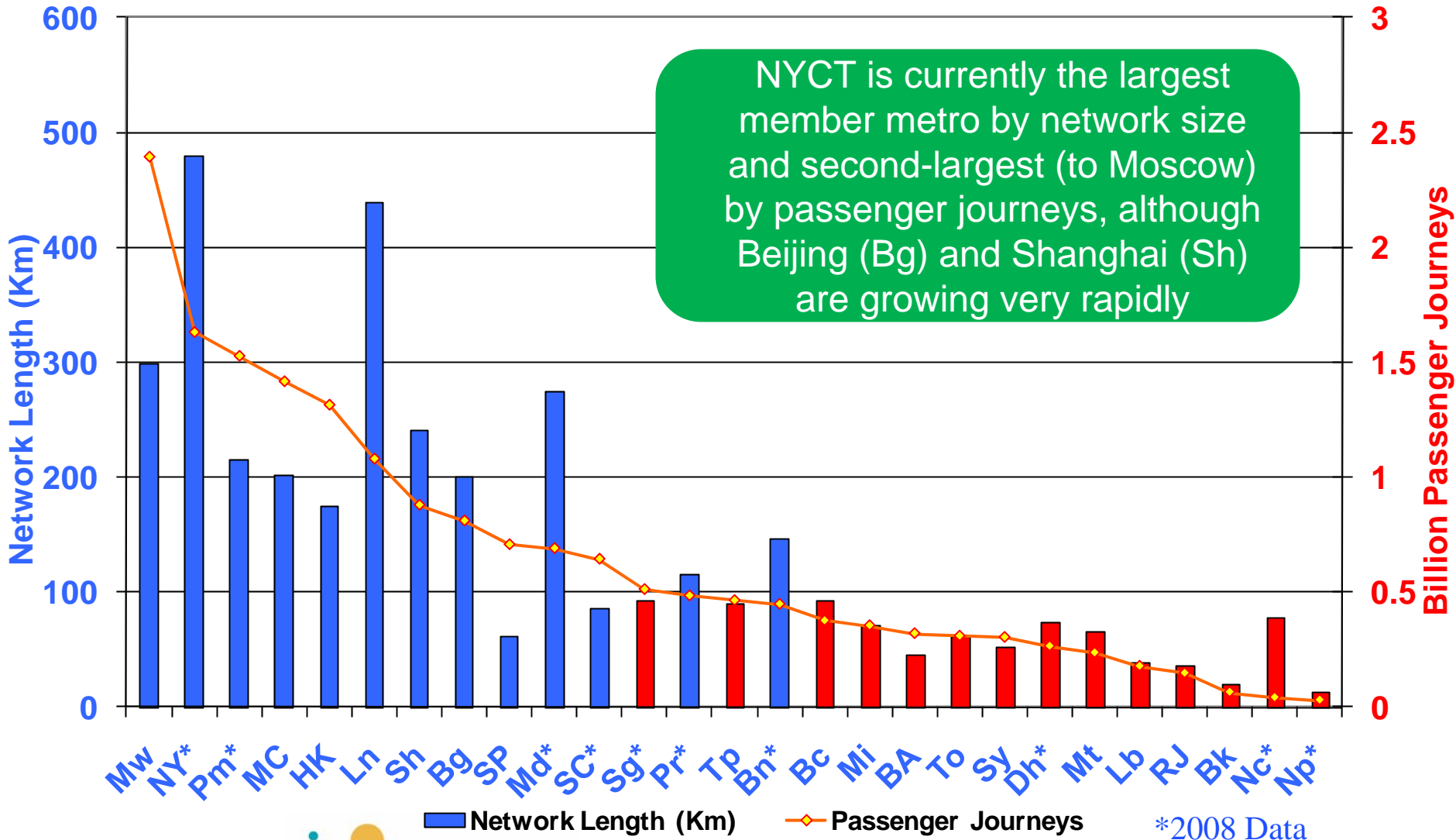


“We try to be best and very often are, but CoMET is very beneficial to us as it opens our eyes to things we might not have seen before”.

Andrew McCusker,
Operations Director, Hong Kong

Experience shows that even large metros can learn from the smallest – issues and challenges are shared

2009 CoMET and Nova Metros

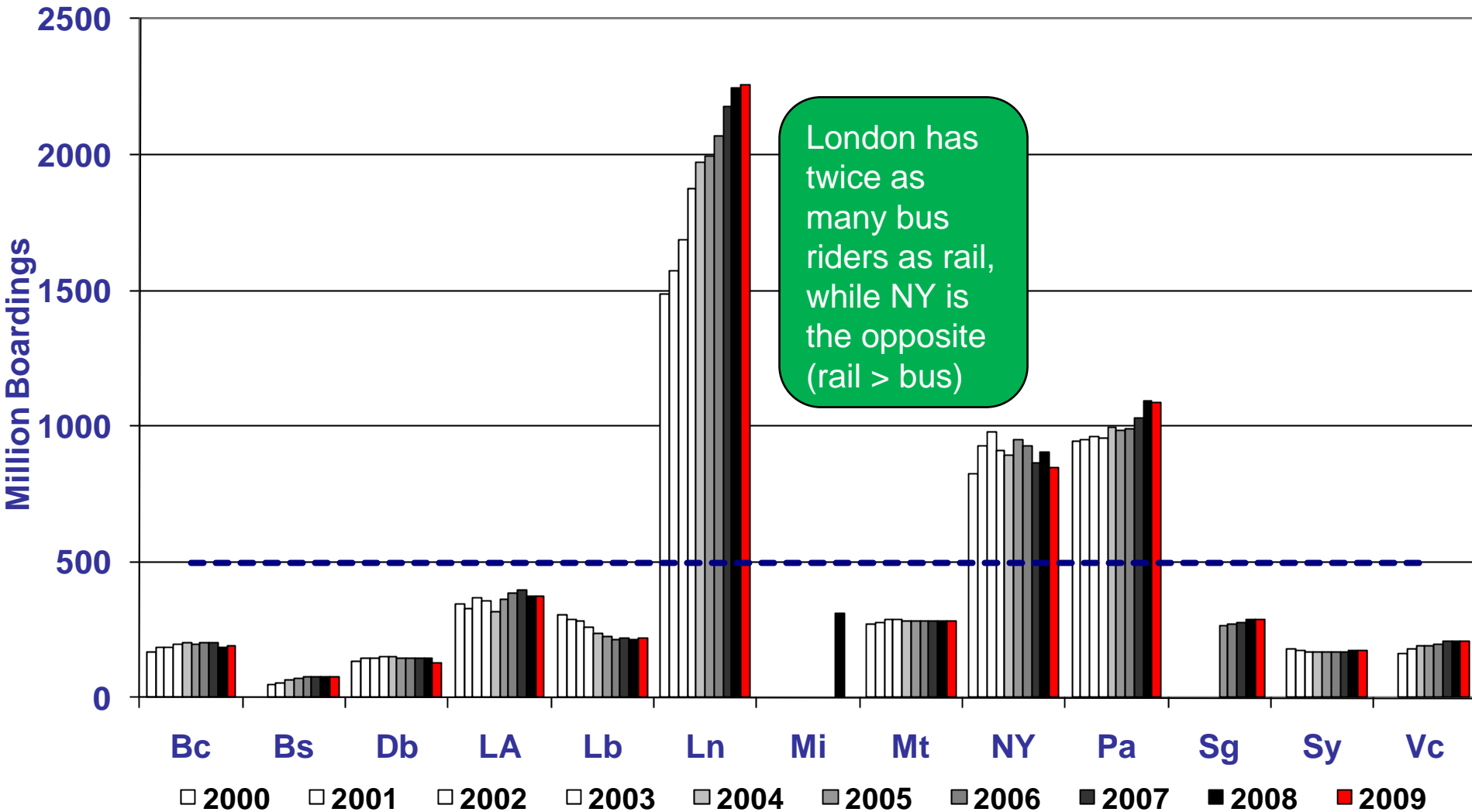


International Bus Benchmarking Group: Thirteen urban bus operators share problems, challenges and solutions



London, Paris, and New York are the largest operators; dramatic recent growth in London

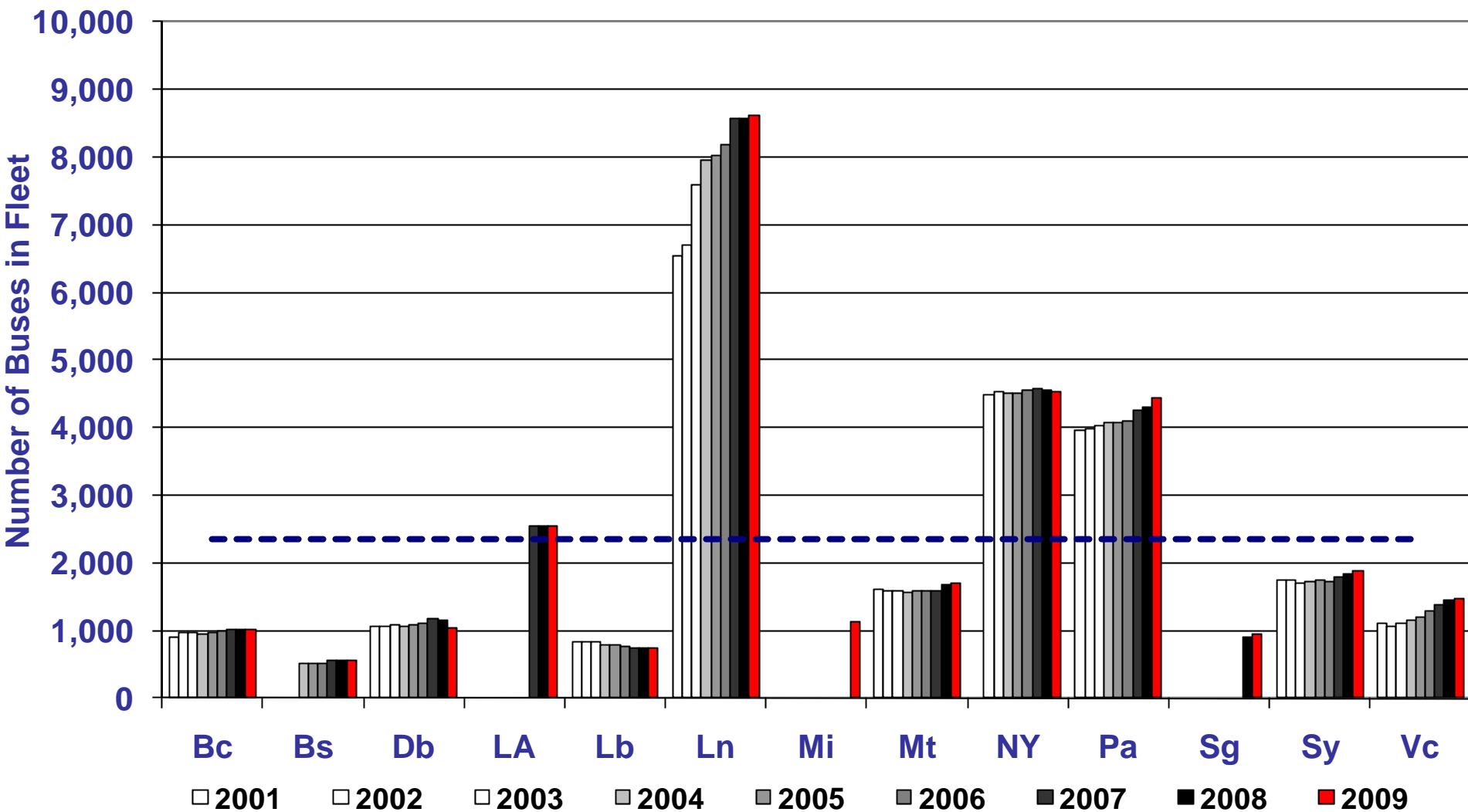
Trends in Annual Passenger Boardings



London has twice as many bus riders as rail, while NY is the opposite (rail > bus)

As with metros, size is not critical for comparability – issues and challenges are shared

Trends in Total Fleet Size



Benchmarking – Project Ownership and Management

- Groups owned, run by the participating agencies; group presidencies rotate annually
 - Independence, Speed and Confidentiality are central attributes, as are contacts/networking
- Project management and analysis carried out by Imperial College London
- Standardized Key Performance Indicator (KPI) System to compare performance and identify best practices. Member Profile report for improved understanding of performance.
- Case Studies—in-depth research on practical topics of common interest



Separate, secure web site for each group – fast, easy access to all information

International Bus Benchmarking Group

Welcome to the International Bus Benchmarking Group website

The Bus Benchmarking Group is a programme of international benchmarking of bus operations and public transport. It is made up of a consortium of thirteen bus organisations: TMO (Barcelona), STIB/NOVB (Brussels), Dublin Bus, Carris (Lisbon), London Buses, LACHTA (Los Angeles), ATM (Milan), MCT (New York), STM (Montreal), RATP (Paris), Singapore SMRT, Sydney Buses and the Coast Mountain Bus Company (Vancouver).

[Click here to see the International Bus Benchmarking Group information video](#)

The objectives of the International Bus Benchmarking Group are to:

- Establish a system of measures for internal management
- Use the system of measures to identify best practice
- Support decision making within the organisations
- Provide comparative information for senior management and stakeholders.

All the group's activities are determined by the member bus organisations. A senior manager from one of the members is elected annually as President and a work programme is developed to accomplish the group's objectives.

The Group is jointly owned and driven by the members with project management and administration carried out by the RTSC at Imperial College London on their behalf. Imperial also provides many of the research resources for the group.

All International Bus Benchmarking Group activities are carried out within a framework of confidentiality. Any information that is released is generally anonymised. No confidential information is allowed to be released to third parties without the expressed permission of the members. All member bus organisations are required to sign and adhere to a confidentiality agreement.

Members

Online Forum for each group – CoMET/Nova forum has nearly 600 questions covering the entire business

Forum List / Short questions /

Short questions

571 items found, displaying 1 to 25.[First/Prev] 1, 2, 3, 4, 5, 6, 7, 8 [Next/Last]

Topics	Category	Replies	Author	Last Post	
MAINTENANCE OF AUTOMATIC VENDING MACHINES	Fare and ticketing	2	Dominique Lemay 2010-07-08 16:56:25	Gabrielle Crocker 2010-07-09 02:57:55	UD 1 x
GSM management during major incidents	Safety and security	1	Joakin Granados 2010-07-07 15:50:01	Dawn Moore 2010-07-08 19:05:55	UD 1 x
To study the floating slab facility for TRTC reference Part 4U	Track	2	Mr. Yu-nan Wang 2010-07-07 08:43:32	Duy Linh Patrick Nguyen 2010-07-09 13:35:22	UD 1 x
Cable Lifecycle Evaluation	Other infrastructure/devices	0	Mr. Yu-nan Wang 2010-07-07 08:41:37		UD 1 x
Procedure of Handling Obstacle Detection Alarm (For driverless system)	Safety and security	7	Mr. Yu-nan Wang 2010-07-02 01:44:16	Felix Ng 2010-07-08 07:11:57	UD 1 x
Capital Investment for Construction of New Metro Lines	Finance and funding	4	Mr. Yu-nan Wang 2010-07-02 01:42:23	Felix Ng 2010-07-08 07:25:37	UD 1 x
Third rail system - voltage selection	Other infrastructure/devices	7	Yanxiang Bi 2010-06-24 12:03:31	Duy Linh Patrick Nguyen 2010-07-08 19:18:12	UD 1 x
No Fault Found	Management system/process	2	Felix Ng 2010-06-24 04:38:33	Amitabh Banerjee 2010-07-05 11:20:15	UD 1 x
Insurance Renewal URGENT	Miscellaneous	4	Marcia Baptista da Silva 2010-06-22 23:20:45	Mr. Yu-nan Wang 2010-07-08 03:40:34	UD 1 x
Thefts and Robberies on Metro Networks (KPI report)	Miscellaneous	5	Claudio Soto 2010-06-22 18:57:45	Felix Ng 2010-07-08 07:34:21	UD 1 x
System to measure the temperature of bushings	Rolling stock	8	Paolo Marchetti 2010-06-21 16:03:12	Mr. Yu-nan Wang 2010-07-07 08:50:46	UD 1 x
Escalator condition monitoring	Other infrastructure/devices	2	Dave Bird 2010-06-16 13:27:57	Gabrielle Crocker 2010-07-05 03:43:42	UD 1 x
Signal Overruns	Operations	5	Dawn Moore 2010-06-15 15:35:15	Duy Linh Patrick Nguyen 2010-07-08 18:46:10	UD 1 x
Business Rules	Operations	10	Amitabh Banerjee 2010-06-15 12:35:16	Felix Ng 2010-07-08 07:41:07	UD 1 x
Noise and Vibration Mitigation	Customer satisfaction	6	Claudio Soto 2010-06-14 14:21:39	Amitabh Banerjee 2010-07-05 11:25:13	UD 1 x



Case Studies and Clearinghouse Studies

➤ Bus Benchmarking Case Studies

- Driver Productivity
- Service Control
- Vehicle Maintenance
- Bus Priority
- Safety Programs
- Real-time Information

➤ CoMET/Nova Case Studies

- Crowding and Train Service Planning
- Rolling Stock Reliability
- Fares, Funding, and Financing
- Energy Saving

➤ Bus Benchmarking Clearinghouse Studies

- Eco Driving
- Accident Management
- Control Room Organization
- Hybrid Buses

➤ CoMET/Nova Clearinghouse Studies

- Station Floor/Wall Material
- Sick Leave Policies
- Waste and Recyclables
- Locked Car End Doors

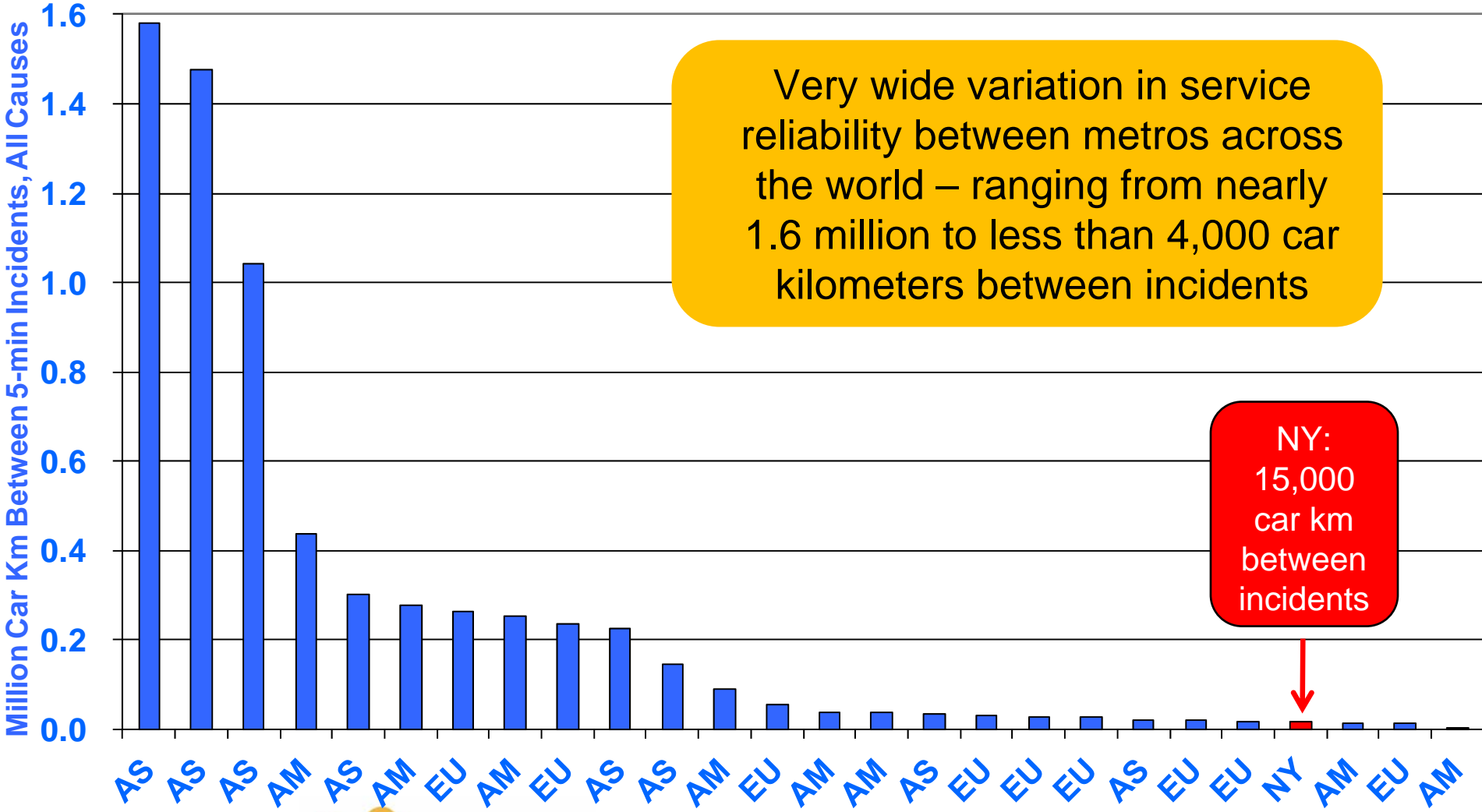
The Key Performance Indicator (KPI) System – Purpose and Use of KPIs

- Benchmarking is NOT merely a comparison of data or a creation of rankings.
- The structured KPI comparisons can be used for:
 - Stimulating productive “why” questions / identifying lines of inquiry.
 - Identifying high priority problems, strengths and weaknesses.
 - Identifying trends: performance can be monitored over time; identify organizations which have truly improved performance over time.
 - Internal motivation – setting targets for improved performance.
 - Supporting dialogue with government, authorities, media and other stakeholders (confidentiality permitting).



CoMET KPI Example: Mean Distance Between Incidents Causing Delays, drilling-down to understand performance

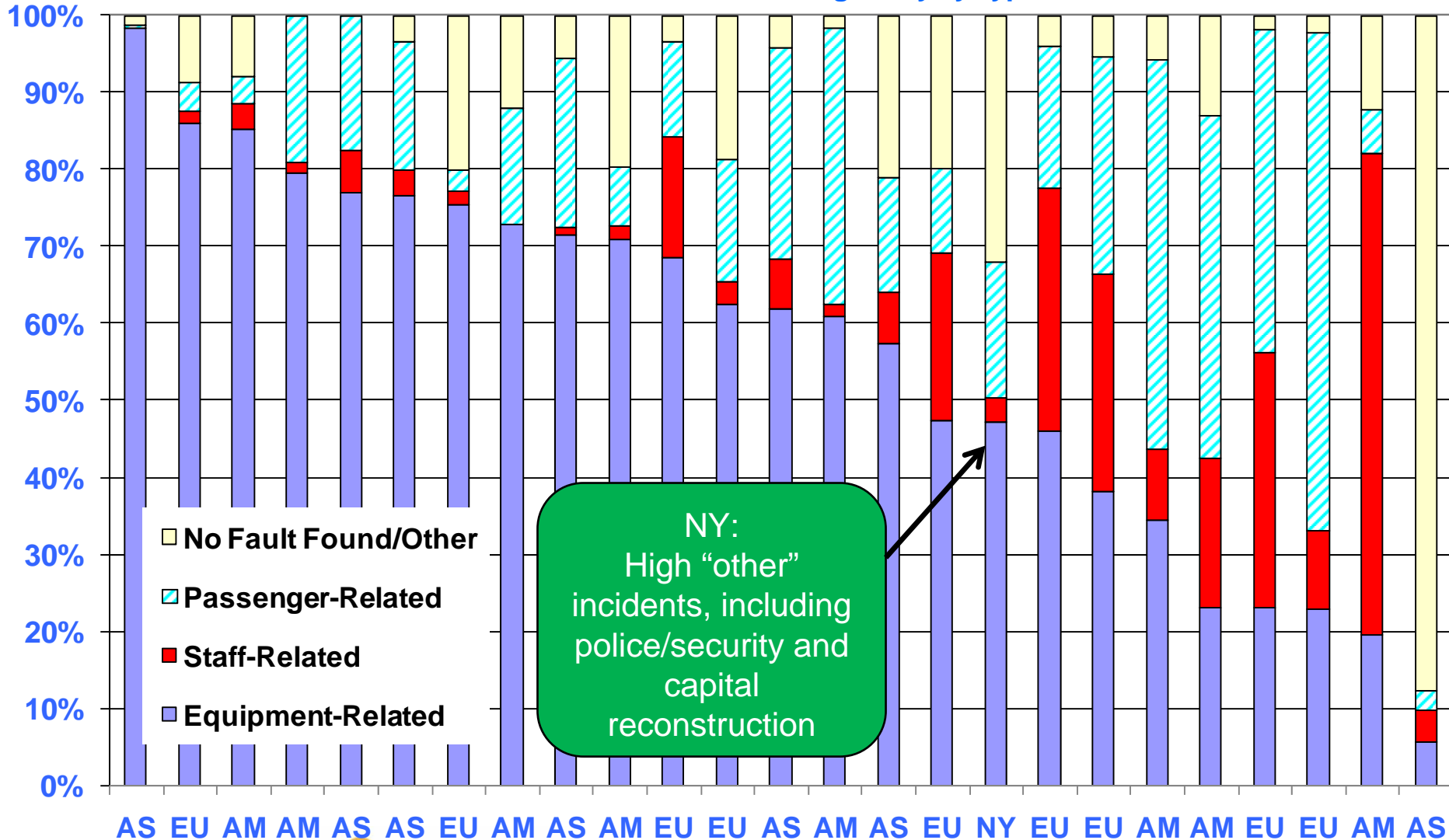
Mean Distance Between All Incidents Causing a Delay > 5 Minutes in Service
(2009 or Most Recent Year)



CoMET KPI Example: Breakdown of Incidents by Type

Equipment and Other categories are further detailed

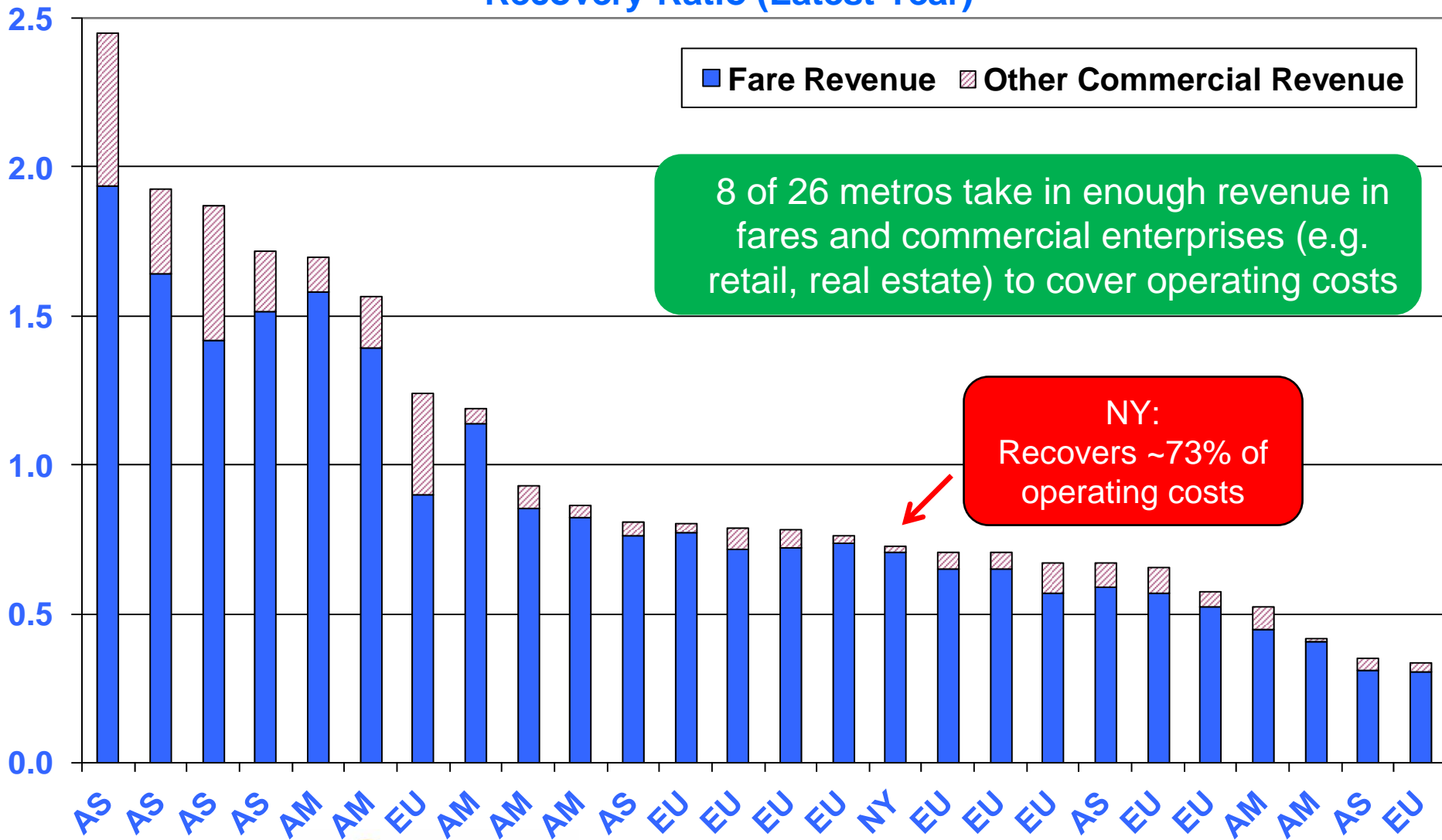
Breakdown of Incidents Causing Delay by Type



CoMET KPI Example: Recovery Ratio

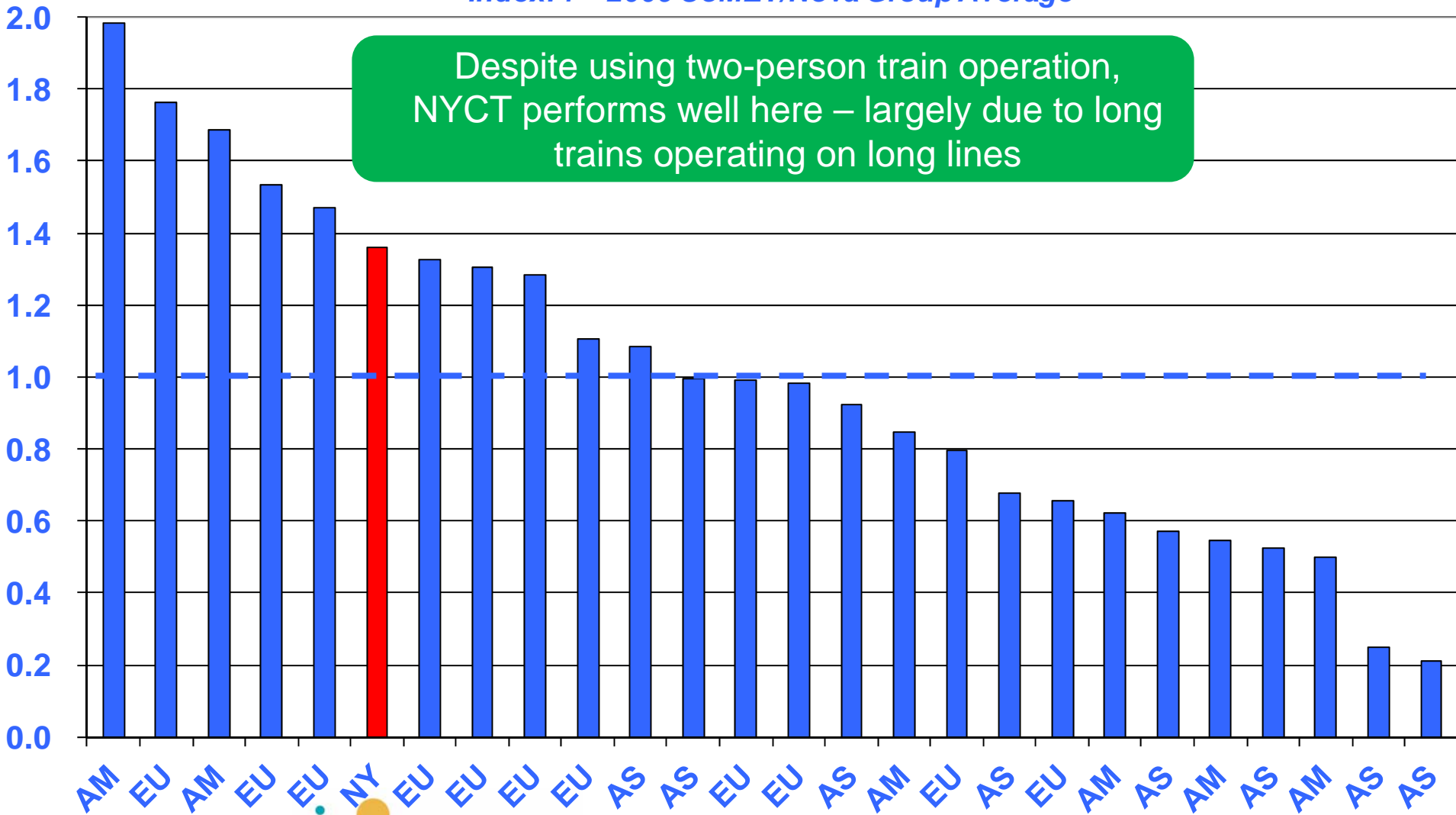
Benchmarking data can help metros to justify fare policies

Recovery Ratio (Latest Year)



CoMET KPI Example: A high-level measure of efficiency, also influenced by costs levels & union contracts

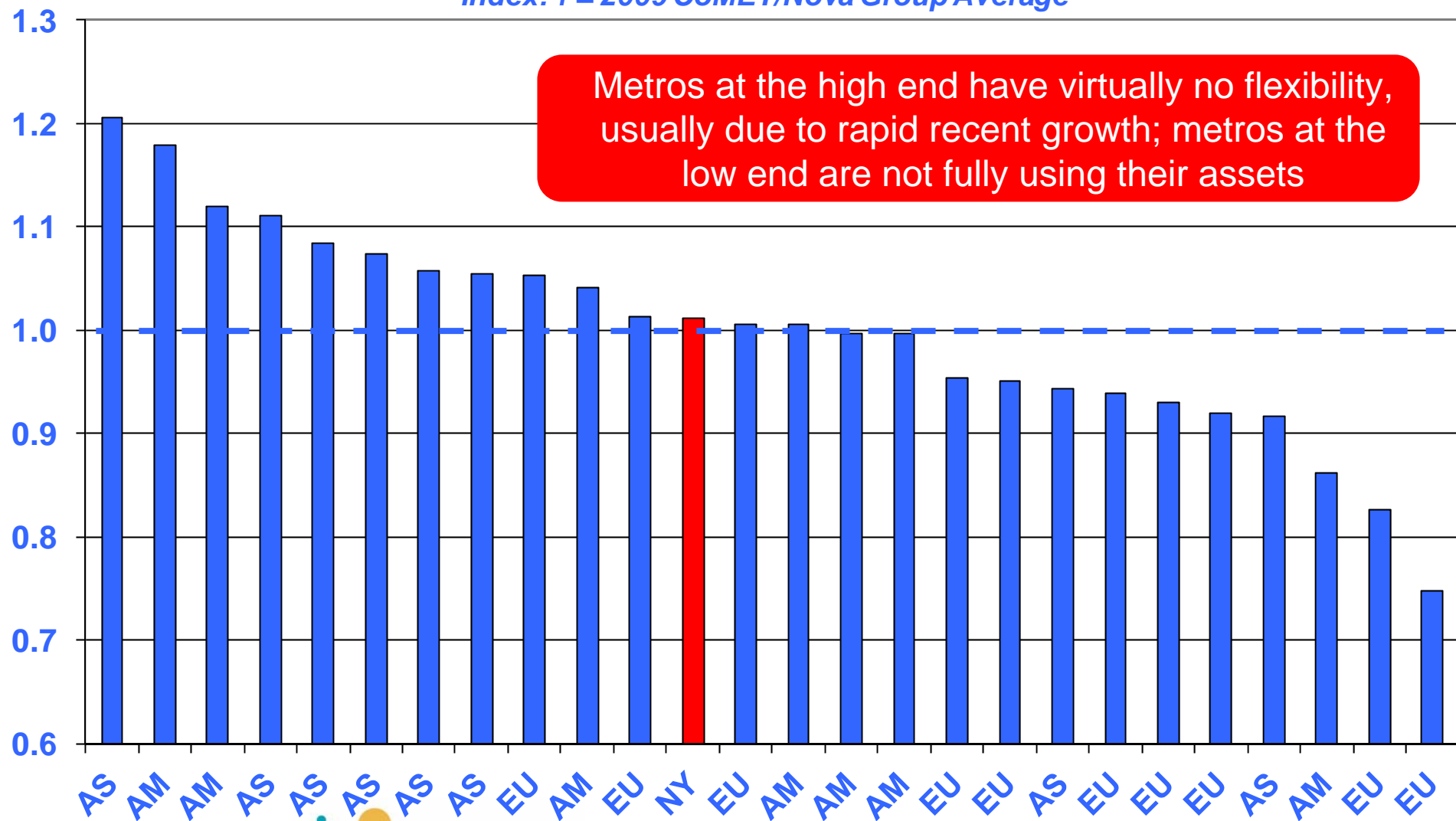
Car Kilometers per Total Labour Hours
Index: 1 = 2009 CoMET/Nova Group Average



CoMET KPI Example: Peak Fleet Use (inverse of spare factor) – NYCT peak usage is just above the group average

Peak Fleet Usage

Index: 1 = 2009 CoMET/Nova Group Average

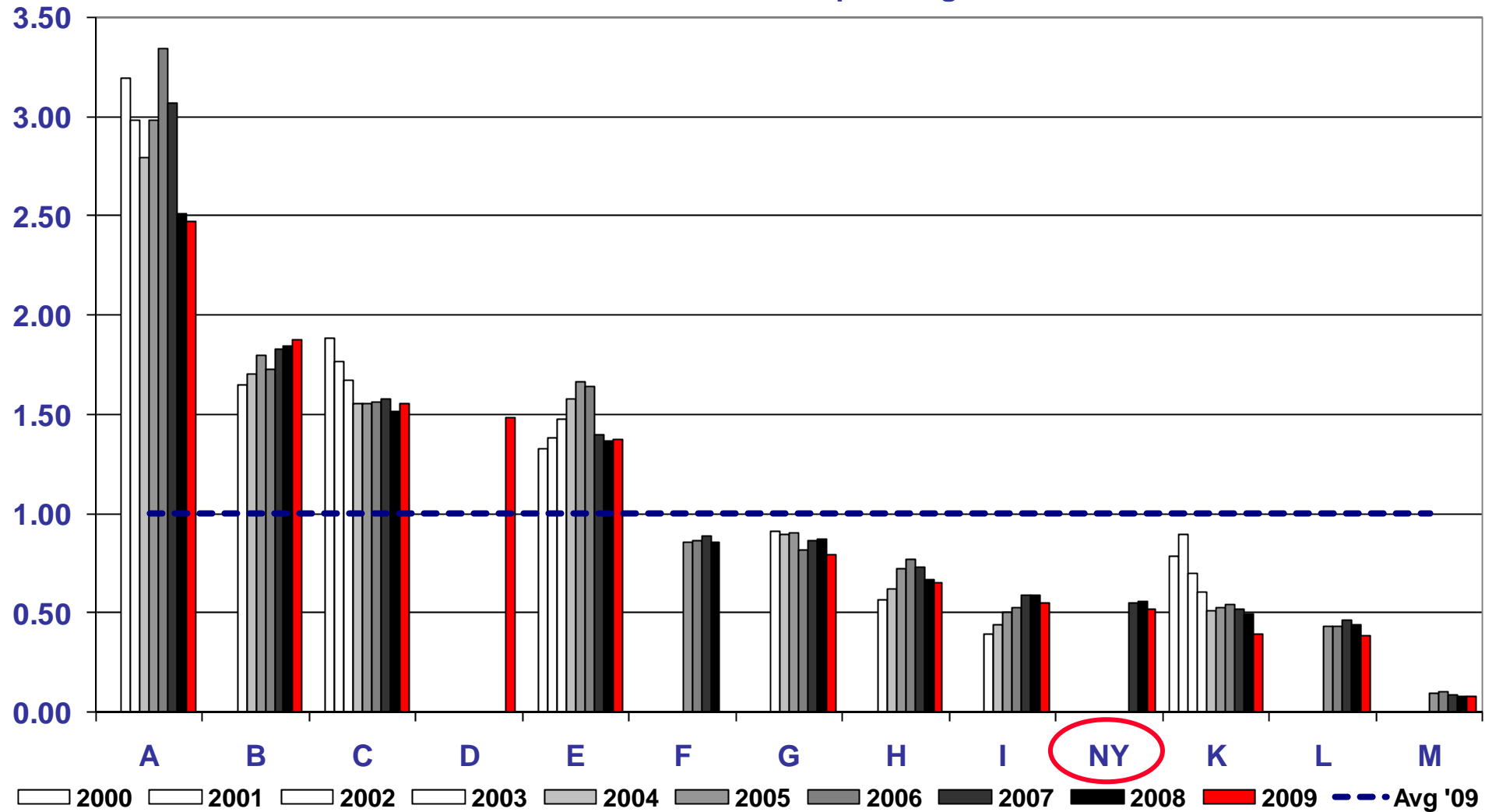


IBBG KPI Example: Vehicle Accidents

NYCT performs very well

Vehicle Accidents per 10,000 Actual Total Vehicle Km

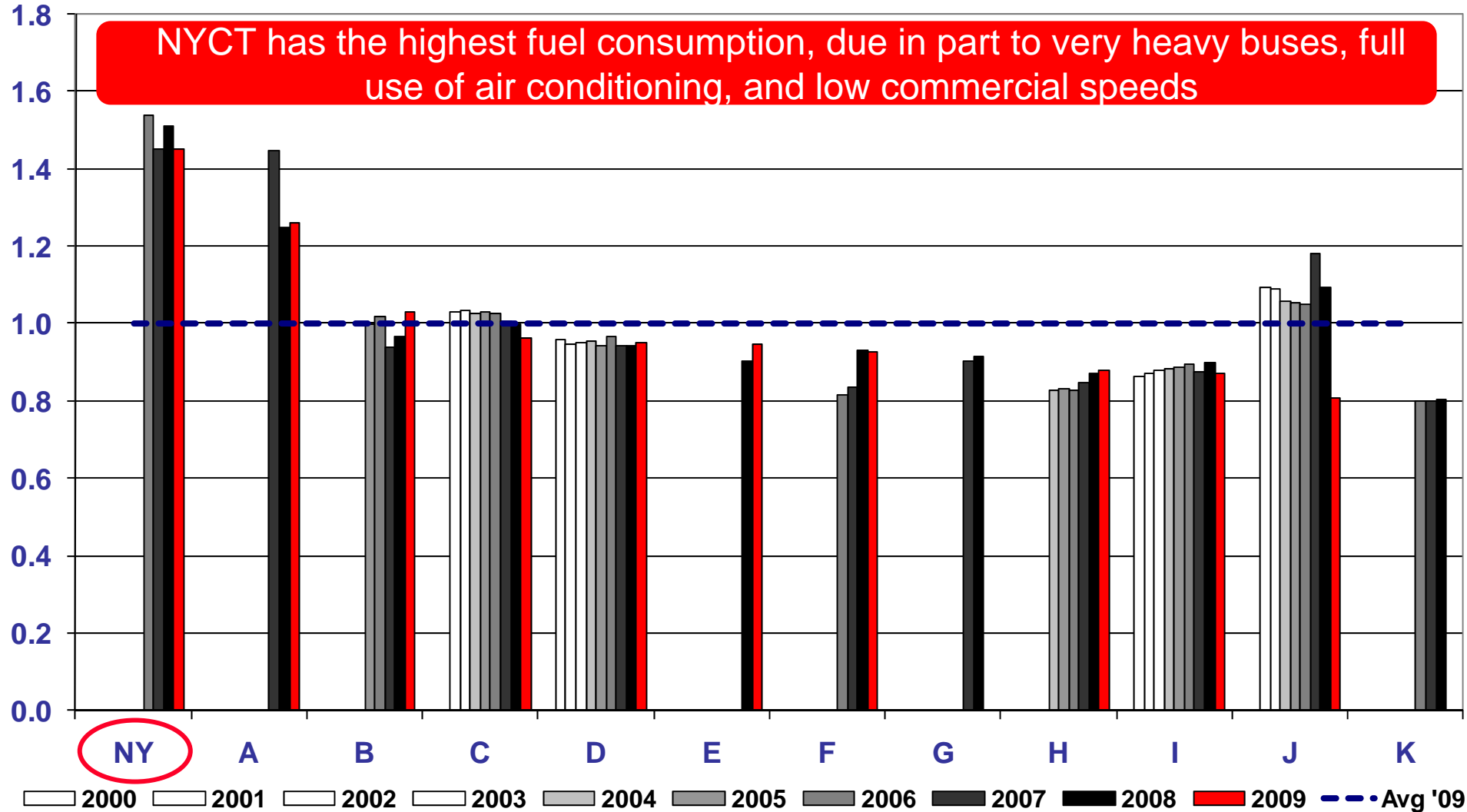
Index: 1.00 = 2009 Group Average



IBBG KPI Example: Diesel fuel consumption is a major cost driver and an important environmental indicator

Diesel Fuel Consumption per Actual Total Diesel Vehicle Km

Index: 1 = 2009 Group Average

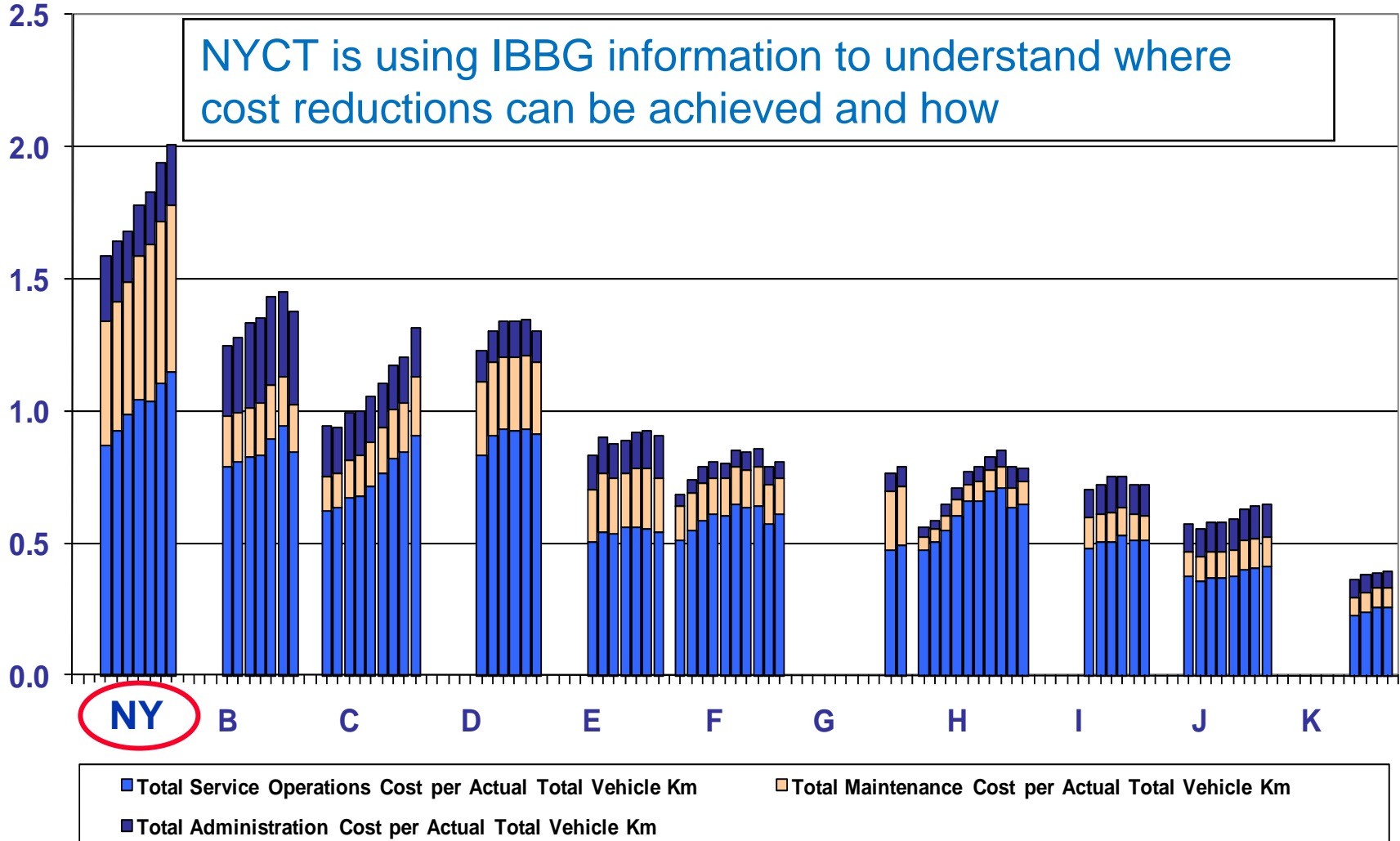


IBBG KPI Example: Financial Comparison and Trends

Normalised World Bank Purchasing Power Parity (PPP)

Total operating cost per total vehicle km 1999 - 2008

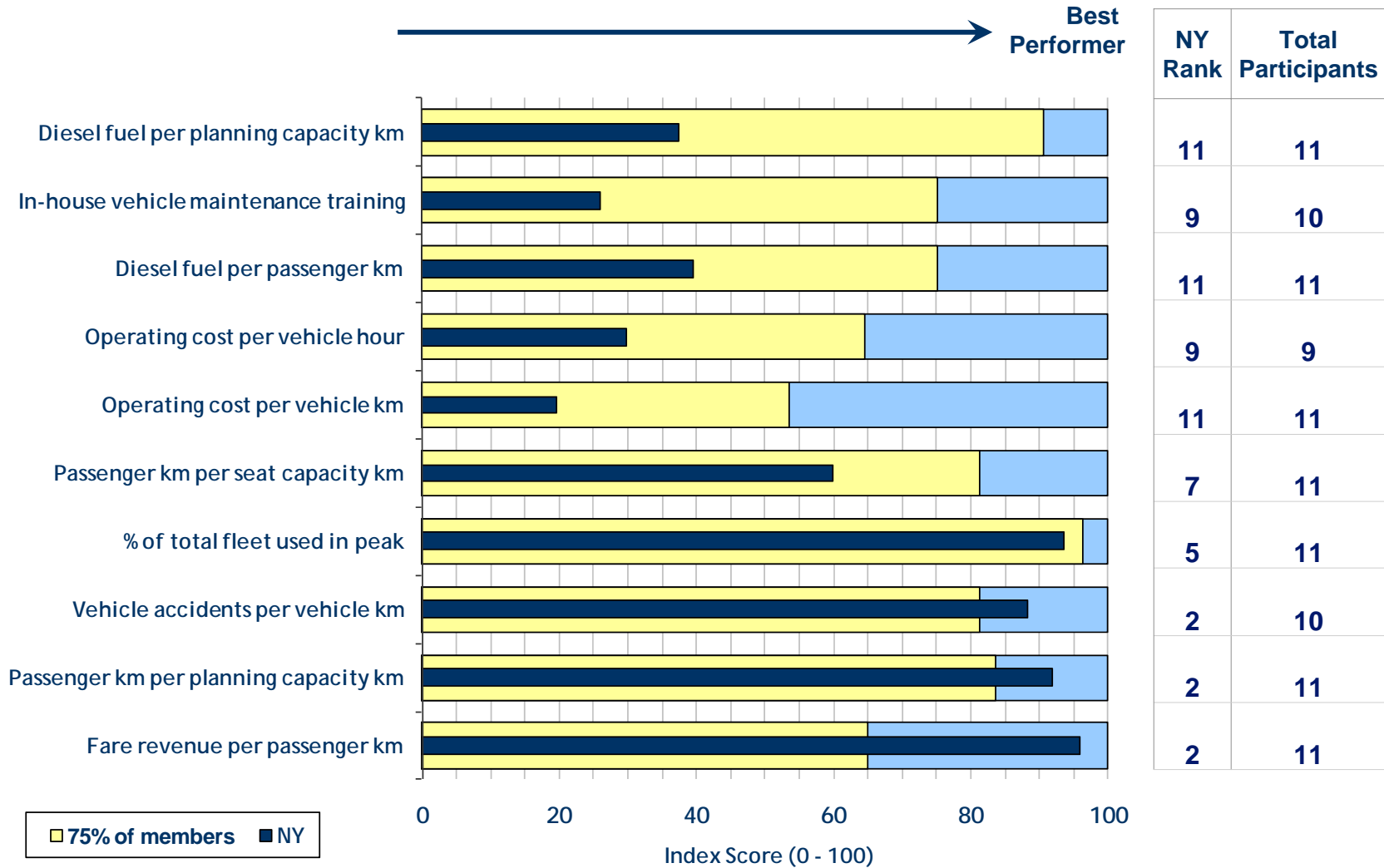
Index: 1 = Total cost group average in 2008



IBBG Relative Performance Dashboard

Compares Individual Agency Performance with Group

KPIs



NYCT Benefits from the Metro and Bus Benchmarking Groups

- Exposure to New Ideas
 - “Step Aside, Speed Your Ride,” inspired by CoMET, led to 4% capacity increase on 4 5
 - Exploration of double-decker buses
 - New station flooring and wall materials
- Support for New or Modified Policies
 - Installation of passenger intercoms on subway cars with locked end doors
 - Launch of “proof-of-payment” with off-board fare collection on Select Bus Service



NYCT Benefits from the Metro and Bus Benchmarking Groups

- Fast Expert Input on Emerging Issues
 - Smart Card planning/deployment strategies
 - Pandemic Preparedness planning
 - Bus Lane enforcement using cameras
 - Shared bus and bike lanes
- Shared Knowledge, Experiences with Vendors and Suppliers (e.g. Siemens, Bombardier, Nova Bus)
- Better Understanding of NYCT Performance
 - What drives differences in maintenance costs, fuel economy?
 - How have other members achieved improvements?



Conclusions

- Metro and urban bus operations are sufficiently comparable across the world, even given cultural differences
- Opportunities for information sharing with peers are very valuable, particularly given similar challenges and vendors
- Benchmarking focused on identifying useable and implementable ideas has tangible benefits



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CoMET and Nova Key Performance Indicator System – Balanced Scorecard Approach, Customized for Transit

Growth, Learning & Innovation

- G1a/b % change Network Size & Passenger Journeys
- G2a/b % change Operated Capacity km & Car km
- G3 Number of Training Hours / 1000 Staff Hours
- G4a/b Non-fare Commercial Revenue / Fare Revenue
& / Passenger Journey

Financial

- F1 Total Commercial Revenue / Operating Cost
- F2 Operating Cost / Revenue Car km
 - F2a Service Operations Cost / Car km
 - F2b Maintenance Cost / Car km
 - F2c Administrative cost / Car km
- F3 Investment cost / Car km
- F4a/b Operating Cost / Passenger Journey & km
- F5a/b Fare Revenue / Passenger Journey & km

Customer

Capacity Provision & Utilisation

- C1 Capacity km / Route km
- C2 Passenger km / Capacity km

Service Quality

- C3 Passenger Hours' Delay / Pass. Journeys
- C4 Passenger Journeys On Time / Pass. Journeys
- C5 Trains On Time / Total Trains
- C6 Train Hours Operated / Hours of Train Delay

Internal Processes

Reliability & Availability

- P1a/b % of Cars Available & Used in Peak Hour
- P2a/b Car km / hours between Incidents (by category)

Efficiency

- P3 Passenger Journeys / Staff + Contractor hours
- P4a/b Capacity & Car km / Staff + Contractor hours
- P5 Train hours / Driver Hours
- P6 % Employee Absenteeism
- P7 Traction Energy Consumed / Car km
- P8a/b Total Energy Consumed / Passenger Journey &
km

Safety & Security

- S1 Total Fatalities / Passenger Journeys
 - S1a Deaths from Suicide / Passenger Journeys
 - S1b Deaths from Accidents / Passenger Journeys
 - S1c Deaths from Illegal Activity / Passenger Journeys
- S2 Incidences of Crime / Passenger Journeys
- S3a/b Staff Lost Time through Accidents / Staff Hours

Environment

- E1 CO2 per Passenger km

International Bus Benchmarking Group

Key Performance Indicator System – Holistic View

Growth & Learning

- G1 Passenger Journeys
- G2 Vehicle Kilometres
- G3 Staff Training (categories)

Customer

- C1 Passenger km / Revenue capacity km
- C2 Actual / Scheduled revenue km & hour
- c3 dynamic customer information
- c4 low floor buses
- C5 % buses on-time (punctuality)
- C6 Regularity
- C7 Customer satisfaction

Internal Processes

- P1 % of fleet used in peak
(not used split by cause)
- p2 revenue / total vehicle km & hour
- P3 Total vehicle hours per labour hour
- p4 staff absenteeism rate (categories)
- P5 Mean distance between failures
- p6 lost vehicle km (internal/external causes)

Safety & Security

- S1 Number of vehicle accidents per vehicle km & hour
- S2 Number of staff accidents per million staff hours
- S3 Number of passenger accidents per boarding
- S4 Number of 3rd party accidents
- S5 Incidences of on-board crime

Financial

- F1 Total cost per total vehicle km & hour
- F2 Total operating cost per total vehicle km & hour
(service operation, maintenance, administration)
- F6 Service operation cost per revenue vehicle km & hour
- F7 Total fare revenue / Total operating cost
- F8 Total operating cost per passenger boarding/kilometre
- F9 Fare revenue per passenger boarding/kilometre

Environmental

- E1a Diesel fuel consumption per 100 total diesel vehicle km
- E1b CNG consumption per 100 total CNG vehicle km
- E2a Diesel fuel consumption per diesel passenger kilometre
- E2b CNG consumption per CNG passenger kilometre
- e3 % of fleet meeting EURO emissions categories
- E4 CO2 emissions per passenger km & vehicle km

Key Performance Indicator System – Balanced Scorecard Approach, Customized for Transit

