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Air quality co-benefits of global climate action under the Paris Agreement

Toon Vandyck

European Commission, Joint Research Centre

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Air quality co-benefits of the Paris Agreement

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Global Energy and Climate Outlook 2017: How climate policies improve air quality

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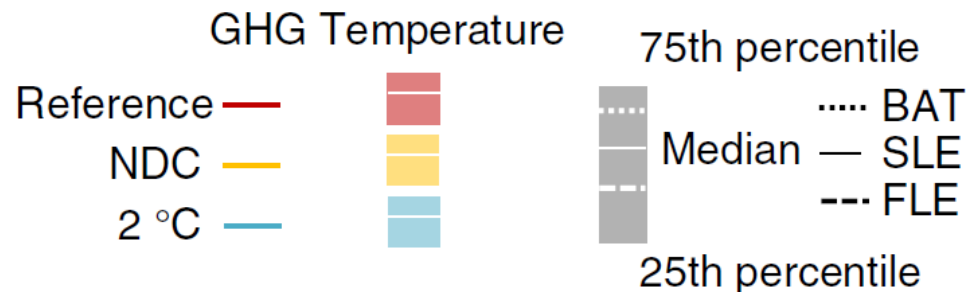
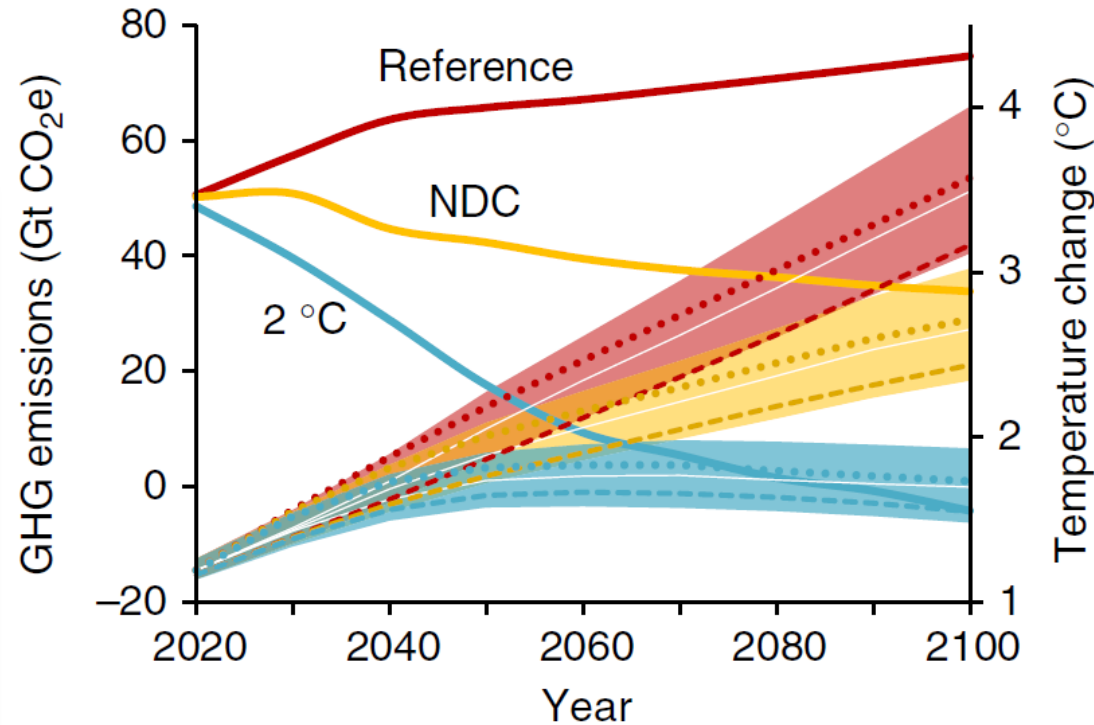
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Air quality co-benefits for human health and agriculture counterbalance costs to meet Paris Agreement pledges

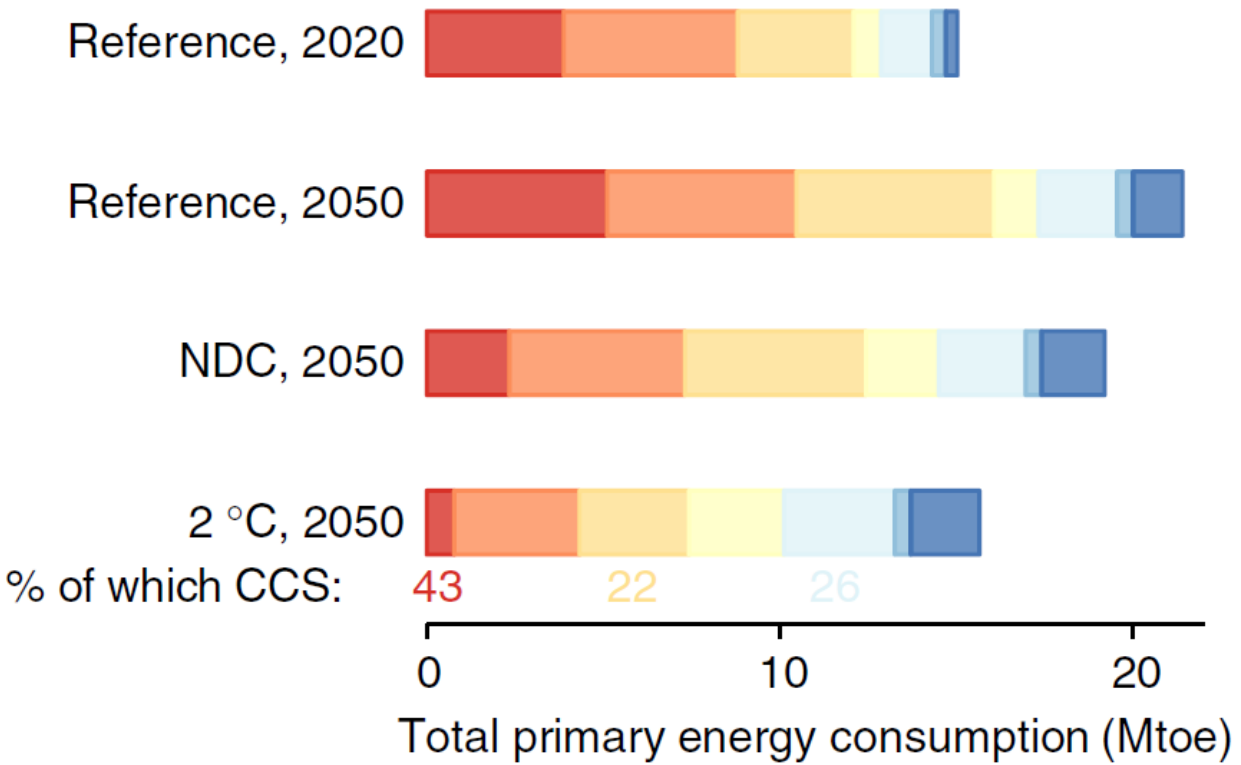
Toon Vandycck¹, Kimon Keramidis¹, Alban Kitous¹, Joseph V. Spadaro², Rita Van Dingenen³, Mike Holland⁴ & Bert Saveyn¹

Local air quality co-benefits can provide complementary support for ambitious climate action and can enable progress on related Sustainable Development Goals. Here we show that the transformation of the energy system implied by the emission reduction pledges brought forward in the context of the Paris Agreement on climate change (Nationally Determined Contributions or NDCs) substantially reduces local air pollution across the globe. The NDCs could avoid between 71 and 99 thousand premature deaths annually in 2030 compared to a reference case, depending on the stringency of direct air pollution controls. A more ambitious 2°C-compatible pathway raises the number of avoided premature deaths from air pollution to 178–346 thousand annually in 2030, and up to 0.7–1.5 million in the year 2050. Air quality co-benefits on morbidity, mortality, and agriculture could globally offset the costs of climate policy. An integrated policy perspective is needed to maximise benefits for climate and health.

¹European Commission, Joint Research Centre (JRC), 41092 Sevilla, Spain. ²Spadaro Environmental Research Consultants (SERC), 19142 Philadelphia, USA. ³European Commission, Joint Research Centre (JRC), 21027 Ispra, Italy. ⁴Economics Research and Consulting (EMRC), R08 79W Reading, UK. Correspondence and requests for materials should be addressed to T.V. (email: toon.vandycck@ec.europa.eu)

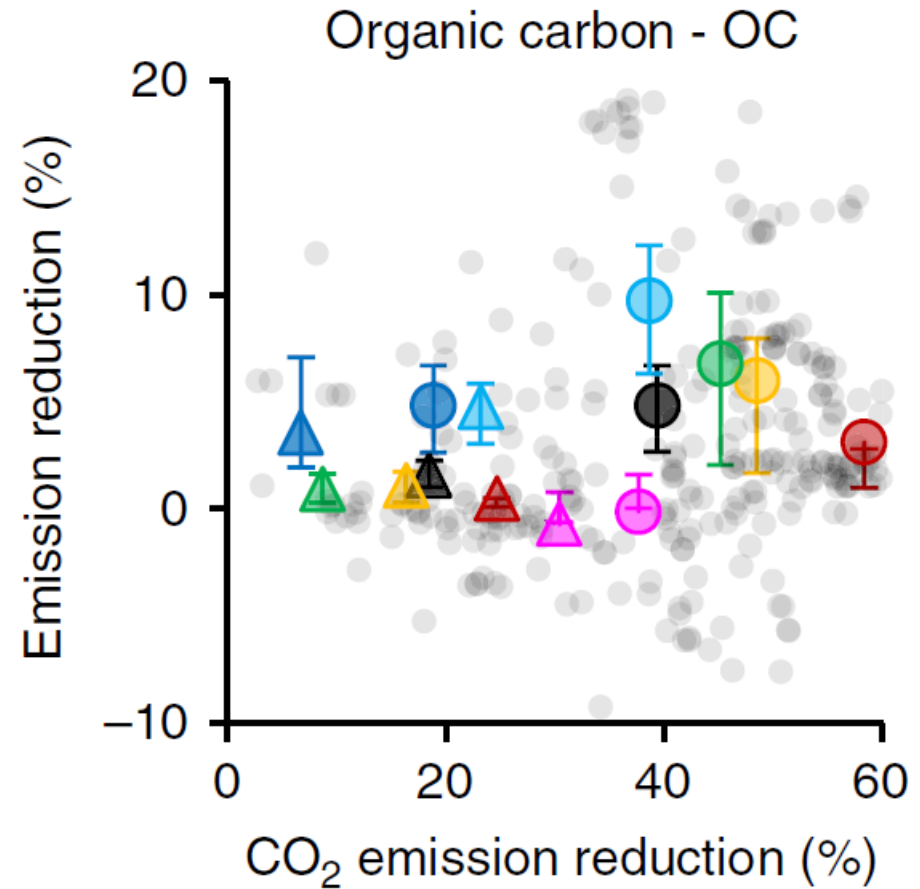
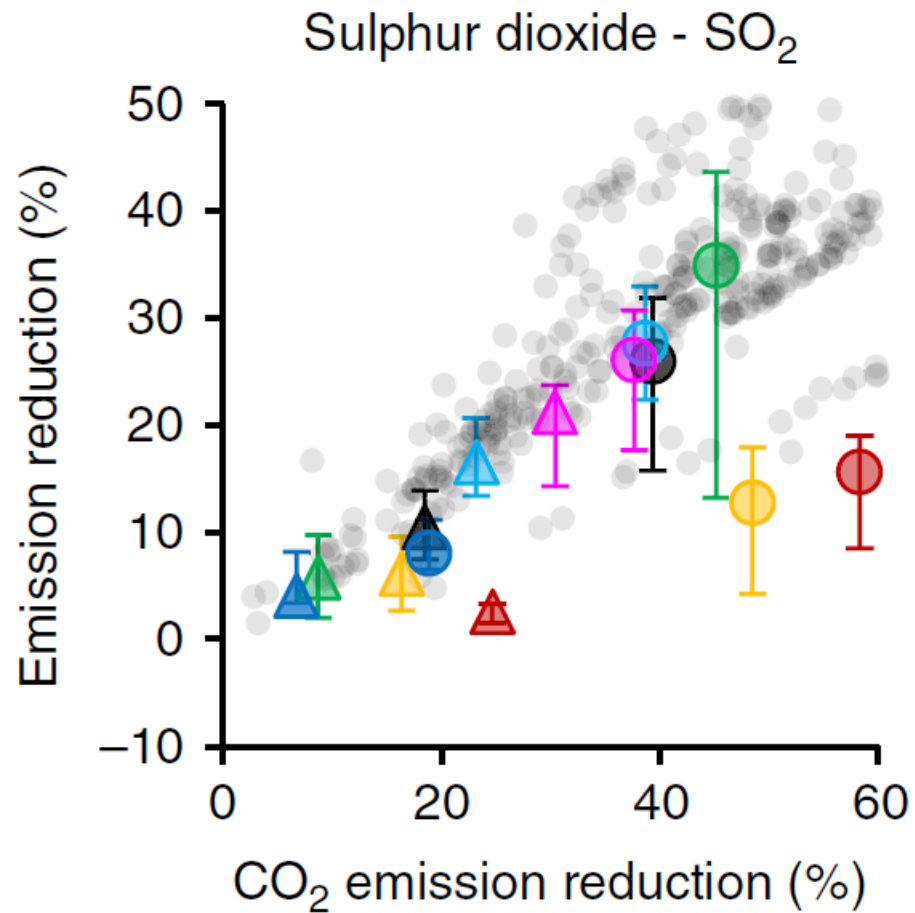


Transformation of the energy system



- Solids
- Oil
- Natural gas
- Nuclear
- Biomass
- Hydro
- Other renewables

Co-benefits for emissions of air pollutants



Particulate matter (PM_{2.5}) and ozone pollution

NDC
2030

2°C
2050

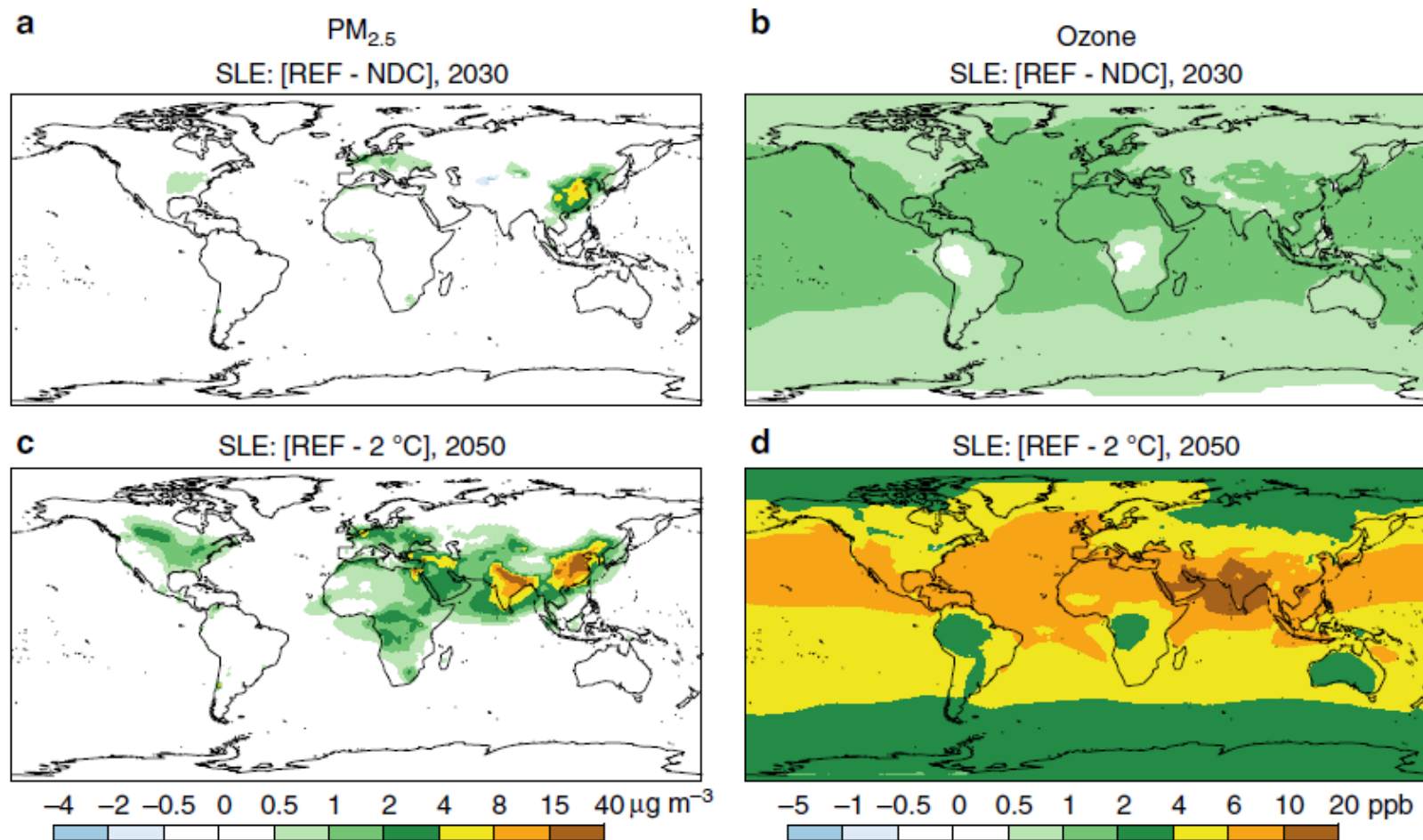


Fig. 3 Reduction of PM_{2.5} concentration ($\mu\text{g m}^{-3}$) and ozone mixing ratio (ppb) due to climate change mitigation policies under the Stringent Legislation case of air quality. NDC scenario compared with the Reference in 2030 (REF—NDC) for **a** PM_{2.5} and **b** ozone. 2°C scenario compared with the Reference in 2050 (REF—2°C) for **c** PM_{2.5} and **d** ozone. Positive values indicate improved air quality

Human health: Avoided premature deaths

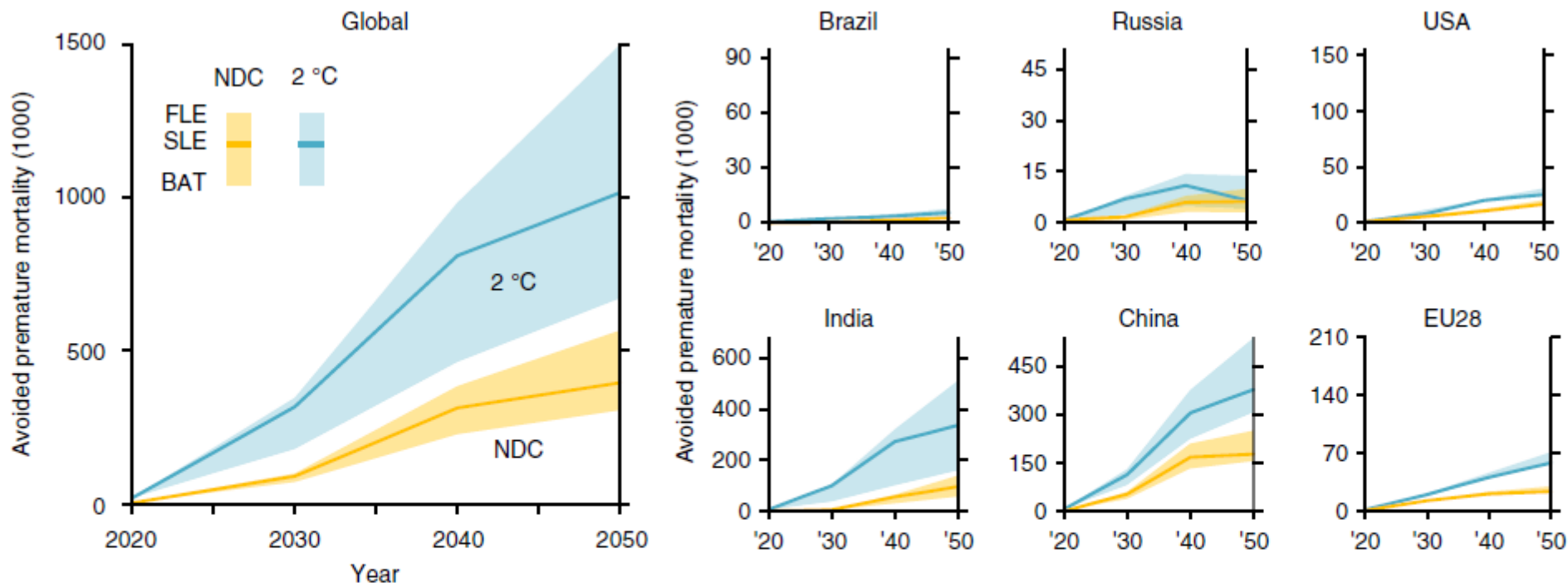
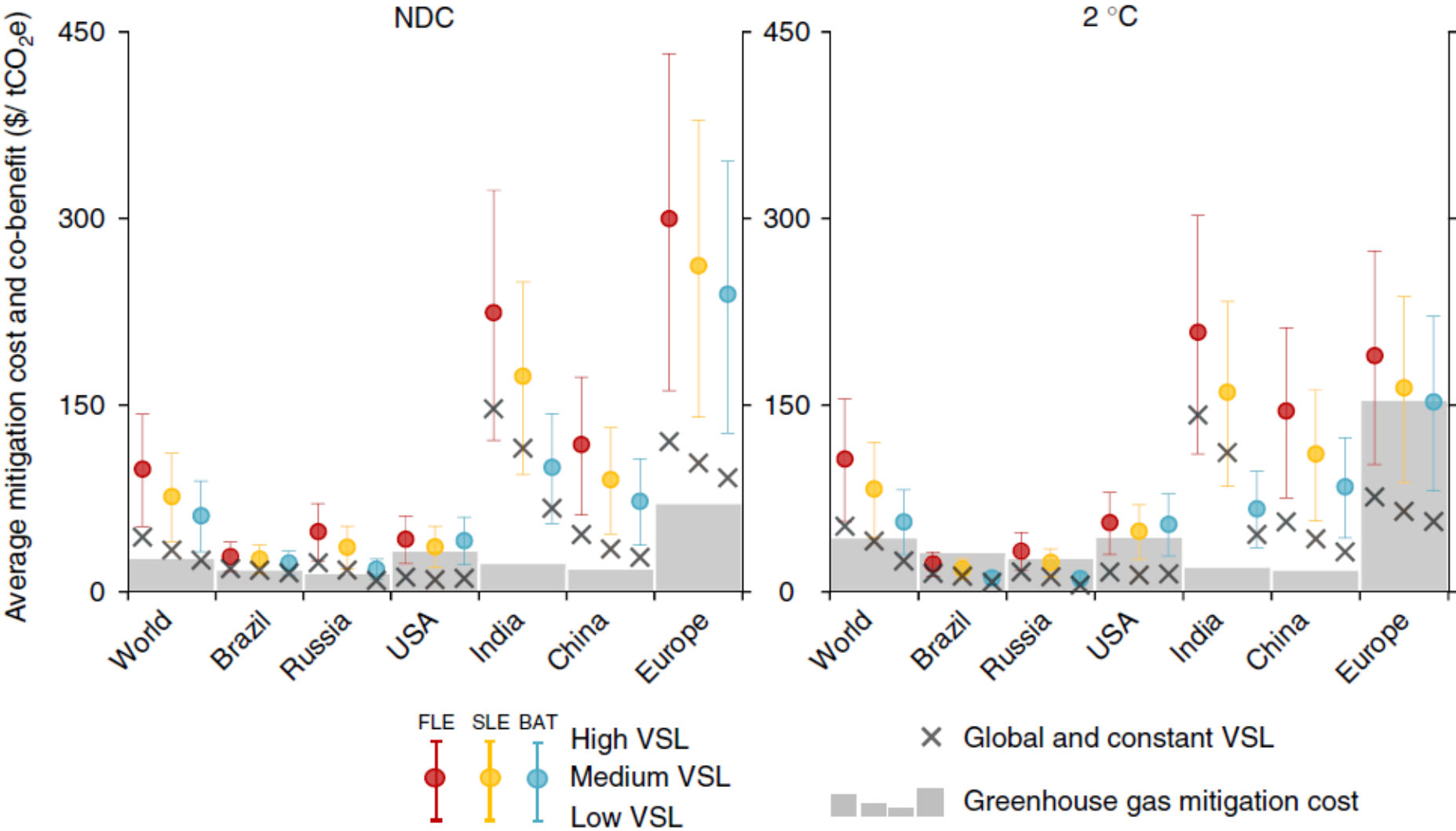


Fig. 4 Avoided premature mortality due to lower $PM_{2.5}$ concentration and ozone mixing ratio implied by climate change mitigation policies. Results shown are relative to the corresponding climate policy Reference case and use non-linear exposure-response functions based on Global Burden of Disease 2015²⁵, with the range encompassing estimates with Fixed Legislation (FLE), Stringent Legislation (SLE), and Best Available Technologies (BAT) air quality scenarios. In addition to global results, the figure shows avoided premature mortality (in thousands) for six regions. To display the absolute numbers in a way that makes the regional figures comparable against each other, the range of the vertical axes is scaled to 0.04% of the region-specific population in 2050

Cost of mitigation and value of co-benefits



Integrated modelling for long-term climate policy



Source: Weitzel et al. (April 2019). Model-based assessments for long-term climate strategies, *Nature Climate Change*

Thank you

Toon.Vandyck@ec.europa.eu



CLIMATE POLICIES

IMPROVE AIR QUALITY
AND **SAVE LIVES**

SUSTAINABLE
DEVELOPMENT
GOALS
UN's Sustainable
Development Goals

PARIS2015
COP21-CMP11
Paris Agreement 2015

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