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Transport Demand Management

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Status quo

Why do we have congestion?

-Not enough road space?

-Too less car infrastructure?

-Fast vehicle growth rate?

-Lack of alternatives?

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Increasing road space will only bring new traffic !!!

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Car-oriented transport needs vast spaces for roads and parking

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Car-oriented transport needs vast spaces for roads and parking

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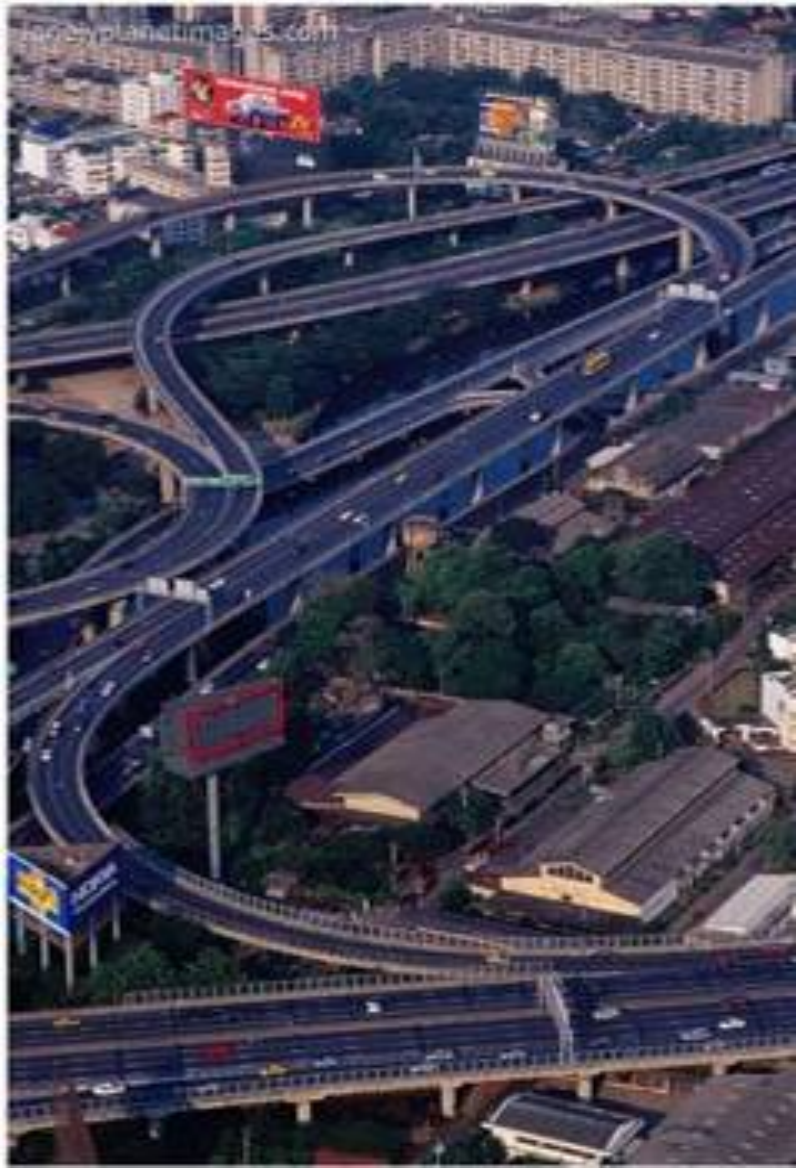
When we are more car friendly then…

- Induced travel
- Environmental costs
- Social costs
- Economic costs



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Total cost of urban travel by various modes

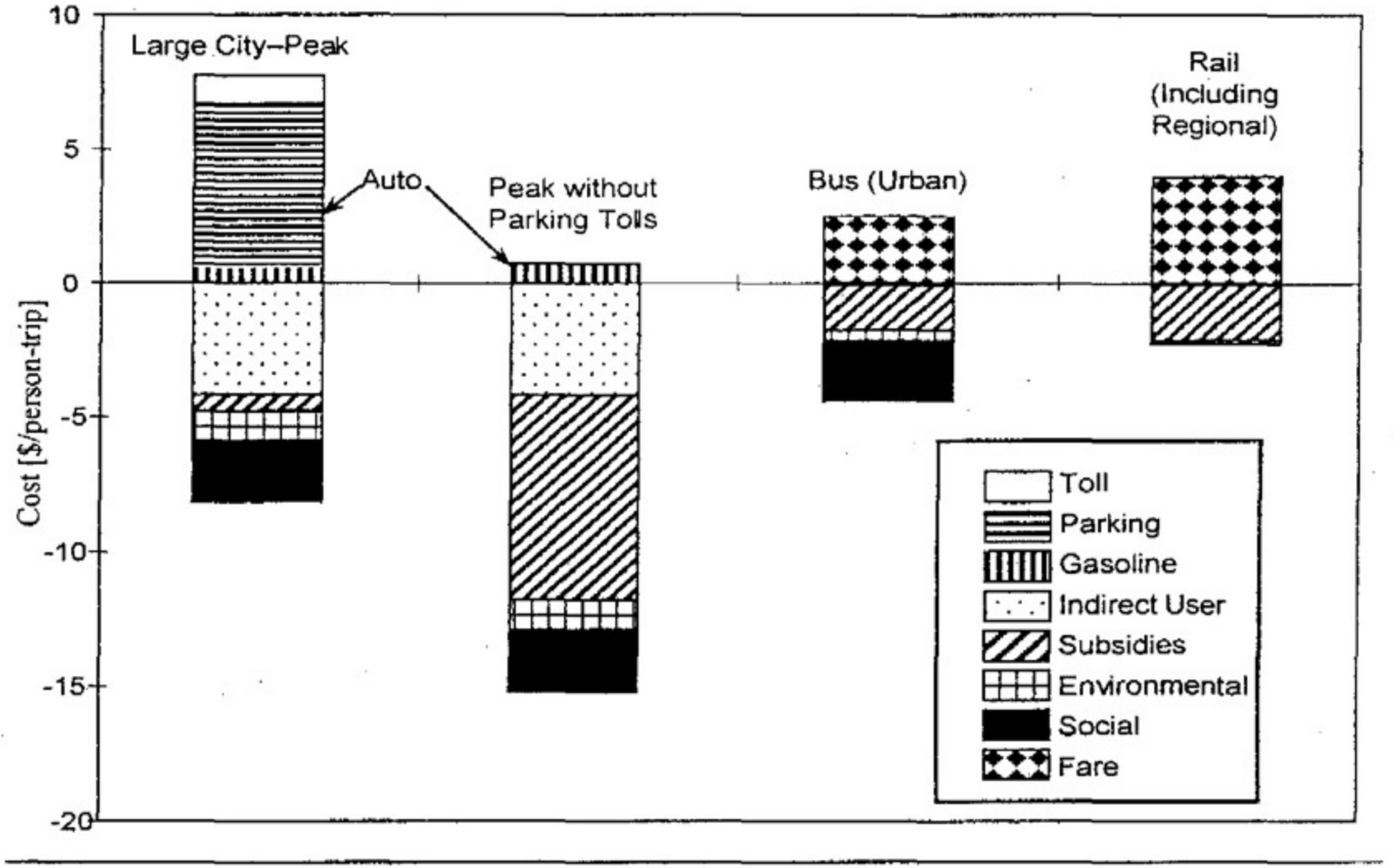

FIGURE 2.13
Total costs of urban travel by different modes

Note: Negative signs are used to distinguish indirect from direct costs; they do not imply negative values.

Source: Vuchic, V. Transportation for Livable Cities, 1999

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Travel Demand Management

- "…managing the demand for travel…reduce or increase…"
- Emphasises more on movement of people and goods
- Creating a balance among modes
- a.k.a Mobility Management

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The TDM package…

Fiscal policies cannot be implemented as isolated instruments, but – for being successful – have always to be embedded in a comprehensive framework of Transport Demand Management measures.

Transport demand management measures (including fiscal policies)

- ❑ Land use development controls
- ❑ Public transport integration and improvement
- ❑ Non-motorised transport improvement
- ❑ Parking controls and management
- ❑ Regulatory controls such as odd/even systems
- ❑ Prioritising Mass Transit and NMT
- ❑ Pricing & charges through fuels, annual taxes
- ❑ Congestion charging

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Where should TDM be done …

- Transit and NMT Improvement and integration
- Parking Management
- Physical restraint measures
- Congestion pricing

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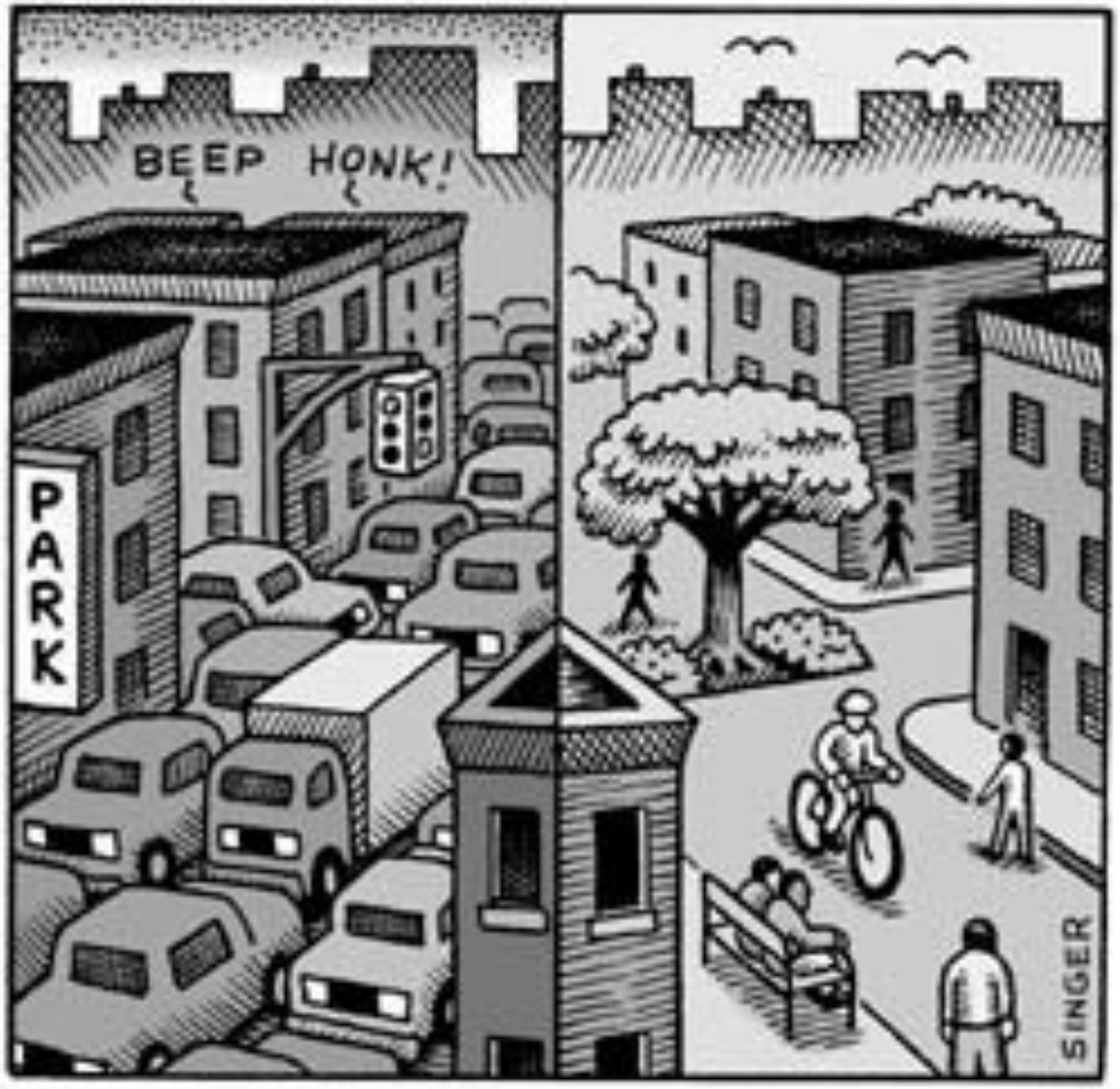
Parking Management



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Pedestrian way or parking zone?

Bangkok / Thailand

Picture: GTZ Photo CD-ROM / Karl Fjellstrom

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Inverted World

Picture: Armin Wagner/GTZ

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Are These The Streets For Our Children?

Picture: Santhosh Kodukula, 2009

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Challenges

- Fast growing car ownership and usage
- Too little space
- Illegal parking
- Reduction of accessibility and mobility in particular in the city centres
- Negative impact on the health and quality of life
- Destruction of side walks

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Positive impacts of parking policy

- Has an impact on mode share
- Can support local economic development
- Major revenue earner
- Improves road safety
- Influences car ownership

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Way Forward

Parking Management Measures

- Establishment of Parking Zones
- Reduction of parking supply in city centre
- Parking Pricing
- Improve other transportation modes
- Establishment of P+R parking facilities
- Enforcement improvement
- Shared parking
- Increase public awareness

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Parking pricing

- Retailers justify their request for free parking or reduction of parking fees with the aim of improving the competitiveness of the inner city retail trade.
- However, free parking only induces long-term parking.
- Parking fees increase the parking chances for customers and therefore the sales may rise.

Picture: Armin Wagner/GTZ

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Copenhagen - Nyhaven

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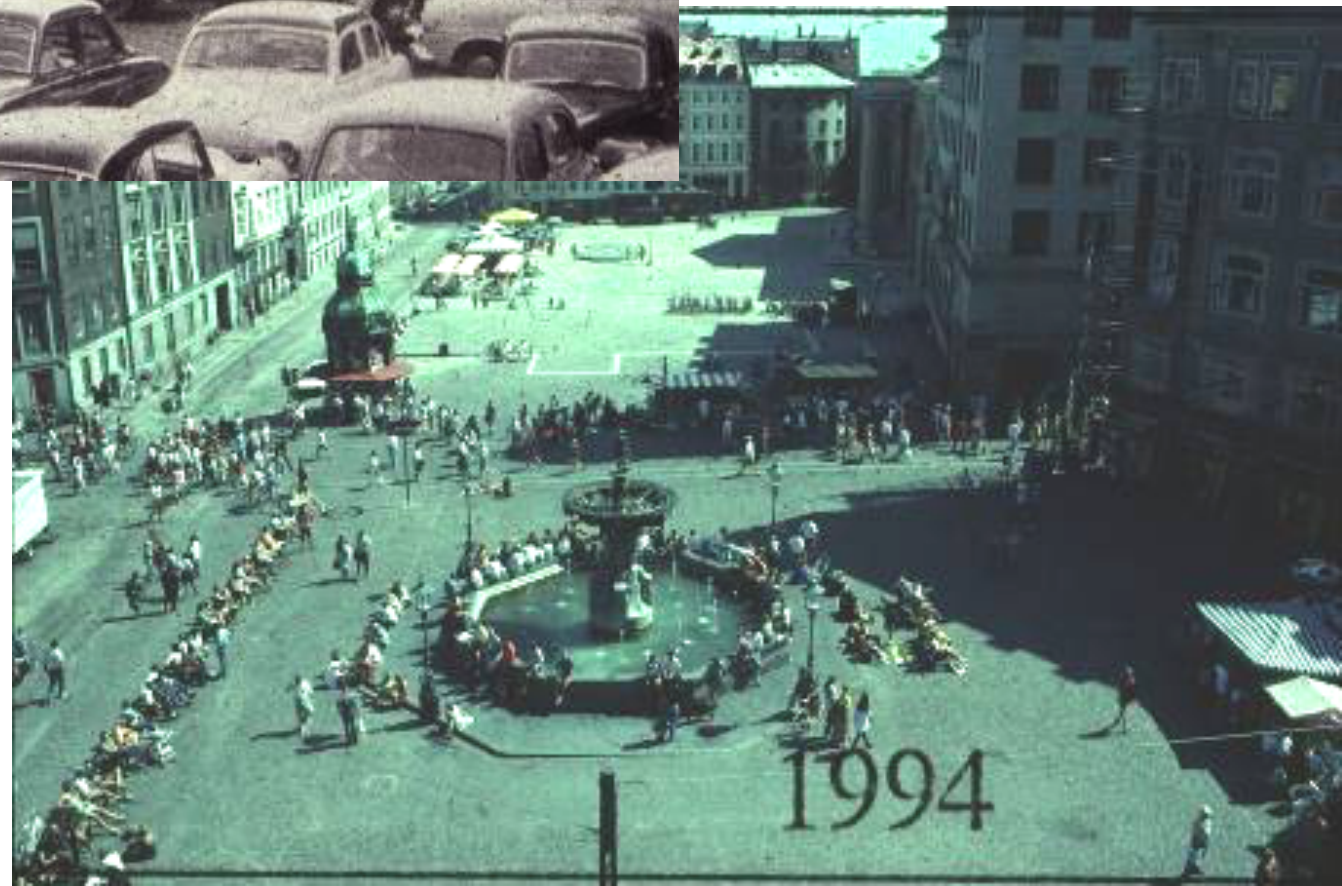
Copenhagen



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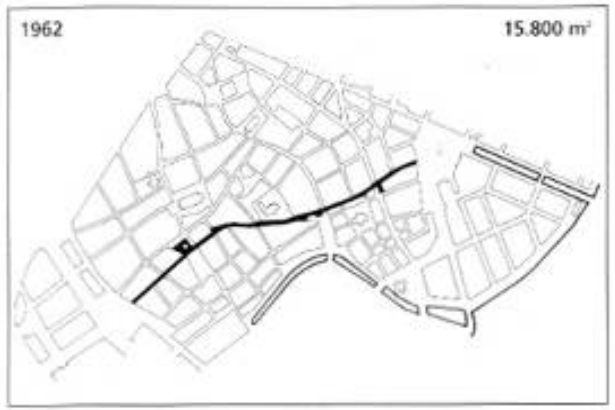
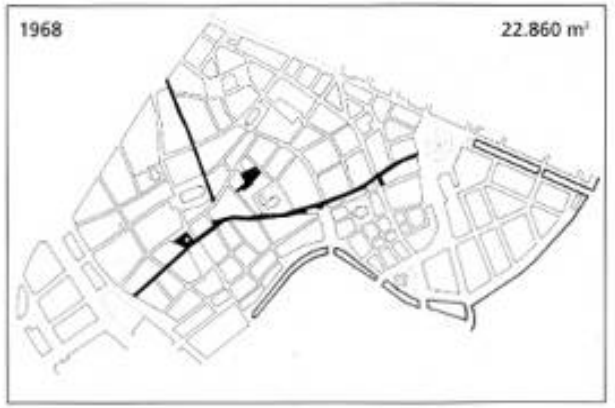
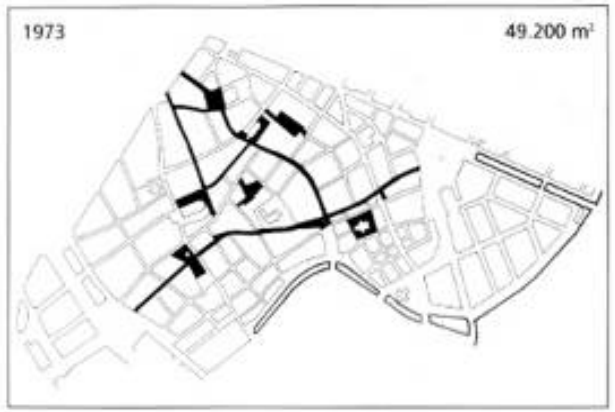
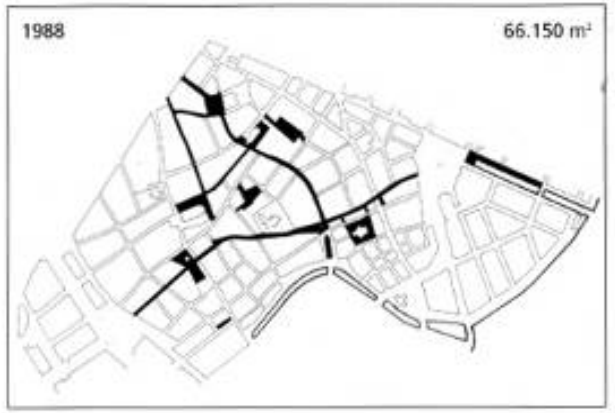
Copenhagen

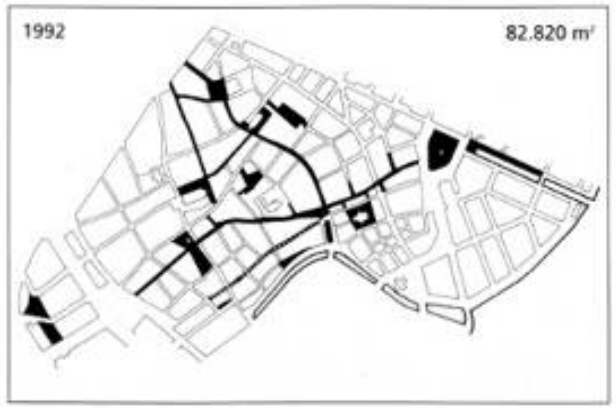
DEVELOPMENT OF CAR-FREE STREETS AND SQUARES 1962-1996

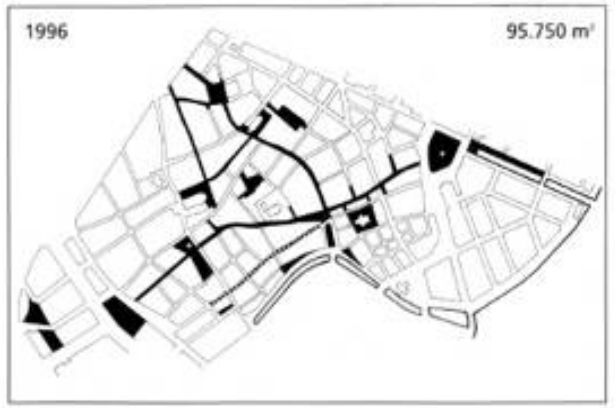


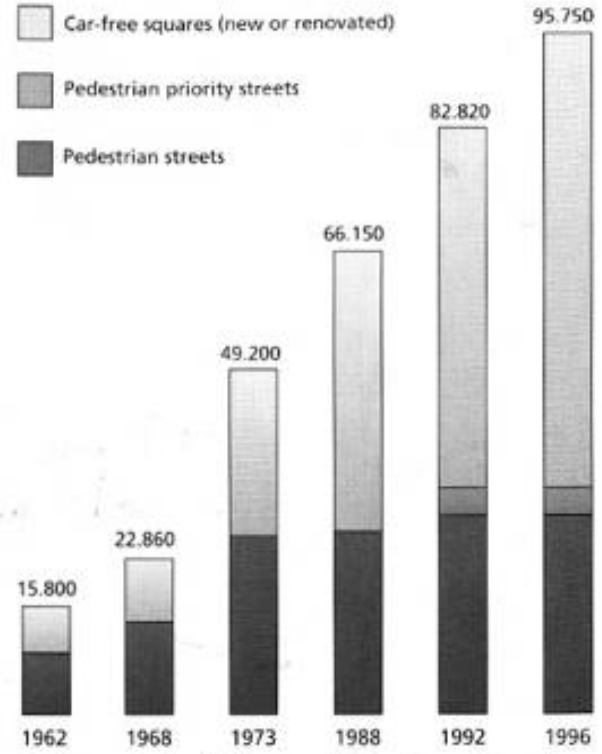












Development of pedestrian areas in Copenhagen city center from 1962 to 1996 (in square meters)

Illustrated on this page are 34 years of gradual transformation of Copenhagen city center.
By 1996, the city center had some 96.000 m² set aside for people activities, a six-fold increase from the first stage in 1962.
The bar graph above shows that the creation of pedestrian streets was actually finished by 1973. Effort has been concentrated subsequently on reclaiming and improving the city squares – the potential oases of the city.

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Copenhagen

Got rid of parking “secretly”

- 1994 – 2005 : reduced parking spaces in city center : 14,000 to 11,500

- Bicycling traffic rose 40%
- 1/3rd of people in Copenhagen commute on a bicycle

Source: Venderbilt T, 2008, „Traffic: Why we drive the way we do (and what it says about us)“, Allen Lane, London pp150

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Our cities need....

Parks

Not

Car parks !!!

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Some fiscal measures

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Low-Emission Zone Charging in Milan

- One-year trial of EcoPass since 2nd January 2008
- It is a scheme of emissions-based charges for the entry into Milan's Limited Traffic Zone (ZTL), which is controlled by 43 gates
- Cameras record vehicle licence plate numbers and pollution class, and debit the card holder's account
- Operating Hours: Monday – Friday 7.30 a.m. to 7.30 p.m.
- Tollage up to EUR 10 (US$12.52) per day, charges are based on the Euro emissions class of the vehicle, the fuel type, the availability of particulate filters, and the type of transport (personal or goods)
- There is an additional offer of a multiple access card (50 days of access, not consecutive, with a reduced price) and a subscription card for residents of the ZTL

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Milan EcoPass Classes and Charges

EcoPass Class	Criteria	Charges			
		Daily	Multiple, first 50 days	Multiple, successive 50 days	Annual resident
Class I	Alternative fuel (e.g. LPG, CNG, electric)	Free	Free	Free	Free
Class II	Gasoline cars and trucks, Euro 3 and later; Diesel cars and trucks, Euro 4 and later	Free	Free	Free	Free
Class III	Gasoline cars and trucks, Euro 1,2	€2 ($2.50)	€50 ($62.60)	€60 ($75.12)	€50 ($62.60)
Class IV	Gasoline cars and trucks, Euro 0; Diesel cars, Euro 1, 2, 3; Diesel trucks, Euro 3; Diesel Bus Euro 4, 5	€5 ($6.26)	€125 ($156.50)	€150 ($187.80)	€125 ($156.50)
Class V	Diesel cars, Euro 0; Diesel trucks, Euro 0, 1, 2; Diesel Bus, Euro 0, 1, 2, 3	€10 ($12.52)	€250 ($313)	€300 ($375.60)	€250 ($313)

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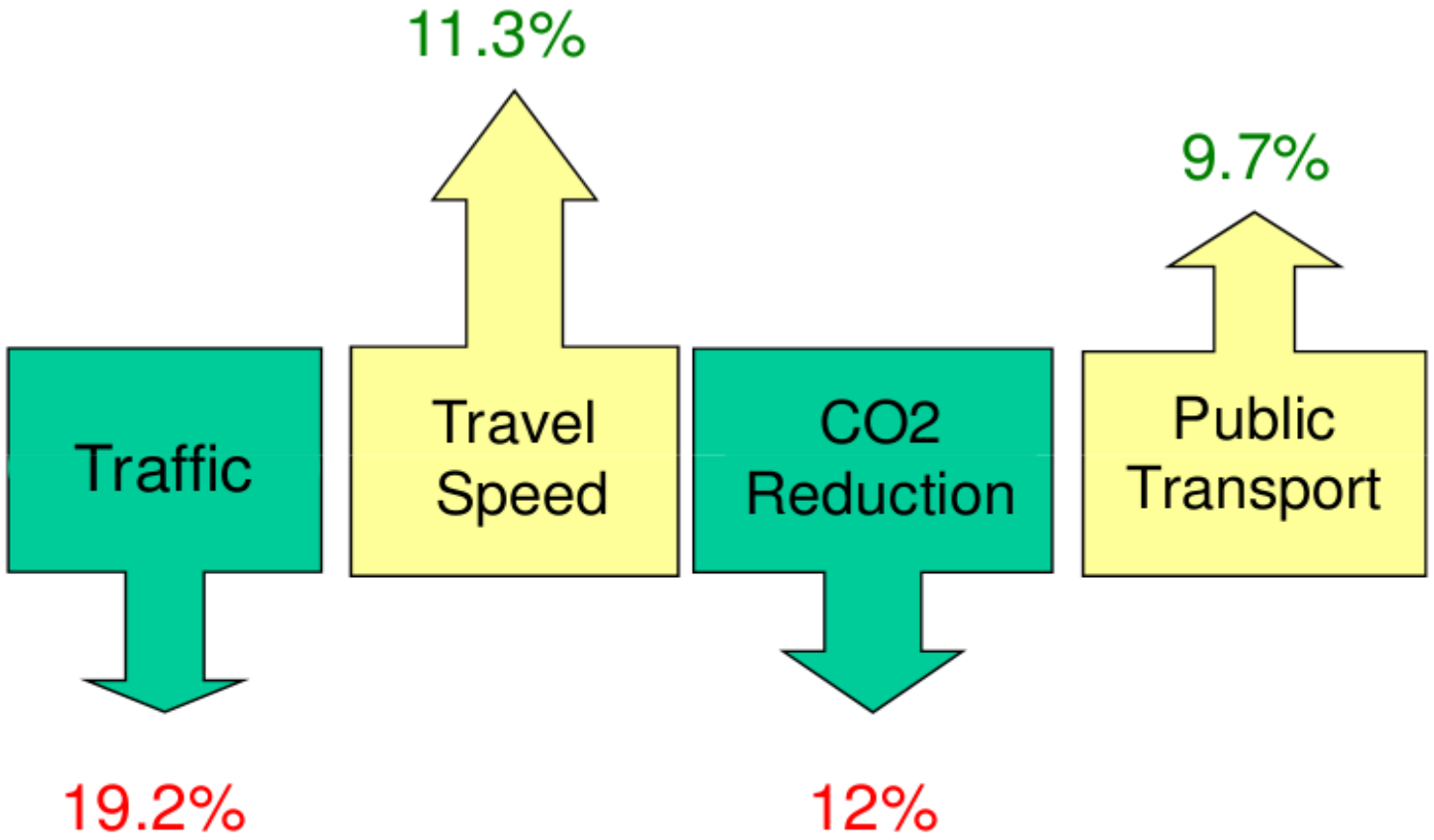
Impacts of EcoPass



• Not limited to Milan, various cities and European countries took up emission taxation programs

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France's green taxes on new cars

- France's Environment Ministry in December 2007 unveiled a system of green taxes on high fuel consuming cars and bonuses for cleaner vehicles, as part of a nationwide strategy to slash global warming emissions.
- From January 1, 2008, any driver who buys a new car emitting more than 160 grams of carbon dioxide per kilometer (just over half a mile) will be charged a once-off penalty of up to 2,600 Euros (3,300 Dollars).

Source: http://www.citiesact.org/training_courses_details.aspx?id=18

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The French way…

Output in grams of Co_2/km	Price
< 60	+ 5000 €
< 100	+ 1000 €
101 – 120	+ 700 €
121-130	+ 200 €
131 – 160	0
161 – 165	- 200 €
166 – 200	- 750 €
201 – 250	- 1600 €
> 250	- 2600 €

Source: http://www.ecologie.gouv.fr/Le-bonus-ecologique-incitera-des.html

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Cost of Vehicle Purchase in Singapore

As of 25 October 2016

Source: https://www.lta.gov.sg/content/ltaweb/en/roads-and-motoring/owning-a-vehicle/costs-of-owning-a-vehicle/tax-structure-for-cars.html

Open Market Value (OMV)

- OMV is assessed by the Customs & Excise Department, taking into account the purchase price, freight, insurance, handling and all other charges incidental to the sale and delivery of the car from country of manufacture to Singapore.

Registration fees

- Registration Fee (RF) $140
- Additional Registration Fee (ARF):

100%+ 140%+180%

- Certificate of Entitlement (COE) Bid
- Excise Duty 20% of OMV
- Used car surcharge $10,000

Example:
The ARF payable for a car with an OMV of S$75,000 will be calculated as follows:

Vehicle OMV (S$75,000)	ARF Rate	ARF Payable
First S$20,000	100%	100% x S$20,000 = **S$20,000**
Next S$30,000	140%	140% x S$30,000 = **S$42,000**
Above S$50,000	180%	180% x S$25,000 = **S$45,000**

Total ARF payable is (S$20,000 + S$42,000 + S$45,000) = **S$107,000**

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Same vehicle - huge price differences

2008 Honda Civic sedan
VTi-S AT (1,8L AT)

$ USA: US$15,010 suggested starting price =$ 21,300

$$ Australia: AUD$23,790 =$ 30,645

**$$$** Thailand: THB768,000 =$ 34,612

**$$$$** UK: £14,880 =$ 41,945

**$$$$$** Mumbai, India: INR1,218,700 =$ 43,910

**$$$$$$** Malaysia: RM113,800 =$ 49,908

$$$$$$$ **Singapore: $ 77,800 (including $8,000 COE)**

Source: Time Out Magazine Singapore, March 2008

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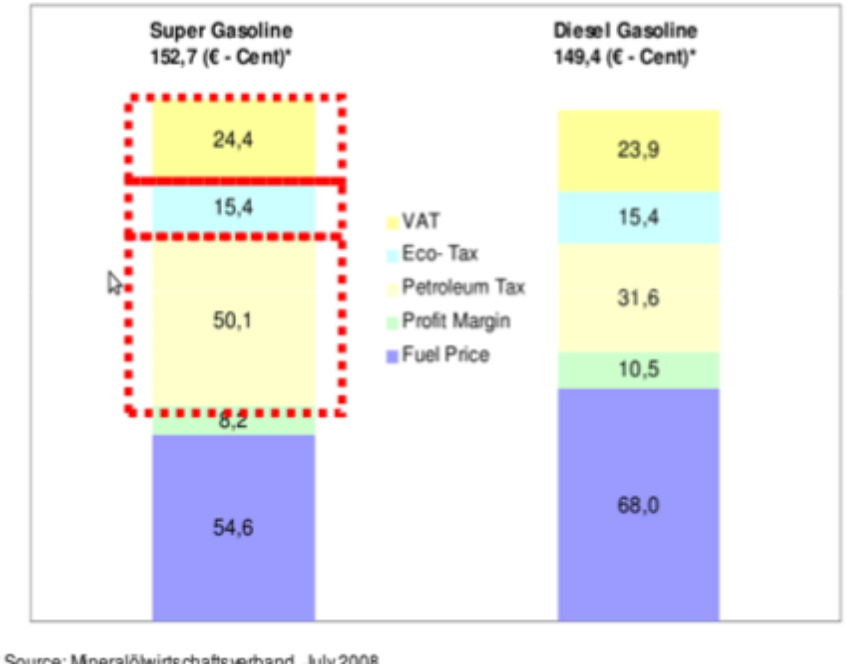
Other Fiscal Instruments include

Parking Pricing

Fuel Taxation

Congestion Pricing



* Source: Mineralölwirtschaftsverband, July 2008

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Congestion Pricing

Singapore way

- Area Licensing Scheme
- The ERP System
- How ERP Works
- Implementing ERP
- ERP Today

The following material is the courtesy of Dr. George Sun, LTA, SIngapore

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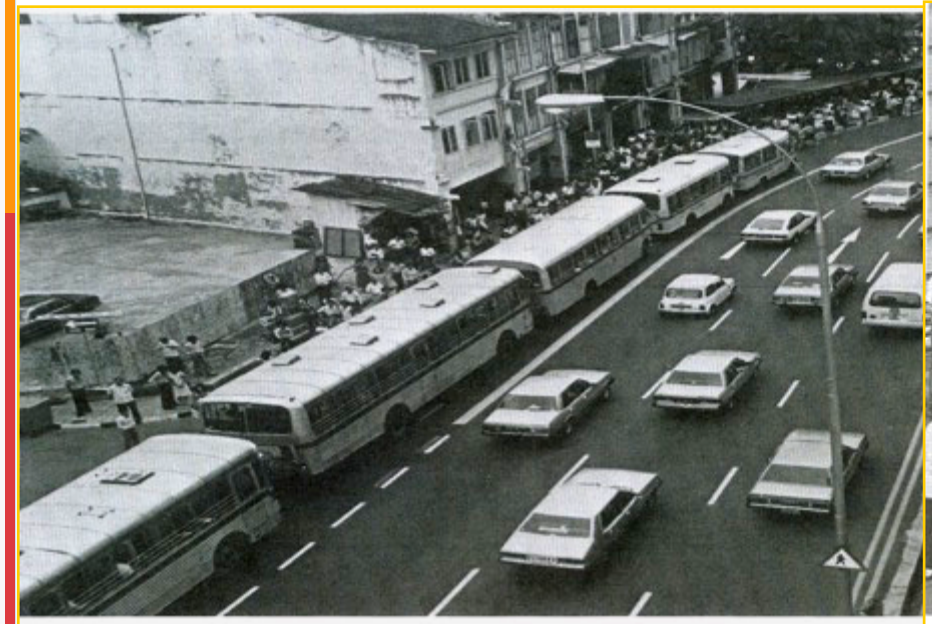
Singapore was not without problems

Early Singapore

- Severe Traffic Congestion
- Rising travel demand
- Unreliable bus services



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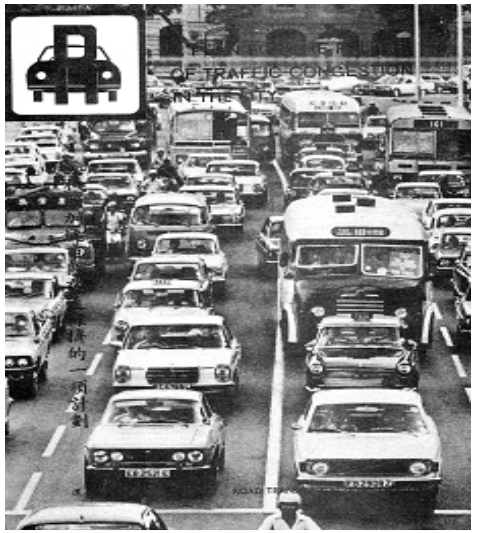
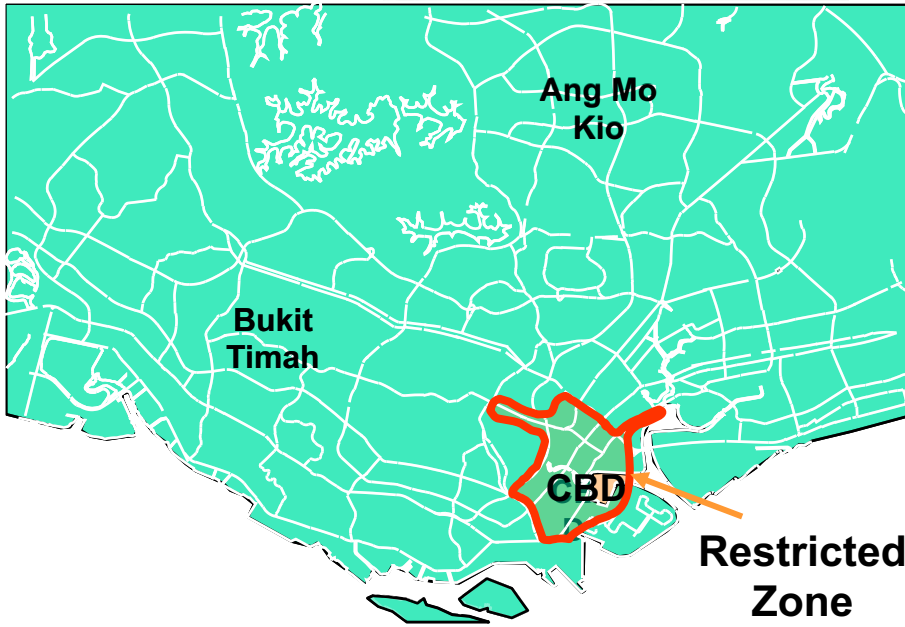
Area Licensing Scheme (ALS)

- Implemented in 1975
- Reduced traffic entering the Restricted Zone (RZ)





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Electronic Road Pricing (ERP)

Car = 1 pcu,

Motorcycle = 0.5 pcu,

Truck = 1.5 pcu ,

Bus = 2 pcu

- **Implemented in 1998**
- **Replaced manual ALS**

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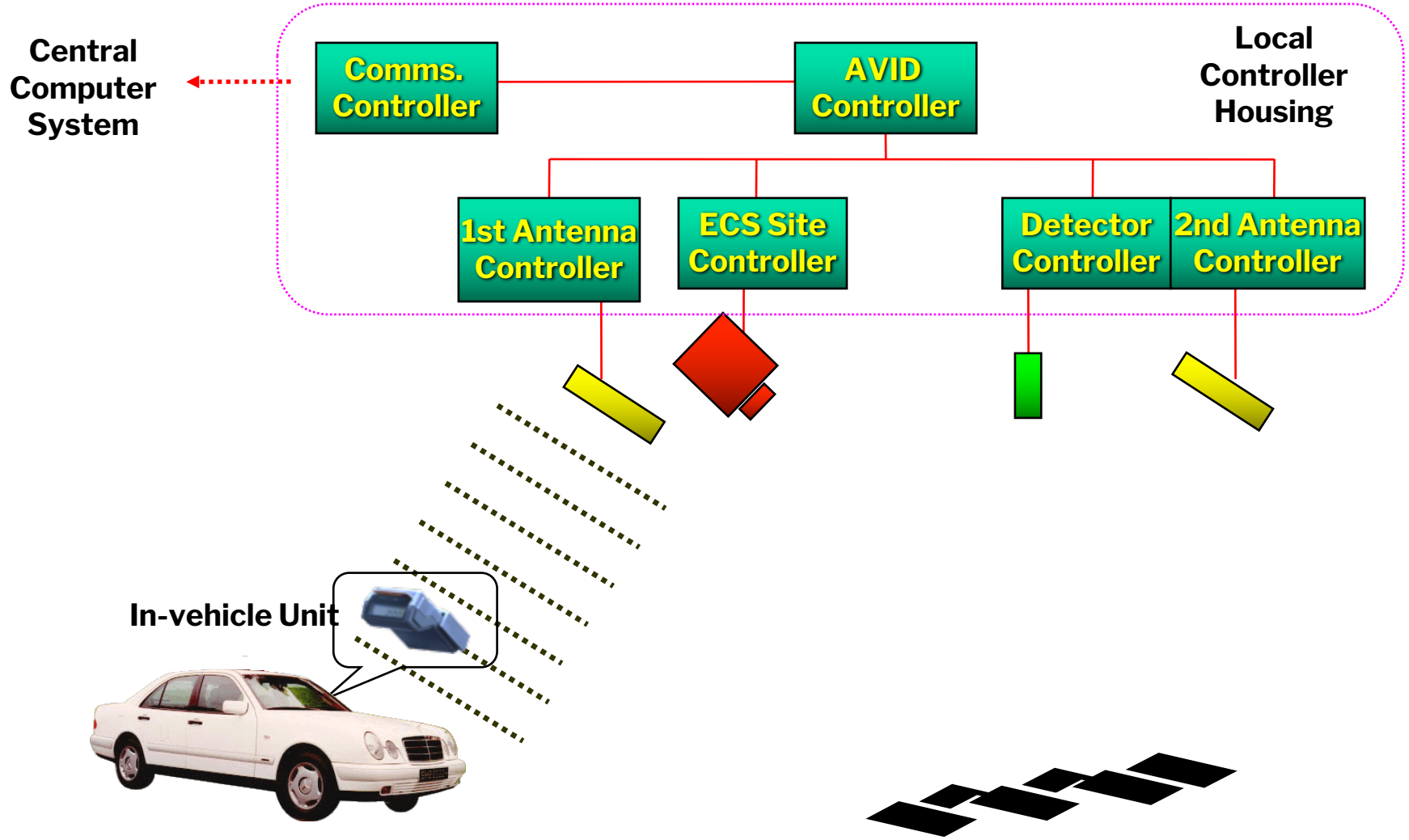
How ERP Works



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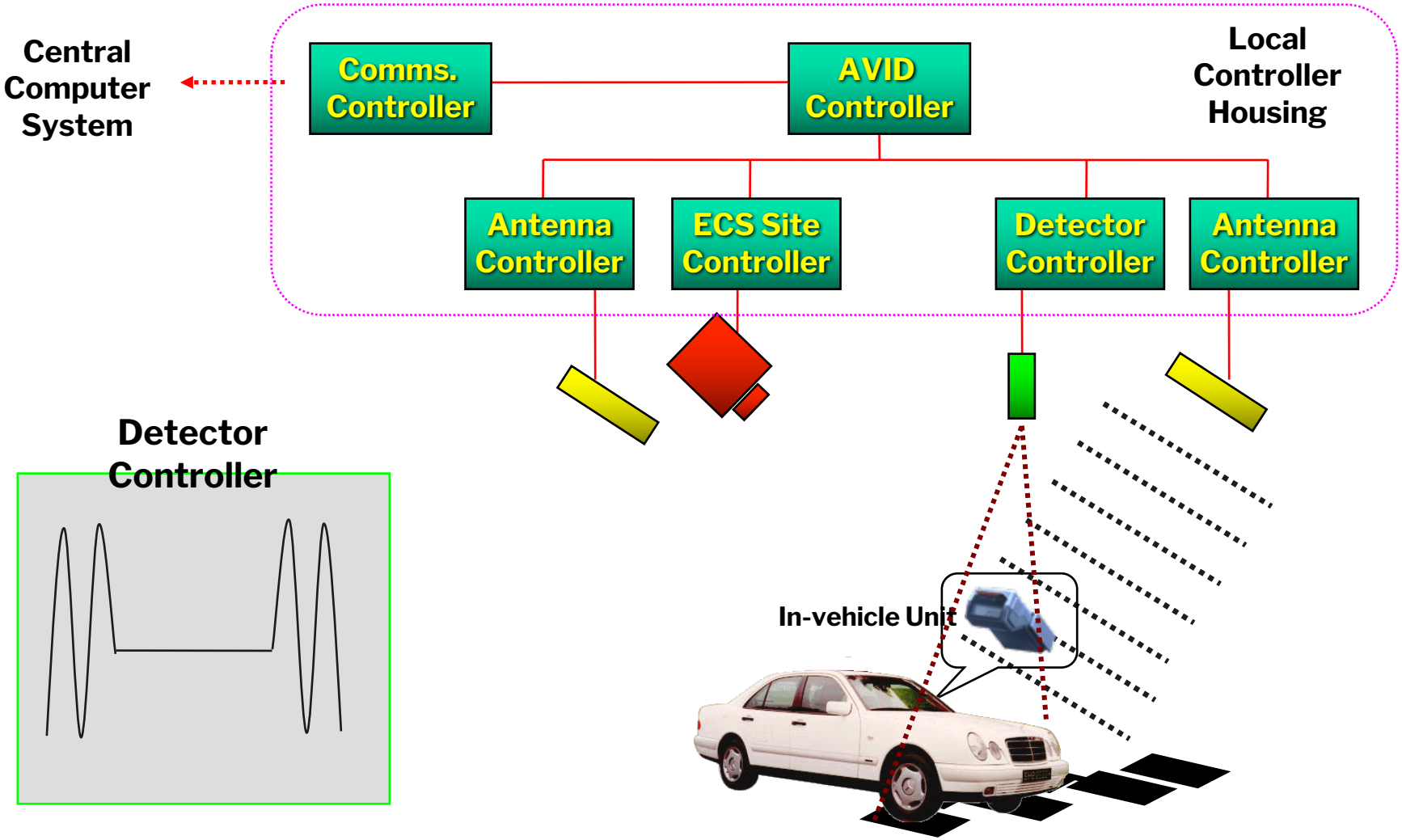
How ERP works



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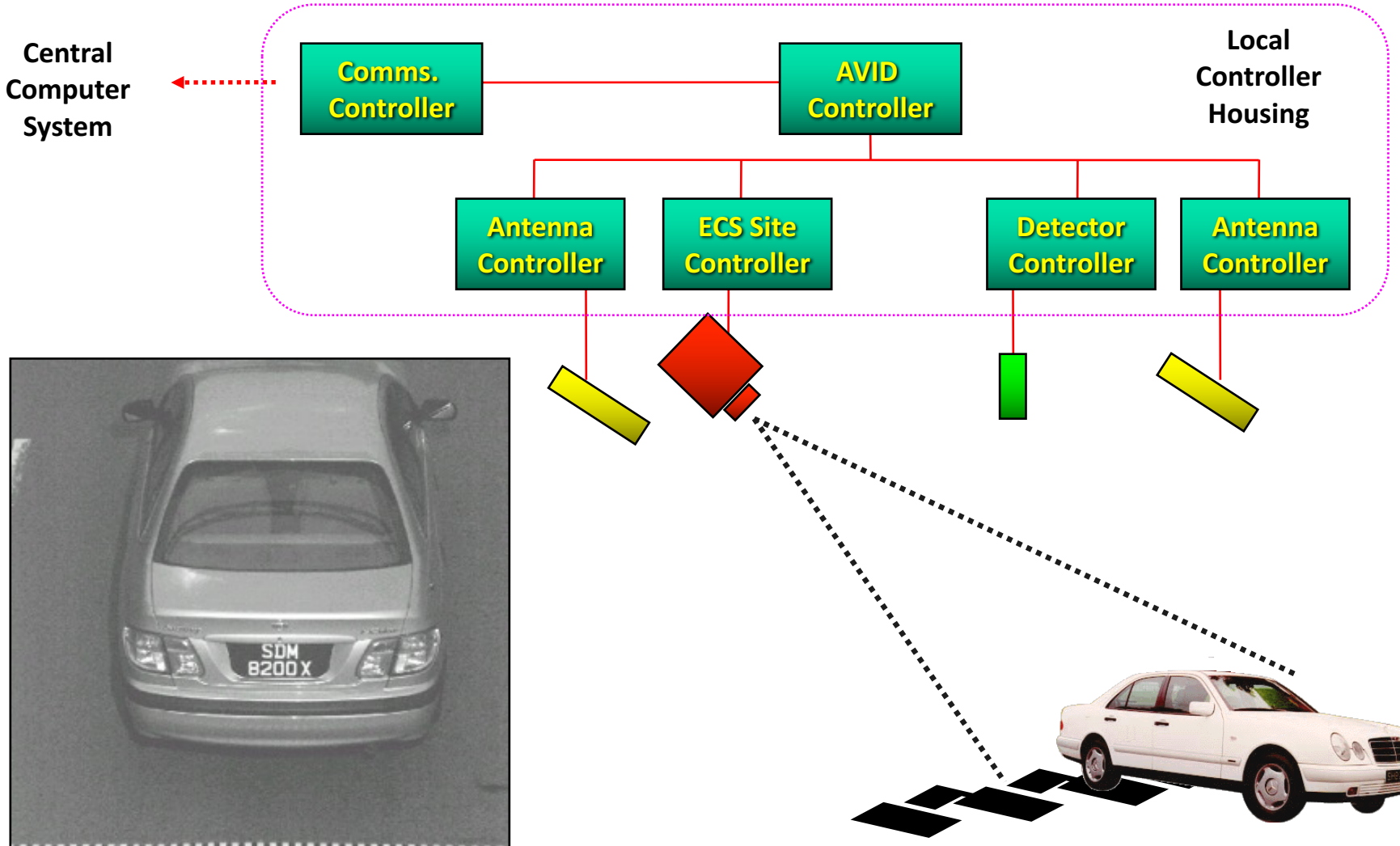
How ERP works



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Implementing ERP

- Development and test
  - 3 tenderers selected each S$1.5m to test
  - 2-year test with ERP team to ensure meeting requirements (e.g. lane switch, high speed)
  - Involving many government agencies
- System cost and business model
  - Capital cost: S$197 million (1998)
  - Annual operating cost: S$16 million
  - Revenue: ALS S$100m ☾ ERP S$80m
    - (US $1 = S $1.5)

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Alternatives in ERP System

- Pay and enjoy smooth ride
- Change time to pay less/nothing
- Change route to non-priced roads
- Change travel mode
- Change destination
- Abandon trip

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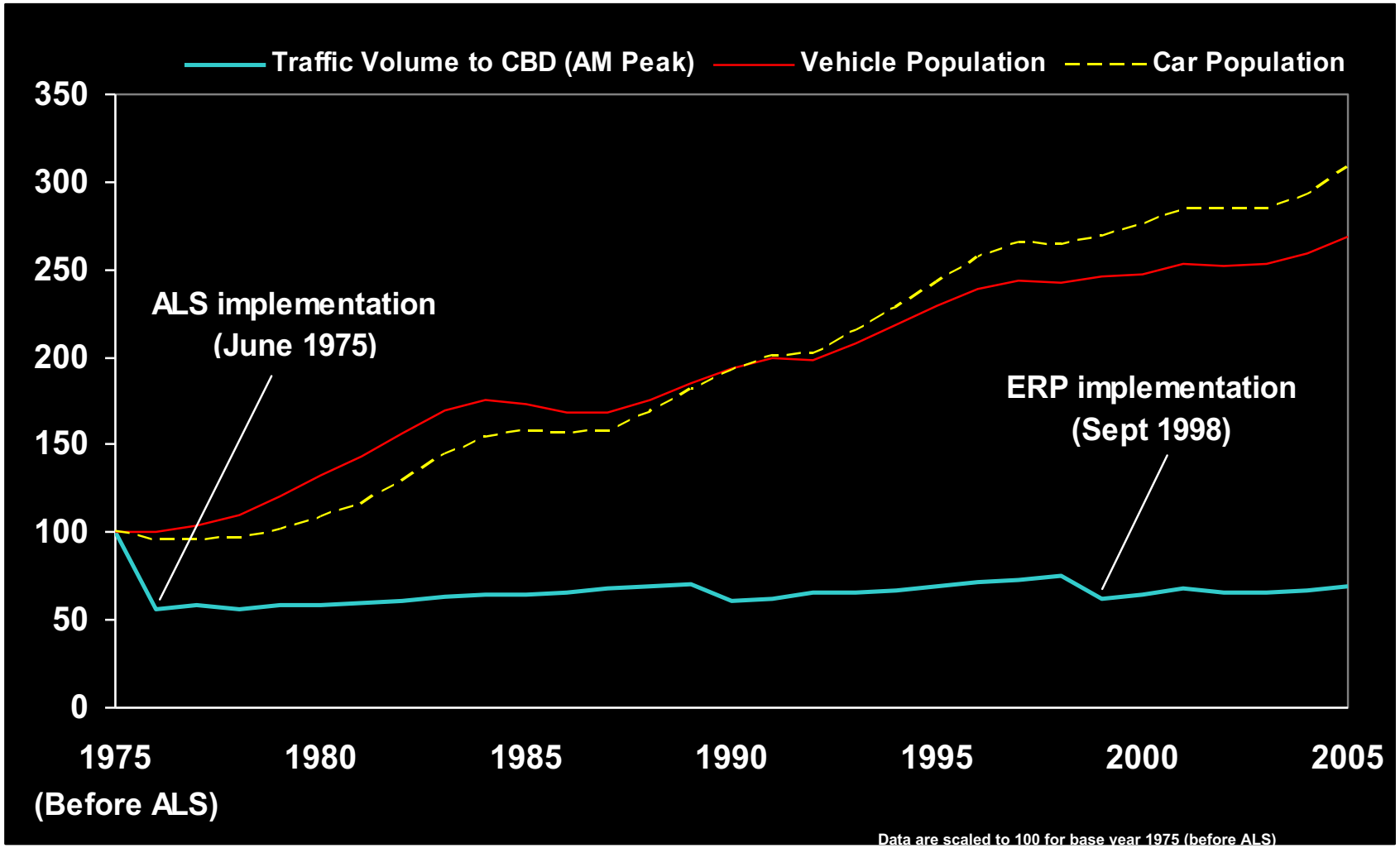
Effect of ALS / ERP



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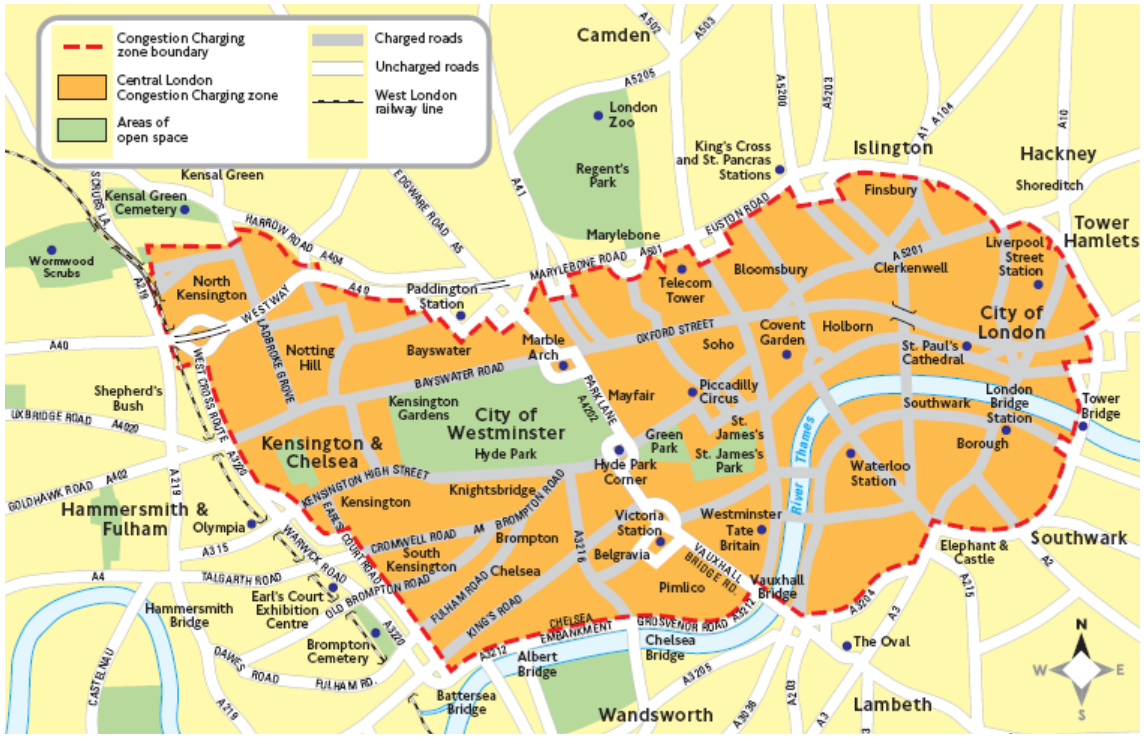
Congestion Charge - London

Where and when does it operate?

Congestion Operating Hours: 7am – 6.00pm Monday to Friday, excluding Public Holidays and Non-charging days (e.g. Christmas Day and New Year's Day)



Source: http://www.tfl.gov.uk/roadusers/congestioncharging/6718.aspx

Congestion charging in London

How does it operate?

- £8 a-day is the congestion charge for those driving in eight square miles of central London.
- Drivers who paid the charge either by (cell-) phone (until 10 pm), via the internet or at shops and garages get registered in a database.
- 700 video cameras scan the rear licence plates of the approximately 110,000 motorists (May 2003) who enter this area daily. This information is matched each night with the database.
- Anyone who fails to pay by midnight on the following charging day is fined £120.

Video Camera Signs (Photo from Todd Litman 2004)

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Congestion charging in London

Impacts on local Business

- Retail activities for the congestion zone raised by 4.7 % during 2003
- 72 % of companies think that congestion charge was right
- Only 26 % of companies say that the congestion charge will have a negative impact on London‘s economy, 32 % say it is neutral, but 26 % judged the congestion charge to have a positive impact on business

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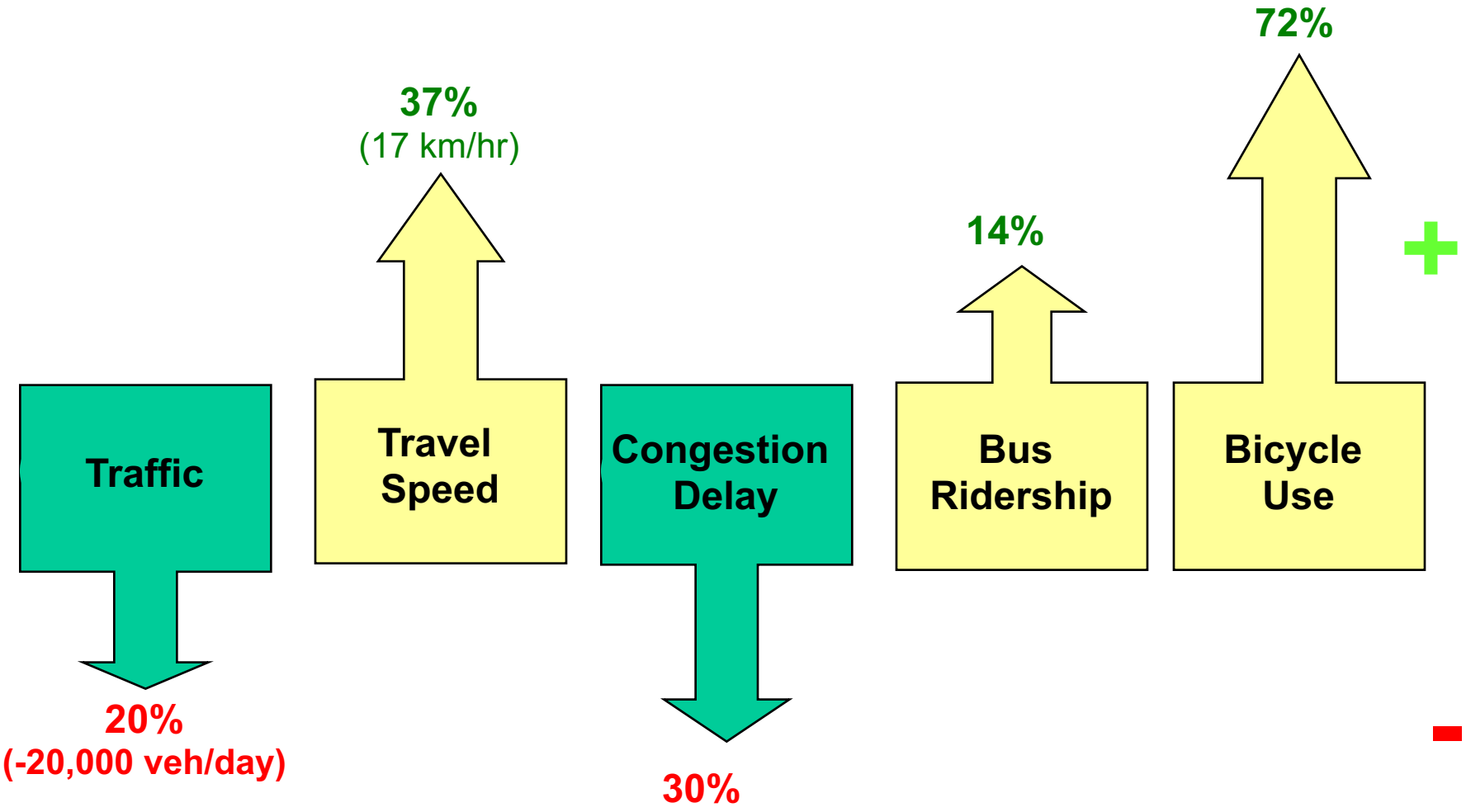
Congestion charging in London



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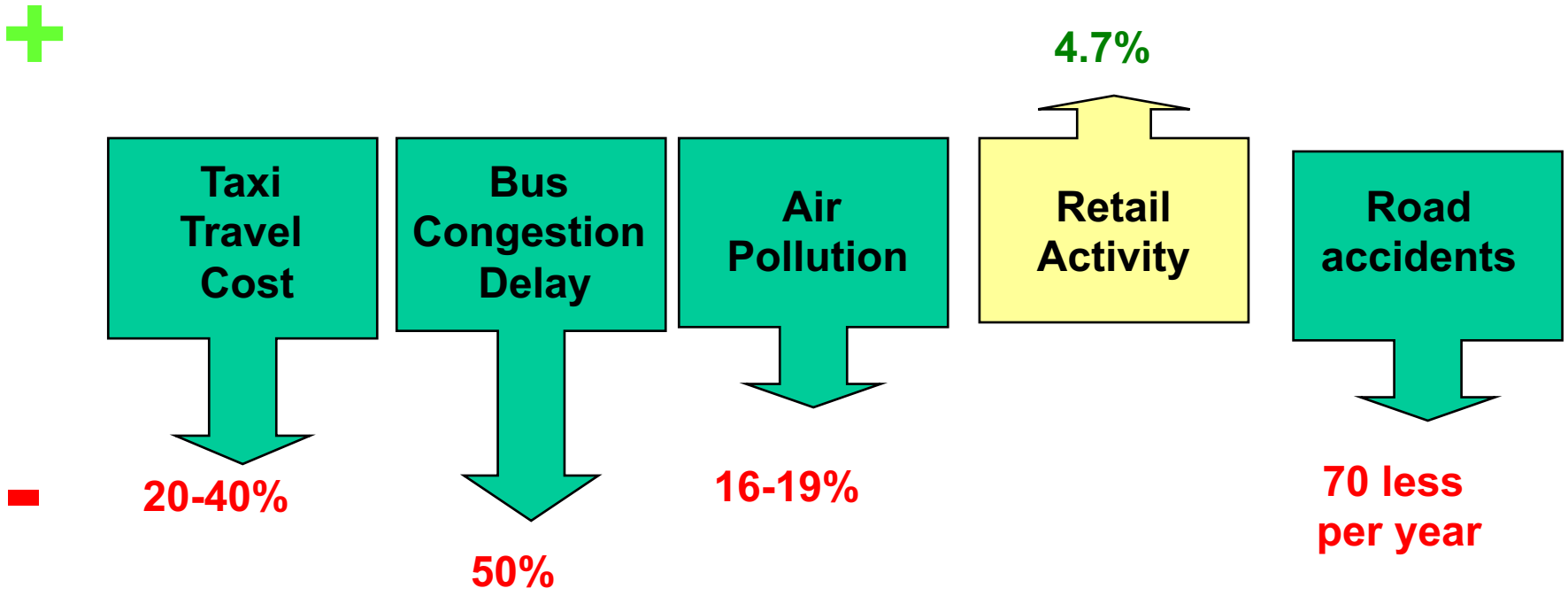
Congestion charging in London

Impacts



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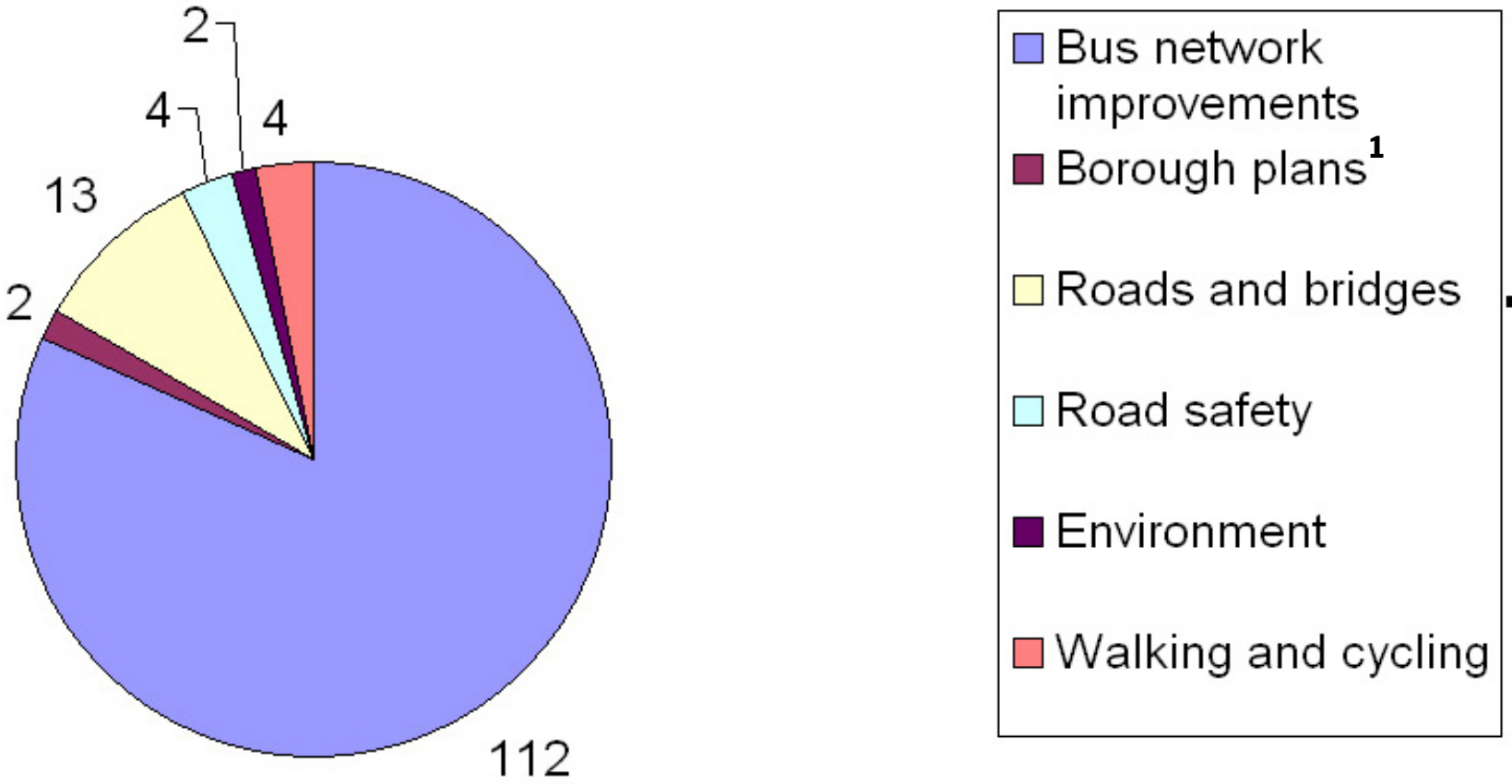
Congestion charging in London

Use of revenues (£137m)



[1] **Borough plans:** Support to London Boroughs for local transport improvements

Source: http://www.tfl.gov.uk/roadusers/congestioncharging/6722.aspx#test – sixth annual report

Congestion Charge („Trängselskatt“) in Stockholm

- Charge depends on the time and the day; max. SEK 60 ($ 7.50) per day and vehicle
- Similar technical system to London: Infrared cameras at control points identify the license plates of each passage of the vehicles passing in and out of the city center.
- accumulated passages made by any vehicle during a month are aggregated into a “tax decision”
- Swedish Road Administration (SRA) sends out a tax decision once a month to the registered owner of the vehicle
- tax is to be paid into the SRA account no later than the end of the month after the month of notification
- no possibility to pay at the control points.

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Congestion Charge („Trängselskatt“) in Stockholm (2)

Exemptions from the congestion tax:

Emergency service vehicles, Buses with a total weight of at least 14 tonnes, Diplomatic cars, Motorcycles, Foreign registered vehicles, Military vehicles, „environmental friendly“ vehicles (e.g. electric, ethanol, biogas),

vehicles with disability permits,

❑Charge applies on weekdays from 6.30 a.m. to 6.29 p.m.

❑ No tax is charged on Saturdays, Sundays, public holidays, the day before a public holiday or during the month of July

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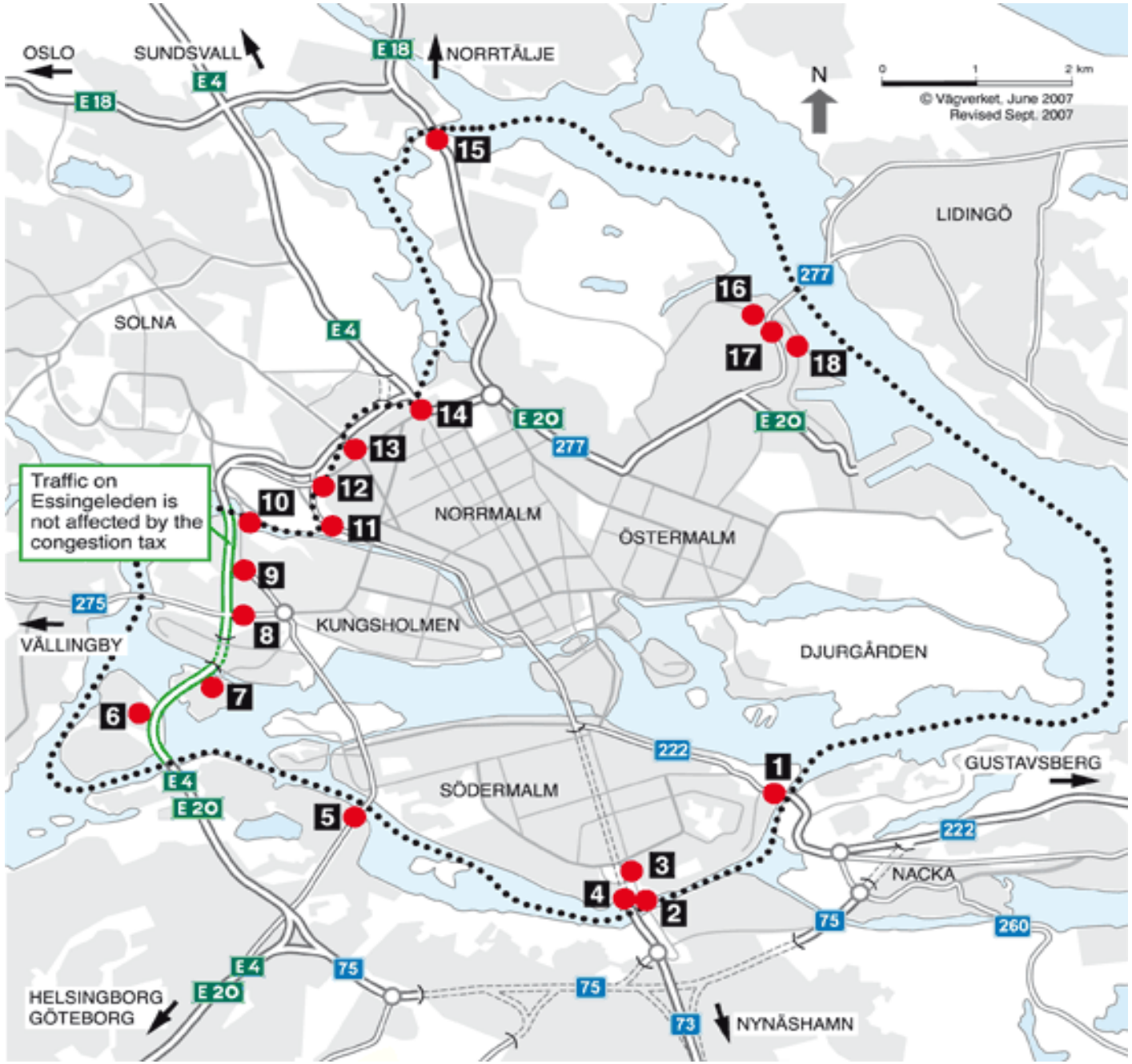
Control points	
1.	Danvikstull
2.	Skansbron
3.	Skanstullsbron
4.	Johanneshovsbron
5.	Liljeholmsbron
6.	Stora Essingen
7.	Lilla Essingen
8.	Fredhäll / Drottningholmsvägen Interchange
9.	Lindhagensgatan Interchange
10.	Ekelundsbron
11.	Klarastrandsleden
12.	Karlberg / Tomtebodavägen Interchange
13.	Solnabron
14.	Norrtull
15.	Roslagsvägen
16.	Gasverksvägen
17.	Lidingövägen
18.	Norra Hamnvägen



Source: http://www.vv.se/templates/page3wide____21440.aspx

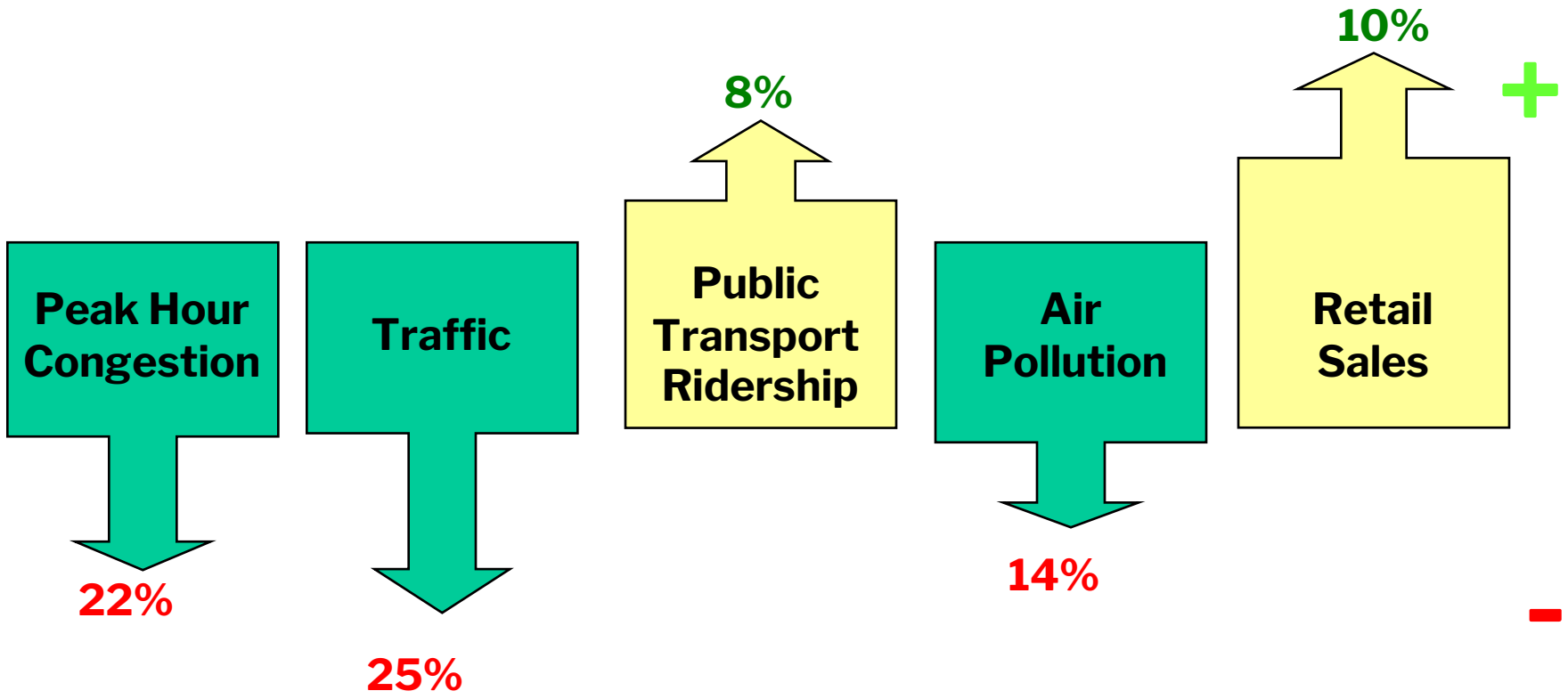
Congestion Charging in Stockholm

- Investment Cost : EUR 380 million
- Est. Revenue : EUR 8 million/month
- The congestion charge didn't harm the business, in contrary, business has increased
- The number of Mass Transit users increased

Source: Michele Dix (2006)

Congestion Tax in Stockholm

Travel Impacts



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Congestion charge in Stockholm – results

- Shortly after implementation, 32% of users supported the charge
- First week after implementation: traffic reduction of up to 30% (100,000 cars) (Target: reducing traffic by 10-15%)
- Additional time to cross the city during peak hours has dropped from 200% to 45% compared to off-peak hours
- As more people switch from cars to public transport, the tax revenue is expected to be 20-30% less than calculated
- Congestion charge didn‘t harm the business, in contrary, business has increased by 4-5%
- Number of Mass Transit users increased by 40,000/day

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Thanks very much for the attention

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