EXECUTIVE SUMMARY

ES.1 Reporting obligation under UNECE/LRTAP

Austria's Informative Inventory Report (IIR) and the complete set of NFR tables (the latter are submitted in digital format only) represent Austria's official submission under the United Nations Economic Commission for Europe (UNECE) Convention on Long-rage Transboundary Air Pollution (LRTAP). The Umweltbundesamt in its role as single national entity regarding emission inventories compiles Austria's annual delivery, and the Austrian Ministry of Agriculture, Forestry, Environment and Water Management submits it officially to the Executive Secretary of UNECE.

As a party to the UNECE/LRTAP Convention, Austria is required to annually report data on emissions of air pollutants covered in the Convention and its Protocols:

- main pollutants: nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOC), sulphur oxides (SO_x), ammonia (NH_3) and carbon monoxide (CO);
- particulate matter (PM): primary PM (fine particulate matter ($PM_{2.5}$) and coarse particulate matter (PM_{10}) as well as total suspended particulates (TSPs);
- priority heavy metals (HMs): lead (Pb), cadmium (Cd) and mercury (Hg);
- persistent organic pollutants (POPs): polychlorinated dibenzodioxins/dibenzofurans (PCDD/Fs), polycyclic aromatic hydrocarbons (PAHs), hexachlorobenzene (HCB) and polychlorinated biphenyls (PCBs).

In order to fulfil this reporting requirement, Austria compiles an Air Emission Inventory ("Österreichische Luftschadstoff-Inventur – OLI"), which is updated annually. The IIR contains information on Austria's inventories of air pollutants for all years from 1990 to 2014 for the main pollutants, for POPs and HMs and for the years 1990, 1995 and from 2000 onwards for PM.

From submission 2015 onwards, Austria reports all pollutants in the NFR14 reporting format from 1990 to the latest inventory year. Emissions of the years before 1990 were last updated and published in submission 2014.[6]

In addition, the report includes both detailed descriptions of methods, data sources and uncertainties and information on quality assurance and quality control (QA/QC) activities as well as analyses of emission trends.

The emission data presented in this report were compiled according to the revised 2014 Reporting Guidelines (ECE/EB.AIR.125) that were approved by the Executive Body for the UNECE/LRTAP Convention at its 36th session.

The Austrian inventory is complete with regard to reported gases, reported years and reported emissions from all sources, and also complete in terms of geographic coverage. PCB emissions from 1990 to 2014 are reported for the first time in the current submission.

[6] Austria´s submission 2014 under the Convention on Long-range Transboundary Air Pollution covering the years 1980–2012: http://www.ceip.at/ms/ceip_home1/ceip_home/status_reporting/2014_submissions/

ES.2 Differences with other reporting obligations

The main pollutant emissions – SO_2, NO_x, VOC, and NH_3 – are also reported under the EU National Emission Ceiling Directive (NEC-D), where a national Total based on *fuel used* (thus excluding emissions from fuel exports in the vehicle tank) is reported for compliance assessment. Under the CLRTAP Austria reports the same values for "National Total for Compliance" and "National Total".

The annual greenhouse gas reporting under the UNFCCC also requires the reporting of indirect GHGs (NO_x, CO, NMVOC) and SO_2 emissions based on *fuel sold*. In contrast to UNFCCC requirements, emissions from aviation under NEC and CLRTAP include domestic LTO and cruise. Furthermore, international navigation of inland waterways is covered additionally under NEC and CLRTAP.

ES.3 Overview of emission trends

Main Pollutants

In 1990, national total SO_2 emissions amounted to 74 kt. Since then emissions have decreased quite steadily. In the year 2014, emissions were down by 78% compared to 1990 and amounted to 16 kt, which was mainly due to lower emissions from residential heating, combustion in industries and in energy industries. The sharp decrease from 2008 to 2009 is due to a further reduction of the sulfur content of gasoil to 10ppm. From 2013 to 2014, emissions increased slightly, by 0.9%, mainly due higher emissions reported by oil refineries.

In 1990, national total NO_x emissions amounted to 216 kt. After an all-time high between 2003 and 2005, emissions have been decreasing continuously, mainly due to lower emissions from heavy duty vehicles. In 2014, NO_x emissions amounted to 151 kt and were about 30% lower than in 1990. From 2013 to 2014, emissions fell by 6.8%, again mainly due to declining emissions from road transportation, in particular from heavy duty vehicles. As emissions mainly arise from transport, the share of NO_x emissions caused by fuel sold in Austria but used abroad is notable. Emissions calculated based on fuel used are almost 21 kt lower in 2014 than when calculated based on fuel sold; the decrease between 1990 and 2014 is also slightly stronger.

In 1990, national total NMVOC emissions amounted to 281 kt. Emissions have decreased steadily since then and in the year 2014, they amounted to 110 kt, which is 61% lower than in 1990. From 2013 to 2014, emissions decreased by 4.4% due to lower biomass use for residential heating as a consequence of the mild winter temperatures in 2014.

National total NH_3 emissions in 1990 amounted to 66.5 kt; emissions were quite stable over the period from 1990 to 2014 and in 2014, they were 0.7% above 1990 levels (67.0 kt). NH_3 in Austria is almost exclusively emitted in the agricultural sector; emissions from agricultural soils, mainly resulting from organic and inorganic fertilization, have the highest contribution to national total NH_3 emissions.

National total CO emissions in 1990 amounted to 1 286 kt. They decreased considerably from 1990 to 2014. In 2014, emissions were 58% below 1990 levels and amounted to 537 kt. This reduction was mainly due to declining emissions from road transport due to the establishment of catalytic converters.

Particulate Matter

Particulate matter emissions in Austria mainly arise from industrial processes, road transport, agriculture and small heating installations.

Particulate matter (PM) emissions show a decreasing trend over the period 1990 to 2014: TSP emissions decreased by 11%, PM_{10} emissions were about 22% below the level of 1990, and $PM_{2.5}$ emissions dropped by about 34%. Between 2013 and 2014, PM emissions fell by 2.0% (TSP), 4.2% (PM_{10}) and 8.1% ($PM_{2.5}$) because of lower biomass consumption of the residential sector due to a mild winter 2014. Apart from industry and road transport, private households and the agricultural sector are the main contributors to PM emissions. Where for TSP the most important source is industrial processes, small heating installations have the highest share in $PM_{2 5}$ emissions.

Heavy Metals

Emissions of all three priority heavy metals (Cd, Pb and Hg) have decreased since 1990.

The overall Cd emissions reduction of 28% from 1990 to 2014 is mainly due to a decline in the industrial processes and energy sector, which is due to loweruse of heavy fuel oil and lower emissions from iron and steel production.

The overall fall in Hg emissions of about 55% for the period 1990 to 2014 is due to decreasing emissions from cement industries and the industrial processes sector as well as due to reduced use of coal for residential heating. Several bans in different industrial sub-sectors and in the agriculture sector are behind these developments in Austria.

The overall reduction trend of Pb emissions was minus 93% for the period 1990 to 2014, which is mainly a result of the ban of lead in fuels. However, abatement techniques and product substitutions also contributed to the emission reduction.

Persistent Organic Pollutants (POPs)

Emissions of PAH and PCDD/F declined remarkably between 1990 and 2014. HCB and PCB emissions increased between 1990 and 2014.

The significant increase (53%) of HCB emissions is due to unintentional releases of HCB by an Austrian cement plant affecting the years 2012, 2013 and 2014.

The increase (12%) of PCB emissions between 1990 and 2014 is a result of increased activities in metal production, which is the main source category.

The most important source for PAH, PCDD/F and HCB emissions in Austria is residential heating. In the 1980s industry and waste incineration were still important sources regarding POP emissions. Due to emission abatement legislation, emissions from industry and waste incineration decreased remarkably from 1990 to 1993.

ES.4 Key categories

To determine key categories, a trend and a level assessment have been carried out, which resulted in 41 identified key categories. It shows that the residential sector has been identified as the most important key category: all air pollutants except NH_3 and PCB are found key in either the trend or the level assessment.

Table 1: Most relevant key categories in Austria for air emissions 2014

Name of key category	No of occurrences as key category
1.A.4.b.1 – Residential: stationary	23 times (SO_2, NO_x, NMVOC, CO, Cd, Pb, Hg, PAH, DIOX, HCB, TSP, PM_{10}, $PM_{2.5}$)
1.A.2.g.8 – Other Stationary Combustion in Manufacturing Industries and Construction	16 times (SO_2, NO_x, Cd, Pb, PAH, DIOX, TSP, PM_{10}, $PM_{2.5}$)
2.C.1 – Iron and Steel Production	13 times (Cd, Pb, Hg, PAH, DIOX, PCB, TSP, PM_{10}, $PM_{2.5}$)
1.A.2.f - Non-metallic Minerals	10 times (SO_2, NO_x, CO, Cd, Hg, HCB)
1.A.3.b.1 – R.T., Passenger cars	10 times (NO_x, NMVOC, CO, Pb, PM_{10}, $PM_{2.5}$)

ES.5 Main differences in the inventory since the last submission

As a result of the continuous improvement process of Austria's Annual Air Emission Inventory, emissions by some sources have been recalculated, e.g. on the basis of updated activity data or revised methodologies. Thus emission data for the whole time series submitted this year differ from the data reported previously.

In NFR sector *1 Energy*, changes are mainly due to revisions of the energy balance following a revision of the household census data evaluation affecting gaseous fuels from the year 2009 onwards. Furthermore, double counting of 2005-2013 emissions from waste incineration plants and double counting of iron and steel industries in 2013 has been eliminated.

In NFR sector *1.A.3 Transport*, emissions have been slightly revised due to the usage of the latest version of the NEMO model and revisions of the energy balance (LPG fuel amounts, CNG fuel amounts). Further revisions are due to the off-road model, where the fleet composition was reorganised in the course of integrating the future emission class "Stage V".

In NFR sector *2 Industrial Processes and Product Use*, recalculations have been carried out following the revision of the calculation model of *2.D.3 Solvent Use* and updated activity data of chipboard production for the years 2008-2013 in subsector *2.H.1 Pulp and Paper Industry*.

For NFR sector *3 Agriculture*, revisions were on the one hand due to methodological improvements like the usage of revised N_2O EFs for poultry in the sector manure management, resulting in slightly increased NH_3 and NO_x emissions as the inventory model follows the N-flow concept. On the other hand, recalculations have been carried out due to updated activity data (livestock data and land use data).

In NFR sector *5 Waste*, recalculations have been carried out due to the redesign of the First Order Decay Model in accordance with the IPCC 2006 Guidelines (*5.A Solid Waste Disposal*) and corrections of activity data (*5.B Compost Production*).

For more detailed information see Chapter 7 – Recalculations and Improvements.

ES.6 Improvement Process

The Austrian Air Emission Inventory is subject to a continuous improvement programme resulting in annual recalculations (see Chapter ES.5 above). Furthermore, the regularly conducted CLRTAP stage 3 reviews trigger improvements. The last in-depth review of the Austrian Inventory took place in 2010 and the findings were commented on in the IIR 2011 (UMWELTBUNDESAMT 2011b). The next stage 3 review will take place in 2017. Recalculations and improvements are summarized in Chapter 7 – Recalculations and Improvements and described in detail in the sector-specific chapters of this report.