Encouraging climate supporting transport choices – what works?

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Presentation structure

1. Its all too difficult, isn't it?
2. People
3. Behaviours
4. Policies
5. Potential
6. Conclusions

4 ways to save emissions

Technical efficiency

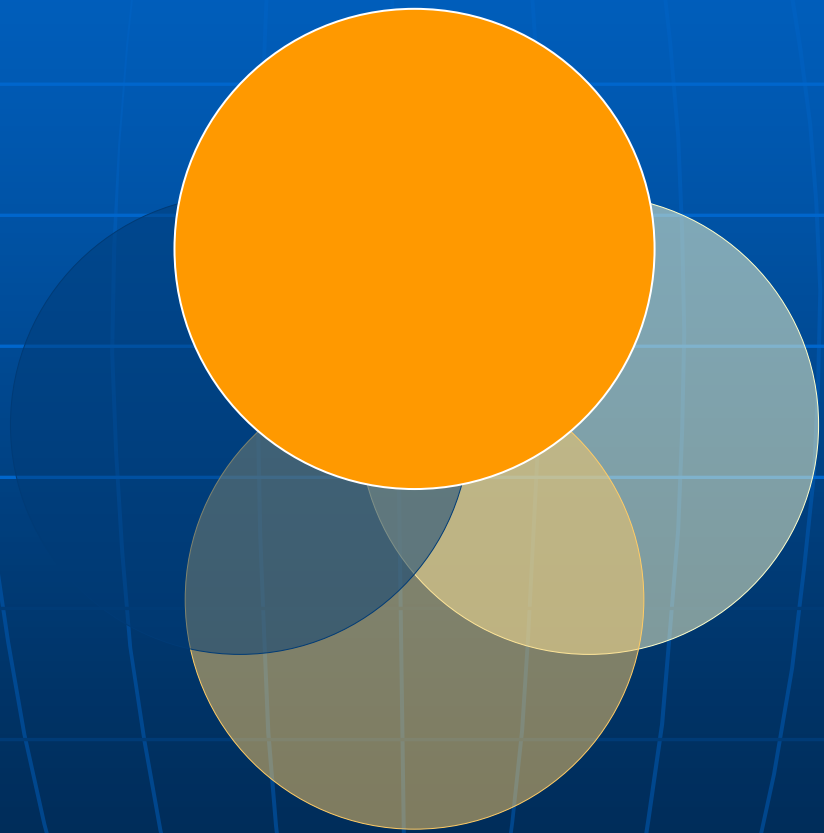
Operational efficiency

Travel demand

Mode Use

4 ways to save emissions

Technical efficiency



Operational efficiency

Travel demand

Mode Use

Technical solutions rule (ok?)

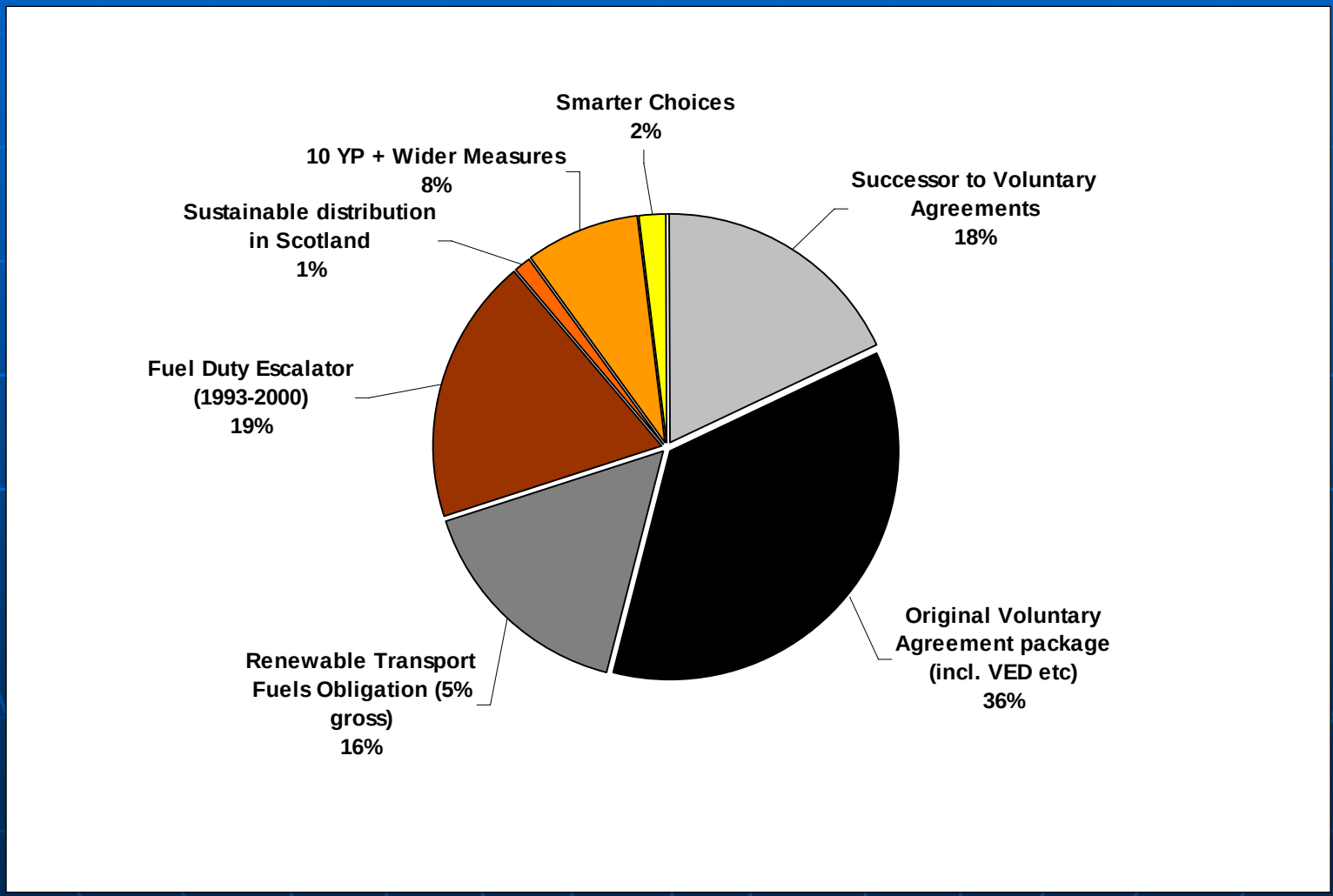
Voluntary Agreement between EC and European, Japanese and Korean motor manufacturers

- Target 140g CO2/km by 2008
- actual in UK (2006) = 166g CO2/km
- Negotiations now for a Mandatory Agreement

Renewable transport fuel obligation

- Requires 5% of fuel supplies to be renewable by 2010/11,then rising to 10%
- Surplus certificates can be bought or a penalty paid

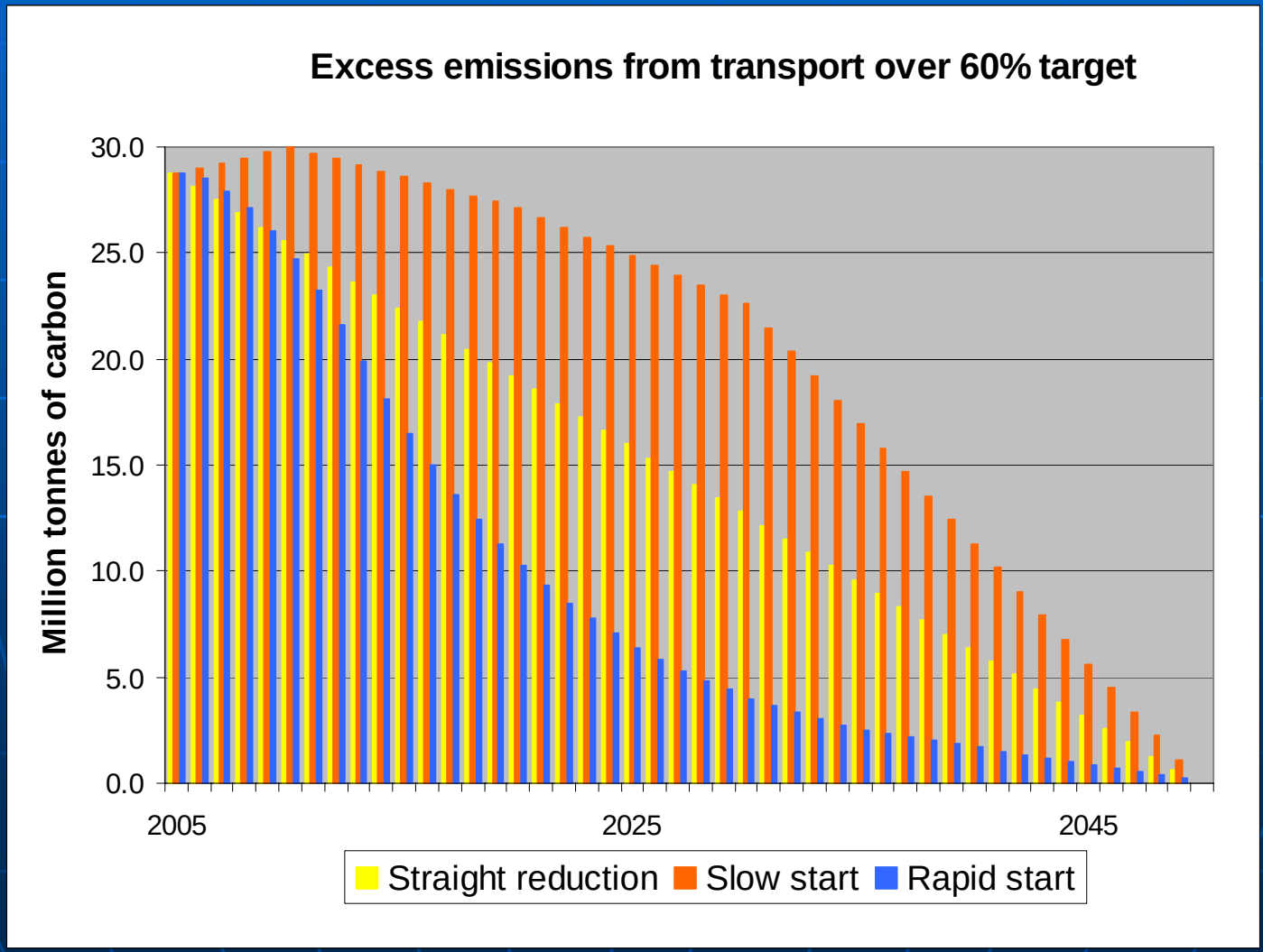
In UK, 68% of C02 savings from transport from technology by 2020



Technical solutions will fail without:

1. A framework to encourage the demand for alternative technologies
2. Measures to lock-in the benefits of efficiency gains
3. Regard to broader sustainability criteria

The rate of progress is as important as the end target date



Source: K.Buchan 2007

But its all too difficult, isn't it?

Stern said:

Transport is one of the more expensive sectors to cut emissions from because the low carbon technologies tend to be expensive and the welfare costs of reducing demand for travel are high. Transport is also expected to be one of the fastest growing sectors in the future. For these two reasons, studies tend to find that transport will be among the last sectors to bring its emissions down below current levels

[Annex 7c]

Cost-effectiveness

Is it more expensive to save carbon from transport?

Stern:

- places particular significance on identifying cost-effective measures
- Says cost-effective measures will mainly come from oil-based transport technology and biofuels
- Concludes the role of demand management is unacknowledged / uncertain

Yet:

- The evidence on the potential for demand reduction suggests otherwise …
- Costs are reduced when packages of supply and demand measures are evaluated
- Co-benefits of transport policies should also be acknowledged

How can we reduce demand?

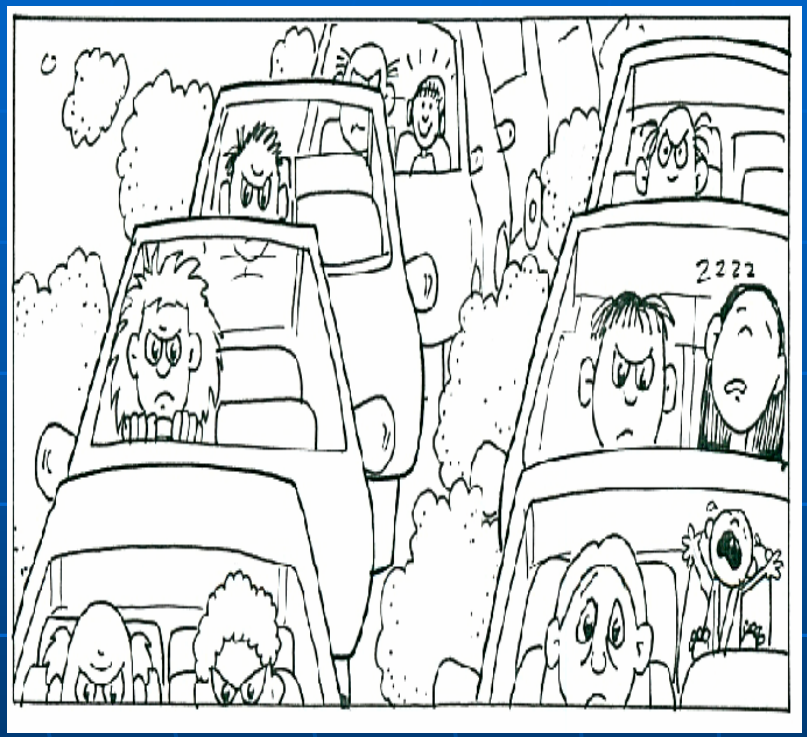
Identify:

- *Who* is most likely to change behaviour and why
- *Which behaviours* can be changed and under what circumstances
- *Which policies* target these people and behaviours

(1) People

Who is most likely to change behaviour and why?

Malcontented Motorists (18%)



- Moral responsibility to reduce car use;
- Willing to sacrifice for the sake of the environment
- Guilt when the car is used unnecessarily
- Find driving stressful

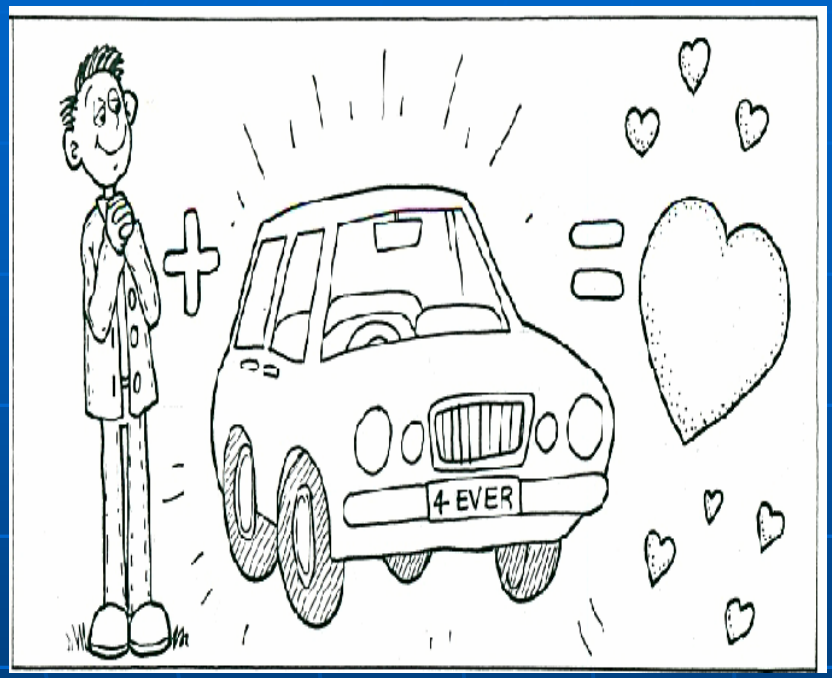
BUT they see big problems with all other modes

Car Complacents (21%)

- Do not see problems with car use and congestion;
- No attempt to reduce car use
- Low participation in 'green' behaviours

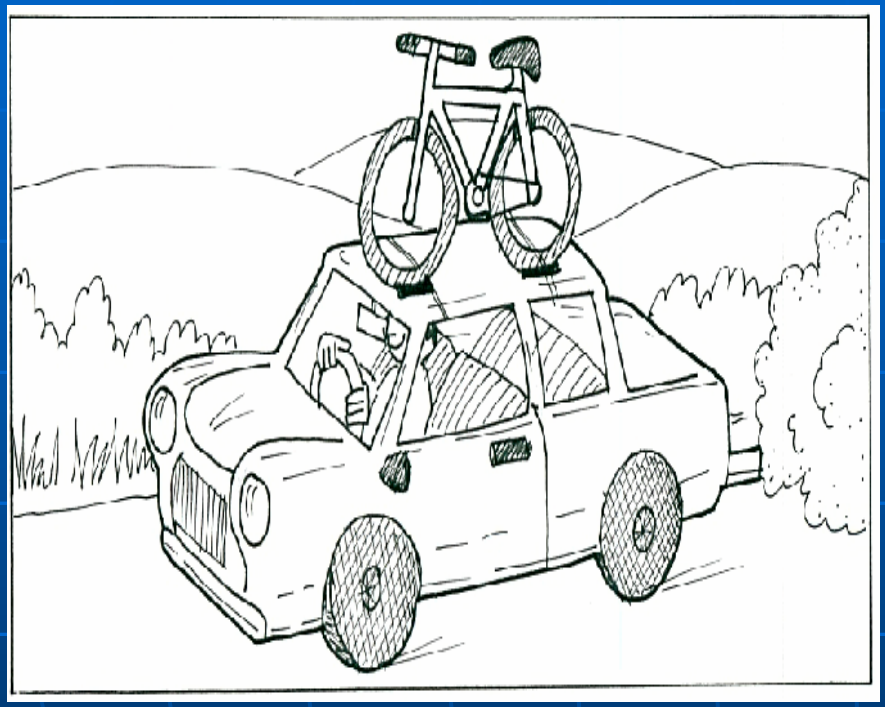
- 'Indifferent' about public transport. (but at least they don't say they hate it)

Die Hard Drivers (20%)



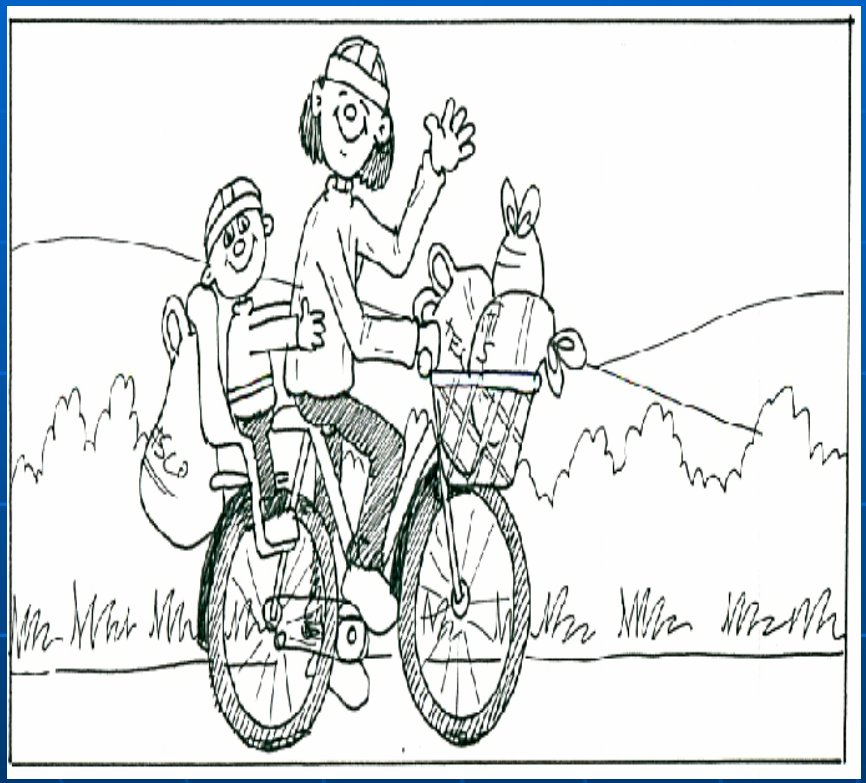
- Lowest desire to reduce car use
- Highest psychological car dependency
- Care what car they drive
- Perceive many problems with other modes
- Unwilling to sacrifice for the sake of the environment

Aspiring Environmentalists (16%)



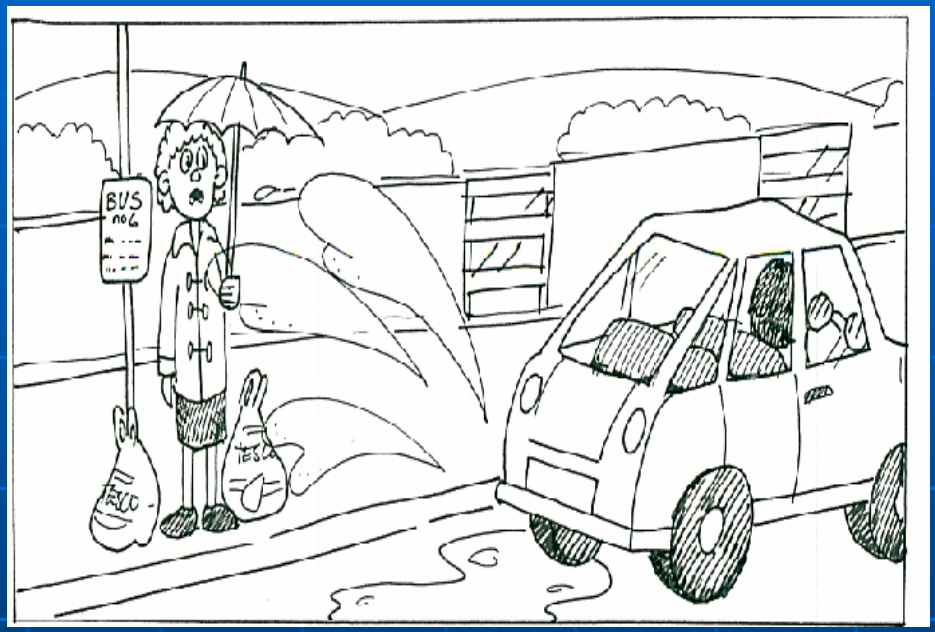
- Have a ‘practical’ approach to car use
- Already reduced their car use and will reduce further if given the chance
- Don’t particularly enjoy car travel
- Feel responsible for environmental problems

Car Sceptics (9%)



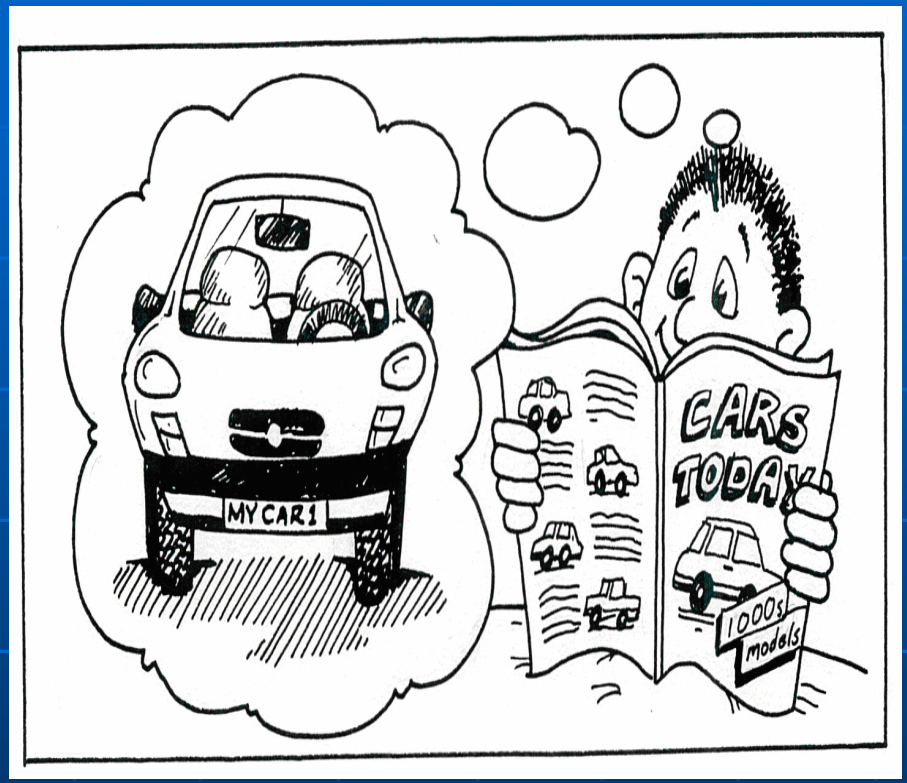
- Do not own a car
- Have a high sense of green awareness and concern
- Have a positive view of public transport
- Enjoy travelling by alternative modes

Reluctant Riders (7%)



- Do not own a car
- Would prefer to have greater access to a car
- Use the car when they have a chance
- Not motivated by environmental issues
- Older and have lower incomes

Car Aspirers (9%)



- Desire car ownership
- High bus use at the moment
- Not motivated by environmental issues
- Socially excluded?
- Potential to shape future habits?

(2) Behaviours

Which behaviours can be changed and under what circumstances?

Travel behaviour change is not just about mode switch

- Purchasing - *which* cars are bought
- Driving - *how* cars are driven
- Use - *how much* cars are driven
  - Mode choice
  - Car occupancy
  - Timing
  - Route choice
  - Frequency
  - Trip-chaining
  - Destinations / distance
  - Residential location choice
  - Work location choice

(2) Policies

Which policies target these people and behaviours?

IMPACT

- Interactive Manual to Abate Carbon from Transport
- www.ukercimpact.org
- Identified over 100 policies for surface passenger transport alone

IMPACT - Information and education

1 **Car labelling**
2 Labelling of vehicle components
3 **Regulating / banning car advertising**
4 **Eco-driving test**
5 **Eco driving / driver training (car)**
6 **Eco driving – rail**
7 Eco-driving - bus
8 **In-car monitoring instruments / Driver Information Systems**
9 Gear shift indicators
10 **Car sharing**
11 **School travel plans**
12 **Workplace travel plans**
15 Accreditation scheme for company travel
14 **Personalised travel / journey plans /**
15 **Special event management**
16 **Campus management**
17 Leisure travel plans
18 Residential travel plans
19 **Environmental awareness campaigns**
20 **Travel awareness campaigns**
21 Intelligent transport systems (e.g. real time info)
22 Public transport information
23 Public transport marketing
24 Social marketing
25 Corporate Social Responsibility Reporting

IMPACT - Fiscal

1 **Company car tax**
2 Low carbon car/ fuel grants
3 **Vehicle Excise Duty**
4 **Vehicle purchase tax**
5 Subsidy for alternative fuelled buses
6 Per passenger bus subsidy
7 **Feebate**
8 Biofuels capital grants
9 Capital allowances for company green transport investment
10 **Vehicle scrappage schemes**
11 **Fuel duty**

14 Fuel duty escalator
13 Differential fuel tax
14 **Distance based vehicle insurance**
15 **Motorway road pricing / tolling**
16 **National road user charging**
17 **Congestion charging~**
18 **Parking charging (public)**
19 **Workplace parking charges / levy**
20 Concessionary fare schemes
21 Ticket pricing
22 **Carbon tax**
23 Value capture taxes

IMPACT – regulation / trading

1 **Voluntary agreement**
2 Mandatory minimum vehicle efficiency standards
3 **Corporate average fuel economy (CAFE) standard**
4 **Biofuels (general)**
5 Renewable Transport Fuels Obligation
6 **Hydrogen and fuel cell development**
7 Bus operator fleet targets for alternative fuels
8 Car and cycle parking standards for new developments
9 Public procurement of alternative vehicles
10 Fuel quality standards
11 Taxi regulation
12 Railway minimum energy standards (e.g. Franchise agreements)
13 Car free housing
14 **Controlled parking zones (CPZ) Green badge parking permits (GBPP)**
16 **High occupancy vehicle lanes/ pricing**
17 **Low emission zones (LEZ)**
18 **Speed limits/ enforcement**
19 Intelligent speed adaptation (ISA)
20 Event data/ Black box recorders (cars)
21 Electronic control units in cars
22 **Vehicle idling campaigns**
23 Tyre pressure monitoring systems
24 Car emissions testing
25 **Flexitime/ adjust opening times**
26 Carbon trading (surface transport in EUETS)
27 Personal carbon trading
28 Fuel rationing/ permits
29 Domestic Tradeable Quotas (DTQs)
30 Carbon offsetting

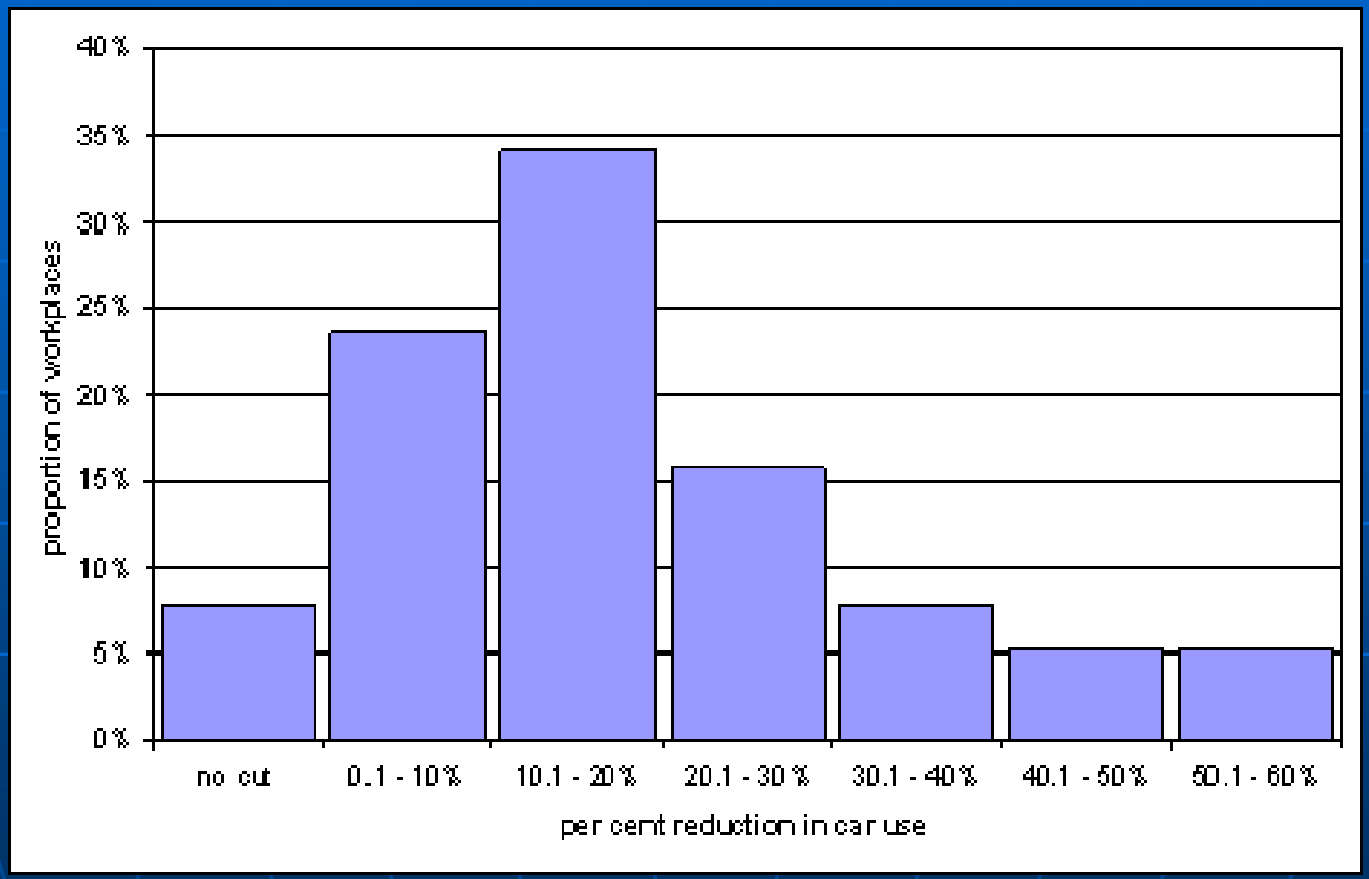
IMPACT – technology / infrastructure provision

1 Bus infrastructure investment
2 Bus passenger subsidy
3 Free public transport
4 Guided bus systems
5 Modal interchanges
6 Bus quality partnerships
7 **Demand responsive bus services**
8 **Park and ride facilities**
9 School bus schemes
10 Multi-modal ticketing systems/ SmartCards
11 **High speed rail**
12 **Maglev**
13 Rail infrastructure investment/ subsidy
14 Rail electrification
15 Rail regenerative braking
16 Rail – non traction savings
17 Light rail infrastructure investment/ subsidy
18 Underground systems
19 **Improvement of cycling facilities**
20 Improvement of walking facilities
21 **Pedestrianisation**
22 Traffic control systems
23 Road widening/ building
24 **Road space reallocation**
25 **Traffic calming**
26 **Car clubs**
27 **Teleshopping**
28 **Teleworking**

Smart Policies

- workplace travel plans
- school travel plans
- personalised travel planning
- public transport information and marketing
- travel awareness campaigns
- car clubs
- car sharing schemes
- teleworking
- teleconferencing
- home shopping
- Residential travel planning

Work place travel plans

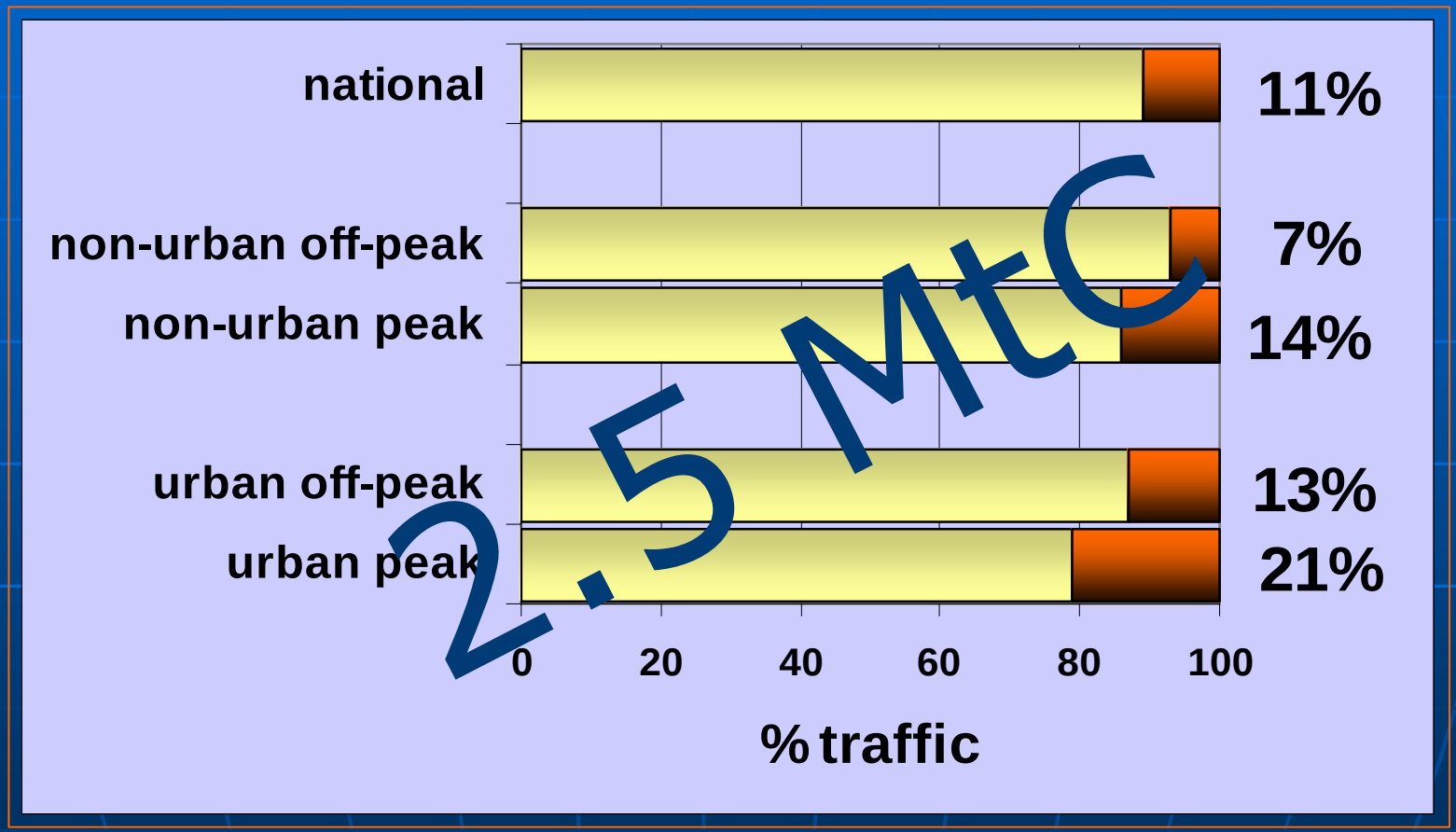


Good travel plans typically reduce car driving by at least 18%

Plans which include parking management achieved >24%

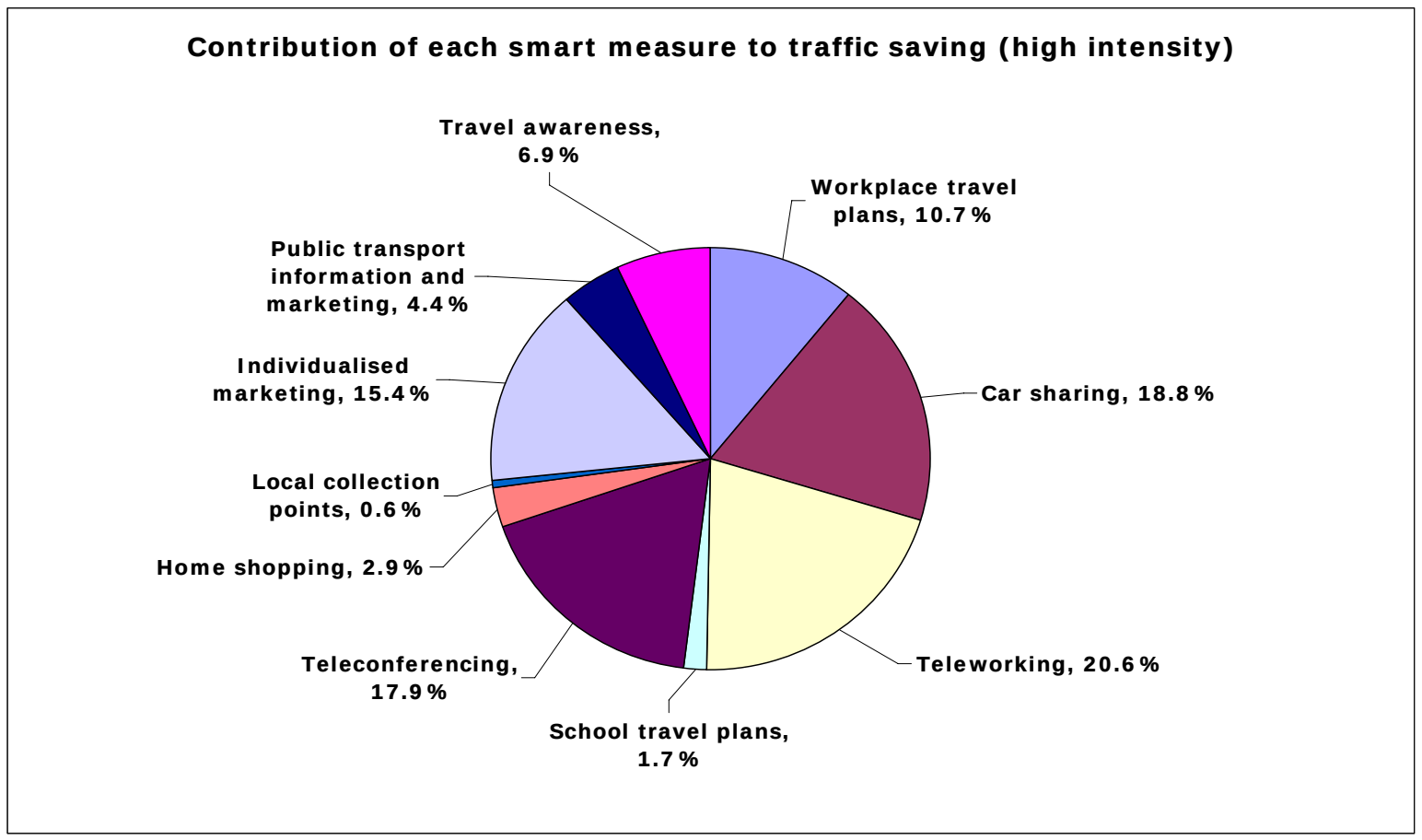
Results of high intensity scenario:

Potential traffic reduction in 10 years



= ca. 8% UK CO2 from transport

Which measures are best?



... need a mixture of hard and soft

... need packages of measures

Tele-initiatives account for around 40% of the savings

Sustainable transport towns

- £10m for 3 demonstration towns over 5 years
- 'showcases' of smarter choices
- Also 4 cycling demonstration towns (Darlington is both)
- Intensive individualised marketing and broader awareness campaigning, infrastructure improvements, staff resources and evaluation

Key initiatives in Darlington

- comprehensive baseline behaviour research
- town-wide individualised travel marketing
- ‘A Town on the Move’ marketing campaign
- stop-specific bus timetables throughout
- free on-road cycle training for year 6 and 7 school pupils
- pedestrian training for youngest pupils
- free one-month cycle loan and training available to all residents or employees based in the town
- small grants scheme for provision of facilities to encourage staff to reduce SOV use
- programme of public and schools events promoting walking and cycling involving over 5,000 participants.

Sustainable transport towns – results in Darlington after 2 years

Results in whole town:

- Walking up 11%
- Cycling up 54%
- Car driver trips down 6%

Results from Individualised Marketing:

- Walking and cycling up 14%
- Public transport up 2%
- Car driver trips down 5%
- Car passenger trips down 12%
- Car kilometers down 5% from baseline

Road space reallocation

- Bus priority; cycling lanes; pedestrianisation; road closures
- Predictions of chaos rarely come true
- Evidence (Goodwin et al 2002): 60 case studies, 11 countries :
  - 22% mean reduction in traffic volume on the road network
- Demonstration of the complex behavioural response

Walking and cycling

- In UK, 1 in 5 car trips is less than 3km
- These are the most polluting car miles …
- Co-benefits (e.g. health) and high cost-benefit ratios, even when factor in promotion costs

Congestion charging (1)

- Likely to lead to savings in cities so long as traffic doesn't simply divert around the zone and travel further or divert to alternative destinations.
- Public acceptability improves once the scheme is in place
- Revenue hypothecated to improve transport infrastructure
- Best when pricing structure is designed to encourage low emission vehicles

Congestion charging (2)

- London and Stockholm – ca.20% reduction in traffic
- London – area recently extended
- Higher charges for higher emission vehicles:
  - £0 for < 100 g CO2/km
  - £25 > 225g CO2/km
  - Otherwise £8
- Sales of Hybrid vehicles in London 10x national average

Distance based fees

- Current policies fail to give motorists the savings that result from driving less
- Many vehicle fees are fixed, not based on the amount driven
- Insurance, registration taxes, leases – could be distance based
- Trial in the UK (by Norwich Union) - reduce the mileage of each participating vehicle by 10-12%

Eco-driving

- Economically sound driving can save around 10% fuel consumption:
  - Optimal gear changes
  - Avoiding idling
  - Ensuring tyres are inflated
  - Shedding excess weight from the car
  - Avoiding sharp braking
- Awareness campaigns, driver training programmes and part of the driving test (from September)

Speed Enforcement

- 50+% of drivers speed on UK motorways
- 15% drive over 80 mph

Yet ..

- A medium sized petrol car is 15% more efficient at 70mph than at 80mph
- Save 1 MtC per year = 10% of the UK transport programme
- ... is easy, fair, immediate, and brings financial and safety benefits

Car purchasing

Lowest CO2 emitting models by market segment: UK 2005

Segment	Model	Fuel	CO_2 g/km	Seg ave	Difference
Mini	Smart Fortwo	Petrol	113	133	-15%
Supermini	Citroen C2	Diesel	107	146	-27%
Lower medium	Audi A2	Diesel	116	161	-28%
Upper medium	Toyota Prius	Petrol/Electric	104	172	-40%
Executive	Mercedes C220	Diesel	156	205	-24%
Luxury saloon	Mercedes S320	Diesel	209	282	-26%
Sports	Honda Insight (Vauxhall Tigra)	Petrol/Electric (Petrol)	80 (146)	232	-66% (-37%)
4x4	Suzuki Jimny	Petrol	174	236	-26%
MPV	Hyundai Matrix	Diesel	142	188	-24%

Summary

- Aspiring environmentalists – ca.20% of the population
- Soft measures – ca. 18% reduction from a good travel plan
- Road space reallocation – ca. 22% disappearing traffic
- Walking and cycling – ca. 20% short journeys
- Distance based charging – ca. 12% reduction
- Congestion charging – ca. 20% reduction in traffic
- Eco-driving – ca. 10% fuel savings
- Downsizing – ca. 30% fuel savings in new cars

Conclusions

- A sustainable transport strategy needs a combination of all four fronts to promote low carbon fuels, low carbon vehicles and low carbon journeys and lifestyles
- Different people are motivated by different factors and require a targeted policy response
- Behaviour change means more than just mode switching
- Empirically measured changes in actual behaviour demonstrate the potential for change
- There is a vast array of policy options – and the evidence suggests cost-effective, rapid behaviour changes can be made with packages of consistent and complementary measures

Barriers to behaviour change

INDIVIDUAL SUBJECTIVE	INDIVIDUAL OBJECTIVE
• Values • Moral norms • Sense of responsibility • Perceived control • Self efficacy / agency • Denial • Instrumental attitudes • Affective attitudes • Identity and status • Heuristics	• Knowledge • Habit • Personal capabilities • Actual resource constraints
COLLECTIVE SUBJECTIVE	**COLLECTIVE OBJECTIVE**
• Social dilemmas • Group cultures/ shared norms • Trust in others and in government	• Contextual/ situational factors • Communication / the media • The nature of the climate change problem

Information can be counterproductive

The ’10 things you can do’ mantra may backfire. People may conclude:

“A problem can’t be that big if simply driving more carefully can fix it, so I won’t worry about it.”

OR

“I know the problem is huge and I really can’t make a difference, so why bother.”

Awareness raising – how *not* to do it …

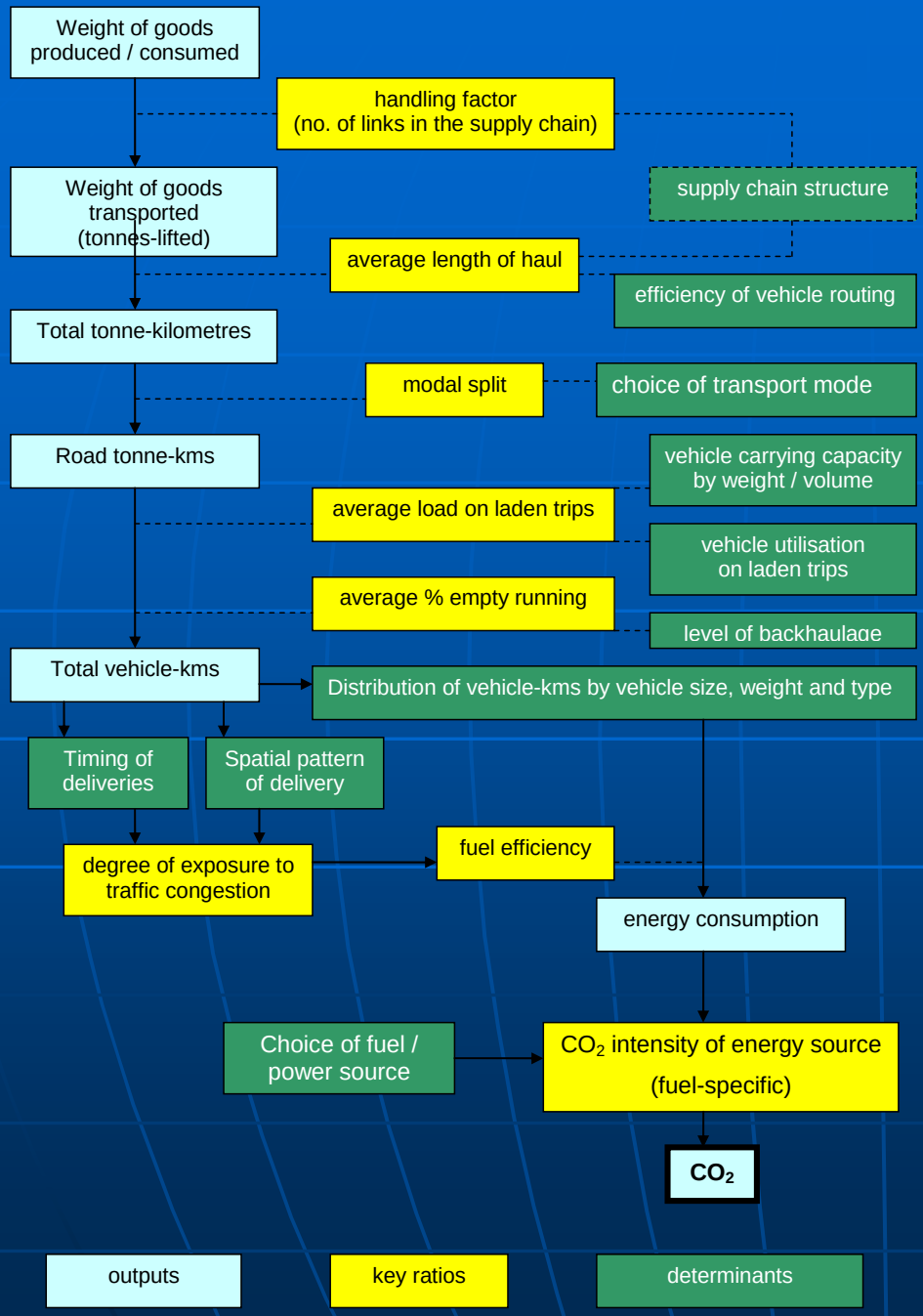
"If everyone in the UK washed their laundry just 10 degrees cooler we would need one less 250MW power station!!"

Mistakes with this statement:

- What is a 250 MW power station?
- Who cares?
- Where is the benefit at the *individual level?*
- What if 'everyone' else doesn't do it?
- What if I *want* to wash my clothes with hot water to get the washing cleaner?

Demand management for air travel?

- International aviation not included in national emissions inventories – who is responsible?
- Different segments – some responsive to price; others do not fly at all
- 85% is for tourism - price sensitive
- Tourism deficit – for every £1 spent in UK, £2.32 spent abroad
- Policy instruments:
  - VAT on fuel
  - Air passenger duty (APD)
  - 'green' landing charges
  - en-route emissions charges
  - Emissions trading – success is dependent on how it is designed
  - Personal carbon allowances



8 key determinants of sustainable distribution:

- Handling factor
- Average length of haul
- Modal split
- Average load
- % empty running
- Traffic congestion
- Fuel efficiency
- Fuel type

Source: McKinnon 2007 (for CfIT)

Freight initiatives

- Improve driver training
- Driver incentive schemes
- Promote the purchase of more efficient vehicles
- Vehicle maintenance
- Fleet management