An aerial photograph of a densely populated city, likely London, with a hazy, overcast sky. The city's buildings and streets are visible in the foreground and middle ground, while the background is obscured by a thick layer of haze or smog. A dark blue rectangular box is superimposed over the center of the image, containing white text.

**Analysis of the air quality impacts  
of  
potential CCC scenarios**

*Helen ApSimon and Tim Oxley*

*Centre for Environmental Policy, Imperial College London*

# **Committee on Climate Change, CCC:**

**What are the co-benefits (or any disbenefits) of energy scenarios with climate measures?**

**-> project on difference between**

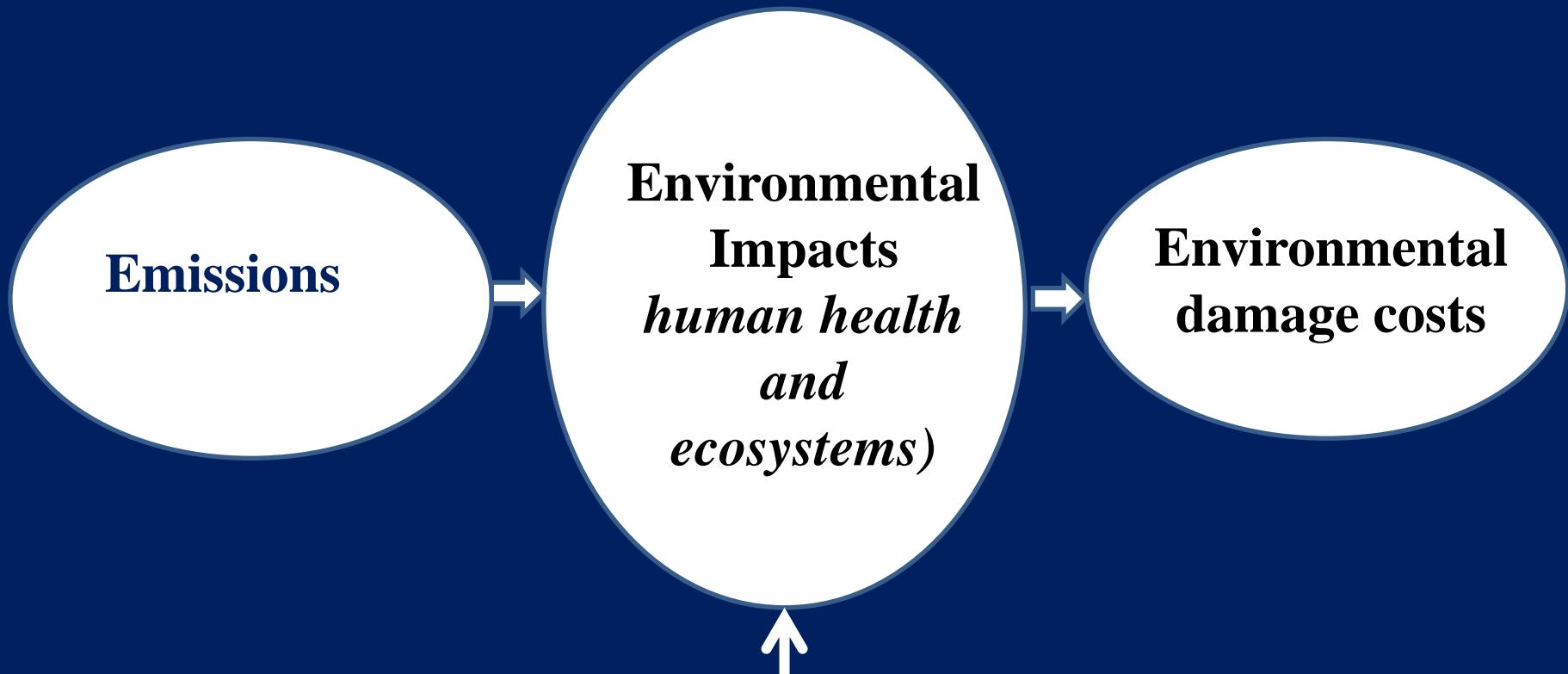
**1)no climate action scenario 2010-2030 ( power sector conventional energy generation)**

**&**

**2) Climate action scenario (4<sup>th</sup> C budget) power sector diverse energy mix+ changes in heat,transport,residential, non-residential and industry**

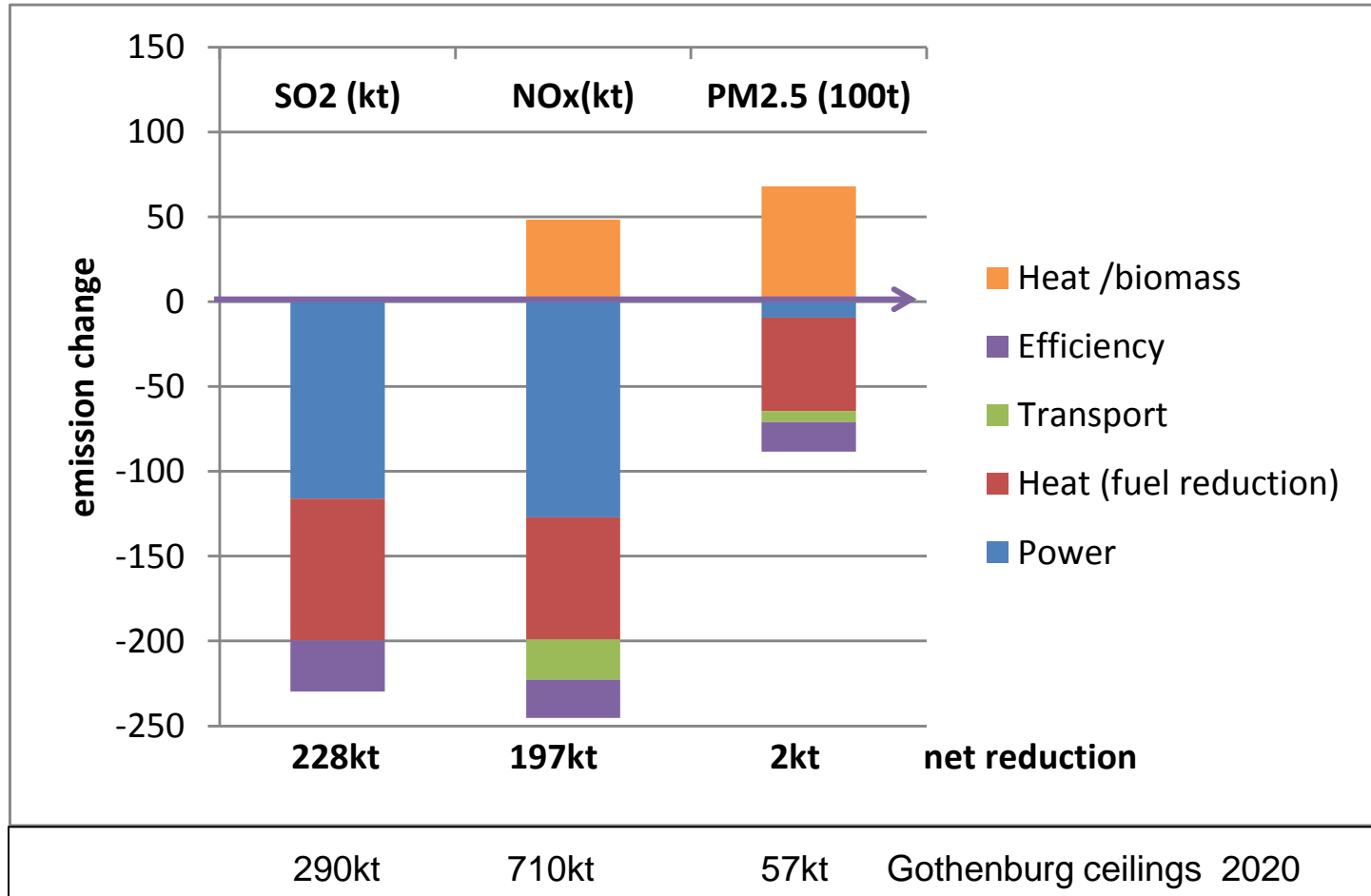
# RAPID

## Rapid Air Pollution Impacts Diagnostics tool



*Impact factors derived from UK Integrated Assessment Model. UKIAM*

# Reductions in emissions of air pollutants



Improvement in emissions relative to “no action” in 2030

## Environmental impacts

**Reduction in acid deposition ~ 3000 Meq** (*~12% proj. dep 2020*)

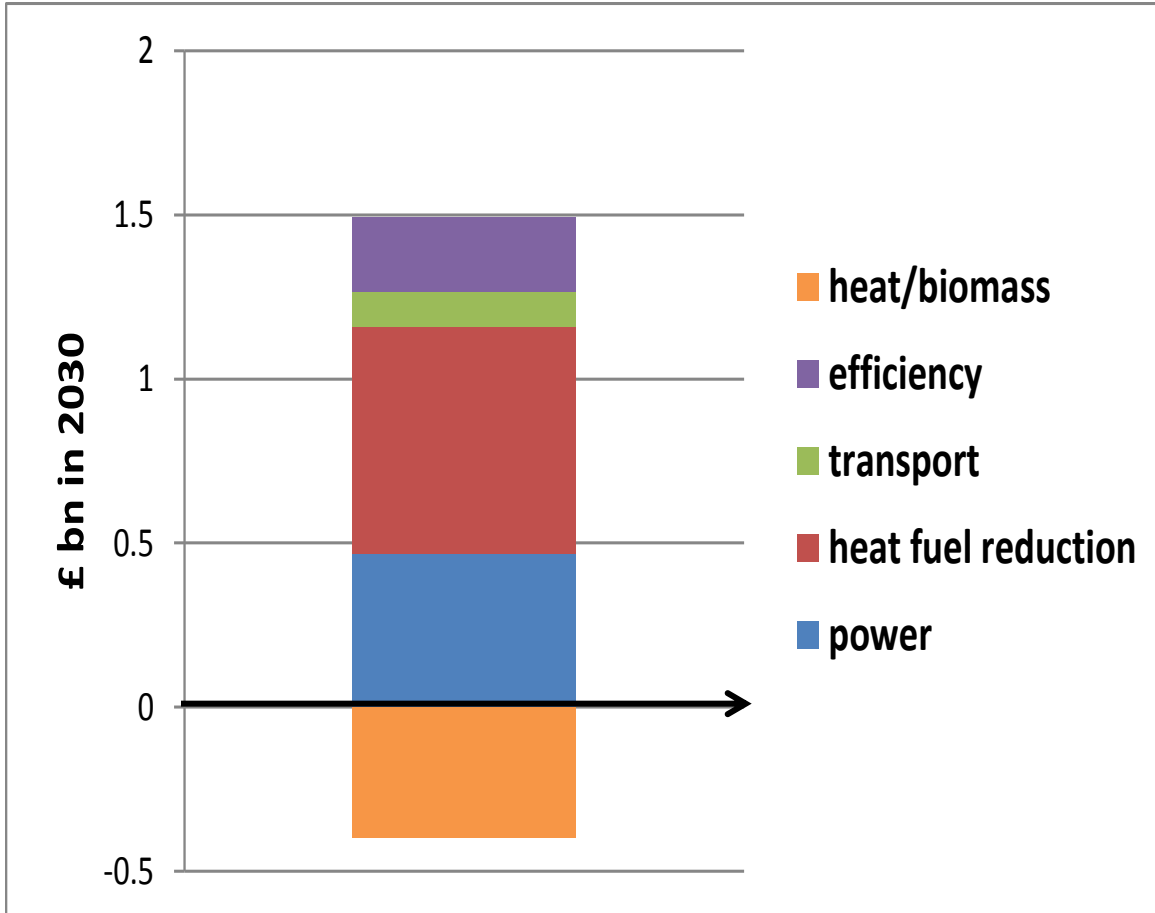
**Small improvement eutrophication ~10 kt N deposition** (*not enough to protect natural ecosystems and biodiversity. N dep 2020 ~260 kt N*)

**Reduction in population weighted NO<sub>x</sub> concentrations ~1 μg/m<sup>3</sup>**

**Reduction in population weighted PM<sub>10</sub> concentration ~ 0.5 μg/m<sup>3</sup>**

***NB PM<sub>10</sub> and NO<sub>x</sub> : very dependent on heat biomass v other fuel savings in heat sector***

# Costing of environmental benefits



**Environmental benefits in 2030: net £1.1 bn**

**Cumulative benefits  
2010-2030**

**Net present value**

**£5.5 bn**

*NB uncertainty re  
biomass*

*Excludes benefits re  
ozone, ecosystems*

# Exploratory agricultural scenarios- dietary changes

## Reductions in NH<sub>3</sub> emissions from agriculture

**Scenario 1: 50% reduction in animal products (40% dairy & eggs, 64% meat) -> 100 kt reduction NH<sub>3</sub> (~45% *agric. emissions*)**

**-> significant reduction in eutrophication of ecosystems and protection of SSSIs (*47% ecosystems at risk to 28%*)**

**-> reduction population weighted PM<sub>10</sub> concentration .16 µg/m<sup>3</sup> (*~£200 m per year in health costs*)**

***Scenarios 2 and 3 change from red to white meat; and 50% reduction in white meat, to smaller changes 14% and 10% reduction in agric. NH<sub>3</sub> emissions respectively***

# CONCLUSIONS

**The CCC climate action scenario implies substantial benefits for air quality in general, but caution about biomass in heat sector**

**More work needed re non CO2 gases**

*CCC report to be published on 11 December together with this report and Ricardo-AEA report on broader externalities- see CCC website [www.theccc.org.uk](http://www.theccc.org.uk)*