

# Climate Change

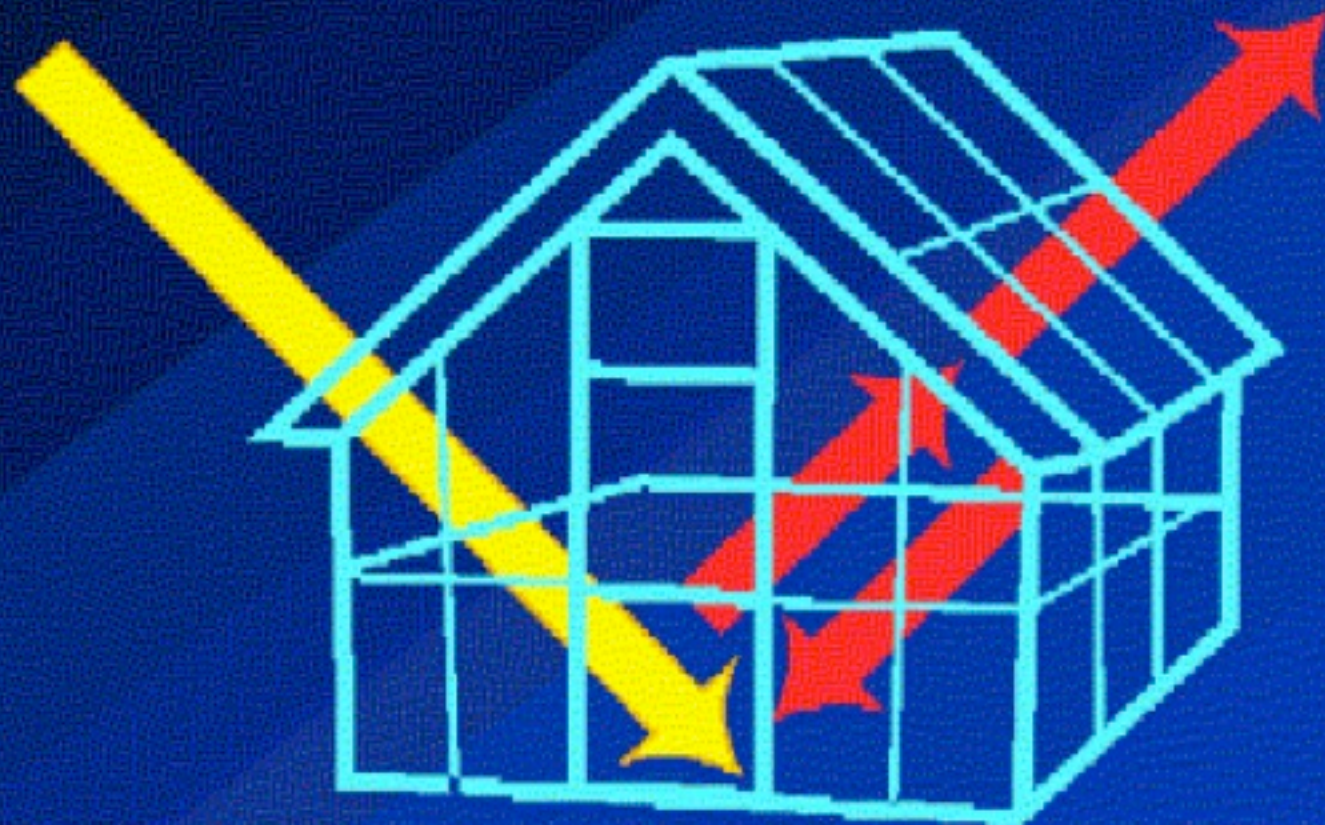
Some slides depicting the causes and effects

By Guy Beards, July 2009

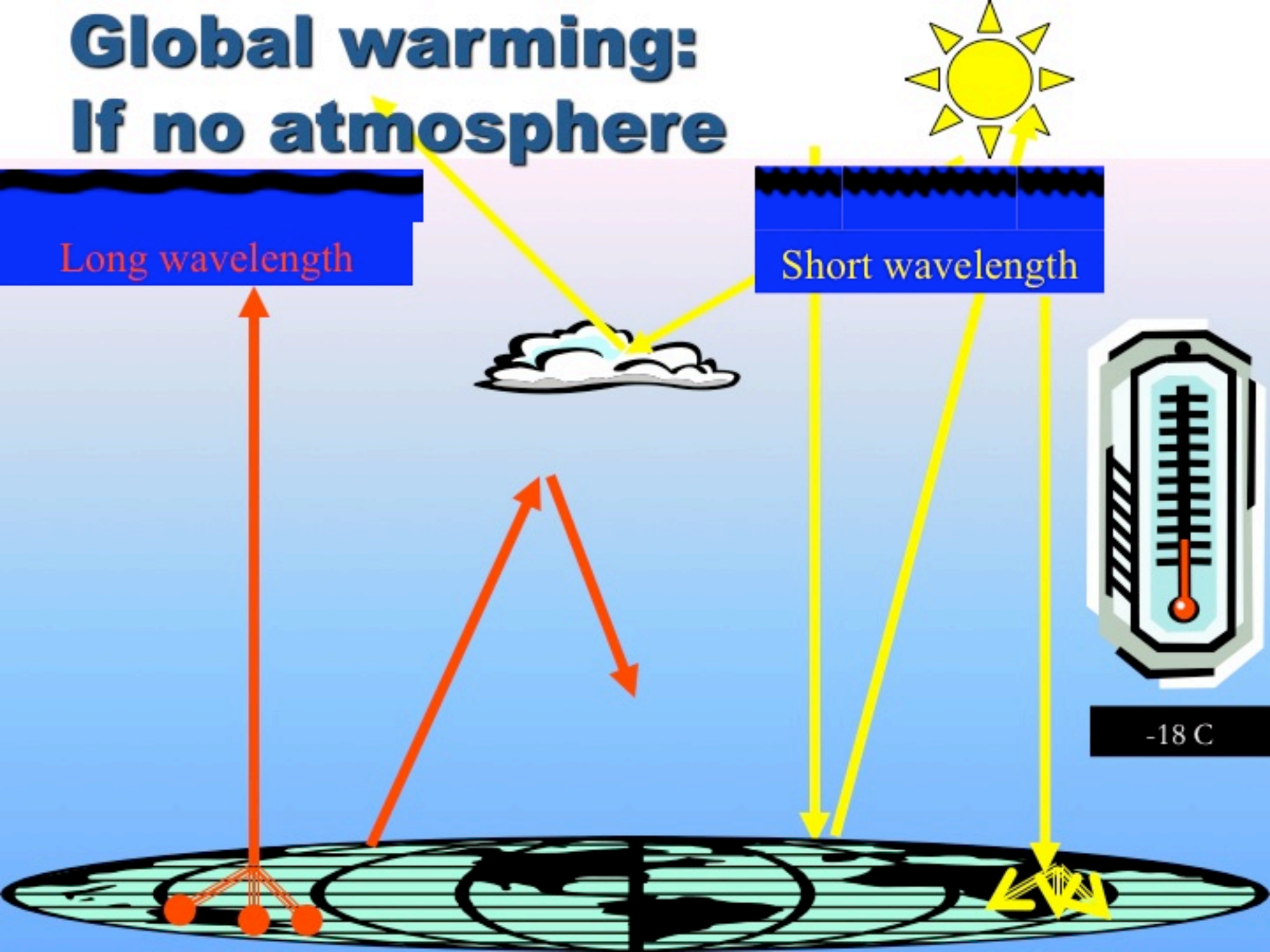
# THE GREENHOUSE EFFECT

Visible energy from the sun passes through the glass and heats the ground

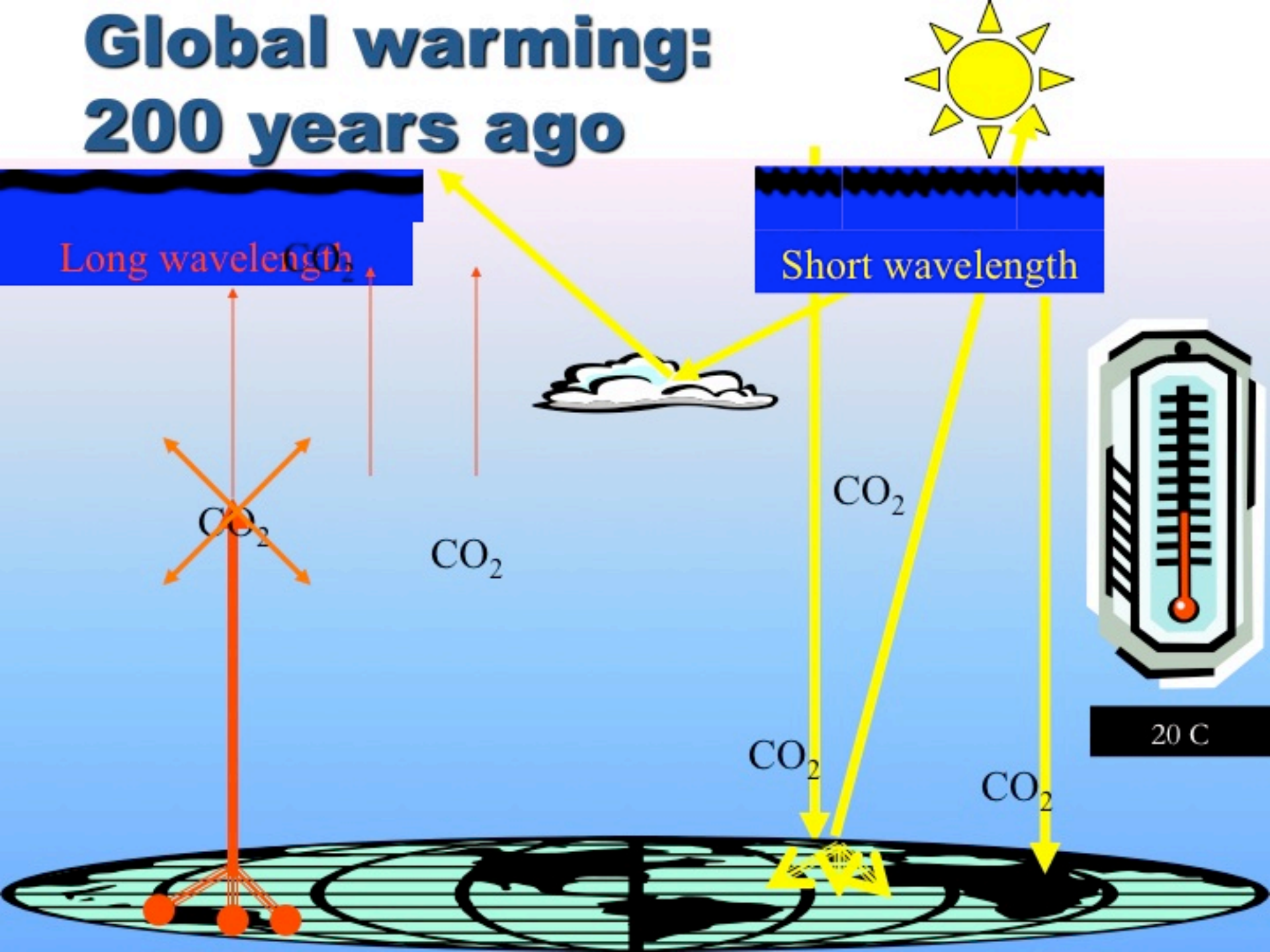
Infra-red heat energy from the ground is partly reflected by the glass, and some is trapped inside the greenhouse



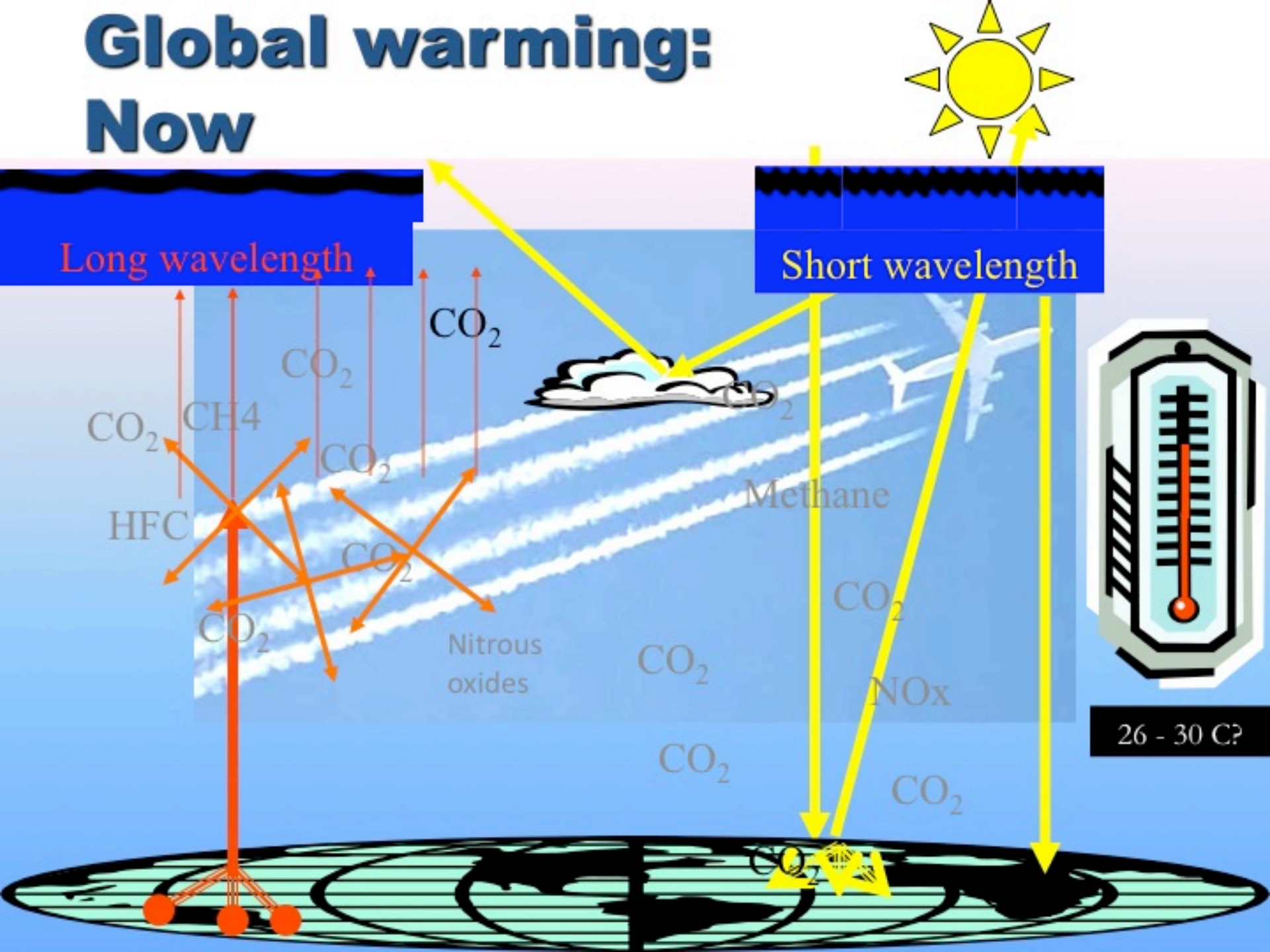
# Global warming: If no atmosphere



# Global warming: 200 years ago



# Global warming: Now



# The Main Greenhouse Gases

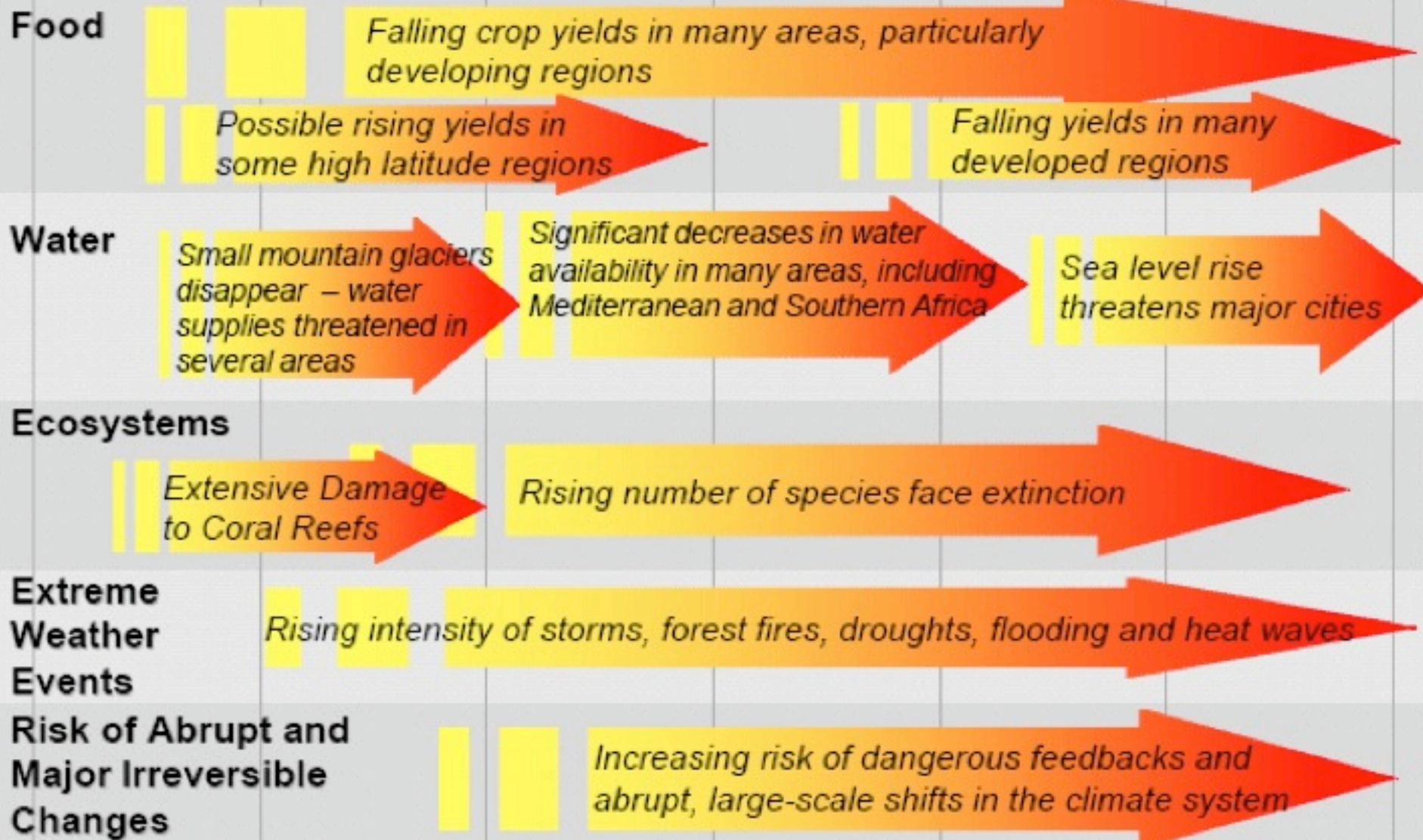
- Water vapour
- Carbon Dioxide
- Nitrous Oxide
- Methane
- Hydrofluorocarbons
- Perfluorocarbons
- Sulfurhexafluoride (SF<sub>6</sub>)



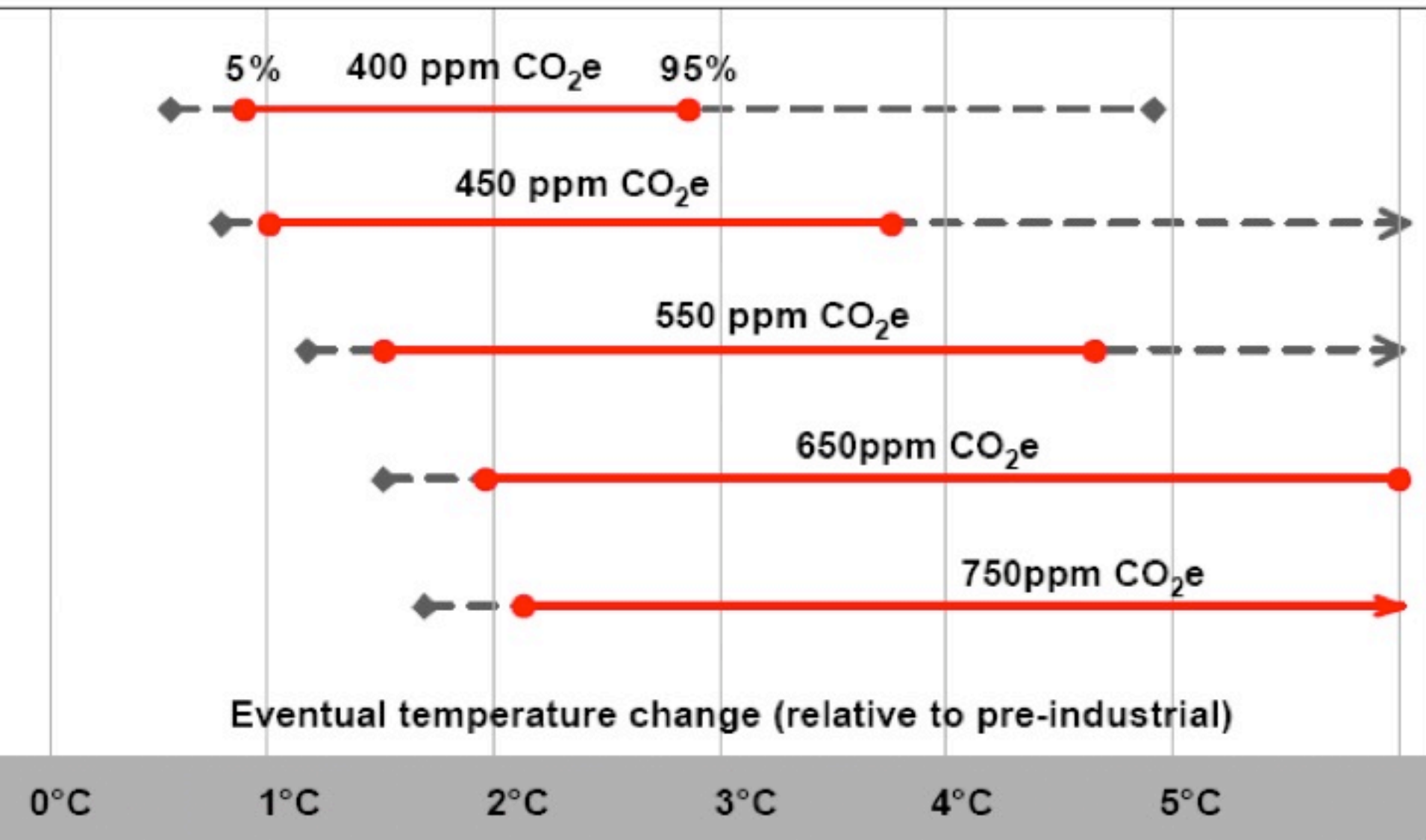
# Projected Impacts of Climate Change

Global temperature change (relative to pre-industrial)

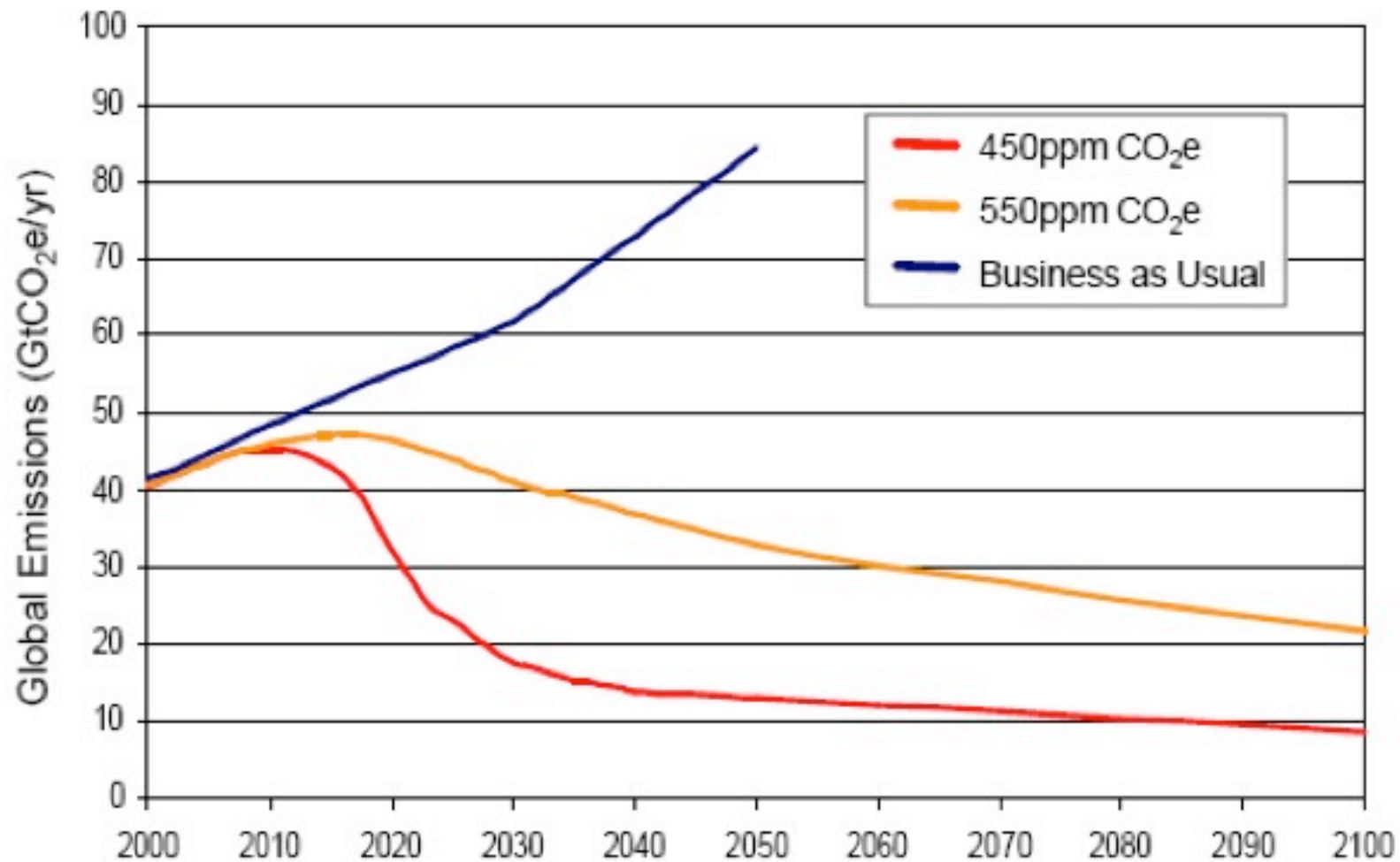
0°C      1°C      2°C      3°C      4°C      5°C



## Warming at various Co<sub>2</sub> concentrations

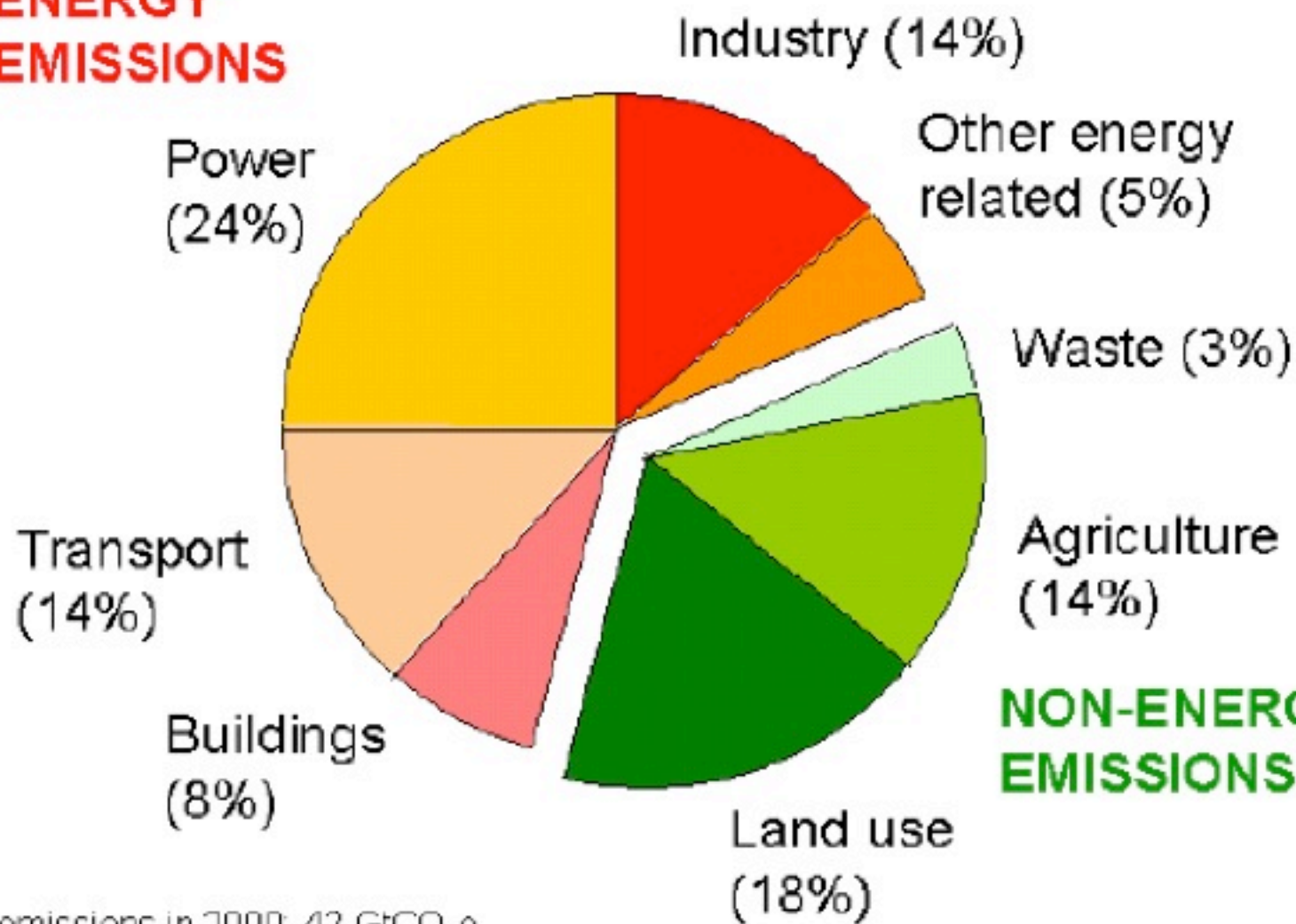


# Emissions Paths to Stabilisation



# Global Emissions by Sector

## ENERGY EMISSIONS



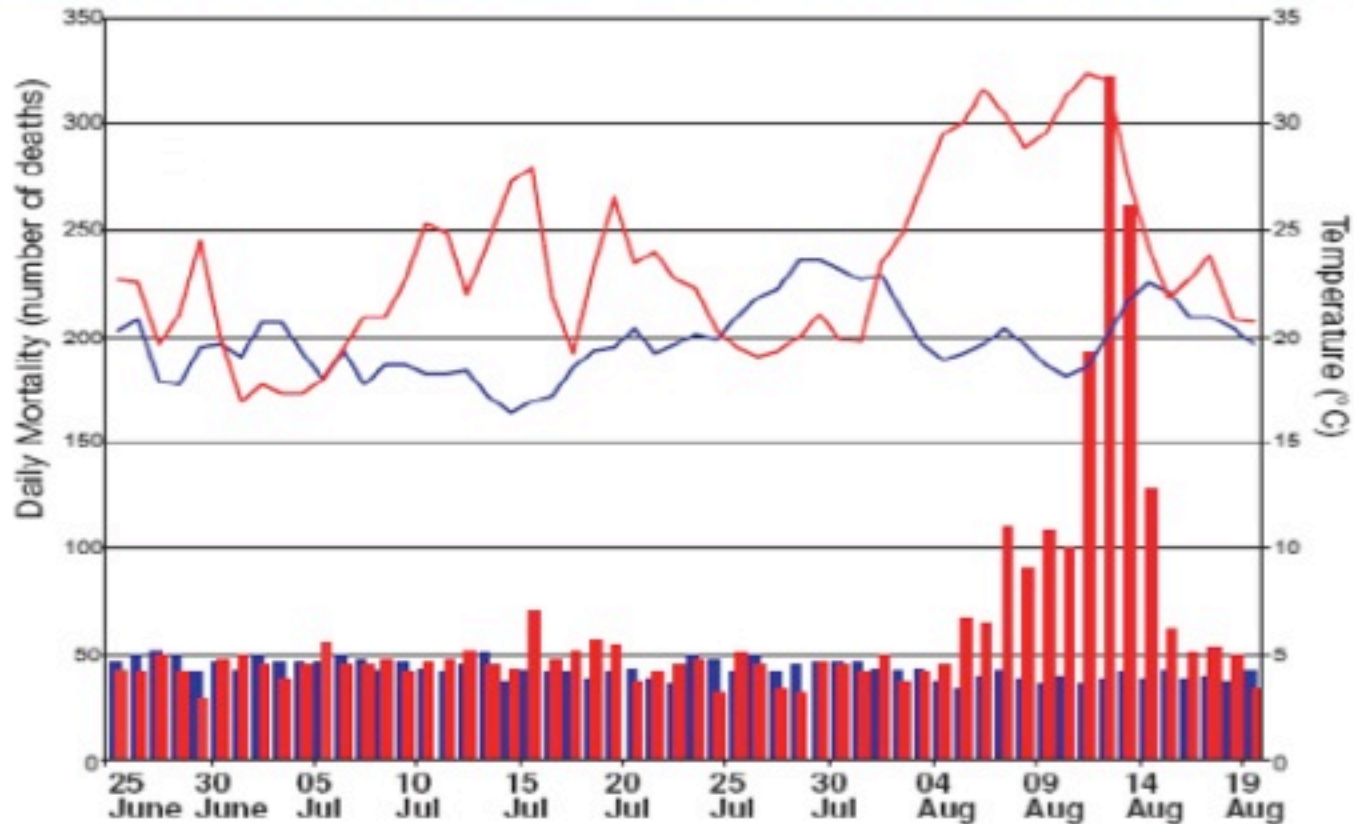
Total emissions in 2000: 42 GtCO<sub>2</sub>e.

# The Chacaltaya glacier and ski-lift, Bolivia

Skiing was no longer possible after 2004



# Daily mortality in Paris (summer 2003) (IPCC AR4 Ch 8)



- Mean Daily Mortality 1999-2002
- Mean Daily Mortality 2003
- Mean Daily Summer Temperature 1999-2002
- Mean Daily Summer Temperature 2003

# Risk of extinctions

- 20% - 30% of plant and animal species predicted to be at “increased risk of extinction” if global average temperatures rise by 1.5 – 2.5 Centigrade.
  - These figures from International Panel on Climate Change (IPCC)

# European Effects (2008)

- Already seen in Europe:
  - Retreat of glaciers
  - Lengthened growing season
  - Shift of species
  - Heat wave of 2003

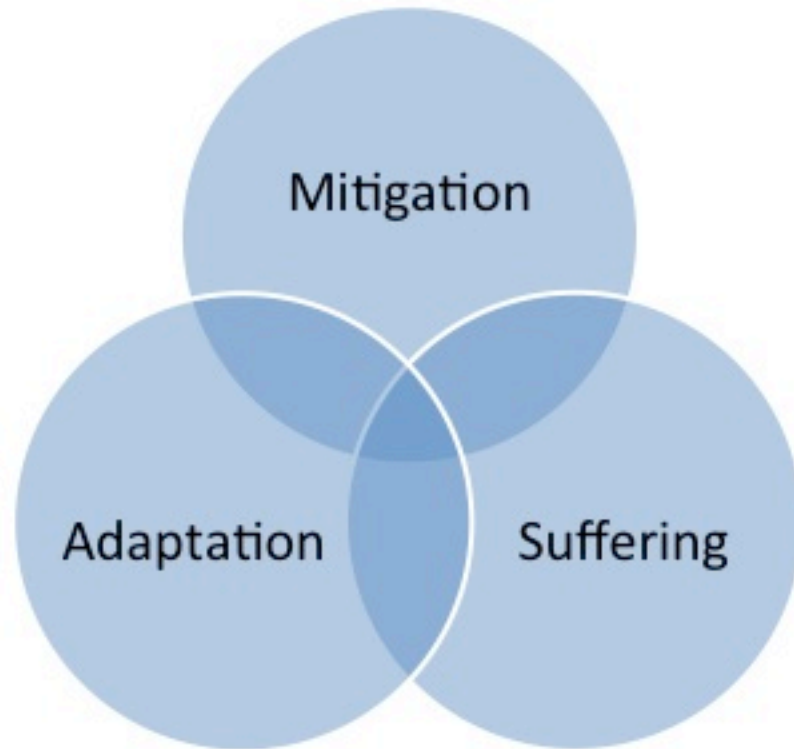
# European Effects (2008)

- Anticipated:
  - More winter floods in coastal regions
    - Storminess and sea level rise
    - 2.5 million people threatened each year
  - Snowmelt floods in Central & East
  - Flash floods
  - Drought and water stress
    - (contamination of water supplies)
  - Reduced frequency of extreme cold events

# European Effects (2008)

- Industrial and economic
  - Agriculture will have increasing water demand for irrigation
  - Peak electricity demand shift from winter to summer
  - Winter tourism damaged
  -

# Global Warming Choices



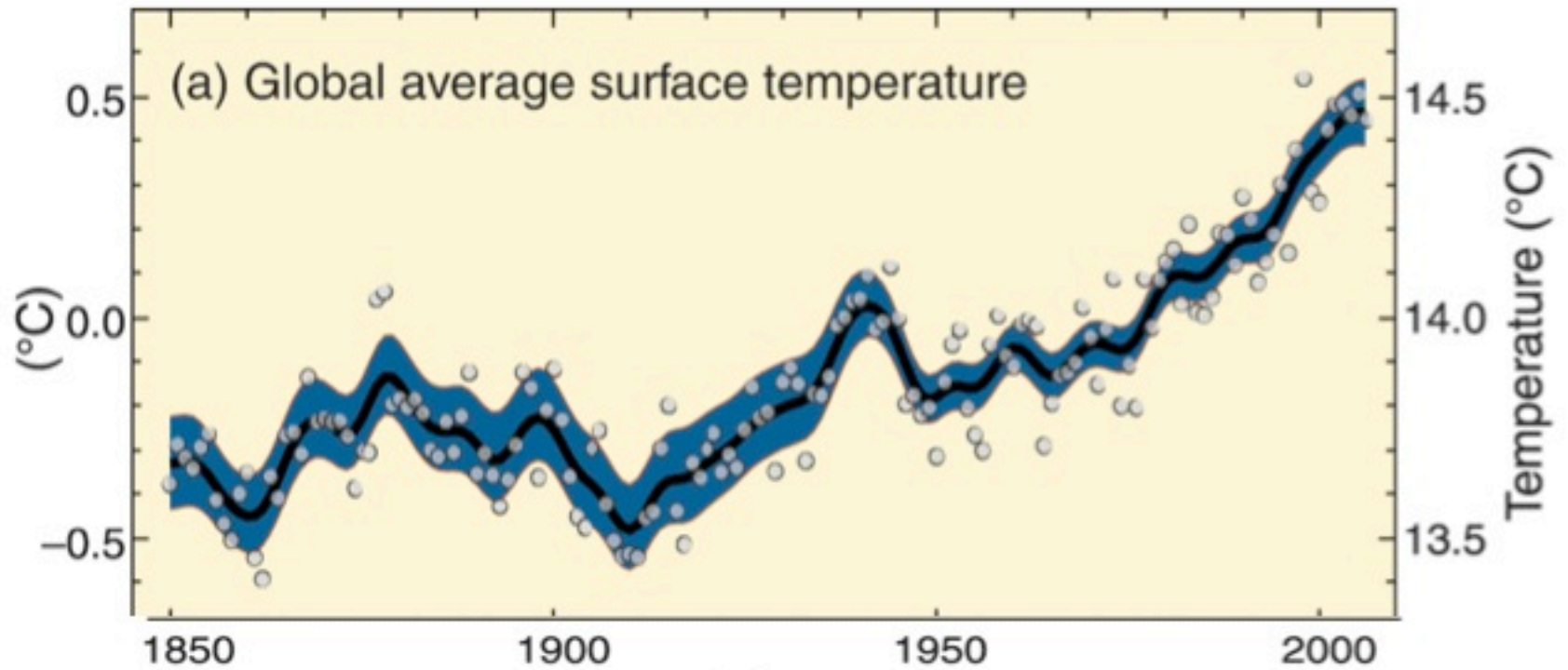
“The more mitigation we do, the less adaptation will be required, and the less suffering there will be.”

(Quote from Mr Jean-Pascal van Ypersele, IPCC Vice-chair)

# Is Global Warming real?

- Scientific consensus
  - <http://www.newscientist.com/article/dn11462>
- Evidence of its effects already
  - Drought, storms, extinctions
- Better safe than sorry
- Government policy
  - May as well believe!

# Jolly Hockey Sticks



Reference: [www.ipcc.ch](http://www.ipcc.ch), accessed Dec 08

# Understanding the UK's carbon footprint is the first step in reducing it.



Now let us help reduce yours.

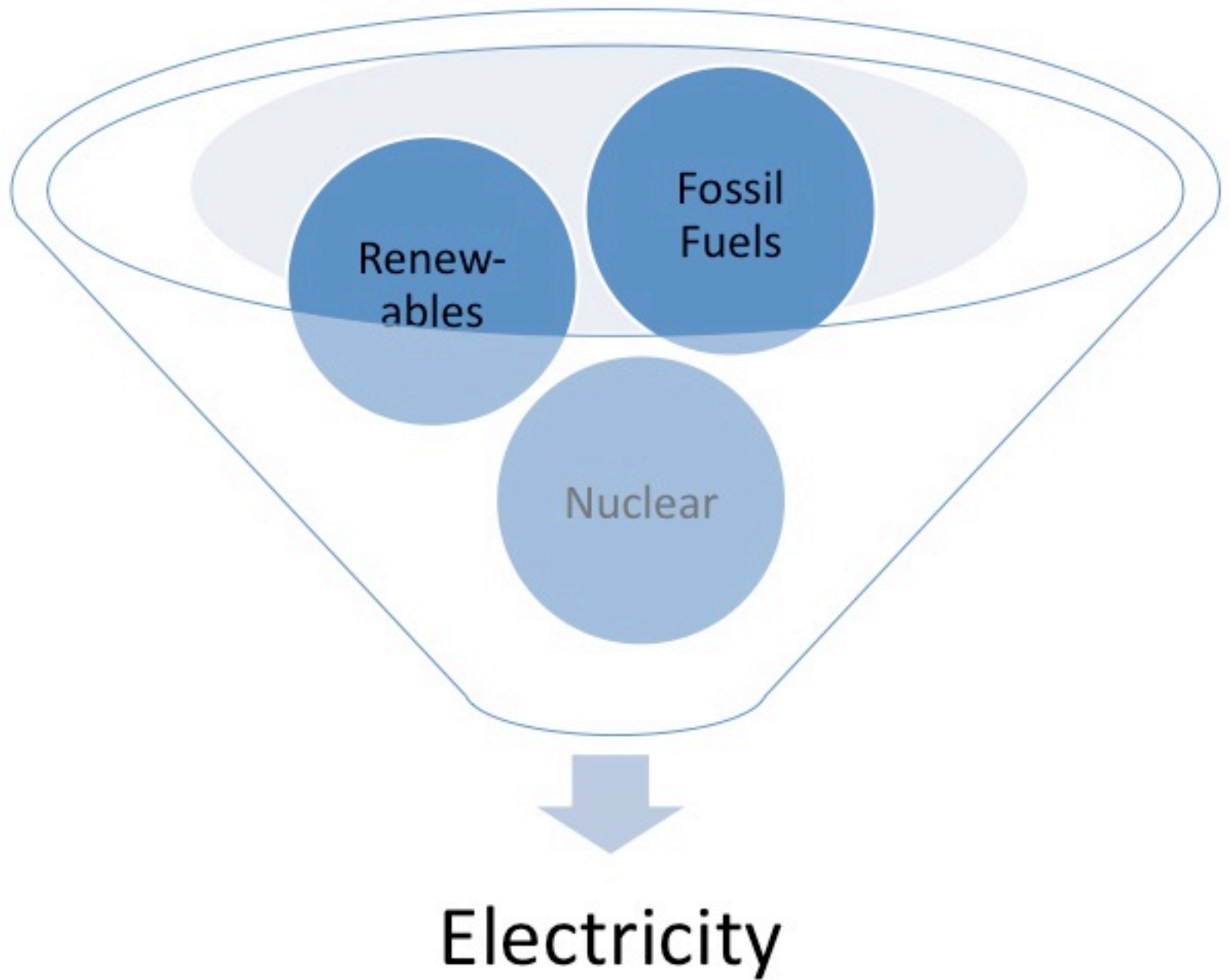
The UK's carbon footprint is 648 million tonnes CO<sub>2</sub>, the annual emissions embedded in everything we do\*. With the Carbon Trust, individual businesses can reduce their footprint through proven carbon management and by developing the lower carbon products and services that consumers will increasingly demand. This will not only benefit business but the UK as a whole. Call us today on 0800 085 2005 or visit [www.carbontrust.co.uk](http://www.carbontrust.co.uk)



\*Source: Carbon Trust Report (2008), "The carbon emissions generated in all that we consumed", using the UK Carbon Attribution Model, Centre for Environmental Strategy, 2008. The Carbon Trust is funded by the Department for Environment, Food and Rural Affairs, the Department of Trade and Industry, the Scottish Executive, the Welsh Assembly Government and Invest Northern Ireland.

# Energy impacts

- Contribution to global warming
- Consumption of resources
- Emission of sulphur dioxide, nitrous oxides and other gases, and particulates
- Security
- Nuisance
- Cost



# Energy: sources

- Fossil Fuels
  - National Grid
  - Local Generation
  - Emergency generators
- Renewable
  - Wind, solar, biomass, tidal, geothermal.
- Nuclear
  - Cost, safety, public perception

## Energy: government initiatives (1)

- Climate Change Levy
  - Arises out of international commitment to reduce global warming (Kyoto)
  - Tax, offset by reductions in National Insurance Contributions
  - Varied rates, dependent on green house gas emission rates of energy source
  - E.g. 01.5 p for gas, 0.43 p for electricity, 0.07 p for LPG (all per kWh, 2005 rates)
  - Agreements available to lesson the impact

# Energy: government initiatives (2)

- Climate Change Act
  - Legally binding targets for GHG emissions
    - 34% of 1990 levels by 2020
    - 80% of 1990 levels by 2050
    - 5 year 'Carbon budgets'
    - Can use 'International Credits' to help achieve these targets
    - Company reporting on GGHG emissions (to come)