ENVIRONMENT AGENCY AUSTRIA

AUSTRIA'S ANNUAL AIR EMISSION INVENTORY 1990–2024

Emissions of SO_2, NO_x, NMVOC, NH_3 and $PM_{2.5}$

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CONTENTS

ZUSAMMENFASSUNG

Die aktuellen Ergebnisse der Österreichischen Luftschadstoff-Inventur (OLI) zeigen im Jahr 2024 gegenüber 2023 rückläufige Emissionen über alle Schadstoffe (SO_2, NO_x, NMVOC, NH_3 und $PM_{2,5}$).

Die folgende Analyse bezieht sich auf die nationalen Emissionsmengen inklusive Kraftstoffexport (berechnet auf Basis der verkauften Treibstoffmengen). Seit dem Bericht 2022 sind für das nationale Monitoring der Zielerreichung unter der NEC-Richtlinie (siehe Kapitel 2.2) die Emissionsmengen aus Kraftstoffexport nicht mehr von der Gesamtemissionsmenge abzuziehen.

- Die SO_2-Emissionen nahmen im Jahr 2024 gegenüber 2023 um 1,6 % ab, was vor allem auf gesunkene Emissionen aus der Zementindustrie (*1.A.2.f*) und die niedrigere Stahl- und Roheisenproduktion (*1.A.2.a*) zurückzuführen ist. Bei den Haushalten haben die Emissionen überwiegend aufgrund des geringeren Einsatzes von Kohle und Biomasse gegenüber dem Vorjahr abgenommen.
- Die NO_x-Emissionen haben verglichen mit 2023 im Jahr 2024 um 4,2 % abgenommen. Hauptverantwortlich für den NO_x-Ausstoß ist der Straßenverkehr, wobei die wesentliche Ursache für die Abnahme im geringeren Dieselabsatz bei Pkw in Kombination mit Effekten der Flottenerneuerung liegt. Weiters kam es zu einer NO_x-Abnahme aus mobilen Maschinen in der Industrie (*1.A.2.g.7*), der Zementindustrie (*1.A.2.f*) und der Eisen- und Stahlindustrie (*1.A.2.a*). Der Emissionsrückgang im Kleinverbrauch ist auf den geringeren Einsatz von Biomasse, Öl und Gas zurückzuführen. Weiters nahmen die Emissionen aus den mobilen Quellen der Landwirtschaft ab, im Wesentlichen durch geringeren Einsatz von fossilen Treibstoffen und fortlaufender Flottenerneuerung.
- Von 2023 auf 2024 sind die NMVOC-Emissionen um 2,2 % gesunken. Diese stammen überwiegend aus dem Lösemittelsektor, der Landwirtschaft und der Bereitstellung von Raumwärme und Warmwasser in Haushalten. In allen diesen Sektoren haben die Emissionen abgenommen. Die Reduktion im Lösemittelsektor beträgt 2,0 %, jene der Landwirtschaft 1,1 % und bei den Haushalten kam es zu einer Abnahme um 3,8 % im Vergleich zum Jahr 2023. Die Gründe dafür sind ein geringerer Einsatz von Lösemitteln sowie weitere Reduktionen in Industrie und Gewerbe, abnehmende Tierbestände (insbesondere Rinder) in der Landwirtschaft und der geringere Biomasseeinsatz als Folge der milderen Witterung im Haushaltssektor.

- Die NH_3-Emissionen stammen nahezu ausschließlich aus dem Sektor Landwirtschaft (93,8 %). Im Jahr 2024 sind sie um 2,5 % gegenüber 2023 gesunken, wofür maßgeblich die reduzierten Emissionen aus der Stickstoffdüngung, sowohl bei der Anwendung von Mineraldüngern als auch bei der Ausbringung von Wirtschaftsdüngern, verantwortlich sind.
- Von 2023 auf 2024 haben die Feinstaubemissionen ($PM_{2,5}$) um 3,0 % abgenommen, hauptsächlich aufgrund des witterungsbedingt verringerten Biomasseeinsatzes in privaten Haushalten zur Bereitstellung von Raumwärme und Warmwasser.

Die vorliegenden Ergebnisse zeigen, dass die geltenden Reduktionsverpflichtungen für die anthropogenen Emissionen von NO_x, SO_2, NMVOC, NH_3 und Feinstaub ($PM_{2,5}$) entsprechend der Richtlinie (EU) 2016/2284 über die Reduktion der nationalen Emissionen bestimmter Luftschadstoffe („NEC-Richtlinie“) bzw. dem Emissionsgesetz-Luft 2018 (EG-L 2018; BGBl. I Nr. 75/2018) seit 2020 für alle genannten Luftschadstoffe eingehalten werden.

1 EINLEITUNG

Dieser Bericht beinhaltet eine Zusammenfassung des aktuellen Stands der Emissionen von Schwefeldioxid (SO_2), Stickstoffoxiden (NO_x), flüchtigen Kohlenwasserstoffen ohne Methan (NMVOC) und Ammoniak (NH_3) sowie der Feinstaubfraktion $PM_{2,5}$. Es werden die Emissionsdaten, die am 12. Februar 2026 an die Europäische Kommission übermittelt wurden, die wichtigsten Trends sowie die wesentlichen methodischen Änderungen gegenüber dem Vorjahr dargestellt.

- Annex 1 beinhaltet die Emissionen der Schadstoffe SO_2, NO_x, NH_3, NMVOC und $PM_{2,5}$ basierend auf dem inländischen Kraftstoffabsatz (Emissionen auf Basis „fuel sold").
- Annex 2 enthält die Emissionstrends dieser Schadstoffe abzüglich der Emissionsmengen aus preisbedingtem Kraftstoffexport in Fahrzeugen (Emissionen auf Basis „fuel used").

Die sektorale Gliederung der im Anhang präsentierten Überblickstabellen hält sich an die Berichtsnomenklatur (Nomenclature For Reporting, NFR) der United Nations Economic Commission for Europe (UNECE). Der vollständige Datensatz wurde in diesem Format an die Europäische Kommission übermittelt.

Der vorliegende Bericht wurde vom Umweltbundesamt auf Grundlage des Umweltkontrollgesetzes (BGBl. Nr. 152/1998) erstellt. Dem Umweltbundesamt wird in diesem Bundesgesetz in § 6 (2) Z. 19 unter anderem die Aufgabe übertragen, an der Erfüllung der Berichtspflichten an die Europäische Kommission gemäß Richtlinien und Entscheidungen der EU mitzuwirken. In § 6 (2) Z. 20 werden die Erstellung und Führung von Inventuren und Bilanzen zur Dokumentation des Zustandes und der Entwicklung der Umwelt sowie der Umweltbelastungen und ihrer Ursachen ausdrücklich als besondere Aufgaben des Umweltbundesamtes genannt.

Das Umweltbundesamt führt jährlich die Berechnung der Österreichischen Luftschadstoff-Inventur (OLI) durch, die als Grundlage für die Erfüllung der nationalen und internationalen Berichtspflichten herangezogen wird. Die OLI wird erforderlichenfalls auch für zurückliegende Jahre aktualisiert, um eine konsistente Zeitreihe zur Verfügung zu stellen. Die in diesem Bericht publizierten Emissionsdaten ersetzen somit die publizierten Daten und Zeitreihen vorhergehender Berichte.

Stand der Daten und das Berichtsformat der vorliegenden Publikation:

Tabelle 1: Datengrundlage des vorliegenden Berichts.

Inventur	Datenstand	Berichtsformat
OLI 2025	12. Februar 2026	NFR-Format der UNECE

2 EMISSIONSTRENDS

In folgender Tabelle sind die aktuellen Ergebnisse der Österreichischen Luftschadstoff-Inventur (OLI) für die Emissionen von SO_2, NO_x, NH_3, NMVOC und $PM_{2,5}$ dargestellt.

Tabelle 2: NEC-Emissionen Österreichs, 1990–2024. (Quelle: Umweltbundesamt).

	Emissionen Österreichs [Kilotonnen]				
	SO_2	**NO_x**	**NMVOC**	**NH_3**	**$PM_{2,5}$**
1990	73,77	213,91	343,53	91,06	27,50
1995	47,40	197,55	256,54	87,54	26,08
2000	31,58	211,91	195,72	82,55	24,66
2005	25,89	249,48	167,91	79,54	23,76
2010	15,97	215,52	146,51	80,58	20,66
2011	15,15	207,74	140,04	79,82	19,44
2012	14,78	204,52	137,38	79,76	18,98
2013	14,34	208,92	134,49	79,36	18,47
2014	14,52	201,93	127,66	80,14	16,87
2015	14,06	198,78	125,89	80,74	16,72
2016	13,43	188,93	124,96	81,56	16,31
2017	12,92	178,47	123,66	81,53	16,09
2018	11,67	165,36	118,98	79,80	14,97
2019	11,22	155,72	116,66	77,99	14,73
2020	10,44	133,27	116,82	77,22	13,78
2021	10,82	131,83	117,91	77,34	14,81
2022	10,73	122,21	113,40	75,93	13,91
2023	10,72	114,71	113,24	74,11	14,06
2024	10,55	109,86	110,81	72,28	13,64

Demnach nahmen im Jahr 2024 gegenüber dem Vorjahr 2023 alle Luftschadstoffemissionen ab.

2.1 Beschreibung der Emissionstrends ab 1990

2.1.1 SO_2-Emissionen

2024 betrugen die SO_2-Emissionen 10,5 Kilotonnen (kt). Seit 1990 (73,8 kt) konnte der SO_2-Ausstoß um 85,7 % reduziert werden. Seit 2005 gab es einen Rückgang um 59,3 %. Diese Entwicklung ist vorwiegend auf den Ersatz von Kohle und Heizöl durch schwefelärmere Brennstoffe, wie z. B. Erdgas, die Absenkung des Schwefelanteils in Mineralölprodukten und Treibstoffen (gemäß Kraftstoffverordnung) sowie den Einbau von Entschwefelungsanlagen in der Industrie und in Kraftwerken in den 1980er- und 1990er-Jahren (gemäß Luftreinhaltegesetz für Kesselanlagen) zurückzuführen.

Den größten Beitrag zu den SO_2-Emissionen lieferte 2024 die Industrie in der Summe aus pyrogenen Emissionen (NFR Sektor *1.A.2*) und Prozessemissionen (NFR Sektor *2*) mit insgesamt 77,5 %, wobei hier klar die Eisen- und Stahlproduktion mit 48,0 % dominiert. 8,6 % stammten aus der Energieversorgung (*1.A.1*) und 11,0 % aus Verbrennungsprozessen beim Kleinverbrauch (*1.A.4*, überwiegend Haushalte). Im Jahr 1990 waren Letztere mit 44,3 % noch Hauptverursacher. Hier konnten durch die Umstellung von Kohle und Heizöl auf schwefelärmere Brennstoffe oder andere Energieträger die größten absoluten Reduktionen erreicht werden.

Von 2023 auf 2024 sind die SO_2-Emissionen um 0,2 kt (-1,6 %) gesunken. Vor allem die Emissionen der Zementindustrie (*1.A.2.f*) sind gegenüber dem Vorjahr aufgrund des geringeren Einsatzes schwefelreicher Brennstoffe stark zurückgegangen (-23,1 %). Eine weitere Abnahme erfolgte durch die niedrigere Stahl- und Roheisenproduktion (*1.A.2.a*). Bei den Haushalten (*1.A.4.b*) sind die Emissionen überwiegend aufgrund des reduzierten Einsatzes von Kohle sowie Biomasse in Wohngebäuden gegenüber dem Vorjahr gesunken. Die Entwicklung von Biomasse ist hauptsächlich durch die milde Witterung bedingt.

Teilweise kompensiert wurde der SO_2-Rückgang durch die gestiegenen Emissionen aus der Erdölraffinerie (*1.A.1.b*) (+45,2 %), wobei die SO_2-Emissionen der Raffinerie stark vom Schwefelgehalt des verarbeiteten Rohöls (unterschiedliche Herkunft) sowie der Effizienz der Schwefeleabscheidungstechnik abhängen. Die SO_2-Emissionen aus stationären Anlagen der produzierenden Industrie (*1.A.2.g.viii*) haben sich aufgrund eines erhöhten Einsatzes von Braunkohle und Holzabfällen ebenfalls leicht erhöht (+6,2 %).

2.1.2 NO_x-Emissionen

Für das Jahr 2024 wurde ein Ausstoß von rund 109,9 kt NO_x berechnet. Im Jahr 1990 betrugen die NO_x-Emissionen 213,9 kt. Seither gingen sie um 48,6 % zurück. Seit 2005 wurde eine Emissionsreduktion um 56,0 % erzielt.

Der Rückgang der NO_x-Emissionen ab 2005 ist überwiegend auf den Straßenverkehr *(1.A.3.b)* zurückzuführen. Technische Fortschritte in der Abgasnachbehandlung für schwere Nutzfahrzeuge und zu einem geringeren Anteil auch bei Pkw zeigten ihre Wirkung. Auch der generell stark rückläufige Einsatz von Heizöl und Kohle, der Umstieg auf modernere schadstoffarme Heizungssysteme und Fernwärme in Haushalten und Dienstleistungsbetrieben sowie Minderungsmaßnahmen bei den großen Kohle- und Ölkraftwerken (*1.A.1.a*) und in der Industrie (*1.A.2*) trugen zur Emissionsabnahme bei. Die COVID-Pandemie war hauptverantwortlich für die deutliche Reduktion der NO_x-Emissionen von 2019 auf 2020.

Der Großteil der nationalen NO_x-Emissionen entsteht bei der Verbrennung von Brenn- und Kraftstoffen, wobei der größte Anteil daran im Jahr 2024 mit 44,3 % auf den Straßenverkehr entfiel. 2005 erreichten die NO_x-Emissionen des Straßenverkehrs einen Höchstwert und gingen seither kontinuierlich zurück. Seit 2005 konnten sie um 69,1 % reduziert werden, wobei absolut besonders die Emissionen des Schwerverkehrs durch Fortschritte in der Abgasnachbehandlung schwerer Nutzfahrzeuge (Lkw, Last- und Sattelzüge) deutlich vermindert werden konnten. Die kontinuierliche Flottenerneuerung mit neuesten Abgasnachbehandlungssystemen zur Einhaltung der aktuellen Abgasstandards sowie der zunehmende Anteil von Elektrofahrzeugen an der Gesamtfahrleistung machen sich auch 2024 bemerkbar.

Von 2023 auf 2024 kam es zu einer Abnahme der österreichweiten NO_x-Emissionen um 4,9 kt oder 4,2 %, wobei diese Reduktion vorwiegend auf den Straßenverkehr *(1.A.3.b)* zurückzuführen ist (-3,8 kt bzw. -7,3 %). Hauptverantwortlich dafür sind die Diesel-Pkw, welche von 2023 auf 2024 sowohl bei den Neuzulassungen als auch im Bestand und der spezifischen Jahresfahrleistung Rückgänge aufweisen. Zudem weisen alle Kfz-Kategorien verbesserte spezifische NO_x-Emissionen je Fahrzeugkilometer (bezogen auf den Flottendurchschnitt) auf.

Die NO_x-Emissionen der mobilen Maschinen (v. a. Baumaschinen) in der Industrie (*1.A.2.g,vii),* der Zementindustrie (*1.A.2.f*) und der Eisen- und Stahlindustrie (*1.A.2.a*) waren aufgrund der gesunkenen Produktion ebenfalls rückläufig und kompensierten die Zunahmen in anderen Industriebranchen. Bei den mobilen Off-road Maschinen (*1.A.2.g.vii*) wirkte

sich auch die Flottenerneuerung und somit ein höherer Anteil von Maschinen der strengsten Abgasklassen Stage IV und V positiv auf die NO_x-Emissionen aus.

Die Verbrennungsemissionen im Kleinverbrauch (*1.A.4*, überwiegend Haushalte) sind aufgrund des geringeren Einsatzes von Heizöl und Erdgas infolge der zunehmenden Umstellung auf klimafreundliche Heizungssysteme, von Biomasse infolge der milderen Witterung sowie der anhaltend hohen Energiepreise gegenüber dem Jahr 2023 um 6,1 % gesunken. Weiters tragen die geringeren NO_x-Emissionen aus den mobilen Quellen der Landwirtschaft zur gesamten Entwicklung bei. Diese sind aufgrund eines geringeren Einsatzes von fossilen Treibstoffen und fortlaufender Flottendurchdringung mit mobilen Off-road Maschinen der Abgasklassen Stage IV und V, die strengere Grenzwerte gegenüber den Vorgängern aufweisen, gesunken.

2.1.3 NMVOC-Emissionen

Die NMVOC-Emissionen betrugen im Jahr 2024 110,8 kt und im Jahr 1990 343,5 kt. Das entspricht einer Reduktion um 67,7 %. Seit 2005 konnten die NMVOC-Emissionen um 34,0 % reduziert werden. Von 2023 auf 2024 ist die Emissionsmenge um 2,4 kt (-2,2 %) gesunken.

Die größten Reduktionen seit 1990 konnten im Verkehrssektor erzielt werden, im Wesentlichen durch den verstärkten Einsatz von Katalysatoren und Diesel-Kfz. Aktuell nimmt der Straßenverkehr (*1.A.3.b*) nur mehr einen Anteil von 5,6 % an den gesamten NMVOC-Emissionen ein.

Der Lösemittelsektor (*2.D.3*) verursachte 2024 rund 30,3 % der gesamtösterreichischen NMVOC-Emissionen. Aufgrund gesetzlicher Regelungen (Lösungsmittelverordnung sowie VOC-Anlagen-Verordnung) konnten beachtliche Reduktionen erzielt werden. Die Reduktion gegenüber dem Vorjahr um 2,0 % resultiert vor allem aus dem geringeren Einsatz von Lösemitteln, aber auch weitere Emissionsreduktionen in Industrie und Gewerbe trugen zur Abnahme bei.

Einen wesentlichen Anteil an den NMVOC-Emissionen hatte 2024 auch der Sektor Landwirtschaft (*3*) mit 29,6 %. Der überwiegende Anteil kommt aus der Rinderhaltung, wobei die Fütterung mit Silage ein bedeutender Faktor ist. Diese Emissionen sind jedoch mit erheblichen Unsicherheiten verbunden. Eine weitere Emissionsquelle mit deutlich geringeren Emissionsmengen ist der Anbau von Feldfrüchten (Ackerpflanzen und Grünlandbewuchs). Im Vergleich zum Jahr 2023 ging das Emissionsniveau 2024 in der Landwirtschaft zurück (-1,1 %), was

vorwiegend auf die abnehmenden Tierbestände (v. a. Rinder) zurückzuführen ist.

Die Bereitstellung von Raumwärme und Warmwasser in privaten Haushalten (*1.A.4.b.1*) nimmt 2024 einen Anteil von 22,4 % der gesamten NMVOC-Emissionen ein. Maßgeblich verantwortlich für die Emissionsabnahme der stationären Quellen der Haushalte um 3,9 % gegenüber dem Vorjahr ist der infolge milderer Witterung gesunkene Einsatz von Biomasse.

2.1.4 NH_3-Emissionen

Für das Jahr 2024 wurde eine Emissionsmenge von rund 72,3 kt NH_3 berechnet. Von 1990 bis 2024 nahmen die NH_3-Emissionen um 20,6 % ab. Seit 2005 ist eine Reduktion um 9,1 % zu verzeichnen.

Die Landwirtschaft ist mit einem Anteil von 93,8 % (2024) Hauptverursacher der österreichischen Ammoniak-Emissionen. Innerhalb des Sektors entstanden 2024 51,2 % der Emissionen aus dem Wirtschaftsdüngermanagement (*3.B*) und 48,8 % aus Landwirtschaftlichen Böden (*3.D*). Die Emissionen aus der Landwirtschaft gingen seit 1990 um 22,7 % zurück. Neben dem rückläufigen Viehbestand wirkten sich die effizientere Fütterung der Tiere, ÖPUL-Maßnahmen wie der verstärkte Einsatz bodennaher Wirtschaftsdüngerausbringungstechniken (u. a. Schleppschlauch, Schleppschuh, Injektor), die Gülleseparierung sowie die geringeren Mineraldüngermengen günstig auf das Emissionsniveau im langfristigen Trend aus. Zusätzlich zeigt die im Jahr 2023 in Kraft getretene Ammoniakreduktionsverordnung (NH_3-VO) bereits erste Wirkung, z.B. im Bereich der Anwendung von Harnstoffdüngern sowie der rascheren Einarbeitung von Gülle und Festmist.

Im Vergleich zu 2023 verringerten sich im Jahr 2024 die NH_3-Emissionen Österreichs um 1,8 kt (-2,5 %). Hauptursache sind die Emissionen aus der Mineraldüngeranwendung, die sich trotz insgesamt steigender Düngermengen verringert haben. Ein wesentlicher Grund dafür sind die verpflichtenden Vorgaben gemäß NH_3-VO zu Harnstoffdüngern ab 30.06.2023, die sich in der Düngemittelstatistik durch abnehmende Mengen unstabilisierter Harnstoffdünger bereits widerspiegeln. Dieser darf nur mehr ausgebracht werden, wenn er unmittelbar eingearbeitet wird (< 4 h) und es dadurch zu einer deutlichen Emissionsverringerung kommt. Bei der Wirtschaftsdüngerausbringung hat sich ebenfalls die Emissionsmenge verringert, einerseits aufgrund abnehmender Tierbestände (v. a. Rinder um insgesamt -0,8 %), andererseits durch die

verstärkte Anwendung bodennaher Wirtschaftsdüngerausbringungstechniken und dem rascheren Einarbeiten gemäß NH_3-VO.

2.1.5 $PM_{2,5}$-Emissionen

Die $PM_{2,5}$-Emissionen betrugen im Jahr 2024 rund 13,6 kt. Seit 1990 nahmen die $PM_{2,5}$-Emissionen um 50,4 %, von 27,5 kt auf 13,6 kt, ab. Die Reduktion seit 2005 beträgt 42,6 %. Die größten Abnahmen seit 1990 gab es bei der Bereitstellung von Raumwärme und Warmwasser in privaten Haushalten (*1.A.4.b.1*) wegen des stark reduzierten Kohleverbrauchs und beim Straßenverkehr (*1.A.3.b*) durch Verbesserungen bei den Antriebs- und Abgasnachbehandlungstechnologien (z. B. Partikelfilter).

Von 2023 auf 2024 gingen die $PM_{2,5}$-Emissionen um 0,4 kt (-3,0 %) zurück, hauptsächlich aufgrund des witterungsbedingt verringerten Biomasseeinsatzes in den privaten Haushalten (*1.A.4.b.1*). Auch die chemische Industrie (*2.B.10*) verzeichnete einen deutlichen Rückgang aufgrund von Optimierungen bei der Abgasreinigung.

Die Bereitstellung von Raumwärme und Warmwasser in privaten Haushalten (*1.A.4.b.1*, inklusive $PM_{2.5}$ aus Grillkohle) nimmt 2024 mit 45,8 % den größten Anteil an den $PM_{2,5}$-Emissionen Österreichs ein. Die Emissionsabnahme um 3,8 % zwischen 2023 und 2024 ist die Folge des verringerten Biomasseeinsatzes, überwiegend bedingt durch die warme Witterung. Effizienzverbesserungen durch thermische Sanierung und die höheren Anteile moderner Biomasseheizungen (Verbesserung der Verbrennungstechnologie) spielen für die Abnahme seit 2005 ebenfalls eine Rolle. Veraltete Scheitholzfeuerungen („Allesbrenner") verursachen als Hauptquelle in diesem Sektor weiterhin hohe Emissionen.

2.2 Emissionsreduktionsverpflichtungen ab 2020

Die nationalen Emissionsreduktionsverpflichtungen für die anthropogenen Emissionen von NO_x, SO_2, NMVOC, NH_3 und Feinstaub ($PM_{2,5}$) sind in der EU-Richtlinie über die Reduktion der nationalen Emissionen

bestimmter Luftschadstoffe (kurz NEC-Richtlinie)[1] bzw. dem Emissionsgesetz-Luft 2018[2] festgelegt und gelten für den Zeitraum von 2020 bis 2029 sowie ab 2030. Basisjahr für die Berechnungen der Emissionsreduktionsverpflichtungen ist das Jahr 2005.

Die Mitgliedstaaten sind verpflichtet, diesen Emissionsreduktionsverpflichtungen jährlich nachzukommen und die Emissionen dieser fünf Schadstoffe entsprechend zu begrenzen.

In folgender Tabelle sind die ab 2020 geltenden Emissionsreduktionsverpflichtungen Österreichs dargestellt.

Tabelle 3: Nationale Emissionsreduktionsverpflichtungen gemäß NEC-Richtlinie für Österreich (Quelle: EG-L 2018, BGBl. I Nr. 75/2018).

	Nationale Emissionsreduktionsverpflichtungen gemäß NEC-Richtlinie	
Luftschadstoff	**Reduktion gegenüber 2005 in jedem Jahr zwischen 2020 und 2029**	**Reduktion gegenüber 2005 in jedem Jahr ab 2030**
NO_x	-37 %	-69 %
SO_2	-26 %	-41 %
NMVOC	-21 %	-36 %
NH_3	-1 %	-12 %
$PM_{2,5}$	-20 %	-46 %

Die Emissionen von NO_x und NMVOC aus Tätigkeiten, die unter die Quellkategorien 3.B (Düngewirtschaft) und 3.D (Landwirtschaftliche Böden) fallen, sind im Rahmen der Reduktionsverpflichtungen nicht zu berücksichtigen und sind daher im Zielvergleich von den jeweiligen Gesamtemissionen abzuziehen.

Entsprechend Artikel 5 der NEC-Richtlinie werden den Mitgliedsstaaten gewisse Flexibilitätsregelungen und Anpassungsmöglichkeiten eingeräumt. Diese werden von Österreich im vorliegenden Bericht nicht angewandt.

[1] Richtlinie (EU) 2016/2284 des Europäischen Parlaments und des Rates vom 14. Dezember 2016 über die Reduktion der nationalen Emissionen bestimmter Luftschadstoffe, zur Änderung der Richtlinie 2003/35/EG und zur Aufhebung der Richtlinie 2001/81/EG, Anhang II. Nach der englischen Bezeichnung *National Emission Reduction Commitments Directive* bzw. der Bezeichnung der Vorgängerrichtlinie (*National Emission Ceilings Directive*) wird sie auch kurz NEC-Richtlinie genannt.

[2] Emissionsgesetz-Luft 2018 (EG-L 2018; BGBl. I Nr. 75/2018): Bundesgesetz über nationale Emissionsreduktionsverpflichtungen für bestimmte Luftschadstoffe (Emissionsgesetz-Luft 2018 – EG-L 2018)

Auf Basis der NEC-Emissionsberichterstattung 2026 stellt sich der Zielvergleich wie folgt dar:

Tabelle 4: Emissionen und prozentuelle Änderung von 2005 bis 2024 (Quelle: Umweltbundesamt).

	2005	2024	2005–2024
NO_x (ohne 3.B und 3.D)	238,75	99,64	-58,3 %
NMVOC (ohne 3.B und 3.D)	127,35	77,96	-38,8 %
SO_2	25,89	10,55	-59,3 %
NH_3	79,54	72,28	-9,1 %
$PM_{2,5}$	23,76	13,64	-42,6 %

Demnach werden in Österreich im Jahr 2024 für alle relevanten Luftschadstoffe (NO_x, SO_2, NMVOC, NH_3 und $PM_{2.5}$) die nationalen Emissionsreduktionsverpflichtungen eingehalten.

Abbildung 1: Gegenüberstellung der SO_2-Emissionen und der Emissionsreduktionsverpflichtungen ab 2020.

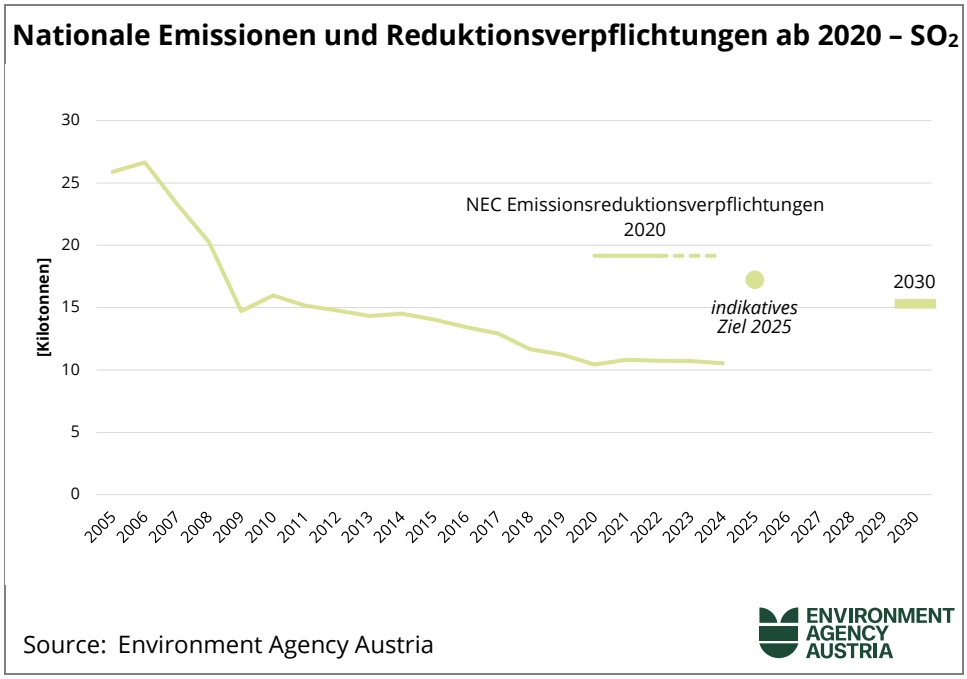


Abbildung 2: Gegenüberstellung der NO_x-Emissionen (ohne 3.B und 3.D) und der Emissionsreduktionsverpflichtungen ab 2020.

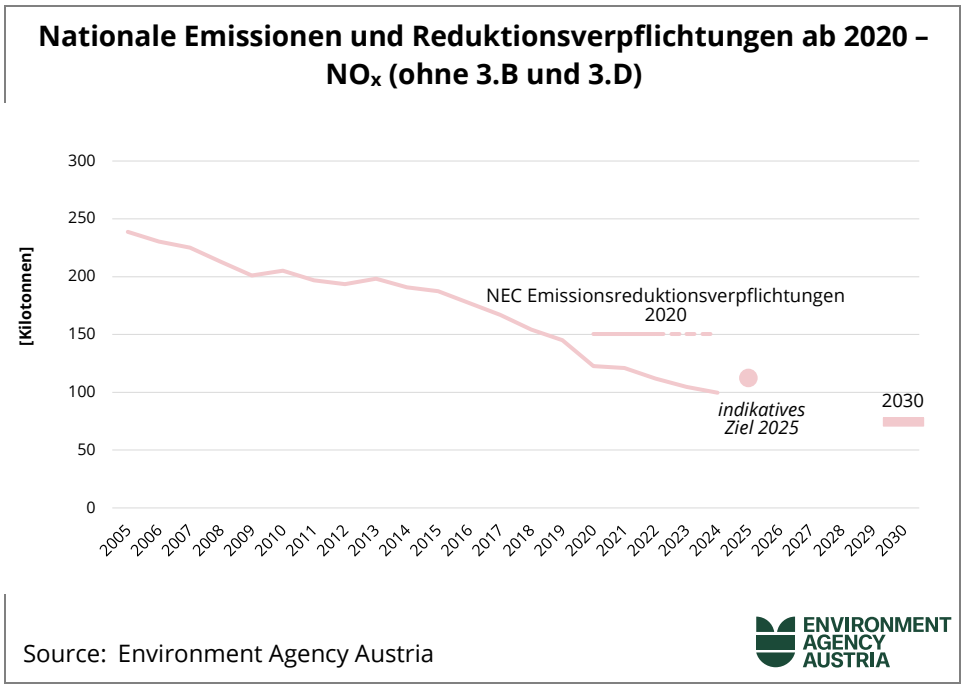


Abbildung 3: Gegenüberstellung der NMVOC-Emissionen (ohne 3.B und 3.D) und der Emissionsreduktionsverpflichtungen ab 2020.

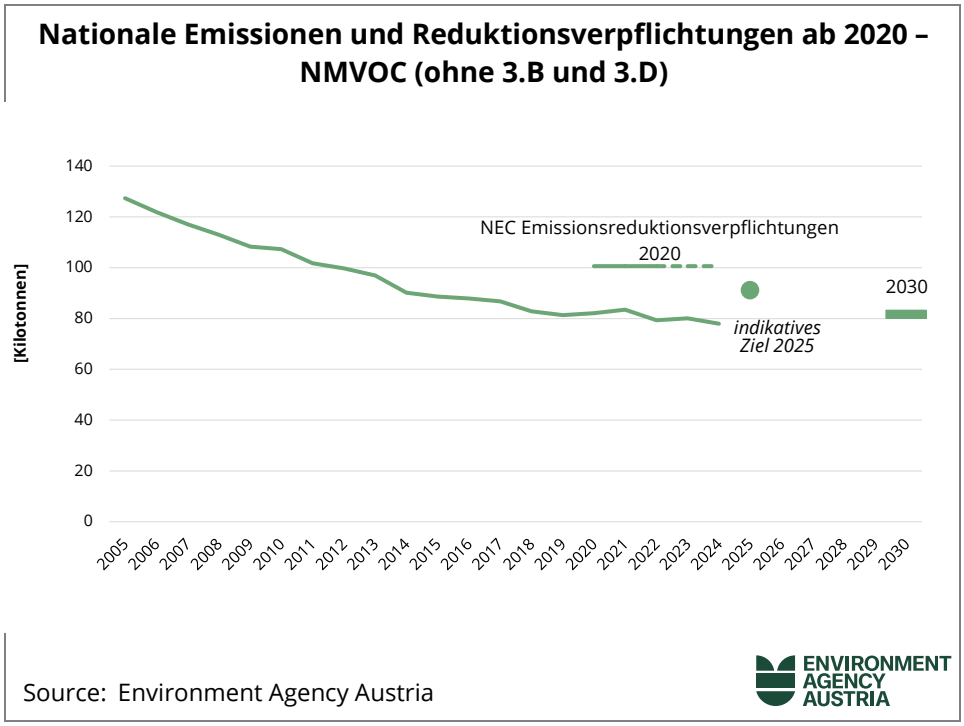


Abbildung 4: Gegenüberstellung der NH_3-Emissionen und der Emissionsreduktionsverpflichtungen ab 2020.

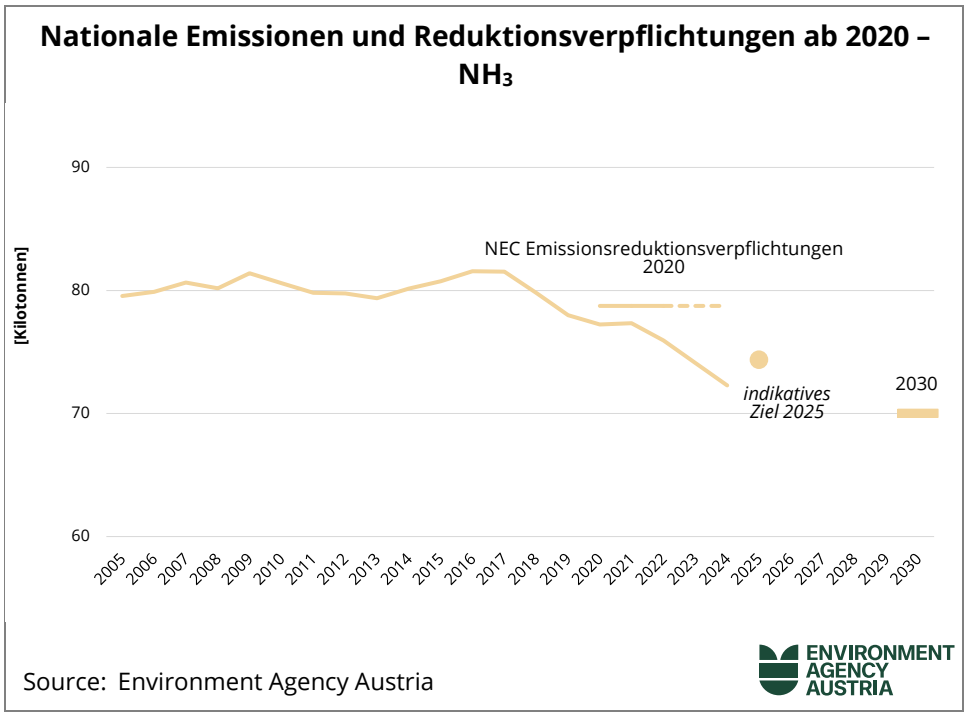
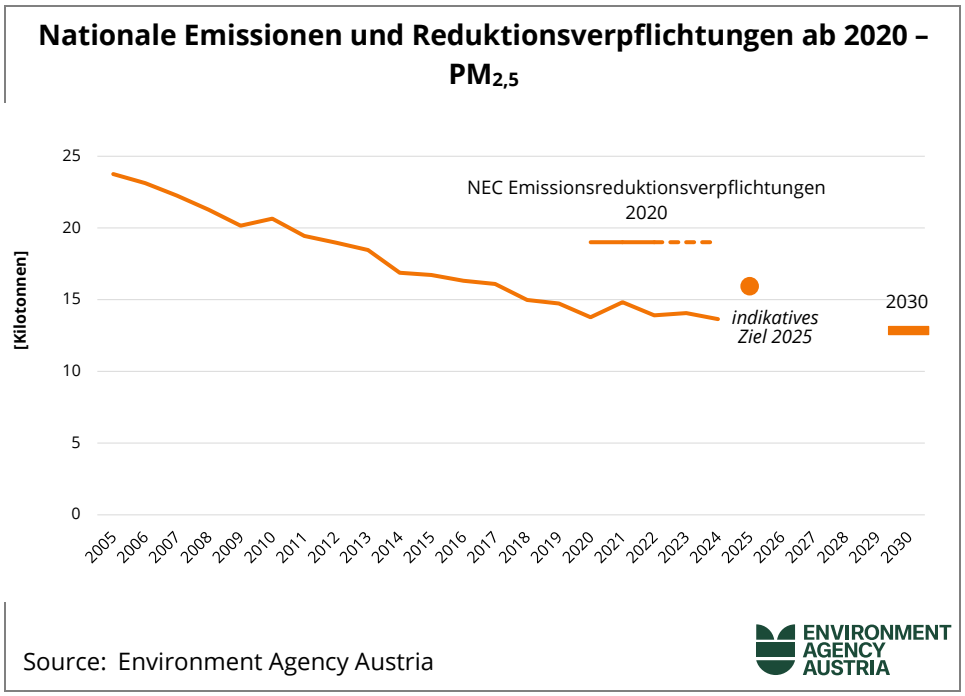


Abbildung 5: Gegenüberstellung der $PM_{2,5}$-Emissionen und der Emissionsreduktionsverpflichtungen ab 2020.



2.3 Kraftstoffexport

Die Emissionsberechnungen für den Straßenverkehr basieren auf der in Österreich verkauften Treibstoffmenge. Allerdings wird nicht die gesamte Menge davon in Österreich verbraucht, ein Teil davon wird in den

Fahrzeugtanks über die Landesgrenzen hinaus exportiert. Dieser Effekt wird „Kraftstoffexport" genannt.

Gründe für diesen Effekt sind strukturelle Gegebenheiten (Binnenland mit hohem Exportanteil in der Wirtschaft) sowie Unterschiede im Kraftstoffpreisniveau zwischen Österreich und seinen Nachbarländern.

Methodisch lassen sich die über die Grenzen verschobenen Kraftstoffmengen aus der Differenz zwischen Kraftstoffabsatz in Österreich und dem berechneten Inlandsverbrauch ermitteln. Davon können die Fahrleistungen (Kfz-km) von Pkw und schweren Nutzfahrzeugen abgeleitet werden und in weiterer Folge die zugehörigen Emissionen für den „Kraftstoffexport in Kraftfahrzeugen".

Nachstehende Tabelle zeigt die Emissionsmengen, die auf den Kraftstoffexport in Fahrzeugtanks zurückzuführen sind. Für NO_x sind dies beispielsweise 6,2 kt im Jahr 2024, was rund 5,6 % der NO_x-Gesamtemissionen Österreichs bzw. 12,7 % des NO_x-Ausstoßes im Straßenverkehr (*1.A.3.b)* entspricht.

Ab Ende der 1990er-Jahre kam es – bedingt durch den zunehmenden Kraftstoffexport – zu einem verstärkten Anstieg der NO_x-Emissionen, vor allem im Schwerverkehr. Im Jahr 2005 wurde ein Höchstwert erreicht; seither nimmt der Kraftstoffexport kontinuierlich ab.

Tabelle 5: Emissionen bedingt durch Kraftstoffexport (Quelle: Umweltbundesamt).

	Emissionen [Kilotonnen]				
	SO_2	**NO_x**	**NMVOC**	**NH_3**	**$PM_{2,5}$**
1990	0,72	14,40	2,69	0,02	0,59
1995	0,86	15,23	-0,71	-0,05	0,69
2000	0,50	31,37	-0,76	-0,22	0,88
2005	0,05	57,80	5,14	0,59	2,24
2010	0,04	40,29	2,64	0,40	1,23
2011	0,03	32,51	2,12	0,33	0,96
2012	0,03	32,29	1,93	0,29	0,89
2013	0,04	39,07	1,76	0,25	0,94
2014	0,03	34,46	1,52	0,21	0,80
2015	0,03	32,74	1,59	0,22	0,78
2016	0,03	27,40	1,53	0,22	0,72
2017	0,04	24,28	1,39	0,20	0,67
2018	0,03	21,22	1,25	0,19	0,60
2019	0,03	18,50	0,96	0,16	0,55

	Emissionen [Kilotonnen]				
	SO_2	**NO_x**	**NMVOC**	**NH_3**	**$PM_{2,5}$**
2020	0,03	14,42	0,68	0,12	0,43
2021	0,03	12,52	0,54	0,11	0,39
2022	0,02	7,56	0,32	0,07	0,25
2023	0,02	6,42	0,52	0,10	0,24
2024	0,02	6,19	0,45	0,09	0,23

Die Emissionen abzüglich dieser oben angeführten Mengen aus dem Kraftstoffexport (vgl. Annex 2: Austria's emissions based on fuel used (without ‚fuel exports')) wurden bis zum Inventurjahr 2019 für den Vergleich mit den verbindlichen Höchstmengen gemäß NEC-Richtlinie[3] herangezogen.

Zur Überprüfung der NEC-Emissionsreduktionsverpflichtungen für die Jahre ab 2020 werden die Emissionsmengen auf Basis der verkauften Treibstoffe (vgl. Annex 1: Austria's emissions based on fuel sold (with ‚fuel exports')) verwendet.

Dies ist in den Leitlinien für die Inventurberichterstattung[4] begründet. Dort ist vorgesehen, dass die Beurteilung der Zielerreichung grundsätzlich anhand der auf Basis der verkauften Treibstoffmenge berechneten Inventurdaten erfolgt.

Jene Staaten, deren Verpflichtungen auf Basis der verbrauchten Treibstoffe festgelegt wurden, können allerdings auch die auf Basis der verbrauchten Treibstoffmengen berechneten Inventurdaten als Grundlage für die Beurteilung der Zielerreichung wählen. Die Festlegung der ab 2010 geltenden Emissionshöchstmengen erfolgte in den späten 1990er-Jahren; damals war die Problematik des Kraftstoffexports im Fahrzeugtank noch nicht einmal erkannt worden. Die Festlegung der Emissionsreduktionsverpflichtungen für 2020 und 2030 basiert jedoch schon auf Modellrechnungen im Auftrag der Europäischen Kommission, bei denen der Kraftstoffexport in die österreichischen Daten eingerechnet wurde.

[3] Richtlinie 2001/81/EG über nationale Emissionshöchstmengen für bestimmte Luftschadstoffe

[4] 2023 Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution. Diese Leitlinien sind auch unter der NEC-Richtlinie anzuwenden.

Die Emissionswerte der Schadstoffe SO_2, NO_X, NH_3, NMVOC und $PM_{2,5}$ abzüglich der Emissionen aus dem Kraftstoffexport sind in Anhang 2 angeführt.

3 INTRODUCTION

This report provides a summary of Austria's annual Sulfur Dioxide (SO_2), Nitrogen Oxides (NO_x), Ammonia (NH_3), Non-Methane Volatile Organic Compounds (NMVOC) and Particulate Matter ($PM_{2.5}$) emissions for the years between 1990 and 2024.

The annexes at the end of the report include trend tables for the main NFR sectors and the years 1990 – 2024 (SO_2, NO_X, NH_3, NMVOC and $PM_{2.5}$):

- Annex 1: national emission data based on the fuel sold
- Annex 2: national emission data based on the fuel used

The complete tables in the NFR format have been uploaded to the Central Data Repository (CDR)[5] of EIONET[6] as digital files (Excel).

[5] https://cdr.eionet.europa.eu/at/eu/nec_revised/inventories/

[6] European Environment Information and Observation Network (EIONET)

4 EMISSION TRENDS

The following table shows the current results of the Austrian Air Emission Inventory (OLI) for the emissions of SO_2, NO_X, NH_3, NMVOC und $PM_{2.5}$ for the years 1990 to 2024.

Table 1: Emissions in Austria, 1990–2024 (Source: Umweltbundesamt).

	Emissions in Austria [kilotonnes]				
	SO_2	**NO_x**	**NMVOC**	**NH_3**	**$PM_{2.5}$**
1990	73.77	213.91	343.53	91.06	27.50
1995	47.40	197.55	256.54	87.54	26.08
2000	31.58	211.91	195.72	82.55	24.66
2005	25.89	249.48	167.91	79.54	23.76
2010	15.97	215.52	146.51	80.58	20.66
2011	15.15	207.74	140.04	79.82	19.44
2012	14.78	204.52	137.38	79.76	18.98
2013	14.34	208.92	134.49	79.36	18.47
2014	14.52	201.93	127.66	80.14	16.87
2015	14.06	198.78	125.89	80.74	16.72
2016	13.43	188.93	124.96	81.56	16.31
2017	12.92	178.47	123.66	81.53	16.09
2018	11.67	165.36	118.98	79.80	14.97
2019	11.22	155.72	116.66	77.99	14.73
2020	10.44	133.27	116.82	77.22	13.78
2021	10.82	131.83	117.91	77.34	14.81
2022	10.73	122.21	113.40	75.93	13.91
2023	10.72	114.71	113.24	74.11	14.06
2024	10.55	109.86	110.81	72.28	13.64

Emissions of all the above pollutants have decreased since 1990. Compared to 2023, the inventory results show reduced emissions for all pollutants in 2024 as well.

4.1 Description of trends since 1990

4.1.1 SO_2 emissions

In 2024, SO_2 emissions amounted to 10.5 kt. Since 1990 (73.8 kt), emissions have decreased by 85.7 % and since 2005 by 59.3 %. This decline is mainly due to the substitution of coal and heating oil with low-sulphur fuels, such as natural gas, the reduction of the sulphur content in mineral oil products and fuels (as prescribed by the Austrian Fuel Ordinance), as well as the installation of desulphurisation units in industry and energy plants (according to the Clean Air Act for boilers).

In 2024, the largest contributor to the national total SO_2 emissions was industry (sum of fuel combustion (*1.A.2*) and process emissions (*2*)) with 77.5 %, whereby the iron and steel industry (*1.A.2.a*) was mainly responsible (contribution of 48.0 % to national emissions). The energy industries sector (*1.A.1*) contributed 8.6 %; the other sectors (*1.A.4*, predominantly households) 11.0 %. In 1990 the sector *1.A.4* had still been a main emission source of SO_2, responsible for 44.3 % of national total emissions. Because of the switch of coal and heating oil to low-sulphur fuels or other energy carriers, the largest emission reductions have been achieved in this sector.

From 2023 to 2024, SO_2 emissions decreased by 0.2 kt (-1.6 %). Above all, emissions from cement industry (*1.A.2.f*) have decreased significantly compared to the previous year (-23.1%) due to a reduced use of high-sulfur fuels. A further decline occurred due to lower steel and pig iron production (*1.A.2.a*). In the case of households (*1.A.4.b.1*), predominantly the reduction in the use of coal and biomass resulted in decreasing emissions in 2024 compared to the previous year as well. The reduction of biomass is largely driven by milder weather conditions.

The above declines were partly offset by rising process emissions from oil refinries (*1.A.1.b*) which depend heavily on the sulfur content of crude oil and the efficiency of SO_2 removal. SO_2 from Other Stationary Combustion in Manufacturing Industries and Construction (*1.A.2.g.viii)* also increased due to higher use of lignite and wood waste.

4.1.2 NO_X emissions

In 1990, NO_X emissions amounted to 213.9 kt, and in 2024 to 109.9 kt, constituting a decrease of 48.6 % over the period. Given that emissions

increased between 1990 and 2005 (2005: 249.5 kt), the emission reduction between 2005 and 2024 is in fact even higher (56.0 %).

The reduction in NO_x emissions from 2005 onwards was mainly due to reductions in the sector *1.A.3.b* (road transport), largely influenced by technological improvements for heavy duty vehicles and - to a lesser extent - for passenger cars. Reductions have also been achieved due to a general decrease in fuel oil and coal consumption in all sectors, the switch of households and service providers to modern low-emission heating systems as well as district heating, and the installation of abatement technologies in energy and manufacturing industries. The COVID pandemic caused a significant fall in emissions between 2019 and 2020.

The main share of Austria's national NO_x emissions is emitted by fuel combustion activities. With 44.3 %, road transportation accounted for the biggest share of Austria's total NO_x emissions in the year 2024. In 2005, NO_x emissions from road traffic peaked and have since then decreased continuously. In 2024 emissions decreased by 69.1 % compared to 2005 levels. In particular, emissions (in absolute numbers) from heavy-duty vehicles (trucks and tractor trailers) have fallen due to improvements in exhaust after-treatment technology. The continuous renewal of the vehicle fleet with the latest exhaust-after-treatment systems to comply with current emissions regulations, combined with the increasing share of electric vehicles in total vehicle-kilometers, continues to have an impact in 2024.

In 2024 national total NO_x emissions were 4.9 kt or 4.2 % lower than in 2023. Road transportation (*1.A.3.b*) decreased by 3.8 kt or 7.3 %. This development is mainly attributable to the reduced activity of diesel passenger cars, which between 2023 and 2024 experienced declines in new registrations, fleet size, and specific annual mileage. Furthermore, all vehicle categories show improved specific NO_x emissions per vehicle-kilometer, based on the fleet average.

NO_x emissions from Mobile Combustion in Manufacturing Industries and Construction *(1.A.2.g.vii)*, the combustion of non-metallic minerals (*1.A.2.f*), particularly from cement and brick manufacturing industries, as well as Iron and Steel *(1.A.2.a)* also fell between 2023 and 2024 due to lower production volumes. For mobile off-road machinery (*1.A.2.g.vii*), fleet renewal and the resulting higher share of machines complying with the most stringent emission standards (Stage IV and Stage V) also had a positive effect on NO_x emissions.

In Other sectors (*1.A.4*, predominantly households) the NO_x-emissions from fuel combustion declined by 6.1 % between 2023 and 2024 due to

the lower use of heating oil and gas because of the increasing switch to climate-friendly heating systems, of biomass due to milder weather and price changes on the energy market. Furthermore, lower NO_x emissions from off-road vehicles and other machinery in agriculture contribute to the overall development. On the one hand, this is due to the reduced use of fossil fuels, but also due to the ongoing fleet penetration with mobile off-road machines of emission classes Stage IV and V, which have stricter limits compared to their predecessors.

4.1.3 NMVOC emissions

Non-methane volatile organic compounds emissions amounted to 343.5 kt in 1990 and to 110.8 kt in 2024. This corresponds to a reduction of 67.7 %. From 2023 to 2024, NMVOC emissions decreased by 2.4 kt (- 2.2 %).

The largest reductions since 1990 have been achieved in the road transport sector due to an increased use of catalytic converters and diesel vehicles. Currently the road transport sector (*1.A.3.b*) accounts only for a small share (5.6 %) of Austria's total NMVOC emissions.

Reductions in the solvent sector (*2.D.3*) have been achieved due to the EU Solvents Directive and the national VOC Installation Act. In 2024, the solvent sector accounted for 30.3 % of Austria's total NMVOC emissions. Compared to the previous year, emissions decreased by 2.0 %, which was primarily due to a lower use of solvents, but also due to further emission reductions in industry and commerce.

With a share of 29.6 %, the agriculture sector (*3*) contributed significantly to total NMVOC emissions in 2024. However, emission calculations for this sector are considerably uncertain. NMVOC emissions from agriculture originate mainly from manure management (*3.B*) and to a lesser extent from agricultural soils (*3.D*). Compared to the previous year, emissions from agriculture decreased in 2024 by 1.1 %, largely due to falling livestock numbers, in particular cattle.

Residential stationary heating (*1.A.4.b.1*) accounted for 22.4 % of the total 2024 NMVOC emissions. The decline in the use of biomass as a result of the milder weather led to a 3.9 % reduction in 2024 compared to the previous year.

4.1.4 NH_3 emissions

Ammonia emissions amounted to 72.3 kt in 2024. Since 1990, NH_3 emissions have decreased by 20.6 %; since 2005, they have decreased by 9.1 %.

The main source of NH_3 emissions is the agriculture sector with a share of 93.8 % in 2024. Within the agriculture sector, 51.2 % of NH_3 emissions result from Manure Management (*3.B*) and 48.8 % from Agricultural Soils (*3.D*). There was a decrease of 22.7 % in NH_3 emissions from the agriculture sector between 1990 and 2024. This reduction can mainly be explained by decreasing livestock numbers, more efficient feeding, the effects of ÖPUL measures such as the application of low emission spreading techniques (e.g. band spreading, trailing shoe, injector) and solid-liquid separation as well as reduced amounts of mineral fertilizer application. In addition, the Ammonia Reduction Ordinance (NH_3-VO), which came into force in 2023, is already showing its first effects, i.e. in the areas of urea and the increased rapid incorporation of manure.

Compared to the previous year 2023, total emissions decreased by 1.8 kt (-2.5 %). The main reason for the decline is that emissions from inorganic fertilizer application, which have decreased despite an overall increase in mineral fertilizer quantities. This is mainly due to the mandatory requirements under the Ammonia Reduction Ordinance for urea fertilizers, resulting in lower quantities of non-stabilized urea fertilizers recorded in Austria's official mineral fertilizer statistics. On the other hand, from June 30 2023, onwards, non-stabilized urea fertilizers have to be immediately incorporated into the soil (< 4 hours), which also leads to a significant reduction in emissions.

NH_3 emissions from animal manure application to soils have also decreased, on the one hand due to declining livestock numbers (especially cattle by -0,8 %), and on the other hand due to the increased use of low nitrogen application techniques.

4.1.5 $PM_{2.5}$ emissions

Since 1990, $PM_{2.5}$ emissions have decreased by 50.4 % to 13.6 kt in 2024. The decrease since 2005 is 42.6 %. The largest reductions were achieved through reduced coal consumption for the provision of space heating and hot water in households (*1.A.4.b.1*) and improved vehicle exhaust after-treatment technologies (e.g. particulate filters) in road transport (*1.A.3.b*).

From 2023 to 2024, $PM_{2.5}$ emissions decreased by 0.4 kt (-3.0 %), mainly due to the lower biomass consumption from residential heating (*1.A.4.b.1*). The chemical industry (*2.B.10*) also recorded a significant decline due to optimizations in exhaust gas purification.

With a share of about 45.8 %, sector *1.A.4.b.1 Residential: Stationary* was the main source of total $PM_{2.5}$ emissions in 2024. The 3.8 % decrease in emissions between 2023 and 2024 was a consequence of mild weather and the associated reduced use of biomass. To some extent, the overall decreasing trend in $PM_{2.5}$ emissions of *1.A.4.b.1* stationary residential heating since 2005 can also be explained by efficiency improvements through thermal renovation and a switch to modern biomass appliances (improvements in fuel combustion technologies). Obsolete log firing systems ("all-purpose burners") continue to be the main source of the relatively high emissions in this sector.

4.2 Emission reduction obligations as of 2020

The EU Directive on the Reduction of National Emissions of Certain Atmospheric Pollutants (NEC Directive for short)[7] and the National Air Emissions Act 2018[8], respectively, set out separate targets for anthropogenic emissions of NO_x, SO_2, NMVOC, NH_3 and particulate matter ($PM_{2.5}$) for the years 2020 to 2029. The Member States are obliged to comply with these emission reduction commitments annually and to limit the emissions of these five pollutants accordingly.

The NEC targets for the years from 2020 onwards are set as relative values compared to base year values. The base year for the calculations of the emission reduction commitments is 2005.

The following table shows Austria's emission reduction commitments that apply for the years from 2020 and 2030.

[7] Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC

[8] Air Emissions Act (Emissionsgesetz-Luft) 2018 (EG-L 2018; BGBl. I Nr. 75/2018): Bundesgesetz über nationale Emissionsreduktionsverpflichtungen für bestimmte Luftschadstoffe (Emissionsgesetz-Luft 2018 – EG-L 2018)

Table 2: National Emission reduction commitments under the NEC Directive for Austria (Source: EG - L 2018, https://www.ris.bka.gv.at/eli/bgbl/I/2018/75).

	National Emission reduction commitments under the NEC Directive	
Atmospheric pollutant	**Reduction compared with 2005 for any year from 2020 to 2029**	**Reduction compared with 2005 for any year from 2030**
NO_x	-37 %	-69 %
SO_2	-26 %	-41 %
NMVOC	-21 %	-36 %
NH_3	-1 %	-12 %
$PM_{2.5}$	-20 %	-46 %

The emissions of NO_x and NMVOC from activities falling under categories 3.B (manure management) and 3.D (agricultural soils) are not to be taken into account in the context of the reduction obligations and should therefore be deducted from the respective total emissions.

In accordance with Article 5 of the NEC Directive, Member States will be given some flexibility and adaptation possibilities. These are not applied by Austria in the present report.

Based on 2026 NEC emissions reporting, the compliance with the 2024 targets is as follows:

Table 3: Emissions and the percentage change from 2005 to 2024 (Source: Umweltbundesamt).

	2005	**2024**	**2005-2024**
NO_x (without 3.B and 3.D)	238.75	99.64	-58.3 %
NMVOC (without 3.B and 3.D)	127.35	77.96	-38.8 %
SO_2	25.89	10.55	-59.3 %
NH_3	79.54	72.28	-9.1 %
$PM_{2,5}$	23.76	13.64	-42.6 %

As the Table above documents, Austria fulfills the respective national emission reduction commitments in 2024 for all air pollutants covered by the NEC Directive (NO_x, SO_2, NMVOC, NH_3 and $PM_{2.5}$). The graphs below furthermore show that Austria has fulfilled its yearly respective national emission reduction commitments for all pollutants for all years from 2020 onwards.

Figure 1: Comparison of SO_2 emissions with emission reduction commitments from 2020 onwards.

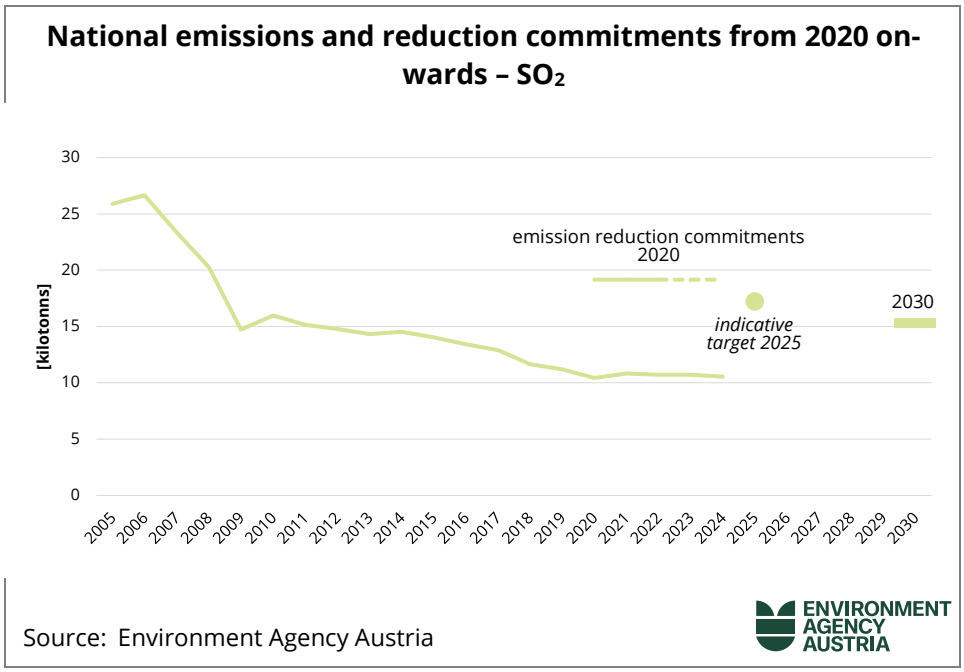


Figure 2: Comparison of NO_x emissions (without 3.B and 3.D) with emission reduction commitments from 2020 onwards.

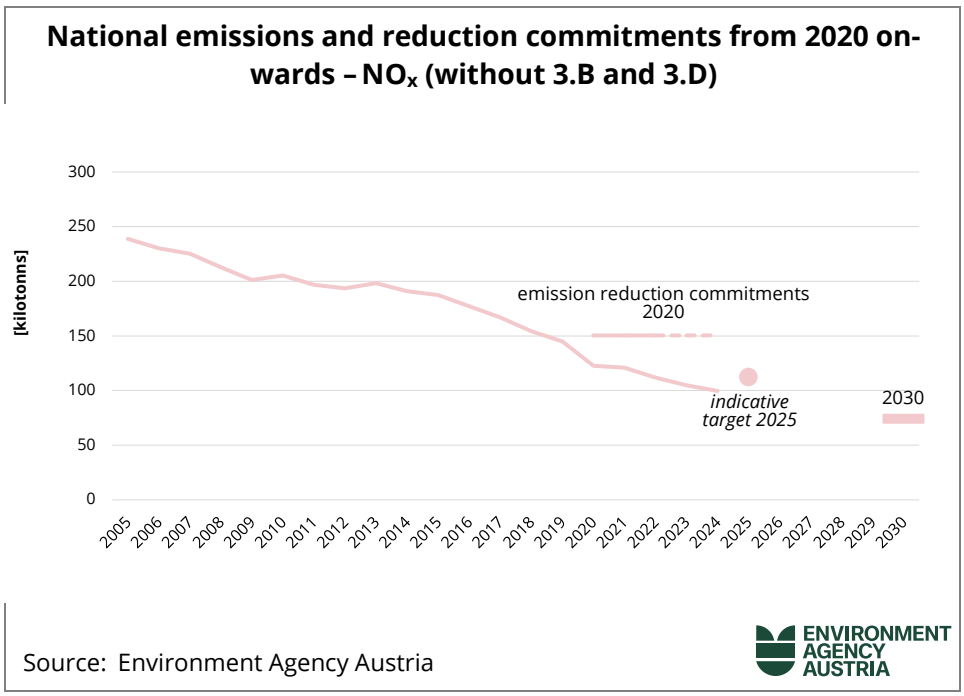


Figure 3: Comparison of NMVOC emissions (without 3.B and 3.D) with emission reduction commitments from 2020 onwards.

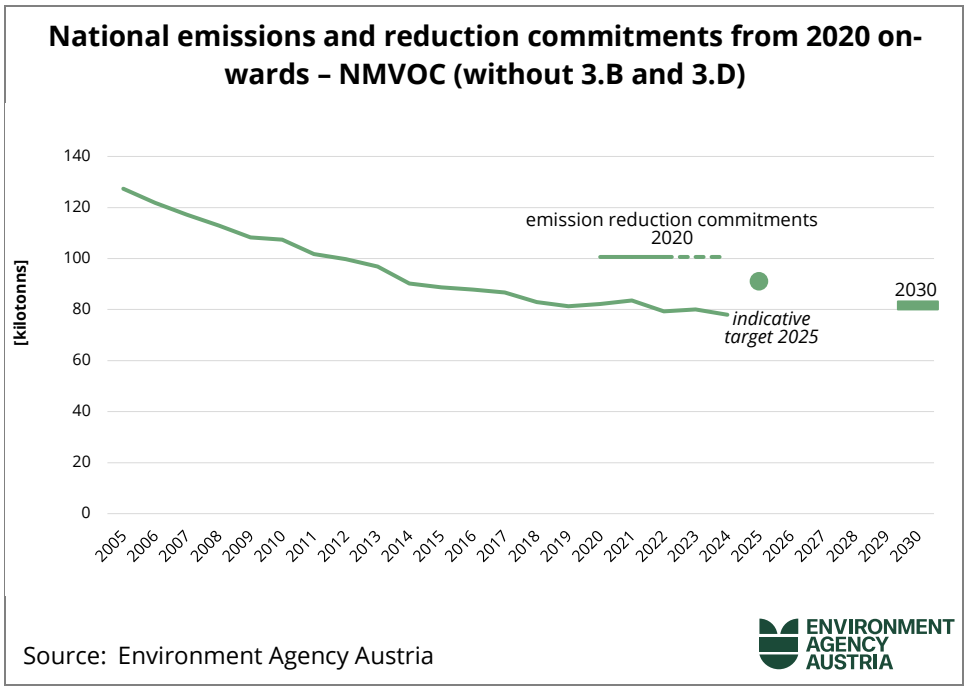


Figure 4: Comparison of NH_3 emissions with emission reduction commitments from 2020 onwards.

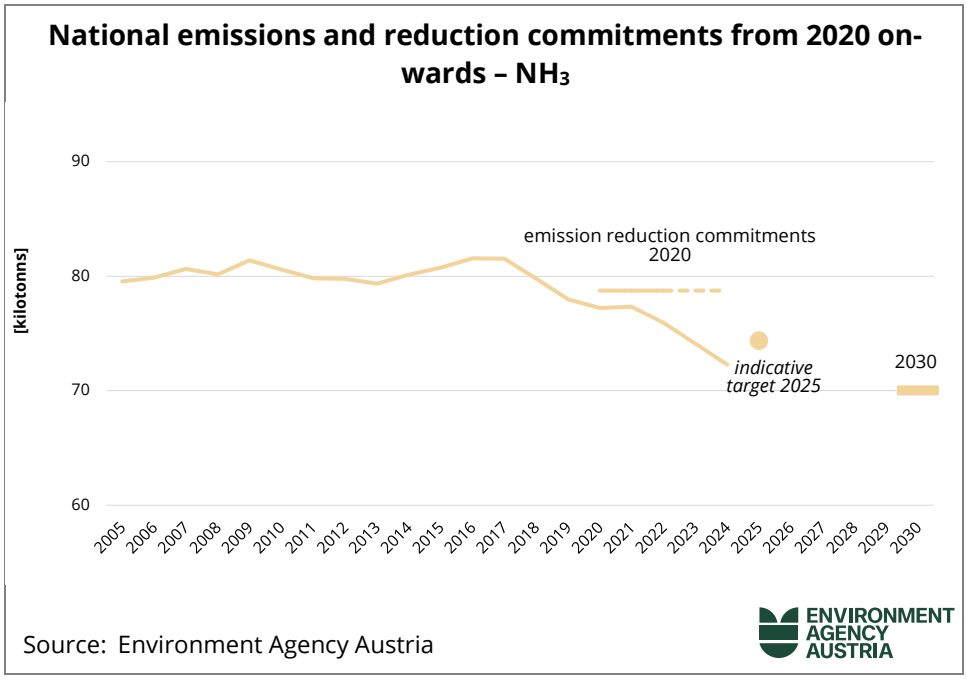
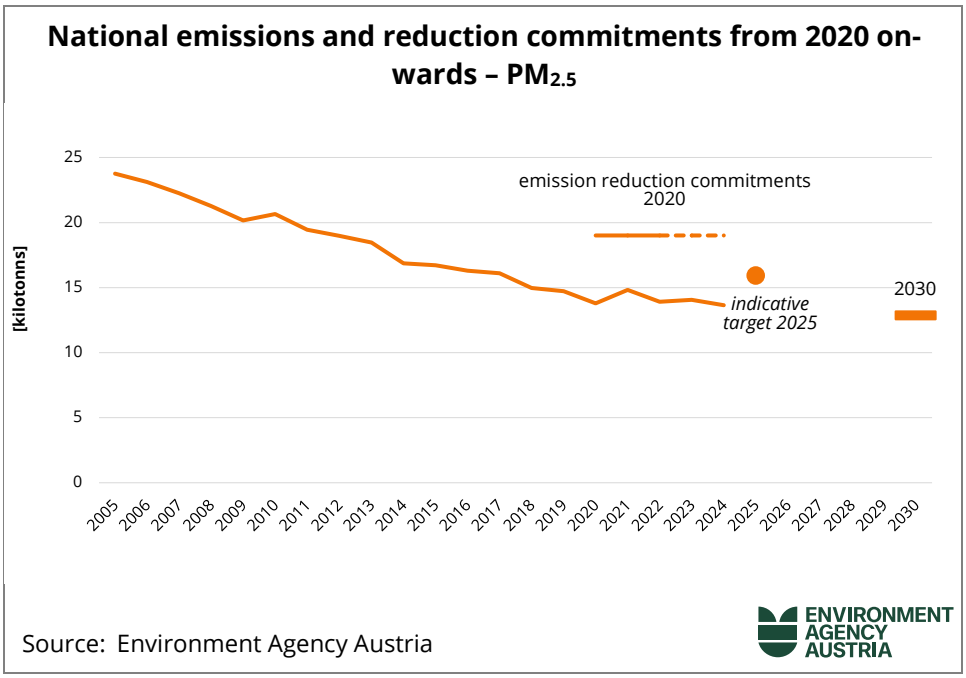


Figure 5: Comparison of $PM_{2.5}$ emissions with emission reduction commitments from 2020 onwards.



4.3 Fuel export

Emission calculations for the sector road transport are based on the quantity of fuel sold in Austria. However, it is important to note that due to "fuel export" the fuel quantity, which is sold in Austria, is higher compared to the quantity of fuel that is used and consumed in Austria. In Austria there is a net export of fuels in vehicle tanks that cross national borders, with subsequent combustion and emissions taking place outside the national territory.

The dynamic is explained in part by structural conditions (Austria is a landlocked country with a high share of exports in the economy) and by differences in fuel price levels between Austria and its neighboring countries.

The net quantities of fuel exported (and used) abroad can be determined from the difference between fuel sales in Austria and the calculated domestic consumption. Emissions from "fuel exports in motor vehicles" are derived from the associated mileage (vehicle-km) of cars and heavy-duty vehicles outside the national territory.

The table below shows the emissions from fuel exports. In 2024, NO_x emissions were estimated at 6.2 kt, which is around 5.6 % of Austria's national total NO_x emissions or 12.7 % of NO_x emissions from *1.A.3.b.* Road Transport.

A peak was reached in 2005; since then, fuel exports have declined continually.

Table 4: Emissions from fuel exports (Source: Umweltbundesamt).

	Emissions [kilotonnes]				
	SO_2	NO_x	NMVOC	NH_3	$PM_{2.5}$
1990	0.72	14.40	2.69	0.02	0.59
1995	0.86	15.23	-0.71	-0.05	0.69
2000	0.50	31.37	-0.76	-0.22	0.88
2005	0.05	57.80	5.14	0.59	2.24
2010	0.04	40.29	2.64	0.40	1.23
2011	0.03	32.51	2.12	0.33	0.96
2012	0.03	32.29	1.93	0.29	0.89
2013	0.04	39.07	1.76	0.25	0.94
2014	0.03	34.46	1.52	0.21	0.80
2015	0.03	32.74	1.59	0.22	0.78
2016	0.03	27.40	1.53	0.22	0.72
2017	0.04	24.28	1.39	0.20	0.67
2018	0.03	21.22	1.25	0.19	0.60
2019	0.03	18.50	0.96	0.16	0.55
2020	0.03	14.42	0.68	0.12	0.43
2021	0.03	12.52	0.54	0.11	0.39
2022	0.02	7.56	0.32	0.07	0.25
2023	0.02	6.42	0.52	0.10	0.24
2024	0.02	6.19	0.45	0.09	0.23

The national emissions without fuel exports (see Annex 2: Austria's emissions based on fuel used (without ‚fuel exports')) were used to assess compliance with the emission ceilings under the NEC Directive[9] for the years 2010 to 2019. However, from 2020 onwards the emissions based on fuels sold (see Annex 1: Austria's emissions based on fuel sold (with ‚fuel exports')) are used for assessing the compliance with the current national emission reduction commitments. This is justified in the inventory reporting guidelines[10]. It provides that the assessment of the

[9] Directive 2001/81/EG on national emission ceilings for certain atmospheric pollutants

[10] 2023 Guidelines for Reporting Emissions and Projections Data under the Convention on Long-range Transboundary Air Pollution. These guidelines are also applicable under the NEC Directive.

achievement of the target is, in principle, based on the inventory data calculated on the basis of the quantity of fuel sold. However, those Member States whose obligations have been determined on the basis of the fuel consumed may also choose the inventory data calculated on the basis of the quantities of fuel used as the basis for assessing the achievement of the target. The emission ceilings applicable from 2010 onwards were established in the late 1990s; at that time, the problem of fuel export in the vehicle tank had not been adequately considered. However, the setting of emission reduction commitments for the years post-2020 and post-2030 is based on model calculations made on behalf of the European Commission, where fuel exports have been considered in the respective Member State targets.

Annex 2 of this report provides emission amounts of the pollutants SO_2, NO_x, NH_3, NMVOC and $PM_{2.5}$ calculated on the basis of fuel used (excluding fuel exports) in tabular form.

5 METHOD OF REPORTING

5.1 Methodology

The Austrian Air Emission Inventory for the period 1990 to 2024 has been compiled according to the 2023 Guidelines for Reporting Emissions and Projections Data as adopted by the Executive Body for the UNECE Convention on Long-range Transboundary Air Pollution (LRTAP Convention) at its 42nd session.

In Austria, emissions of air pollutants as well as emissions of greenhouse gases are all gathered in a database based on the CORINAIR (CORe INventory AIR)/ SNAP (Selected Nomenclature for sources of Air Pollution) nomenclature. This nomenclature was designed by the EEA to function as common framework for describing and labelling the various anthropogenic sources of air pollutant (and GHG) emissions. To comply with the reporting obligations under the UNECE/LRTAP Convention, the CORINAIR/SNAP category emissions are translated and assigned to the respective categories of the NFR (Nomenclature for Reporting) format.

The complete set of tables in the NFR format, including – in particular – sectoral emissions and activity data, is submitted separately in digital form only (Excel files). In this report, the NFR summary tables are presented in annexes 1 and 2.

The following table summarises the status of this report:

Table 5: Status of report.

Format	Inventory	Version
NFR Format (UNECE)	OLI 2025	February 12th 2026

Data presented in this report are based on the 2025 Austrian Air Emission Inventory cycle (Österreichische Luftschadstoff-Inventur, OLI 2025) prepared by the Umweltbundesamt in the year 2025 with annual emissions estimates for the years between 1990 and 2024. The Austrian Air Emission Inventory is subject to continuous improvement, resulting in recalculations as outlined in Chapter 6.

5.2 Sources of Data

Table 6 presents the main data sources used for activity data as well as information on the institutions that carried out respective calculations.

Table 6: Main data sources for activity data and emission values.

Sector	Data Sources for Activity Data
Energy	• Energy Balance from Statistik Austria • EU-ETS • Steam boiler database (Large combustion plants) • Small scale combustion market data • Direct information from industry or associations of industry • IMEO Reports (OGMP 2.0)
Transport	• Energy Balance from Statistik Austria • Yearly new vehicle registrations from Statistik Austria • Yearly growth rates of transport performance on Austrian roads from Federal Ministry of Infrastructure, Mobility and Innovation (BMIMI) • ZBD: Zentrale Begutachtungsdatenbank (periodically updated specific mileage, "sticker check" according to § 57a KFG) • Yearly flight movements from AustroControl • Yearly FC of airport ground activities at Vienna International Airport
IPPU	• Reports submitted under the Industrial Emissions Directive • Market data for consumer products (EUROMONITOR) • Direct information from industry or associations of industry • National statistics (production and foreign trade) • Surveys at companies and industrial associations
Agricul-ture	• National studies • Statistik Austria: national agricultural statistics • INVEKOS Data from the Integrated Administration and Control System (IACS) • Agrarmarkt Austria (AMA): national fertilizer statistics, data on protein content and fat content of milk • Rinderzucht Austria: national statistics on cattle breeding • Distributing company (sales data)
Waste	• Federal Waste Management Plan (Data sources: Database on landfills (1998–2007), Electronic Data Management (EDM) in environment and waste management)

Sector	Data Sources for Activity Data
	• EMREG-OW (Electronic Emission Register of Surface Water Bodies) • National studies • National fire statistics (Die österreichischen Brandverhütungsstellen – BVS) • Austrian Fire Brigade Association (Österreichischer Bundesfeuerwehrverband – ÖBFV)
Other Sources	• Statistics from the annual reports of FEDIAF European Pet Food

Emission calculations and related inventory work (reporting, QA/QC, documentation and archiving, etc.) are carried out by sector experts of the Inspection Body for Emission Inventories (IBE).

In cases which exceed the IBE's resources, the IBE concludes service contracts with qualified institutions (particularly universities or research institutes).

In the course of this activity, the IBE is responsible for

- choice of the contractor i.e. judging his/her expertise with regard to the technical and QMS requirements
- specifying the technical and QMS requirements in the service contract
- performing and documenting a detailed QC check of the results i.e. checking if the specified requirements were fulfilled
- implementation of the results into the emission inventory in line with the technical and QMS requirements particularly the requirement of full reproducibility of the emission inventory

Service contracts have so far been concluded with:

- Technical University Graz (Road and Off-road transport)
- University of Natural Resources and Applied Life Sciences, Research Center Seibersdorf (Agriculture)
- Öko-Recherche, Büro für Umweltforschung und -beratung GmbH (F-gases)
- Institute for Industrial Ecology (Product Use)
- Barbara Amon and Stefan Hörtenhuber (Agriculture)
- Laboratorium für Umweltanalytik GmbH (heavy metals and POPs)
- Forschung Burgenland GmbH (Fugitive emissions)
- EFA Emissionsforschung Austria GmbH (Buildings)

A detailed description of the activity data, emission factors, and the methodologies applied will be provided in Austria's Informative Inventory Report (IIR) 2026[11], which is to be submitted under the UNECE Convention on Long-range Transboundary Air Pollution and the NEC-Directive (EU 2016/2284) on 15 March 2026. Furthermore, relevant service contracts, as described in brief above, will be referenced in the sector-specific chapters of this document.

[11] https://www.umweltbundesamt.at/emiberichte

6 RECALCULATIONS

Following the continuous improvements made to Austria's annual Air Emission Inventory, some sources have been recalculated based on updated activity data or revised methodologies. Thus, the emission data for the period from 1990 to 2023 submitted this year may differ from the data previously reported.

The figures presented in this report replace former data reported by the Umweltbundesamt under the reporting framework of the UNECE/LRTAP Convention and the NEC Directive of the European Union.

Table 7: Recalculation difference with respect to the previous submission (Source: Umweltbundesamt).

	Recalculation Difference [%]		
	1990	**2005**	**2023**
SO_2	0.09%	0.00%	1.38%
NO_x	-0.90%	0.70%	5.47%
NMVOC	1.64%	2.70%	9.20%
NH_3	1.37%	1.09%	0.00%
$PM_{2.5}$	0.51%	2.71%	9.25%

Recalculations were carried out in all sectors for all pollutants. However, the most significant revisions were made for $PM_{2.5}$, NMVOC and NO_x. The largest recalculations for $PM_{2.5}$ took place in the residential sector (*1.A.4.b*) due to revisions of the energy balance. For NMVOC and NO_x there have been remarkable changes as well, largely due to revisions of the energy balance in the sectors residential heating (*1.A.4.b*) and road transport *(1.A.3.b)* as well as due to updated emission factors in the road transport sector.

The following section describes the methodological changes made to each sector of the inventory since the previous submission.

6.1 ENERGY (1)

6.1.1 Stationary combustion (*1.A.1.a-c, 1.A.2.a-g, 1.A.3.e.i and 1.A.4.a-1.A.4.c*)

6.1.1.1 Update of activity data

Revision of the energy balance

The federal statistics office 'Statistik Austria' revised the energy balance (mainly for the years 2021 to 2023) with the following **main implications** for energy consumption as used in the inventory:

- Natural gas 2023: Gross inland consumption was not revised. Around 0.1 PJ was shifted from final energy consumption to transport losses. Final energy consumption by private households (*1.A.4.b*) was revised downwards by 0.03 PJ and final consumption by the manufacturing industry (1.A.2) by 0.1 PJ.
- Gas oil 2023: Around 0.1 PJ was shifted from the manufacturing industry (*1.A.2*) to private households (*1.A.4.b*) and the commercial/institutional sector (*1.A.4.a*).
- Liquefied natural gas 2023: Around 0.1 PJ was shifted from private households and agriculture to 'non-energy consumption'.
- Solid biomass 2023: Gross domestic consumption was revised upwards by 19.5 PJ. Heating plants (1.A.1.a) were revised upwards by around 1 PJ, private households (*1.A.4.b*) by around 17 PJ and agriculture (*1.A.4.c*) by around 1.6 PJ.
- Industrial waste 2023: Gross domestic consumption was revised upwards by 0.5 PJ and added to the manufacturing sector (non-metallic minerals). As this sector is covered by emissions trading, this does not result in any changes to the greenhouse gas calculation.

6.1.1.2 Methodological Changes

For industrial waste, the inventory has been increasingly harmonised with the energy balance since 2008. Activity from other manufacturing industries (*1.A.2.g*) were revised upwards while activity data of the chemical industry were revised downwards.

Due to the methodological change in ammonia production (*2.B.1*) and the strict application of the IPCC Guidelines, natural gas consumption in the chemical industry (*1.A.2.c*) was reduced retroactively from 1990 onwards (total natural gas consumption for ammonia production,

including final consumption, was deducted instead of only non-energy consumption as previously). This resulted in about 0.2 kt lower NO_X emissions for the years 2005 to 2023.

Other Sectors (*1.A.4*)

For 1990 to 2023, minor changes in air pollutant emissions of categories Commercial/Institutional *(1.A.4.a)* and Residential *(1.A.4.b)* occur because of updated heating stock data and newly allocated shares of combustion technologies per energy carrier (updated energy demand model for space heating).

1.A.2.c.2 Agriculture/Forestry: Off-road Vehicles and Other Machinery

The fleet model has been updated in the NRMM emission model GEORG by implementing battery-electric vehicles and resulted in minor changes (< 0.001 kt for all pollutants) from 2012 onwards.

6.1.2 Transport (*1.A.3*)

6.1.2.1 Road Transport (*1.A.3.b*)

Update/Improvement of activity data

Revision of the energy balance

Update of natural gas consumption for the years 2022 (-1.3%) and 2023 (-1.4%) due to revisions in the current national energy balance by the federal statistics office 'Statistik Austria'.

Update of emissions factors

Emission factors have changed due to an update of the HBEFA (Hand-Book Emission Factors for Road Transport)[12] used in Austria's road transport emission model NEMO (old version: HBEFA version 4.2; new version: HBEFA version 5.1.002). Based on over 250 new measurements (chassis dyno and real driving emissions (RDE) tests), the road emission

[12] Notter, B. et al. (2025): HBEFA 5.1. Documentation of updates. INFRAS Research and Consulting. Bern/Graz/Heidelberg/Lyon/Göteborg/Oslo/Dresden, 22 October 2025. https://download.hbefa.net/reports/hb51/HBEFA5.1_Update_documentation.pdf.

factors were updated for all air pollutants. The relevant updates for the Austrian inventory are summarised as follows:

- More detailed driving situations:
  HBEFA 5.1 uses more traffic situations (speed, stop-and-go, road type). This leads to more realistic fuel consumption values, especially in urban traffic.
- Cold start extra emissions (CSEE) included more broadly:
  In HBEFA 5.1 existing cold start emission factors were updated. NO_x emissions of cold starts are highly relevant for both EURO 6d/6d-Temp gasoline and diesel passenger cars (PCs), whereas particulate emissions are particularly significant for EURO 6d/6d-Temp gasoline PCs.
- Tampering and defective Selective-Catalytic-Reduction (SCR) systems in heavy duty vehicles (HDVs) included:

  A deactivation of urea dosing and manipulated On-Board Diagnostics (OBD) leads to zero SCR efficiency and increased NO_x emissions. This effect was integrated via country-specific shares of NO_x-tampered HDVs.
- New approach for non-exhaust PM emissions:

  In HBEFA 5.1, disaggregated non-exhaust emissions (tyre, break, and road wear) were integrated in the database for the first time. These factors are now used in the NEMO model instead of EMEP/EEA 2023 emission factors.
- Updated deterioration functions for PCs, LDVs, and HDVs:
  Chemical, thermal and mechanical ageing effects reduce the performance of exhaust after-treatment systems over their lifetime. This usually leads to increasing emissions of those exhaust gas components converted by the catalysts (CO, HCs, NO_x).

These changes resulted in recalculations in *1.A.3.b. Road Transport* for 2023 of +5.33 kt NO_x, +0.004 kt SO_2, -0.15 kt NH_3, +2.88 kt NMVOC and -0.01 kt $PM_{2.5}$.

6.1.2.2 Military, mobile (*1.A.5.b*)

The kerosene consumption of military air traffic for the whole time-series was updated following a recommendation in the recent UNFCCC review in autumn 2025. The various methods have been consolidated by interpolating data between years with actual known fuel consumption data. The last known value (2018) was carried forward as a constant for the subsequent years.

These changes resulted in recalculations in *1.A.5.b Other, Mobile* for 2023 of +0.002 kt NO_x, +0.0003 kt SO_2, +0.000002 kt NH_3, +0.0003 kt NMVOC and +0.0003 kt $PM_{2.5}$.

6.1.1 Fugitive emissions (*1.B*)

Natural gas (*1.B.2.b*)

Minor recalculations were reported for NMVOC from category *1.B.2.b* natural gas (+0.017 t) due to some methodological improvements.

6.2 INDUSTRIAL PROCESSES (*2*)

6.2.1 Update of data

6.2.1.1 Other chemical industry - Sulfuric acid (*2 B-10 a*)

SO_2 emissions from sulfuric acid production were updated using information on changed plant capacities. These improvements resulted in revisions from 2016-2023 (-0.06 kt SO_2 in 2023).

6.2.1.2 Solvent use (*2.D.3* except *2.D.3.b* and *2.D.3.c*)

The 2023 emission estimate for industrial and commercial solvent use based on extrapolated data was updated. New data for 2024 was derived from solvent balances that were prepared following the EU regulation - Industrial Emissions Directive 2010/75/EU. Some methodological improvements, mainly concerning the allocation of installations to sectors were also implemented. This led to minor recalculations of NMVOC emissions for the whole time series (+0.2 kt NMVOC for 2023).

6.2.1.3 Food and beverages industry (*2.H.2*)

Primary data used as activity data for spirits was reassessed and a double counting was eliminated. Improvements resulted in recalculations from 1996 onwards (-0.2 kt NMVOC for 2023).

6.2.2 Methodological changes

6.2.2.1 Other product manufacture and use: Tobacco (*2.G*)

New categories of tobacco that came into use in recent years ("heats") were added to AD. Also, the tobacco content of cigarettes and cigars that previously was 1g per cigarette and 5g per cigar was changed to more realistic values obtained from the federal ministry responsible for tobacco legislation (0,7g cigarette^{-1} and 10g cigar^{-1}). In total, these improvements led to revisions for the entire time series of NO_x, NMVOC, NH_3 and $PM_{2.5}$ emissions (for 2023: -0.002 kt NO_x, -0.01 kt NMVOC, -0.01 kt NH_3 and -0.03 kt $PM_{2.5}$).

6.2.2.2 *2.I Wood processing* (Chipboard)

NMVOC emissions from chipboard production previously reported under *2.D.3.g Chemical Products* were moved to category *2.I Wood processing*. Also, the underlying data for NMVOC emissions from chipboard production was reassessed and subsequently revised using national studies and recent PRTR reporting data from the installations. This led to slightly revised AD and PM emissions (+0.002 kt $PM_{2.5}$).

6.3 AGRICULTURE (*3*)

6.3.1 Update of activity data

6.3.1.1 Manure Management (*3.B*), Agricultural Soils (*3.D*)

Background data for feeding and nutrition of dairy cows

The net energy for pregnancy of dairy cows was slightly recalculated between 2021 and 2023, as updated data on the calving intervals became available from the latest Zuchtdata Report 2024[13]. These improvements led to marginal revisions of the gross energy intake (GE), $N_{excretion}$ and $VS_{excretion}$ from 2021 onwards.

[13] Zuchtdata (2024): ZuchtData Jahresbericht 2024. Wien. Jahresberichte - Offizielle Webseite der RINDERZUCHT AUSTRIA

Updated feeding and nutrition for sheep, goats, layers and deer

For the non-key livestock categories sheep, goats, layers and deer feeding and nutrition data was further improved. For sheep and goats the multiple births per year have been considered in the calculations, which led to slightly recalculated net energy requirements for lactation. For deer, in the feeding calculations the share of grazing was corrected, which resulted in slightly revised net energy of activity. For laying hens, the consideration of rearing pullets was improved, which account for about a third of the animals in the category. They consume less feed per day and have a slightly lower crude protein (CP) requirement. Consequently, the country-specific GE-intake, $VS_{excretion}$ and $N_{excretion}$ values have been slightly updated for all these livestock categories.

Livestock data – poultry

For 2023 new livestock numbers for poultry (layers, broilers, turkeys and other poultry) became available according to the results of the farm structure survey 2023 (Statistik Austria 2025)[14]. The years 2021 and 2022 were determined by interpolation.

Biogas plants

Updated figures for biogas plants (E-CONTROL 2025)[15] resulted in slightly revised NO_x and NH_3 emissions with an impact on the source categories *3.B Manure Management, 3.D.a.2.a Animal manure applied to soils* and *3.D.a.2.c Other organic fertilizers applied to soils* for 2020-2023.

ÖPUL promotion data slurry separation

The latest data from the ÖPUL promotion database[16] of the Federal Ministry of Agriculture and Forestry, Climate and Environmental Protection, Regions and Water Management (BMLUK) on solid-liquid separation of slurry was implemented, which led to slight revisions from 2018

[14] Statistik Austria (2025): Agrarstrukturerhebung 2023. Land- und forstwirtschaftliche Betriebe und deren Strukturdaten. Endgültige Ergebnisse. Wien, 2025. https://www.statistik.at/fileadmin/publications/SB_1-17-Agrarstrukturerhebung_2023.pdf

[15] E-CONTROL (2025): Herkunftsnachweisdatenbank der E-Control gem. Erneuerbaren Ausbau Gesetz (EAG), § 81 Abs 9. https://anlagenregister.at/. Accessed in November 2025.

[16] The Agri-environmental Programme ÖPUL is intended to foster the environmentally sound management of the agricultural areas in Austria. One of the objectives is the reduction of greenhouse gas and ammonia emissions from agriculture.

onwards. Nitrogen amounts that are separated are now based on yearly values instead of interpolated numbers between the years 2017 and 2023.

Sewage sludge

There have been minor revisions of activity data in 2016, which resulted in marginal revisions in source category *3.D.a.2.b Sewage sludge applied to soils*.

Manure Management (3.B) – $PM_{2.5}$

Due to updated activity data (livestock data), $PM_{2.5}$ emissions from manure management were slightly revised upwards for the years 2021-2023 (+0.003 kt $PM_{2.5}$ for 2023).

Other organic fertilizers (*3.D.a.2.c*)

As a result of the updated figures for biogas plants, NH_3 and NO_x emissions have been slightly revised for the years 2020-2023 (+0.001 kt NH_3 and +0.0003 kt NO_x for 2023).

On-farm storage, handling and transport of agricultural products (*3.D.c*)

Marginal revisions of cropland areas led to slightly changed PM emissions for several years (-0.0003 kt $PM_{2.5}$ for 2023).

Cultivated crops (*3.D.e*)

Marginal revisions of cropland areas led to slightly changed NMVOC emissions for several years (-0.01 kt NMVOC for 2023).

6.3.2 Methodological changes

6.3.2.1 Manure Management (*3.B*) – NH_3, NO_x, and NMVOC

One reason for the revised estimates is the improved activity data (feeding and nutrition, livestock data, ÖPUL-data on separation, biogas - see above). Additionally, methodological improvements have been carried out for the ammonia calculations. The time series of grooved floor (cattle) and partly slatted floor (swine) have been improved based on the new data taken from the latest research project 'Animal husbandry and manure management systems in Austria' ('TIHALO III', PÖLLINGER et al.

2026)[17]. Furthermore, the calculations of straw input as bedding material have been improved. Straw inputs are now considered in both storage and spreading. Additionally, the straw inputs for poultry were updated according to the latest air emissions inventory of Germany (German IIR 2025[18], KTBL 2024). In total, these updates resulted in higher NH_3 emissions. These improvements had also an impact on NO_x and NMVOC.

Furthermore, in Austria's GHG inventory recalculations have been carried out for methane emissions in CRT sector *3.A Enteric fermentation* with an effect on NMVOC emissions based on revised activity data (revised livestock data and $VS_{excretions}$, see above).

Overall, NO_x, NMVOC and NH_3 emissions from manure management are now slightly higher for the entire time series (+1.4 kt NH_3, +0.1 kt NO_x and +0.3 kt NMVOC for 2023) compared to the previous inventory.

6.3.2.2 Agricultural Soils (*3.D*) – NH_3, NO_x, NMVOC and $PM_{2.5}$

Animal Manure Applied to Soils (*3.D.a.2.a*)

Updated activity and nutrition data, as described before, resulted in revised NH_3, NO_x and NMVOC emissions. In addition, the methodological changes as discussed in sector *3.B Manure Management* (chapter 6.3.2.1) also had an effect on this emissions source:

The revised calculations of straw resulted in lower ammonia emissions from manure application. Additionally, the share of cattle slurry that is applied to arable land was adjusted based on new data from the research project 'Animal husbandry and manure management systems in Austria' ('TIHALO III', PÖLLINGER et al. 2026).

For NO_x, the lower amounts of N available for application due to the increased NH_3-N losses during the storage resulted in smaller emission amounts from manure application.

Revised activity data and methodological improvements in sector *3.B* led to lower NMVOC emissions from manure application as well.

[17] PÖLLINGER et al. (2026): Erhebung zum Wirtschaftsdüngermanagement aus der landwirtschaftlichen Tierhaltung in Österreich. Surveys on manure management from agricultural livestock farmings in Austria. Abschlussbericht TIHALO III. The final report is currently under preparation and will be published in 2026.

[18] Umweltbundesamt (2025): Germany's Informative Inventory Report 2025 (IIR 2025). German Environment Agency. Dessau. https://iir.umweltbundesamt.de/2025/_media/wiki/germanys_informative_inventory_report_2025.pdf

Overall, the entire time series was recalculated for NH_3, NO_x and NMVOC (-1.3 kt NH_3, -0.05 kt NO_x and -0.5 kt NMVOC for 2023).

Urine and dung deposited by Grazing Animals (*3.D.a.3*)

Livestock related updates (livestock numbers, $N_{excretion}$ values) led to revisions of air pollutant emissions from grazing animals. Furthermore, the methodological revisions in sector 3.B Manure Management (chapter 6.3.2.1) also had an impact on this source category. Improvements resulted in revised NH_3, NO_x and NMVOC emissions over the entire time series (+0.01 kt NH_3, +0.005 kt NO_x and +0.00002 kt NMVOC for 2023).

6.4 WASTE (*5*)

6.4.1 Update of activity data

6.4.1.1 Composting (5.B.1)

Marginal recalculations are reported for *5.B.1 Composting* of municipal solid waste (2023: < 0.00001 kt NH_3) due to a minor change of activity data.

6.4.1.2 Anaerobic digestion at biogas facilities (*5.B.2*)

Recalculations of NH_3 for the entire time series, reported for 5*.B.2 anaerobic digestion at biogas facilities* (+0.001 kt in 2023), are due to updates of activity and nutrition data. See also Chapter 6.3 on recalculations in the agriculture sector.

6.5 Other Sources (*6.A*)

6.5.1 Update of activity data

As a result of updated activity data (livestock numbers of cats and dogs) for 2023 taken from the latest FEDIAF-Report 2025[19], NH_3 emissions have been slightly revised (+0.004 kt NH_3 for 2023).

[19] FEDIAF (2025): 2025. FACTS & FIGURES. Based on aggregated data from 2023. FEDIAF-Facts-Figures-2025.pdf

TABELLENVERZEICHNIS FÜR KAPITEL 1 BIS 3

ABBILDUNGSVERZEICHNIS FÜR KAPITEL 1 BIS 3

LIST OF TABLES FOR CHAPTERS 4 TO 7

LIST OF FIGURES FOR CHAPTERS 4 TO 7

ANNEX 1: AUSTRIA'S EMISSIONS BASED ON FUEL SOLD (WITH ‚FUEL EXPORTS')

Notation keys:

NE (not estimated)..... for existing emissions by sources and removals by sinks of pollutants which have not been estimated.

IE (included elsewhere).... for emissions by sources and removals by sinks of pollutants estimated but included elsewhere in the inventory instead of the expected source/sink category.

NO (not occurring)..... for emissions by sources and removals by sinks of pollutants that do not occur for a particular gas or source/sink category.

NA (not applicable)..... for activities in a given source/sink category that do not result in emissions or removals of a specific pollutant.

C (confidential) ..... for emissions, which could lead to the disclosure of confidential information if reported at the most disaggregated level. In this case, a minimum of aggregation is required to protect business information.

The complete tables in the NFR format are submitted separately in digital form only (Excel files).

Table A.I-1: SO_2 emissions [kilotonnes] 1990–2024 based on fuel sold. (Source: Umweltbundesamt)

	NFR								
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER	NATIONAL TOTAL	International Bunkers
1990	71.76	69.76	2.00	1.93	0.00	0.07	NA	**73.77**	0.25
1991	69.14	67.84	1.30	1.61	0.00	0.06	NA	**70.81**	0.28
1992	52.88	50.88	2.00	1.36	0.00	0.04	NA	**54.29**	0.30
1993	51.76	49.66	2.10	1.11	0.00	0.04	NA	**52.92**	0.32
1994	46.27	44.99	1.28	1.12	0.00	0.05	NA	**47.44**	0.34
1995	46.28	44.75	1.53	1.07	0.00	0.05	NA	**47.40**	0.38
1996	42.93	41.73	1.20	0.99	0.00	0.05	NA	**43.97**	0.42
1997	39.40	39.33	0.07	0.96	0.00	0.06	NA	**40.42**	0.43
1998	34.71	34.67	0.04	0.87	0.00	0.06	NA	**35.64**	0.45
1999	32.89	32.84	0.04	0.81	0.00	0.06	NA	**33.76**	0.44
2000	30.74	30.70	0.04	0.78	0.00	0.06	NA	**31.58**	0.48
2001	31.68	31.63	0.05	0.71	0.00	0.06	NA	**32.45**	0.47
2002	30.57	30.53	0.04	0.71	0.00	0.06	NA	**31.34**	0.43
2003	30.33	30.28	0.05	0.71	0.00	0.06	NA	**31.10**	0.40
2004	25.78	25.73	0.04	0.72	0.01	0.06	NA	**26.56**	0.47
2005	25.11	25.06	0.04	0.72	0.00	0.06	NA	**25.89**	0.55
2006	25.87	25.82	0.05	0.73	0.00	0.05	NA	**26.65**	0.58
2007	22.54	22.49	0.05	0.75	0.00	0.04	NA	**23.33**	0.61
2008	19.45	19.40	0.04	0.78	0.00	0.03	NA	**20.26**	0.61
2009	14.01	13.95	0.06	0.70	0.00	0.02	NA	**14.73**	0.53
2010	15.25	15.20	0.05	0.70	0.00	0.01	NA	**15.97**	0.57
2011	14.46	14.41	0.05	0.68	0.00	0.01	NA	**15.15**	0.60
2012	14.12	14.07	0.05	0.65	0.00	0.01	NA	**14.78**	0.57
2013	13.74	13.70	0.04	0.58	0.00	0.01	NA	**14.34**	0.54
2014	13.94	13.91	0.04	0.56	0.00	0.01	NA	**14.52**	0.54
2015	13.49	13.45	0.04	0.55	0.00	0.01	NA	**14.06**	0.58
2016	12.68	12.66	0.02	0.73	0.00	0.01	NA	**13.43**	0.54
2017	12.21	12.17	0.04	0.70	0.00	0.01	NA	**12.92**	0.52
2018	11.01	10.98	0.02	0.65	0.00	0.01	NA	**11.67**	0.59
2019	10.57	10.54	0.02	0.64	0.00	0.01	NA	**11.22**	0.68
2020	9.83	9.81	0.02	0.59	0.00	0.01	NA	**10.44**	0.24
2021	10.23	10.20	0.03	0.58	NA	0.01	NA	**10.82**	0.27
2022	10.22	10.19	0.03	0.50	NA	0.02	NA	**10.73**	0.45
2023	10.22	10.19	0.03	0.49	NA	0.01	NA	**10.72**	0.61
2024	10.04	10.02	0.03	0.49	NA	0.02	NA	**10.55**	0.68

Table A.I-2: NO_x emissions [kilotonnes] 1990–2024 based on fuel sold. (Source: Umweltbundesamt)

	NFR								
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER	NATIONAL TOTAL	International Bunkers
1990	198.58	198.58	IE	1.53	13.67	0.12	NA	**213.91**	2.48
1991	208.25	208.25	IE	1.51	13.58	0.11	NA	**223.45**	2.80
1992	197.01	197.01	IE	1.41	13.16	0.08	NA	**211.66**	3.06
1993	191.78	191.78	IE	1.50	12.89	0.07	NA	**206.25**	3.27
1994	183.88	183.88	IE	1.37	12.68	0.07	NA	**198.01**	3.43
1995	183.85	183.85	IE	0.89	12.74	0.07	NA	**197.55**	3.85
1996	202.33	202.33	IE	0.86	12.56	0.07	NA	**215.82**	4.24
1997	188.56	188.56	IE	0.86	12.55	0.07	NA	**202.03**	4.43
1998	200.61	200.61	IE	0.83	12.57	0.07	NA	**214.08**	4.59
1999	192.84	192.84	IE	0.82	12.15	0.07	NA	**205.87**	4.52
2000	199.11	199.11	IE	0.83	11.90	0.07	NA	**211.91**	6.44
2001	210.29	210.29	IE	0.78	11.80	0.07	NA	**222.93**	6.32
2002	218.57	218.57	IE	0.78	11.75	0.07	NA	**231.17**	5.67
2003	230.58	230.58	IE	0.81	11.27	0.07	NA	**242.72**	5.21
2004	231.91	231.91	IE	0.69	10.71	0.07	NA	**243.36**	6.09
2005	237.97	237.97	IE	0.70	10.75	0.06	NA	**249.48**	6.99
2006	229.59	229.59	IE	0.58	10.78	0.05	NA	**241.01**	7.54
2007	224.57	224.57	IE	0.48	10.94	0.05	NA	**236.02**	7.99
2008	212.26	212.26	IE	0.56	11.47	0.04	NA	**224.33**	7.90
2009	200.65	200.65	IE	0.41	11.24	0.03	NA	**212.32**	6.86
2010	204.61	204.61	IE	0.55	10.35	0.02	NA	**215.52**	7.60
2011	196.35	196.35	IE	0.51	10.86	0.02	NA	**207.74**	7.98
2012	193.01	193.01	IE	0.54	10.95	0.02	NA	**204.52**	7.68
2013	197.63	197.63	IE	0.45	10.82	0.02	NA	**208.92**	7.46
2014	190.34	190.34	IE	0.46	11.11	0.02	NA	**201.93**	7.49
2015	186.76	186.76	IE	0.52	11.48	0.02	NA	**198.78**	8.18
2016	176.68	176.68	IE	0.51	11.72	0.02	NA	**188.93**	10.28
2017	166.50	166.50	IE	0.47	11.47	0.02	NA	**178.47**	10.06
2018	153.75	153.75	IE	0.41	11.18	0.02	NA	**165.36**	11.54
2019	144.49	144.49	IE	0.50	10.70	0.02	NA	**155.72**	13.47
2020	122.06	122.06	IE	0.48	10.71	0.03	NA	**133.27**	4.54
2021	120.46	120.46	IE	0.46	10.88	0.03	NA	**131.83**	5.35
2022	111.35	111.35	IE	0.40	10.44	0.03	NA	**122.21**	8.91
2023	104.20	104.20	IE	0.46	10.02	0.03	NA	**114.71**	11.59
2024	99.23	99.23	IE	0.38	10.23	0.03	NA	**109.86**	13.03

Table A.I-3: NMVOC emissions [kilotonnes] 1990–2024 based on fuel sold. (Source: Umweltbundesamt)

	NFR								
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER	NATIONAL TOTAL	International Bunkers
1990	171.06	155.14	15.92	118.95	53.35	0.17	NA	**343.53**	0.18
1991	174.41	158.85	15.56	112.44	52.32	0.17	NA	**339.33**	0.20
1992	158.71	143.05	15.66	105.70	49.80	0.16	NA	**314.37**	0.21
1993	145.98	130.85	15.13	99.02	50.30	0.16	NA	**295.45**	0.23
1994	130.02	118.43	11.59	92.41	49.71	0.15	NA	**272.29**	0.24
1995	121.40	111.43	9.98	85.74	49.24	0.15	NA	**256.54**	0.26
1996	113.98	105.02	8.95	83.22	47.96	0.14	NA	**245.30**	0.31
1997	101.75	93.30	8.45	80.75	47.03	0.14	NA	**229.66**	0.35
1998	95.44	88.51	6.93	78.52	46.76	0.14	NA	**220.85**	0.39
1999	87.28	81.13	6.15	74.89	45.86	0.13	NA	**208.17**	0.38
2000	80.54	74.36	6.18	70.82	44.24	0.13	NA	**195.72**	0.42
2001	77.54	73.21	4.33	68.83	43.40	0.12	NA	**189.90**	0.41
2002	74.66	70.13	4.53	66.77	42.43	0.12	NA	**183.98**	0.37
2003	72.92	68.43	4.48	64.18	41.82	0.12	NA	**179.04**	0.34
2004	69.41	65.31	4.10	62.06	41.39	0.12	NA	**172.98**	0.40
2005	66.93	63.04	3.90	60.27	40.59	0.12	NA	**167.91**	0.47
2006	63.37	59.44	3.93	58.35	40.03	0.11	NA	**161.86**	0.50
2007	60.84	57.26	3.57	56.19	39.78	0.11	NA	**156.92**	0.53
2008	58.79	55.42	3.37	54.02	39.35	0.10	NA	**152.26**	0.52
2009	56.34	53.12	3.22	51.78	39.57	0.10	NA	**147.79**	0.45
2010	57.57	54.50	3.07	49.65	39.20	0.09	NA	**146.51**	0.49
2011	53.32	50.26	3.06	48.30	38.33	0.09	NA	**140.04**	0.51
2012	52.83	49.77	3.07	46.76	37.70	0.08	NA	**137.38**	0.49
2013	52.06	49.06	3.01	44.76	37.58	0.08	NA	**134.49**	0.46
2014	46.90	43.78	3.11	43.19	37.49	0.07	NA	**127.66**	0.46
2015	46.97	43.95	3.02	41.59	37.26	0.07	NA	**125.89**	0.50
2016	46.11	43.14	2.97	41.67	37.11	0.07	NA	**124.96**	0.23
2017	45.29	42.29	3.00	41.33	36.97	0.07	NA	**123.66**	0.20
2018	41.83	38.95	2.88	40.98	36.11	0.06	NA	**118.98**	0.22
2019	41.07	38.15	2.92	40.22	35.30	0.06	NA	**116.66**	0.24
2020	38.26	35.73	2.54	43.79	34.70	0.06	NA	**116.82**	0.10
2021	42.04	39.52	2.52	41.42	34.39	0.06	NA	**117.91**	0.12
2022	39.09	36.78	2.31	40.15	34.10	0.06	NA	**113.40**	0.19
2023	41.02	38.52	2.50	38.96	33.20	0.06	NA	**113.24**	0.22
2024	39.70	37.17	2.53	38.20	32.85	0.05	NA	**110.81**	0.23

Table A.I-4: NH_3 emissions [kilotonnes] 1990–2024 based on fuel sold. (Source: Umweltbundesamt)

	NFR								
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER	NATIONAL TOTAL	International Bunkers
1990	2.13	2.13	IE	0.33	87.69	0.37	0.55	**91.06**	0.00
1991	2.63	2.63	IE	0.57	87.44	0.38	0.55	**91.57**	0.00
1992	2.80	2.80	IE	0.43	83.89	0.43	0.56	**88.12**	0.00
1993	3.10	3.10	IE	0.28	83.29	0.51	0.57	**87.75**	0.00
1994	3.23	3.23	IE	0.23	82.61	0.60	0.57	**87.23**	0.00
1995	3.43	3.43	IE	0.16	82.76	0.61	0.58	**87.54**	0.00
1996	3.61	3.61	IE	0.15	81.24	0.63	0.59	**86.23**	0.00
1997	3.66	3.66	IE	0.15	80.68	0.62	0.59	**85.70**	0.00
1998	3.95	3.95	IE	0.16	80.87	0.65	0.60	**86.22**	0.00
1999	3.96	3.96	IE	0.18	78.88	0.70	0.60	**84.32**	0.00
2000	3.90	3.90	IE	0.16	77.15	0.74	0.61	**82.55**	0.00
2001	4.08	4.08	IE	0.14	76.42	0.77	0.62	**82.01**	0.00
2002	4.21	4.21	IE	0.12	75.02	0.79	0.62	**80.76**	0.00
2003	4.31	4.31	IE	0.13	74.62	0.81	0.63	**80.51**	0.00
2004	4.18	4.18	IE	0.11	73.81	1.00	0.64	**79.75**	0.00
2005	4.16	4.16	0.00	0.12	73.52	1.09	0.65	**79.54**	0.00
2006	4.09	4.08	0.01	0.13	73.90	1.12	0.66	**79.89**	0.00
2007	3.99	3.98	0.01	0.13	74.69	1.16	0.66	**80.63**	0.00
2008	3.73	3.72	0.00	0.13	74.48	1.15	0.67	**80.16**	0.00
2009	3.53	3.52	0.00	0.14	75.90	1.14	0.67	**81.39**	0.00
2010	3.57	3.57	0.00	0.14	75.02	1.17	0.68	**80.58**	0.00
2011	3.25	3.25	0.00	0.15	74.56	1.17	0.68	**79.82**	0.00
2012	3.11	3.11	0.00	0.15	74.65	1.18	0.68	**79.76**	0.00
2013	2.93	2.93	0.00	0.15	74.48	1.11	0.69	**79.36**	0.00
2014	2.68	2.68	0.00	0.14	75.48	1.15	0.69	**80.14**	0.00
2015	2.70	2.70	0.00	0.13	76.04	1.17	0.70	**80.74**	0.00
2016	2.59	2.59	0.00	0.14	76.91	1.22	0.70	**81.56**	0.00
2017	2.61	2.61	0.00	0.16	76.85	1.20	0.71	**81.53**	0.00
2018	2.52	2.52	0.00	0.13	75.19	1.19	0.76	**79.80**	0.00
2019	2.50	2.50	0.00	0.16	73.31	1.20	0.82	**77.99**	0.01
2020	2.25	2.25	0.00	0.16	72.70	1.24	0.88	**77.22**	0.00
2021	2.39	2.39	0.00	0.14	72.66	1.28	0.88	**77.34**	0.00
2022	2.31	2.31	0.00	0.13	71.39	1.23	0.88	**75.93**	0.00
2023	2.27	2.27	0.00	0.13	69.58	1.24	0.88	**74.11**	0.00
2024	2.21	2.21	0.00	0.12	67.79	1.29	0.88	**72.28**	0.01

Table A.I-5: $PM_{2.5}$ emissions [kilotonnes] 1990–2024 based on fuel sold. (Source: Umweltbundesamt)

	NFR								
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER	NATIONAL TOTAL	International Bunkers
1990	22.88	22.78	0.11	4.02	0.34	0.25	NA	**27.50**	0.27
1995	22.09	22.00	0.09	3.40	0.34	0.25	NA	**26.08**	0.41
2000	20.95	20.86	0.09	3.15	0.32	0.24	NA	**24.66**	0.52
2001	21.41	21.32	0.09	3.07	0.33	0.24	NA	**25.06**	0.51
2002	21.12	21.02	0.10	2.65	0.32	0.25	NA	**24.34**	0.46
2003	21.17	21.07	0.10	2.60	0.32	0.25	NA	**24.34**	0.43
2004	20.72	20.63	0.09	2.56	0.36	0.25	NA	**23.89**	0.51
2005	20.75	20.66	0.09	2.47	0.31	0.22	NA	**23.76**	0.59
2006	20.38	20.29	0.09	2.22	0.31	0.22	NA	**23.12**	0.63
2007	19.60	19.52	0.08	2.08	0.31	0.27	NA	**22.26**	0.66
2008	18.54	18.46	0.08	2.16	0.31	0.26	NA	**21.27**	0.66
2009	17.59	17.53	0.06	2.01	0.30	0.25	NA	**20.16**	0.57
2010	18.11	18.04	0.07	1.96	0.30	0.30	NA	**20.66**	0.62
2011	16.86	16.79	0.07	2.01	0.28	0.29	NA	**19.44**	0.65
2012	16.49	16.43	0.07	1.91	0.27	0.31	NA	**18.98**	0.62
2013	16.01	15.94	0.07	1.93	0.26	0.27	NA	**18.47**	0.59
2014	14.37	14.30	0.06	1.92	0.27	0.32	NA	**16.87**	0.59
2015	14.25	14.18	0.07	1.88	0.26	0.33	NA	**16.72**	0.63
2016	13.82	13.76	0.06	1.91	0.26	0.32	NA	**16.31**	0.70
2017	13.60	13.53	0.07	1.91	0.26	0.32	NA	**16.09**	0.67
2018	12.56	12.50	0.06	1.87	0.26	0.28	NA	**14.97**	0.76
2019	12.25	12.19	0.06	1.89	0.26	0.33	NA	**14.73**	0.88
2020	11.41	11.36	0.05	1.80	0.25	0.33	NA	**13.78**	0.31
2021	12.29	12.24	0.05	1.92	0.25	0.35	NA	**14.81**	0.37
2022	11.46	11.41	0.05	1.83	0.25	0.36	NA	**13.91**	0.59
2023	11.68	11.63	0.05	1.81	0.25	0.33	NA	**14.06**	0.79
2024	11.34	11.30	0.05	1.72	0.25	0.34	NA	**13.64**	0.88

ANNEX 2: AUSTRIA'S EMISSIONS BASED ON FUEL USED (WITHOUT ‚FUEL EXPORTS')

Notation keys:

NE (not estimated)..... for existing emissions by sources and removals by sinks of pollutants, which have not been estimated.

IE (included elsewhere).... for emissions by sources and removals by sinks of pollutants estimated but included elsewhere in the inventory instead of the expected source/sink category.

NO (not occurring)..... for emissions by sources and removals by sinks of pollutants that do not occur for a particular gas or source/sink category.

NA (not applicable)..... for activities in a given source/sink category that do not result in emissions or removals of a specific pollutant.

C (confidential) ..... for emissions, which could lead to the disclosure of confidential information if reported at the most disaggregated level. In this case, a minimum of aggregation is required to protect business information.

Table A.II-1: SO_2 emissions [kilotonnes] 1990–2024 based on fuel used. (Source: Umweltbundesamt)

	NFR Sectors								
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER	NATIONAL TOTAL	Civil Aviation - Cruise
1990	71.03	69.03	2.00	1.93	0.00	0.07	NA	**73.04**	0.25
1991	68.17	66.87	1.30	1.61	0.00	0.06	NA	**69.84**	0.28
1992	51.92	49.92	2.00	1.36	0.00	0.04	NA	**53.33**	0.30
1993	50.69	48.59	2.10	1.11	0.00	0.04	NA	**51.85**	0.32
1994	45.34	44.06	1.28	1.12	0.00	0.05	NA	**46.51**	0.34
1995	45.43	43.90	1.53	1.07	0.00	0.05	NA	**46.55**	0.38
1996	42.23	41.03	1.20	0.99	0.00	0.05	NA	**43.27**	0.42
1997	39.02	38.95	0.07	0.96	0.00	0.06	NA	**40.04**	0.43
1998	34.09	34.04	0.04	0.87	0.00	0.06	NA	**35.02**	0.45
1999	32.46	32.41	0.04	0.81	0.00	0.06	NA	**33.33**	0.44
2000	30.24	30.20	0.04	0.78	0.00	0.06	NA	**31.08**	0.48
2001	31.06	31.01	0.05	0.71	0.00	0.06	NA	**31.83**	0.47
2002	29.89	29.85	0.04	0.71	0.00	0.06	NA	**30.66**	0.43
2003	29.59	29.54	0.05	0.71	0.00	0.06	NA	**30.36**	0.40
2004	25.72	25.68	0.04	0.72	0.01	0.06	NA	**26.51**	0.47
2005	25.05	25.01	0.04	0.72	0.00	0.06	NA	**25.84**	0.55
2006	25.83	25.78	0.05	0.73	0.00	0.05	NA	**26.61**	0.58
2007	22.51	22.45	0.05	0.75	0.00	0.04	NA	**23.30**	0.61
2008	19.42	19.37	0.04	0.78	0.00	0.03	NA	**20.23**	0.61
2009	13.98	13.92	0.06	0.70	0.00	0.02	NA	**14.70**	0.53
2010	15.22	15.17	0.05	0.70	0.00	0.01	NA	**15.93**	0.57
2011	14.43	14.38	0.05	0.68	0.00	0.01	NA	**15.12**	0.60
2012	14.08	14.04	0.05	0.65	0.00	0.01	NA	**14.75**	0.57
2013	13.70	13.66	0.04	0.58	0.00	0.01	NA	**14.30**	0.54
2014	13.91	13.87	0.04	0.56	0.00	0.01	NA	**14.48**	0.54
2015	13.46	13.42	0.04	0.55	0.00	0.01	NA	**14.02**	0.58
2016	12.65	12.63	0.02	0.73	0.00	0.01	NA	**13.39**	0.54
2017	12.17	12.14	0.04	0.70	0.00	0.01	NA	**12.88**	0.52
2018	10.97	10.95	0.02	0.65	0.00	0.01	NA	**11.64**	0.59
2019	10.53	10.51	0.02	0.64	0.00	0.01	NA	**11.18**	0.68
2020	9.80	9.78	0.02	0.59	0.00	0.01	NA	**10.41**	0.24
2021	10.20	10.17	0.03	0.58	NA	0.01	NA	**10.79**	0.27
2022	10.20	10.17	0.03	0.50	NA	0.02	NA	**10.71**	0.45
2023	10.20	10.17	0.03	0.49	NA	0.01	NA	**10.71**	0.61
2024	10.03	10.00	0.03	0.49	NA	0.02	NA	**10.53**	0.68

Table A.II-2: NO_x emissions [kilotonnes] 1990–2024 based on fuel used. (Source: Umweltbundesamt)

	NFR Sectors								
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER	NATIONAL TOTAL	Civil Aviation - Cruise
1990	184.18	184.18	IE	1.53	13.67	0.12	NA	**199.51**	2.48
1991	186.75	186.75	IE	1.51	13.58	0.11	NA	**201.95**	2.80
1992	178.31	178.31	IE	1.41	13.16	0.08	NA	**192.95**	3.06
1993	173.09	173.09	IE	1.50	12.89	0.07	NA	**187.56**	3.27
1994	169.18	169.18	IE	1.37	12.68	0.07	NA	**183.30**	3.43
1995	168.62	168.62	IE	0.89	12.74	0.07	NA	**182.32**	3.85
1996	168.81	168.81	IE	0.86	12.56	0.07	NA	**182.30**	4.24
1997	169.23	169.23	IE	0.86	12.55	0.07	NA	**182.70**	4.43
1998	167.36	167.36	IE	0.83	12.57	0.07	NA	**180.82**	4.59
1999	167.82	167.82	IE	0.82	12.15	0.07	NA	**180.85**	4.52
2000	167.74	167.74	IE	0.83	11.90	0.07	NA	**180.54**	6.44
2001	170.90	170.90	IE	0.78	11.80	0.07	NA	**183.54**	6.32
2002	170.43	170.43	IE	0.78	11.75	0.07	NA	**183.03**	5.67
2003	175.20	175.20	IE	0.81	11.27	0.07	NA	**187.34**	5.21
2004	176.36	176.36	IE	0.69	10.71	0.07	NA	**187.82**	6.09
2005	180.17	180.17	IE	0.70	10.75	0.06	NA	**191.68**	6.99
2006	182.04	182.04	IE	0.58	10.78	0.05	NA	**193.46**	7.54
2007	179.53	179.53	IE	0.48	10.94	0.05	NA	**190.98**	7.99
2008	175.36	175.36	IE	0.56	11.47	0.04	NA	**187.43**	7.90
2009	162.38	162.38	IE	0.41	11.24	0.03	NA	**174.05**	6.86
2010	164.32	164.32	IE	0.55	10.35	0.02	NA	**175.24**	7.60
2011	163.84	163.84	IE	0.51	10.86	0.02	NA	**175.23**	7.98
2012	160.72	160.72	IE	0.54	10.95	0.02	NA	**172.24**	7.68
2013	158.56	158.56	IE	0.45	10.82	0.02	NA	**169.85**	7.46
2014	155.88	155.88	IE	0.46	11.11	0.02	NA	**167.47**	7.49
2015	154.02	154.02	IE	0.52	11.48	0.02	NA	**166.04**	8.18
2016	149.28	149.28	IE	0.51	11.72	0.02	NA	**161.54**	10.28
2017	142.22	142.22	IE	0.47	11.47	0.02	NA	**154.19**	10.06
2018	132.52	132.52	IE	0.41	11.18	0.02	NA	**144.14**	11.54
2019	126.00	126.00	IE	0.50	10.70	0.02	NA	**137.22**	13.47
2020	107.64	107.64	IE	0.48	10.71	0.03	NA	**118.85**	4.54
2021	107.94	107.94	IE	0.46	10.88	0.03	NA	**119.31**	5.35
2022	103.78	103.78	IE	0.40	10.44	0.03	NA	**114.65**	8.91
2023	97.78	97.78	IE	0.46	10.02	0.03	NA	**108.29**	11.59
2024	93.04	93.04	IE	0.38	10.23	0.03	NA	**103.68**	13.03

Table A.II-3: NMVOC emissions [kilotonnes] 1990–2024 based on fuel used. (Source: Umweltbundesamt)

	NFR Sectors								
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES*	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER	NATIONAL TOTAL	Civil Aviation - Cruise
1990	168.37	152.45	15.92	118.95	53.35	0.17	NA	**340.84**	0.18
1991	164.43	148.88	15.56	112.44	52.32	0.17	NA	**329.35**	0.20
1992	153.96	138.30	15.66	105.70	49.80	0.16	NA	**309.62**	0.21
1993	143.88	128.75	15.13	99.02	50.30	0.16	NA	**293.36**	0.23
1994	130.53	118.94	11.59	92.41	49.71	0.15	NA	**272.80**	0.24
1995	122.11	112.14	9.98	85.74	49.24	0.15	NA	**257.24**	0.26
1996	115.96	107.01	8.95	83.22	47.96	0.14	NA	**247.28**	0.31
1997	104.67	96.22	8.45	80.75	47.03	0.14	NA	**232.59**	0.35
1998	95.21	88.29	6.93	78.52	46.76	0.14	NA	**220.62**	0.39
1999	88.68	82.53	6.15	74.89	45.86	0.13	NA	**209.57**	0.38
2000	81.30	75.13	6.18	70.82	44.24	0.13	NA	**196.48**	0.42
2001	76.69	72.36	4.33	68.83	43.40	0.12	NA	**189.05**	0.41
2002	71.15	66.62	4.53	66.77	42.43	0.12	NA	**180.47**	0.37
2003	67.94	63.46	4.48	64.18	41.82	0.12	NA	**174.06**	0.34
2004	64.30	60.20	4.10	62.06	41.39	0.12	NA	**167.87**	0.40
2005	61.79	57.89	3.90	60.27	40.59	0.12	NA	**162.76**	0.47
2006	59.37	55.44	3.93	58.35	40.03	0.11	NA	**157.86**	0.50
2007	56.95	53.38	3.57	56.19	39.78	0.11	NA	**153.03**	0.53
2008	55.95	52.58	3.37	54.02	39.35	0.10	NA	**149.42**	0.52
2009	53.44	50.22	3.22	51.78	39.57	0.10	NA	**144.88**	0.45
2010	54.93	51.87	3.07	49.65	39.20	0.09	NA	**143.88**	0.49
2011	51.20	48.14	3.06	48.30	38.33	0.09	NA	**137.92**	0.51
2012	50.91	47.84	3.07	46.76	37.70	0.08	NA	**135.45**	0.49
2013	50.30	47.30	3.01	44.76	37.58	0.08	NA	**132.73**	0.46
2014	45.38	42.27	3.11	43.19	37.49	0.07	NA	**126.14**	0.46
2015	45.38	42.36	3.02	41.59	37.26	0.07	NA	**124.30**	0.50
2016	44.58	41.61	2.97	41.67	37.11	0.07	NA	**123.43**	0.23
2017	43.90	40.90	3.00	41.33	36.97	0.07	NA	**122.27**	0.20
2018	40.58	37.70	2.88	40.98	36.11	0.06	NA	**117.74**	0.22
2019	40.11	37.19	2.92	40.22	35.30	0.06	NA	**115.69**	0.24
2020	37.58	35.04	2.54	43.79	34.70	0.06	NA	**116.13**	0.10
2021	41.50	38.98	2.52	41.42	34.39	0.06	NA	**117.37**	0.12
2022	38.76	36.46	2.31	40.15	34.10	0.06	NA	**113.07**	0.19
2023	40.50	38.00	2.50	38.96	33.20	0.06	NA	**112.72**	0.22
2024	39.25	36.72	2.53	38.20	32.85	0.05	NA	**110.36**	0.23

**exhaust and non-exhaust emissions (gasoline evaporation) from 1.A.3.b Road Transport calculated on the basis of 'fuel used'*

Table A.II-4: NH_3 emissions [kilotonnes] 1990–2024 based on fuel used. (Source: Umweltbundesamt)

	NFR Sectors								
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER	NATIONAL TOTAL	Civil Aviation - Cruise
1990	2.11	2.11	IE	0.33	87.69	0.37	0.55	**91.04**	0.00
1991	2.50	2.50	IE	0.57	87.44	0.38	0.55	**91.44**	0.00
1992	2.72	2.72	IE	0.43	83.89	0.43	0.56	**88.04**	0.00
1993	3.06	3.06	IE	0.28	83.29	0.51	0.57	**87.71**	0.00
1994	3.26	3.26	IE	0.23	82.61	0.60	0.57	**87.27**	0.00
1995	3.48	3.48	IE	0.16	82.76	0.61	0.58	**87.59**	0.00
1996	3.78	3.78	IE	0.15	81.24	0.63	0.59	**86.40**	0.00
1997	3.89	3.89	IE	0.15	80.68	0.62	0.59	**85.94**	0.00
1998	4.03	4.03	IE	0.16	80.87	0.65	0.60	**86.30**	0.00
1999	4.19	4.19	IE	0.18	78.88	0.70	0.60	**84.55**	0.00
2000	4.12	4.12	IE	0.16	77.15	0.74	0.61	**82.77**	0.00
2001	4.13	4.13	IE	0.14	76.42	0.77	0.62	**82.07**	0.00
2002	3.91	3.91	IE	0.12	75.02	0.79	0.62	**80.46**	0.00
2003	3.79	3.79	IE	0.13	74.62	0.81	0.63	**79.99**	0.00
2004	3.61	3.61	IE	0.11	73.81	1.00	0.64	**79.18**	0.00
2005	3.57	3.57	0.00	0.12	73.52	1.09	0.65	**78.95**	0.00
2006	3.52	3.52	0.01	0.13	73.90	1.12	0.66	**79.32**	0.00
2007	3.41	3.41	0.01	0.13	74.69	1.16	0.66	**80.06**	0.00
2008	3.32	3.31	0.00	0.13	74.48	1.15	0.67	**79.75**	0.00
2009	3.10	3.10	0.00	0.14	75.90	1.14	0.67	**80.96**	0.00
2010	3.17	3.16	0.00	0.14	75.02	1.17	0.68	**80.18**	0.00
2011	2.93	2.92	0.00	0.15	74.56	1.17	0.68	**79.49**	0.00
2012	2.82	2.82	0.00	0.15	74.65	1.18	0.68	**79.47**	0.00
2013	2.68	2.68	0.00	0.15	74.48	1.11	0.69	**79.10**	0.00
2014	2.46	2.46	0.00	0.14	75.48	1.15	0.69	**79.92**	0.00
2015	2.48	2.48	0.00	0.13	76.04	1.17	0.70	**80.52**	0.00
2016	2.38	2.38	0.00	0.14	76.91	1.22	0.70	**81.34**	0.00
2017	2.40	2.40	0.00	0.16	76.85	1.20	0.71	**81.33**	0.00
2018	2.34	2.33	0.00	0.13	75.19	1.19	0.76	**79.61**	0.00
2019	2.34	2.34	0.00	0.16	73.31	1.20	0.82	**77.83**	0.01
2020	2.13	2.13	0.00	0.16	72.70	1.24	0.88	**77.11**	0.00
2021	2.28	2.28	0.00	0.14	72.66	1.28	0.88	**77.24**	0.00
2022	2.24	2.24	0.00	0.13	71.39	1.23	0.88	**75.86**	0.00
2023	2.17	2.17	0.00	0.13	69.58	1.24	0.88	**74.01**	0.00
2024	2.12	2.12	0.00	0.12	67.79	1.29	0.88	**72.19**	0.01

Table A.II-5: $PM_{2.5}$ emissions [kilotonnes] 1990–2024 based on fuel used. (Source: Umweltbundesamt)

	NFR Sectors								
	1	1 A	1 B	2	3	5	6		
	ENERGY	FUEL COMBUSTION ACTIVITIES *	FUGITIVE EMISSIONS FROM FUELS	INDUSTRIAL PROCESSES	AGRICULTURE	WASTE	OTHER	NATIONAL TOTAL	Civil Aviation - Cruise
1990	22.29	22.18	0.11	4.02	0.34	0.25	NA	**26.90**	0.27
1995	21.40	21.31	0.09	3.40	0.34	0.25	NA	**25.38**	0.41
2000	20.06	19.97	0.09	3.15	0.32	0.24	NA	**23.78**	0.52
2001	20.21	20.12	0.09	3.07	0.33	0.24	NA	**23.85**	0.51
2002	19.41	19.31	0.10	2.65	0.32	0.25	NA	**22.64**	0.46
2003	19.08	18.98	0.10	2.60	0.32	0.25	NA	**22.25**	0.43
2004	18.54	18.45	0.09	2.56	0.36	0.25	NA	**21.71**	0.51
2005	18.50	18.41	0.09	2.47	0.31	0.22	NA	**21.51**	0.59
2006	18.50	18.41	0.09	2.22	0.31	0.22	NA	**21.24**	0.63
2007	17.89	17.81	0.08	2.08	0.31	0.27	NA	**20.55**	0.66
2008	17.29	17.22	0.08	2.16	0.31	0.26	NA	**20.02**	0.66
2009	16.33	16.28	0.06	2.01	0.30	0.25	NA	**18.90**	0.57
2010	16.88	16.81	0.07	1.96	0.30	0.30	NA	**19.43**	0.62
2011	15.90	15.83	0.07	2.01	0.28	0.29	NA	**18.48**	0.65
2012	15.60	15.54	0.07	1.91	0.27	0.31	NA	**18.09**	0.62
2013	15.07	15.00	0.07	1.93	0.26	0.27	NA	**17.53**	0.59
2014	13.57	13.51	0.06	1.92	0.27	0.32	NA	**16.08**	0.59
2015	13.47	13.40	0.07	1.88	0.26	0.33	NA	**15.94**	0.63
2016	13.11	13.04	0.06	1.91	0.26	0.32	NA	**15.59**	0.70
2017	12.92	12.86	0.07	1.91	0.26	0.32	NA	**15.42**	0.67
2018	11.96	11.90	0.06	1.87	0.26	0.28	NA	**14.37**	0.76
2019	11.70	11.64	0.06	1.89	0.26	0.33	NA	**14.18**	0.88
2020	10.97	10.92	0.05	1.80	0.25	0.33	NA	**13.35**	0.31
2021	11.90	11.85	0.05	1.92	0.25	0.35	NA	**14.42**	0.37
2022	11.21	11.17	0.05	1.83	0.25	0.36	NA	**13.66**	0.59
2023	11.44	11.39	0.05	1.81	0.25	0.33	NA	**13.83**	0.79
2024	11.12	11.07	0.05	1.72	0.25	0.34	NA	**13.42**	0.88

* *exhaust and non-exhaust emissions (tyre and break wear, road abrasion) from 1.A.3.b Road Transport calculated on the basis of 'fuel used'*

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