Sustainable Transport in a Carbon Constrained World
Malcolm Shepherd
Chief Executive
what do we do?

we create the best public space we can focused on access not mobility

we provide information and work directly with people to bring about behaviour change

we influence government policy
1985
3 Railway Paths open
- Bristol & Bath
- Bangor
- Bethesda

1995
The National Cycle Network
500 miles open

2000
The National Cycle Network
5,000 miles open

2005
The National Cycle Network
10,700 miles open

2011
The National Cycle Network
over 13,000 miles open
Sustainable Transport in a Carbon Constrained World

- How and why people travel
- The consequences of how we choose to travel
- What needs to change
  - and how do we achieve that change?
Journey Purpose

Most travel takes place in order to undertake other activities (a “derived demand”)¹

Per cent of all trips

- Commuting/business
- Social
- Shopping
- Escort
- Personal business
- Education
- Other

The main journey purpose of ‘escort’ travel is to accompany others e.g. taking children to school, giving partner a lift to the shops etc.
Our Journeys are concentrated around 2 peaks in the day.
Improvements in transport have allowed people to make longer trips without increasing time spent travelling.
## Constants in travel behaviour
consistent over decades, and across developed world

<table>
<thead>
<tr>
<th>Daily mobility</th>
<th>On average, people make three trips per day, spending one hour travelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activities</td>
<td>Only one in five trips is work-related</td>
</tr>
<tr>
<td>Spatial orientation</td>
<td>Five out of six trips begin or end at home</td>
</tr>
<tr>
<td>Car trips</td>
<td>10% are not further than 1km, 30% are not further than 3km and 50% are not further than 5km</td>
</tr>
</tbody>
</table>
Mode share
% of trips per person in UK towns and cities

<table>
<thead>
<tr>
<th></th>
<th>Darlington</th>
<th>Peterborough</th>
<th>Worcester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>25</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td>Cycling</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Motorbike</td>
<td>41</td>
<td>43</td>
<td>45</td>
</tr>
<tr>
<td>Car as driver</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Car as passenger</td>
<td>21</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>Public transport</td>
<td>12</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Bristol</th>
<th>Kingston</th>
<th>Gloucester</th>
<th>Sheffield</th>
<th>Cramlington</th>
<th>Nottingham</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>29</td>
<td>22</td>
<td>20</td>
<td>22</td>
<td>22</td>
<td>23</td>
</tr>
<tr>
<td>Cycling</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Motorbike</td>
<td>40</td>
<td>40</td>
<td>49</td>
<td>42</td>
<td>45</td>
<td>38</td>
</tr>
<tr>
<td>Car as driver</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Car as passenger</td>
<td>19</td>
<td>17</td>
<td>22</td>
<td>18</td>
<td>21</td>
<td>17</td>
</tr>
<tr>
<td>Public transport</td>
<td>8</td>
<td>17</td>
<td>7</td>
<td>17</td>
<td>11</td>
<td>21</td>
</tr>
</tbody>
</table>
Mode share

% of trips per person internationally

<table>
<thead>
<tr>
<th>Mode</th>
<th>Total STDT</th>
<th>Bellingham</th>
<th>Fremantle</th>
<th>Gloucester</th>
<th>Viernheim</th>
<th>Athis-Mons</th>
<th>Freiburg</th>
<th>Konstanz</th>
<th>Basel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>24 (3)</td>
<td>9 (13)</td>
<td>0 (0)</td>
<td>21 (15)</td>
<td>41 (16)</td>
<td>0 (1)</td>
<td>0 (1)</td>
<td>0 (1)</td>
<td>22 (30)</td>
</tr>
<tr>
<td>Cycling</td>
<td>43 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>22 (0)</td>
</tr>
<tr>
<td>Motorbike</td>
<td>22 (8)</td>
<td>20 (16)</td>
<td>23 (11)</td>
<td>21 (12)</td>
<td>43 (16)</td>
<td>11 (11)</td>
<td>9 (10)</td>
<td>7 (9)</td>
<td>23 (10)</td>
</tr>
<tr>
<td>Car as driver</td>
<td>22 (8)</td>
<td>64 (16)</td>
<td>52 (11)</td>
<td>49 (12)</td>
<td>41 (16)</td>
<td>31 (11)</td>
<td>29 (11)</td>
<td>17 (9)</td>
<td>23 (10)</td>
</tr>
<tr>
<td>Car as passenger</td>
<td>24 (3)</td>
<td>20 (16)</td>
<td>21 (11)</td>
<td>12 (12)</td>
<td>12 (16)</td>
<td>0 (11)</td>
<td>11 (10)</td>
<td>3 (9)</td>
<td>22 (10)</td>
</tr>
<tr>
<td>Public transport</td>
<td>8 (0)</td>
<td>9 (0)</td>
<td>5 (0)</td>
<td>5 (0)</td>
<td>18 (0)</td>
<td>18 (0)</td>
<td>10 (0)</td>
<td>23 (0)</td>
<td>23 (0)</td>
</tr>
</tbody>
</table>

Socialdata
Comparison of walking & car trips

The decline in walking has been met with a commensurate increase in trip stages made by car.

Index = 1985
In comparison to Great Britain, some other European countries have a much higher proportion of trips made by bicycle.

Estimated share of journeys (trips) made by bicycle.

**Cycling in the UK**

<table>
<thead>
<tr>
<th>Year</th>
<th>Distance (Kms)</th>
<th>Modal Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>1952</td>
<td>23bn</td>
<td>13%</td>
</tr>
<tr>
<td>1970</td>
<td>5bn</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Percentage of journeys by bicycle in other European countries:**

- The Netherlands: 26%
- Denmark: 19%
- Germany: 10%
- Austria: 9%
- Switzerland: 9%
- Belgium: 8%
- Sweden: 7%
- France: 5%
- Italy: 5%
- Czech Republic: 3%
- Ireland: 3%
- Great Britain: 2%
Bus use outside London and Manchester has continued to decline

Bus passenger journeys by PTE area (1997/98 = 100)
Railway passenger kilometres and journeys

Passenger journeys (millions) - Passenger kilometres (billions)

Graph showing the trend of passenger journeys and kilometres from 1950 to 2010.
Car ownership rates continue to rise, whilst bus services outside London remain broadly static

Bus services (km operated) and number of cars per household. 1997=100
The costs of purchasing cars have fallen in real terms

Cost and price indices, 1997=100
Consequences of how we choose to travel

Co² Emissions
Peak Oil & Energy
Security
K.S.I.
Health
Air Quality
Congestion
Place
The wider costs of Transport
Carbon Dioxide in the atmosphere has risen by over 30% due to human activities.
### Projected impacts of climate change

<table>
<thead>
<tr>
<th>Global temperature change (relative to pre-industrial)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°C</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td><strong>Food</strong></td>
</tr>
<tr>
<td>Food</td>
</tr>
<tr>
<td><strong>Water</strong></td>
</tr>
<tr>
<td>Water</td>
</tr>
<tr>
<td><strong>Ecosystems</strong></td>
</tr>
<tr>
<td>Ecosystems</td>
</tr>
<tr>
<td><strong>Extreme Weather Events</strong></td>
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<tr>
<td><strong>Risk of Abrupt and Major Irreversible Changes</strong></td>
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Cars account for 12% of UK CO$_2$ emissions

- Private motor transport: 27.9%
- LGV / HGV: 42.7%
- Bus (2.2%)
- Maritime: 5.7%
- Air (incl. international): 21.1%
- Rail (1.5%)

All UK transport sector carbon emissions: 72.1%

All UK carbon emissions by source: 27.9%
Source of UK CO$_2$ emissions from Transport (excluding international aviation)

Source: Department for Transport, 2008 Carbon Pathways Analysis
Climate Change is personal

car travel is the single biggest source of personal CO$_2$ emissions in the UK

Source: Department of Energy and Climate Change, 2009 Act on CO$_2$ Calculator Version 2.0
"It's no secret anymore that for every nine barrels of oil we consume, we are only discovering one."

BP Statistical Review of World Energy
November 11th, 2009
Breakdown of KSI casualties in 2007 by road type (%)

- Those involved in fatal or serious accidents are disproportionately young, male or from areas of high deprivation
  - 15-25 year olds represent approximately 15% of the population but account for 30% of urban road accidents
  - 75% of all British road deaths are among men in 2007
  - those living in the 10% most deprived areas were one and a half times as likely to be involved in a road accident relative to those living in the 10% of least deprived areas

Of the 247,780 total road casualties in 2007, 2,946 were fatal.
The number of killed and seriously injured (KSI) road casualties has fallen significantly during the period of the current road safety strategy.

% change in a selection of metrics in comparison to 1994-98 baseline

- All KSI: -40% (Target) -36% (Progress to date)
- Children KSI: -50% (Target) -55% (Progress to date)
- Slightly Injured Rate: -10% (Target) -32% (Progress to date)
- Traffic Volume: 16% increase

The reductions in road casualties have occurred against an increase in traffic volume.
Cross-governmental support (DfT / DH)

Active Travel: The Miracle Cure?
A guide for the NHS on raising physical activity levels through your local transport plan

‘We have put walking and cycling at the heart of our transport and health strategies’
Sadiq Khan MP – Minister of State for Transport
Gillian Merron MP – Minister of State for Public Health.
(Active Travel Strategy, Department for Transport & Department of Health, February 2010)

‘The potential benefits of physical activity to health are huge. If a medication existed which had a similar effect, it would be regarded as a “wonder drug” or “miracle cure”.
Sir Liam Donaldson – Chief Medical Officer
(Annual Report of the Chief Medical Officer 2009, Department of Health, March 2010)
UK obesity levels 1995 - 2003 (females)

Source: Lobstein and Leach, Foresight obesity review, 2007
…. obesity is only part of the problem

physical inactivity increases heart disease risk…

… and type II diabetes…

… many forms of cancer…

… mental illnesses

… other health impacts

£ billions in healthcare
Over the period from 1990 to 2006 emissions of harmful pollutants from road transport have been reduced.
Some of the issues: ‘severance’

Appleyard study in San Francisco: affects of traffic volume

**Light traffic:**
- 3.0 friends
- 6.3 acquaintances

**Moderate traffic:**
- 1.3 friends
- 4.1 acquaintances

**Heavy traffic:**
- 0.9 friends
- 3.1 acquaintances

Source: Appleyard (1981)
Comparison of the wider cost of transport in English urban areas (£ billion per annum, 2009 prices and values)

- Excess delays: £10.9 billion
- Accidents: £8.7 billion
- Poor air quality: £4.5 – £10.6 billion
- Physical inactivity: £9.8 billion
- Greenhouse gas emissions: £1.2 – £3.7 billion
- Noise - amenity: £3 – £5 billion
What needs to change?

- A reduced threat from climate change
- Enhanced mobility through wider choice
- Reduced congestion and increased journey time reliability
- Better health as a result of improved safety & much greater levels of walking & cycling
- Streets and public spaces which are enjoyable places to be, where exposure to harmful emissions are reduced and where quality of life is transformed

‘Our vision for the future of Urban Transport’. Sadiq Khan November 2009
The importance of infrastructure

Seoul Municipal Government
The importance of infrastructure
Connect2 in Worcester

1 mile

Main roads

river
Diglis Bridge, Worcester Connect2
The key issue: speed?

Source: Ashton and Mackay (1979)
From the streets of London…
...and Philadelphia
What do we want from our streets?

“Transportation is not an end — it is a means to having a better life, a more enjoyable life — the real goal is not to improve transportation but to improve the quality of life.”

- Enrique Peñalosa, former mayor of Bogotá
Waves of innovation
Greener Cars of the Future?

- Electric Cars
- Hybrids & Plug-in Hybrids
- Biofuels
- Hydrogen Fuel Cells
- More Efficient Conventional Vehicles
Potential for sustainable travel modes

% of trips per person (STDTs)

- Actual usage (walking, bicycle, public transport) 35%
- Trips by motorised private modes 65%
Potential for sustainable travel modes
% of trips per person (STDTs)

Constraints

Actual usage (walking, bicycle, public transport)
Potential for sustainable travel modes

% of trips per person (STDTs)

- Constraints
  - No adequate alternative: 27
  - 9

- Actual usage (walking, bicycle, public transport): 35
Potential for sustainable travel modes
% of trips per person (STDTs)

- Actual usage (walking, bicycle, public transport): 35%
- Only subjective reasons against sustainable travel modes: 29%
- No adequate alternative: 27%
- Constraints: 9%
Enabling people to leave their car behind

TravelSmart - The UK’s most successful travel behaviour programme

Source: Sustrans/Socialdata, 2010: data derived from combined analysis of completed TravelSmart project evaluations
Intervention:
environmental and behavioural

- now working in over 800 schools
- 400,000 children involved
universities, work places

- information
- loan bikes
- travel planning
- physical activity projects

UTravelActive, Leeds University
“...we can't ignore the fact that 84% of journeys are made by car and there is no realistic prospect of displacing the private car for point to point complex journeys.”

Trips by car accounted for 63% of all trips in 2009 (National Travel Survey)
Road user charging

Significant, long-term, incremental..... helps people plan their lives
NOT ALL PARKS ARE FUN