

# Renewable Energy

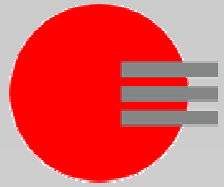
Jeremy Rawlings

Consultant in Building Integrated Renewables

**THE NATIONAL ENERGY FOUNDATION**

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

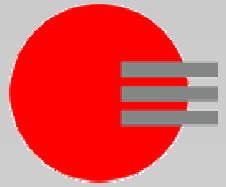




# National Energy Foundation

- An independent educational charity.
- Works with organisations to promote
  - energy efficiency
  - renewable energy
- Works with schools
- Provides training
- Consultancy service

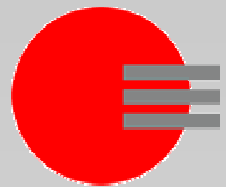




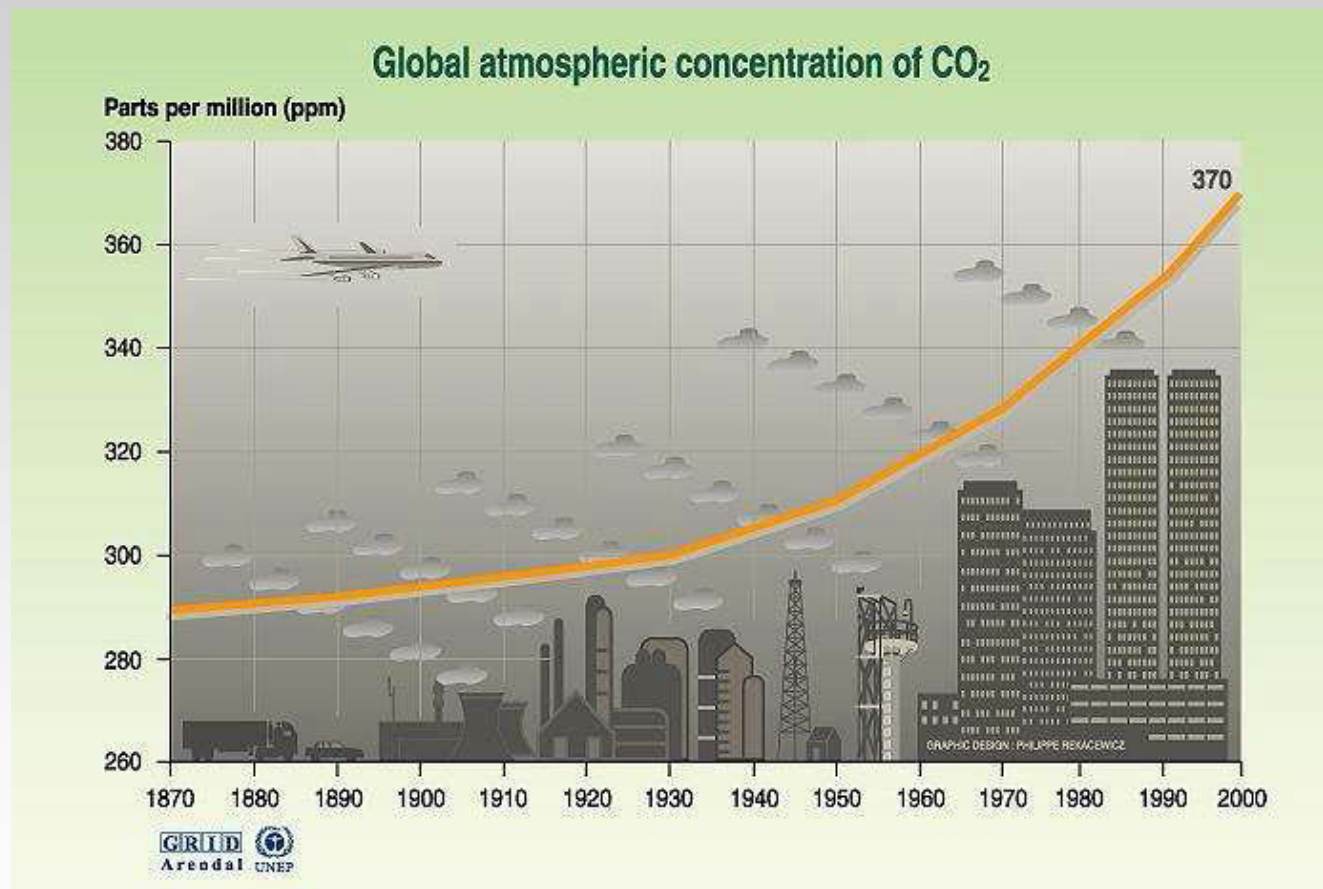
# Green House Gases

- Carbon Dioxide
- Water Vapour
- Methane
- Nitrous Oxide



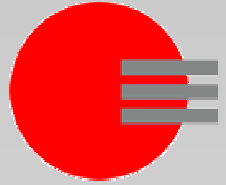


# How has CO<sub>2</sub> level changed?



Sources: TP Whorf, Scripps, Mauna Loa Observatory, Hawaii, institution of oceanography (SIO), university of California La Jolla, California, United States, 1999

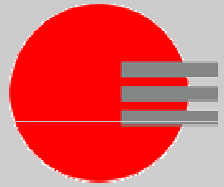




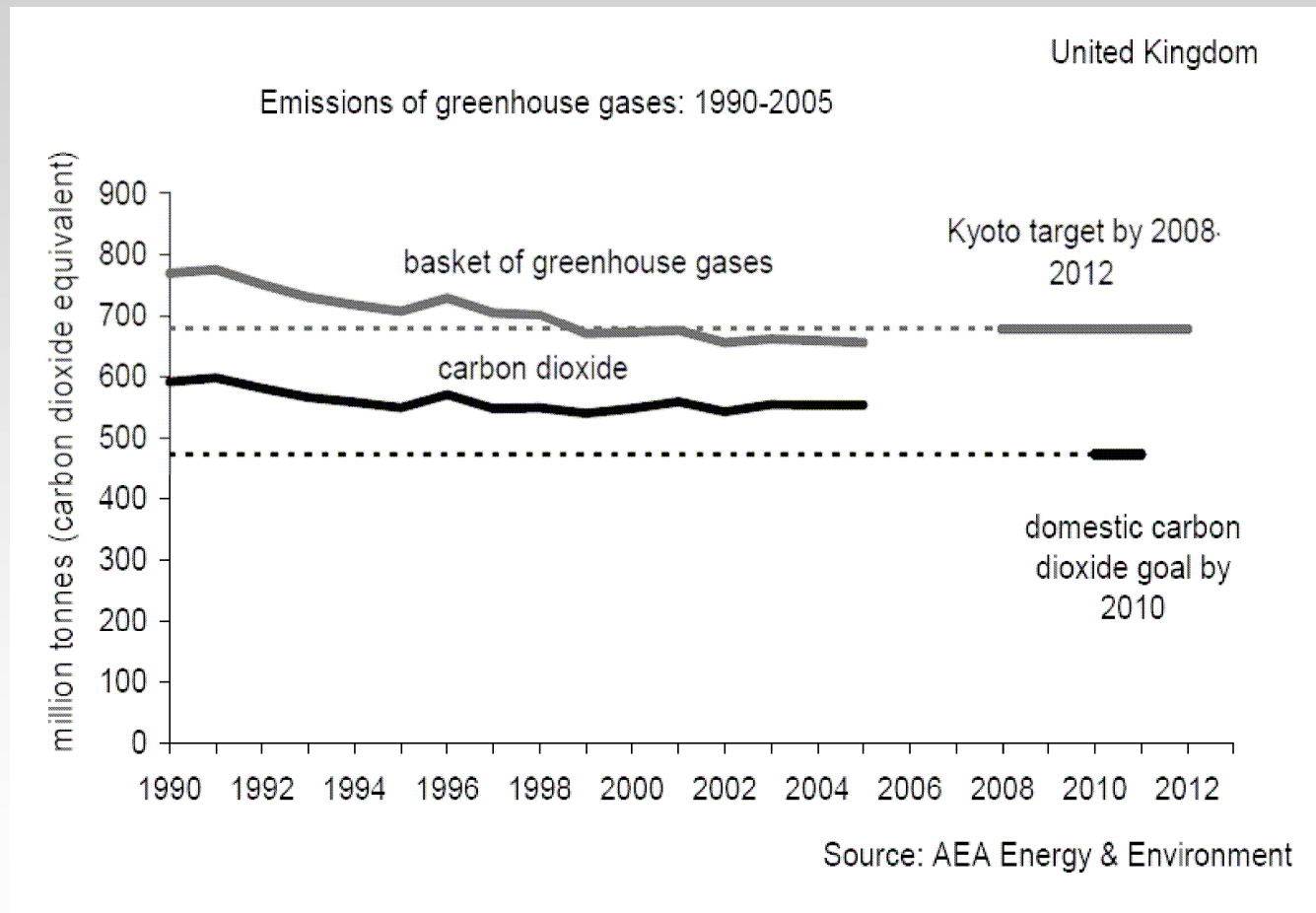
## So what?

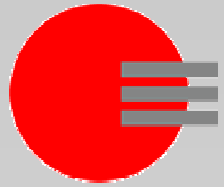
- Increasing global air and ocean temperatures
- Rising global average sea level
- Reductions of snow and ice





# UK Progress

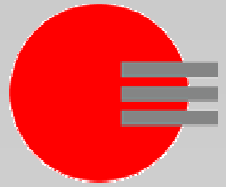




# The Energy Hierarchy

Mayor's Energy Strategy includes a three-step Energy Hierarchy :

- Step 1 Use less energy (*be lean*)
- Step 2 Use renewable energy (*be green*)
- Step 3 Supply energy efficiently (*be clean*) – Where it is not practical to use renewable energy, energy should be supplied as efficiently as possible e.g. through Combined Heat & Power systems  
(from the London Mayor's Energy Strategy)



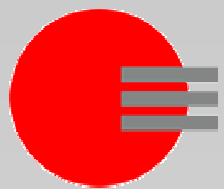
# Renewable Energy

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Renewable technologies:

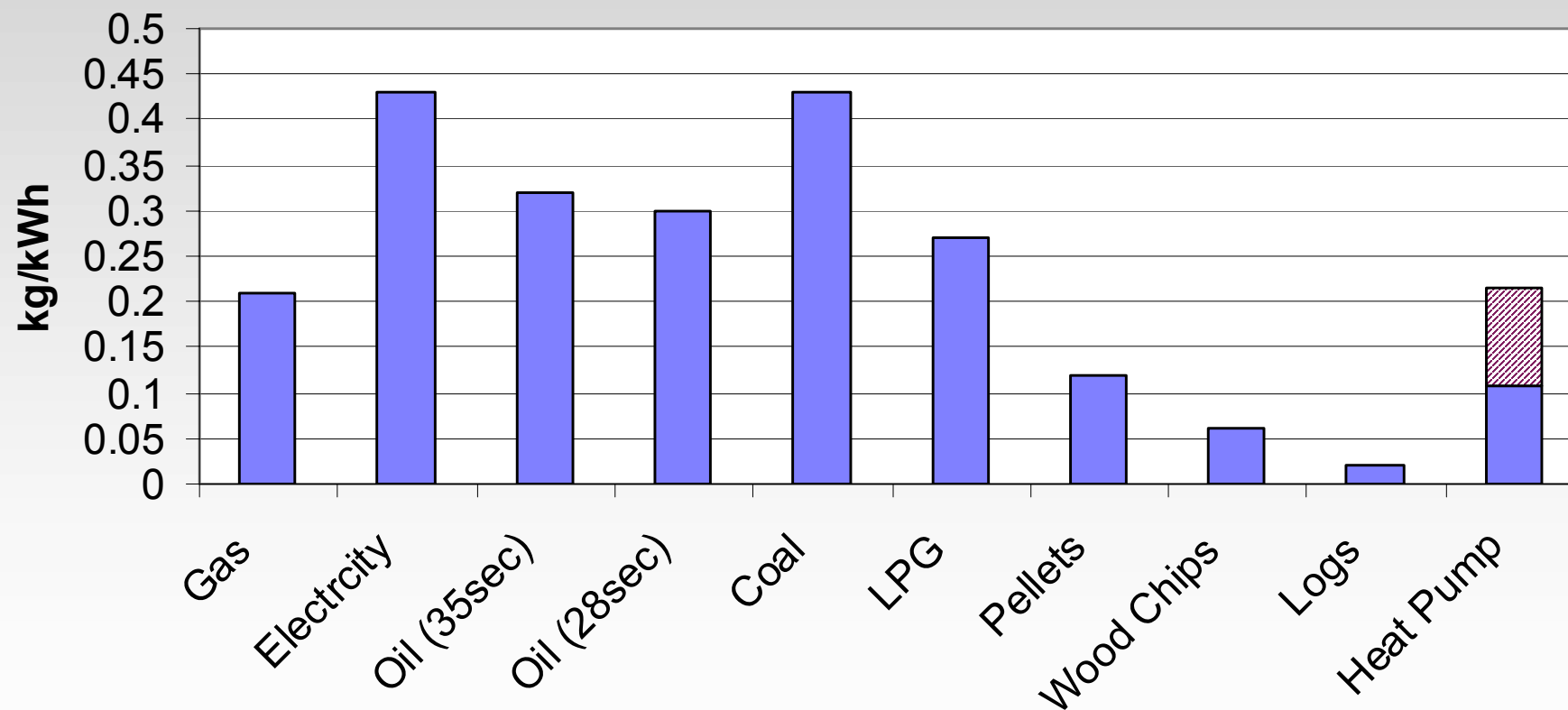
- Photovoltaics
- Solar thermal
- Heat pumps
- Biomass
- Wind

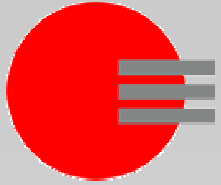




# CO<sub>2</sub> Emissions (kg/kWh Including conversion efficiency)

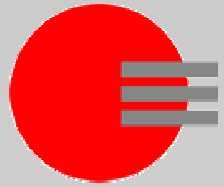
## CO<sub>2</sub>/ delivered kWh for Different Fuels





# Average Household Consumption

- For electricity – 3,300kWh BUT large variation – average single household 3,000kWh; working couple 4,000 and family with two children (parents working, children at school) 5,500kWh – consider wealth
- Gas – 18,000kWh



# What does a tonne of CO<sub>2</sub> look like?

**One** tonne of CO<sub>2</sub> would fill **six** Double Decker buses

