

# Making Sense of the Big Issues – Climate Changes and Peak Oil

STAR Conference, Glasgow

Scott Leitham | 24 April 2008



# Climate Change - Some Background....

- Relationship between man made emissions and temperature rise first put forward in 1980s
- Intergovernmental Panel on Climate Change (IPCC) formed in 1988
  - Increasing certainty over time
- **Climate change is real and is a threat**
- CO<sub>2</sub> and other Greenhouse Gases
- Fossil Fuel based CO<sub>2</sub> accounts for 56% of global emissions
  - Deforestation, agriculture, waste and the decay of biomass

# CO<sub>2</sub> levels & Observed Change - IPCC

## Atmospheric concentration of CO<sub>2</sub>

- 2005 379ppm, Pre-industrial 280ppm
  - Rate of increase is accelerating
- Levels far exceed those from last 650,000 years

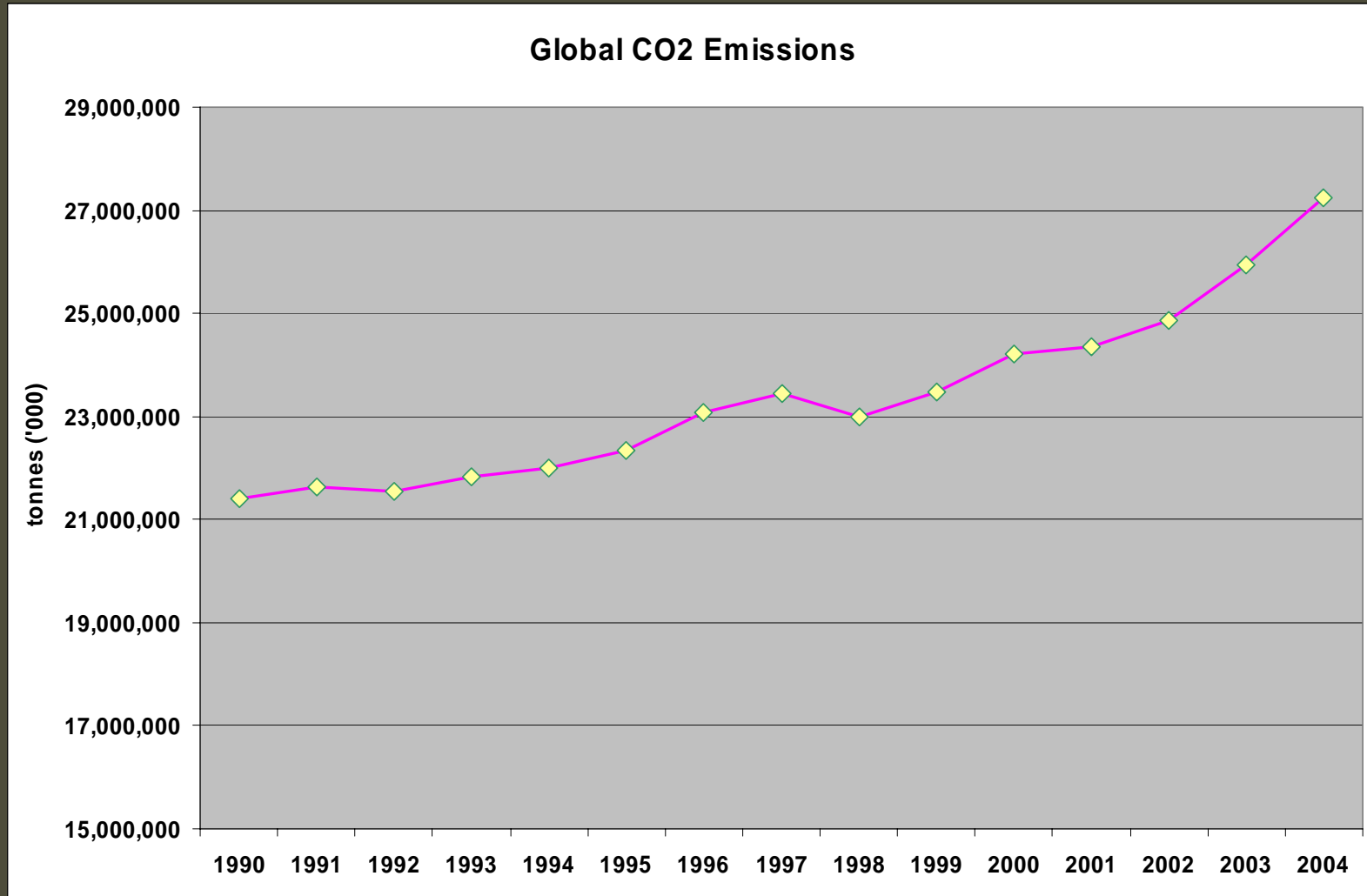
## Climate change to date

- Temp: 1906-2005, +0.74C, increase is accelerating, and the impacts of this are being seen
- Sea Level 1900-2005, +250mm, increase is accelerating
  - Reducing snow and ice coverage

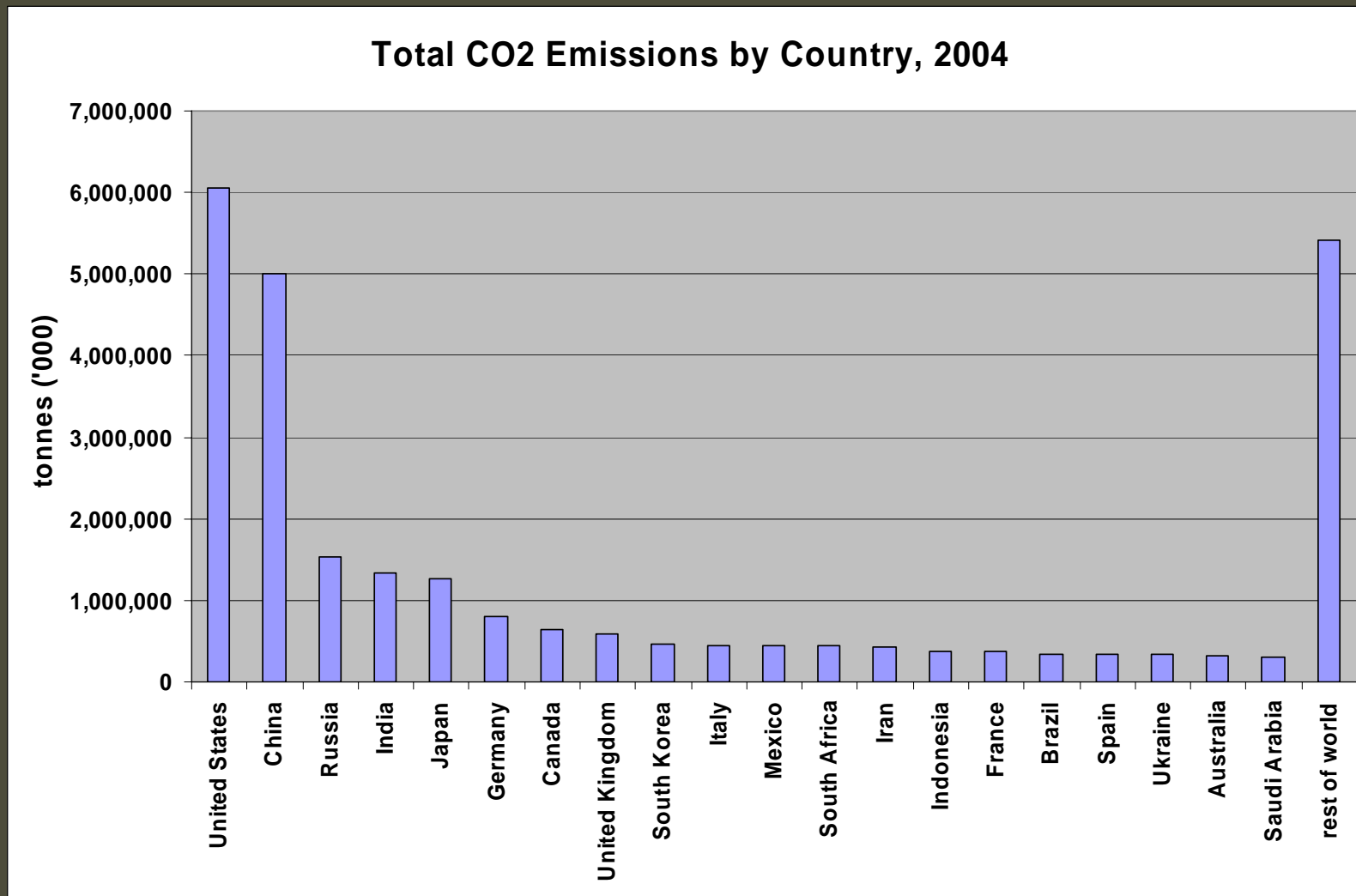
# Climate Change Outcomes - IPCC

- By 2095
  - temperatures will be 1.1C-6.4C higher than 1990
  - Sea level will be 0.18m-0.59m than 1990
  - Conservative analysis?
  - Earth currently +5C compared to last Ice Age
- IPCC 'Headline' Scenario
  - CO2 concentrations must peak at 350ppm-400ppm (present day = 379ppm)
  - emissions must peak then reduce between 2000 and 2015
  - CO2 emissions in 2050 must be between 50% and 85% lower globally than in 2000

# Global CO2 Emissions, Fossil Fuels, 1990-2004

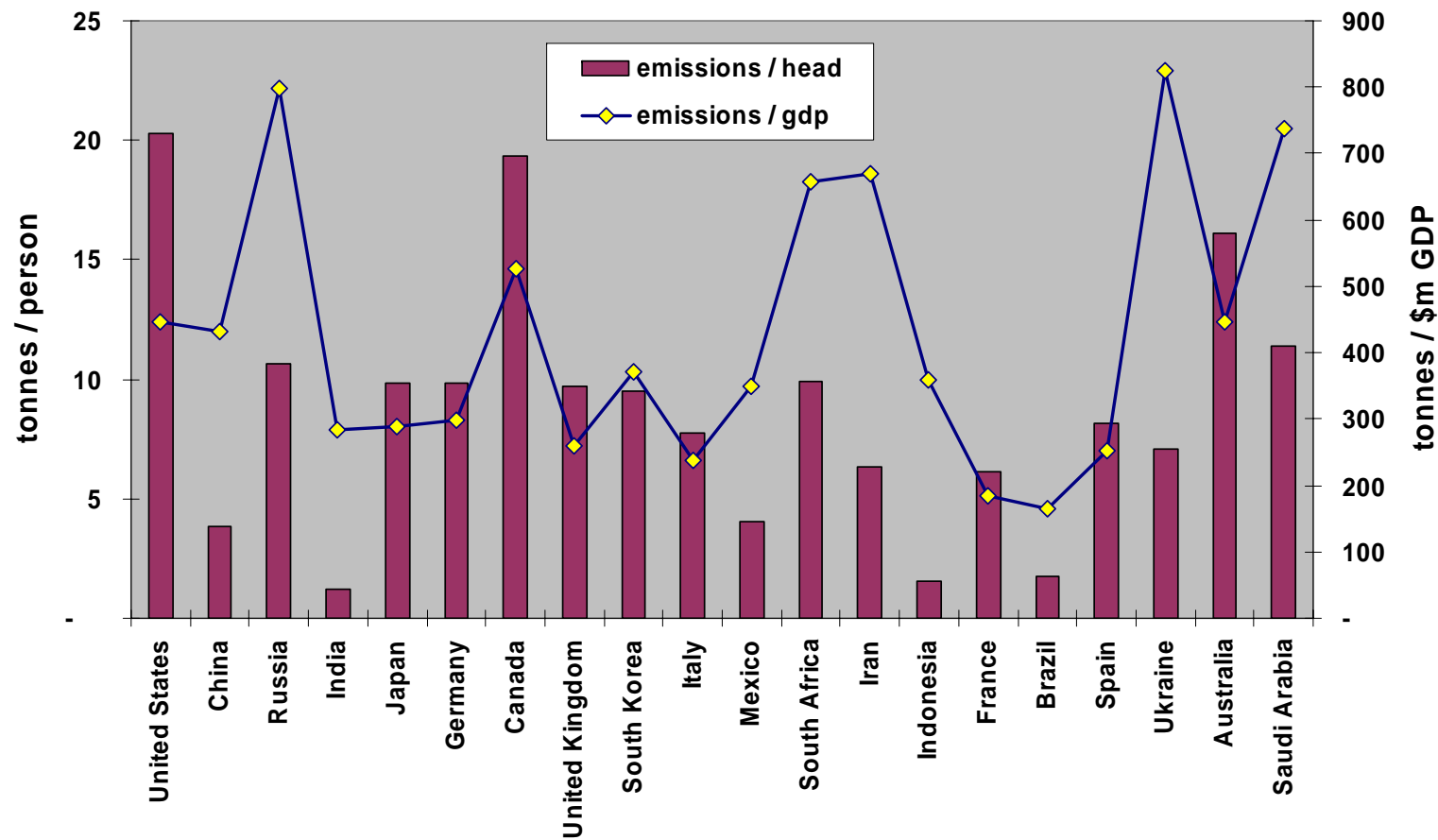


# CO2 Emissions by Country – Fossil Fuel Burning



# Emissions per Head & GDP

## CO2 Emissions By Country, 2004



# Recent Change in Emissions



# Growth Projections

## Cars:

- Present day – 600m
- 2050 – 1,100m in China & India alone

## Population:

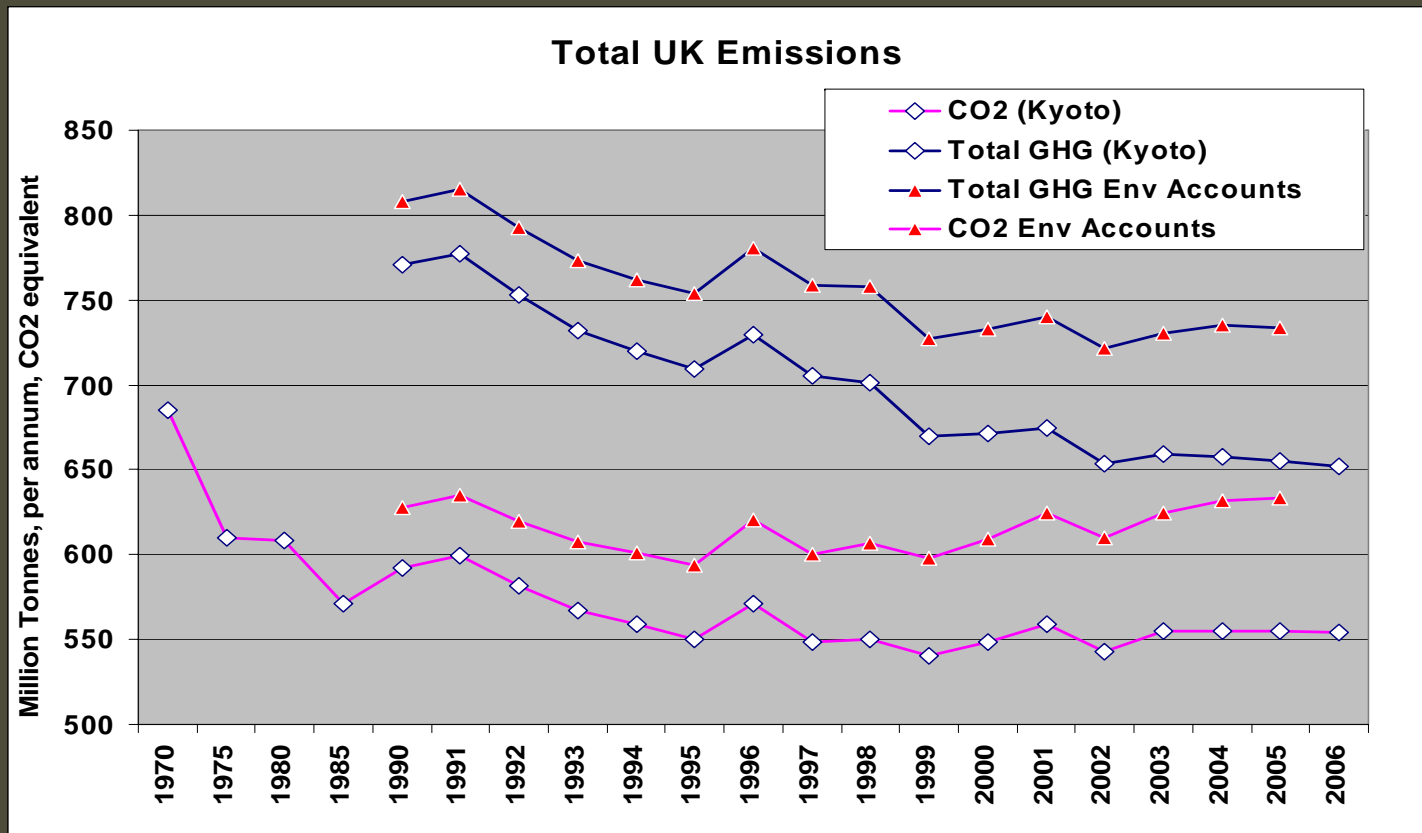
- 6,700m (2008) → 9,220m (2075)

## Economy:

- Global growth of a factor of 3-4 by 2050

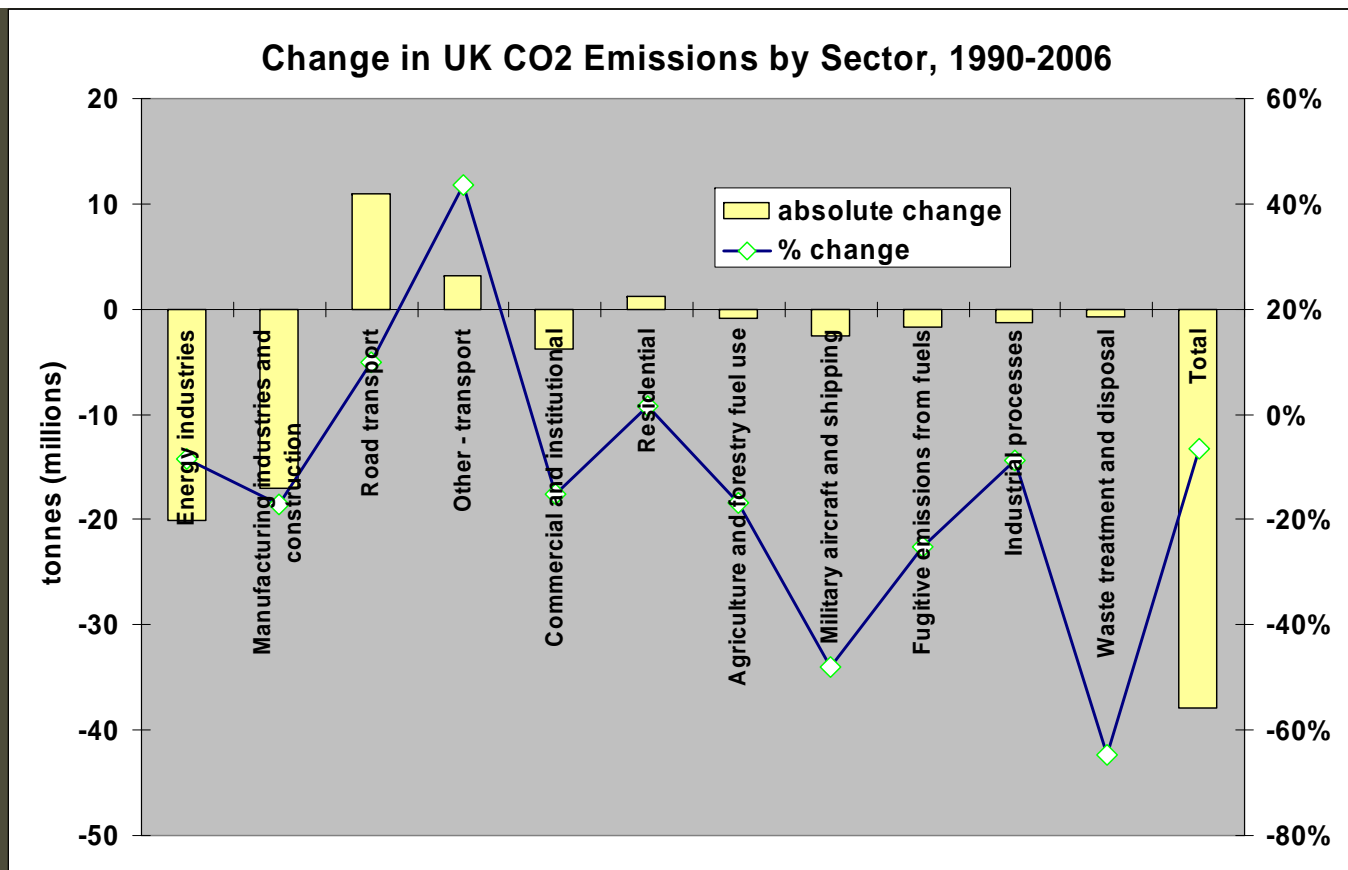
Major future energy pressures from the developed and developing world

# Trend in UK GHG and CO2 Emissions



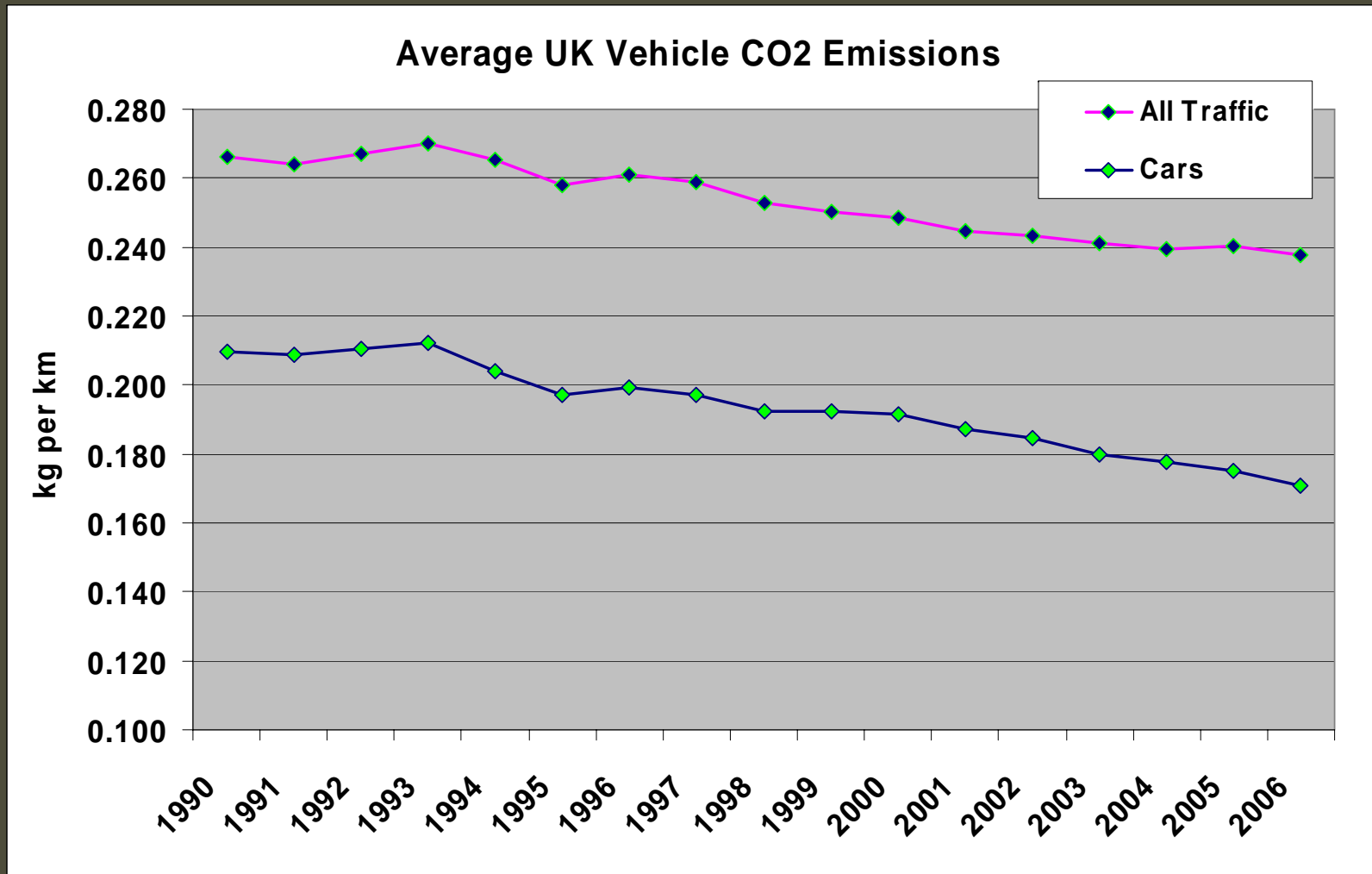
- Transport second biggest source of UK emissions
- Car accounts for around half the total, goods & buses 40% and others 10%

# Change in CO2 Emissions by Sector - Kyoto



- Total car emissions have reduced
- Emissions from all other modes have increased

# Changes in UK Vehicle Fleet Efficiency



# Emissions – Good and Bad?



# Emissions Reductions Targets

## International - Kyoto

- 5.2% GHG cut between 1990 & 2008/12, in 36 countries
- No USA, No developing countries
- Emissions trading based on 1990 levels
- UK Target of 12.5% cut

## EC Vehicle Standards – does not include CO<sub>2</sub>

- Voluntary target of 140g/km by 2008 – being missed
- EC pursuing binding targets of 125g/km by 2015

## UK Domestic

- 20% cut in CO<sub>2</sub> from 1990 by 2010 - missed
- Climate Change Bill – 60%-80(eighty)% cut by 2050
- Scottish Climate Change Bill - consultation

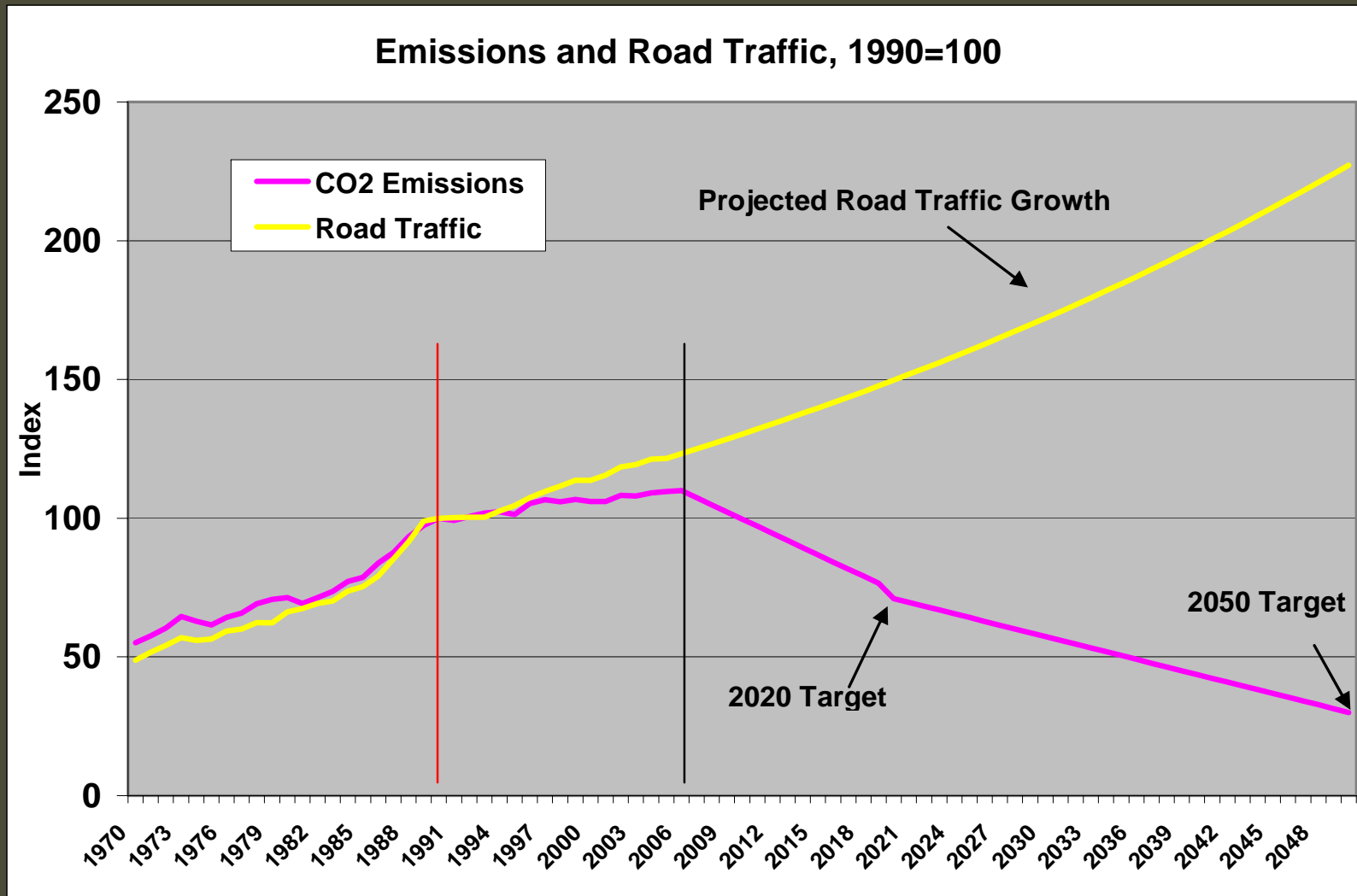
## International – future?

- Bali 2007, Copenhagen 2009?

# Climate Change - Response?

- Limited scientific opposition now
- Some economic opposition
  - What 'value' in reducing emissions – high cost for minimal impact
  - Money better spent elsewhere
- UK committing to up to 80% cut by 2050, but:
  - Transport sector emissions are growing
  - Demand for transport continues to grow – across all modes

# Road Traffic & Emissions Targets



# Climate Change targets - How do we Achieve them?

- Behavioural change – travel volumes and modal choices – in terms of the scale of change required
  - Would require dramatic and unpalatable measures
  - Can have an effect at the margin
- Technological change – improvements in vehicle efficiency and use of alternative fuels

# King Report

*"....in the long term (2050 in the developed world), almost **complete de-carbonisation of road transport** is a realistic ambition. If:*

- *substantial progress can be made in solving electric or other innovative vehicle and fuel technology challenges and, critically*
- *the power sector can be decarbonised and expanded to supply a large proportion of road transport demand,*

*....per kilometre **emissions reductions of around 90 per cent** could be achievable for cars."*

# Peak Oil

Very Simply:

- In short, 'peak oil' refers to the inevitable point in time when global oil production hits a peak and starts to decline
- A supply and demand issue

Essentially an economic issue centred on three questions:

- How much obtainable oil is left in the ground?;
- What is the capacity of the delivery systems to supply oil?; and
- What is the likely future demand for oil?

Currently not an issue for Government

# Present and Future Demand?

Present day production – 87mb/d

- Growing at 1.5%pa

Demand projections:

- The IEA's World Energy Outlook
  - 87mb/d (today) → 99mb/d (2015) → 116mb/d (2030)
- the US government's EIA projects 97mb/d (2015) and 118mb/d (2030)

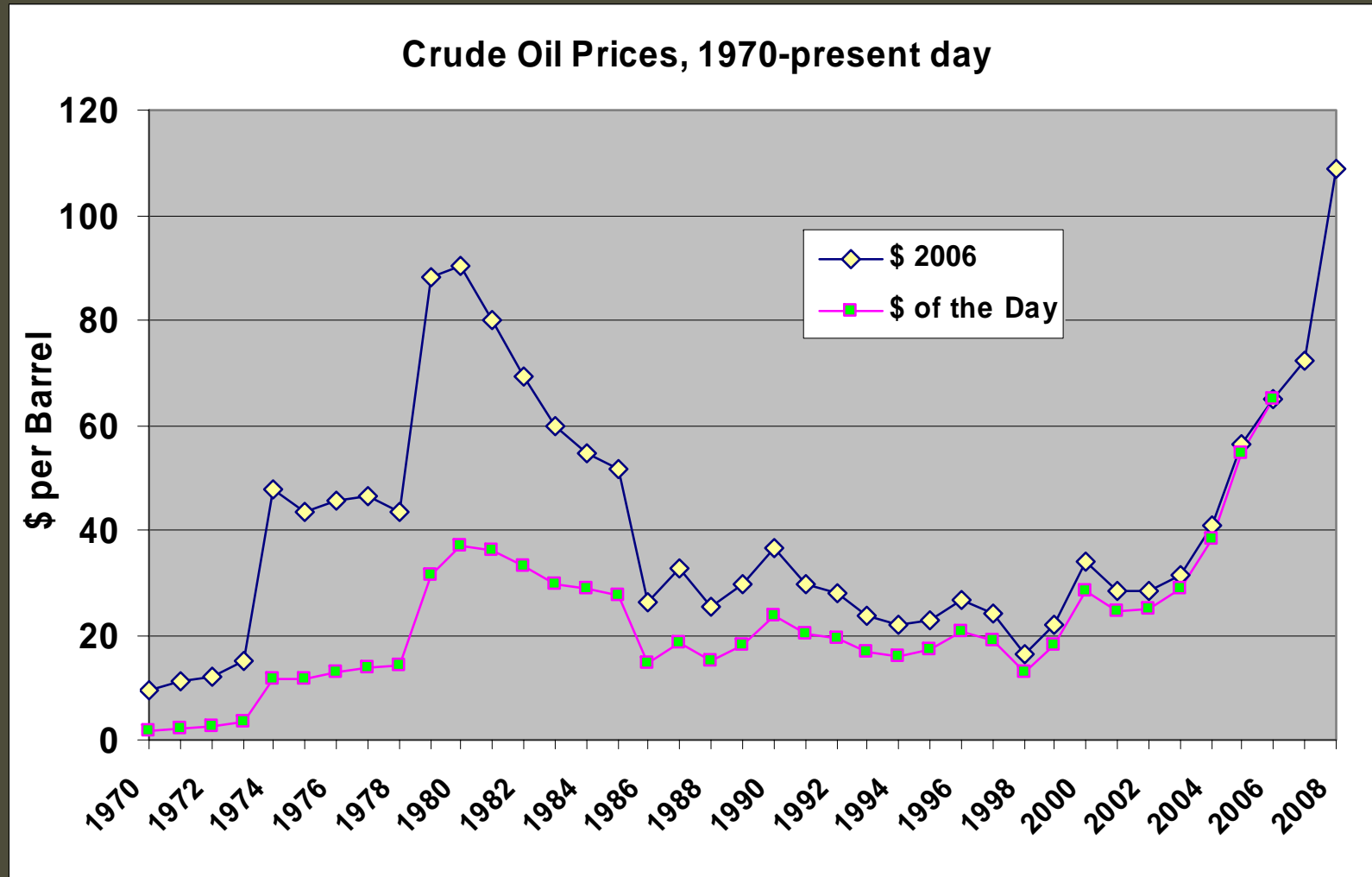
Can this demand be met – at affordable prices?

# Peak Oil - Doubts

- The discovery of new oil peaked in 1965 and we have been depleting since 1980
- Production has peaked in some countries
- Question marks over level of reserves
  - 1.2 trillion or 780m barrels?
- Other factors
  - Corporate write downs
  - OPEC reserves
  - Discoveries made since 1970s have been small
  - Declining production in some major fields
- Investment levels in new exploration / supply

**Oil industry & others would rebut all these doubts**

# Oil Prices 1970-present day



# Oil / Fuel Prices & Taxes

- Further oil prices rises could bring pressures to freeze or cut levels of fuel duty and VAT – ‘to keep the country moving’
- Fuel duty worth £23.5bn in 2006/07 – 5<sup>th</sup> highest source of income
- A 1p rise in income tax generates around £4bn
- Current assumptions used in forecasting travel demands (WebTag) are for continuing low fuel prices

# Summary and Conclusions

- Scenario Planning
  - Alternatives to business as usual
- Decarbonisation of the sector
  - Implications not yet thought through
- Climate Change Rhetoric
  - Serious measures – or wait for technology?
- Copenhagen 2009 – UK Climate Change Bill
- 'Pain' or no 'Pain'
  - Only time will tell

# 1966 and all that....

