Trends of ozone precursor emissions and their impacts

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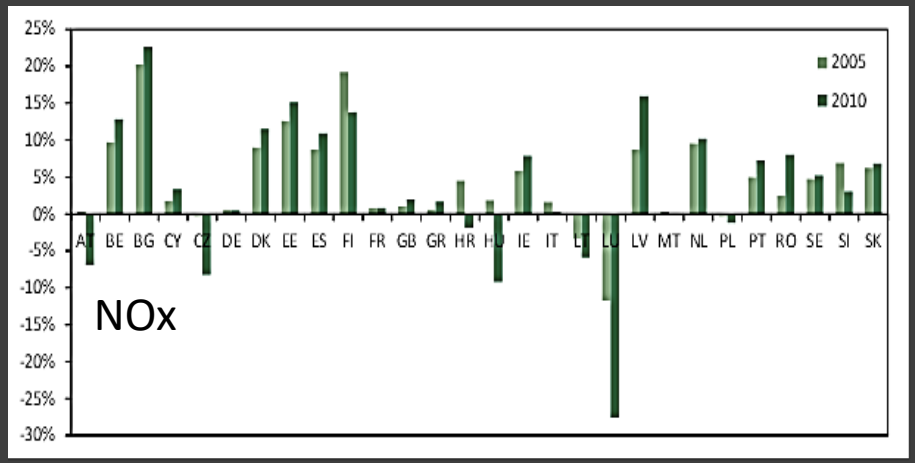
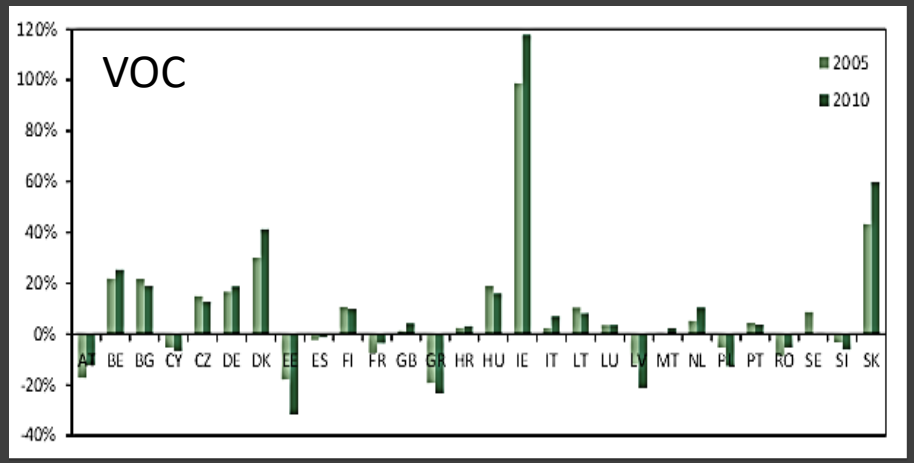
NO_x and VOC emissions

There are still important uncertainties in emission inventories

Changes in reported emissions between the 2014 and the 2017 submissions





Source: Amann at al, 2017

Changes in total EU-28 emissions reported in 2017 (excl. Greece)

	NO_x	VOC
For 2005:	+ 3.3 %	+ 3.3 %
For 2010 :	+ 2.9 %	+ 5.2 %

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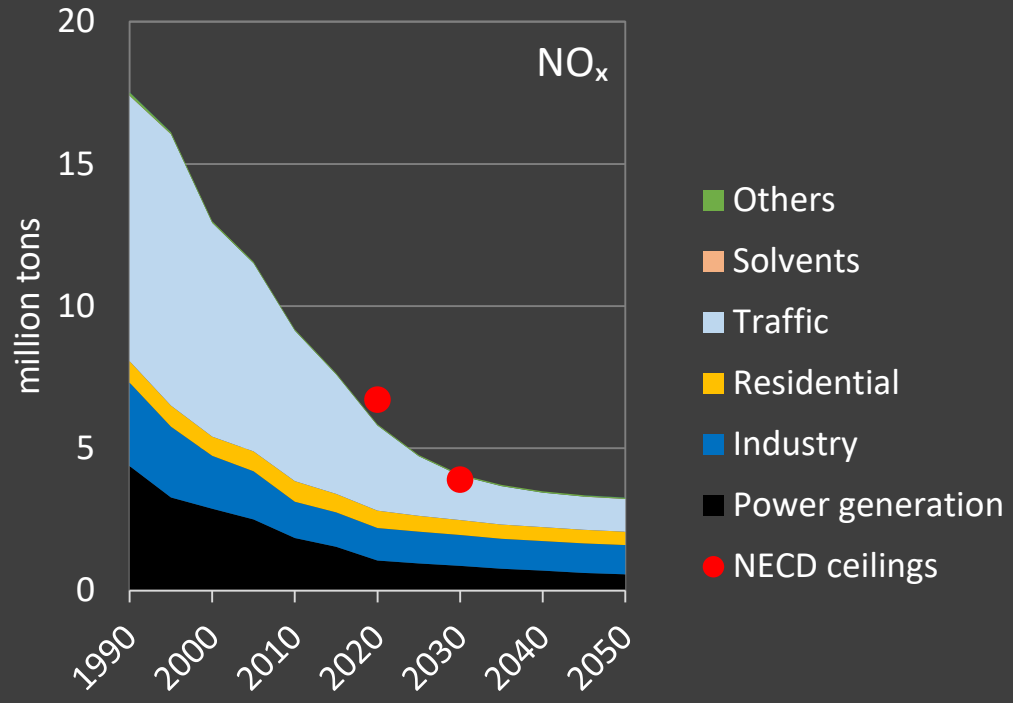

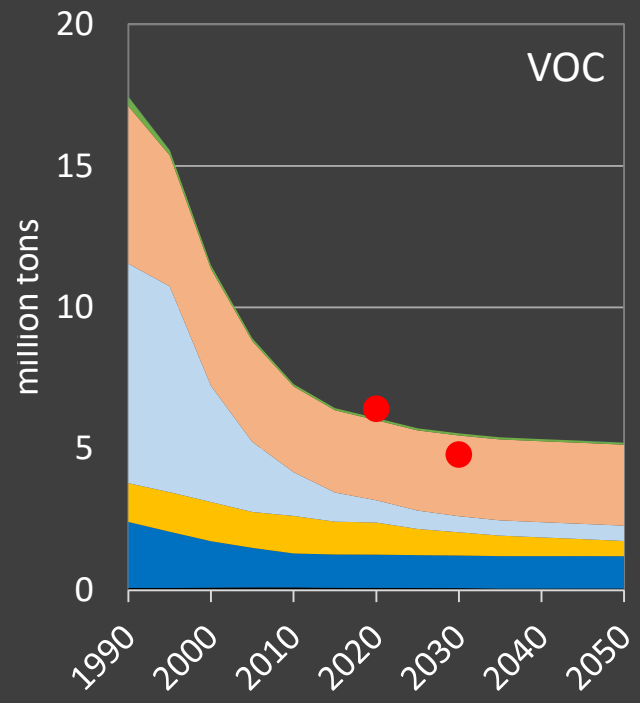

Source: GAINS, IIASA

NO_x and VOC emissions have declined in the past, and will continue to fall until 2030 due to the NECD and other legislation

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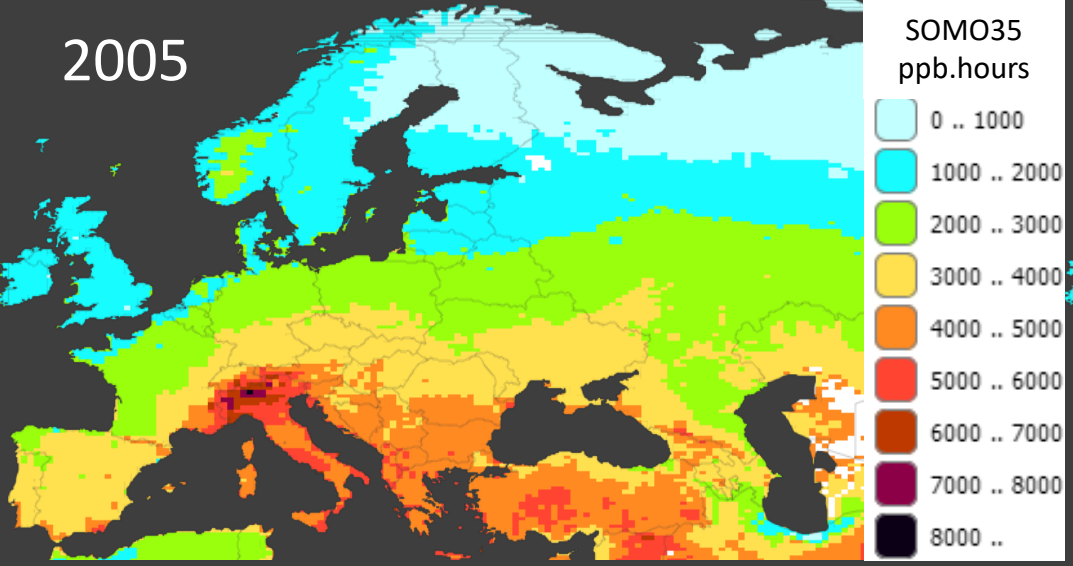
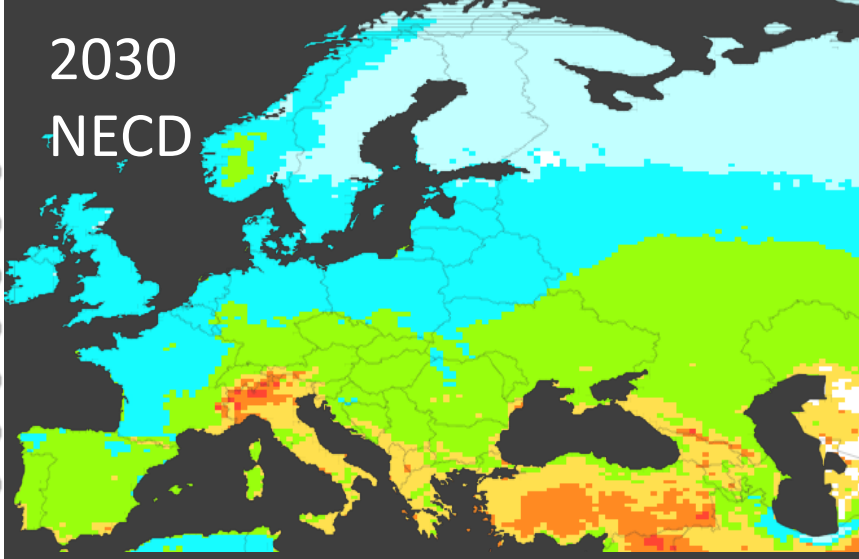
Impacts on health and vegetation



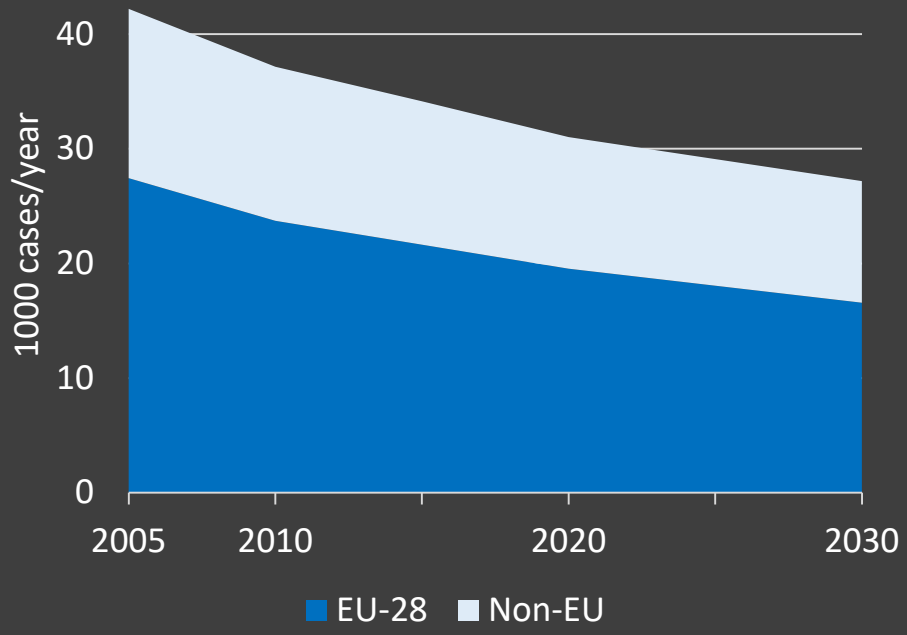
SOMO35
ppb.hours

- 0 .. 1000
- 1000 .. 2000
- 2000 .. 3000
- 3000 .. 4000
- 4000 .. 5000
- 5000 .. 6000
- 6000 .. 7000
- 7000 .. 8000
- 8000 ..

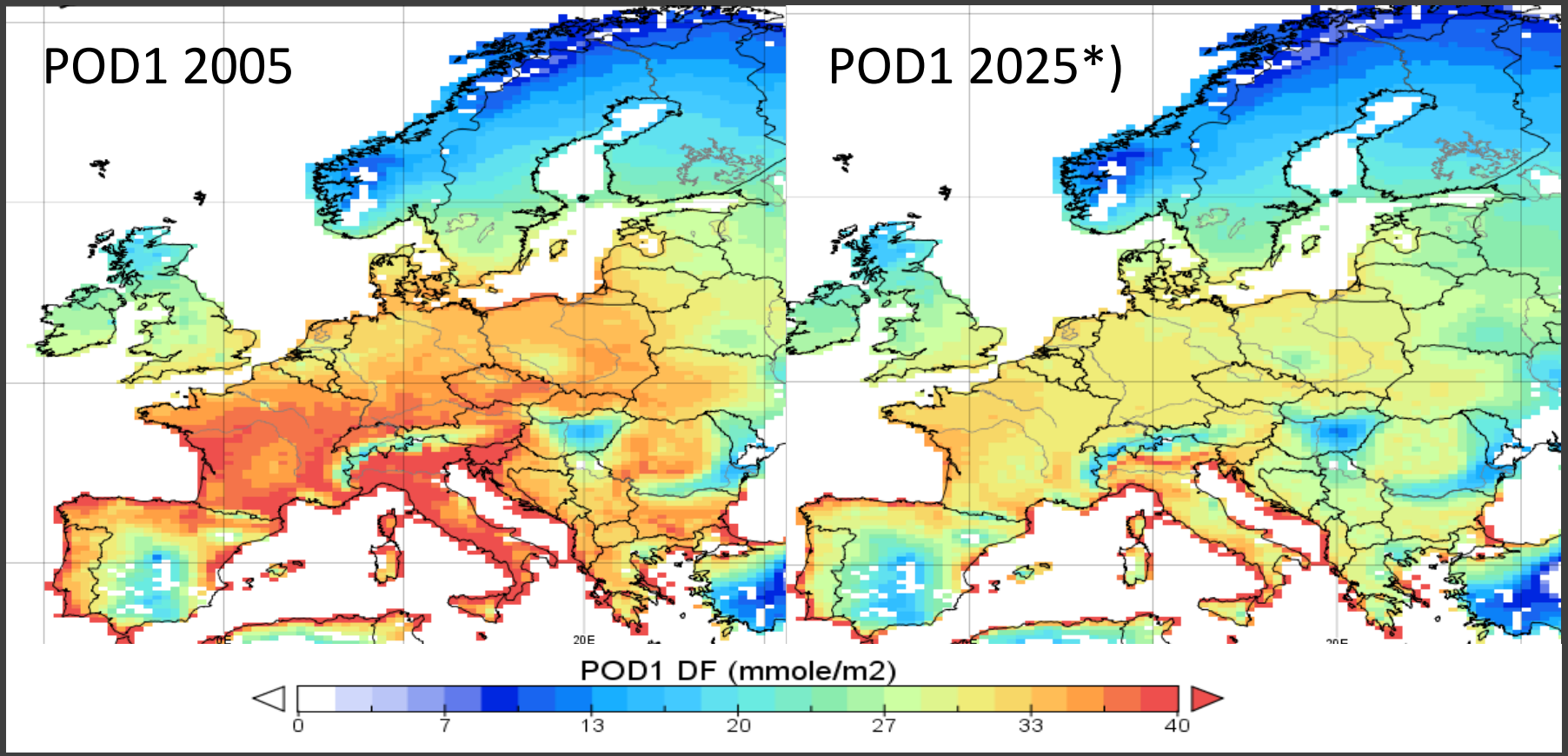


Source: GAINS, IIASA

Premature deaths attributable to O_3



The health-relevant SOMO35 exposure metric is expected to decline by one third from 2005 to 2030



POD1 … Phytotoxic ozone dose (mmol m^{-2}) above a threshold of 1 nmol m^{-2} s^{-1} (for deciduous trees)
*) assuming no change in hemispheric background concentrations

High ozone fluxes prevail over large areas in Europe

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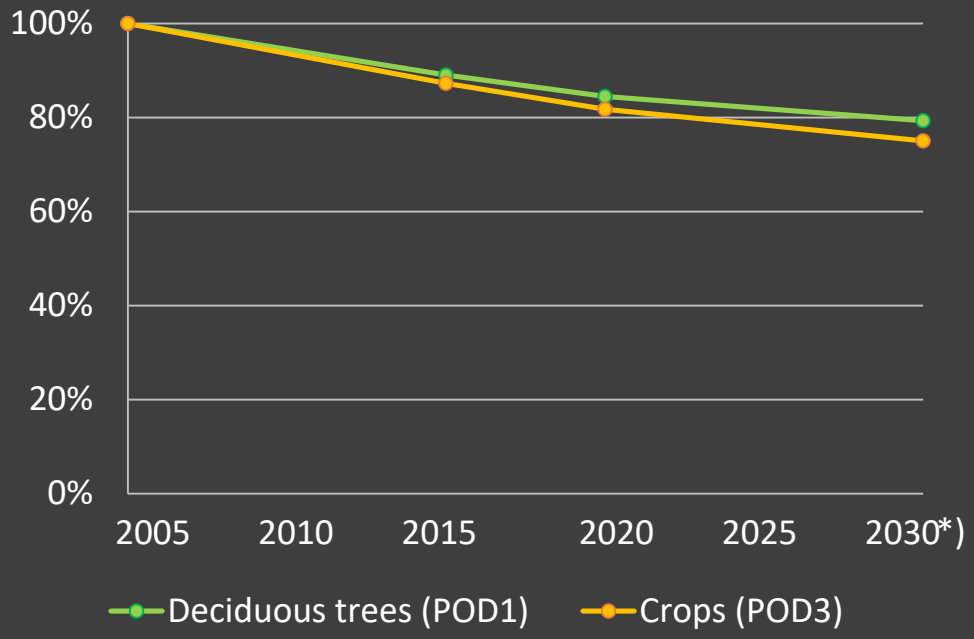
Changes in ozone fluxes to forests and crops



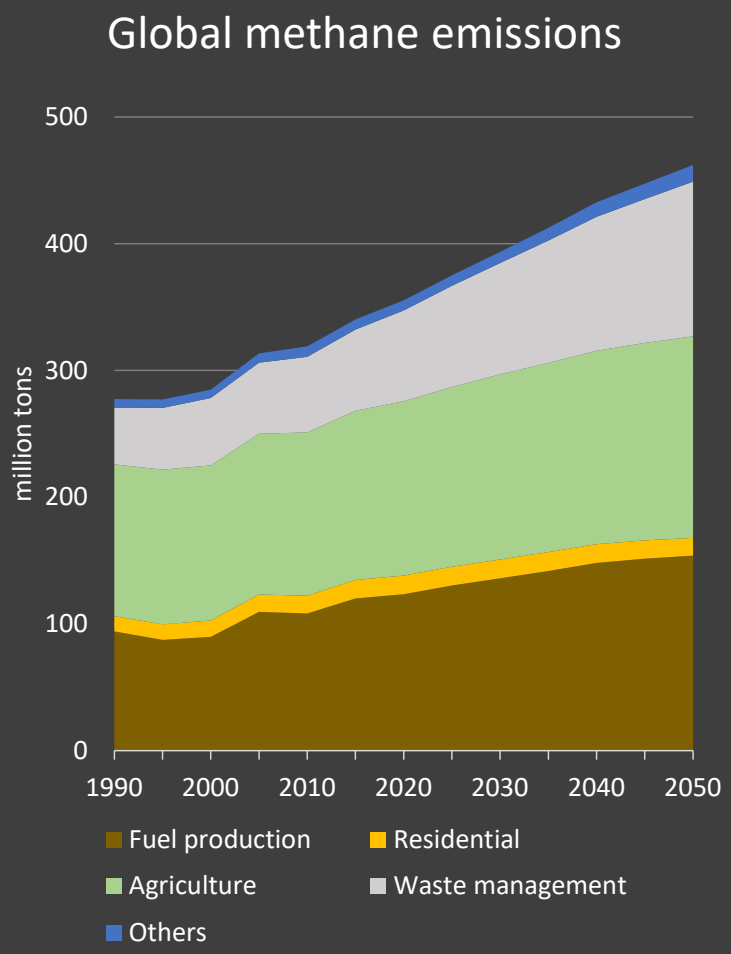
*) assuming no change in hemispheric background concentrations

Source: GAINS, IIASA

Vegetation-related impact metrics are expected to decline by 20-25% between 2005 and 2030

Global trends of CH_4 emissions



Source: GAINS, IIASA

Methane emissions,
a global precursor of O_3,
are expected
to grow further

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Key points

- NO_x and VOC emissions have substantially declined in Europa in recent years, and current legislation should deliver further reductions.
- This will have benefits for ozone peaks, but less for mean ozone levels for which European efforts are likely to be counteracted by continued growth of global methane.
- Estimates of future impacts on health and vegetation depend on the scientific understanding of the critical impact mechanisms/metrics.

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