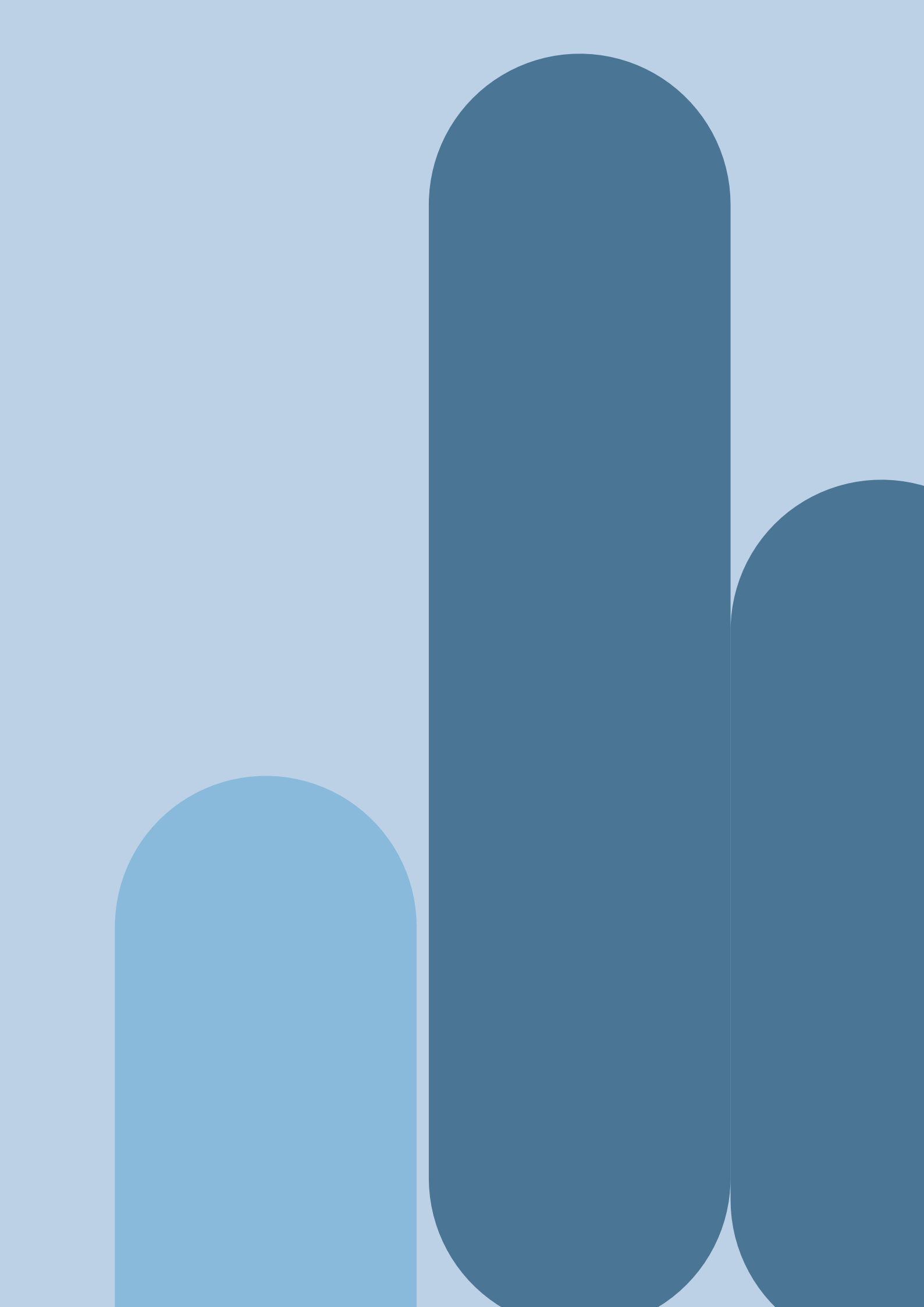

Conclusions

Conclusions

During the last decades Europe has successfully eliminated the most visible and immediate harmful effects of air pollution. However, there is ample and robust scientific evidence that even at present rates Europe's emissions to the atmosphere pose a significant threat to human health, ecosystems and the global climate, though in a less visible and immediate way.

Refined scientific methods reveal that, e.g., via the long-term exposure to fine particulate matter, current levels of air pollution shorten statistical life expectancy of the European citizens by several months. Biodiversity and Europe's genetic resource base is under threat from the excessive release of nitrogen to the atmosphere from energy combustion and intensive agriculture. Europe's greenhouse gas emissions, currently twice as high on a per-capita basis as the world average, and historically responsible for about a quarter of current concentrations in the atmosphere, make a significant contribution to global climate change.

This report presents an outlook into the likely development of emissions of greenhouse gases and air pollutants and their impacts up to 2030 as can be envisaged from the current expectations on economic development and the implementation of existing legislation on air pollution controls in the European Union. The study adopts the most recent post-economic crisis projections as a central assumption, as they incorporate the economic downturn that occurred in 2008 and 2009. It considers national and EU-wide energy, climate agricultural and air pollution policies that have been implemented by spring 2009.

The analysis starts from a recent projection of population development, which outlines a 6% increase in the population of the EU-27 due to continued immigration. The economic projection assumes quick recovery of economic activities after the crisis in 2009 with temporarily higher growth rates, and a steady growth after 2015 although at lower rates than assumed in the earlier projections before the economic crisis. Thus, by 2020 total GDP in the EU-27 will be about 30% higher than in 2005, and 50% in 2030.

The baseline suggests that recent energy and climate policies will show distinct effects on future energy consumption in Europe. They will lead to clear decoupling between the level of economic activity (GDP), energy consumption and greenhouse gas emissions. Economic restructuring and dedicated energy policy measures will reduce energy intensity of GDP in 2030 by almost one third compared to 2005. Per-capita energy assumption is expected to decline by 6%. Total energy consumption is assumed to recover to the pre-crisis levels between 2010 and 2015 and remain at this level up to 2030. Although renewable energy will increase its market share to some extent, no major changes in the composition of fuel use are projected up to 2030 despite the assumed 50% increase in GDP. For transport, car ownership would remain at current levels at the aggregate EU-27 level. Increases in the car ownerships in the new Member States will be compensated by saturation effects in the old Member States. Further growth, however, will occur for freight transport, although the 33% increase to 2030 is lower than the assumed growth in GDP.

The baseline projection of the agricultural sector suggests future declines in the numbers of cattle and sheep (between 10 and 20%), and increases in pigs and chicken. Overall agricultural area will decline due to continued extension of built-up land.

These changes in human activity levels, together with dedicated policies to reduce emissions of greenhouse gases and air pollutants, will have distinct impacts on future pollution of the atmosphere in Europe. Most notably, the baseline projection suggests a decline of greenhouse gas emissions, reaching -8% in 2020 and -16% in 2030 relative to 2005. Particularly large reductions are anticipated for CH_4 (-21% in 2020 and -25% in 2030) due to the continuing implementation of EU Directives on waste treatment in the new Member States, while emissions of F-gases are expected to increase by 24% in 2030 owing to further penetration of air conditioning and cooling in the EU.

Much larger dynamics are expected for emissions of air pollutants (i.e., SO_2, NO_X, PM2.5, NH_3, VOC), due to the ongoing structural changes in the economy and the effects of new emission control legislation. For 2020, the baseline projection suggests SO_2 emissions will decline by two-thirds compared to 2005, NO_X emissions by half, and PM and VOC emissions by one third. These declines will continue after 2020, however at a much lower rate. The big exception, however, is NH_3, for which no substantial changes in emissions are expected for the baseline.

These changes in baseline emissions will have distinct impacts on air pollution impacts on human health, forests, vegetation, freshwater, crops and material. Health impacts from exposure to fine particulate matter, which is associated for the year 2000 to a shortening of stati-

stical life expectancy of 8.6 months in the EU, would decline by 45% in 2020 and by 52% in 2030. The number of premature deaths that are attributable to the exposure to ground-level ozone (26000 in 2000) would decline by one third in 2020 and by 39% in 2030. Similarly positive impacts are computed for vegetation and ecosystems. For instance, the area of European forests that are under threat of acidification (as they receive acid deposition above their critical loads) will decline by about 70%.

However, despite these significant improvements, the anticipated baseline development of emissions to the atmosphere will not be sufficient to achieve sustainable environmental conditions that safeguard human health and ecosystems services. Per-capita greenhouse gas emissions will still be at 9.2 tons CO_2eq/person/yr in 2020 and at 8.3 tons/person/yr in 2030, which is significantly higher than the 2 tons that would be available in a budget approach that allocates equal GHG emissions to all people in the world while limiting temperature increase to 2 degrees. Even within Europe, despite the impressive reductions in precursor emissions, fine particulates in ambient air will still cause life shortening of more than four months to the European population. Biodiversity will continue to be threatened by excessive input of harmful air pollution in wide areas in Europe, and particularly in many of the Natura2000 habitat protection areas. As these improvements do not reach the environmental targets that have been established in the EU Thematic Strategy on Air Pollution for 2020, further measures to reduce emissions will be necessary. This analysis provides an assessment of the starting point for considerations of how further improvements could be achieved in a cost-effective way. The EC-4MACS model tool box offers scientifically sound and validated tools to inform policy discussions on future climate and air pollution strategies in Europe.

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