Integrated Assesment Modelling in the UK

Integrated assessment modelling at Imperial College began with the ASAM model (Abatement Strategies Assessment Model) at the European scale, applied in parallel with IIASA and the RAINS model during development of the second sulphur protocol and Gothenburg protocol. During this time we concentrated particular emphasis on NH3 and agriculture, and on particulate matter (which was not then within the remit of CLRTAP). The subsequent development of IAM modelling at the UK scale, the UKIAM model, was aimed at exploring attainment of UK emission ceilings while also meeting other environmental objectives, including urban air quality and human health as well as natural ecosystems. Nested within the European scale ASAM modelling, UKIAM operates at a 5x5km resolution, currently being refined to a 1x 1 km grid for London and other major cities. This is also linked to the BRUTAL transport model for the UK road network to provide roadside concentrations with respect to air quality limit values, and to explore non-technical measures affecting traffic volumes and composition as well as straight technical measures. We have also continued to work on NH3 using detailed UK data, and drawing on the UK research activities on the N cycle.

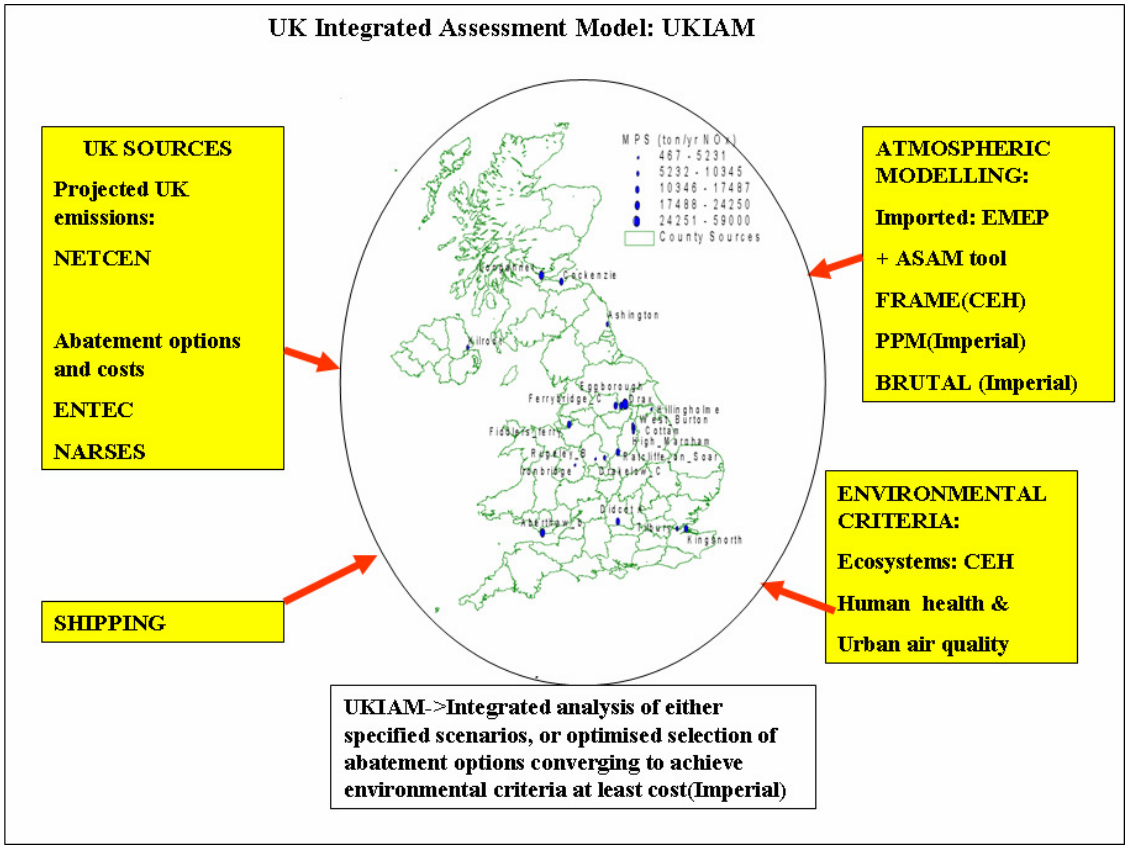

Figure 1: Components of the UK Integrated Assessment Model, UKIAM

The UK National Focal Centre for Integrated Asessment Modelling links the work at Imperial College with UK research on atmospheric modelling (CEH and the Met Office),

ecosystem protection and critical load mapping (CEH); and with AEA Technology on emissions and the UK National Atmospheric Emissions Inventory (NAEI); also with ENTEC on abatement measures and their costs. A new consortium project with these partners is just starting with emphasis on linking air quality and greenhouse gas emissions. This project will investigate different scenarios for energy, transport and agriculture in the UK up to 2020 and beyond, set in the context of broader European scenarios, including shipping.

Table 1. Air quality pollutants covered, and maps generated over the UK. To these CO2, CH4 and N2O emissions are being added weighted by GWP, starting with the transport sector.

pollutant	map	application
SO2 NOx NH3	S deposition(by ecosystem type) Oxidised N deposition Reduced N deposition	Acidification exceedance maps *Can be broken down by ecosystem type if required; also used with target loads from dynamic modelling*
NOx NH3	Oxidised N deposition Reduced N deposition	Eutrophication exceedance maps *Again can be total or by ecosystem type*
SO2 NOx NH3	Sulphate aerosol Nitrate “ Ammonium “	Secondary inorganic aerosol. SIA as part of PM10 (PM2.5); pop. Weighted mean concns.
Primary PM	Primary PM concentrations	Urban background and roadside enhancement of PM10 (PM2.5), population weighted mean concn re health effects
NOx	NO2 concentrations	Urban background and roadside concns. Exceedance AQ annual limit values

Further information:

Oxley, T., ApSimon, H., Dore, A., Sutton, M., Hall, J., Heywood, E., Gonzales del Campo T., & Warren, R.(2003) The UK Integrated Assessment Model, UKIAM: A national scale approach to the analysis of strategies for abatement of atmospheric pollutants under the Convention on Long-Range Transboundary Air Pollution, Integrated Assessment, 4(4), pp 236-249

Also new website imminent. http://www3.imperial.ac.uk/environmentalpolicy/research/iau

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