Strategies to Keep Public Transport Affordable

Balancing Affordability V/s Sustainability

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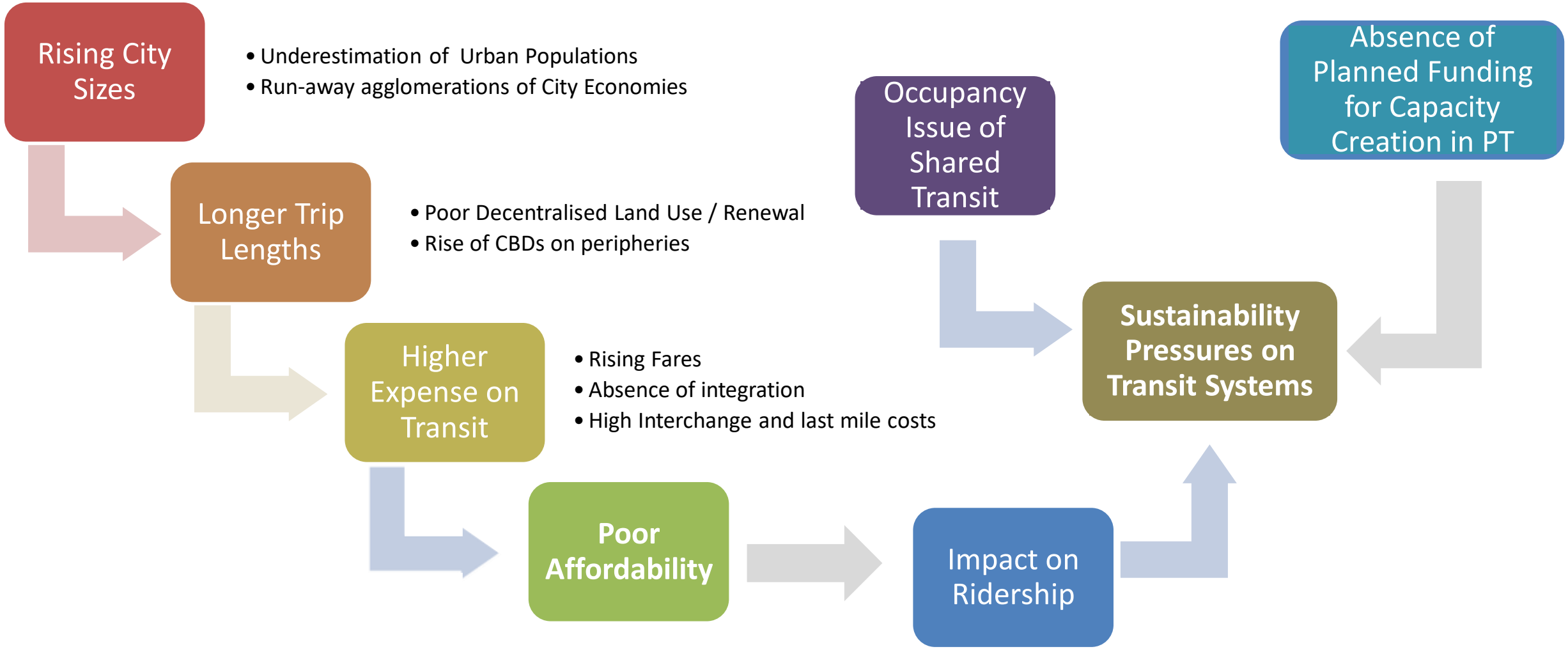
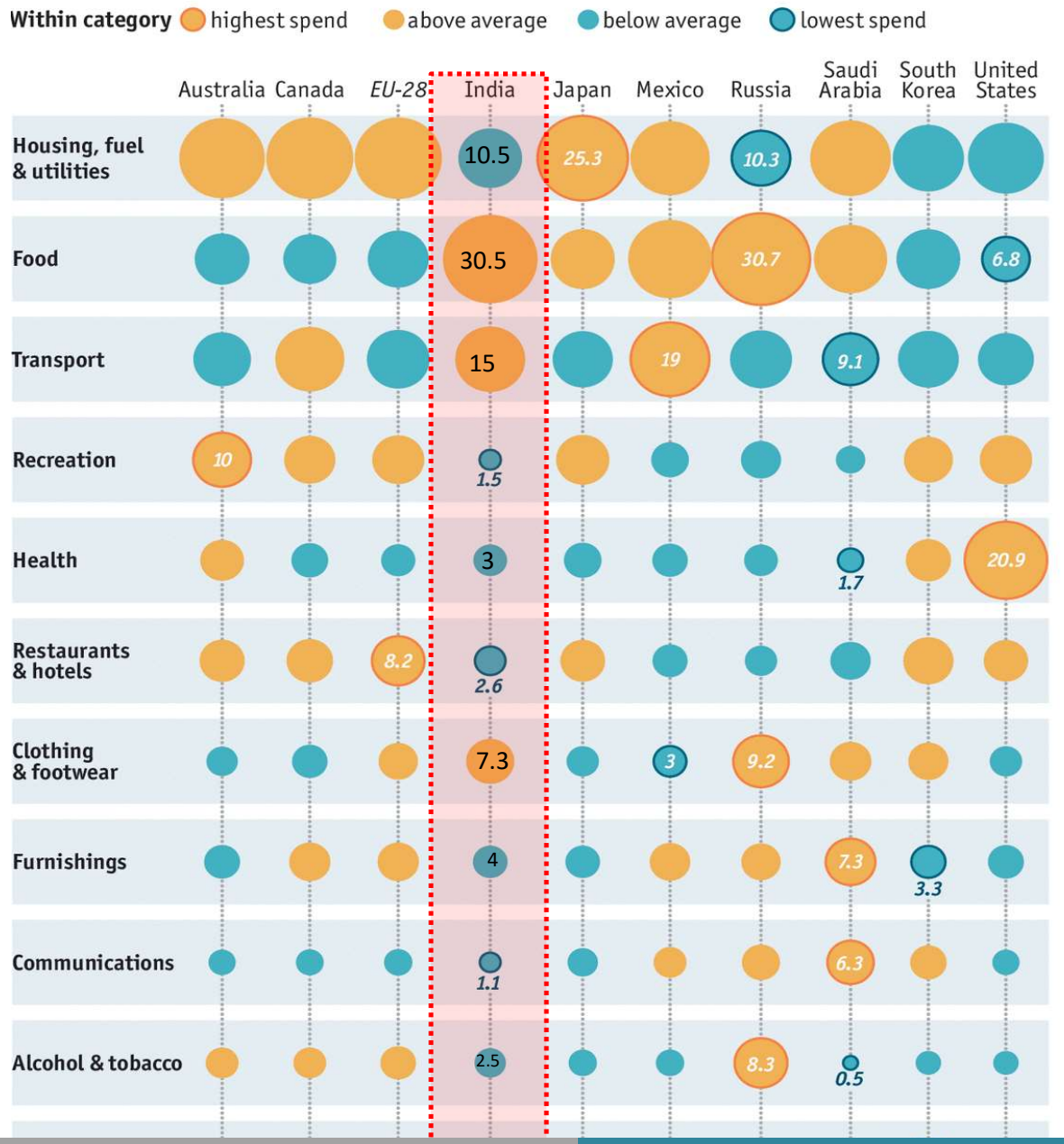


Need to make Transit **Affordable** without compromising **Financial Sustainability**

Affordability in Public Transport

India Ranked Second in Household Spending on Transport related Expense (15%)



Source: Eurostat, Director General of European Commission

Household Spending as a % of Total, 2013

- In the expenditure basket, Indian households spend highest on food followed by transport
- Higher spending on transport leads to lower spending on access housing, health and education and hampering inclusive growth of the society.
- This necessitates need for Affordable Transport System.

Overall, the working definition of affordable transport is that expenditure on transport should be not hgiher than 10-15% of household expenditure.

Premium PT services are beyond reach for lower income group

City	Monthly Income (Rs. pm) (As per Minimum Wages)		Average Trip Length (KM)**	Fare required to travel average trip length		Monthly Expenditure on PT (Rs.)	% of Transportation expenses over Total income	
	Skilled Manpower	Unskilled Manpower		PT Mode	Fare (Rs per Trip)		Skilled Manpower	Unskilled Manpower
Delhi	16848	13884	14	Bus (Non AC)	15	1170	7%	8%
				Bus (AC)	25	1950	12%	14%
				Metro	40	3120	19%	22%
Bangalore	14704	12271	12	Non AC Bus	23	1794	12%	15%
				AC Bus (Suvarna)	25	1950	13%	16%
				AC Bus (Vajra)	50	3900	27%	32%
Ahmedabad	8559	8112	10	BRTS	20	1560	18%	19%
				City Bus	12	936	11%	12%

- **3 trips per person assumed since each person has at least some non-working dependents who also travel.**
- **Except in case of Non AC Buses services in Delhi, lower income group needs to spend more than 10% of their monthly income on Non Premium Transportation Services.**
- **Largely, the access to PT for even those earning just minimum wages remains elusive.**

**Source: Minimum wage Notification of Delhi, Karnataka and Gujarat as on April, 2018, **Source: Census 2011 and adjustments*

Share of Income spent on Integrated Journeys for PT for different income classes

Delhi				
Avg. Monthly Income (2015) *	Distribution of income classes	share of income spent on Non AC Bus	Share of Spending on DTC	Share of Spending on DMRC
< 4100	17%	36%	59%	95%
6,300 to 12,500	17%	16%	26%	41%
12,500 to 25,000	17%	8%	13%	21%
25,000 to 42,000	12%	4%	7%	12%
42,000 to 85,000	14%	2%	4%	6%
>85,000	23%	2%	3%	5%

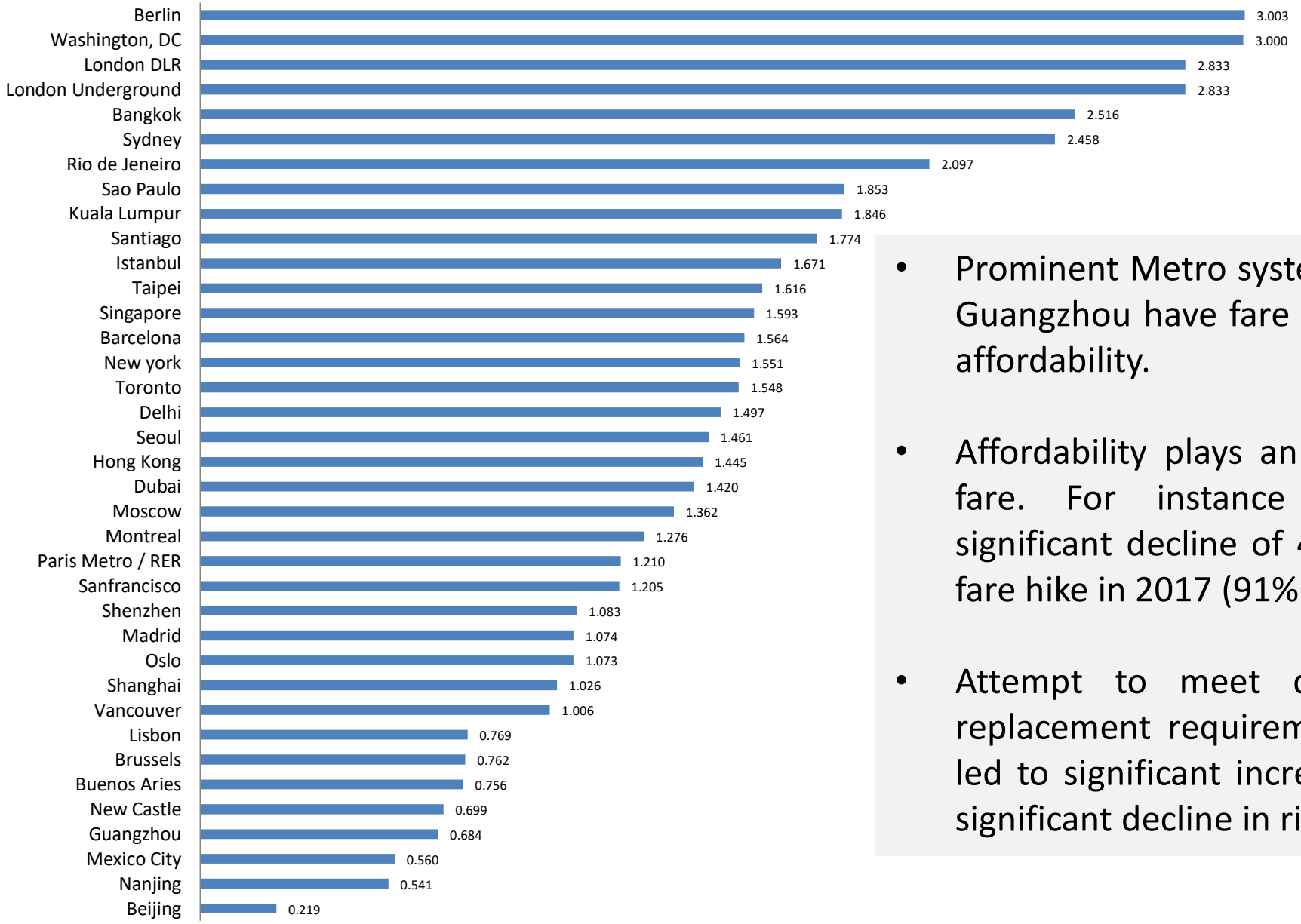
Bangalore				
Avg. Monthly Income (2015) *	Distribution of income classes	share of income spent on Non Ac Bus	Share of Spending on AC Bus (Suvarna)	Share of Spending on AC Bus (Vajra)
< 4100	12%	55%	59%	119%
6,300 to 12,500	16%	24%	26%	52%
12,500 to 25,000	19%	12%	13%	26%
25,000 to 42,000	11%	7%	7%	15%
42,000 to 85,000	15%	4%	4%	8%
>85,000	28%	3%	3%	6%

- In Delhi, for the lowest two quintiles, the cost is higher than the affordable level of 15%.
- Buses in Bangalore are more expensive than Delhi in affordability terms.
- For the high earning classes, the two quantiles of people in Bangalore and Delhi are spending approximately the same from their wages. (Category 5 & 6)

**integrated cost of travel assumed to be 25% higher than cost of travel by main mode like bus/rail alone."*

https://www.statista.com/statistics/658423/share-of-annual-income-in-bengaluru-india/

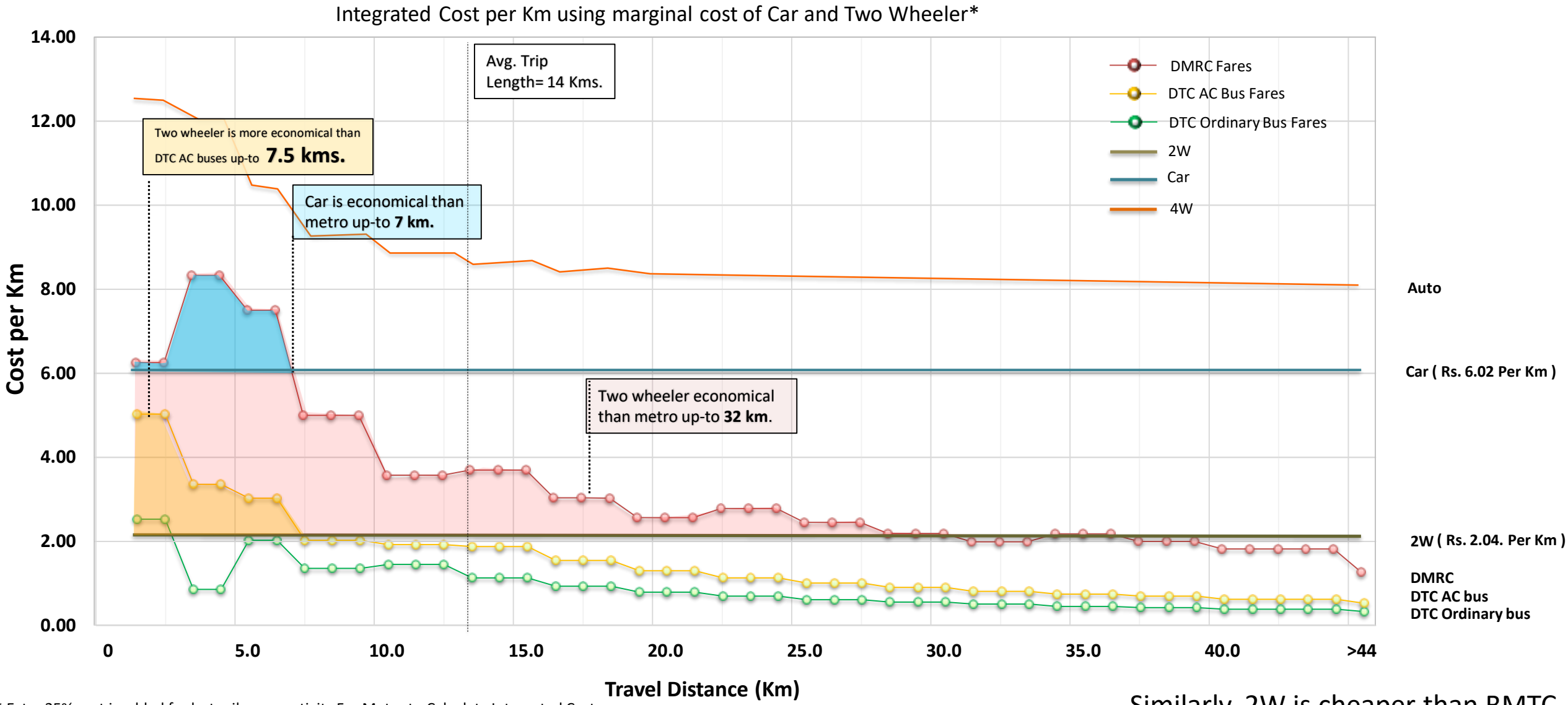
Comparison of Fare of Members of Comet- Nova Metro System using Purchasing Power Parity for 10 KM Fare (USD)



- Prominent Metro system such as Beijing, Brussels, Guangzhou have fare less than 1 USD considering affordability.
- Affordability plays an important role in deciding fare. For instance Delhi Metro witnessed significant decline of 4.3 lakh daily ridership post fare hike in 2017 (91% hike over 2009 prices).
- Attempt to meet debt servicing plus asset replacement requirement through fare revenue led to significant increase in fares which caused significant decline in ridership.

Source : Fare derived from websites of different Metro Systems , CSE Analysis

Delhi: Travel Cost per Km by different modes



* Extra 25% cost is added for last mile connectivity For Metro to Calculate Integrated Cost

* 2W assumptions : Capital Cost : Rs. 60,000 ; Petrol Price Rs. 78.75 per litre . FE- : 40 km/litre ; . Maintenance – Rs. 1000 pa ; Life span - 7Yrs.

* Car : Capital cost -Capital Cost : Rs 5 lakh;. FE- : 12 km/litre ; . Maintenance – Rs. 7000 pa ; Life span – 2 lakh km

Similarly, 2W is cheaper than BMTC Ordinary Bus up- to 13.5 km.

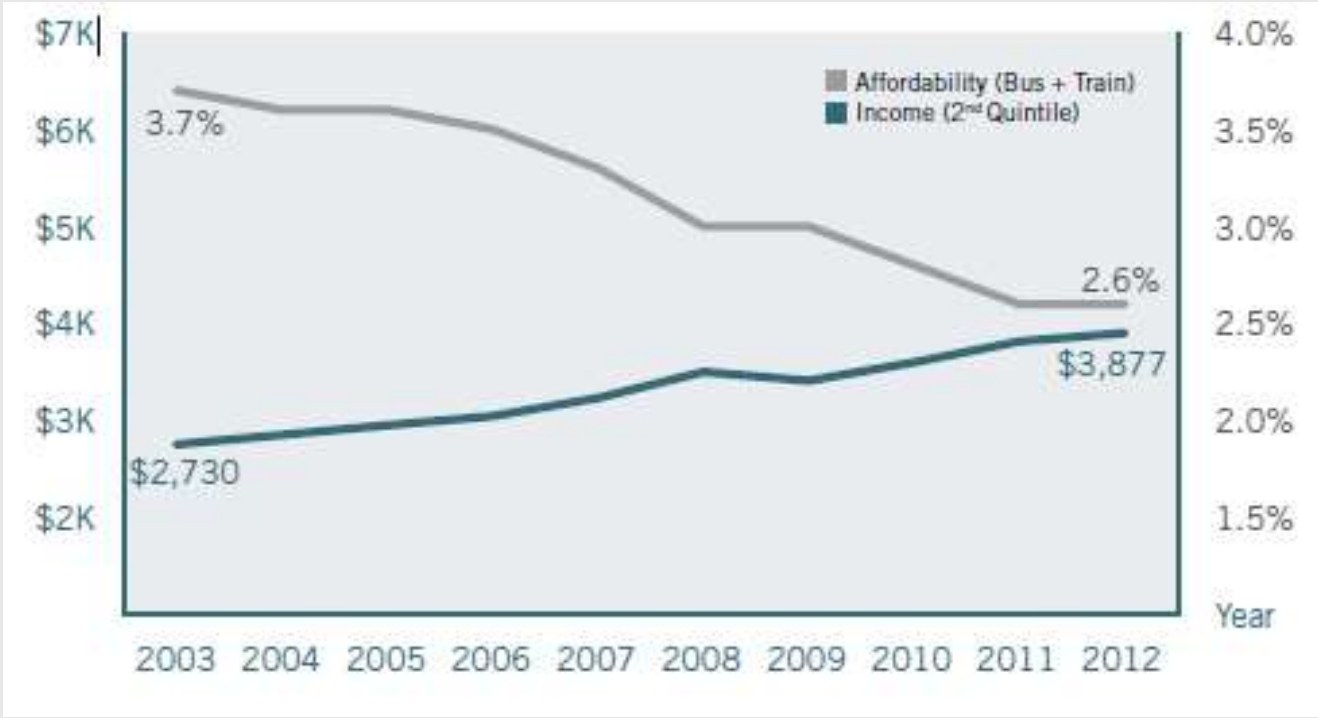
Affordability Concerns

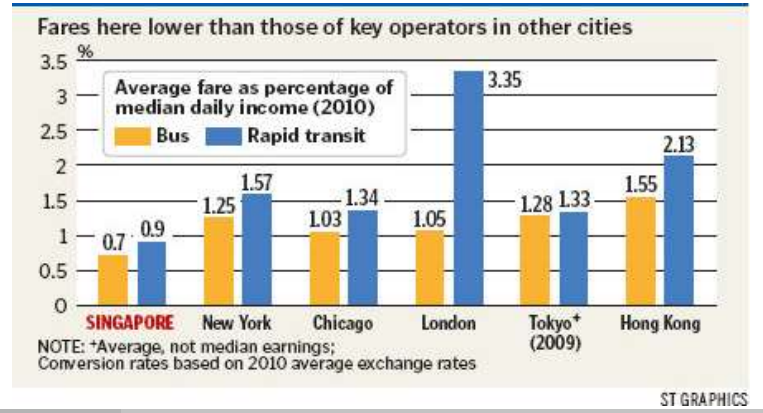
Case Study : Singapore

How much do we spend on transport fares as part of our household income?

- **Affordability Indicator** =
  Monthly household expenditure of the household on public transport
  Monthly household income of that household group

- Cost burden of public transport on the low income households, as a proportion of their overall household incomes, has lessened over the Last 10 years.





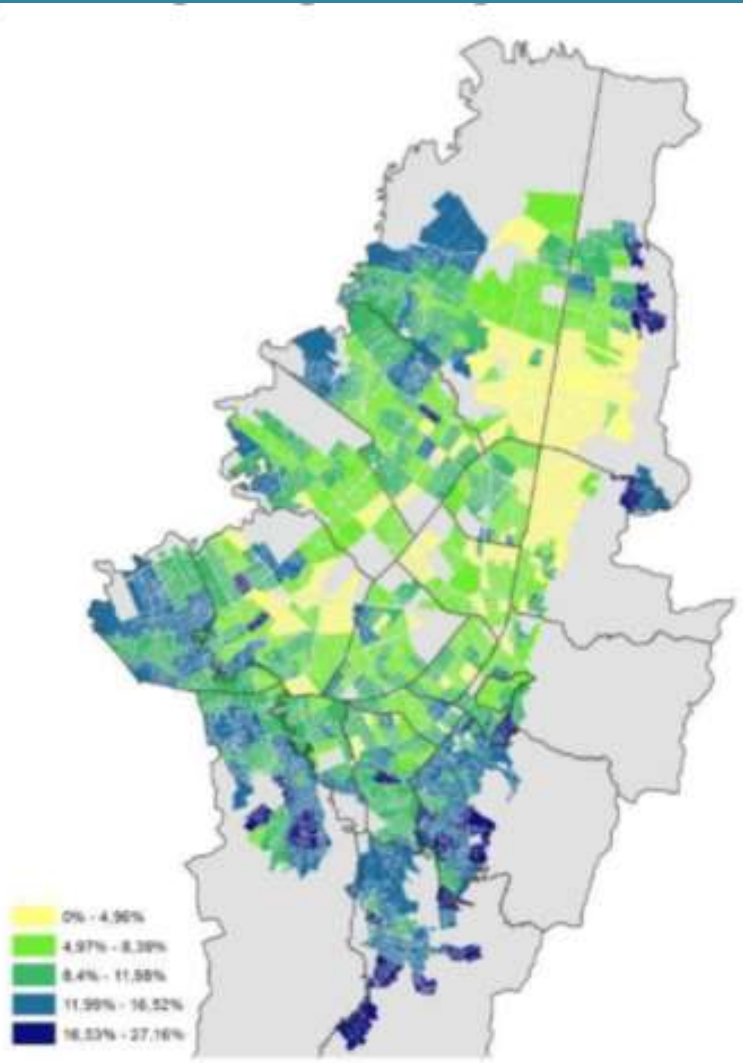
- Bogotá's 2014 Multi-Purpose Survey gave information of poorest households and what they spent on transit. They were found to be spending a greater proportion on transport, between 16% to 27% of their incomes, compared to a maximum of 4% in relatively richer areas.

- Targeted social group identified were therefore identified using wider SISBEN system

- SISBEN utilizes a proxy-means surveys to determine an individual's eligibility for assistance. Surveys compose data on socioeconomic indicators—or proxies—(household demographic composition, marital status, education, employment, income, possession of goods and assets, and dwelling characteristics) to estimate household welfare needs.

- Price Elasticity Analysis was done in the poorest neighbourhood to determine what should the extent of subsidy. Impact of proposed price subsidy was analysed in terms of impact on income and costs.

- Subsidized Pricing at USD 0.5/ride instead of USD 0.79/ride offered using transit discount cards.



Source: Rodríguez Hernández and Peralta-Quiros - Balancing financial sustainability and affordability in public transport , Case of Bogota, OECD Discussion Paper 2016

- **Bogota, Santiago and Brazil** : Targeted subsidies to groups identified through surveys and point systems through Transit Discount Cards

- **Vale-Transporte in Brazil :** Transit costs are capped at 6% of income. Any excess beyond this is re-imbursed by employers to the transiting employees as a tax deductible expense**.**

- **Rio De Janerio and Bogota :** Free Feeder Buses and Cable Cars in poorer areas for providing last mile connectivity to main system.

- **Around the world** : Subsidised Fares for Students, Senior Citizens, War Veterens and others . Employer tax in france.

Some Conclusions

- **Affordability** as understood globally is not used as a input or a capping parameter in fare revisions In India. As a result, for large sections of our population, particularly the lower income groups, PT is becoming unaffordable.

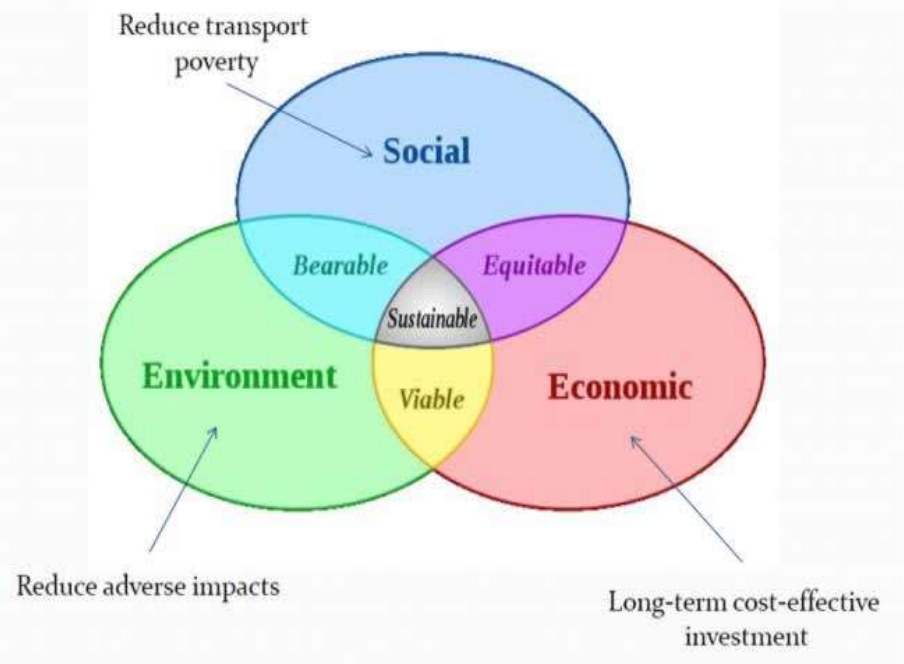
- **Fare Revision mechanisms** are still evolving around the world, but while India has proudly adopted best practices in metros in technical areas, our fare revision practices need improvements

But yet more questions

- If Affordability needs to be accounted for, how will it **affect financial sustainability** of the PT system?
- If it affects it adversely, what could be the **policy response or mechanism** for addressing such issues?

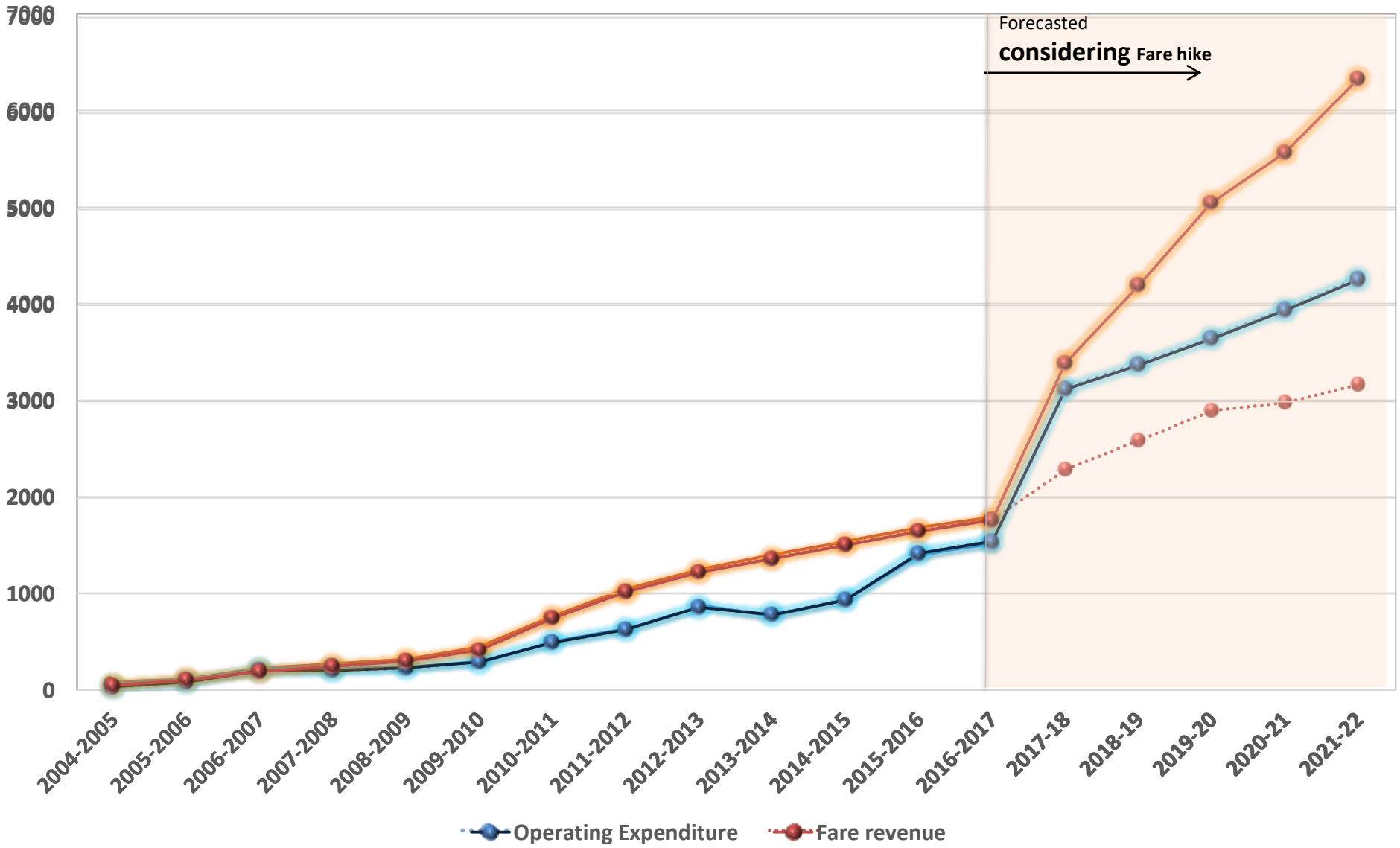
Sustainability of Public Transport

- Financial Sustainability of a transport system could be defined **as the ability of a transport system to plan and provide for meeting its capacity addition and operation expenses drawing this from all beneficiaries of the system including non-users.**
- At the crude level, it means expenditure is balanced with revenues.



Is Fare revenue able to recover the Operating expense?

Source: DMRC 4th FFC Report, 2016

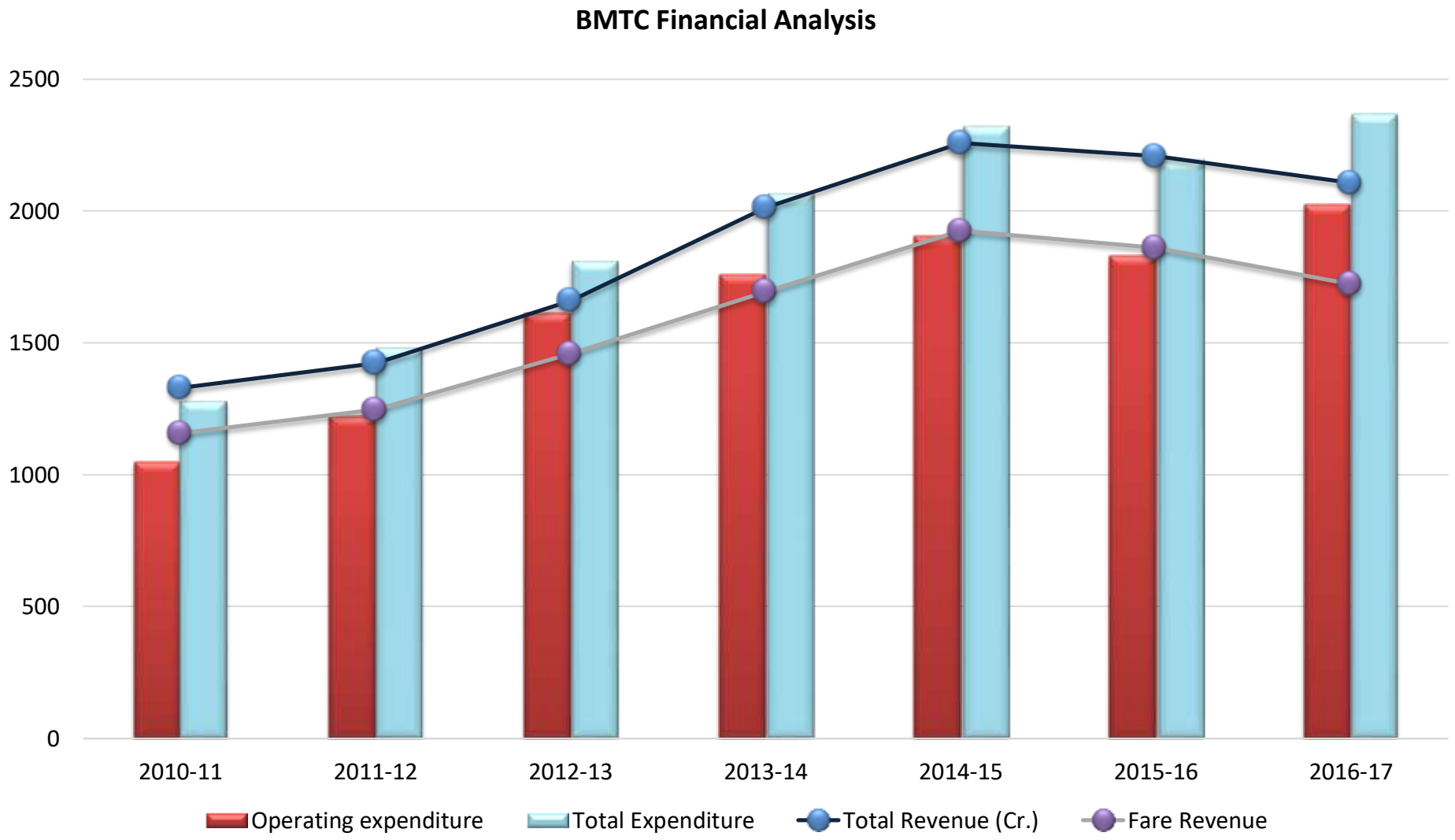


Huge operating surpluses projected will be generated due to fare hike. (Impact of loss in ridership not considered)

*" **DMRC will be able to increase depreciation cover up to 45% by 2022"*** - 4 th FFC Report.

Showing an attempt to recover capital expenses from operating surpluses

Bangalore story : Only success story is turning around



Even for a high patronage denser bus system like BMTC, fare income can now recover only about 87% of the operating costs.

BMTC generates other income from commercial development of around 10-12 terminals fror which it earned Rs. 124 crore in 2016-17.

Source: BMTC reports

Our Bus based PT Systems are broke.

Data: Yr. 2013-14

Agencies	CPKM (Rs.)	EPKM (Rs.)	Viability Gap
Ahmedabad MTS	58.38	26.56	-31.82
The Brihan Mumbai Electric Supply &Transport Undertaking (BEST)	77.53	53.75	-23.78
Bangalore Metropolitan Transport Corporation (BMTC)	36.99	35.42	-1.57
Chandigarh Transport Undertaking (CTU)	47.55	30.64	-16.91
Delhi Transport corporation (DTC)	120.67	37.57	-83.1
Metro Transport Corporation (Chennai) (MTC)	39.76	36.38	-3.38
Navi Mumbai Municipal Transport (NMMT)	45.92	39.51	-6.41

Outsourced operations have brought down the CPKM to around Rs..40-60 / km in some systems, leading to lowering of costs. But EPKMs are still lower,

Source: http://www.wrirosscities.org/sites/default/files/BusKaro-Dec11.pdf

Operating deficits do not allow for accumulated earnings for capacity creation.

Table 3:Select Financial Parameters of SRTUs plying in Metropolitan Cities during 2014-I5

Sr. No.	Name of State Road Transport Undertaking (SRTU)	Total Revenue (Lakhs)	Total Cost (Lakhs)	**Surplus / Deficits**
I	Ahmedabad MTS	13,011	35413	**-22402**
2	BEST Undertakings	150,856	235503	**-84647**
3	Bangalore Metropolitan TC	225,684	232175	**-6491**
4	Calcutta STC	7,241	23191	**-15950**
5	Chandigarh TU	11,107	18139.97	**-7033**
6.	Delhi TC	111,321	510468	**-399147**
7	Metro TC (Chennai) Limited	137,652	159599	**-21947**
8	Pune Mahamandal	70,738	87507	**-16769**
	Total (SRTUs plying in metropolitan cities)	727,610	1301995.97	**-574386**
	Share of SRTUs plying in metropolitan cities as proportion of total reporting SRTUs (%)	1029	1488	**3425**

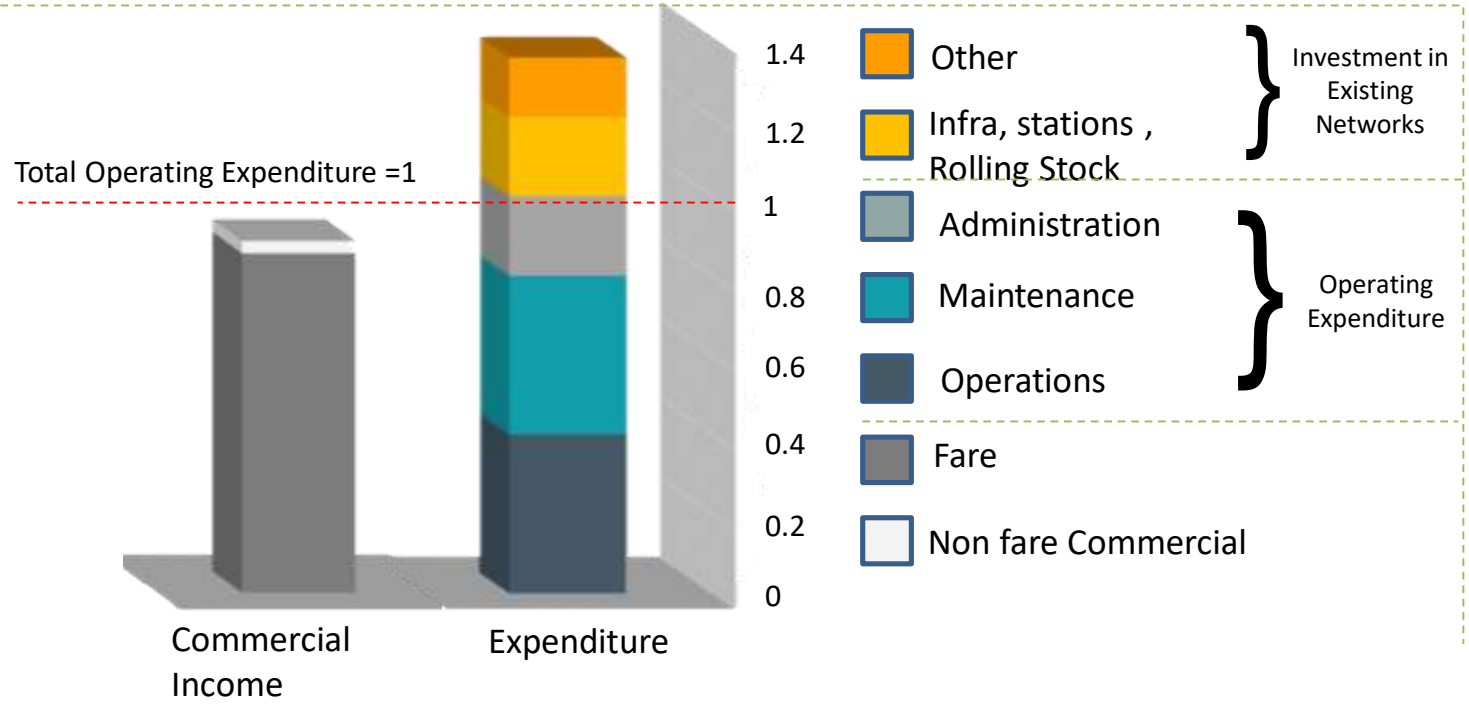
Source: Review of Performance of SRTUs 2014-15

Even at the aggregate levels, all systems live with deficits.

How to cover high cost of Construction, Operations, Maintenance?.....

Comet and Nova are metro membership organisations comprising 27 members.

Total Operating Expenditure and income from COMET and Nova Metros (Using data 1994-2009)

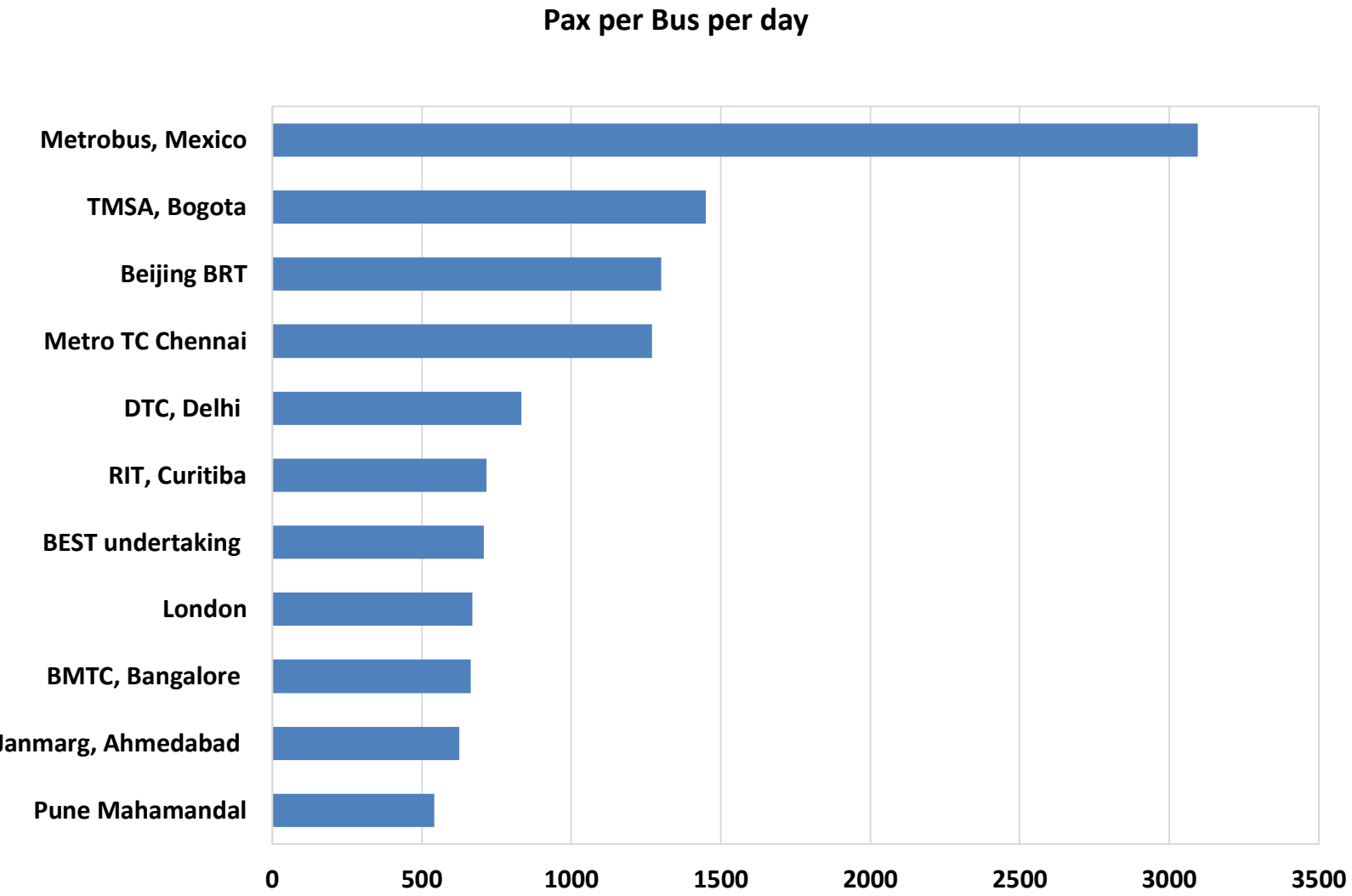


Study aggregated financial data from 26 member metros across 1994-2008. Key lessons :

- Most metros are barely able to cover the usual Operating expenses (average 11% shortfall) using fare revenues + advertisement/retail.
- Other than usual O&M expenses, recurring capital investments in existing networks is a huge expense.
- Other common sources of funding
  - Concessionary fare support,
  - Operating revenue gap support and
  - Capital grants
- Other sources such as Congestion charges in London, Employment Tax in France and fuel levy in Canada are have provided dependable cash streams to these metros.

Source: Richard J. Anderson, Improving Fares and funding policies to support Sustainable Metros,2011

Some global exceptions are benefited by higher trips per bus.



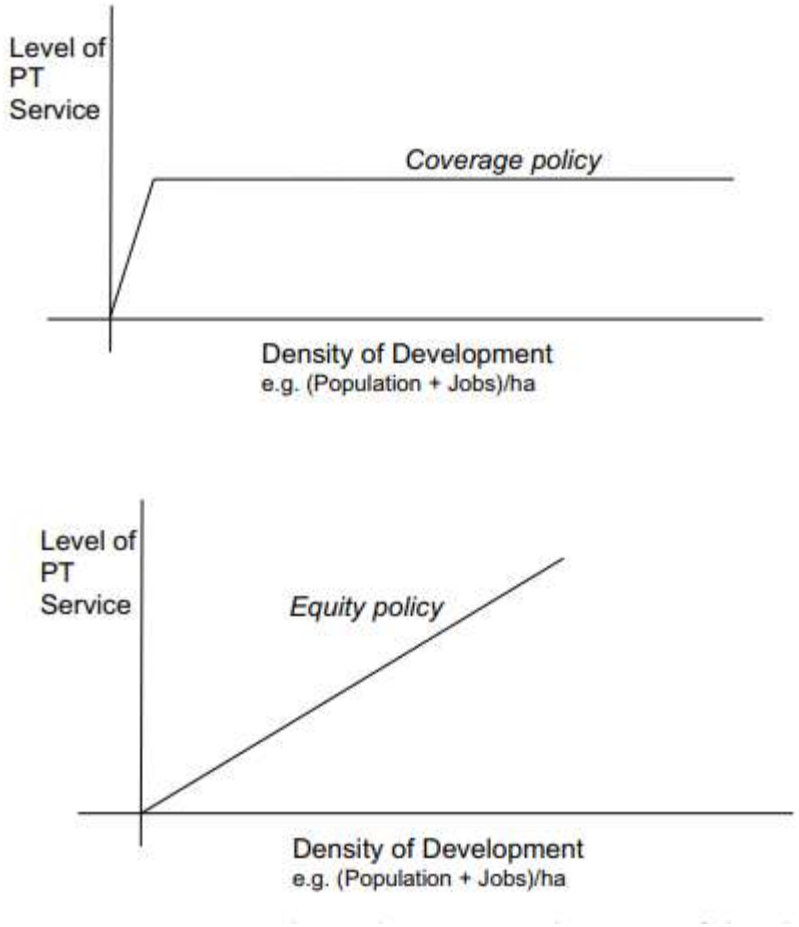
Some systems are able to recover operating costs from fare revenues due to two reasons :

- Asset use efficiencies in terms of boardings per day are higher and/or
- Highers Fares afforded by the patrons due to higher average incomes.

However these are rare exceptions, and PT Systems have to rely on other methods to remain viable

- Systems can focus on either higher patronage or higher coverage as a Policy stance.
- Patronage focused systems respond mainly to busy routes with higher capacity. In such a focus, coverage of sparsely populated areas at the peripheries suffer.
- Coverage focused systems tend to offer services to even low density areas without regard to ridership.
- Higher coverage leads to lower occupancies and lead to lower revenues vis-à-vis expenses.
- A conscious policy stance, perhaps towards a balanced approach of both coverage and patronage needs to be taken, accepting inevitability of some losses.

The Patronage v/s Coverage trade off



Source: Walker, Jarrett, Purpose-driven public transport: creating a clear conversation about public transport goals,

Designing the Solution

Investments required in Urban Transport during 12th Five Year Plan

Nature of Projects	Investments (Rs. Crores)
Street Infrastructure	1,67,218
Public Transport	2,02,628
ITS and ATC	8,520
Parking	1,943
Institutions and Capacity Building	5,000
Innovations, R&D & Pilot projects	1,000
NMT and IPT projects	2,000
Total	**3,88,308**

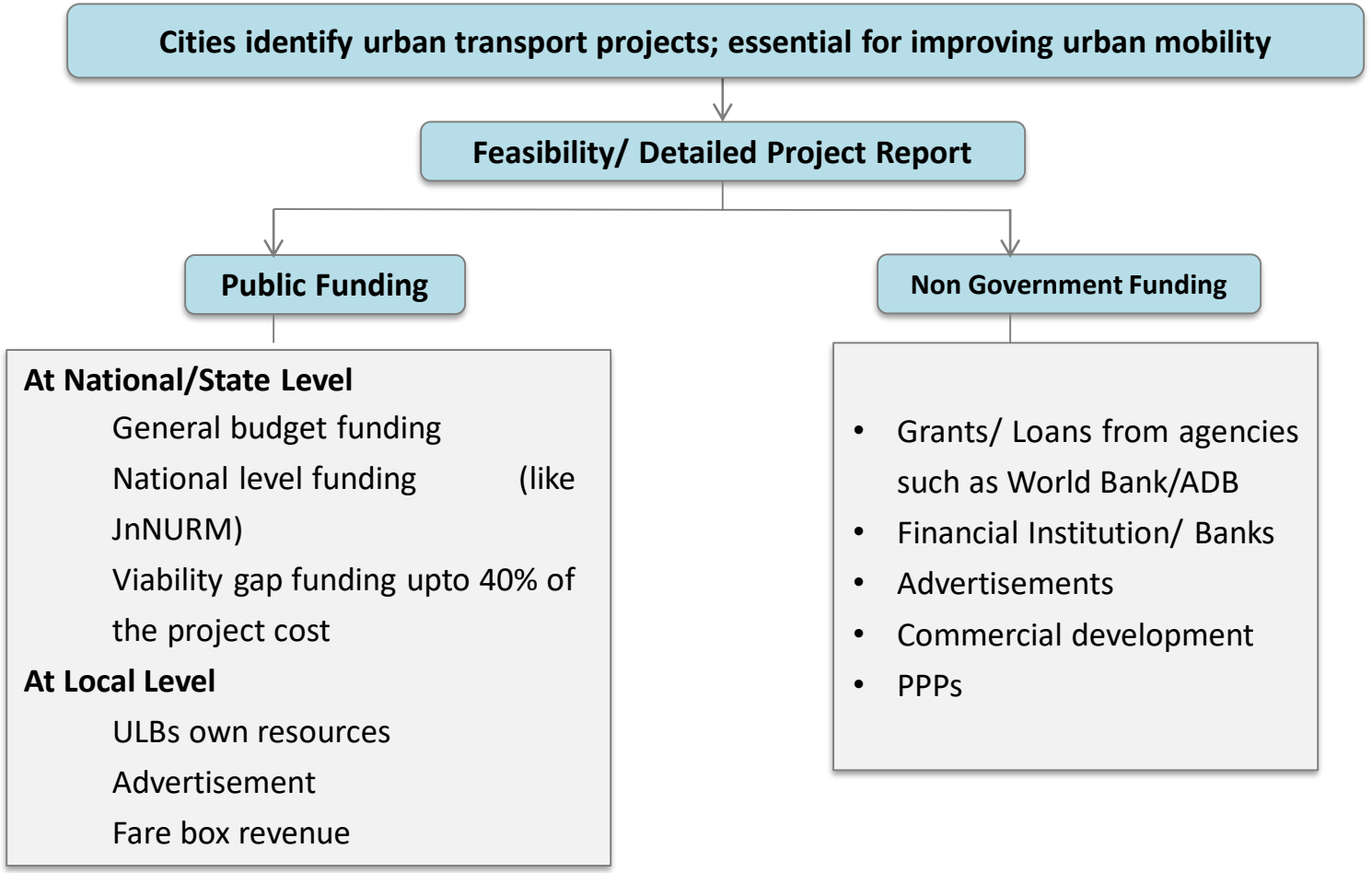
- Source : 12th Five Year Plan - Working Group on Urban Transport

PT Improvement projects as per CMPs of Cities

Phases	Project Cost (Rs crores)
Phase I : Immediate Projects : 2014-2015	125.40
Phase II : Short Term Projects : 2016-2019	549.01
Phase III : Medium Term Projects : 2020-2025	2022.53
Phase IV : Long Term Projects : 2026-2031	3051.99
Total	**5748.93**

The timidness of the proposals in CMPs show the cities are not yet fully seized of the Urban Transport crisis facing them.

Source: DMRC Annual report 2015-16



Poor clarity on policy or principles based on which cities are allocated or supported for funding. Ad hoc mechanisms for each type of project.

First time funding for buses came in 2007-09 under JnNURM. Now FAME.

Funding tends to move from dept to dept (MORTH, MOHUA, DHI)

Generally, larger funding needs tend to move up to Central Govt.

Project	Length (Km)	Status	Total Project Cost	Govt. Equity	Multilateral Debt	Other Sources
			Rs. Crore			
Kolkata Metro (N-S Corridor and Extension)	16.5 + 8.7	Operational	NA	100%	Nil	Nil
Kolkata Metro (E-W corridor)	13.74	Under Imp.	4676	55%	45% (JICA- ODA)	Nil
Delhi Metro (Phase 1)	65.1	Operational	NA	30%	60% (JICA- ODA)	10% Sub debt by GOI
Delhi Metro (Phase 2)	82.11	Operational		44% (Equity, Internal Acc., Property Dev.)	46% (JICA- ODA)	10% GOI Sub debt
Chennai Metro	45	Under Imp.	14600	30% (15% GOI and GOTN each)	59% (JICA- ODA)	11% Sub debt by GOI & GOTN
Bangalore Metro	41.7	Under Imp/Oper..	8156	30% (15% GOI and GOKN each)	45% (JICA- ODA)	25% Sub debt by GOI and GOKN
Jaipur Metro	12+23	Operational	3151 (Ph I) 6581 (Ph II)	43.3%	56.7% (JICA)	Nil

Indian Practices in Funding PT : PPP Metros

Projects	Concessionaire	Project cost	VGF	Revenue Share (pa)	Means of Finance	
		Rs. Crore			Equity	Debt
Delhi Metro Airport Express Link (Revenue Share Model)	JV of Reliance Infra. Ltd. and Construcciones y Auxiliar De Ferrocarriles (CAF) of Spain	TPC Rs. 5700 crore. Cost for the concessionaire: Rs. 2800 Crore	Nil	Approx Rs. 51 Crore pa and 1% to 5% share in gross revenue	30%	70% 17.25 years Term loan by consortium of 8 banks lead by Axis bank
Hyderabad Metro (VGF Model)	L&T Metro Rail (Hyderabad) Ltd.	16378	1458 (9% of TPC)	Nil	21% (Rs. 3440 Crore)	70% (Rs. 11480 Crore)
Mumbai Metro - VAG Corridor (VGF Model)	Mumbai Metro One Pvt. Ltd. –JV of Reliance Energy Ltd and Violia Transport of France	2356	650 (28% of the TPC)	Nil	22% (Rs.513 Crore)	50% (Rs. 1194 Crore)

Global Practices in Funding PT

1. Using Property Development [Hong Kong/London (partly)]

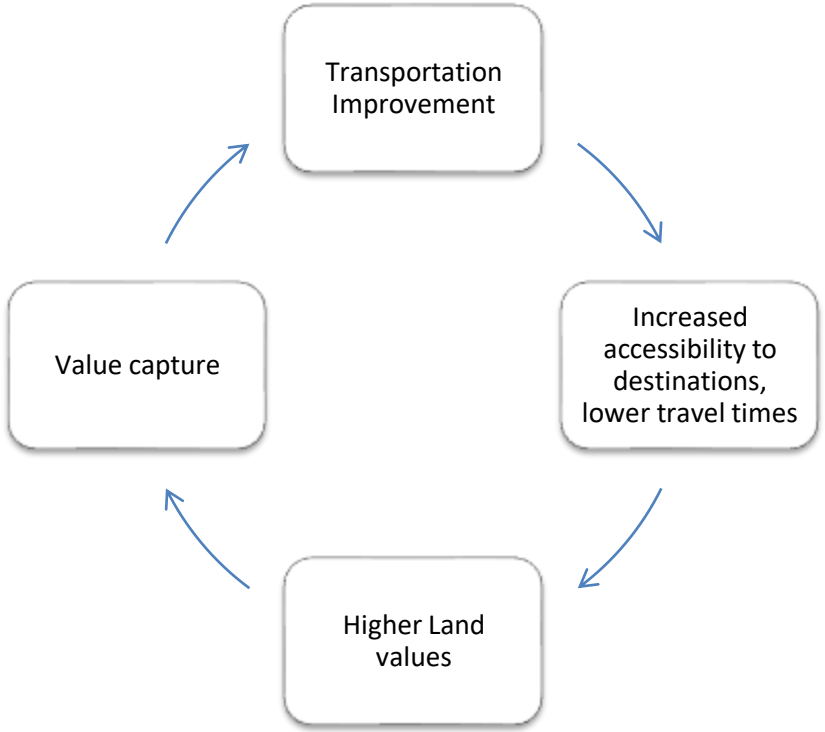
2. Govt. supply of capital items or capital costs and outsourcing of transit operations on GCC to reduce cost (Singapore, London)

3. Congestion Pricing / Property Taxes (London)

4. Direct Subsidies to target groups (Bogota) combined with full pricing of transit services

5. Paris transit system, RATP, charges local and national governments a "compensatory indemnity" for keeping fares below the break-even price. Governments recover this from an employment tax.

6. Land Value Capture



- **Bogota Model is Higher Version of GCC. The entire revenue generated from the system is distributed among the vendors in proportion to their operational costs through an Escrow arrangement.**

- The Payment System in Bogotá is broadly as follows;

  - **Determination of Technical Fare:** Total System Cost per km / Estimated passengers per km.

    Total System Cost includes bus operation cost (Trunk + Feeder lines), ITMS cost and Fare Collection Cost.

  - Technical Fare is paid to operator on per km basis and is revised every six months

  - Actual Fare = Technical Fare to start with

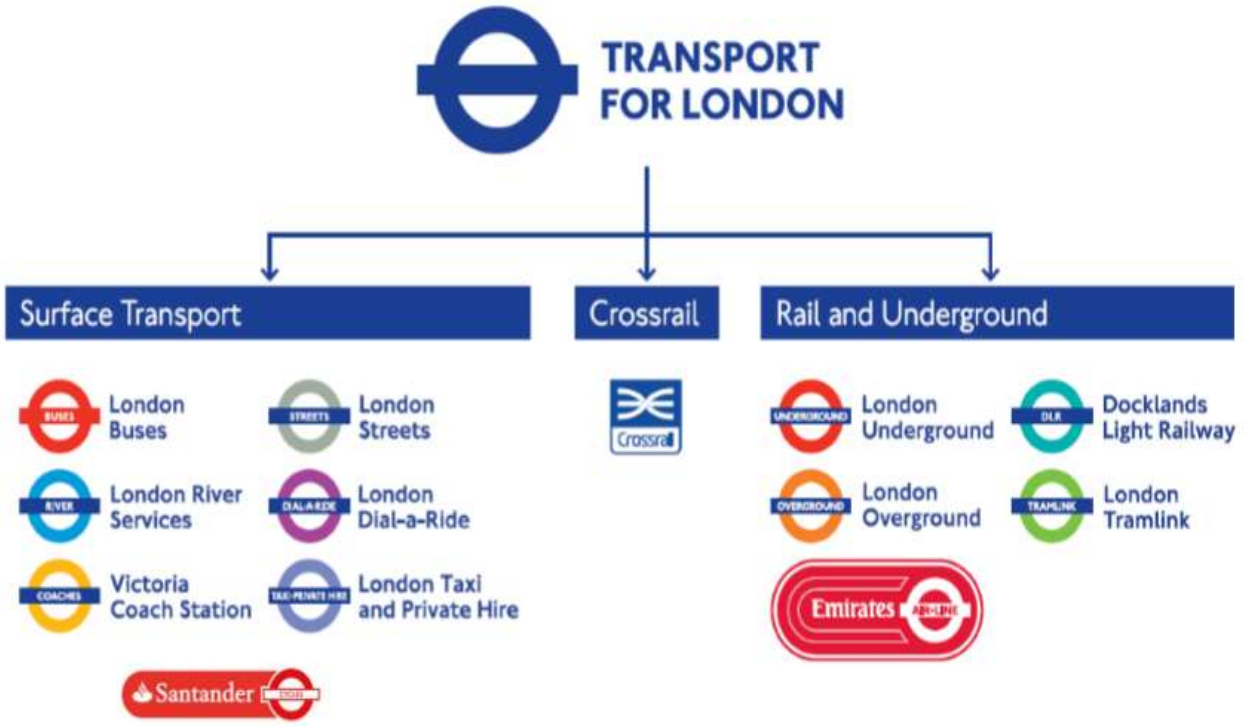
  - Revision to Technical fare is based on two components

    - Change in Inflation of fuel, consumables and Minimum wages decreed by the Govt. from time to time

    - Change in ridership levels for which, for losses in ridership upto a point, actual fares are revised to recoup the loss in system revenue

  - The risk of change in ridership levels up to a point is thus shared by the operator.

Colombian law (Law 86 of 1989, Article 14) requires that public transport systems operate at self sufficient levels with fares set at " cost recovery" and that city government does not subsidize the system



Three Sources of TfL Funding

Head	Sources
Revenue	• Fares from Buses, Tube • Over ground and DLR revenues • Congestion Charging • Cycle Hire • Emirates Cable Car • Commercial Dev and Property Rental • Advertising
Grant	• Central Govt.'s Transport Grants • Business Rates • Third Party Funding for Specific Projects
Borrowings	• Subject to Local and Central Govt. limits

Source: DMRC Annual report 2015-16

TfL Budget for Year 2014-15

Billion Pounds

Expenditure		Income	
Service improvments	4.25	Grant Funding	2.73
		Cross Rail Funding	1.64
Operating Exp.	6.65	Fares	4.36
		Other Income	0.76
		Borrowings	1.42
Total Expenditure	**10.9**	**Total Income**	**10.9**

- TfL budgets required to be balanced by law
- Deficit in Operating Expenditure financed through borrowings.
- TfL has unlimited backup to Central Funds as emergency liquidity support by law
- Based on budgets such as above, Govt has entered into a multi year Funding Agreement with TfL.
- **Almost all Capacity additions financed through Grants and Budgets .**

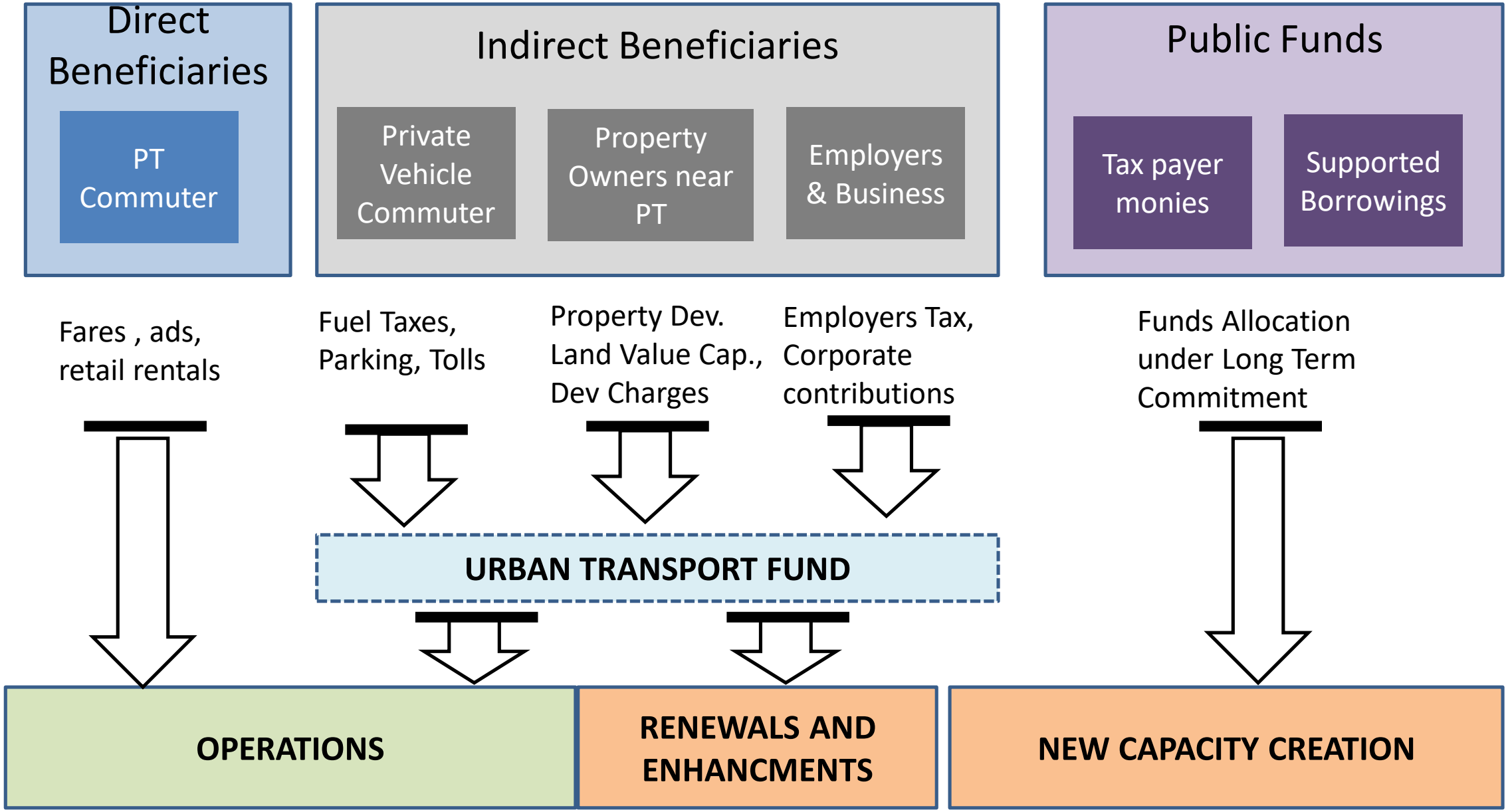
Designing the Solution : Identifying the Beneficiaries

- Direct PT Users

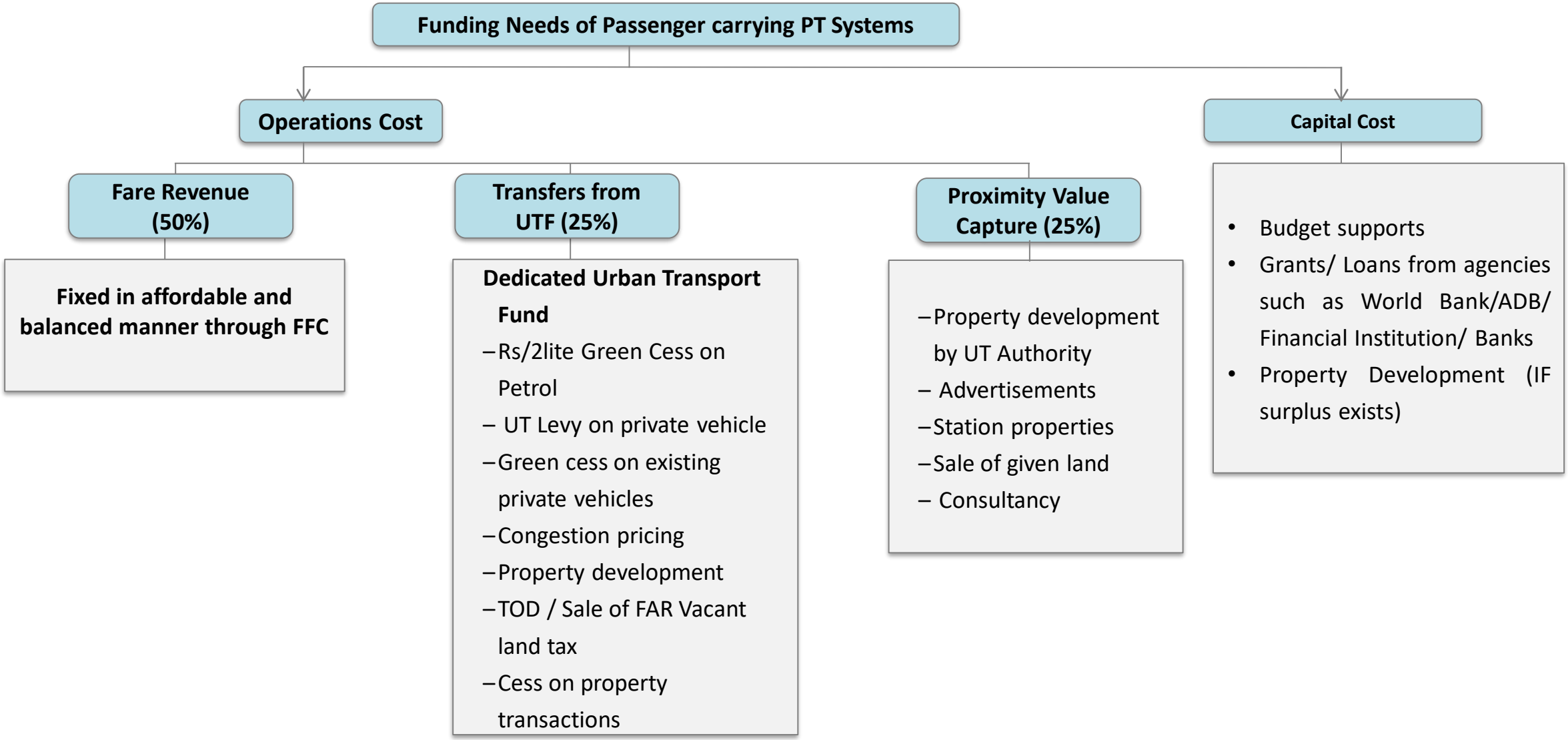
- Non PT users who benefit from Lower congestion

- Employers of PT users who benefit since they don't have to pay higher wages
- Rise in property prices of residents near PT stations
- Education, health and recreation bodies for whose services access is created
- Social services which become accessible

Wider society which benefits from lower pollution, lower accident risk, increased employment opportunities and enhancement of competitiveness and GDP due to augmented productivities.


Direct Beneficiaries
PT Commuter
Indirect Beneficiaries
Private Vehicle Commuter
Property Owners near PT
Employers & Business
Public Funds
Tax payer monies
Supported Borrowings
Fares , ads, retail rentals
Fuel Taxes, Parking, Tolls
Property Dev. Land Value Cap., Dev Charges
Employers Tax, Corporate contributions
Funds Allocation under Long Term Commitment
URBAN TRANSPORT FUND
OPERATIONS
RENEWALS AND ENHANCMENTS
NEW CAPACITY CREATION

Designing the Solution :Proposed Model for Funding



- We have a huge Affordability problem in Public Transport which we haven't yet fully acknowledged.

- We also have a financial sustainability problem which we are not addressing.

- This seems to be due to
  - Pricing distortions - private transport continues to be hugely subsidized at the expense of Public Transport
  - Inability to capture benefits arising from Public Transport and make the polluter pay
  - (iii) Faulty Fare policies and
  - (iv) Insistence that Public Transport must be profitable

- The solution lies in (i) Policy action to reduce incentives to Private Transport (ii) Supporting financing of PT through a combination of financing instruments.

Thank You