Chapter 11 - Adjustments and Emissions Reduction Commitments

Emission reduction targets 2010 and Germany's compliance

This section describes the 2010 emission reduction targets established by the original Gothenburg Protocol and the first NEC Directive. It transparently explains Germany's (non-)compliance and illustrates the use of adjustments. Later emission reduction targets for 2020 or 2030 are not covered here, since the assessment can only be made with 2020 data, available from 2022 onward.

	NO_x					SO_2					NMVOC					NH_3				
NATIONAL EMISSION CEILINGS																				
Gothenburg	**1,081**					**550**					**995**					**550**				
NEC	**1,051**					**520**					**995**					**550**				
INVENTORY DATA																				
	2010	**2011**	...	**2018**	**2019**	**2010**	**2011**	...	**2018**	**2019**	**2010**	**2011**	...	**2018**	**2019**	**2010**	**2011**	...	**2018**	**2019**
Inventory Total	1,724.1	1,691.9	...	1,533.7	1,422.4	455.9	455.9	...	312.9	299.4	1,390.1	1,390.1	...	1,170.4	1,145.2	642.1	642.1	...	667.3	638.1
minus 11.B - Forest fires	0.06	0.02	...	0.05	0.29	0.01	0.01	...	0.01	0.07	0.19	0.19	...	0.15	0.91	0.02	0.02	...	0.01	0.08
minus 1.A.3.a i - Cruise	107.08	103.77	...	131.9	136.3	6.00	6.00	...	7.17	7.38	1.50	1.50	...	1.65	1.75	1.22	1.22	...	1.46	1.50
minus 1.A.3.a ii - Cruise	8.44	7.77	...	7.25	7.08	0.42	0.42	...	0.37	0.38	0.46	0.46	...	0.37	0.36	0.09	0.09	...	0.08	0.08
minus 1.A.3.d i	137.59	135.81	...	106.5	76.5	44.3	44.3	...	3.66	2.59	3.99	3.99	...	2.82	1.81	0.03	0.03	...	0.03	0.02
National Total *for Reporting*	1,471.0	1,444.5	...	1,288.1	1,202.3	405.2	405.2	...	301.7	289.0	1,384.0	1,384.0	...	1,165.4	1,140.3	640.8	640.8	...	665.7	636.4
EXCEEDANCES OF SET EMISSION CEILINGS																				
against NEC	422.9	422.9	...	237.1	151.3	*no exceedance*					389.0	389.0	...	170.4	145.3	90.8	90.8	...	115.7	86.4
against Gothenburg	392.9	392.9	...	207.1	121.3	*no exceedance*					389.0	389.0	...	170.4	145.3	90.8	90.8	...	115.7	86.4
ADJUSTMENTS																				
	NO_x					SO_2					NMVOC					NH_3				
	2010	**2011**	...	**2018**	**2019**	**2010**	**2011**	...	**2018**	**2019**	**2010**	**2011**	...	**2018**	**2019**	**2010**	**2011**	...	**2018**	**2019**
National Total *for Reporting*	1,473.9	1,473.9	...	1,288.1	1,202.3	405.2	405.2	...	301.7	289.0	405.2	405.2	...	1,165.4	1,140.3	640.8	640.8	...	665.7	636.4
minus NOx from 1.A.3.b	-297.8	-297.8	...	-214.9	-174.6															
minus NOx and NMVOC from 3.B	-1.63	-1.63	...	-1.55	-1.52						405.2	405.2	...	-320.2	-316.5					
minus NOx and NMVOC from 3.D	-114.1	-114.1	...	-123.9	-116.9						405.2	405.2	...	-9.74	-7.82					
minus NOx & NH3 from 3.I - Storage of Energy crops	-0.16	-0.16	...	-0.18	-0.18											-3.04	-3.04	...	-3.27	-3.29
minus NOx & NH3 from Energy crops residuals used in 3.D	IE in 3.D NO_x Total															-37.3	-37.3	...	-55.4	-55.7
National Total *for Compliance*	1,060.1	1,060.1	...	947.6	909.1	405.2	405.2	...	301.7	289.0	1,057.2	1,057.2	...	835.5	816.0	600.5	600.5	...	607.0	577.5
REMAINING EXCEEDANCES																				

	NO_x		SO_2	NMVOC		NH_3				
against NEC	9.1			62.2		50.5	50.5	...	57.0	27.5
against Gothenburg				62.2		50.5	50.5	...	57.0	27.5

The table above provides a breakdown of the emission data for the years 2010, 2016, 2017 and 2018 and the four pollutants relevant for Gothenburg and NEC compliance (NO_x, SO_2, NMVOC, and NH_3). Starting from the **Germany's emission ceilings** required by the **Gothenburg protocol** and the **NEC directive** respectively, the **Inventory Total** values are provided. These include emission amounts that are not considered for compliance (the so-called “Memo Items”, e.g. bunkers, aviation etc.). These amounts are subtracted, resulting in the **National Total** officially used for reporting. These national totals are then compared to the NEC and Gothenburg ceilings and exceedance amounts are provided wherever an exceedance occurs.

In the next step, the **Adjustments** as defined by the CLRTAP Guidelines are applied to the national totals. All German adjustment proposal have been reviewed and accepted by independent expert teams.

Finally, new national totals for compliance checking and the remaining exceedance against both the NEC directive and the Gothenburg protocol are calculated for each pollutant and year. The years 2011 to 2015 are not shown in this table due to space limitations, data from these years is consistent and does not show any further exceedances.

As a general result, it can be derived that Germany meets all its reduction targets from 2011 onward, with the notable exception of ammonia.

Current situation per pollutant

For **NO_x**, both the NEC and the Gothenburg commitments have been undercut by 2011 and Germany expects to stay in compliance due to a continuing downward trend.

Germany's **SO_2 emissions** have been on a steep and steady decline since the 1980's. Today's numbers are significantly lower than expected when the emission ceilings were established, thus Germany does not have any problems meeting its emission ceiling for sulphur oxides.

The national total emissions of **NMVOCs** showed a steady downward trend until 2009. After recovery from the “crisis year” 2009, which brought the emissions up again in 2010, the national totals returned to the level reached in 2009 where they remain stable since. With the majority of emissions resulting from solvent production and application which is primarily governed by product legislation, action on EU level is needed to further bring down these emissions. With the adjustment in agriculture applied, Germany is, however, currently in compliance with its commitments for this pollutant.

For **NH_3**, emission estimates have been revised significantly and repeatedly over the last years. Due to various inventory changes in the 2015, the 2016 and the 2018 submissions, each revising critical emission factors, total emissions first went up by about 120kt and have come back down a bit in the latest calculations. The 2016 submission additionally includes the new source “emissions from digested energy crops” for the first time, resulting in extra emissions of about 65 kt per year. Given these changes, compliance will only be possible with additional measures, even when taking adjustments into account.

Adjustments in detail

Please refer to the following sub-sections for details on the emission adjustments applied by Germany:

- Adjustment DE-A for NOx from 1.A.3.b Road Transport
- Adjustment DE-B for NOx and NMVOC from 3.B Manure Management
- Adjustment DE-C for NOx and NMVOC from 3.D Agricultural Soils
- Adjustment DE-D for NOx & NH3 from Energy Crops in 3.D and 3.I