

LEADERS IN URBAN TRANSPORT PLANNING AND MANAGEMENT PROGRAMME- 7

## STRATEGIES FOR TRANSIT RIDERSHIP ENHANCEMENT – A CASE OF KOCHI METRO



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# INTRODUCTION

## BACKGROUND

- A rapidly growing city like Kochi makes ever-increasing demands on urban infrastructure in general and transportation amenities in particular
- As a solution Metro was opened for the public in 2017 for the corridor between Aluva- Maharajas (18.4 kms) by Kochi Metro Rail Corporation (KMRL)
- On September 3<sup>rd</sup> it was extended till Thykoodam (additional 6.76 kms) which will be further extended to a total of 28.46 Kms when the whole Phase 1 gets completed in 2021.
- The expected rider ship for 2020 till Maharajas Metro station is around 3.4 lakh/day and the ridership was only 35k to 45k/day.
- After the opening of Thykoodam Stretch ridership has been improved to 65k/day against the projected 3.6 lakh/day

## THE SCOPE

- To identify, analyze and assess the existing ridership and revenue strength of KMRL and to suggest the strategies for enhancing the ridership and there by increasing the revenue generation

## THE LIMITATION

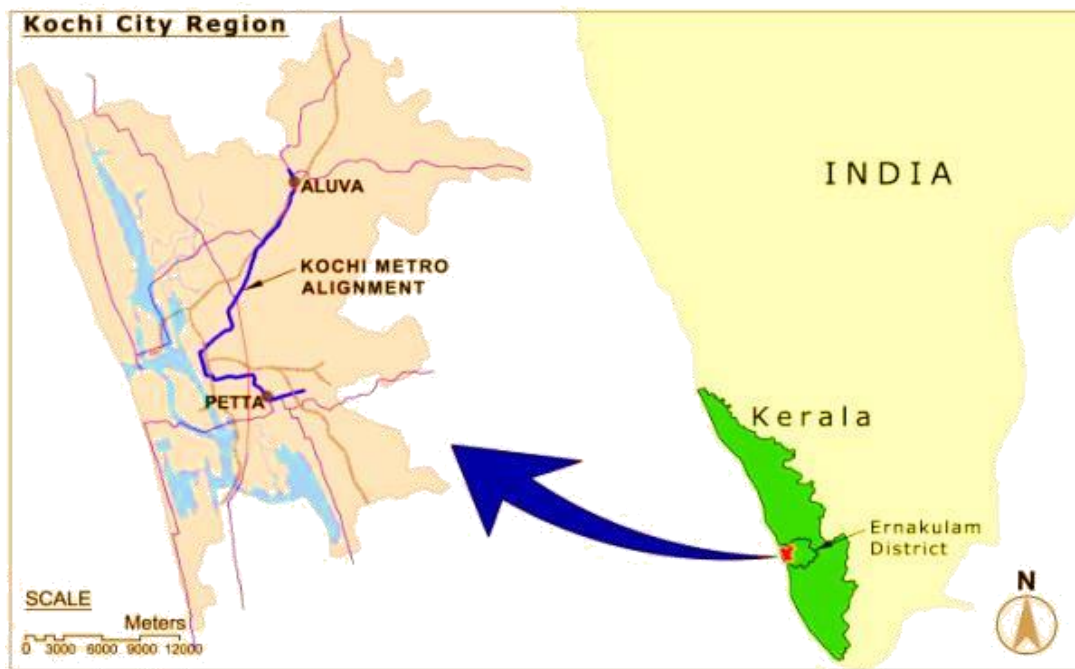
- The study focused on strategies as a whole and fare box revenue in particular

# METHODOLOGY

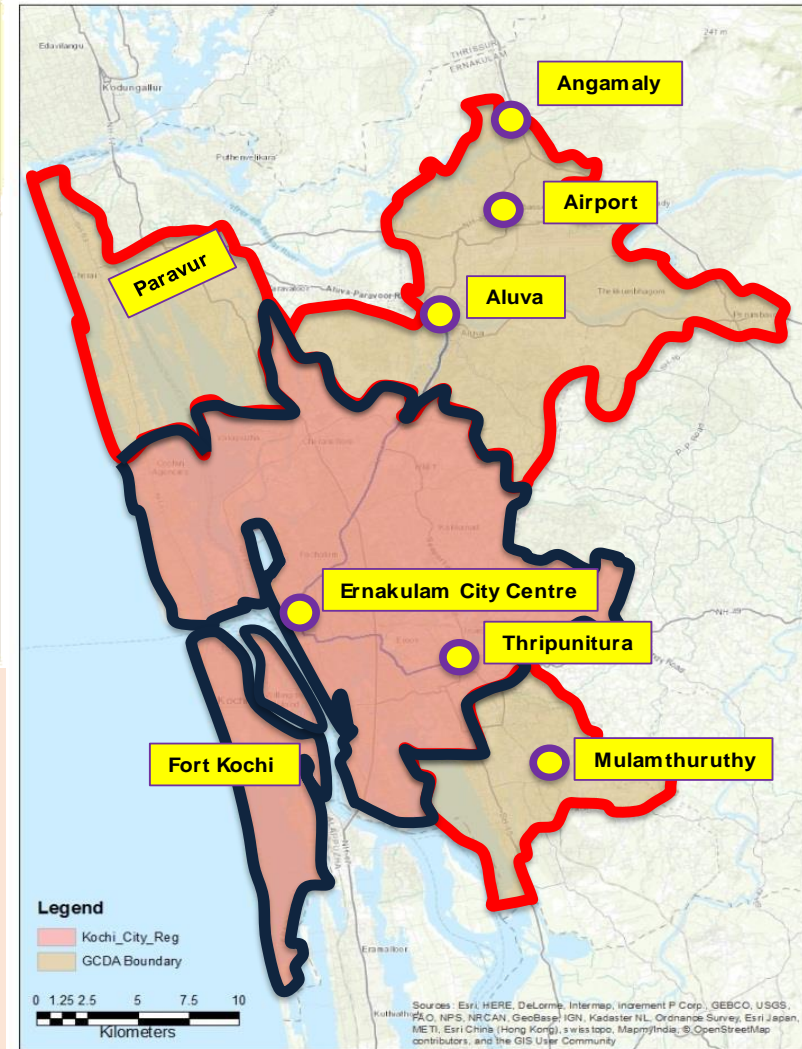
## **APPROACH TO THE PROBLEM**

- Background study about Kochi and Kochi Metro initiatives
- Identification of strategies and analysis
- Analysis of the Ridership Vs Revenue of case scenarios
- Setting up of a road map for strategies with prioritization

# KOCHI-CITY BACKGROUND



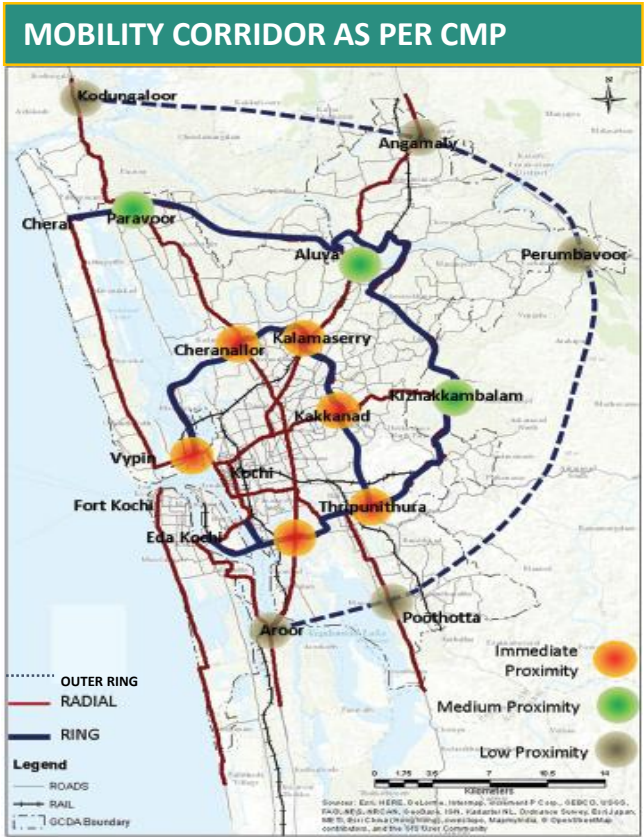
- Greater Kochi has a population of 20.01 lakhs (Census, 2011), it is ranked as the seventeenth largest city in the country.
- Comprises Kochi Municipal Corporation, 9 Municipalities and 29 Panchayats.
- The total area under consideration is 632 Sq. km.
- Density (PPHA): 32



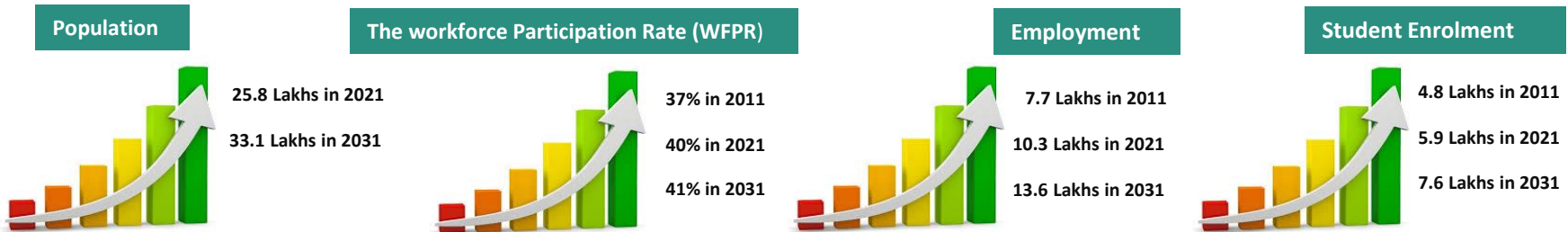
— GCDA Boundary — Kochi City Region



# GREATER KOCHI- MOBILITY TRENDS

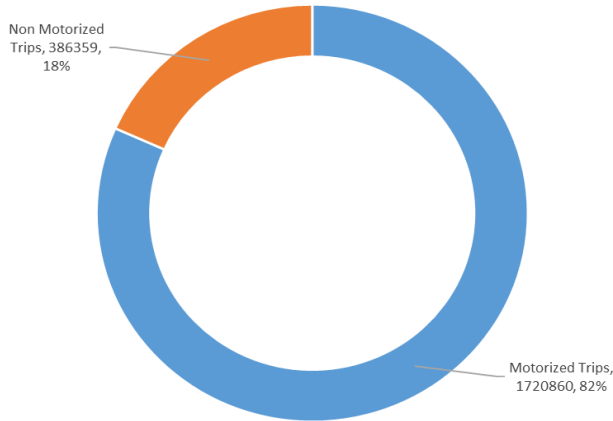


- Transport pattern and road usage skewed against public transport towards personal transport vehicles
- 75% of roads with width of less than 10 m
- Buses account for 4% of the daily trips in Kochi, but they carry around 49% of the passengers moved.
- Cars account for 27% of the daily trips, but move only 12% of the passengers.



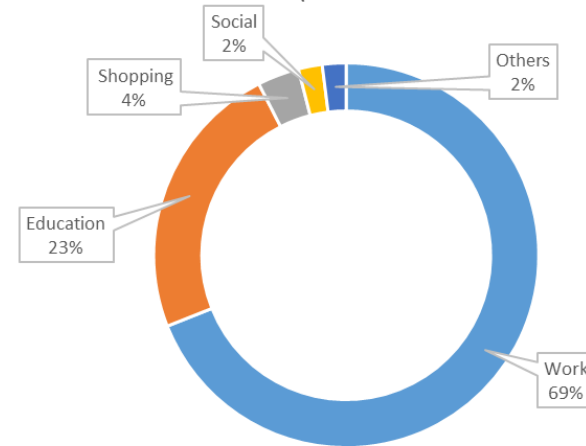
# MOBILITY LEVELS

DAILY TRIPS



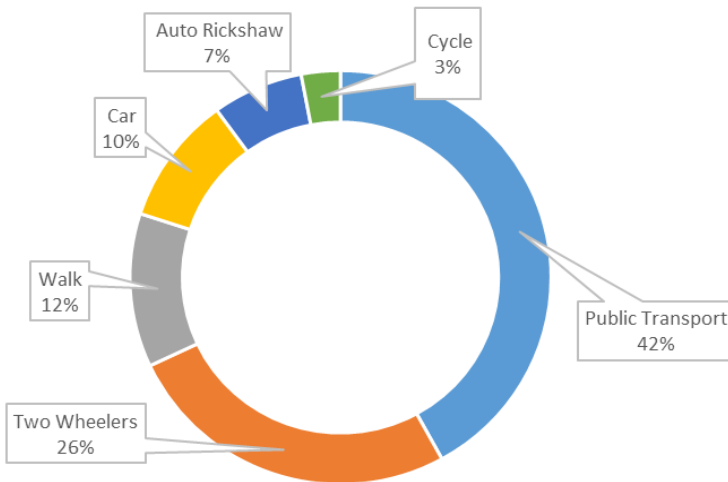
■ Motorized Trips ■ Non Motorized Trips

TRIP PURPOSE (% SHARE BY PURPOSE)



■ Work ■ Education ■ Shopping ■ Social ■ Others

MODAL SPLIT



■ Public Transport ■ Two Wheelers ■ Walk ■ Car ■ Auto Rickshaw ■ Cycle

Average trip length (Km) - All trips and Motorised trips 10.875 KM, 10.6 KM

- Total Road length: 1168 Km
- Primary road network length: 273 Km
- Registered Transport Vehicles – 71,675
- Registered Non-Transport Vehicles – 5,65,271
- Para Transit / NMT (Estimated Daily Ridership)
  - Auto Rickshaw : 7.4 lakh pax trips
  - Taxi : 8,000 pax trips
  - App based cab : 32,000 pax trips
  - E-Rickshaw : 2,400 pax trips

# KOCHI INTEGRATED PUBLIC TRANSPORT

## Integrated Public Transport Map

### മുദ്രശേഖ | Legend

- നിലവിൽ പ്രവർത്തനരേഖാഗതമായ ലൈൻ (ഘട്ടം 1)  
Currently Operational line (Phase 1)
- നിലവിൽ നിർമ്മാണം പുരോഗമിക്കുന്ന ലൈൻ (ഘട്ടം 1, ഘട്ടം 1A)  
Construction work in Progress (Phase 1, Phase 1A)
- നിർദ്ദിഷ്ട ഘട്ടം 2  
Proposed phase 2
- നിർദ്ദിഷ്ട ഘട്ടം 1B  
Proposed phase 1B
- മുഖ്യ റോഡുകൾ  
Major Roads
- ഇന്ത്യൻ റെയിൽവേ ലൈൻ  
Indian Railway line
- വാട്ടർ മെട്രോ  
Water metro

ഘട്ടം 1  
Phase 1  
Aluva - Putta

ഘട്ടം 1A  
Phase 1A  
Putta - S N Junction

ഘട്ടം 1B  
Phase 1B  
S N Junction - Tripunithura

ഘട്ടം 2  
Phase 2  
J L N Stadium - Info Park

■ റെയിൽവേ കണക്ടിവിറ്റി  
Railway connectivity

■ ബസ് കണക്ടിവിറ്റി  
Bus connectivity

■ വാട്ടർ മെട്രോ  
Water metro

○ സ്റ്റേഷൻ  
Station

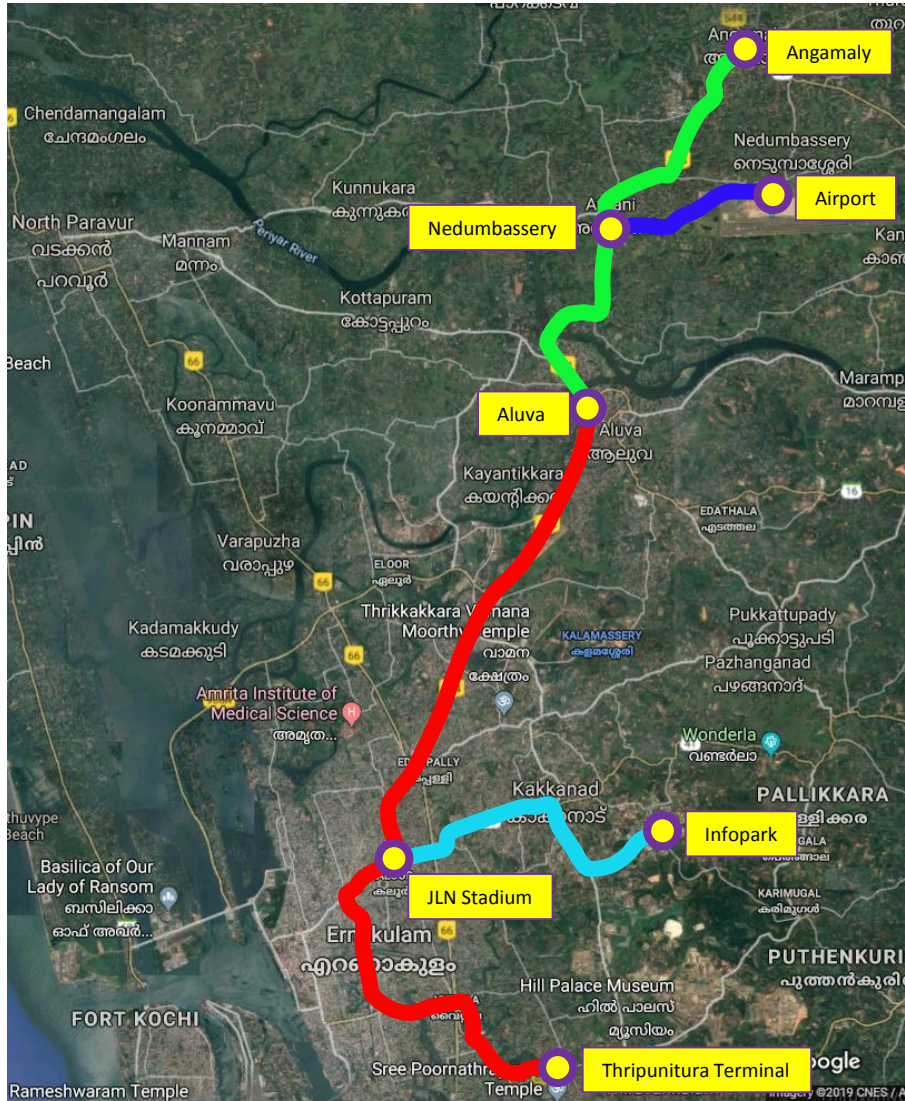
○ ഭാവിയ്ക്കുള്ള സ്റ്റേഷൻ  
Future Station

○ ഭാവിയ്ക്കുള്ള ഇന്റർചേഞ്ച്  
Future Metro Interchange





# KOCHI METRO RAIL NETWORK



## PHASE – I ALUVA TO THRIPUNITURA TERMINAL

- Total Alignment Length - 28.36 Km
- No.of Stations - 25 Nos.



23.88 Km with 21 stations under Operation



1.28 Km with 1 station - ROD in December 2019



3.2 Km with 3 Stations - Design & Implementation Stage.  
Expected completion in July 2022

## PHASE – II JLN STADIUM TO INFOPARK VIA KAKKANAD

- Total Alignment Length - 11.20 Km
- No.of Stations - 11 Nos.



Awaiting approval from GoI

## PHASE – III ALUVA TO ANGMAHY WITH AIRPORT LINK

- Total Alignment Length - 19.25 Km
- Aluva to Angmaly - 14.25 Km
- Airport link - 5.00 KM
- Total No.of Stations - 14 Nos.
- Aluva to Angmaly - 11 Nos.
- Airport link - 5 Nos.

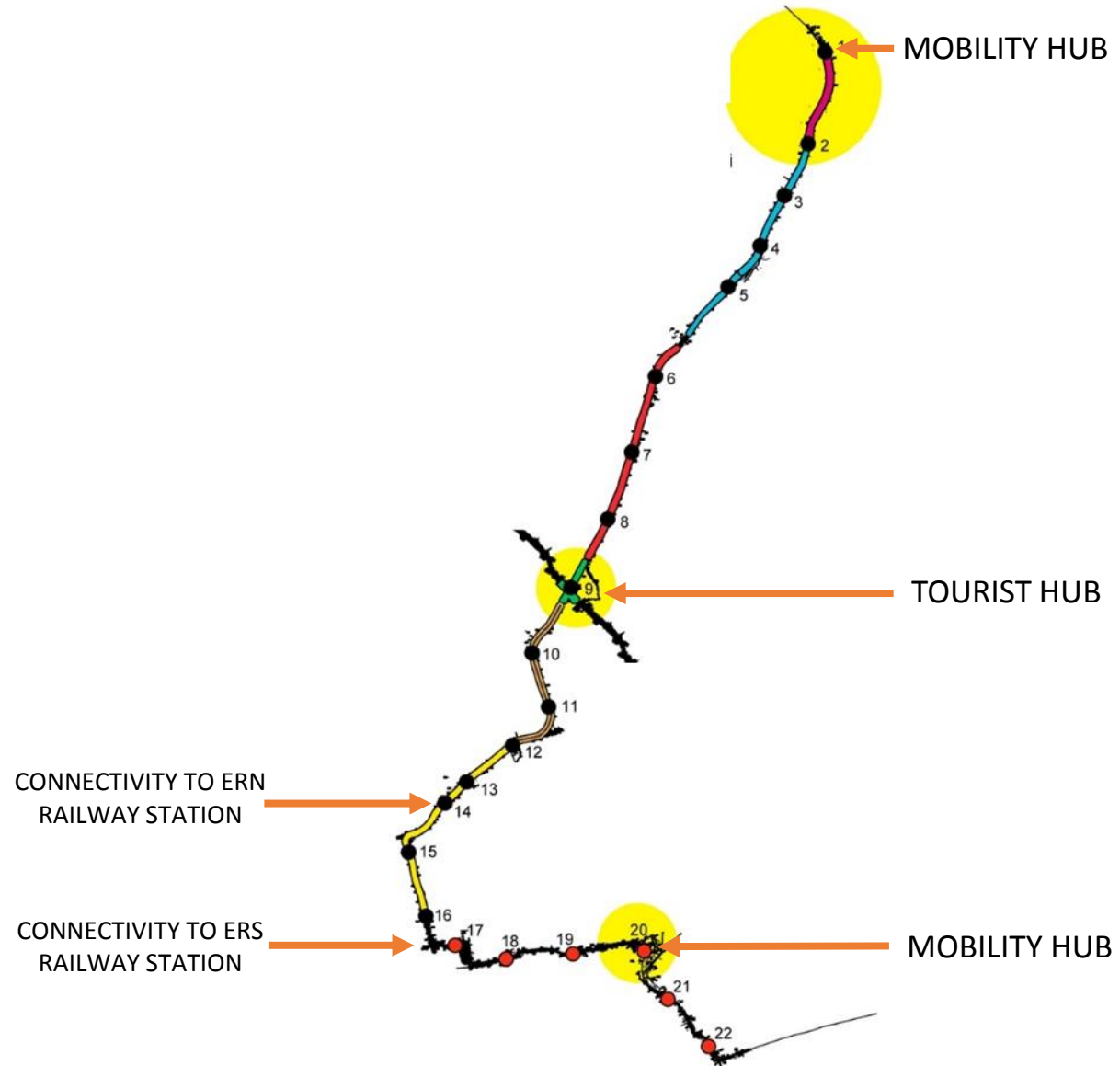


DPR Prepared

# KOCHI METRO STATIONS

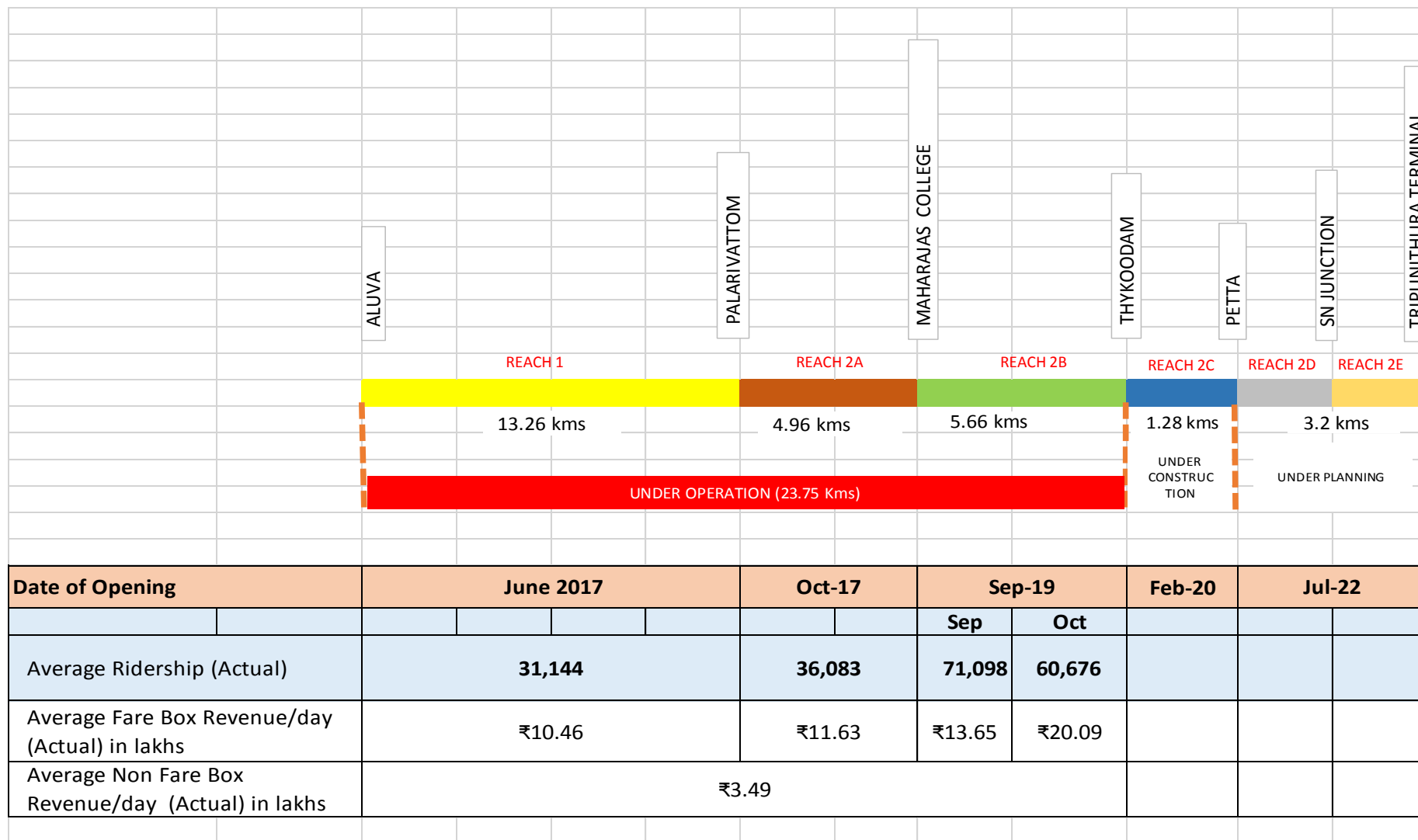
## LIST OF STATIONS

1. Aluva
2. Pulinchodu
3. Companypady
4. Ambatukavu
5. Muttom
6. Kalamassery
7. Cochin University
8. Pathadipalam
9. Edapally
10. Changampuzha park
11. Palarivattom
12. J L N Stadium
13. Kaloor
14. Lissie
15. M G Road
16. Maharaja's college
17. Ernakulam South
18. Kadavanthra
19. Elamkulam
20. Vyttila
21. Thaikoodam
22. Petta



# METRO RIDERSHIP SCENERIO – REACH WISE

Currently 23.75 kms is operational and another 4.5 kms is under construction to complete Phase I





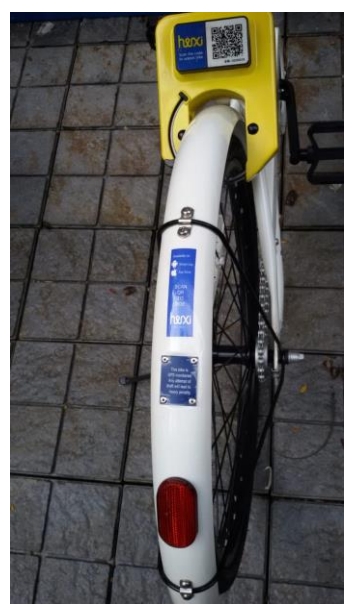


**ATMA**  
ആത്മീയ കൂട്ടി സന്തോഷം  
വിശ്വം സന്തോഷമാക്കട്ടെ

From: 10th September 2019 To: 30th September 2019

For e-mail: [atma@kmrl.com](mailto:atma@kmrl.com)

**സന്തോഷത്തിന്റെ**  
**metronam**



**Patronage surges, metro makes operating profit**  
Poor condition of city roads makes Kochi metro an attractive travel proposition

**Potholed roads unsparring on public transport network**

The Kochi Metro Rail Corporation (KMRC) has reported a significant increase in passenger patronage since the start of the year, which has helped it achieve an operating profit for the first time. The company's revenue for the first quarter of 2019 was ₹1.25 crore, compared to ₹0.85 crore in the same period last year. The increase in patronage is attributed to the company's efforts to improve the quality of its services, including the introduction of new train models and the expansion of its network. The company's operating profit for the first quarter was ₹0.15 crore, compared to a loss of ₹0.10 crore in the same period last year. The company's revenue for the first quarter of 2019 was ₹1.25 crore, compared to ₹0.85 crore in the same period last year. The increase in patronage is attributed to the company's efforts to improve the quality of its services, including the introduction of new train models and the expansion of its network. The company's operating profit for the first quarter was ₹0.15 crore, compared to a loss of ₹0.10 crore in the same period last year.

**യാത്രകൾക്കൊരു CHANGE**  
നവോത്ഥാന യാത്രകൾക്കൊരു മാറ്റം

**നന്മക്ക് ആദരം**

**100% ആനന്ദം**

ഈ ലക്ഷ്യം നേടാൻ ഹിന്ദിയിൽ 100% വിജയം നേടാൻ കോട്ടയിൽ സന്നദ്ധതയുണ്ട്

# INITIATIVES BY KMRL FOR RIDERSHIP ENHANCEMENT

**ഒരു പാസിൽ അങ്ങിമിറ്റഡ് യാത്രകൾ**

**DAY PASS ഉപയോഗിച്ച് മെട്രോയിൽ അങ്ങിമിറ്റഡ് ആയി കറങ്ങാം!**

**Kudam, Pongal, Mithai in comfort food of Kerala**

**PUTTU**



# INITIATIVES BY KMRL FOR RIDERSHIP ENHANCEMENT



## 1. Initiatives for inducing growth

- Proposals like Metro village and Metro city along the existing and proposed corridors
- Aluva and Tripunithura metro stations as terminal stations facilitating park and ride
- Edapally Metro station as tourist hub

## 2. Urban Design, Aesthetic improvement and Site Planning Initiatives

- Approximately 30 kms of road with footpaths have been developed by KMRL along the metro corridor with footpaths and cycle tracks
- Cycle tracks at Aluva and Kadavanthra promoting NMT
- Direct Interconnection between LuLu and Chennai Silks to Metro Stations
- 5.6 Acres of land worth 44 Cr is available for mixed use development
- Theming of stations based on themes such as movies ,food etc.



# INITIATIVES BY KMRL FOR RIDERSHIP ENHANCEMENT

■ Extended timing will help train travellers

## Commuters want more Metro hours

DC CORRESPONDENT  
KOCHI, SEPT. 5

The demand for extending operating hours of the Kochi metro has gained pace with the service enjoying increased commuter patronage post opening of the Maharaja's College-Thykoondam line. The rest of the metro systems such as the Delhi Metro Rail Corporation and 'Namma Metro' (Bangalore) have extended period of services than the Kochi Metro, especially in lines connecting the major railway stations.

The first service in the Airport Express Line from New Delhi railway station to IGI airport starts at 4.45 am while the last service is at 11.15 pm. 'Namma Metro' operates from 5 am to 11 pm while the Kochi Metro services begin at 6 am and the

■ Delhi metro runs from 4.45 am to 11.15 pm; 'Namma Metro' from 5 am to 11 pm. Kochi Metro timings are from 6 am to 10 pm

last trip from Thykoondam is at 10 pm.

"After the introduction of metro, several private city buses have wound up operations," said Ebenezer Chullikad of the Greater Cochin Development Watch. "After 8 pm, there are very few city buses. The metro authorities should extend the time of operation at least by half an hour in the night."

The demand is being made by a large section in the social media handle of the Kochi Metro, saying that the same would be beneficial to those travelling by early trains such as the Executive

Express or the Intercity Express.

"A main reason for increased patronage is the commuters travelling in the South railway station-Vyttila Hub section. Many long haul trains arrive late or depart in the early morning hours and the metro authorities should give a serious thought of extending the operating hours. The frequency of services could be 15 to 30 minutes instead of the usual five to seven minutes," said P. P. Krishnakumar, a member of Zonal Railway Users Consultative Committee.

When contacted, KMRL managing director APM Muhammed Hanish was non committal. Sources, however, said the move will require additional shift for staff instead of double shifts and hence will entail more financial burden.

### 3. Initiatives to Increase System Capacity

- The operations are currently fulfilled with 16 train sets, with headway of around 7 minutes which can be reduced to a minimum of 3 minutes. KMRL currently achieves an average punctuality rate of 99.83%.
- Average ridership 35843 and average earning of Rs 11,45,072 per day till date from ROD.

### 4. Initiatives to Improve Service Quality

- Feeder Services:- Total 16 E-Autos are running for different locations. Share auto basis also been introduced recently. Average 450 kms per day travelled by passengers as part of the last mile connectivity measures.
- Bicycle sharing services:-Public bicycle sharing schemes are in place for five stations. Hero Cycles have been planned to operate the services shortly at various stations.
- Engagement of Women cooperative society-Kudumbashree for facility management at stations ensuring people's participation
- Association with google for live information on transit availability on google maps
- First metro agency to offer info via apps for free use as open data



KOCHI METRO RAIL LIMITED



#### സമയമാറ്റം

ഓണക്കാലത്തെ തിരക്കും, യാത്രക്കാരുടെ സൗകര്യവും കണക്കിലെടുത്ത് സെപ്റ്റംബർ 10, 11, 12 തീയതികളിൽ മെട്രോ സർവീസുകളുടെ സമയം നീട്ടിയിരിക്കുന്നു. ഈ ദിവസങ്ങളിൽ ആലുവ, തൈക്കുടം മെട്രോ സ്റ്റേഷനുകളിൽ നിന്നുള്ള അവസാന ട്രെയിനുകൾ രാത്രി 11 മണിക്ക് പുറപ്പെടുന്നതായിരിക്കും.

#### Timings on 10-12 September 2019

To make commuting easier and faster during Onam, we have extended the timings of Metro services on the 10th, 11th and 12th of September 2019. The last train from Aluva / Thykoondam station will leave at 23:00 hours.

# INITIATIVES BY KMRL FOR RIDERSHIP ENHANCEMENT

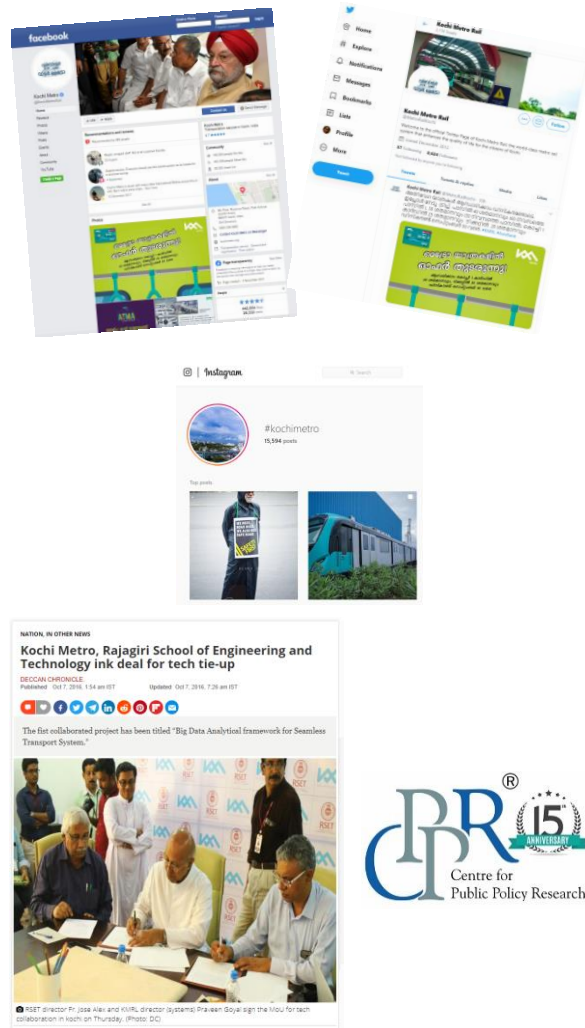


## 5. Pricing and Fare Media Initiatives

- Kochi1 Card outside issuances:- Apart from station issuances KMRL started issuing the Kochi1 cards outside the metro stations to cover the institutions, banks, IT companies and Hospitals
- Discount of Kochi1 Card:- To attract the sales of the Kochi1 cards attractive discounts were given like total issuance fee waver off, book my show etc.
  - Issuance Fee Waver-off :- 3 Mar- 3Apr 2019 (12884 cards sold)
  - Book My Show:- 17 Jun – 30 Jun 2019 (795 cards sold)
- Introduction of Trip Pass:- After successful introduction of trip pass facility to the passengers, the sales during last year trip passes are 9000 (Jul-2018 to Jun-19) approx.
- Passes for Parking:- Introduced passes like Day Pass, 24 hr pass and monthly for regular commuters using parking facility
- Parking Discounts:- For Kochi1 Card holders discount of 20% have been provided at all Kochi Metro parking locations .100% fees wave off during Onam season



# INITIATIVES BY KMRL FOR RIDERSHIP ENHANCEMENT



## 6. Marketing and Education Initiatives

- Promotion in Social Media:- Started influencing the usage and the benefits of Kochi1 card in various social media like Instagram, Twitter and Facebook by the user itself.
- Public Lectures in Housing Societies and Schools
- LCD monitor :- Installed LCD TVs at various locations at stations which is used to provide various information of the fare media and promotes the usage of Kochi1 cards.

## 7. Evaluation and performance improvement measures

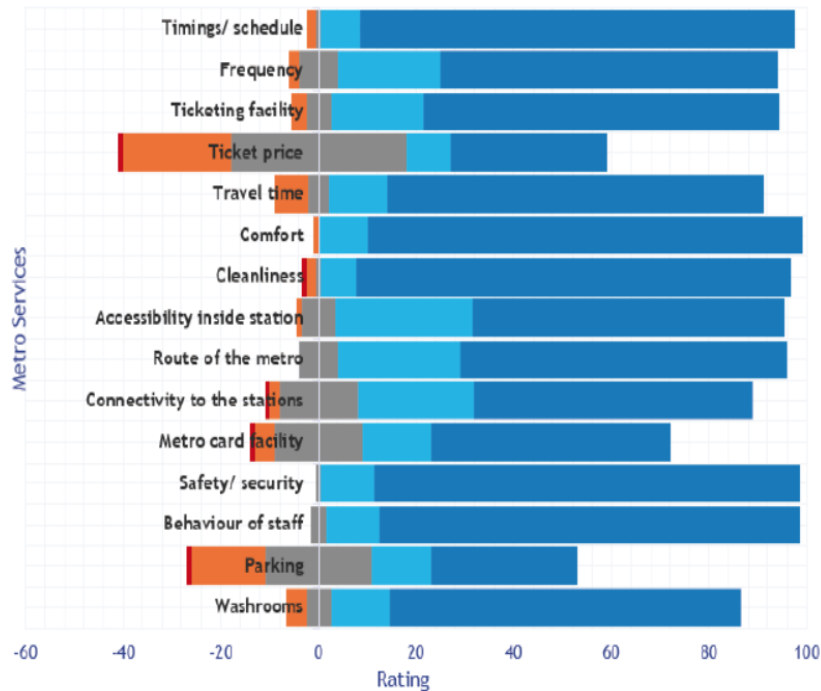
- Formation of MTA as the authority for traffic and transport under the leadership of KMRL
- Formation of cooperative society for Bus and autos
- KMRL in association with research organizations like CPPR, Rajagiri College of Engineering, SEMS school of Management is conducting surveys for metro and non metro users



# METRO USERS & NON USERS SATISFACTION SURVEY

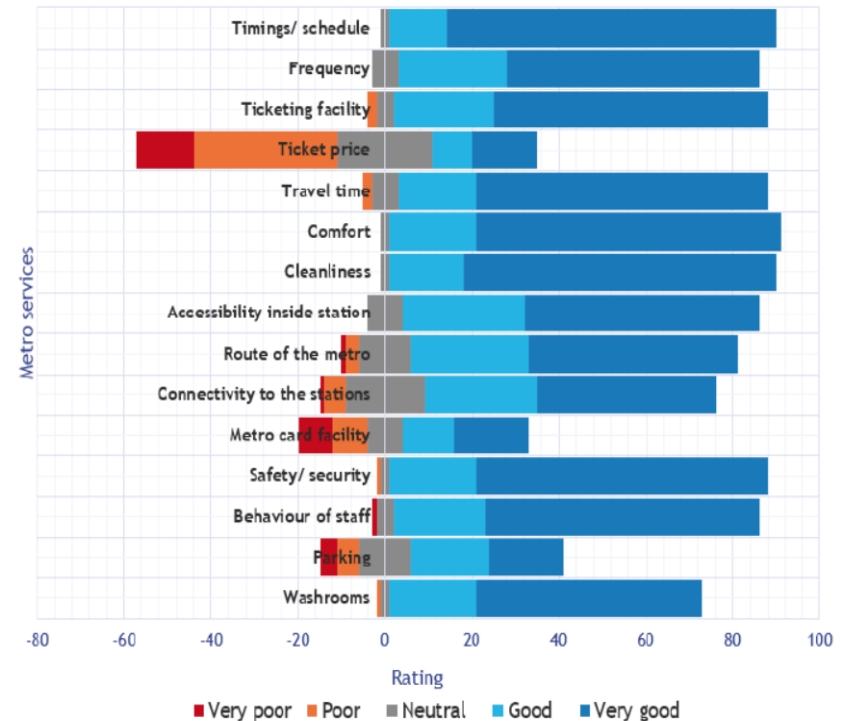
Based on the primary survey conducted by KMRL

## METRO USERS



Among the Metro users, 23 per cent of the respondents expressed dissatisfaction with the ticket price being high, whereas 36 per cent were neutral and 41 per cent were satisfied with the price.

## NON- METRO USERS

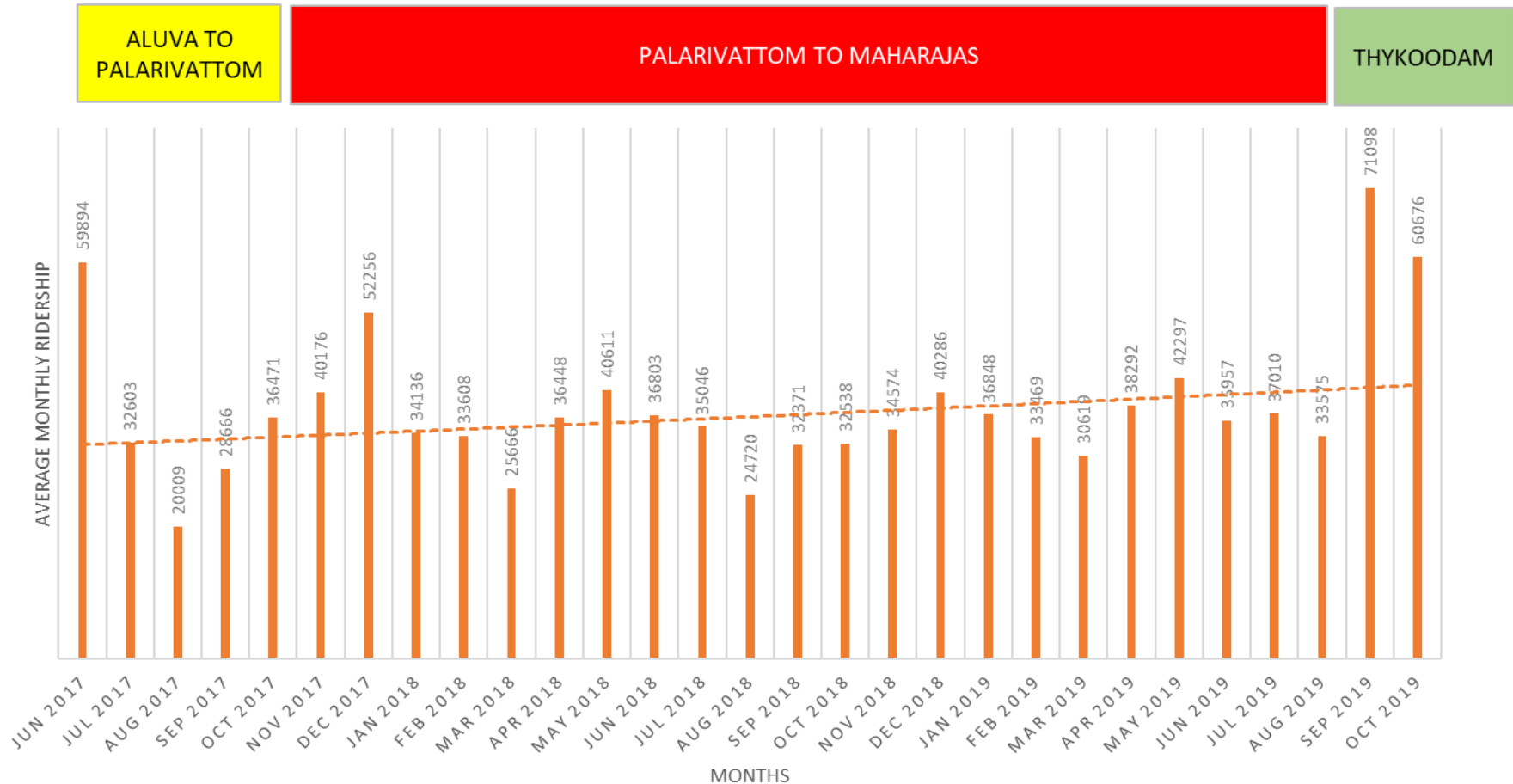


Among the non Metro users, 46 per cent of the respondents were dissatisfied with the ticket price and marked it very poor or poor. This has also emerged as a major reason for not using the metro for daily commuting.

## RIDERSHIP & REVENUE – FACTS AND FIGURES

# 1. AVERAGE MONTHLY RIDERSHIP

## AVERAGE MONTHLY RIDERSHIP



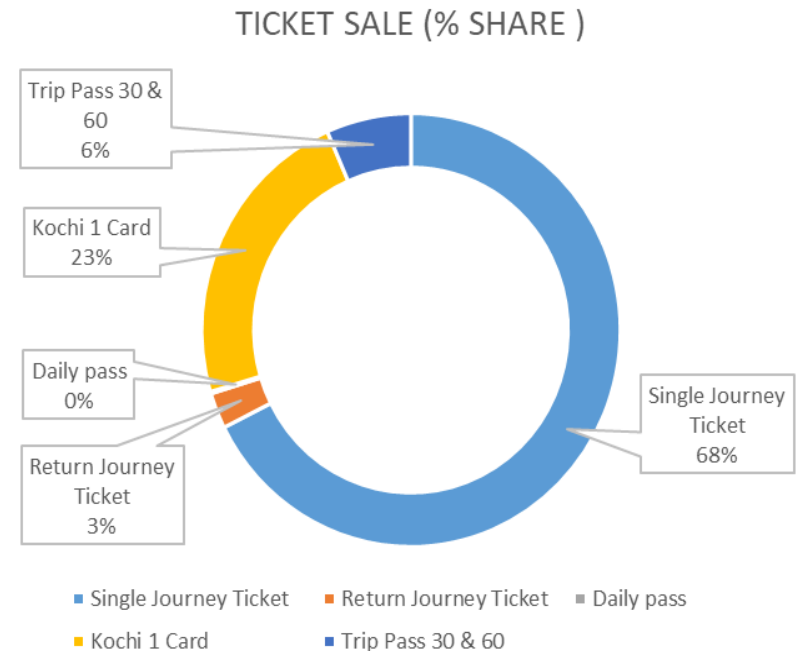
- Two peak months having maximum ridership-May and December
- Opening of Thykoodam stretch made an impact on the average monthly ridership by increasing it by 82 %

## 2.ANALYSIS OF METRO TICKET FARE AND SALE

### Fare slabs

Fare Basis	Peak	Remarks
F1	Rs. 10	Upto 2 KM
F2	Rs. 20	Between 2 KM and 5 KM
F3	Rs. 30	Between 5 KM and 10 KM
F4	Rs. 40	Between 10 KM and 15 KM
F5	Rs. 55	Between 15 KM and 20 KM
F6	Rs. 65	Between 20 KM and 25 KM

- Fare is based on cost with fixed costs and variable costs. Variable costs include salary, maintenance and electricity. Fixed cost consists of depreciation and interest.
- Based on total passenger KM travelled
- All commuters bear a portion of fixed costs irrespective of distance travelled and variable costs is borne by the commuters based on the distance travelled.
- 6 slabs for fare
- Minimum Fare Rs 10
- Fare per km Rs 2.7



Single journey ticket constitute 68%



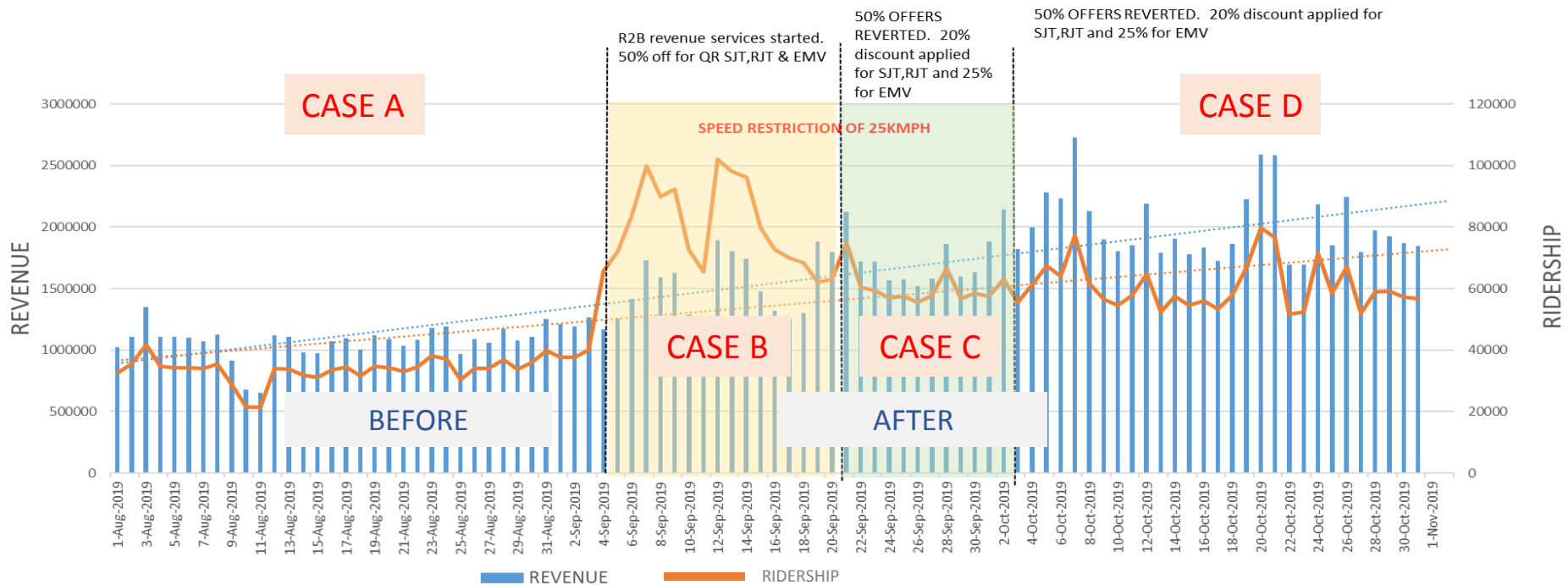
# COMPARISON WITH OTHER MODES

MODE	INSTITUTION	FLEET	FARE SETTING
<b>Auto Rickshaw</b>	JDI (Joint Declaration of Intend) signed to form as a single body and 10,000 autos under 6 unions of total 18,360 autos	18,367	<ul style="list-style-type: none"> <li>Minimum Fare Rs 20 for 1.25 Km, with Rs 8 per Km after minimum fare.</li> </ul>
<b>Ferry System</b>	Kerala State Water Transport Department (KSWTD) – 5 divisions	6	<ul style="list-style-type: none"> <li>Fare/Km is 50 Paise and Access Fee of Rs2</li> <li>Minimum Fare distance -4Km &amp; stage distance -2Km</li> </ul>
<b>Private Bus</b>	<ul style="list-style-type: none"> <li>Private Bus Operators Association(PBOA)</li> <li>1000 Private Buses 7 Unions</li> </ul>	1137	<ul style="list-style-type: none"> <li>Fare per Km is 70 paise &amp; Access Fee of Rs4.5</li> <li>Minimum fare distance - 5Km and stage distance -2.5Km</li> </ul>
<b>KURTC</b>	Kerala Urban Road Transport Corporation (KURTC)	48 A/C 5 Non-A/C	<ul style="list-style-type: none"> <li>Fare per Km is 85paise per Km for Non-A/C service and Access Fee is Rs6</li> <li>Fare per Km : Rs 120 paise per Km for A/C service and Access Fee is Rs14</li> </ul>
<b>KSRTC</b>	Kerala State Road Transport Corporation (KSRTC)	139	<ul style="list-style-type: none"> <li>Fare per Km : Rs 70 paise per Km &amp; Access Fee is Rs 4.5</li> <li>Min.Fare for 5 Kms &amp; stage distance of 2.5Kms</li> </ul>

- Metro is competing with Bus system having a minimum fare of Rs 8 and Rs 0.70 paise /km
- Overlapping routes with Metro
- Route rationalization of buses should be prioritized

# 3. ANALYSIS OF RIDERSHIP Vs REVENUE

## BEFORE AND AFTER OPENING OF THYKODAM STRETCH



	CASE A	CASE B	CASE C	CASE D
Average Daily Ridership	33997	80636	60658	60676
Average Daily Revenue	Rs 10,79,626	Rs 14,97,095	Rs 16,89,058	Rs 20,09,260
Average Revenue per trip	Rs 31.8	Rs 18.6	Rs 27.8	<b>Rs 33.12</b>

**FINDINGS:** Comparing CASE B & C ,CASE C with 20% discount for Monthly Ticket, Return Ticket and 25% discount for Kochi 1 Card gives 50 % more per trip revenue

# 4. STATION WISE RIDERSHIP- BEFORE R2B

On 31<sup>st</sup> August 2019, Saturday

Exit																						
Aluva	Pulinchodu	Companypady	Ambattukavu	Muttom	Kalamassery	Cochin University	Pathadipalam	Edapally	Changampuzha Park	Palarivatom	JLN Stadium	Kaloor	Lissie	M.G Road	Maharajas College	Emakulam south	Kadavanthra	Elamkulam	Vyttila	Thykkoodam	Grand Total	
58	43	69	51	53	217	139	124	1514	172	353	227	393	511	789	1543	0	0	0	0	0	6256	
38	14	14	2	6	18	11	9	135	17	30	21	53	44	90	123	0	0	0	0	0	625	
51	13	19	18	11	22	19	18	153	14	26	10	41	31	47	126	0	0	0	0	0	619	
24	0	11	13	16	10	12	4	91	6	18	7	19	19	34	39	0	0	0	0	0	323	
60	6	15	18	143	36	13	7	95	11	19	12	21	27	27	76	0	0	0	0	0	586	
282	43	44	11	27	19	63	24	537	96	129	83	189	111	288	439	0	0	0	0	0	2385	
205	12	21	12	10	48	23	22	493	59	102	50	169	221	308	557	0	0	0	0	0	2312	
141	12	20	4	8	20	29	18	184	37	38	31	66	105	114	187	0	0	0	0	0	1014	
1601	110	112	72	81	420	396	131	93	247	260	409	556	545	938	1706	0	0	0	0	0	7677	
225	10	13	16	13	58	42	26	258	71	52	37	71	78	165	371	1	0	0	0	0	1507	
379	18	25	15	14	79	78	32	352	54	56	15	61	122	206	295	0	0	0	0	0	1801	
354	27	18	9	14	59	71	45	510	35	16	26	25	51	155	317	0	0	0	0	0	1732	
493	37	30	20	17	175	175	62	649	68	74	32	25	19	83	207	0	0	0	0	0	2166	
637	39	37	15	26	135	156	53	569	101	105	50	35	77	57	109	0	0	0	0	0	2201	
768	94	48	26	15	240	258	86	936	136	194	128	84	71	103	75	0	0	0	0	0	3262	
1677	83	99	53	76	413	372	138	1761	286	282	207	208	90	45	153	0	0	0	0	0	5945	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6993	561	595	355	530	1969	1857	799	8330	1410	1754	1345	2016	2122	3449	6323	0	0	0	0	0	4041	

## FINDINGS:

- Among the stations Aluva, Edapally and Maharajas College having highest footfall (48% of the total)
- Edapally which is the busiest station alone have 18% of the total footfall
- Ridership from Aluva to Maharaja's College station which are the end stations caters to 4% (1600 pax) of the total
- Pulinchodu, Companypady, Ambattukavu, Muttom and Pathadipalam has footfall less than 2% each

# STATION WISE RIDERSHIP- AFTER R2B

DISCOUNT: 50% off

On 16<sup>th</sup> September 2019 , Monday

	Exit																					
Entry	Aluva	Pulinchodu	Companypady	Ambattukavu	Muttom	Kalamassery	Cochin University	Pathadipalam	Edapally	Changampuzha Park	Palarivatom	JLN Stadium	Kaloor	Lissie	M.G Road	Maharajas College	Ernakulam south	Kadavanthra	Elamkulam	Vytilla	Thykkoodam	Grand Total
Aluva	178	74	92	57	122	295	416	168	1483	280	589	416	624	877	1034	1774	442	481	196	570	416	10584
Pulinchodu	57	35	14	7	12	35	27	12	146	23	37	34	72	69	104	141	37	56	8	32	15	973
Companypady	53	13	29	11	29	36	33	13	124	26	49	32	47	47	86	88	25	29	14	25	26	835
Ambattukavu	55	5	8	47	12	31	21	6	65	12	19	18	18	41	33	37	22	5	4	41	9	509
Muttom	98	7	26	17	193	56	32	13	118	26	31	26	39	49	46	103	28	31	18	47	40	1044
Kalamassery	282	33	43	21	46	75	83	43	401	108	135	133	169	194	255	391	153	120	38	169	102	2994
Cochin University	270	19	30	19	29	55	41	29	349	53	124	112	137	203	252	429	190	163	29	132	96	2761
Pathadipalam	169	10	11	3	8	45	32	25	159	39	50	49	78	79	130	142	61	17	44	39	1255	
Edapally	1619	111	112	64	103	372	421	151	102	265	308	381	592	714	903	1238	598	425	164	390	429	9465
Changampuzha Park	312	16	25	9	20	103	61	18	279	84	64	42	88	135	185	309	183	126	29	115	110	2313
Palarivatom	530	27	49	21	30	122	104	52	373	70	71	31	91	141	220	265	192	155	53	123	130	2850
JLN Stadium	474	38	20	20	30	143	95	52	438	62	29	28	70	87	215	338	162	106	54	139	154	2754
Kaloor	618	54	48	20	27	142	110	65	587	81	78	68	47	64	107	208	199	107	32	208	184	3054
Lissie	1087	61	47	30	54	221	353	91	803	161	205	113	72	113	114	215	244	123	63	288	277	4735
M.G Road	969	79	52	24	39	228	180	113	898	144	214	182	108	85	253	85	77	129	73	359	371	4662
Maharajas College	1706	117	85	40	66	335	355	130	1189	273	270	278	225	170	47	130	61	117	79	488	494	6655
Ernakulam south	476	28	20	21	20	228	288	59	666	149	314	234	277	371	154	71	92	104	74	539	462	4647
Kadavanthra	503	52	29	9	15	122	136	13	510	129	155	106	113	138	172	129	80	64	31	221	272	3039
Elamkulam	238	10	12	3	15	50	34	22	226	53	52	43	33	51	96	117	58	27	95	70	80	1385
Vytilla	416	16	17	18	17	158	114	42	306	69	119	93	141	163	249	332	300	22	35	266	104	3097
Thykkoodam	476	14	33	8	35	124	85	45	557	123	179	156	208	298	443	602	477	209	53	65	47	4237
Grand Total	10586	819	802	469	922	2976	3021	1205	9779	2230	3092	2575	3249	4089	5098	7144	3681	2764	1159	4331	3857	73848

## FINDINGS:

- After the opening of R2B section also Aluva, Edapally and Maharajas College have highest footfall (37% of the total)
- Edapally and Aluva having maximum footfall
- Ridership from Aluva to Maharaja's College station which are the end stations caters only 1% of the total
- Vytilla and Ernakulam South being the interchanges have 5% and 6% footfall respectively



# STATION WISE RIDERSHIP- AFTER R2B

**DISCOUNT:** 20% discount applied for SJT,RJT and 25% for EMV

**On 23<sup>rd</sup> September 2019 , Monday**

	Exit																					
Entry	Aluva	Pulinchodu	Companypady	Ambattukavu	Muttom	Kalamassery	Cochin University	Pathadipalam	Edapally	Changampuzha Park	Palarivatom	JLN Stadium	Kaloor	Lissie	M.G Road	Maharajas College	Ernakulam south	Kadavanthra	Elamkulam	Vytla	Thykkoodam	Grand Total
Aluva	222	57	87	55	117	290	284	143	1253	282	483	296	499	804	907	1509	388	458	126	410	330	9000
Pulinchodu	40	82	17	4	14	26	11	8	131	22	40	23	50	47	106	143	30	36	7	23	28	888
Companypady	55	16	93	23	14	22	28	10	87	31	32	25	48	55	73	91	19	20	4	29	10	785
Ambattukavu	41	7	16	80	23	7	21	5	43	9	11	12	12	32	25	48	11	10	3	19	7	442
Muttom	99	9	14	18	230	69	39	13	104	15	26	18	29	35	50	85	23	18	6	17	19	936
Kalamassery	315	32	33	6	53	114	76	40	315	84	133	83	160	166	270	324	129	135	30	120	94	2712
Cochin University	293	17	36	24	27	65	65	45	286	61	87	72	166	202	263	375	148	127	37	109	85	2648
Pathadipalam	148	4	15	7	8	24	43	88	119	26	37	33	57	96	118	141	58	54	9	17	33	1185
Edapally	1178	86	73	45	96	301	314	118	275	178	257	280	477	667	763	1000	482	332	109	282	269	7582
Changampuzha Park	297	15	30	5	17	70	46	18	231	124	67	47	78	126	149	258	159	103	27	100	91	2058
Palarivatom	451	27	33	15	23	111	72	35	287	53	156	26	86	113	160	240	141	92	37	103	107	2368
JLN Stadium	365	29	29	16	16	86	78	43	351	53	20	94	40	98	160	302	148	89	45	92	86	2240
Kaloor	469	32	37	11	37	172	153	57	517	80	72	52	128	45	87	192	151	102	45	179	113	2731
Lissie	910	44	47	31	40	157	184	98	662	143	159	70	40	125	74	117	225	130	59	297	251	3863
M.G Road	753	82	54	26	30	220	197	102	778	123	173	133	82	92	305	61	70	127	68	321	319	4116
Maharajas College	1445	90	73	36	75	342	315	99	1050	241	246	225	157	103	47	191	48	81	70	376	395	5705
Ernakulam south	397	17	28	6	21	201	199	52	545	153	260	145	260	326	159	72	128	110	74	389	368	3910
Kadavanthra	429	30	26	7	13	141	120	47	365	101	125	103	69	129	143	122	78	134	17	161	202	2562
Elamkulam	166	10	5	3	10	37	15	195	32	35	30	35	62	103	77	56	12	15	88	65	1222	
Vytla	295	6	19	14	13	144	81	41	187	72	81	71	129	144	201	225	202	97	36	331	23	2412
Thykkoodam	345	35	15	7	23	119	75	47	345	109	136	81	127	301	387	388	391	158	44	46	191	3370
Grand Total	8713	727	780	439	900	2718	2470	1124	8126	1992	2636	1919	2729	3768	4550	5961	3085	2425	1038	3549	3086	62735

## FINDINGS:

- 5 new stations are adding 25k to 30k (40 to 50 %) more ridership to the network
- Aluva, Edapally and Maharajas College continue to have highest footfall (36% of the total)

# STATION WISE RIDERSHIP- AFTER R2B

**DISCOUNT:** 20% discount applied for SJT,RJT and 25% for EMV

**On 20<sup>th</sup> October 2019 , Sunday**

	Exit																					
Entry	Aluva	Pulinchodu	Companypady	Ambattukavu	Muttom	Kalamassery	Cochin University	Pathadipalam	Edapally	Changampuzha Park	Palarivatom	JLN Stadium	Kaloor	Lissie	M.G Road	Maharajas College	Ernakulam South	Kadavanthra	Elamkulam	Vyttila	Thykkoodam	Grand Total
Aluva	321	42	47	44	49	176	148	71	2431	133	232	2759	257	399	533	933	370	225	125	417	338	10050
Pulinchodu	43	115	14	7	2	26	9	7	184	15	19	324	19	25	39	73	22	12	4	14	29	1002
Companypady	41	15	102	14	10	6	12	5	173	11	9	119	27	21	22	49	23	13	5	41	15	733
Ambattukavu	41	4	12	104	10	22	14	4	92	3	11	99	10	12	22	9	15	8	2	9	18	521
Muttom	94	5	11	11	194	46	7	3	124	12	19	174	5	20	15	38	32	11	4	25	15	865
Kalamassery	170	25	6	21	34	116	47	67	509	32	63	581	61	108	142	203	124	51	100	53	2493	
Cochin University	144	7	17	20	11	24	117	16	449	39	56	548	70	113	158	148	108	52	5	40	2229	
Pathadipalam	107	11	7	8	2	9	23	99	195	11	27	169	24	39	61	81	36	31	10	43	26	1019
Edapally	2393	173	153	81	105	467	418	150	452	275	333	3380	665	806	927	1449	812	560	269	540	792	15200
Changampuzha Park	185	7	8	6	2	33	28	9	305	129	33	227	23	53	111	117	96	50	24	93	77	1616
Palarivatom	262	10	9	16	9	65	63	22	472	23	141	253	32	59	111	113	88	44	16	54	69	1931
JLN Stadium	2124	249	147	104	144	507	501	156	2171	164	181	530	175	868	337	575	909	275	215	517	592	11441
Kaloor	361	15	15	7	14	78	53	30	760	25	43	363	134	26	94	140	141	57	31	152	140	2679
Lissie	575	21	17	24	27	183	151	47	1225	52	129	1441	38	221	69	99	144	72	35	191	146	4907
M.G Road	431	27	28	13	5	123	93	39	1111	76	110	367	69	51	304	35	78	68	41	230	257	3556
Maharajas College	809	26	26	21	27	179	129	56	1618	82	153	634	105	60	20	198	58	36	27	317	428	5009
Ernakulam South	340	8	8	11	9	143	86	29	991	89	158	1158	207	194	81	44	162	48	36	320	299	4421
Kadavanthra	215	13	6	10	10	50	69	29	680	53	47	366	41	47	64	35	49	140	7	84	96	2111
Elamkulam	163	6	8	5	4	26	18	312	19	20	225	22	30	66	55	45	8	36	25	1251		
Vyttila	348	12	17	16	16	96	78	534	47	70	526	96	140	164	197	427	252	81	29	310	26	3073
Thykkoodam	389	19	13	16	18	95	47	47	999	97	94	698	139	174	333	427	384	67	22	52	175	4305
Grand Total	9556	810	671	559	702	2470	2111	883	15787	1387	1948	14941	2219	3466	3673	5018	3948	1909	1078	3620	3656	80412

67%

14%

15%

4%

## FINDINGS:

- Even after the increase in speed to 80Kmph the proportionate addition of footfall from stations almost remain same with a variation of 2 to 3 %

## 5. KEY FINANCIAL INDICATORS

Key financial indicators of Kochi Metro operations for the period 1st August 2019 - 31 Aug 2019 are as below:

1st April 2019 - 31 Aug 2019				No of Days		31	Total KM		18.22			
	Rs. in lakhs			Rs. in lakhs			Rs. in lakhs			Rs		
Particulars	For the period -1st August 19 - 31st Aug 19			Daily Average			Per KM			Per Passenger		
	Budget	Actual	Prev year	Budget	Actual	Prev year	Budget	Actual	Prev year	Budget	Actual	Prev year
Ridership/day				40000	37475	34680	2195	2057	1903			
REVENUE												
Fare Box	434	372	341	14	12	11	23	20	19	1065	984	998
Non Fare Box	775	372	310	25	12	10	42	20	81	1896	991	852
<b>Total</b>	1209	744	651	<b>39</b>	<b>24</b>	<b>21</b>	65	41	35	2961	1975	1849
Operating Expense	1333	713	744	43	23	24	72	39	40	3273	1874	2114
<b>Operating Cash Profit/Loss</b>	<b>-124</b>	<b>31</b>	<b>-93</b>	<b>-4</b>	<b>1</b>	<b>-3</b>	<b>-7</b>	<b>2</b>	<b>-5</b>	<b>-313</b>	<b>101</b>	<b>-265</b>
Interest	775	744	589	25	24	19	42	40	32	1916	1950	1699
<b>Total Cash Profit/Loss</b>	<b>-899</b>	<b>-713</b>	<b>-682</b>	<b>-29</b>	<b>-23</b>	<b>-22</b>	-49	-38	-37	-223	-185	-196

### FINDINGS:

- For the period from 1<sup>st</sup> April 2019 to 31<sup>st</sup> Aug 2019 KMRL is showing operational profit meaning it is able to meet OPEX from its revenue
- Non fare box revenue contributes almost 50% to revenue
- On an average Rs 23 to 25 lakh/day is required to meet the OPEX

# KEY FINANCIAL INDICATORS

Key financial indicators of Kochi Metro operations for the period 1st Sep 2019 to 30<sup>th</sup> Sep 2019 are as below:

01 Sep 2019 -30th Sep 2019					No of Days		30	Total KM	23.75
	Rs. in lakhs		Rs. in lakhs		Rs. in lakhs		Amount in Rs		
Particulars	For the period -01 Sep 2019 -30th Sep 2019		Daily Average		Per KM		Per Passenger		
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	
Ridership/day			40000	69148	1684	2911			
REVENUE									
Fare Box	426	464	14.2	15.5	17.9	19.5	1065	671	
Non Fare Box	758	403	25.3	13.4	31.9	17.0	1895	583	
Total	1184	867	39.5	28.9	49.9	36.5	2960	1254	
Operating Expense	1309	886	43.6	29.5	55.1	37.3	3273	9369	
Operating Cash Profit/Loss	-125	-19	-4.2	-0.6	-5.3	-0.8	-313	-27	
Interest	720	720	24	24	30.3	30.3	1800	1041	
Total Cash Profit/Loss	-845	-739	-28	-25	-35.6	-31.1	-2113	-1069	

## FINDINGS:

- For September it is under Operational loss
- Operational expenditure increased by 25 to 30 % due to addition of 5 stations



# KEY FINANCIAL INDICATORS

Key financial indicators of Kochi Metro operations for the period 1st October 2019 to 31<sup>st</sup> Oct 2019 are as below:

01 Oct 2019 -31 <sup>st</sup> Oct 2019			No of Days			31	Total KM	23.75
Particulars	Rs. in lakhs		Rs. in lakhs		Rs. in lakhs		Amount in Rs	
	For the period -01 Oct 2019 -31 <sup>st</sup> Oct 2019		Daily Average		Per KM		Per Passenger	
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
Ridership/day			40000	69148	1684	2911		
REVENUE								
Fare Box	426	624	13.7	20.1	17.9	26.3	1065	1027
Non Fare Box	758	402	24.5	13.0	31.9	16.9	1895	662
<b>Total</b>	<b>1184</b>	<b>1026</b>	<b>38.2</b>	<b>33.1</b>	<b>49.9</b>	<b>43.2</b>	<b>2960</b>	<b>1689</b>
Operating Expense	1309	1083	42.2	34.9	55.1	45.6	3273	9369
<b>Operating Cash Profit/Loss</b>	<b>-125</b>	<b>-57</b>	<b>-4.03</b>	<b>-1.84</b>	<b>-5.3</b>	<b>-2.4</b>	<b>-313</b>	<b>-94</b>
Interest for loans	766	1056	24.7	34.1	32.3	44.5	1915	1738
<b>Total Cash Profit/Loss</b>	<b>-845</b>	<b>-777</b>	<b>-27</b>	<b>-25</b>	<b>-35.6</b>	<b>-32.7</b>	<b>-2113</b>	<b>-1279</b>

## FINDINGS:

- Average Fare box Collection increased to Rs 20 lakh/day
- For October also it is under operational loss
- Operational expenditure increased by 50%

# 6.DEMAND ELASTICITY ON FARE- MACRO ANALYSIS

## IMPACT OF FARE ON RIDERSHIP

Under arc elasticity model, the demand after the price increase (D2) compared to previous demand (D1) is given by:

$$D2 = D1 \times (F2/F1)^p$$

Where

**D2 = Demand after the price increase or decrease**

**D1 = Demand prior to price change**

**F1 = Fare before fare change**

**F2 = Revised fare**

**<sup>p</sup> = Elasticity**

		D1	D2	F1	F2	<sup>p</sup>
CASE 1	COMPARING CASE B and CASE D	80636	60755	0.5	0.8	-0.60

Using the data obtained by comparing CASE B and CASE C scenarios and solving for <sup>p</sup> the level of fare elasticity has been measured and found to be -0.60. In an ideal scenario developed markets show riders' response to fare changes are in general **inelastic and is around -0.18**.

Based on the hypothetical scenario

		D1	D2	F1	F2	<sup>p</sup>
CASE 2	COMPARING CASE B and CASE D	80636	60755	0.17	0.8	-0.18

In a hypothetical situation, 83% reduction in fare from the existing will ensure the maximum ridership

# DEMAND ELASTICITY ON FARE- MICRO ANALYSIS

**COMPARING THE TIME PERIOD CASE B (with 50% discount) & CASE C ( with 20% discount for Monthly Ticket, Return Ticket and 25% discount for Kochi 1 Card)**

FARE STAGE	METRO STATIONS IN FARE STAGES	FARE BEFORE	FARE NOW	PASSENGERS BEFORE	PASSENGERS NOW	% change in passengers	% change in fare	% CHANGE IN PASSENGERS / % CHANGE IN FARE
1	ALUVA , PULINCHODU	5	8	11405	9440	-21%	38%	-0.56
2	COMPANYPADY,AMBATTUKAVU, MUTTOM	10	16	2193	2119	-3%	38%	-0.09
3	KALAMASSERY, COCHIN UNIVERSITY,PATHADIPALAM	15	24	7202	6312	-14%	38%	-0.38
4	EDAPALLY, CHANGAMPUZHA ,PALARIVATTOM ,JLN STADIUM	20	32	17676	14673	-20%	38%	-0.55
5	KALOOR,LISSIE,MG ROAD,MAHARAJAS,ERNAKULAM SOUTH	25	40	23261	20093	-16%	38%	-0.42
6	KADAVANTHRA,ELAMKULAM,VYTILLA,THAIKOODAM,PETTA	30	48	12111	10098	-20%	38%	-0.53

## FINDINGS:

- FARE STAGE 2 is rather less affected by change in ticket rate as the footfall is very less
- FARE STAGE 1,4 & 6 are the worst affected

# 7.DEMAND ELASTICITY ON RUNNING KM- MACRO ANALYSIS

## IMPACT OF NETWORK LENGTH ON RIDERSHIP

Here using arc elasticity model, the demand after the network increase (D2) is compared to previous demand (D1) and is given by:

$$D2 = D1 \times (L2/L1)^b$$

Where     **D2 = Demand after the network increase**  
             **D1 = Demand prior to network change**  
             **L1 = Total running km before network increase**  
             **L2 = Total running km after network increase**  
             **<sup>b</sup> = Elasticity**

Using the data obtained by comparing CASE A and CASE C scenarios and solving for <sup>b</sup> the level of demand elasticity on running Kms has been measured and found to be 0.80

		D1	D2	L1	L2	<sup>b</sup>
CASE 1	COMPARING CASE A and CASE C	33997	60755	3575	6214	1.05

Analysis shows that 1% increase in running Kms will add 1.05% increase in ridership  
(640 pax/running Km)



# A ROAD MAP FOR STRATEGIES

## SCENARIO 1:

### CURRENT SCENERIO

Operating with less or no reduction/offers in ticket rates

#### DISADVANTAGES:

- Below Average ridership
- Less Non Fare box revenue due to lack of demand
- Under utilized system capacity
- Over burden on buses and will affect quality of services

## SCENARIO 2:

### OPEX FROM REVENUE

Operational cost of Rs 30-35 lakh achieved from Fare box and Non Fare box revenue in 50:50 ratio as per the existing Fare will be such that it is just sufficient to meet the 50 % of OPEX

#### ADVANTAGES:

- Average ridership ensured

#### DISADVANTAGES:

- Non Fare box revenue may not be achieved as budgeted due to lack of demand

## SCENARIO 3 :

### MAXIMISING RIDERSHIP

KMRL operating at 80% reduced fare from existing with operational loss funded by Govt or an international organization grant or through non fare box revenue

#### ADVANTAGES:

- Maximum ridership
- Maximum economic benefits to the public by reducing traffic jams, accidents and pollution
- Because of maximum ridership there will be heavy demand for Retail spaces and property development initiatives

#### DISADVANTAGES:

- May lead to the decline in the Level/quality of Service as the system is utilized to its maximum capacity

# SUGGESTIONS & WAY FORWARD

- **More passengers in the system means more opportunities for revenue: either through Fare box or through Non Fare box**
- Conscious effort is needed to convert the existing single journey ticket travelers to Kochi 1 Card which will ultimately reduce the operational expenditure
- Metro travelers using mobility hubs for transfer can be charged less and Leisure travelers especially travelling to Edapally can be charged more
- Non-peak hour concession between 11:00 a.m. and 4:00 p.m to facilitate shifting from personalized vehicles
- Densification of areas near to less performing stations should be looked into
- As Non fare box revenue have a major role in maintaining the operational profit, effort to stabilize the same with clear targets should be taken up

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THANK YOU