For our Environment

Umwelt Bundesamt

48th TFIAM meeting in Berlin

The German air pollution control programme and IAM activities in Germany

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Section II 4.1 „General Aspects of Air Quality Control“

The German air pollution control programme- General aspects and Responsibilities

- The German air pollution control programme will soon be available via the UBA website (in German, summary in English)
- UBA is resposible for drafting the programme.
- Ministry of the Environment is responsible for the interservice consultation within the German government and other consultation processes.

Challenges

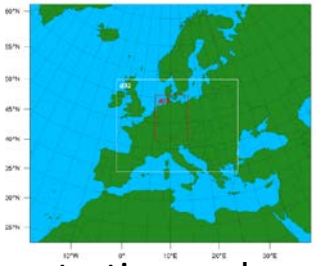
- The interservice consultation within the German government is not yet concluded.
- Critical issues are:
  - The agreement on a set of measures to reduce NH_3 emissions from agriuculture
  - Coal exit in Germany: The Commission on Growth, Structural Change and Employment („Coal Exit Commission“) has published its final report in January 2019, which sets out a pathway for Germany to phase out coal-fired power generation by 2038 (or 2035). First step: 12.5 GW of capacity will be switched off by 2022.

    → There is not yet an official energy scenario. But preparation of a sensitivity scenario that shows what effect the German coal phase-out has on emissions of air pollutants.

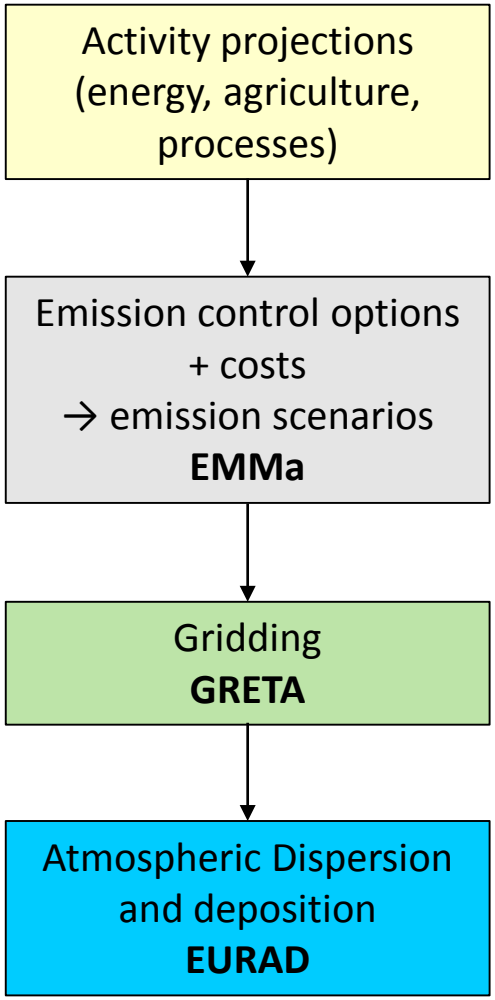
    → An update of the German air pollution control programme will include an updated energy scenario.

Methodology

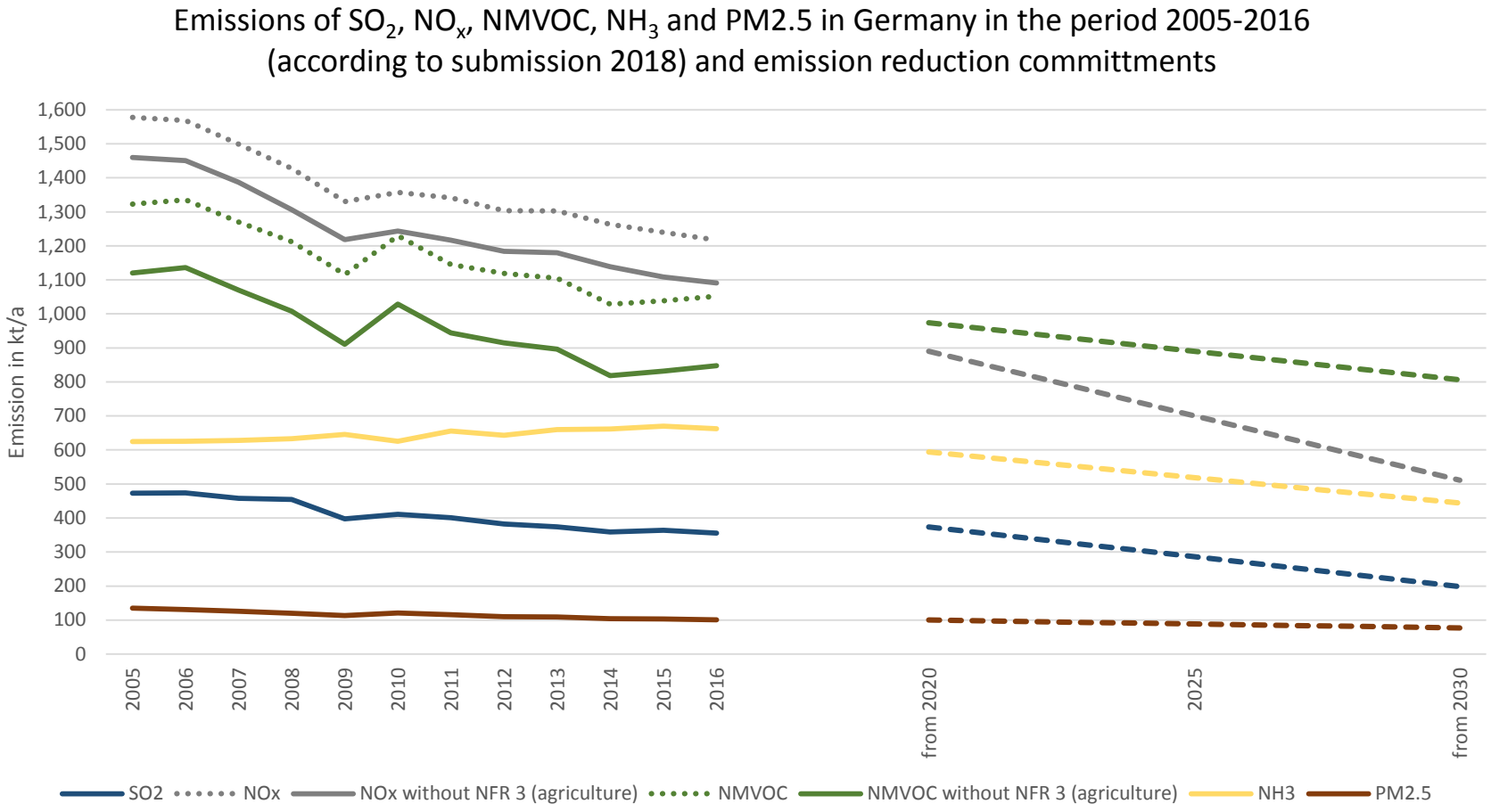
- Activity data are coherent with other policies and reporting requirements (e.g. reporting on GHG emissions)
- Database EMMa is connected to the database used to calculate the national emissions for the national inventory report
- Chemical Transport Model EURAD:
  - Model configuration:
    Europe: 50x50 km^2
    Central Europe: 10 km^2
    Germany: 2x2 km^2



  - Regional air quality (concentration and deposition) for 2020, 2025 and 2030 and comparison with 2005
  - Data on hot-spot concentrations available for certain regions.



Emissions 2005-2016



Source: Draft German air pollution control programme, UBA 2018

Emission scenarios

		2005				
		NO_x	SO_2	NMVOC	NH_3	PM2.5
Emissions submission 2018 (including adjustments for NO_x and NMVOC)	**kt**	1459	473	1121	625	135
Adjustment anaerobic digestion of energy crops					614	

With Measures Scenario (WM)																
		2020					2025					2030				
		NO_x	SO_2	NMVOC	NH_3	PM2.5	NO_x	SO_2	NMVOC	NH_3	PM2.5	NO_x	SO_2	NMVOC	NH_3	PM2.5
Emission reduction commitments (compared with 2005 base year)	%	39%	21%	13%	5%	26%	52%	39,5%	20,5%	17%	34,5%	65%	58%	28%	29%	43%
With Measures Scenario	%	40%	34%	28%	2%	33%	50%	44%	30%	8%	36%	59%	50%	30%	9%	39%
	kt	882	314	803	614	91	725	267	787	575	86	604	237	785	570	82
Adjustment anaerobic digestion of energy crops	%				9%											
	kt				560											
With Additional Measures Scenario (WAM)																
		2020					2025					2030				
		NO_x	SO_2	NMVOC	NH_3	PM2.5	NO_x	SO_2	NMVOC	NH_3	PM2.5	NO_x	SO_2	NMVOC	NH_3	PM2.5
With Measures Scenario	%	41%	36%	29%	2%	33%	57%	50%	30%	18%	39%	65%	58%	31%	31%	43%
	kt	856	304	800	614	90	633	239	782	514	82	504	199	777	431	77
Adjustment anaerobic digestion of energy crops	%				9%											
	kt				560											

Source: Draft German air pollution control programme, UBA 2018

Measures

- The WAM scenario is based on a more ambitious energy scenario than the WM scenario.
- Additional measures included in the WAM scenario:
  - Set of measures for the transport sector (software update Diesel cars and LDVs Euro 5/6, retrofitting of busses, promotion of public transport, cycling and walking, increase share of electric vehicles)
  - Set of 10 measures for the agricultural sector (i.a. incorporation of manure and slurry within 1 h, low-emission application techniques, covered manure storage, low-emission animal housing)
  - Measures for coal-fired LCPs
  - Implementation of the MCPD
  - Maintain national regulations for solid fuel boilers which are more ambitious than Regulation (EU) 2015/1189 (Ecodesign requirements for solid fuel boilers)

Projected improvement of air quality

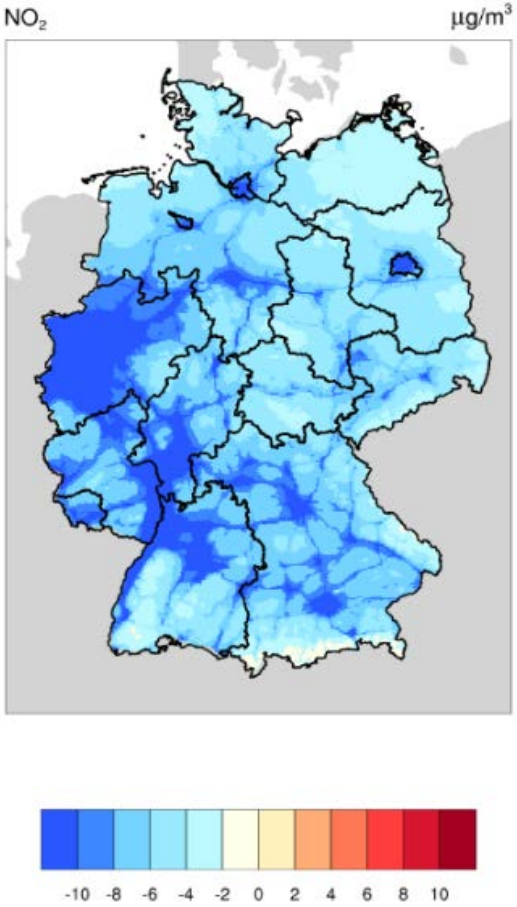
Mean difference of annual mean background concentrations 2005-2030 for relevant pollutants (meteorology 2005) Scenarios WM and WAM

Pollutant	WM scenario	WAM scenario
NO_2	-6,4	-6,7
O_3	+4,7	+4,7
NH_3	+0,1	-0,8
SO_2	-1,2	-1,3
PM10	-4,9	-5,4
PM2.5	-5,1	-5,6

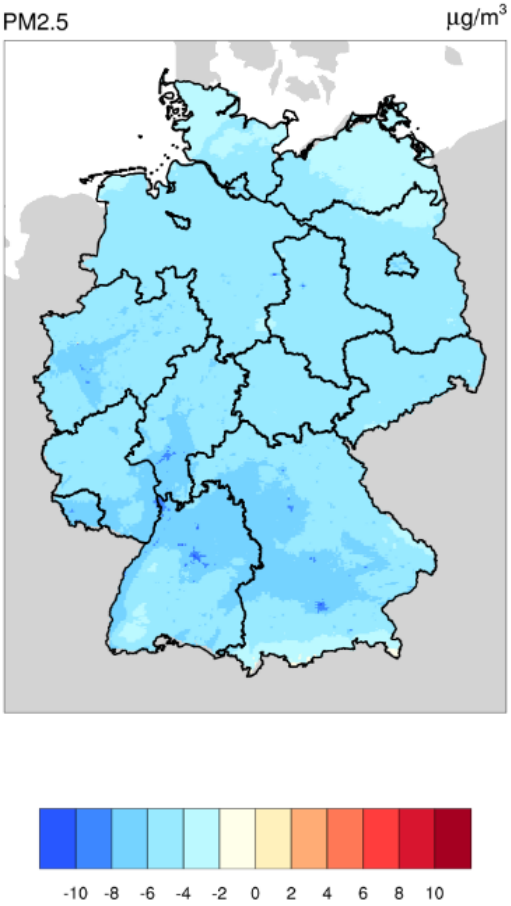
- For NO_2, SO_2 and O_3 differences between the scenarios WM and WAM are relatively small
- No reduction of NH_3 concentrations in the WM scenario but reduction in the WAM scenario
- Significant increase of O_3 annual mean values

Projected improvement of air quality

Change in annual mean NO_2 concentrations 2005-2030, WAM scenario



Change in annual PM2.5 concentrations 2005-2030, WAM scenario



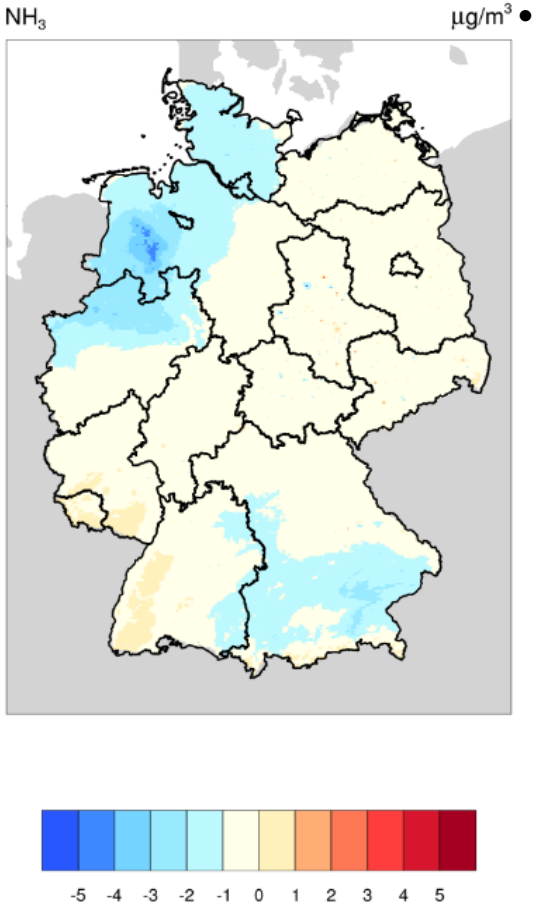
- Clear reduction of NO_2 background concentrations (up to 10 µg/m³) especially in agglomeration areas and along motorways due to a significant decrease of NO_x emissions from road traffic until 2030. For an assessment of local NO_2 concentrations small-scale models need to be used.
- PM2.5 background concentrations decline (2-8 µg/m³) especially in agglomeration areas due to different emission reduction measures.

Source: Draft German air pollution control programme, UBA 2018

Projected improvement of air quality

Change in annual mean NH_3 concentrations 2005-2030, WM scenario

Change in annual NH_3 –concentrations 2005-2030, WAM scenario

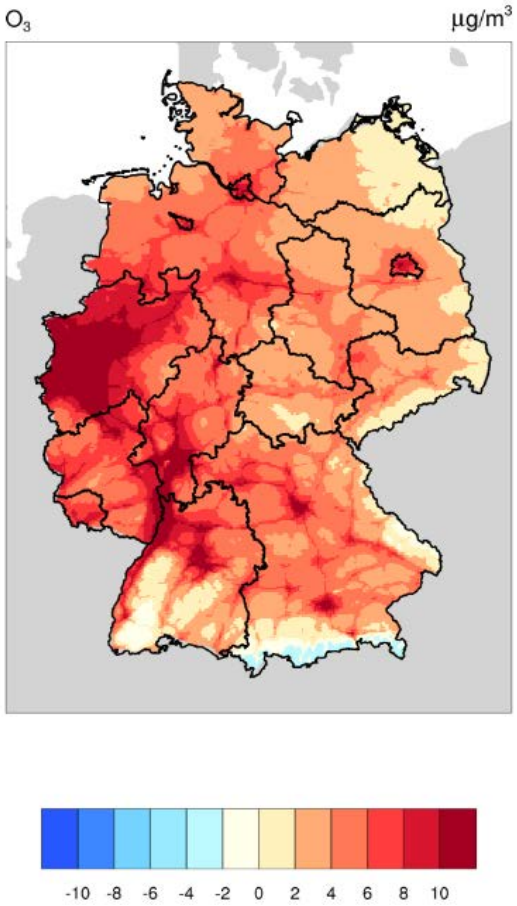


No reduction of NH_3 background concentrations in the WM scenario but decline (in agricultural areas) in the WAM scenario due to agricultural emission reduction measures.

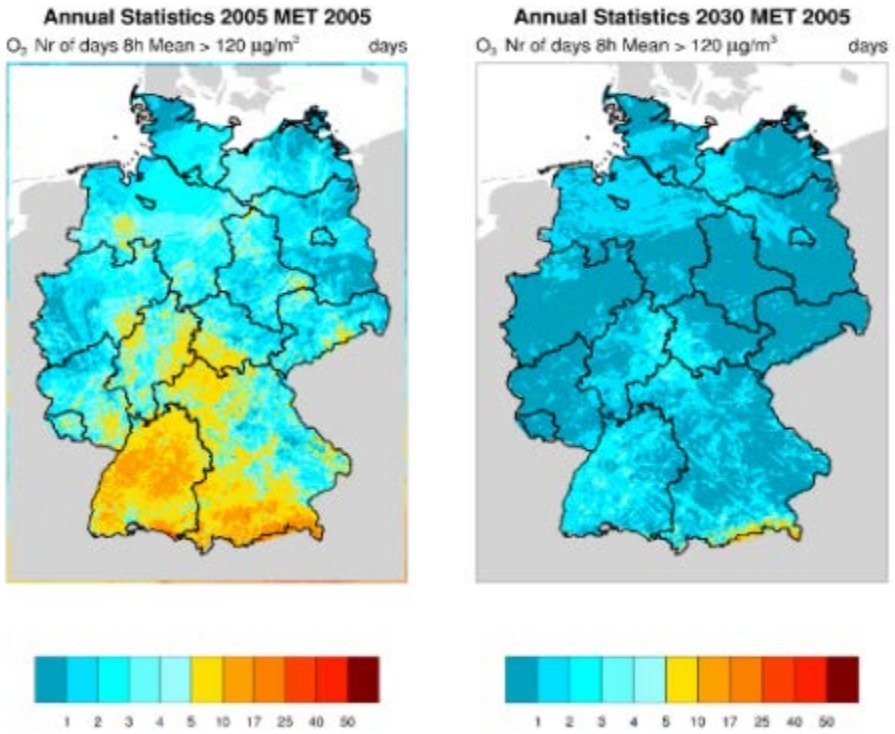
Source: Draft German air pollution control programme, UBA 2018

Projected improvement of air quality

Change in annual mean O_3 concentrations 2005-2030, WAM scenario



O_3 - Number of days with 8 h mean > 120 µg/m³ 2005 and 2030, WAM scenario (meteorology 2005)



- Projected increase of annual mean ozone concentrations between 2005 and 2030 up to 10 µg/m³ in agglomeration areas due to a reduction of NO emissions in urban areas
- Reduction of peak concentrations due to reductions in precursor emissions

Source: Draft German air pollution control programme, UBA 2018

Other IAM activities and outlook

- German study on health effects of NO_2 published in March 2018: estimation of the background NO_2 exposure for the population in Germany and quantification of the related burden of disease for mortality and morbidity. Small scale NO_2 exposure was examined in selected model regions.
- Research project on the assessment of costs and benefits of emissions reduction measures will start in May 2020.

Thank you for your attention!

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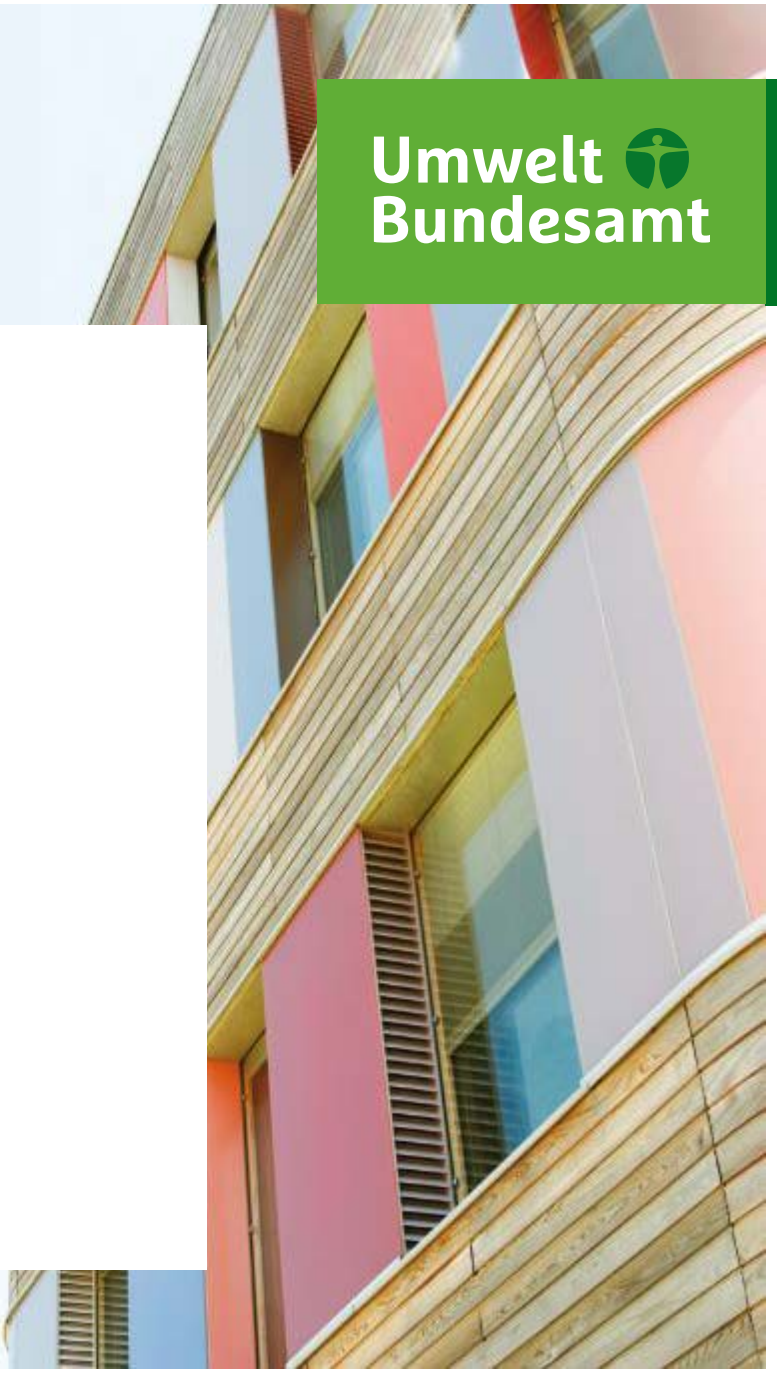
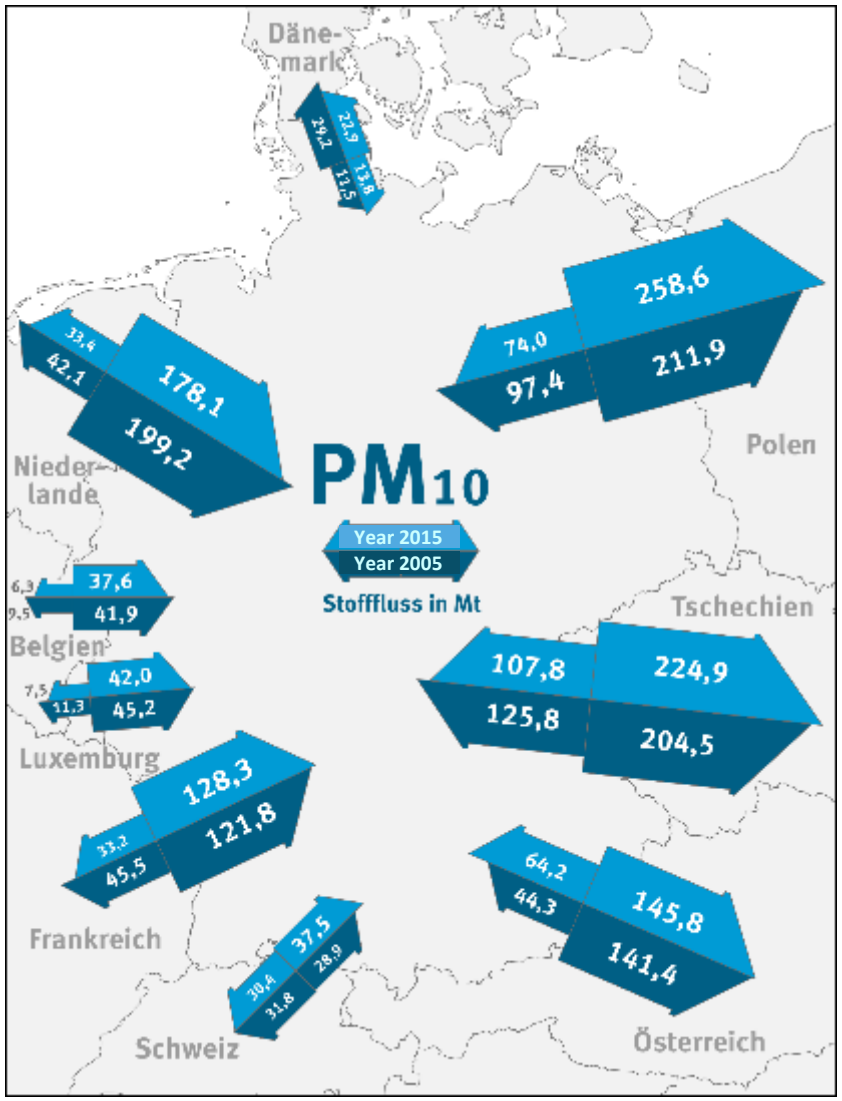
https://www.umweltbundesamt.de/en/topics/air



Transboundary transport



Source: German air pollution control programme, UBA 2019

- Estimation of the flux of pollutants up to an altitude of 3000 metres.
- The methodology has been criticised in the interservice consulations.
- For an updated air pollution control programme a different methodology to estimate transboundary transport will be used.