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	2010	2016	2017	2019	2010		2016	2017	2010	2010		2016	2017	2018	2010		2016	2017	2010
Inventory Total	1,724.7		_																
minus 11.B - Forest fires	0.06	0.03	0.05	0.29	0.01		0.01	0.01	0.07	0.19		0.11	0.15	0.91	0.02		0.01	0.01	0.08
minus 1.A.3.a i - Cruise	105.6	119.2	131.9	136.3	6.00		6.51	7.17	7.38	1.50		1.48	1.65	1.75	1.22		1.33	1.46	1.50
minus 1.A.3.a ii - Cruise	7.63	7.47	7.25	7.08	0.42		0.39	0.37	0.38	0.46		0.38	0.37	0.36	0.09		0.08	0.08	0.08
minus 1.A.3.d i	137.6	125.0	106.5	76.5	44.3		4.8	3.66	2.59	3.99		4.01	2.82	1.81	0.03		0.03	0.03	0.02
National Total for Reporting	1,473.9	1,335.9	1,288.1	1,202.3	405.2		311.4	301.7	289.0	1,384.0		1,160.3	1,165.4	1,140.3	640.8		675.5	665.7	636.4
EXCEEDANCE	ES OF SET	EMISS	ION CEI	LINGS									·		-				
against NEC	422.9	284.9	237.1	151.3	no exceedance				389.0		165.3	170.4	145.3	90.8		125.5	115.7	86.4	
against Gothenburg	392.9	254.9	207.1	121.3	no exceedance				389.0		165.3	170.4	145.3	90.8		125.5	115.7	86.4	
ADJUSTMENT	ΓS																		
		NO	×				SO	·				NMV	ос				NH	3	
	2010	2016	2017	2018	2010		2016	2017	2018	2010		2016	2017	2018	2010		2016	2017	2018
National Total for Reporting	1,473.9	1,335.9	1,288.1	1,202.3	405.2		311.4	301.7	289.0	1,384.0		1,160.3	1,165.4	1,140.3	640.8		675.5	665.7	636.4
minus NOx from 1.A.3.b	-297.8	-244.3	-214.9	-174.6															
minus NOx and NMVOC from 3.B	-1.63	-1.56	-1.55	-1.52						-317.2		-322.8	-320.2	-316.5					
minus NOx and NMVOC from 3.D	-114.1	-126.5	-123.9	-116.9						-9.53		-9.69	-9.74	-7.82					
minus NOx & NH3 from 3.I - Storage of Energy crops	-0.16	-0.18	-0.18	-0.18											-3.04		-3.30	-3.27	-3.29
minus NOx & NH3 from Energy crops residuals used in 3.D	IE in 3.D NO _x Total													-37.3		-56.1	-55.4	-55.7	
National Total for Compliance	1,060.1	963.4	947.6	909.1	405.2		311.4	301.7	289.0	1.057.2		827.7	835.5	816.0	600.5		616.1	607.0	577.5
REMAINING	EXCEEDA	NCES									_	1							

	NO _x		SO _x		NMVOC	NH ₃				
against NEC	9.1			62.2		50.5		66.1	57.0	27.5
against Gothenburg				62.2		50.5		66.1	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 1) 2) 3) 4) 5) 6) 7) 8) 9) 10)

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

EMEP Executive Body Decision 2014/1 - Improving the guidance for adjustments under the 1999 Protocol to Abate

Acidification, Eutrophication and Ground-level Ozone to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them/ URL:

http://www.ceip.at/fileadmin/inhalte/emep/Adjustments/Decision_2014_1.pdf

3)

Centre on Emission Inventories and Projections (CEIP): CEIP/Adjustment RR/2014/GERMANY: Review of the 2014 Adjustment Application by Germany, URL:

 $https://webdab01.umweltbundesamt.at/download/adjustments 2014/Adjustment_Review_Report_GERMANY_2014.pdf?cgiproxy_skip=1, 5 August 2014$

Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2014/10: Review of adjustment applications 2014; URL: http://www.ceip.at/fileadmin/inhalte/emep/pdf/2015/ece.eb.air.ge.1.2014.10.edited.ae_formatting_accepted.ko.pdf, 5 August 2014

Centre on Emission Inventories and Projections (CEIP): CEIP/Adjustment RR/2015/Germany: Review of the 2015 Adjustment Application by Germany, URL:

 $https://webdab01.umweltbundesamt.at/download/adjustments 2015/Germany 2015-adj.pdf?cgiproxy_skip=1, September 2015$

6)

Centre on Emission Inventories and Projections (CEIP): CE/EB.AIR/GE.1/2015/10-ECE/EB.AIR/WG.1/2015/13: Review of adjustment applications 2015; URL:

http://www.ceip.at/fileadmin/inhalte/emep/Adjustments/ece.eb.air.ge.1.2015.10_ece.eb.air.wg.1.2015.13.AV.pdf, 6 July 2015

Centre on Emission Inventories and Projections (CEIP): Review of the 2016 Adjustment Application by Germany, URL: https://webdab01.umweltbundesamt.at/download/adjustments2016/Germany2016-adj.pdf?cgiproxy_skip=1, 2016: 8: CEIP, 2016b: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2016/10—ECE/EB.AIR/WG.1/2016/18: Review of adjustment applications 2016; URL:

https://www.ceip.at/fileadmin/inhalte/emep/pdf/2016/ECE_EB.AIR_GE.1_2016_10_E.pdf, 2016

8)

Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2017/10-ECE/EB.AIR/WG.1/2017/20: Review of adjustment applications 2017; URL:

 $\frac{\text{https://www.ceip.at/fileadmin/inhalte/emep/pdf/2017/Advance_ece_eb_air_ge_1_2017_10_ece_eb_air_wg_1_2017.pdf, 2017}{\text{good of the properties of the pr$

Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2018/10-ECE/EB.AIR/WG.1/2018/21: Review of adjustment applications 2018; URL:

 $https://www.ceip.at/fileadmin/inhalte/emep/pdf/2018/ADJ_ece.eb.air.ge. 1.2018. 10-ece.eb.air.wg. 1.2018. 21_advance.pdf, 2018. 2018. 2018. 2018. 2018. 2018. 2019. 201$

10)

Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2019/10—ECE/EB.AIR/WG.1/2019/22: Review of adjustment applications 2019; URL:

https://www.ceip.at/fileadmin/inhalte/emep/pdf/2019/ECE EB.AIR GE.1 2019 10-1909789E.pdf, 2019