

# How Germany's national air pollution control programme contributes to reduced emissions of reactive nitrogen into the atmosphere

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## Abstract

Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants (new NEC Directive) establishes emission reduction commitments for national emissions of all member states. Member states also have to draw up national air pollution control programmes summing up all measures, which are needed to meet the reduction commitments. For Germany, measures to mitigate climate change and to reduce ammonia emissions from agriculture are the most important additional measures to fulfil the reduction commitments for emissions of reactive nitrogen.

Keywords: national air pollution control programme, Germany, atmospheric emissions, ammonia, nitrogen oxides, NEC Directive

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## 1. Introduction

The new NEC Directive (EU) 2016/2284 establishes emission reduction commitments for anthropogenic atmospheric emissions of sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), non-methane volatile organic compounds (NMVOC), ammonia (NH<sub>3</sub>) and fine particulate matter (PM<sub>2.5</sub>). Germany has to reduce its national emissions of pollutants contributing to reactive nitrogen in the atmosphere, i. e. NO<sub>x</sub> and NH<sub>3</sub>, in a first step by 39 per cent and 5 per cent until 2020 compared with 2005 for NO<sub>x</sub> and NH<sub>3</sub>, respectively. A second step requires emission reductions by 65 per cent and 29 per cent until 2030 compared with 2005 for NO<sub>x</sub> and NH<sub>3</sub>, respectively.

Germany's national air pollution control programme (<https://www.umweltbundesamt.de/nlrp2019>) describes the pathway including needed measures to comply with these reduction commitments.

## 2. Scenarios within the national air pollution control programme

Emissions projections for the national air pollution control programme have been produced on the basis of two scenarios. The With Measures (WM) scenario comprises measures that have already been adopted, whereas the With Additional Measures (WAM) scenario contains further measures that had not been formally adopted and strategies that the German government has agreed to implement in order to comply with the reduction commitments of the new NEC Directive.

The WAM scenario contains measures for climate change mitigation including the phasing out of electricity generation from coal and lignite and further air pollution control measures aiming at combustion plants, transport and agriculture.

## 3. Measures to reduce atmospheric emissions of reactive nitrogen

The WM scenario shows that Germany will fulfil the reduction commitments in 2020 with already adopted measures, but further measures are needed to fulfil the reduction commitments in 2030 for NO<sub>x</sub> and NH<sub>3</sub>.

Within the WM scenario, Germany will achieve a reduction of NO<sub>x</sub> emissions by 59 per cent in 2030. The most important effect in the WAM scenario is caused by climate change mitigation measures, an additional reduction can be achieved by the implementation of the Medium Combustion Plants Directive (EU) 2015/2193. Together with additional measures in the transport sector, Germany will be able to fulfil the reduction commitments in 2030 for NO<sub>x</sub>.

The largest gap between WM scenario and reduction commitments can be found for NH<sub>3</sub> in 2030, where the WM scenario only gives a reduction of 9 per cent. A package of agricultural measures, including optimised feeding, emissions reduction measures in animal housing; low-emission storage and application of manure, is needed to reach the reduction commitments in 2030 for NH<sub>3</sub>.

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