Title of dataset	**Air pollutant emissions, 2012-2019**
Variables	**sector:** Source of emissions – high-level **class**: Source of emissions – medium-level **sub-class:** Source of emissions – low-level **fuel**: Source of emissions – fuel type (combustion sources only) **year**: Year of emissions, January-December (YYYY) **pm_{10}:** Emissions of particulate matter < 10 micrometres in diameter (tonnes/annum) **$pm_{2.5}$:** Emissions of particulate matter < 2.5 micrometres in diameter (tonnes/annum) **CO:** Emissions of carbon monoxide (tonnes/annum) **NOx:** Emissions of nitrogen oxides (tonnes/annum) **SO2:** Emissions of sulphur dioxide (tonnes/annum)
Environmental reporting topic	Air pollutant emissions are a direct measure of the 'Human activities' topic.
Environmental reporting category	The accuracy of the data source is of medium quality.
Environmental report	Our Air 2021
Relevant measure on the Stats NZ Tatauranga Aotearoa, Environment website	Air pollutant emissions
Other data and reports which relate to this measure	Related indicators $PM_{2.5}$ concentrations PM_{10} concentrations Nitrogen dioxide concentrations Carbon monoxide concentrations Sulphur dioxide concentrations

	Health impacts of PM 10 Natural sources of particulate matter Related content Our air 2021 Environment Aotearoa 2019 Our Air 2018 About the National Environmental Standards for Air Quality Why air quality matters Land Air Water Aotearoa (LAWA) Technical reports Air pollutant emissions sources and methods Air pollutant emissions methodology review
Methodology (collection & analyses)	The air pollutant emissions indicator reports on national human-generated (anthropogenic) emissions of particulate matter (PM10 – particles smaller than 10 micrometres and PM2.5 – the subset of PM10 particles that are smaller than 2.5 micrometres), nitrogen oxides (NOx), carbon monoxide (CO), and sulphur dioxide (SO2), between 2012 and 2019. The grouped sources include: energy (combustion), transport, construction (non-combustion), road dust, industrial (non-combustion), agriculture, biomass burning, and waste. Only human-generated emissions were included in this emission inventory. For detailed information on methodology please see Air pollutant emissions: Sources and methods (Stats NZ, 2021), as well as a methodology review complied by Metcalfe & Sridhar (2021). The methodology is primarily based on the Global Atmospheric Pollution Forum Air Pollutant Emissions Inventory Manual (Vallack & Rypdal, 2012). Most inputs to the inventory were calculated from readily available national-level data (such as fuel use from New Zealand's Greenhouse Gas Inventory) and default emissions factors, rather than by direct measurement at the source. For sources other than road transport and aviation, emission factors are held constant over time.
Limitations to data & analysis	Using national average emission factors may lead to lower accuracy in comparison to measuring emissions from individual sources as changes in technology or composition may not be fully accounted for. However, this method provides national-level emission estimates that are easily updatable, consistent over time, and more complete in terms of sources. Users are

	advised to consult the external data sources cited for further information on the quality of the data, as the relevance and accuracy of these varies. There is larger uncertainty in estimates of emissions from two major sources – burning wood for home heating and unsealed road dust. There are also sources which have been omitted due to a lack of data. Estimates of emissions from residential wood burning are based on a 2013 assessment of home heating emissions, updated with 2018 population estimates and number of households using wood burning for home heating. Emission factors have been held constant across the time series, and it is likely that the efficiency of burners and volume of wood used will have changed over time. There is also uncertainty in estimates of unsealed road dust, with assumptions made regarding surface material, vehicle speed, and precipitation on unsealed roads. Two important industrial non-combustion sources not included in this inventory are dairy processing (especially milk-powder processing) and manufacture of particle board, fibreboard, and other wood processing due to a lack of either activity data or emission factors. Further information on methodology limitations is provided in the Air pollutant emissions methodology review.
Changes to time series	This is the first time Stats NZ have compiled a national timeseries of air pollutant emissions, and it is likely that the source data and methodology will continue to evolve and be developed in further iterations. Revisions to future releases are to be expected from either methodology changes or revisions to input data. Because this inventory uses a different methodology from previous reports, it should not be compared with previous inventories.
References	Metcalfe, J & Sridhar, S (2021). 2019 National Air Emissions Inventory – Methodology Review. Report prepared for Statistics New Zealand by Emission Impossible Ltd Stats NZ (2021). Air pollutant emissions: Sources and methods. Retrieved from https://www.stats.govt.nz Vallack, H, & Rypdal, K (2012). The Global Atmospheric Pollution Forum air pollutant emission inventory manual. Version 5.0. Stockholm Environment Institute. University of York. Retrieved from www.sei.org.