



Modelling the impact of energy transitions on air quality

Carlijn Hendriks, Jeroen Kuenen, Richard Kranenburg, Joost Beltman, Martijn Schaap

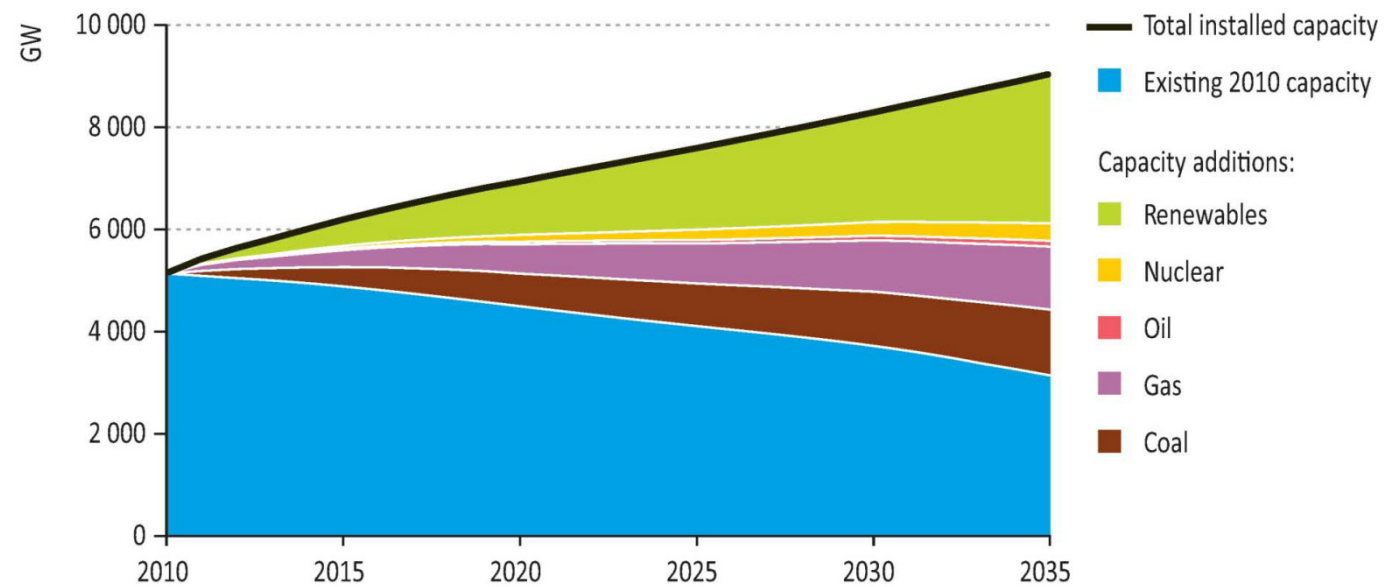
TFIAM workshop – 7-9 May 2012, Bilthoven





Introduction

- › Energy system transition
- › Air quality impacts of energy use
- › Source Receptor Matrices

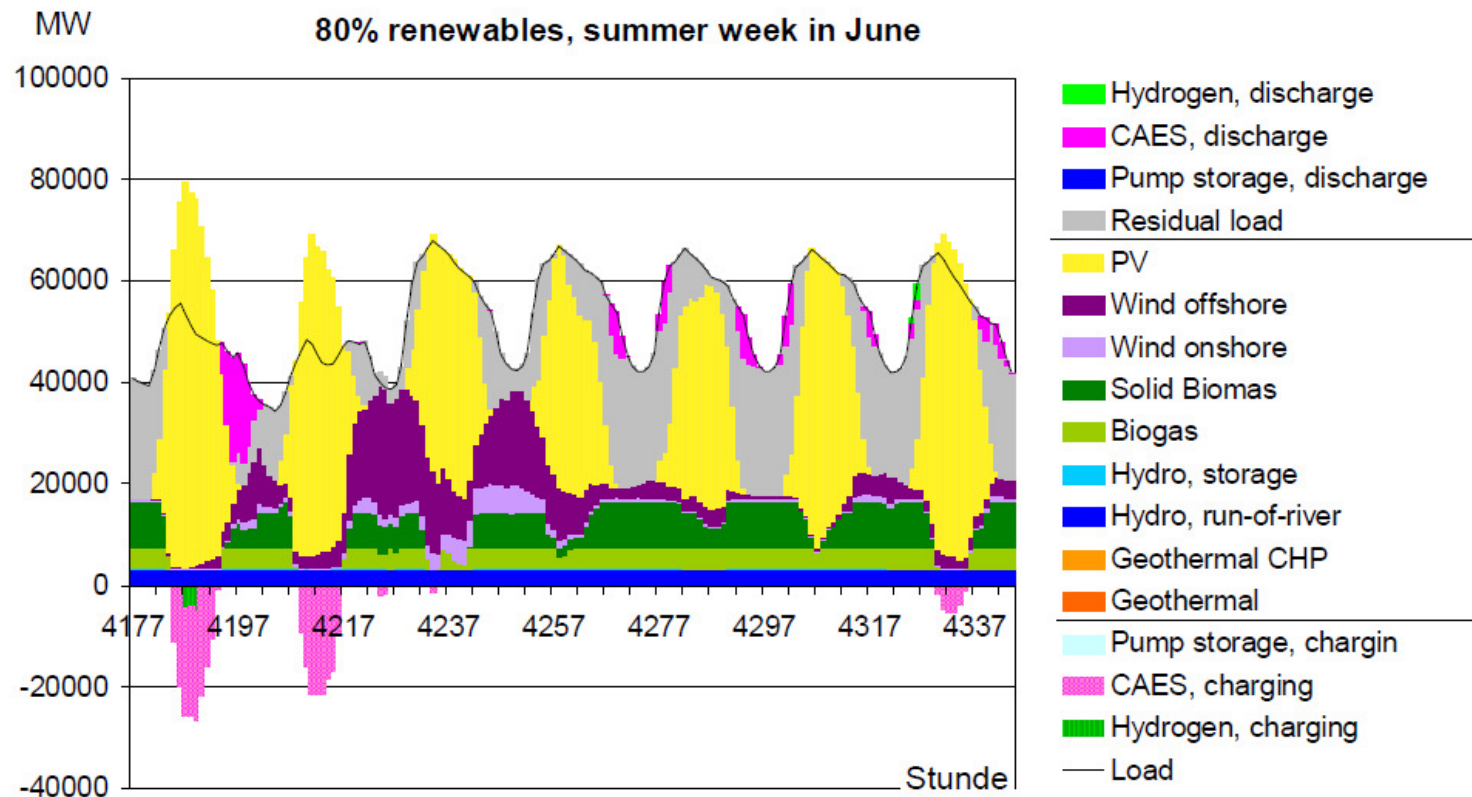


World Energy Outlook, 2011





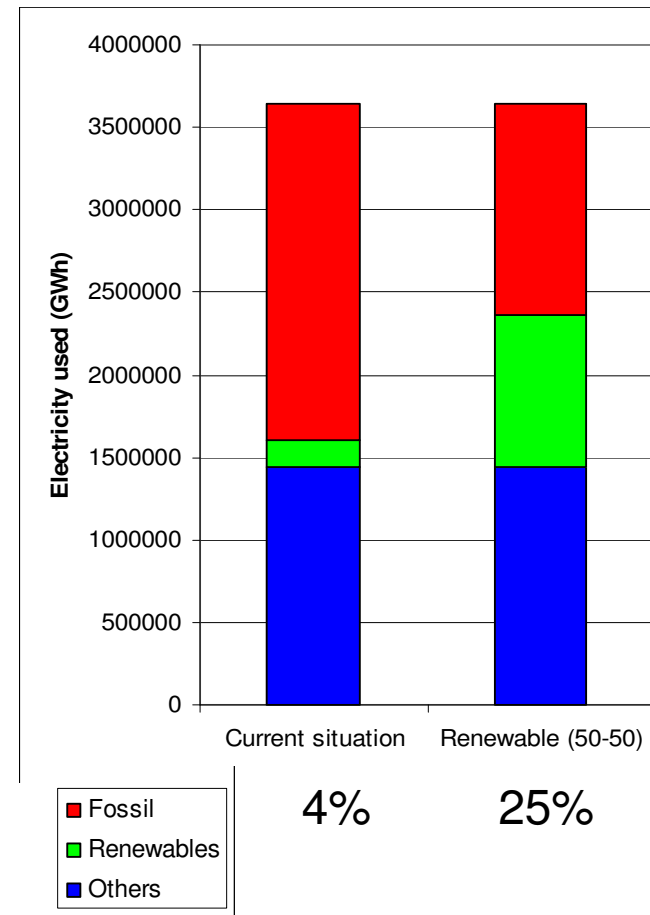
Changing energy system





Testing validity SRMs – experiment setup

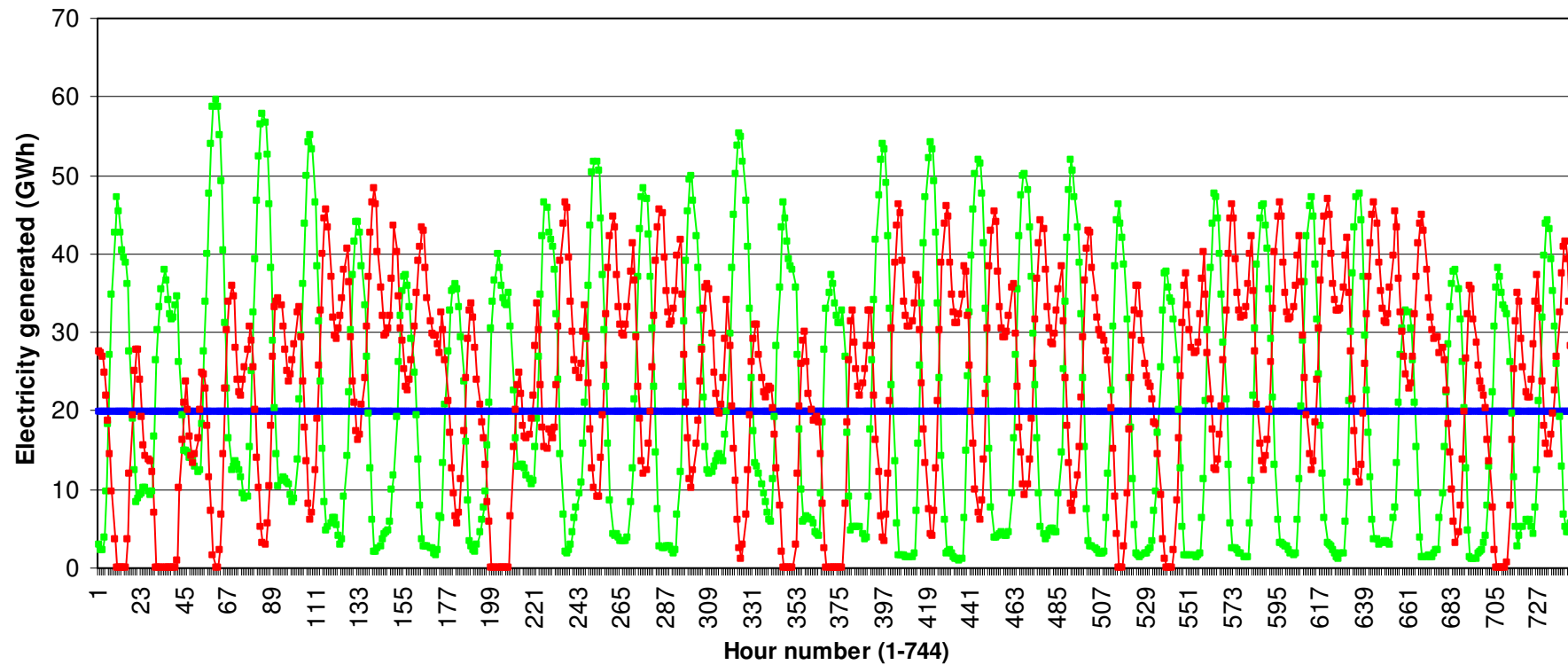
- › LOTOS-EUROS model
- › 3 scenarios:
 - › Current emissions & time profiles
 - › Emissions PP– 25%;
Current time profiles
 - › Emissions PP– 25%;
Changed time profiles (ReMIX)





Impact of large-scale use of renewables on fossil fuel use

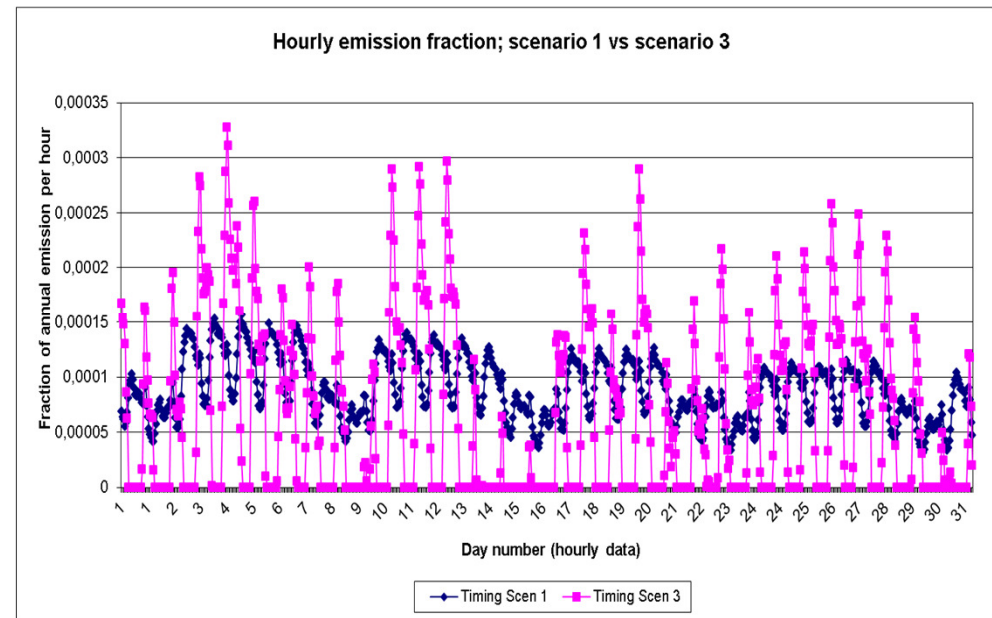
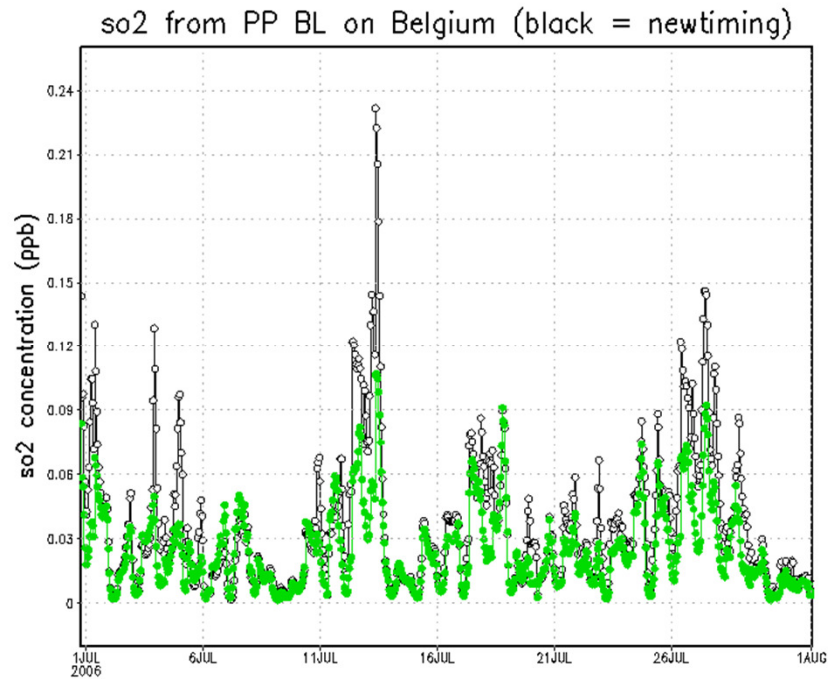
Electricity distribution; month 7; country DEU; scenario: 30% renewables, equally solar/wind



- Others - Renewables - Fossil



Timing of emissions seems crucial



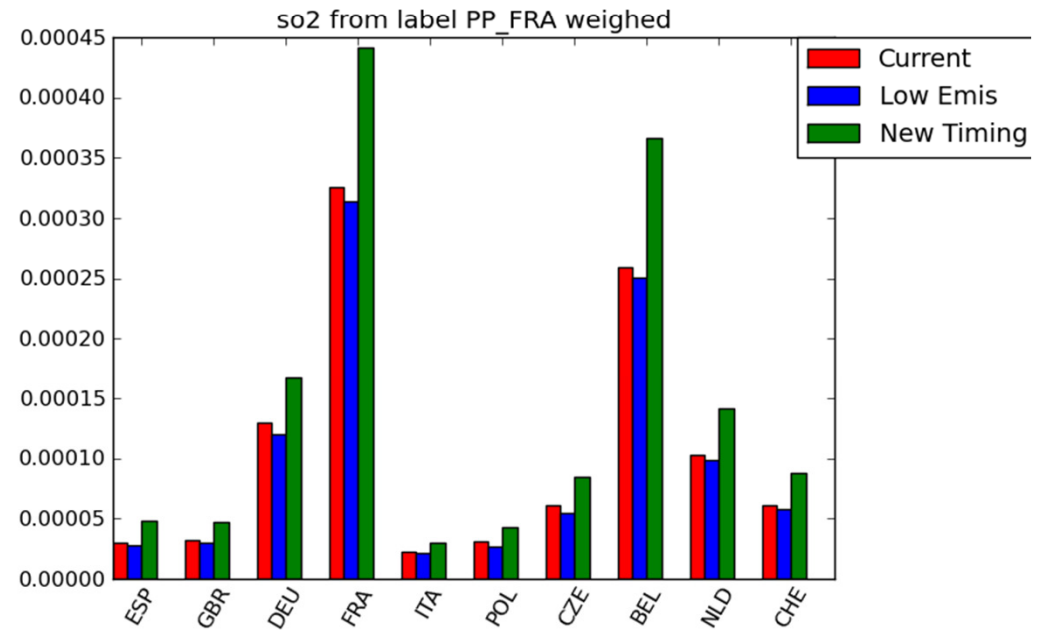
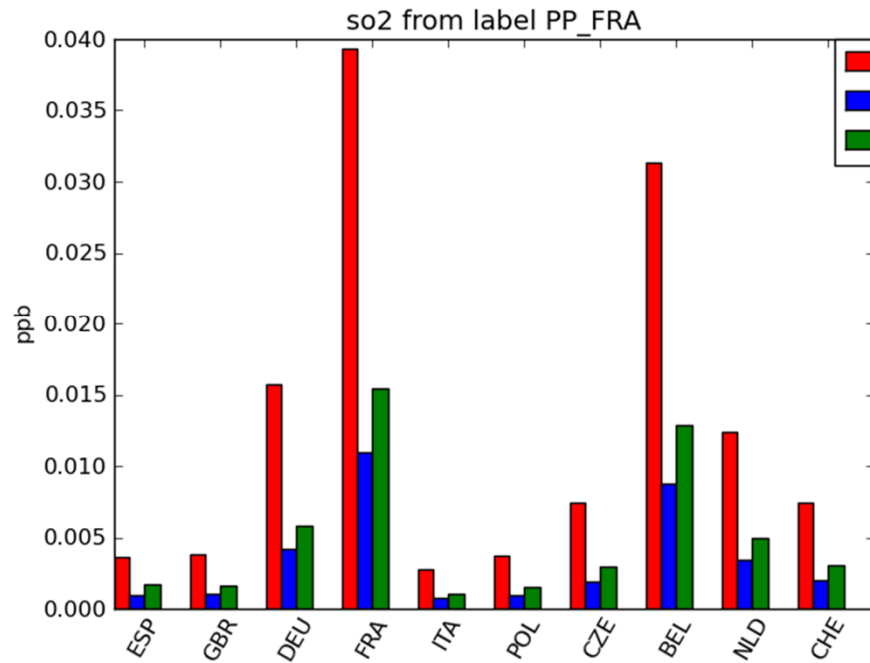
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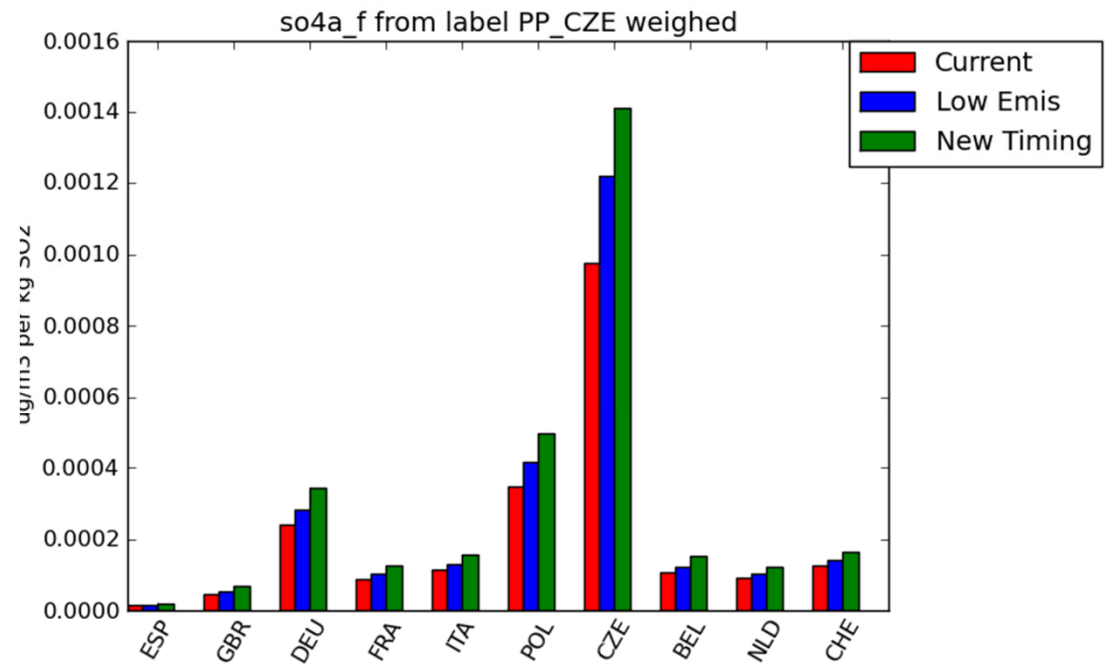
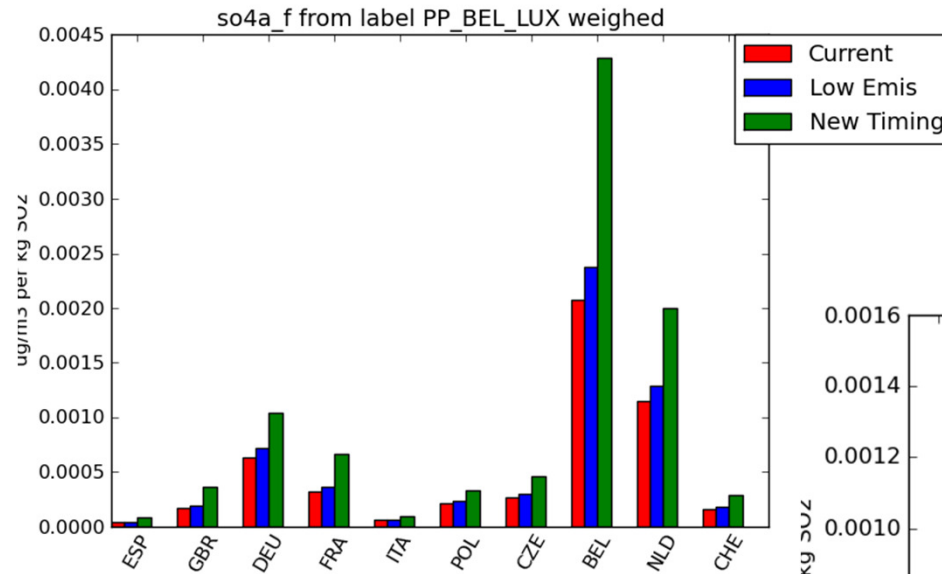


Results – SO₂ from French power plants



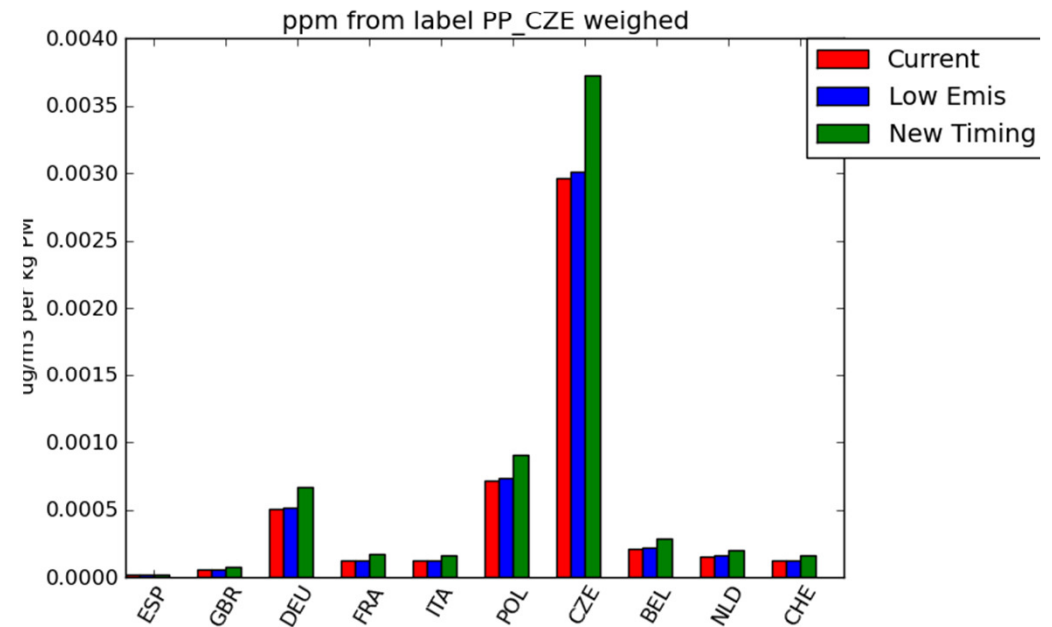
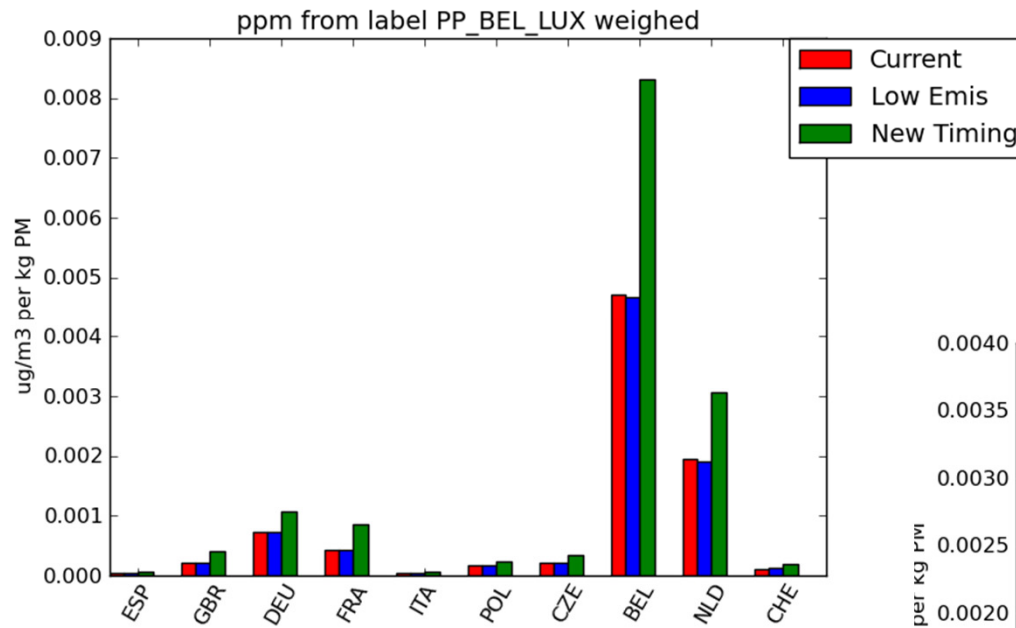


Results – SO₄ from BEL/LUX and CZE



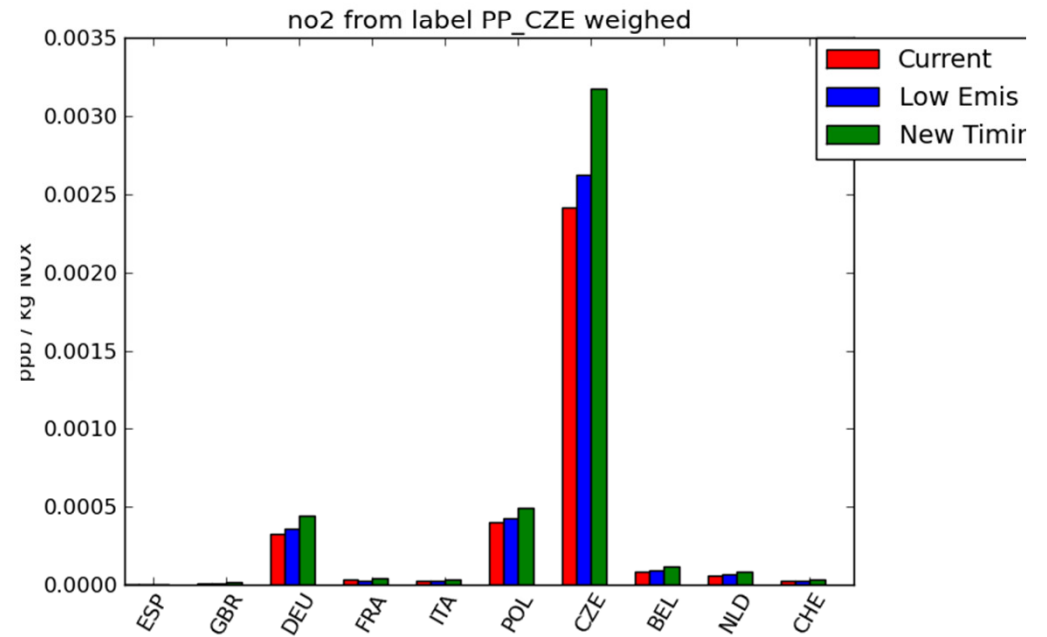
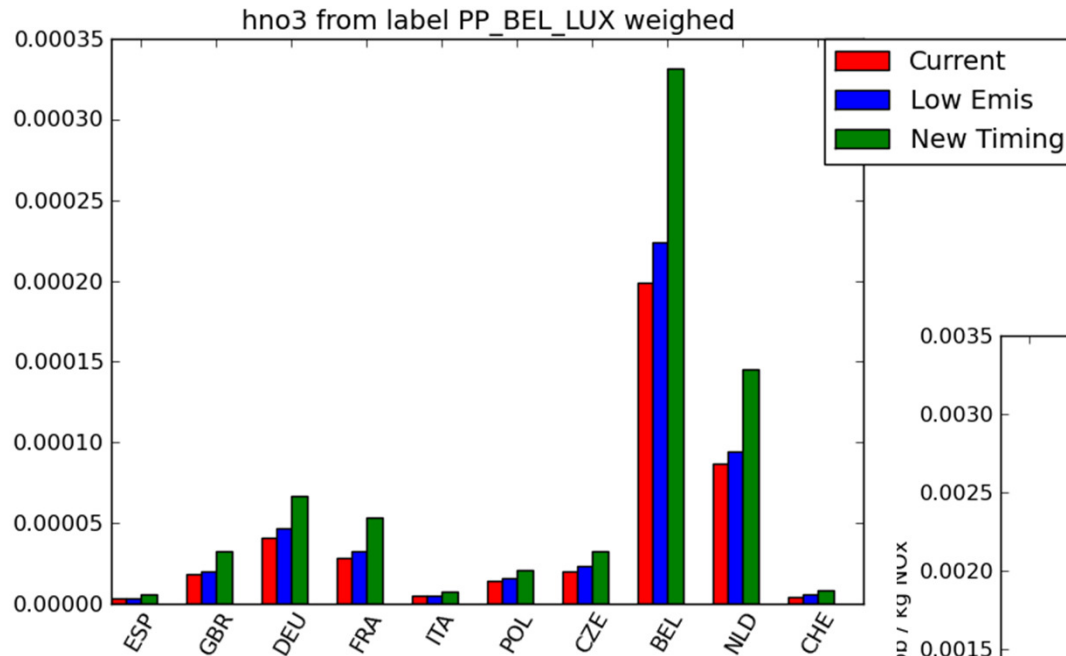


Results – Primary PM10 from BEL/LUX and CZE





Results – NO_x-based substances





Further research

- › Planned:
 - › EnerGEO scenarios 2030 / 2050
 - › Cause of higher 'effectivity' of emissions

- › Other sectors

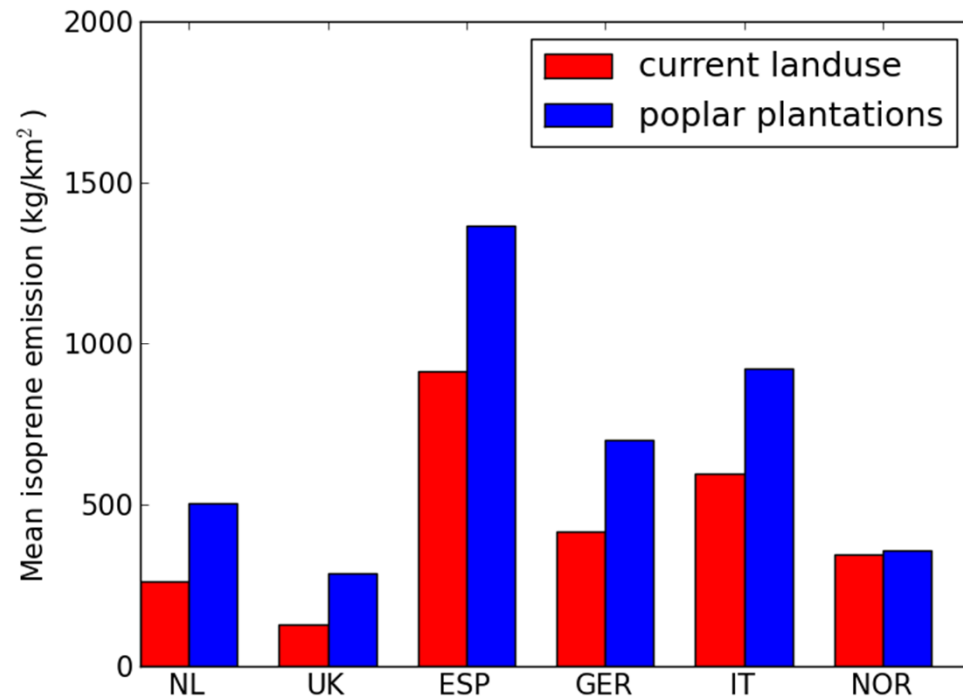
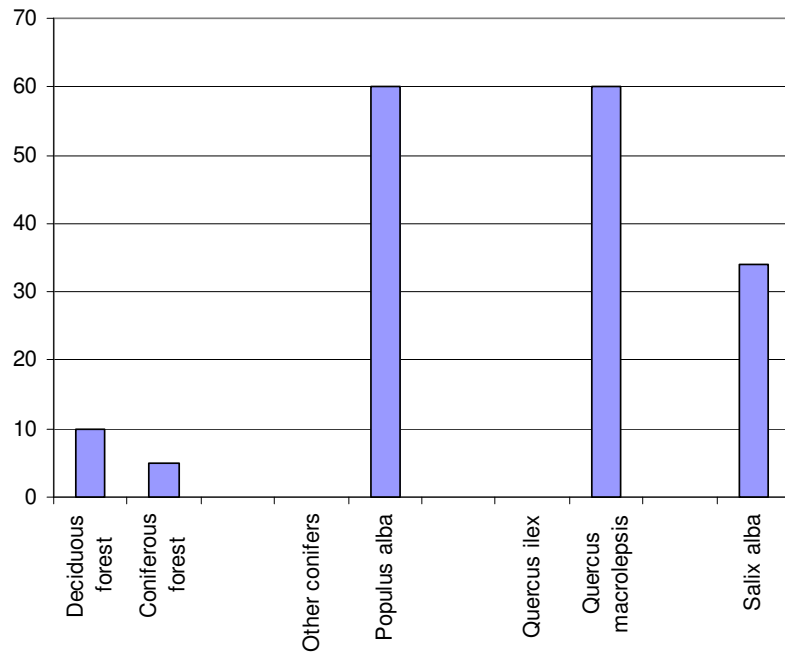
- › Deposition





Biogenic VOC emissions of forests

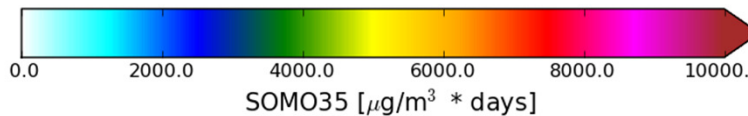
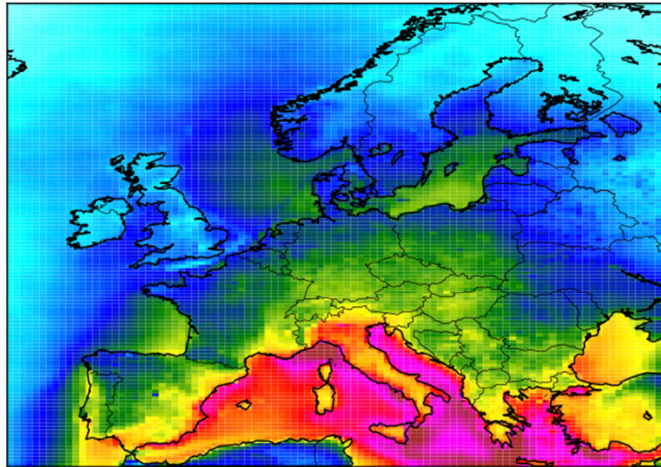
- › Large scale implementation of biomass-based energy changes biogenic emissions which will affect air quality



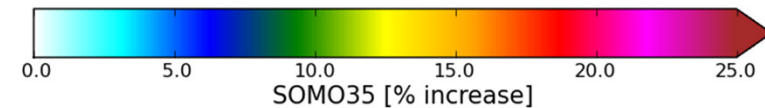
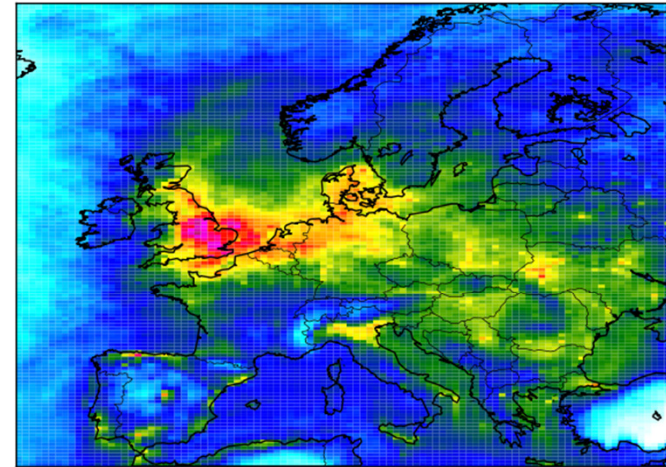


5% of agricultural area used as poplar plantation Impact on ozone – SOMO35

current landuse



relative increase upon landuse change





Implications

- › Correct representation emission timing is important
- › Relevant mechanisms and effects missing in models
- › Validity SRMs for large changes in emission characteristics?

