

Our vision is a world in which people choose to travel in ways that benefit their health and the environment.

**Bypass the bypass by path.**

  
**sustrans**  
JOIN THE MOVEMENT

# Global climate change & carbon reduction

Potential economic, health and other savings from a switch to the bike

**Peter Lipman**

Director, Liveable Neighbourhoods  
& Low Carbon Travel

# Presentation overview

- The background - climate change, transport's role, peak oil
- The potential for change in the UK
- Importance of infrastructure
- Some success stories
- Health, economics
- Personal and corporate questions
- Tentative conclusions

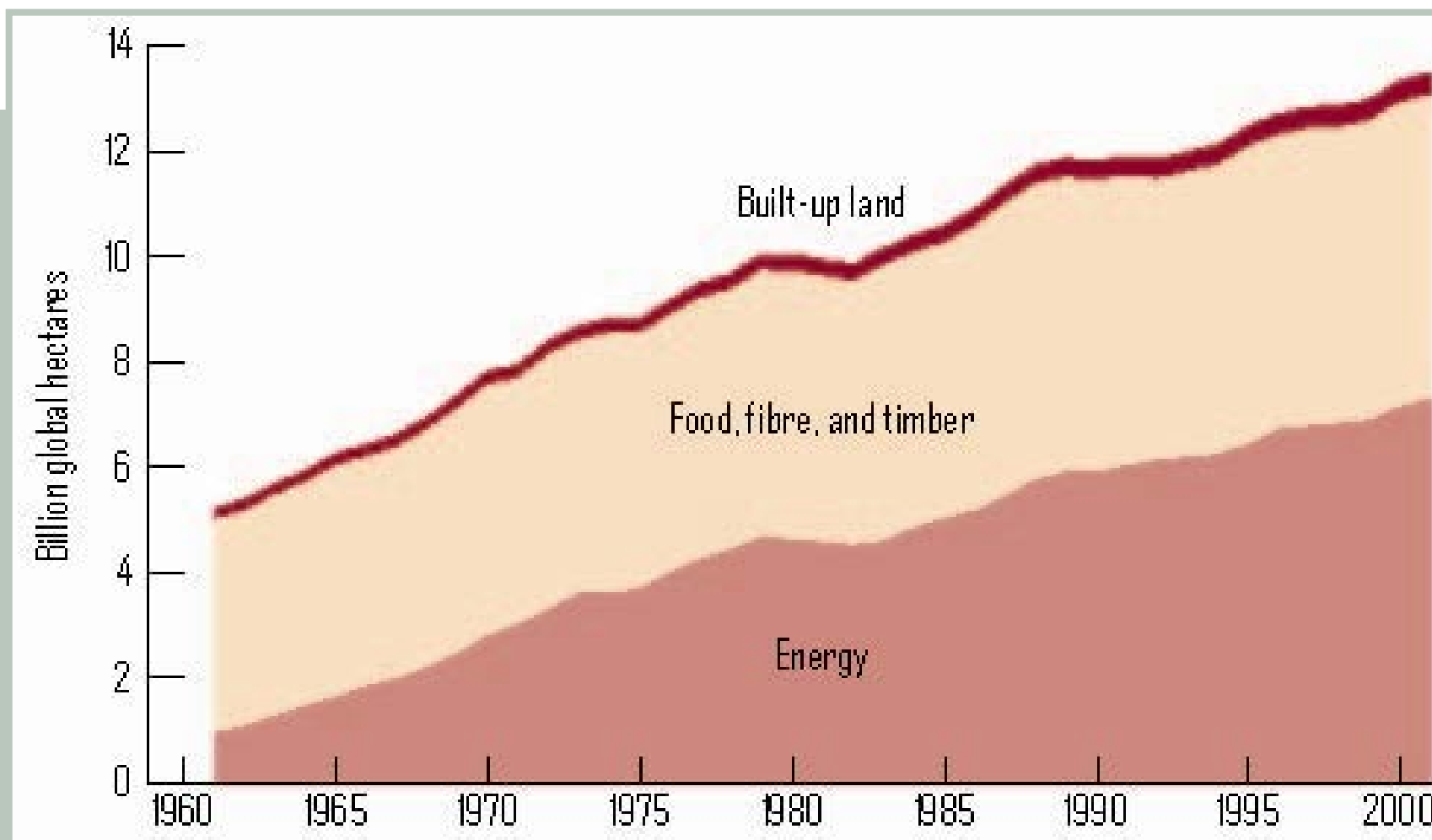
# Climate change

Rapidly growing evidence of massive, irreversible (?) changes to our climate ...

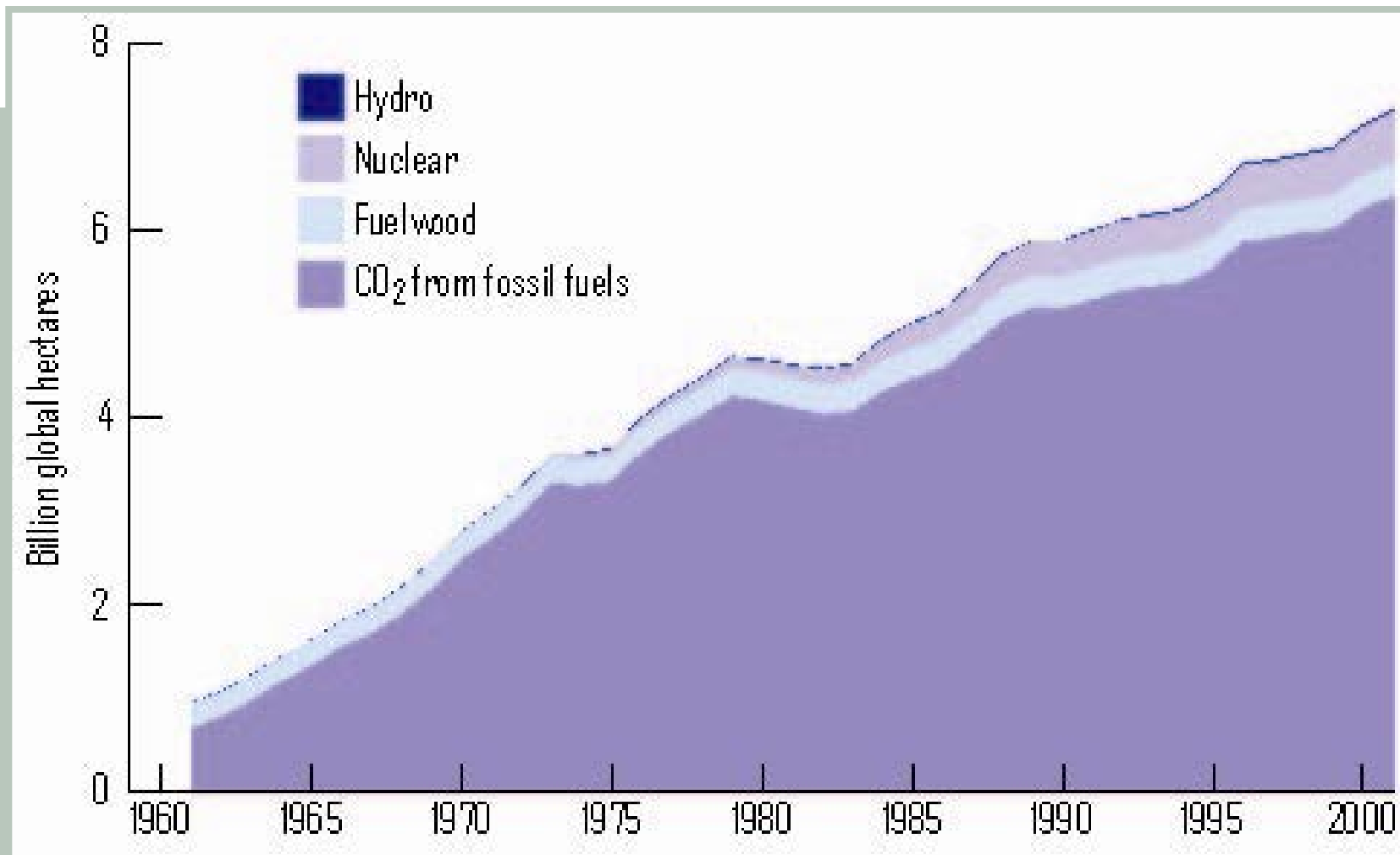
- Glaciers in retreat, the Arctic melting, as are the Greenland and West Antarctic ice sheets
- Number of droughts have doubled since 1975
- Hurricanes are much more intense and are showing up in places they never have before
- Significant changes in ocean circulation patterns appearing



# Humanity's ecological footprint, 1961 - 2001



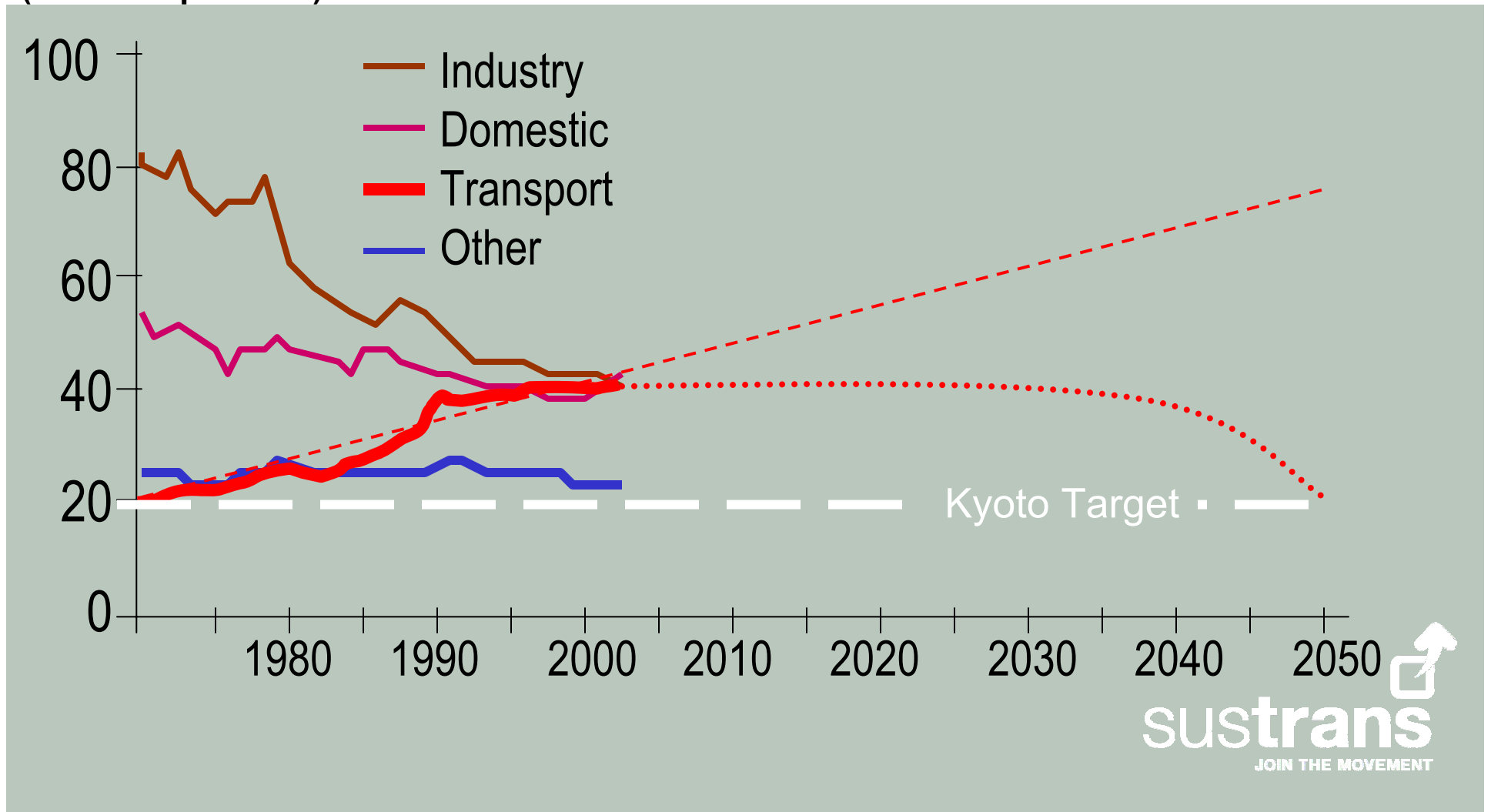
# Humanity's energy footprint, 1961 - 2001



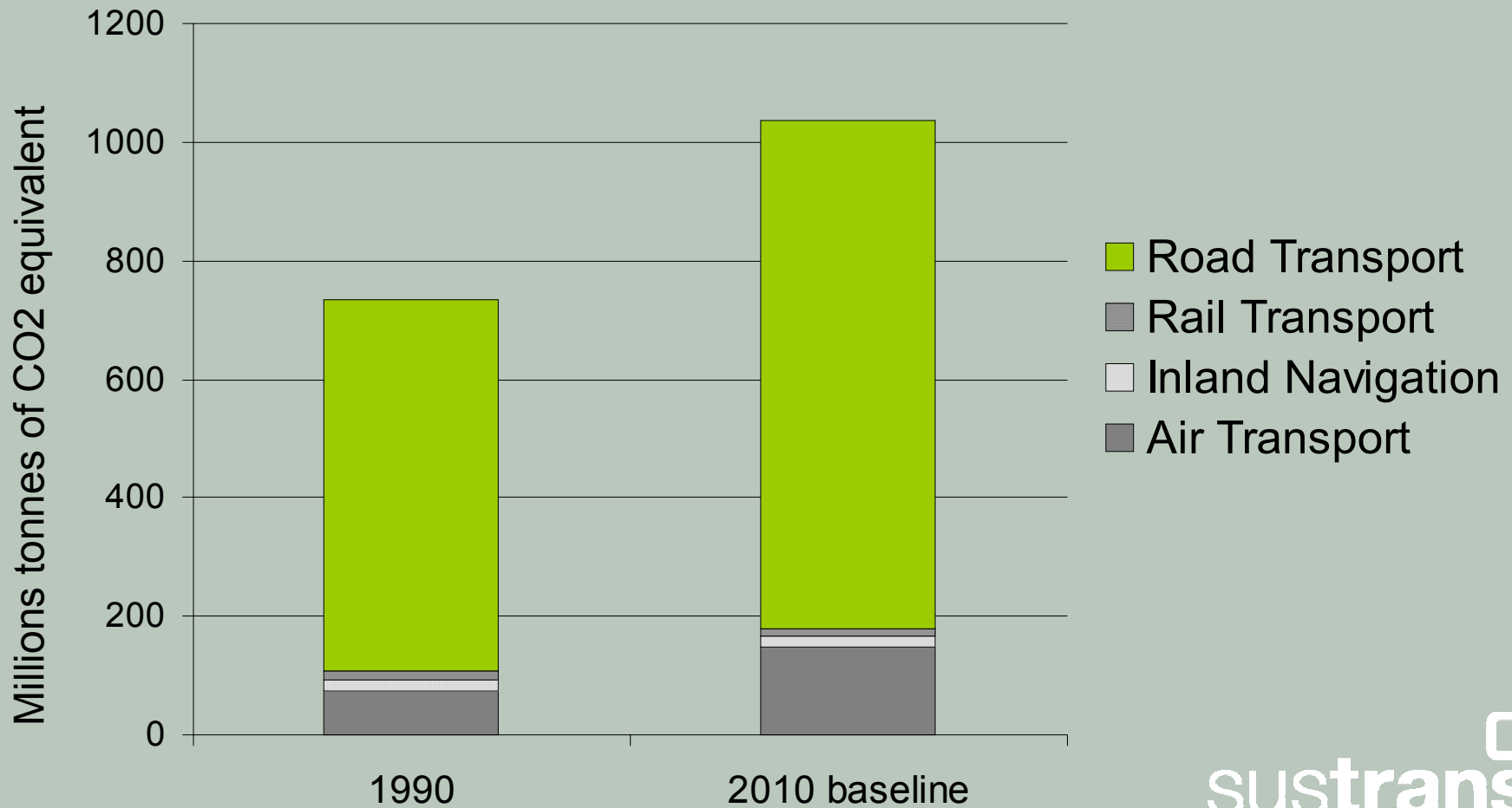
# Carbon dioxide emissions by end user

Million tonnes pa  
(carbon equivalent)

1970 - 2002 UK



# Emissions of CO<sub>2</sub> per transport mode, 1990 and 2010 (projected) in EU-15



Source: Primes baseline projection, 2003.

# Peak oil

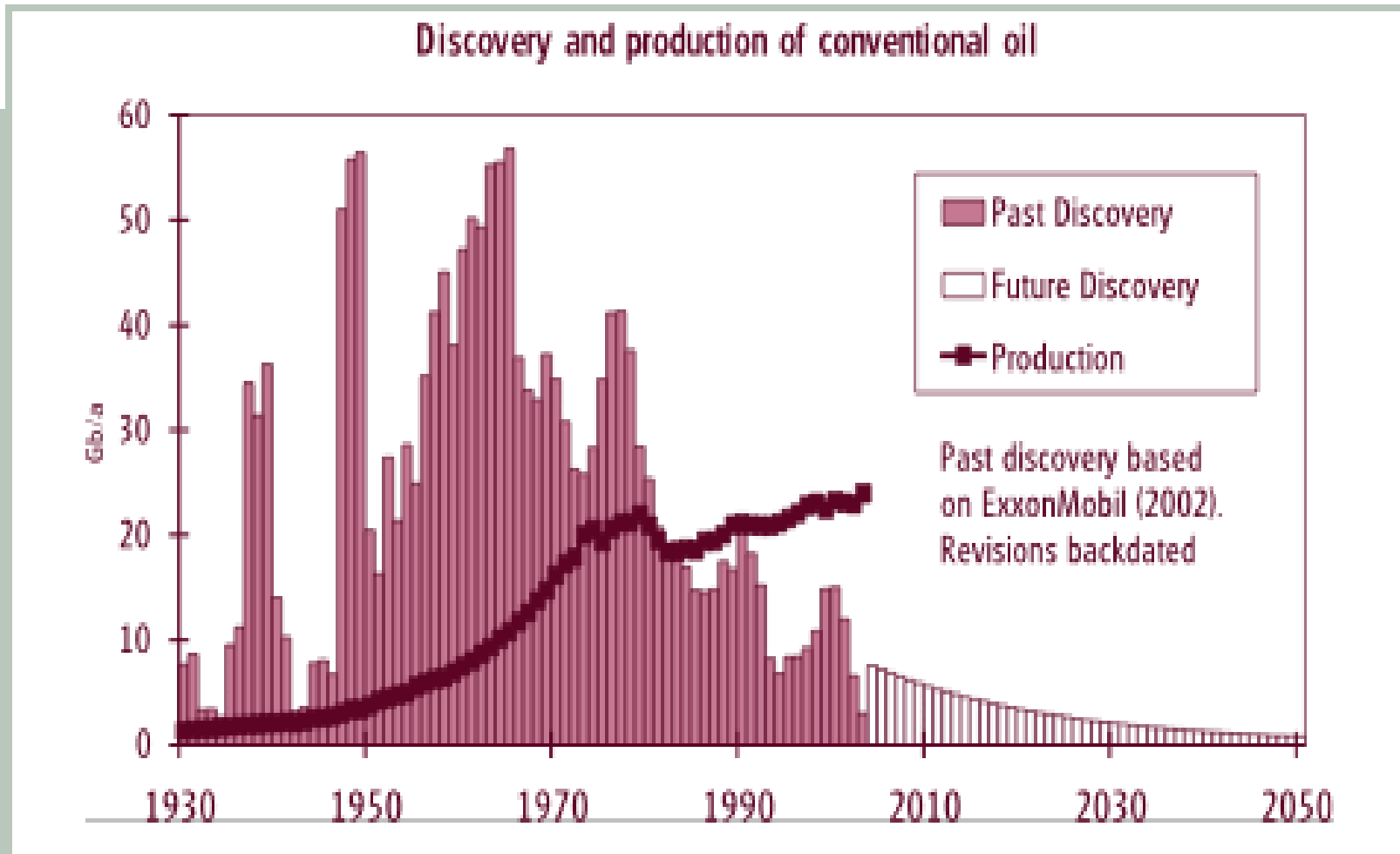
Over 90% of motorised transport is fuelled by oil.

So what does the peak in global oil production mean? Oil use has powered the economic/population growth over the last 150 years with ever increasing levels of extraction & refining - currently over 80 million bpd.

Once we go through the halfway point of all reserves, production becomes ever more likely to decline. Peak oil doesn't mean running out of oil, "just" running out of cheap oil, with enormous consequences for societies leveraged on ever increasing amounts of cheap oil.



# Oil - the growing gap



Source: Feasta

# Interplay between climate change and peak oil

Will we just fry (bake?) our world if peak oil doesn't stop us?

Will our desperation for our hydrocarbon fix mean that we just use coal to do it instead of oil? (Sasol etc)

What sort of transport, with its unique dependence on oil, can we have post peak?

How are peak oil and climate change already interacting as drivers? One example: Katrina and overpumping in Iraq?

# VIBAT: Visioning and backcasting for UK transport policy

Can a 60% CO<sub>2</sub> reduction target in the UK domestic transport sector be achieved by 2030?

YES through:

- **behavioural change**
- **technological innovation**

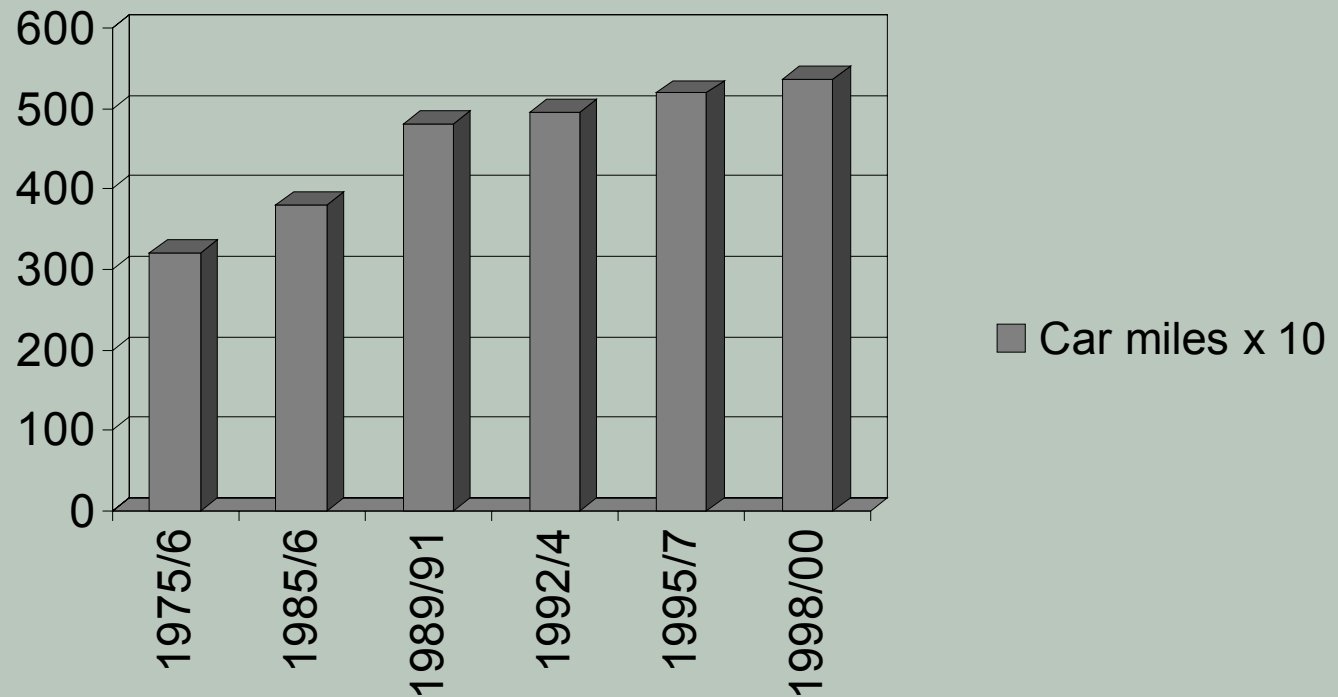
But it is in travel behaviour that the real change must take place, and this can and must be implemented at the earliest possible occasion.

# Technology to the rescue?

So technology is crucially important - but lets be realistic, nearly a century ago, Ford's Model T got 25 miles to the gallon (10.6 km/litre).

Today, Ford's cars and trucks average 22.6 miles per gallon (9.6 km/litre), and the Explorer (SUV model) gets just 16 miles per gallon (6.8 km/litre)

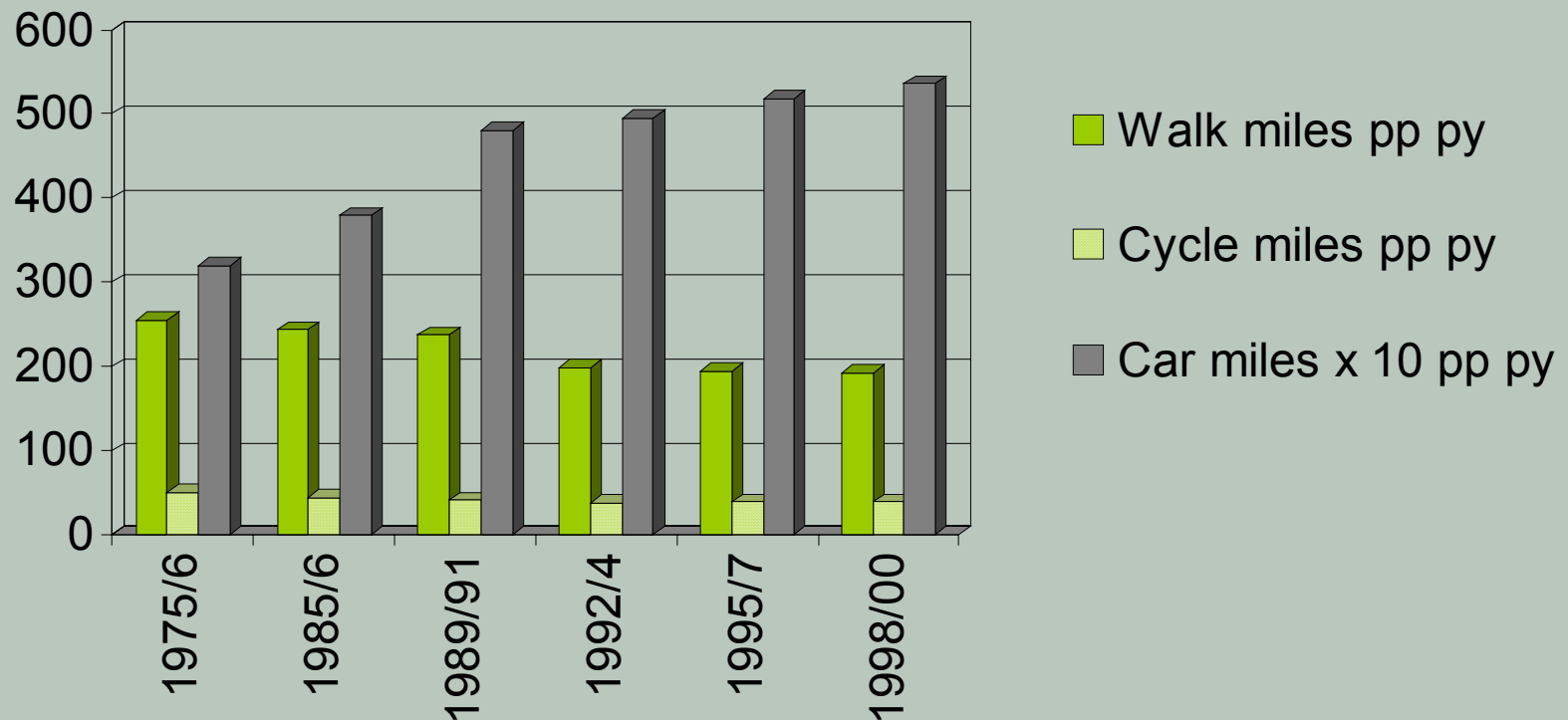
# UK - distance travelled by car 1975 - 2000



Source: National Travel Survey / Cavill Associates

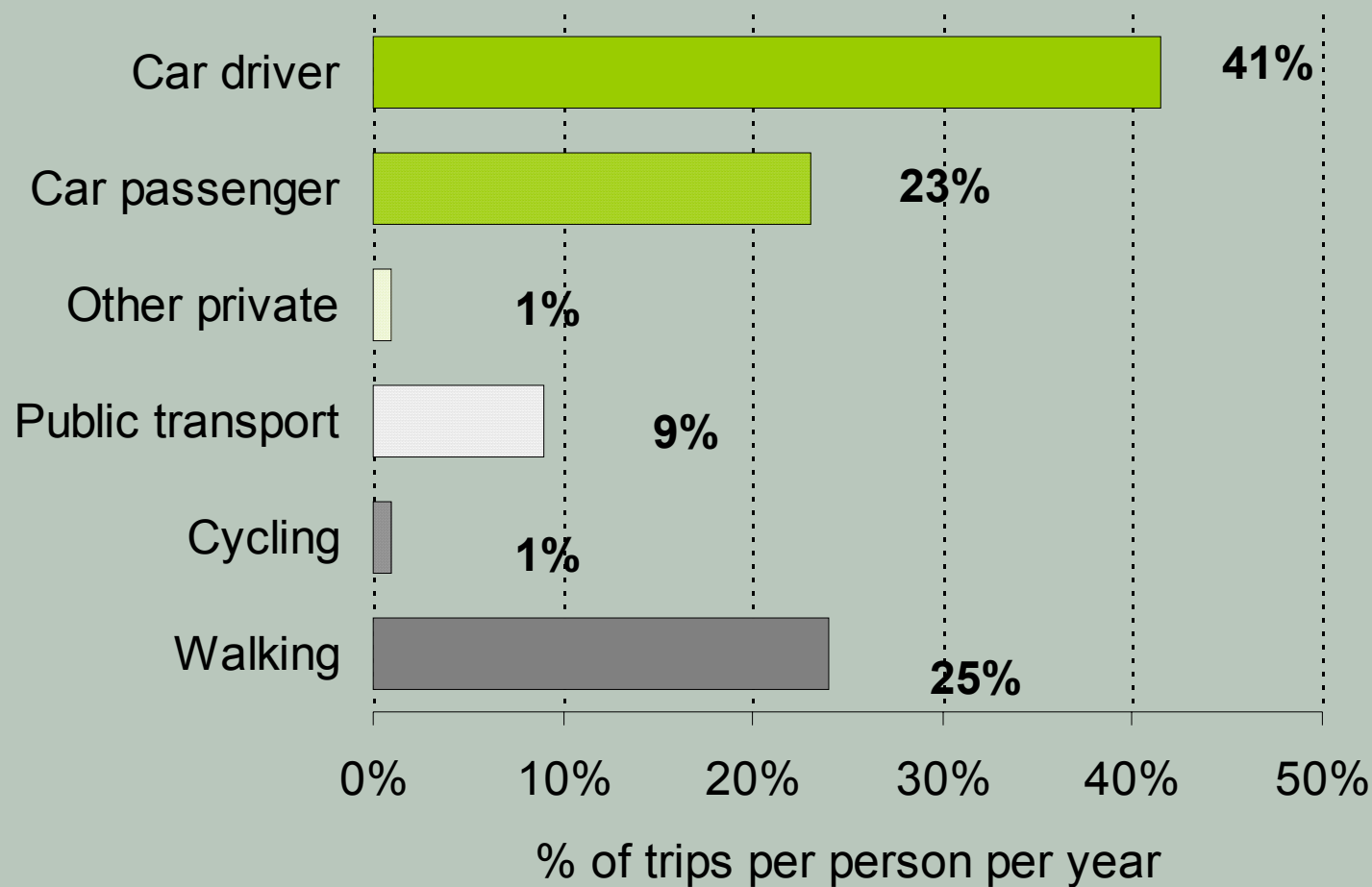


# Distance travelled by walking, cycling, and car



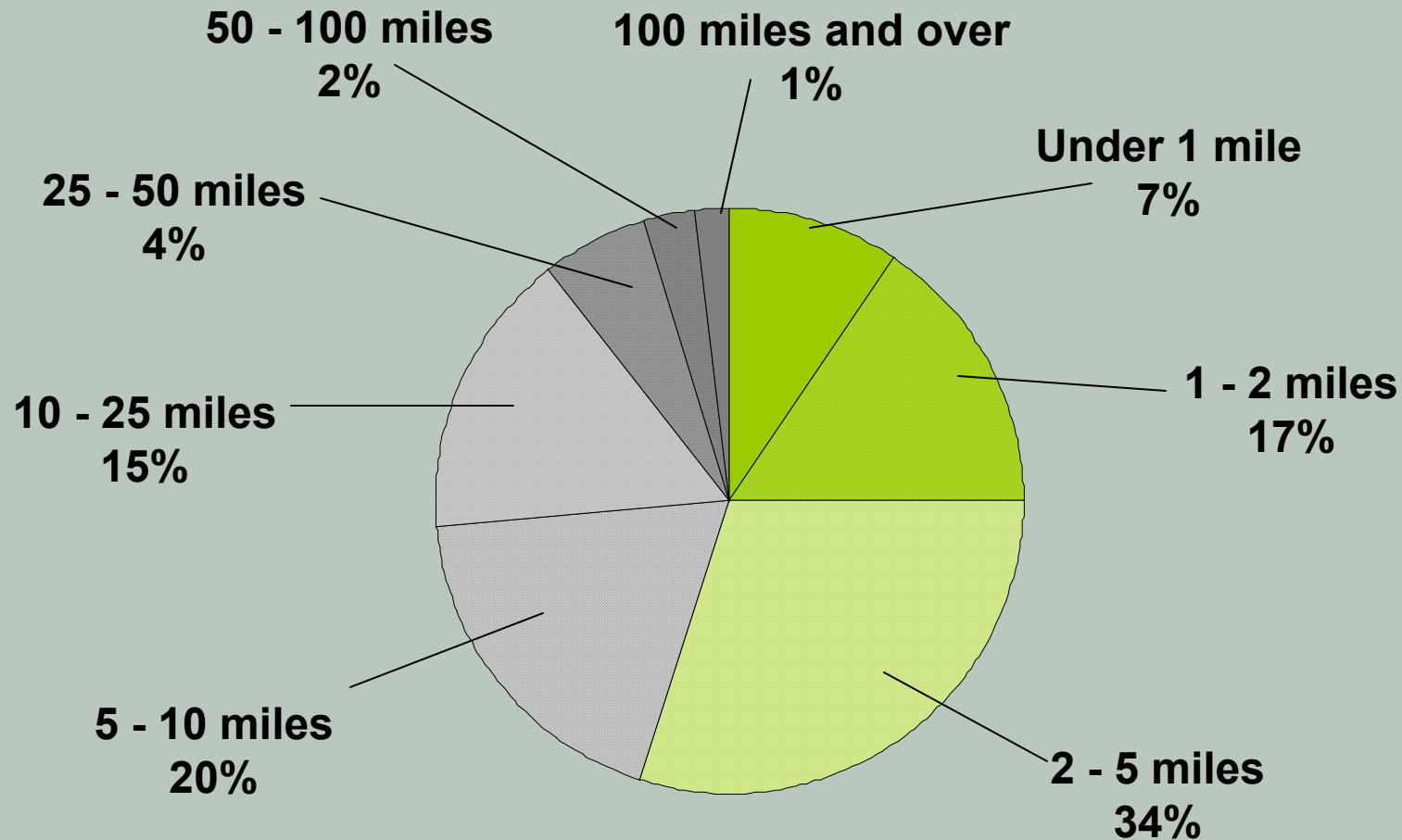
Source: National Travel Survey / Cavill Associates

# UK - travel by main mode



Source: *National Travel Survey 2003*, Department for Transport (October 2004)

# UK car trip distance - 58% < 5 miles



Source: *National Travel Survey 2003*, Department for Transport (October 2004)

# Know your customer!

Retailers in the city of Graz were asked "How do your customers travel to your shop?"



25%

5%

12%

58%

Shopkeepers' estimates

Source: Socialdata GmbH

# Know your customer!

*How customers actually travel to the shops in Graz*



44% (25%)

8% (5%)

16% (12%)

32% (58%)

*Actual mode of customer travel  
(Shopkeepers estimates in brackets)*

Source: Socialdata GmbH



## Traffic empties shops

Percentage of shops vacant in selected Leicester streets



Source: Wiggins

## Edinburgh shoppers' concerns



43%  
good selection  
of shops



33%  
pavements  
not wide  
enough



30%  
more  
pedestrian  
priority



19%  
traffic  
congestion



16%  
pedestrian  
environment  
"unsafe"

## retailers' concerns



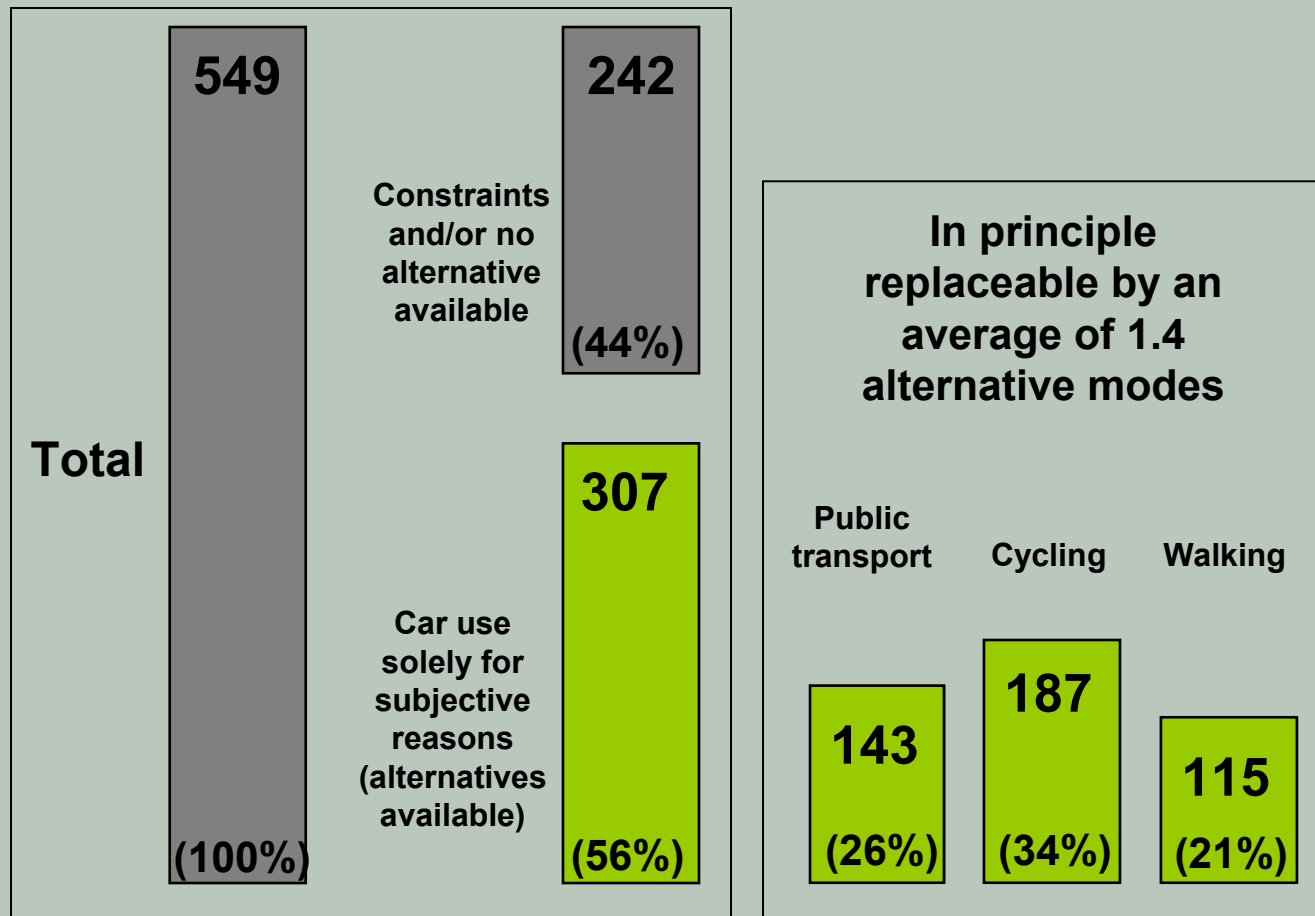
51%  
wanted more  
parking

Sources: Roger Tym and Partners, Touche Ross and Co

# So, how do we create a culture more likely to . . . . .

- chose active travel modes?
- prefer local journeys?
- use public transport?
- join car clubs?
- travel electronically?
- be environmentally conscious?
- achieve a 60% reduction in CO<sub>2</sub>?

# Replaceable car trips in Darlington



# Efficient use of road space





# The importance of infrastructure



Seoul Municipal Government



# ‘Dead worm’ cul-de-sacs don’t work for walking and cycling



# York Millennium Bridge

Walking and cycling along the Ouse grew by 59% between 1999 and 2002, from 650k to over a million trips pa

- trips on foot from 430k to 740k
- cycling trips from 220k to 290k
- utility trips to work, shops etc from 160k to 390k (+141%)





# Addenbrooke's hospital

- priority cycle parking - 1,300 spaces
- linked to local cycle network
- priority for car sharers
- on-site bus station and service improvements
- discount bus tickets
- 16 pool cars
- wide-ranging travel plan



# Addenbrooke's hospital

Between 1993 and 2003, the travel plan caused big changes in travel behaviour:

- bus travel rose from 4% to 23%
- cycling from 17% to 25%
- walking from 4% to 7%
- car use fell from 74 to 42%

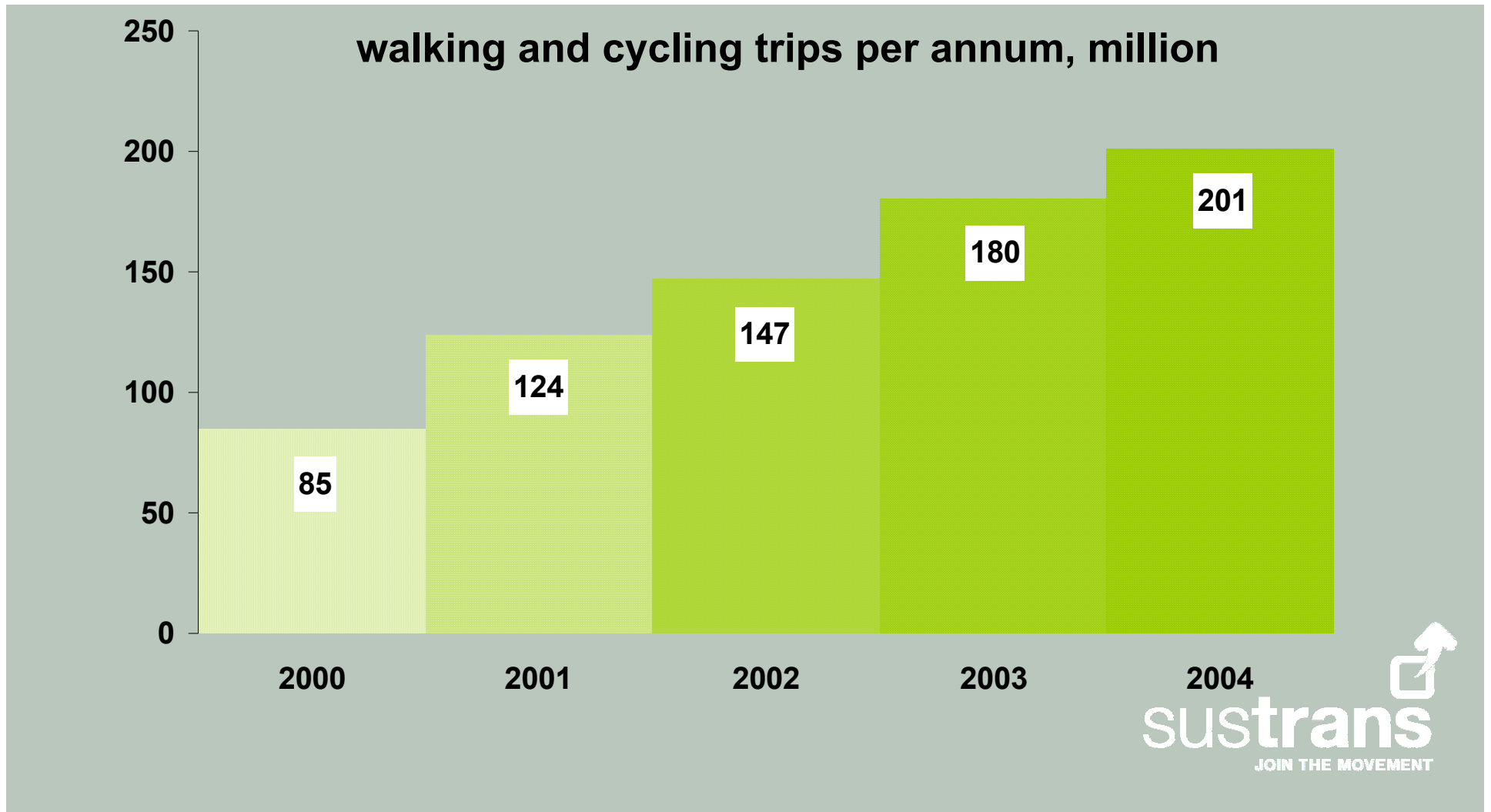
The Trust continues to enhance its travel plan.



# Sustrans projects

- The National Cycle Network
  - more than 200 million journeys a year,  
40% replace a car trip
- Bike IT
  - quadrupled cycling levels in 40 schools in  
one year, 50% replace a car trip
- TravelSmart
  - reduces car trips by 10% across whole area

# Usage growth on the National Cycle Network



# The National Cycle Network: changing people's travel behaviour



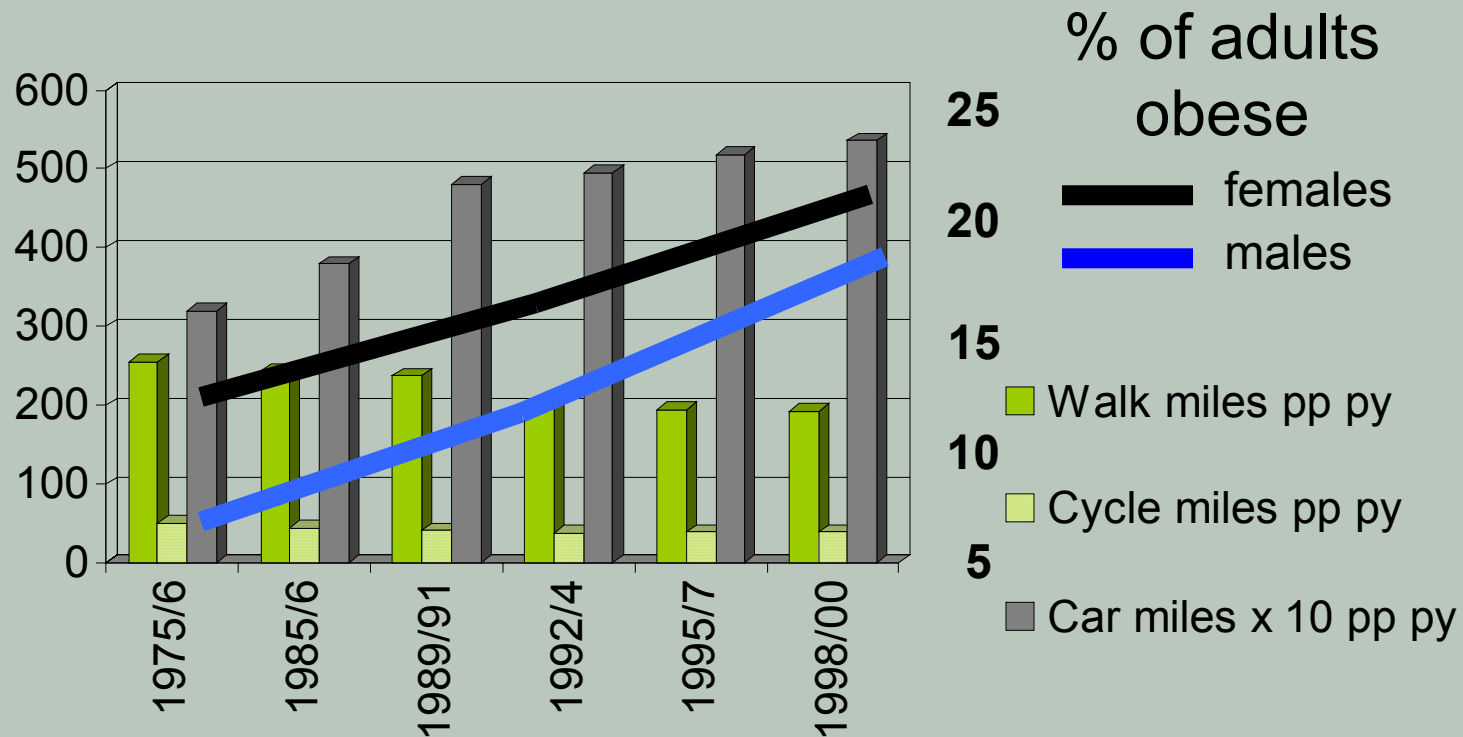
25% could have used a car, but chose not to

72% “more active thanks to the Network”

used for all trip purposes



# Distance by walking and car: rates of male and female obesity

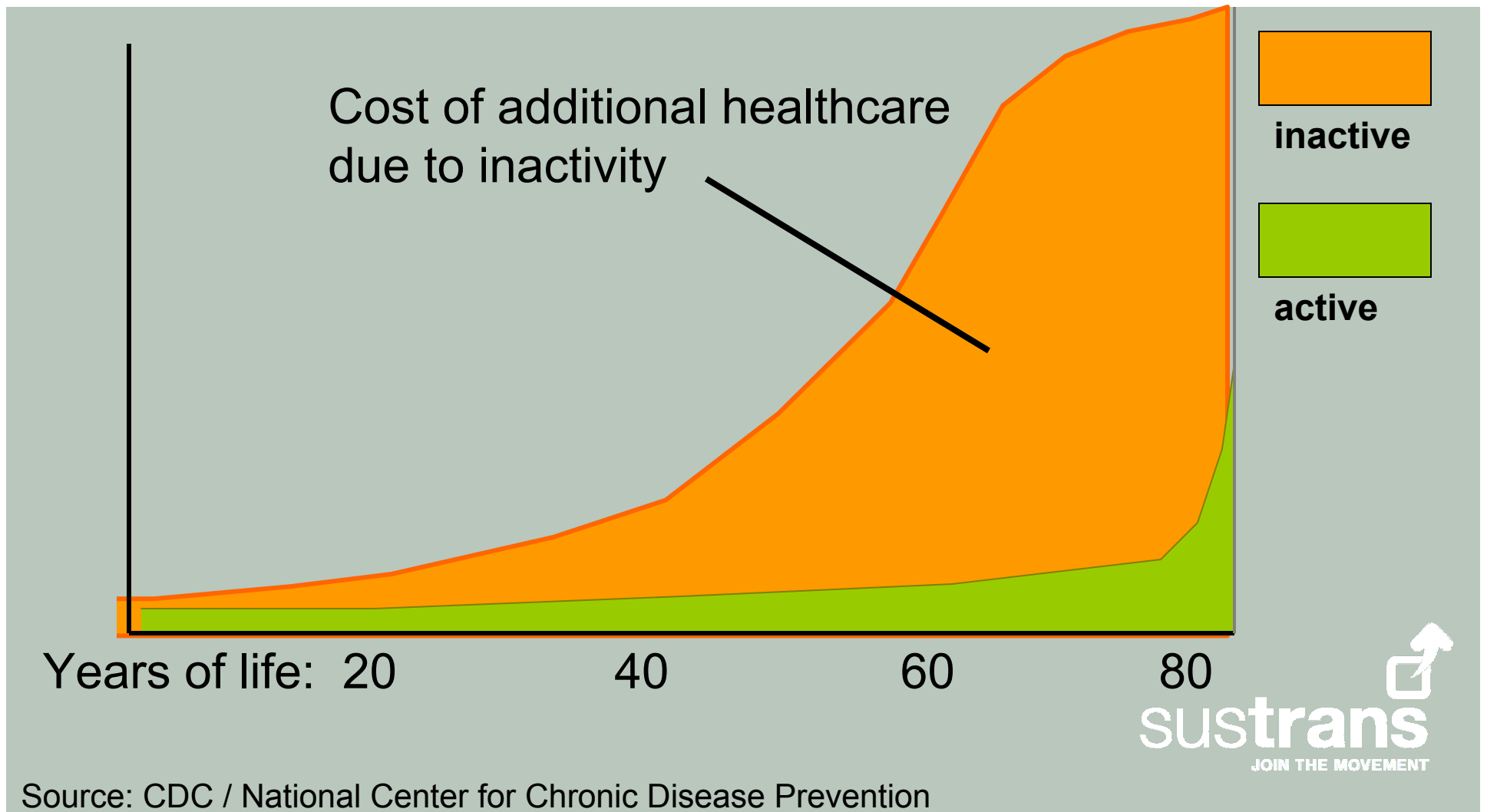


# Physical inactivity is a big problem

“Besides the human costs of inactivity in terms of mortality, morbidity and quality of life, the report highlighted an estimate for the cost of inactivity in England to be £8.2 billion annually. This excludes the contribution of physical inactivity to overweight and obesity, whose overall cost might run to £6.6 - £7.4 billion per year according to recent estimates.”

*Choosing Activity: a physical activity action plan (DH, 2005)*

# Inactive people have higher healthcare costs



# Valuing the mortality benefits of cycling: approach

- Assume an increase in cycling in a population
- Calculate mortality gains
- Subtract increased cyclist deaths
- Calculate number of life years/gained lost
- Relate this to cost per life year
- Calculate annual value of mortality benefits
- Sensitivity analysis

# Case study: Copenhagen

- 6,954 regular cycle commuters
- total study population of 30,640
- followed up for an average of 14.5 years
- mean journey time for 3 hours per week
- relative risk of death 0.72 (95%CI 0.57-0.91)
- adjusted for age, sex, educational status, leisure time physical activity, body mass index, blood lipid levels, smoking and blood pressure.

# Deaths averted through cycling

Mean proportion of population aged 20-60 dying/year	0.002052095
Deaths from all causes expected in 100,000 people aged 20-60	205.21
Reduction in this because of cycle commuter RR of 0.72	57.46
Net number of deaths	147.75

# Number of excess deaths among cyclists

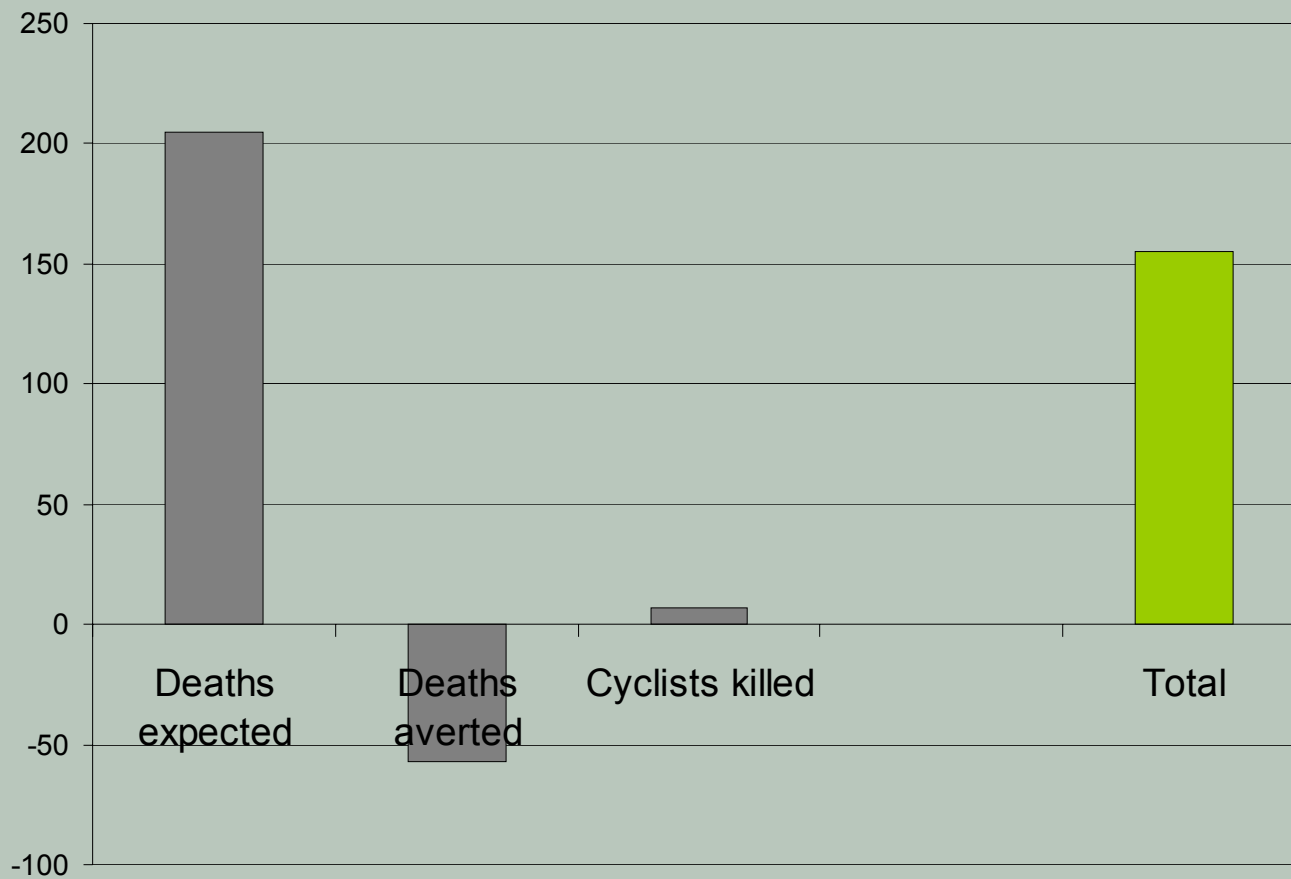
Extra distance cycled per person – 12 km/day for 220 days/year at 20km/hour (i.e. 3 hours/week)	2,640
Total extra km by the 100,000 extra cyclists	264,000,000
Risk of death per km cycled	2.7798E-08
Extra cyclist deaths	7.34

# Reduction in deaths and gain in life years

Mean age of death for all-cause mortality	48
Mean LYL for an all-cause death	34
LYG through deaths averted	1,954
Mean age of death of cyclists dying on roads	41
Mean LYL for a cyclist death	40
LYL through cyclist deaths	294
Net reduction in deaths	50
Net gain in life years	1,660



# Costs and benefits



# Values associated with these data

Value of a life year	£31,250
Overall benefit	£52,374,242
Benefit per cyclist	£523

## Assumptions:

- People cycle for 3 hours a week at a mean speed of 20km/h
- Injuries increase linearly with increased cycling
- Benefits and costs are evenly distributed across the population in question
- Commuters are aged 20-60

# What does all of this mean for companies?

So what are the implications of these factors for how:

- companies distribute their goods and services;
- source their energy inputs and raw materials;
- ensure that their workforce and/or customers can get the required access;
- maintain profitability?

# And what does it mean for us as individuals?

Is it right to fly to a conference in Cape Town when by doing so, given current fuels/systems, we are contributing to climate change? Is it right in the UK to import our food from South Africa instead of sourcing it locally?

How are these issues different for people struggling to find money to live?

What sort of moral system will enable us to act responsibly in a climate changing environment?

# Are we ready for change?

Recent UK Guardian/ICM poll:

- 28% want government to prioritise tackling climate change against 16% wanting the economy to grow faster.
- 25% have cycled instead of using a car to save the environment, 24% have decided against a holiday involving flying.

# Tentative conclusions

- Very rapidly moving towards sustainable travel is crucial for a range of reasons, including economic and health but also climate change, peak oil.
- Cycling should play a very significant role in a low carbon world.
- We are on the point of widespread acceptance of the need for change.

# Thank you



Peter Lipman

[peter.lipman@sustrans.org.uk](mailto:peter.lipman@sustrans.org.uk)

[www.sustrans.org.uk](http://www.sustrans.org.uk)

0117 915 0333