

WELCOME

Please help yourself to coffee
and water from the front

We begin at 1100



Welcome

Chris Cheek

Passenger Transport
Intelligence Services



Before we begin:

- ◆ Please turn mobile phones off or set to silent.
- ◆ Fire alarm is a continuous ringing bell. Nearest exit is out of the room to your right and down the stairs beside the lifts.
- ◆ Nearest toilets are: Ladies out near the lifts; Gents one floor up or down.

Seminar programme

- 1100 Welcome
Chris Cheek, Passenger Transport Intelligence Services
- 1105 The Need for Profits
Chris Cheek, Passenger Transport Intelligence Services
- 1200 Workshop: Operational Costing
Steve Warburton, The TAS Partnership
- 1300 Lunch
- 1330 Operational Costing Workshop feedback
- 1400 The Cost of Time
Chris Cheek, Passenger Transport Intelligence Services
- 1500 Wrap up and Close



the **young
bus managers**
network



Chris Cheek

Passenger Transport Intelligence Services



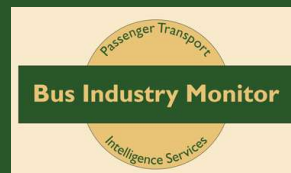


YBMN Seminar

The Need for Profits

Sustainable Bus Companies

- Those involved need to be:
 - Professional
 - Successful
 - Customer-oriented
 - High quality



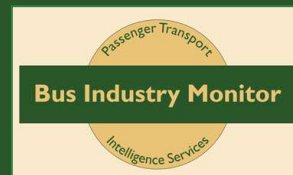
Sustainable Businesses

■ PROFESSIONAL

- Service provided is operated in accordance with
 - the best standards of professional practice
 - relevant laws and regulations

■ SUCCESSFUL

- The operator
 - regularly achieves its goals
 - is profitable
 - is able to invest for the future



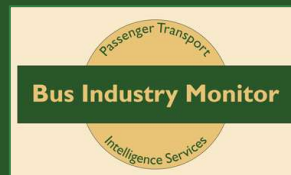
Sustainable Businesses

■ CUSTOMER ORIENTED

- The customer always genuinely comes first with all the staff
- Service delivery
 - Standards are
 - laid out for all to see
 - are monitored with results published

■ HIGH QUALITY

- Service is reliable
- Vehicles are
 - clean
 - comfortable
 - well-maintained
- Customer-facing staff are welcoming, helpful and friendly



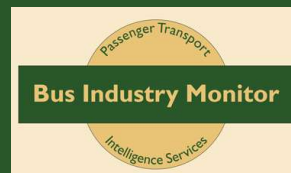
How do we measure success?



- Growth
 - Revenue - ahead of inflation
 - Volume - more passengers
 - Trip Rate - more trips per head
 - Service provision
 - Speed & productivity
- Profits
 - Make sufficient money to stay in business
 - But why and what does this mean?



So why do we need to
make a profit?



Why do we need profits?

My take...



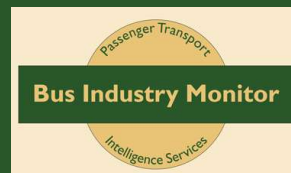
- Need to generate a surplus of income over expenditure
- Surplus needs to allow for
 - Renewal of assets
 - Build reserves to survive bad times
 - Business improvement & expansion
 - Funding the cost of capital
 - Payment of interest on borrowings
 - Reward shareholders for their ownership and risk
 - Making repayments as they fall due

How do we define profit?

- Five measures
 - **Gross Profit**
 - **EBITDA**
 - EBIT
 - Pre-tax Profit
 - Net Profit
- Gross Profit
 - Revenue less direct costs of operation
- EBITDA
 - Earnings before Interest, Taxation, Depreciation and Amortisation
 - Gross Profit less overheads and administrative costs
 - Useful measure as it's all in the management's control

How do we define profit?

- Five measures
 - Gross Profit
 - EBITDA
 - EBIT
 - Pre-tax Profit
 - Net Profit
- EBIT
 - Earnings before interest and taxation
 - aka “Operating Profit”
 - EBITDA less depreciation
 - The traditional focus
- Pre-tax Profit
 - EBIT less financing costs
- Net Profit
 - after tax
 - the ‘disposable income’



How do we measure profit?

- Two main methods
 - Margins
 - Returns

- Margins

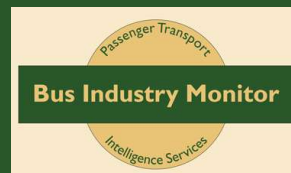
- Measuring the five types of profit as a proportion of turnover
- Operating Margin is the most quoted
 - Operating profit/Turnover
- Useful for comparisons
- Easy to calculate

Worked example

Op profit: £2.5m

Turnover: £26.5m

= margin of 9.3%



How do we measure profit?

- Two main methods
 - Margins
 - **Returns**

Worked example
Op profit: £2.5m
Capital employed
£22.7m
= return of 8.4%

- Returns
 - Expresses profit as a proportion of various balance sheet figures, known as a RETURN. For instance:
 - Value of Fixed Assets
 - Capital Employed
 - Returns are the most useful, because they look like and can be compared with interest rates
 - But more difficult to calculate

How do we measure profit?

- Two main methods
 - Margins
 - **Returns**

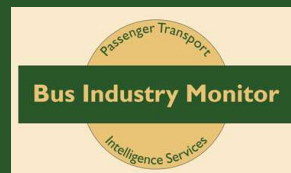
Worked example

Interest rate: 6%

Target dividend: 2.6%

Weighted average
cost of capital: 4.3%

- Returns are important
 - Investors will look to see if your business is a good investment
 - Banks will need to ensure that their interest will be paid
 - The return on capital needs to equal or exceed the cost of that capital
 - Cost of capital = interest payments and dividends



How much profit?

- Driven by resources required
 - Buses
 - Depot
 - Other Equipment
 - Money to fund these = capital
 - Capital is borrowed
 - from shareholders and lenders
 - Creates obligations
 - Pay interest
 - Reward shareholders (dividends)
- = cost of capital

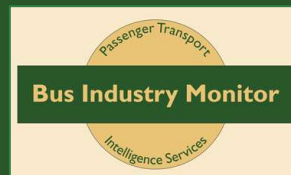


How much profit is needed?

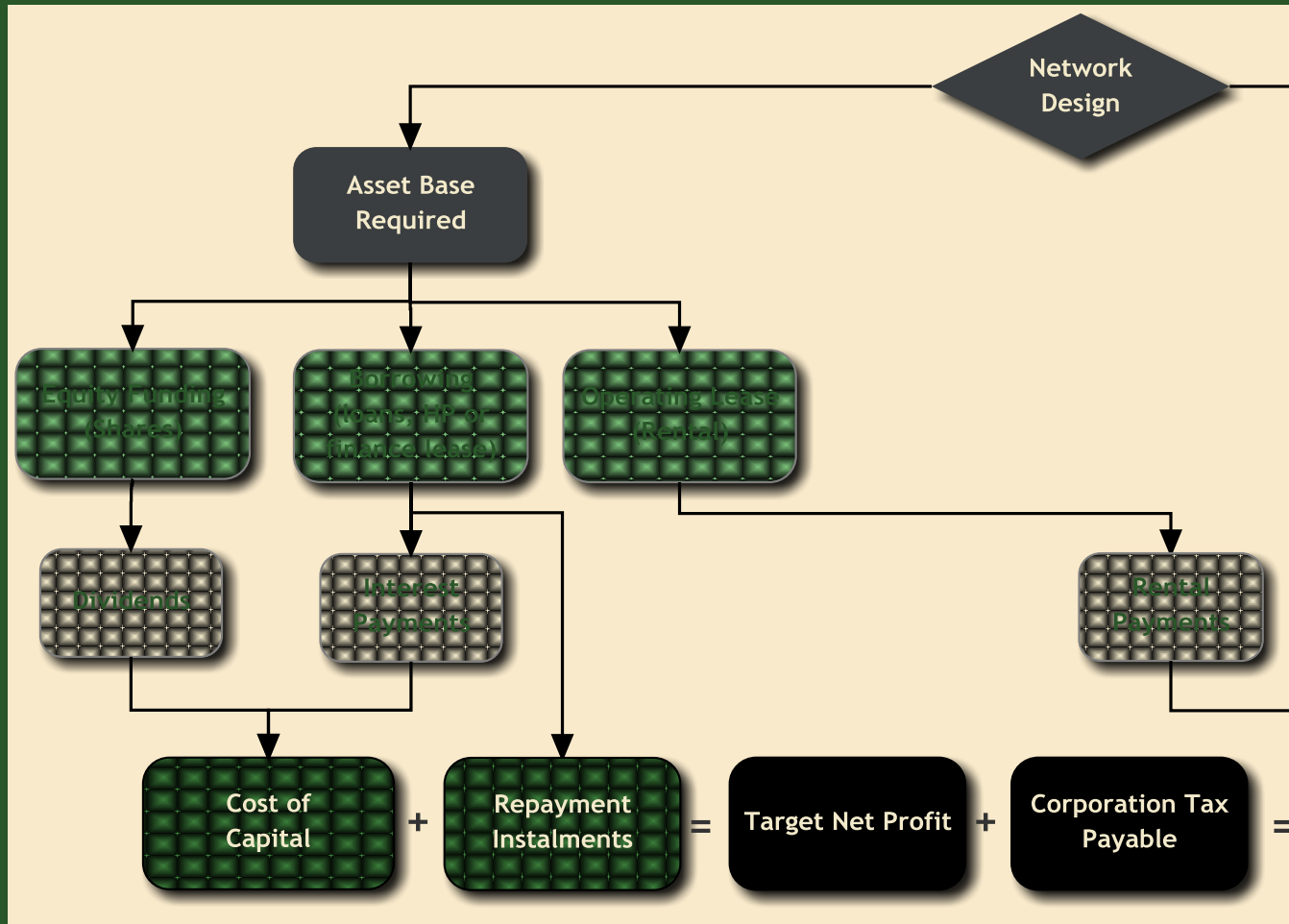
The ARCC approach

- Assets
- Returns
- Costs
- Capital

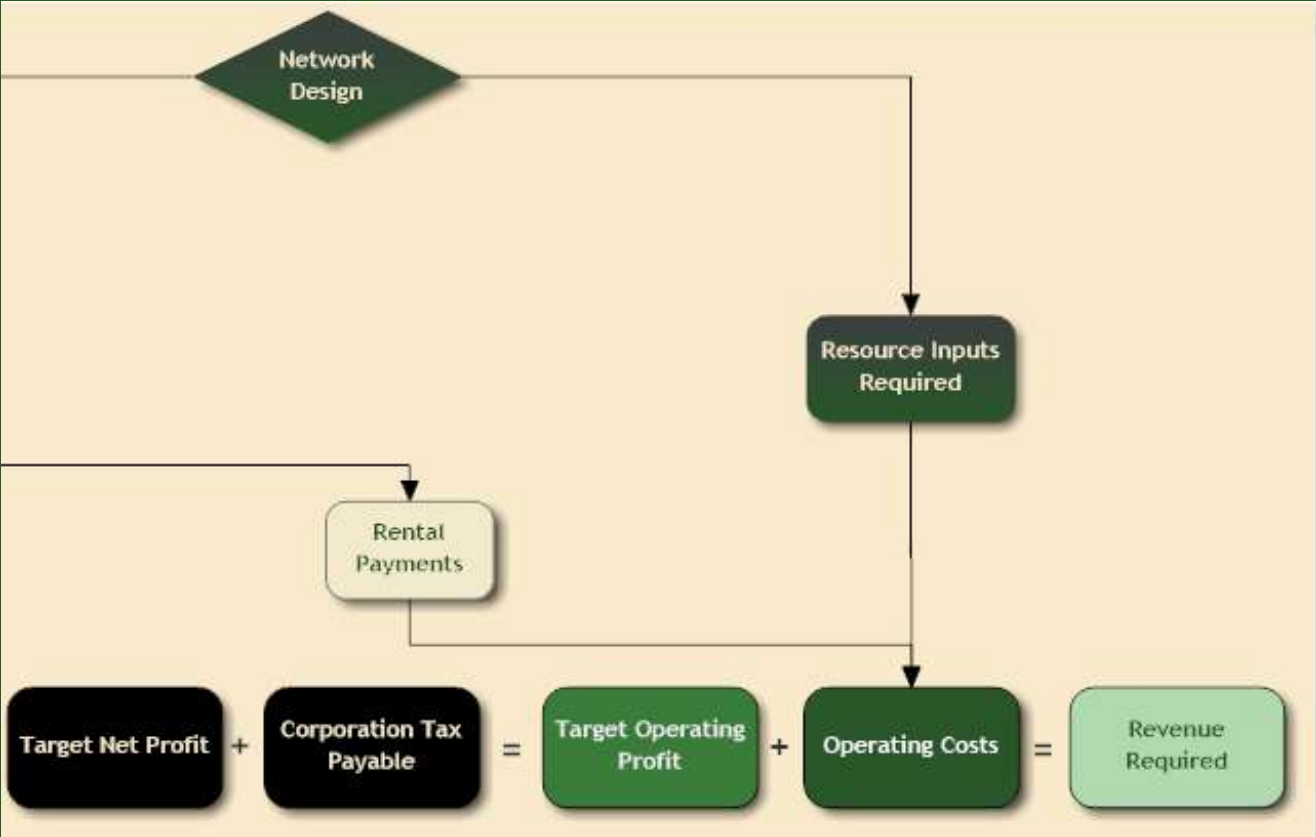
- Four questions - the ARCC approach
 - What assets does the company need to provide its service?
 - What level of return is required on those assets to cover the cost of capital?
 - How much does the business cost to run?
 - What capital will the company need to borrow and on what terms?
- We can then determine:
 - what the profits should be
 - how much revenue the company needs in order to meet its obligations



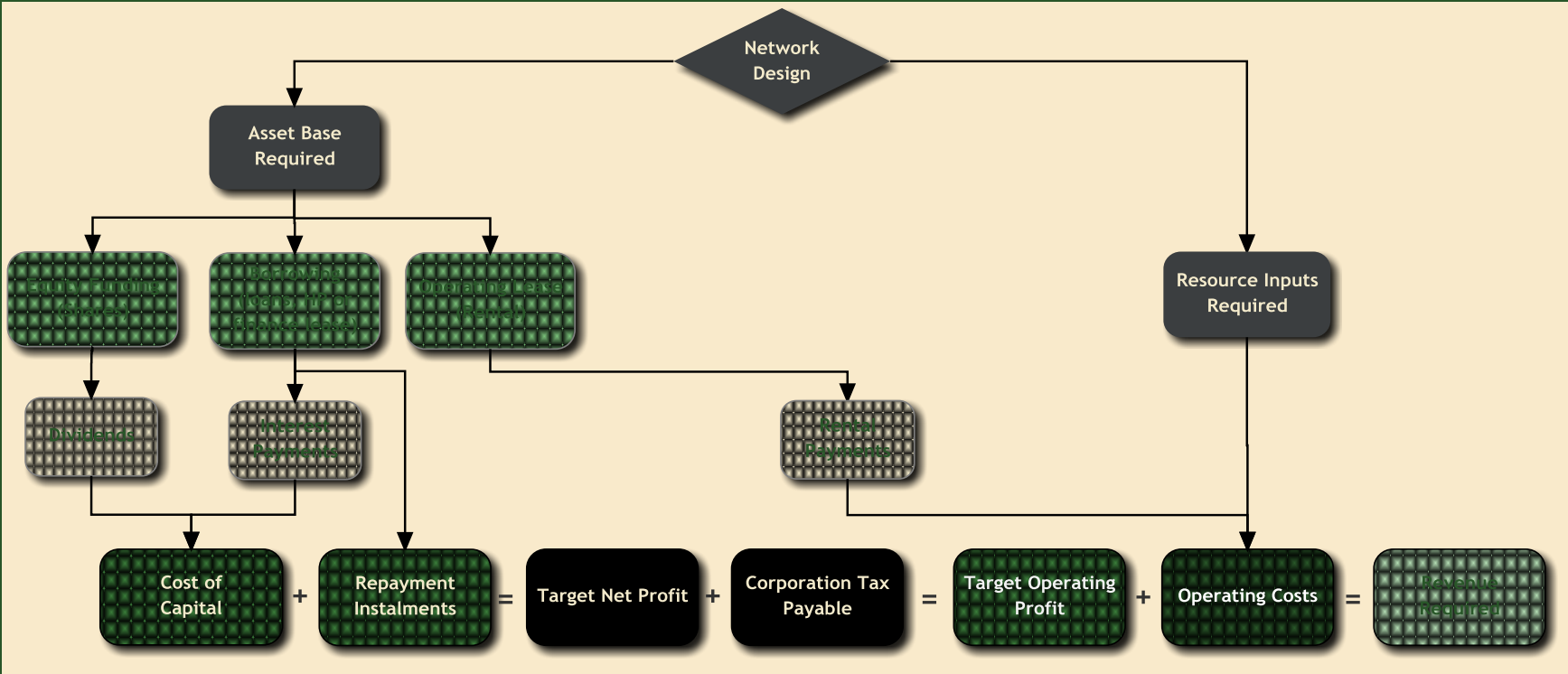
Calculating Target Profit & Revenue



Calculating Target Profit & Revenue

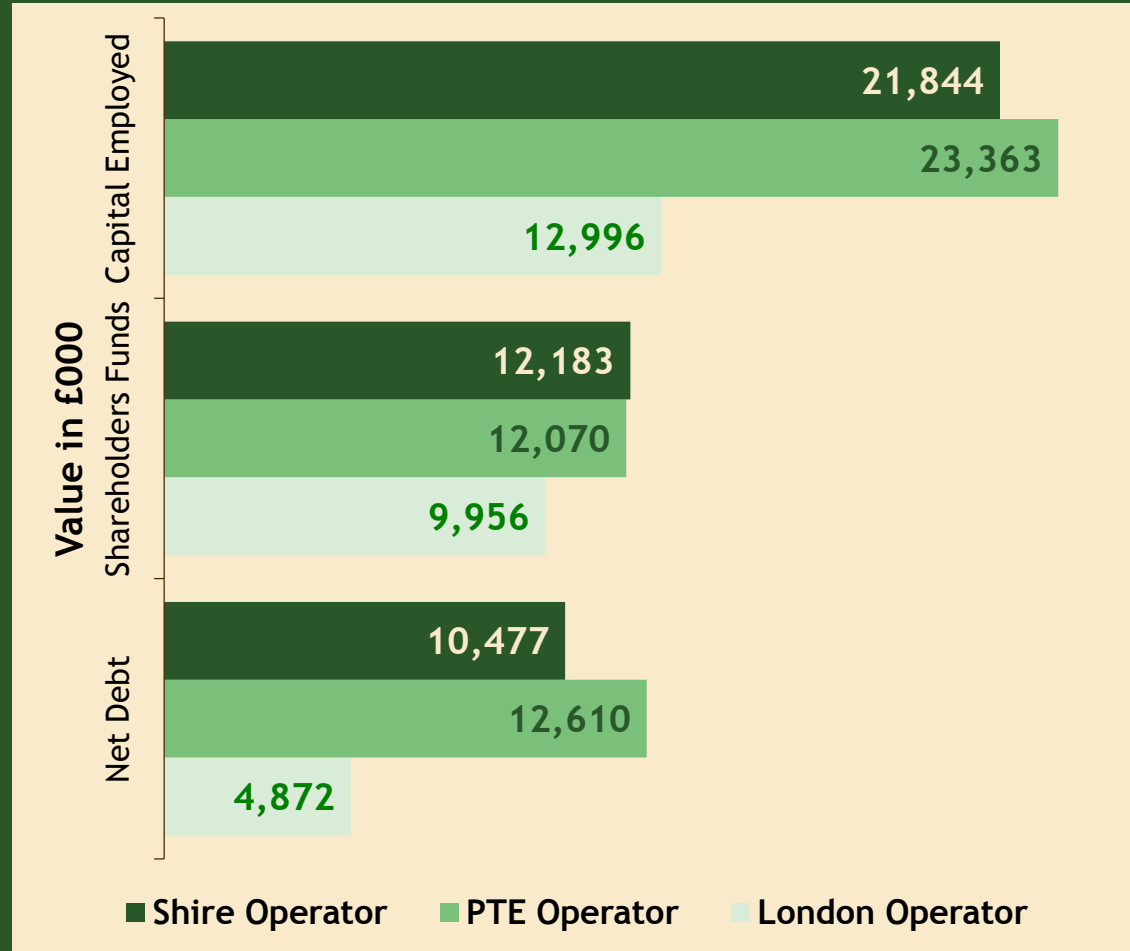


Calculating Target Profit & Revenue



Worked Example - 1: The Balance Sheet

- 3 x 200 vehicle companies, 3 depots
 - English Shire area
 - Major conurbation
 - London.
- Suitable mix for fleets
- Average age of eight years.
- In London, the fleet is younger and 64% is on operating lease.



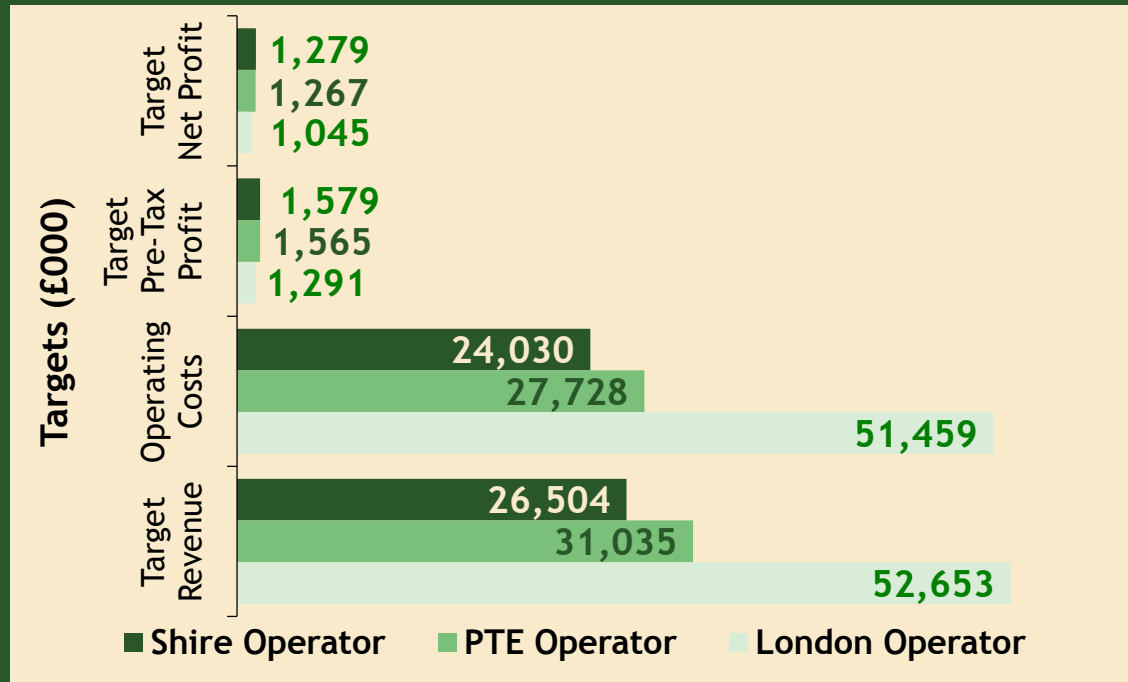
Worked Example 2: Financial Targets

Sum of

- Nominal interest 6%
 - Dividend target 2.6% on shareholder funds
 - WACC = 4.3%
 - Need for replacement capex
- = Target Net Profit

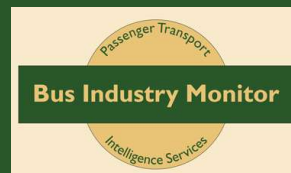
Sum of

- Target Net Profit
 - Tax payable
 - Operating Costs
- = Target Revenue



The operating costs in London are double that of the shire operator, because:

- the operating day is much longer, requiring more staff
- speeds are slower, further increasing the number of drivers needed and the fuel used
- unit labour costs much higher

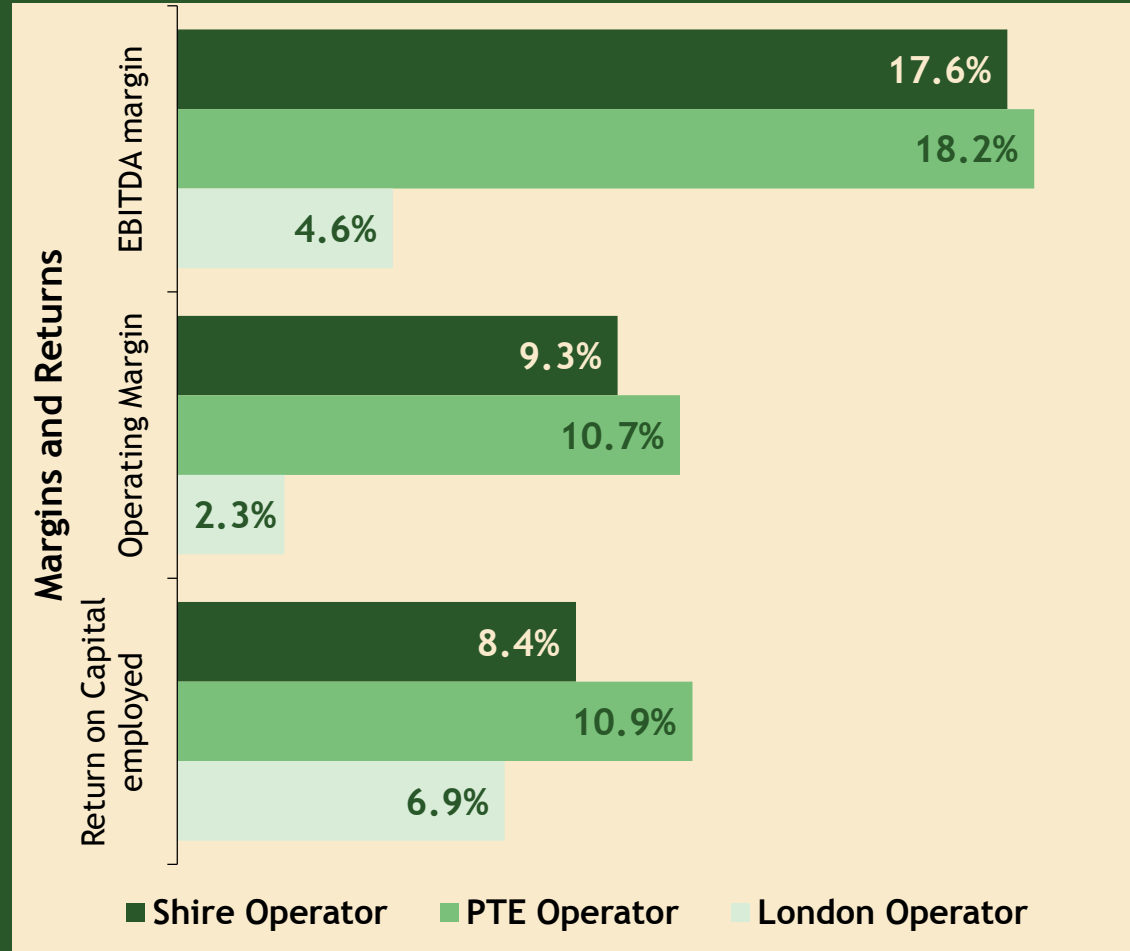


Worked Example 3: Margins & Returns

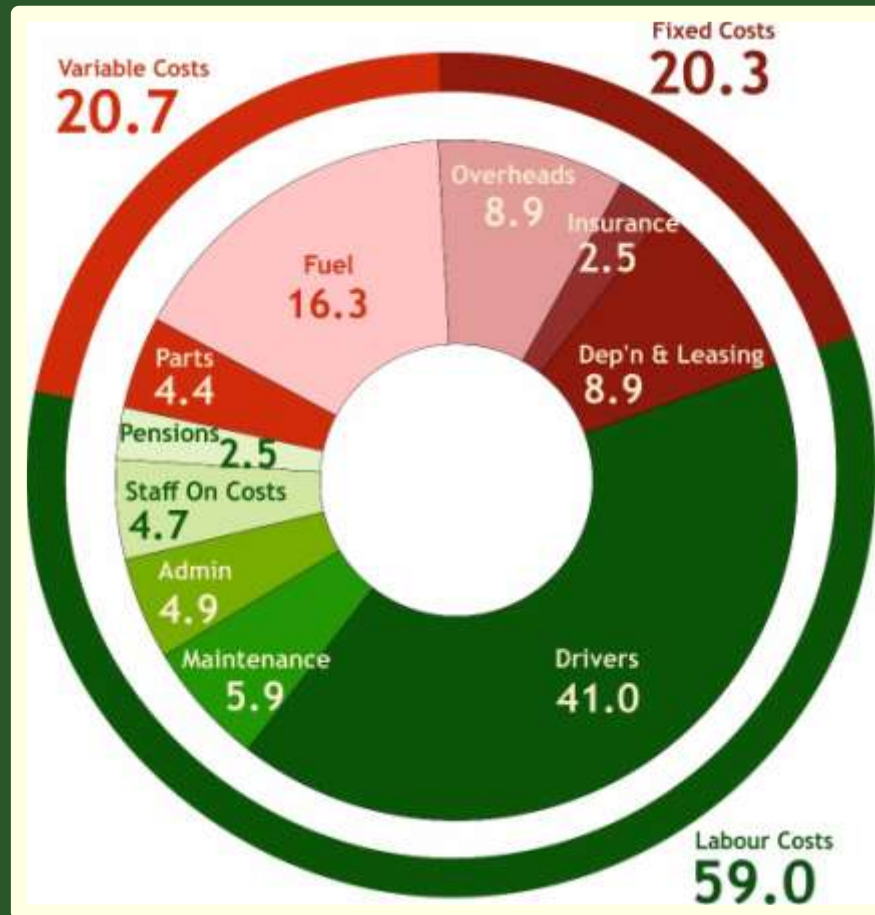
Assuming target revenue, results would be as shown

Note effect of different business model in London

- Lower returns are needed
- Target cash profit translates into a much lower margin.



Operating Costs



A Word About Leasing

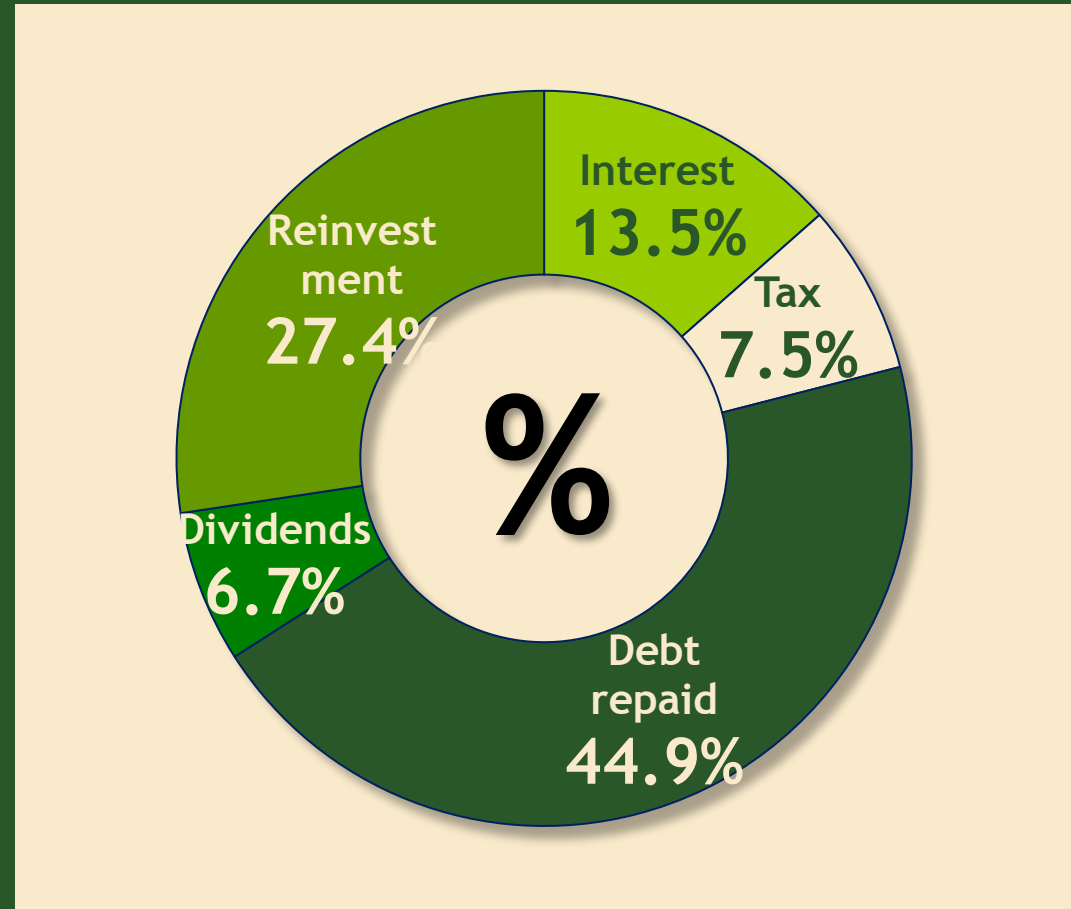


EBITDA stands for "Earnings before Depreciation, Amortisation, Interest and Taxation"

- Vehicles on operating leases
 - Do not
 - appear on the balance sheet
 - count as capital employed
 - attract interest charges
 - have to be depreciated
 - BUT the rental payments have to be added to the costs
- The result completely changes the way the accounts look

How operating profit is spent

- Meet interest charges on loans/leases
- Repay loans
- Pay tax
- Pay a dividend
- Reinvest in the business



Based on a 'shire' company
with 200 buses in 2015/16

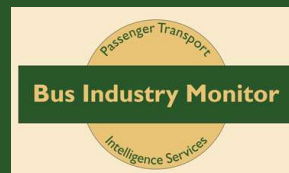
The Key Messages

to Workforce and Stakeholders

- Profits are needed to:
 - Meet obligations to lenders and shareholders
 - Interest payments
 - Repayment of loans
 - Dividend payments
 - Invest in the future
 - Asset renewal
 - Cleaner buses
 - New services
 - New technology



This is equally true
under franchising!



www.passtrans.co.uk



the **young
bus managers**
network



Workshop

Steve Warburton The TAS Partnership



Route Costing

Workshop for



September 2017



- **Please Don't...**



My Challenge



- **To make something this dry vaguely interesting!**
- **Especially when you want your lunch**

My First Encounter



1978 – Study of Express Buses at Newcastle University
Main subject the joint United & Northern Hourly X5 between Newcastle and Hartlepool

- Main issue – overloading.
- Yet route costing showed it making a substantial loss!
- Main issues – costs allocated per mile
- And flat rate per trip allocation of Travelcard & Conc
- Really more like 35% profit!

Background

- NBC supposedly had a 'standard' route costing method in 1971, blessed by CipFA
- But old habits died hard!
- c1999 I had to persuade the new finance team that they needed route costing at all!
- **"Won't depot level do?"**

Route Costing – Two Meanings

- **A:**

- *A method* of allocating costs and revenue to services to get an idea of profit or loss.

- **B:**

- 'The Route Costing'
- Period end printout of the results, usually by depot or area

The Period End Route Costing

- It's a fait accompli and everyone believes it (especially the MD)
- **I've never seen one 'undone'**
- Careers have ended on the basis of it!

Period End

- Always produced in a rush!
 - **And one day somebody will explain to me why**
 - **Cynical busman here thinks if you collected £300 last Tuesday that won't have changed next week!**
- *"In my dome of ivory,
A home of activity,
I want the answers quickly,
But I don't have no energy"* - Kate Bush

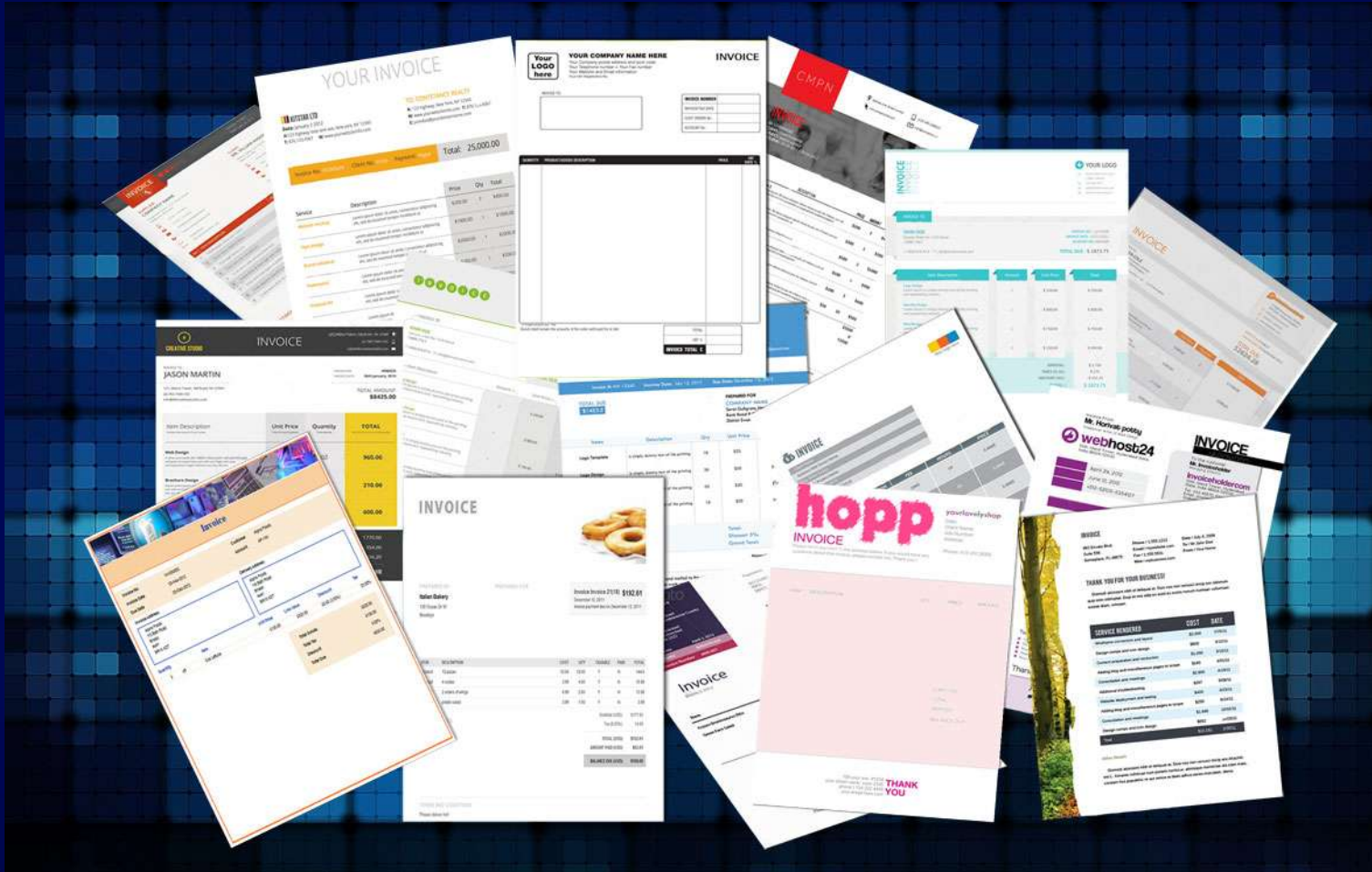
Challenge!

- **Route Costing is a financial 'thing' often divorced from operational and commercial staff**
 - **Who might not even see it!**
- **Accountants are happy with numbers in boxes whether they're right or not!**
 - **Revenue going to long-dead services etc.**
- **Not a black and white process**
- **No 'right answer' but some things are very clearly wrong!**

My First Rule of Route Costing



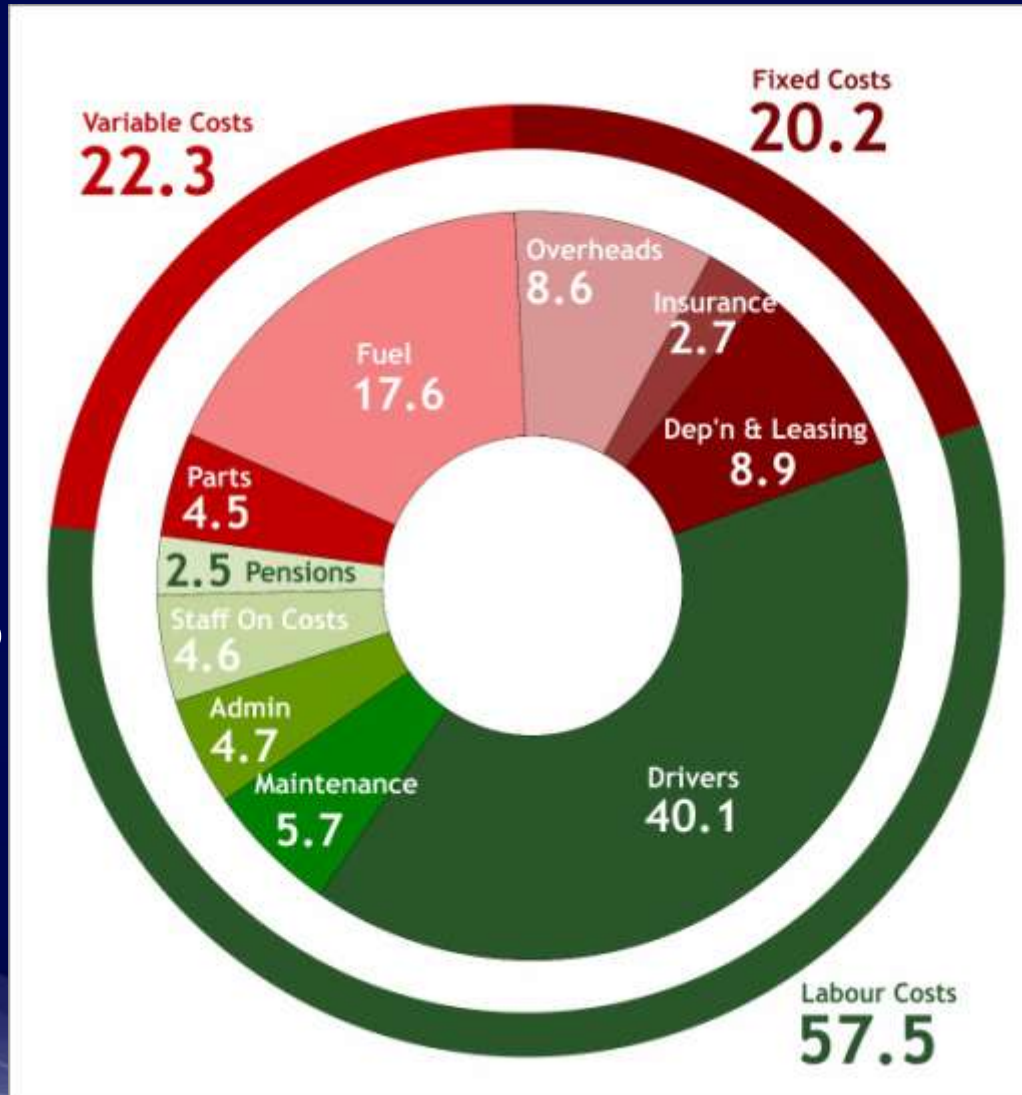
Let's Look at Costs First



Bus Costs – Make Up by %age

Wage
Related
Costs total
58%

Big change!
10 years ago:
Fuel was 7-8%
Wages more
like 70%



Thanks
to Chris
Cheek
for this

Only Four Ways to Allocate Cost



Some sort of 'Cost Dump'
More on that story later...



**Curb your excitement...
...now for an 'exciting' exercise**

What do you Think?

Category	Miles	Hours	PVR
Vehicle Purchase, Depreciation & Leasing	?	?	?
Depot Overheads	?	?	?
Company & Group Overheads	?	?	?
Insurance	?	?	?
Drivers & Op Staff Wages*	?	?	?
Engineering Staff Wages*	?	?	?
Management & Admin Staff Wages*	?	?	?
Replacement Parts, Oil etc.	?	?	?
Fuel	?	?	?

* Wages include on-costs and pension contributions

Obsession with Mileage!



Aaaaaaaaargh!

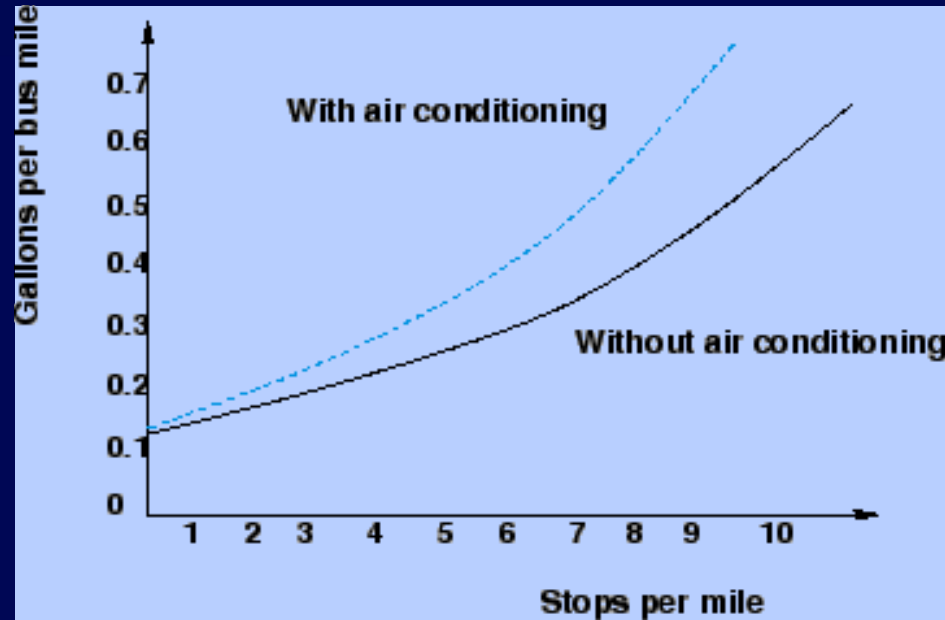
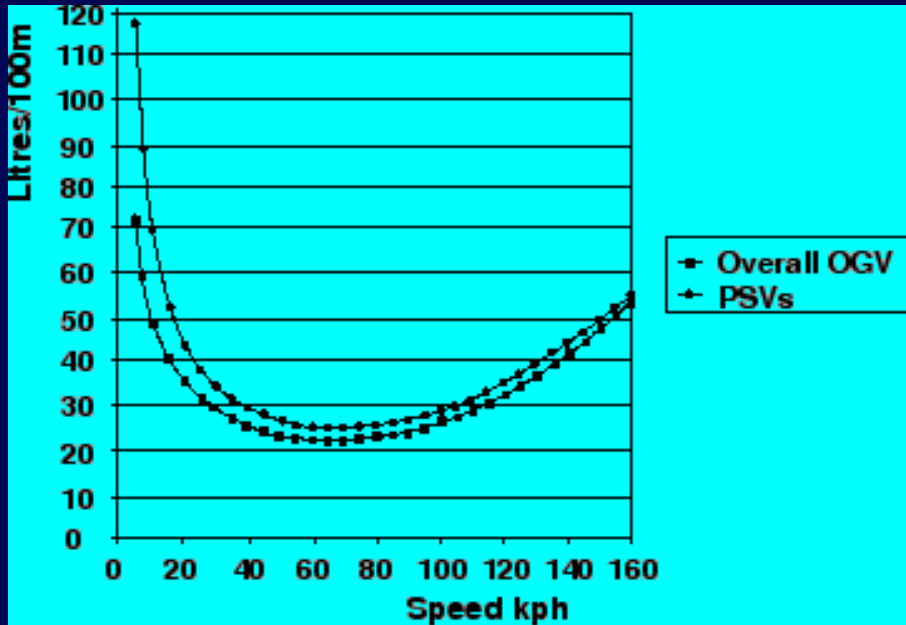
How many fitters are paid by the mile?

**Wear and tear maintenance?
Look at your ex London 'low mileage' buses!**

How many miles-based KPIs are there? And how many by hours?



Fuel – A Function of Time or Distance?



Research by Indian Institute of Technology Bombay
(and Bombay rather than Mumbai is their use of the name not mine!)

*Btw the units on the l/h. graph are missing a 'k'!
70 litres per 100m equals 0.04 mpg!*

A bit of Arithmetic Using the Graph (Sorry!)

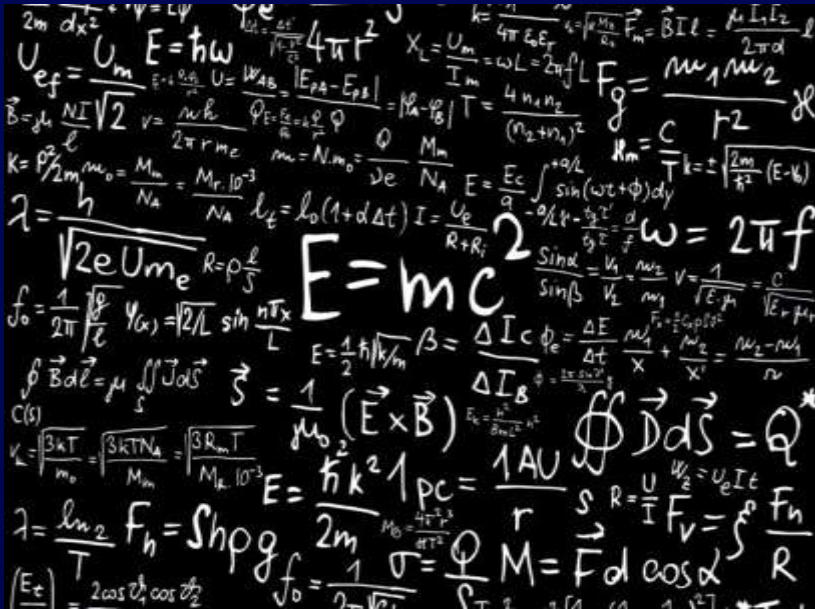
Let's say the local service manages an average 8 mph and the interurban 18 mph.

Fuel consumption of 4.7 mpg and 9.4 mpg respectively.

Fuel cost allocated purely by mileage operated gives: 30% town service; 70% interurban

Recalculating based on likely consumption by speed (ignoring topography) gives: 47% town service; 53% interurban

The difference could be £1,000s



My brain on a bad day!



Cost Conundrum 1



- A bus on service 9 has an accident
- **Repairs and insurance claims come to £125K**
- How is this cost allocated?
 - To service 9?
 - To the depot?
 - As a company overhead?

Cost Conundrum 2



- A subsidiary of a major group is allocated £1½m of HQ costs
- **How is this spread?**
- By depot?
- Across core services?
- Across all services?
- 'on the bottom'?

Insurance



**Spurious personal accident claims and 'ambulance chasers' were a big problem
Offset by CCTV and vigorous legal pursuit of fraudulent claims**

- **Bus operators (esp. big groups) self-insure to a large degree**
- **A major catastrophe means they can take a big hit (e.g. Western Greyhound)**



I do Have to Mention the 'Cost Dump'



- At least one major group 'dumps' overhead costs at the bottom of the route costing.
- **So the depot as a whole is expected to cover them but they are not split back by service.**
- Who is to say this is right or wrong?
 - But it is a bit odd!

Revenue



**Bus Company
revenue comes in
lots and lots of
small amounts**

**Can be a good thing
Cash flow, small
variations,
predictability**

**Can be a bad thing
Transaction cost,
cash handling**

Revenue



- **More than ever revenue comes direct from the passenger – latest figure 84% (60% in London)**
Even if the government pays...

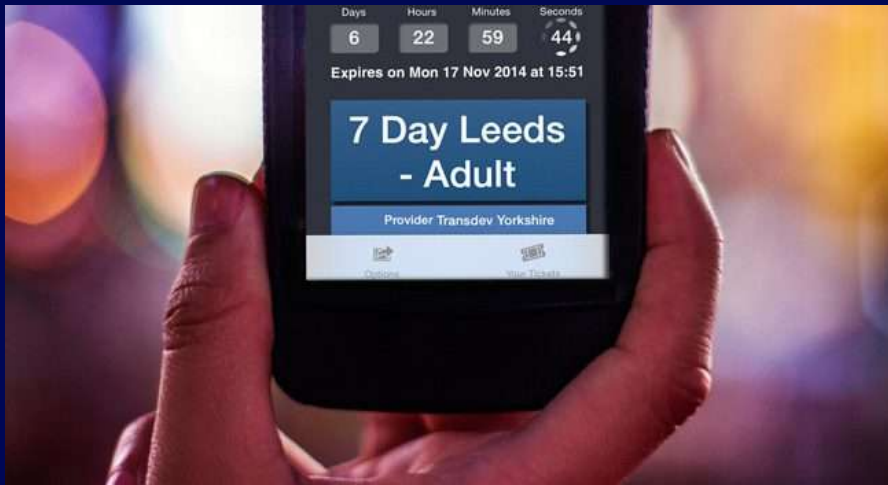
Revenue

- **Taken by the driver**
 - Including multi journey tickets and smartcard top-ups
- **Sold off-bus**
 - Multi journey or carnet
- **Other sources**
 - Concessions
 - BSOG
 - Contract payments
 - Advertising



How should each of these be allocated to a service?

New Tech



**What about revenue from these?
How does the operator receive details of internet sales?
Consider how uses are recorded...**

- **And these?**
- **What if it's multi-operator?**
- **Or capped? [Help!]**

Revenue Conundrum 1



- The finance director receives a £1.5m cheque for concessionary fares.
- **How is this allocated to services?**

Revenue Conundrum 2



The industry is *very* averse to moving on-bus revenue to somewhere else, it almost 'does not compute'

- A driver sells a £20 weekly ticket on service 20
- **What happens to the £20?**
- Issue increases in importance with volume of sales

Options

Revenue Allocation Methods

1. Leave it where it's sold
2. Allocate per mile operated
3. Allocate per passenger carried
4. Allocate per use recorded
5. Allocate per use weighted by average single fare
6. Guess!
7. We did it once in 1997, why should anything have changed?
8. Some other brilliant way! (Always open to suggestions)

Discuss...

And think why smartcards etc. don't really make it any easier!

Don't Worry, We're on the Home Straight...



AFP/GETTY IMAGES

bus managers
network

TAS

Resistance to Change



Suffice to say the said services were taken on by 'another operator' and later increased in frequency..

- **“You can’t allocate weekly ticket revenue to the express services like that. It gives them way too much money and we know they make a big loss”**

General Industry Failing

- Don't appear too interested in knowing the detail
- Happy with 'pots' of money
- No real change in attitude in years
- Obsession with KPIs based on miles
- SPT ZoneCard
 - Scheme revenue distribution has fallen apart for two years
 - Operators don't understand the mechanism for calculating their share
 - Don't see detail of which tickets are sold

Pants!



Literally Pants!



- Retail Parallel
- **Can you imagine M&S not knowing how much these cost to make and (probably) import?**
- **And how many it sells?**
 - But how much of the store's overhead is covered by each pair of pants?

Route Costing is the Link

- Between Cost and Revenue
- **Much too easy to look at them totally separately in accounts, budgets and P&L**
- Or look at whole depot figures
- **THE fares fundamental**
- If costs rise but passengers and revenue fall
- Each passenger has to pay more just to stay still!



A Mention of Marginal Costing

What does it really cost to operate?



***Are these expensive babies sat doing nothing? (But hopefully paid for by other work)
"We must reduce mileage guys!"***

Are the troops sat around paid but waiting a long time for their next duty piece? [And why is the Queen serving?]



Like Shetland!



Link with Marginal Costing – The Classic off-peak ‘between schools’ service – small operator ‘bread and butter’ stuff



School contract income has paid for a chunk of his or her time too (or maybe all day)

School contract income has paid for these...



Hence: 'Between schools' service

- It only costs:
1. Maybe some wages
 2. Fuel
 3. Tyre charges
 4. A bit of wear and tear



Market day service covered at low cost...
..bus is paid for
Doesn't Cost a lot to run

STOP!



Or is it the other way round?

Can you quote cheaply for a school run because the bus is occupied off-peak?

*This is not as silly as it sounds!
Having the peak of demand in the 'off-peak' is not unusual!*

Are the two inextricably linked?
(General efficiencies of integrating school and 'other' services anyway)

Have you sinned and priced both parts at marginal cost? [losing money]

Will marginal cost be reflected in route costing anyway?
Told you there wasn't a right answer!





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LUNCH



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What do you Think?

Category	Miles	Hours	PVR
Vehicle Purchase, Depreciation & Leasing	?	?	?
Depot Overheads	?	?	?
Company & Group Overheads	?	?	?
Insurance	?	?	?
Drivers & Op Staff Wages*	?	?	?
Engineering Staff Wages*	?	?	?
Management & Admin Staff Wages*	?	?	?
Replacement Parts, Oil etc.	?	?	?
Fuel	?	?	?

* Wages include on-costs and pension contributions

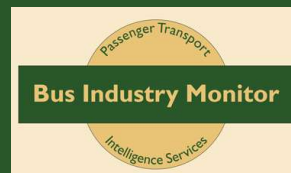


YBMN Seminar

The Cost of Time

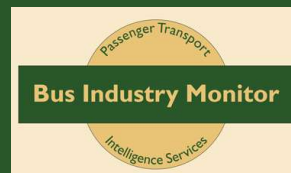
Time is Money!

- Demand for our services is driven by the desire to do other things
 - Work, school, shopping, visiting friends etc
- Customer's primary concern is **TIME**
 - This drives demand and choice, not price/quality
- Measured by Generalised Cost or 'Time Cost'
 - The cost in time and money of the whole journey from door to door
- Important measure, too often regarded as an abstruse topic for modellers



Why is all this so important?

- Helps your own business - planning and evaluating potential improvements
- It is fundamental to government's evaluation of transport projects
- Makes you an 'informed client' when confronted by proposals which might damage your business
 - Leeds Trolleybus
 - Tyne & Wear Quality Contract
 - Both used spurious assumptions which operators were able to debunk (with a little help from their friends!)



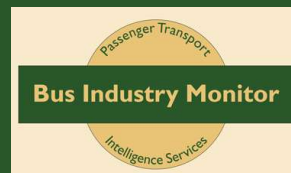
How do we measure the cost of a bus journey?

- The time taken to walk from home to the bus stop
- The time spent waiting for the bus
- The time spent on the bus itself
- The time taken to walk from your alighting point to your final destination



A Worked Example

- Single point to start with
- Stop 3.9 miles from a city centre
- Bus every five minutes
- Bus journey time 29 minutes
- Average single fare = £1.80
- Passengers live an average of 500 metres (4 minutes' walk) from the stop
- Have we got all we need?



So Far it's Just *too* Easy!

- Elements of Psychology apply:
- We don't like walking
- We hate waiting
- We particularly hate waiting longer than we should
- We never consider the 'true' motoring cost



We Need to Account for This



- We apply various weightings.
- In best English language tradition, including a weighting for waiting!
- And this is where the arguments start!



Let's Look at Bus Journeys



Walking to the Bus Stop



- Few passengers have a bus service directly outside their house
- And those who do usually don't want them (but it's alright next door)

Walking to the Bus Stop



- Most people have a walk to the bus stop
- The accepted average is 400 metres
- But the derivation of this is the average distance covered in five minutes
- Topography issues (and a formula discovered for Sheffield)
- **Walk time weighted by two**

Recent research by ITS Leeds suggests this is too high



Waiting at the Bus Stop



- Waiting is one of the least popular parts of a trip
- Traditionally also weighted by two
- But is it right we have the same weighting as the 'walk' element?

Amenity at the Bus Stop – A 'Soft Factor'

- A27 near Guildford
- A pole and a small piece of hardstanding
- No shelter
- No light (nice in winter)
- Life in your hands to cross the road



How Long do We Wait?

- Accepted wisdom – half the headway, but this is clearly rubbish!
- It assumes passengers turn up at random times devoid of any timetable knowledge
- Loads of research done about the pattern of *BUS* arrivals at bus stops
- Precious little about the pattern of passenger arrivals
- But it isn't the bus that waits!

What we Found...

Note waiting time increases by 50% 10min to 12min

%ge of Passengers Timing Their Arrival at Stops

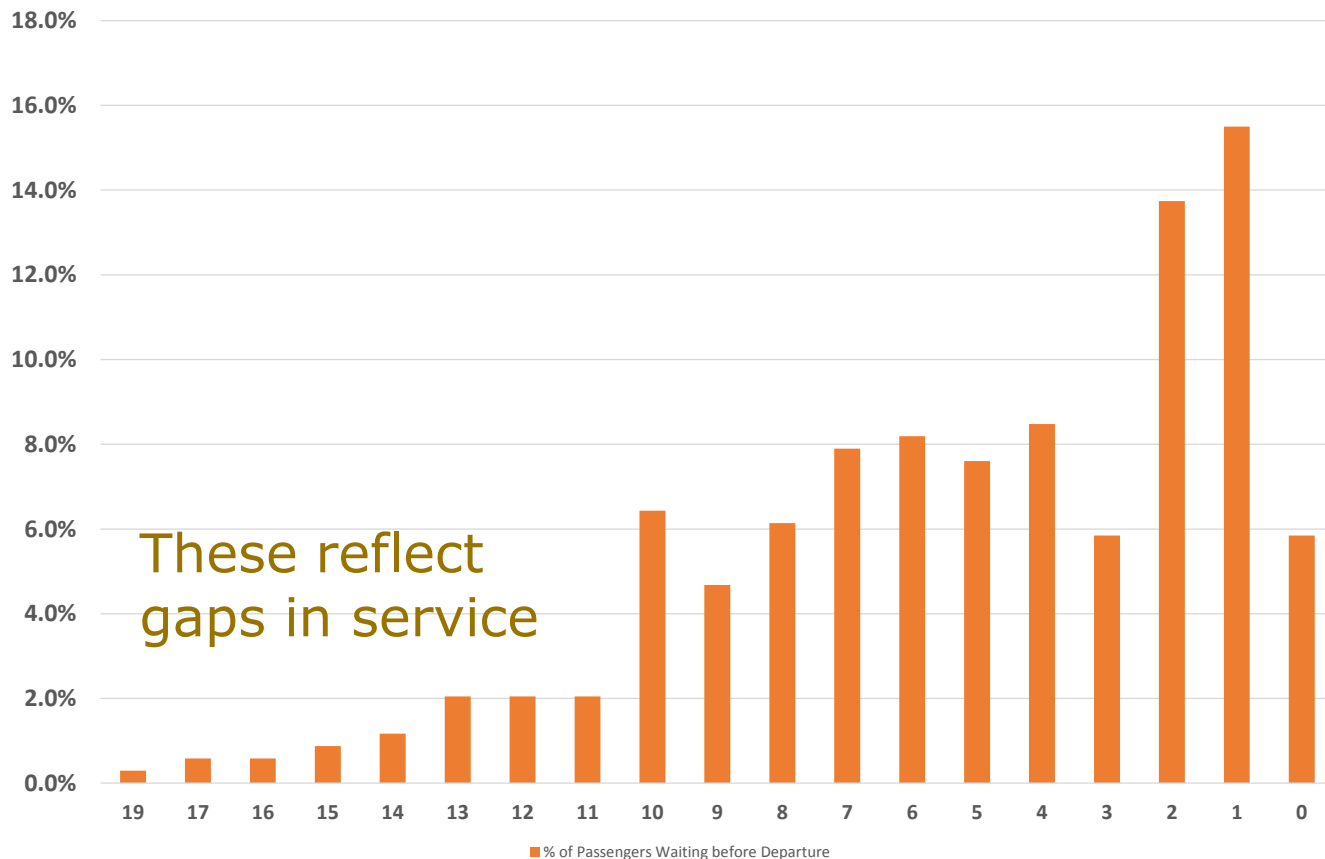
Freq.	5 min	7/8 min	10 min	15 min
Am Peak	20%	50%	>80%	>80%
Off Peak	0%	0%	55%	55%
Pm Peak	22%	30%	70%	n/a

Average Waiting Time by Headway

Frequency	Waiting Time
7/8	3.75
10	4.00
12	6.00
15	6.53
20	8.02
30	11.01
60	19.98
120	37.92

So We think Every Ten Mins is Turn up and Go?

%ge of Pax waiting each number of mins on a 10-min service



University of
Chicago
Research



Excess Waiting Time (EWT)



Might ask what the passenger perceives as the schedule!
Long gaps in service might even be timetabled

- “Where’s this f’ing bus?”
- A measure of the additional time you wait because of variance from schedule
- **Usually weighted by two, but can this really be right?**

Case in Point – Preston Bus 23

Mondays to Fridays

23 Asda via Plungington Road, Black Bull Lane and Royal Preston Hospital

Bus Station	0540	0555	0610	0625	0640	0650	0700		1734	1742	1750
Lytham Road	0552	0607	0622	0637	0652	0702	0712		1750	1756	1804
Royal Preston Hospital	0557	0612	0627	0642	0657	0707	0717		1758	1802	1810
Fulwood Asda	0545	0605	0620	0635	0650	0705	0715	0725	1812	1810	1822
Royal Preston Hospital	0549	0609	0624	0639	0654	0709	0719	0729	1819		1827
Lytham Road	0555	0615	0630	0645	0700	0715	0725	0735	1826		1834
Bus Station	0608	0628	0643	0658	0713	0728	0738	0748	1844		1849

Buses
up to every
5 minutes
until

Bus Station	1950		2210	2230	2300	Lancaster Road	2400	0100
Lytham Road	2002		2222	2242	2312	Lytham Road	0008	0108
Royal Preston Hospital	2007		2227	2247	2317	Black Bull, Fulwood	0012	0112
Fulwood Asda	2015		2235	2255	2323	Royal Preston Hospital		
Longsands Lane	-		-	-	2325	Barnacre Close	0016	0116
Royal Preston Hospital	2019		2239	2259				
Lytham Road	2025		2245	2305				
Bus Station	2038		2258	2318				

Buses
every 20
minutes
until

These journeys FRIDAYS ONLY -
start at Lancaster Rd
terminate Barnacre Close, Sherwood

For extra buses to Royal Preston Hospital, see **Service 19**

This is what PB publishes

'Up to every 5 minutes' sounds very 'turn up and go'. Not much waiting involved.

- **Except in the Detail:**
- It's an 8-minute headway which doesn't start until 1000
- No bus from ASDA 0745 until 0804
- No bus from Hospital 1517 until 1534
- What does the average punter think?



Boarding Time

- Probably equivalent of waiting time
- It's actually more of an irritation during travelling time
- People glower at the slow payer



"C'moan! Hurry up an' die ye awkward ba...."



Fare

- Traditionally took a simple equivalent single fare
- But single fares are dwindling – now as little as c5% of adult farepayers in some cities
- If we assume *only* a ten trip per week commute, from 2015 fare survey cost per trip:
 - Single - £2.21
 - Weekly – £1.60
 - Monthly - £1.40 (say)
 - Should we discount more than just commuting?



In-Vehicle Time



The usual model has no such thing as 'EXCESS TRAVEL TIME' – but should there not be to reflect journey time variability?

- Usually taken with no weighting.
- Electronic devices mean it can be productive time – personal or business - (not available to car drivers)
- But if it's crowded or rowdy...

Walk Time at Destination



Depends on town centre access. Right into the High Street? (Grimsby, left) Or tucked away round the back (Birmingham Town Hall, right). Think of relative perceptions of security. Convenience factor. Probably a longer walk the larger the size of the destination.

Usually taken as five minutes weighted by two.





Now look at Car Journeys



Walk Time and Wait Time



- Traditionally assumed to be zero – car ready on the drive and you don't have to wait for it

But What if...

Parking at home is restricted?



The pressure on on-street parking outside homes is growing. The car might no longer be right outside the front door.

Or Even...

May be a multi-car household where car 'musical chairs' gets played every morning. Unlikely that the 'wait time' is zero



Marginal Motoring Cost

- It's a lost cause
- You never get any acceptance of any car-related 'on-cost'
- Only the cost of fuel used
 - Which has dropped significantly in pence per mile



In-vehicle Time

Taken as it is



As with the bus trip, do we now need 'Excess Journey Time' too to reflect unpredictability?

But more realistically



Note that congestion narrows the bus vs. car speed differential – in Bristol am peak bus speeds and traffic speeds were the same (appallingly slow).

Parking Charge

May be none if workplace parking is plentiful and cheap

May be hefty if it isn't



Main difference industrial estates (sorry, 'business parks') vs. town and city centres.



Walk at Destination

May be none if workplace parking is on-site

May be lengthy if it isn't (could even be further than the bus stop)



Main difference again industrial estates (sorry, 'business parks') vs. town and city centres.



So What Does it All Mean?



I'm Sorry!



- Cute puppies don't get away from showing numbers!

Basic Calculation

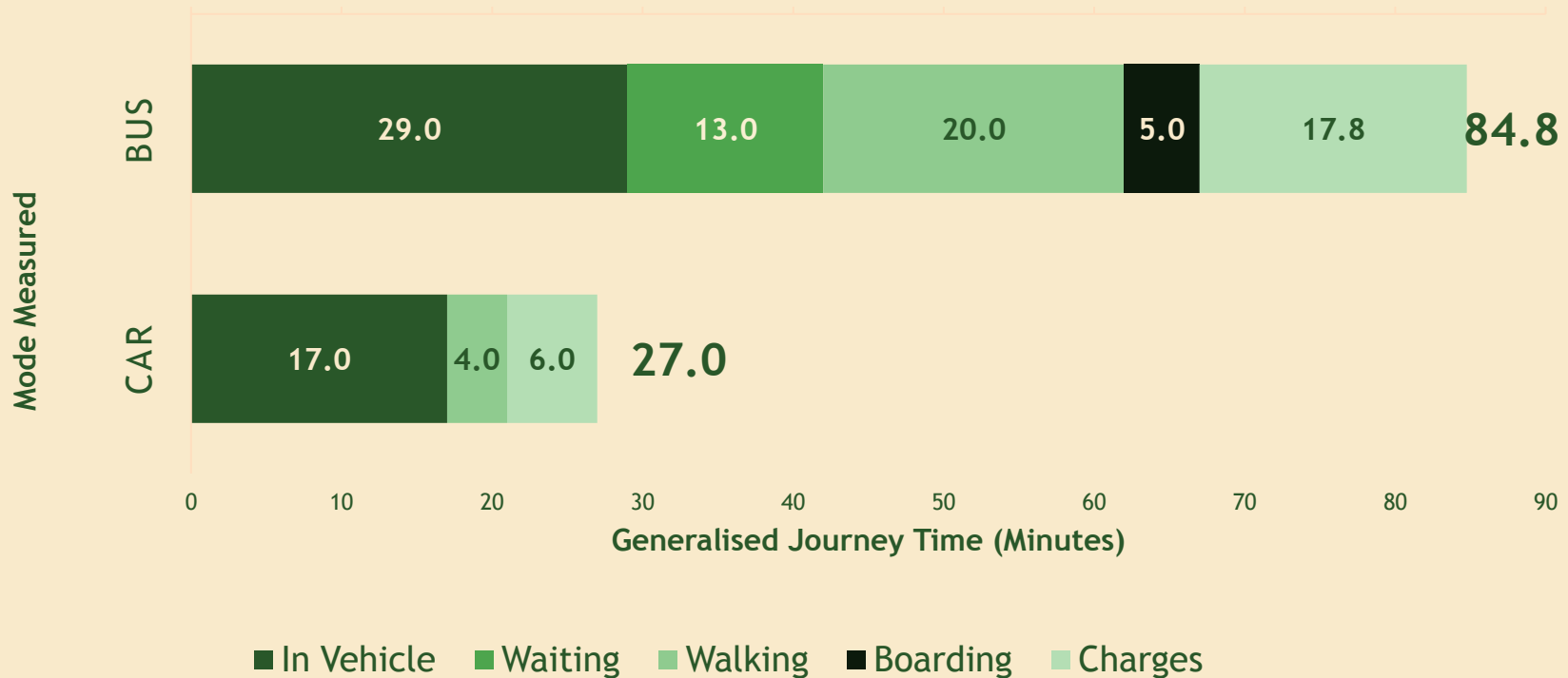
- The time element of the journey would be:
 - 10 minutes walk time from home to stop
 - 10 minutes wait time + 3 minutes excess waiting time
 - 5 minutes boarding time
 - 29 minutes IVT
 - 10 minutes walk time from alighting to destination**= 67 minutes**
- The fare is converted to minutes by reference to a value of time
 - set by DfT at £6.08 per hour 2016 prices**= 17.8 minutes**



What about the competition?

- Same journey by private car
 - NO walk time at home
 - NO wait time
 - In-vehicle time 17 minutes
 - 2 minutes walk time at destination = cost of 4 minutes
 - Fuel cost = 61p = 6 minutes
- No boarding penalty
- Total generalised cost = 27 minutes

The Competitive Challenge



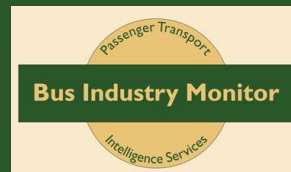
New Calculation

- The time element of the journey would be:
 - 7.5 minutes walk time from home to stop
 - 5 minutes wait time + 3.75 minutes excess waiting time
 - 5 minutes boarding time
 - 29 minutes IVT, reduced to a perceived 25 minutes
 - 7.5 minutes walk time from alighting to destination**= 58.8 minutes**
- The fare is converted to minutes by reference to a value of time
 - set by DfT at £6.08 per hour 2016 prices**= 17.8 minutes**

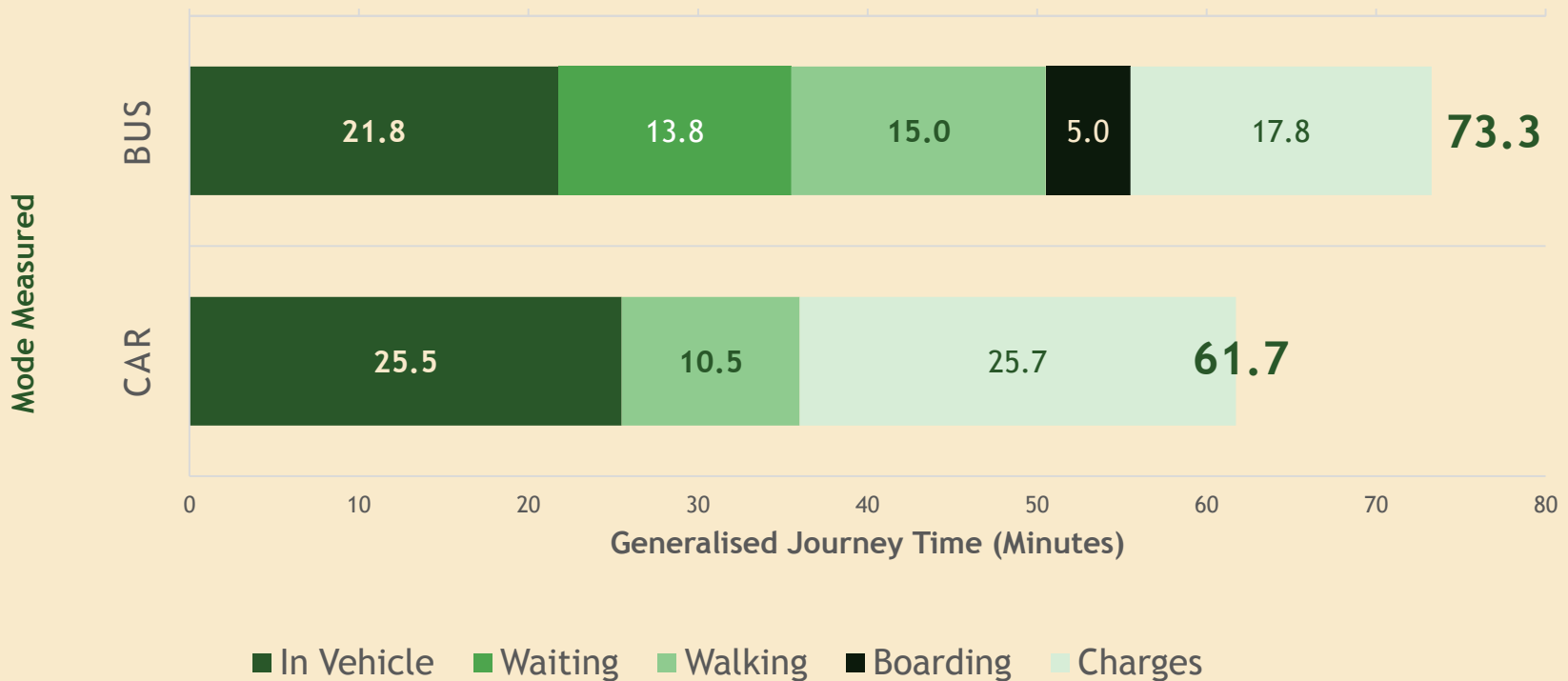


What about the competition?

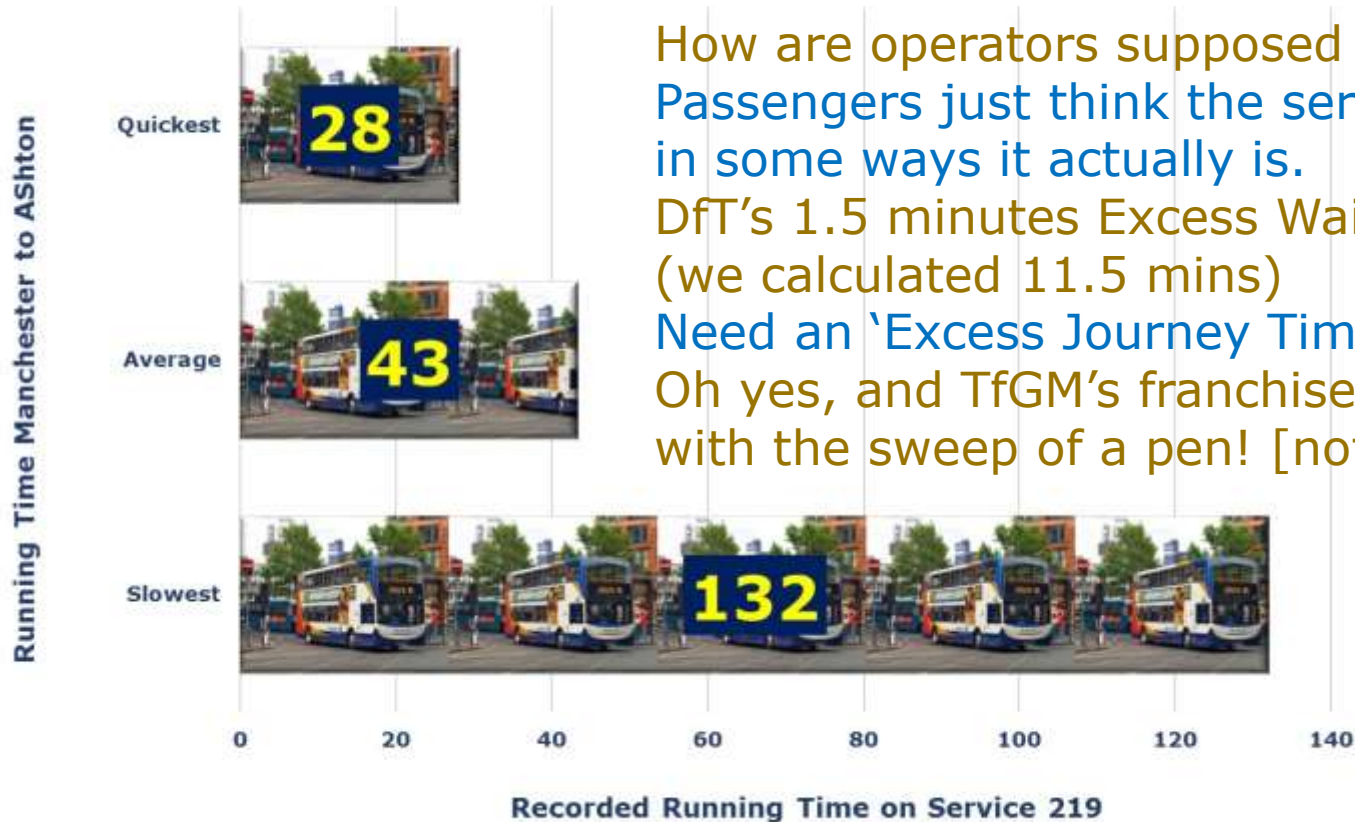
- Same journey by private car
 - 5 minutes walk time at home
 - NO wait time
 - In-vehicle time 17 minutes
 - 2 minutes walk time at destination = cost of 4 minutes
 - Fuel cost = 61p + £2 a day parking = 25.7 minutes
- No boarding penalty
- Total generalised cost = 61.7 minutes



A more balanced position?



Unpredictability! It's A Killer...



How are operators supposed to cope with this? Passengers just think the service is crap! – And in some ways it actually is.

DfT's 1.5 minutes Excess Wait is widely adrift (we calculated 11.5 mins)

Need an 'Excess Journey Time' measure

Oh yes, and TfGM's franchise will solve it all with the sweep of a pen! [not]

btw These are ACTUAL times recorded by Stagecoach between Manchester and Ashton in the am Peak

What Happens When the Traffic is Clear?

The bus has no option but to wait at timing points for the scheduled time

Which passengers hate!



What Happens When the Traffic is Clear?

The car sails through and arrives unexpectedly early...

Which drivers love! Then tell everyone at work what a dream drive to work they had!



Operator Actions to Maintain Reliability

Example here – Go North East Services 2 and 2A in the afternoon leaving Washington Bus Station

Then at these minutes past each hour																				
2	2A	2	2A	2	2A	2	2A	2	2A	2	2A	2	2A	2	2A	2	2A	2	2A	2
40	57	10	27	1340	1357	1410	1427	1440	1501	1515	1538	1552	1610	1622	1641	1654	1713	1728	1747	1808
43	-	13	-	1343	-	1413	-	1443	-	1518	-	1555	-	1625	-	1657	-	1731	-	1811
47	-	17	-	1347	-	1417	-	1447	-	1523	-	1559	-	1629	-	1701	-	1735	-	1815

Headway 17 / 13 / 14 / 13 / 14 / 18 / 12 / 19 / 13 / 19 / 15 / 19 / 21

What *is* the average waiting time with this mess? [Note TAS habit of scoffing at operators running 17-minute headways etc.]

What do passengers ***perceive*** is going on? Buses may be ***punctual*** but are they ***predictable***?



Operator Actions to Maintain Reliability

Back to Go North East Services 2 and 2A again

Then at these minutes past each hour																				
2	2A	2	2A	2	2A	2	2A	2	2A	2	2A	2	2A	2	2A	2	2A	2		
40	57	10	27	1340	1357	1410	1427	1440	1501	1515	1538	1552	1610	1622	1641	1654	1713	1728	1747	1808
43	-	13	-	1343	-	1413	-	1443	-	1518	-	1555	-	1625	-	1657	-	1731	-	1811
47	-	17	-	1347	-	1417	-	1447	-	1523	-	1559	-	1629	-	1701	-	1735	-	1815

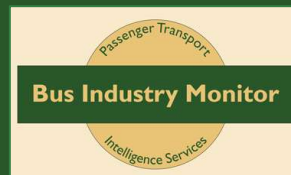
Headway 17 / 13 / 14 / 13 / 14 / 18 / 12 / 19 / 13 / 19 / 15 / 19 / 21

Is it worse if the passenger specifically wants either a 2 or a 2A? – Note how service 2 ‘normally’ leaves at ten past and twenty-to the hour and how far off this it gets by five o’clock.

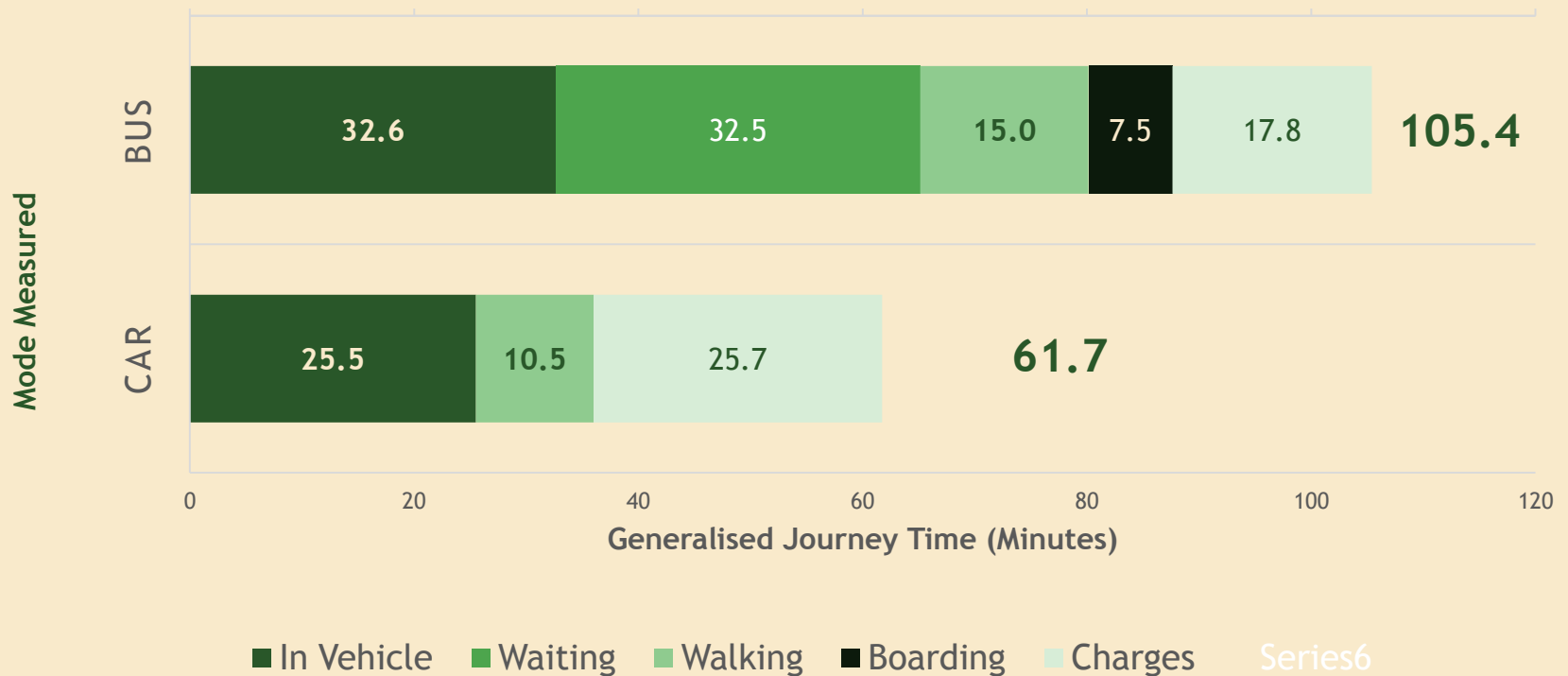
Operators are perhaps over-cautious about timings – tendency to over-pad if anything (Personal feeling) – and massive jumps from daytime to peak running times. E.g. PB Service 23 – 1440 from Preston round trip in 59 minutes; 1448 gets 69 minutes.

New Calculation

- The time element of the journey would be:
 - 7.5 minutes walk time from home to stop
 - 5 minutes wait time + 22.5 minutes excess waiting time
 - 7.5 minutes boarding time
 - 43 minutes IVT (50% variance from schedule), reduced to a perceived 32.6 minutes
 - 7.5 minutes walk time from alighting to destination**= 87.6 minutes**
- The fare
= 17.8 minutes



Factoring Unreliability into Generalised Costs



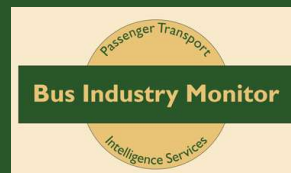
Understanding Customers

- The concept of ‘willingness to pay’ for improvements, e.g. new modes, better facilities
- Came largely from the railways
- Two approaches - evidence-based
 - “We made this improvement and this happened”
 - Known as “revealed preference”
- Customer research
 - shown illustrations and asked to evaluate them
 - Known as “stated preference”



The Difficulties with this Approach

- Stated preference has too many ‘leaps of faith’
 - Assumes customer knowledge and understanding
 - Relies on their ability to interpret accurately the illustrations shown
 - Assumes that their statements about their own willingness to change behaviour are true
 - Capable of manipulation
- Application as a fixed number of minutes in the generalised cost equation regardless of journey length

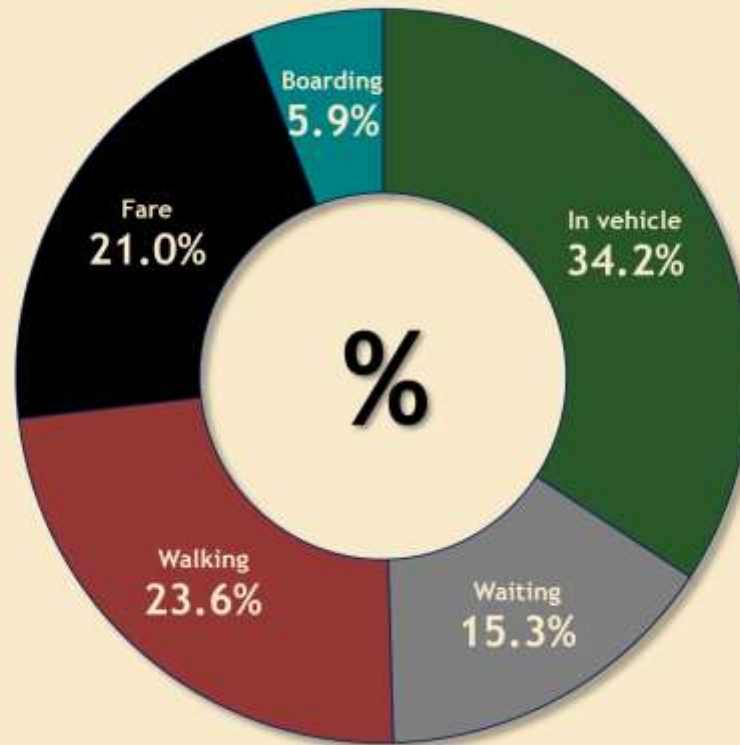


Worked Example

- Real-time information at stops/via smartphone
- Advantage is that it takes the uncertainty out of waiting for the bus
- Therefore, could reduce the waiting penalty we talked about earlier, from (say) 2 x actual to 1.5 x actual
- Stated preference would apply a fixed value to the RTPI regardless of the length of the waiting time. Does not accurately reflect customer priorities



The Components of a Bus Journey

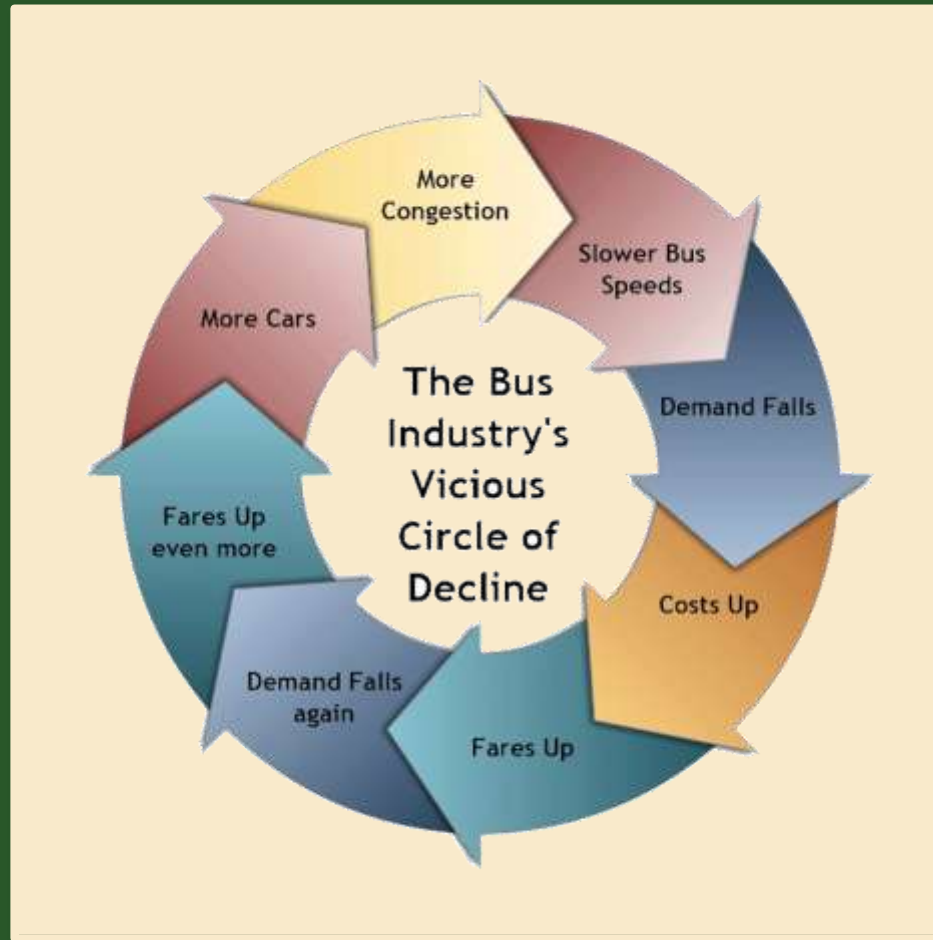


The Crucial Importance of Time



- Reduce ‘generalised cost’ of using buses
 - in absolute terms and relative to the private car.
 - the central objective of policy.
- Achievement of this will:
 - improve economic efficiency
 - cut journey time for users
 - drive mode shift, cut congestion
 - generate additional patronage and revenue
 - reduce the costs of operation
 - help keep fares lower

Reversing the Vicious Circle





the **young
bus managers**
network

