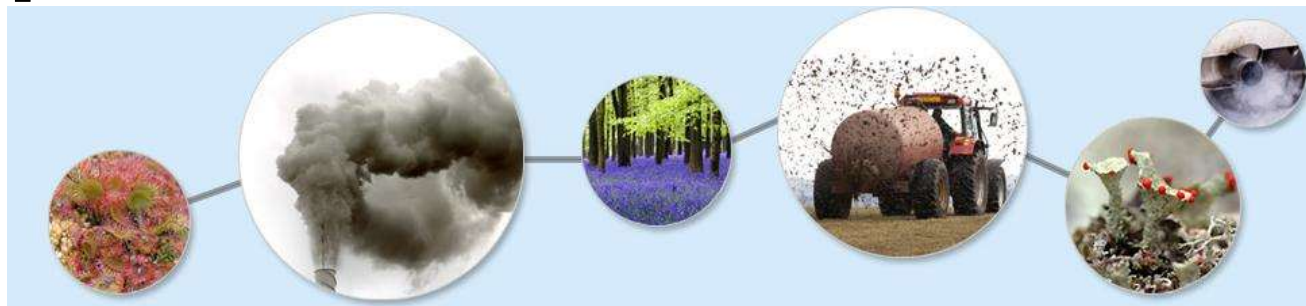


Starter's Guide to Air Pollution and Pollution Sources.

Downloaded from APIS website <http://www.apis.ac.uk/starters-guide-air-pollution-and-pollution-sources> on 26 May 2020.

Provided by the RHS to the ExA in response to Written Question Q4.4.7 at Deadline 10.



(1)

Air Pollution Information System (1)

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Starter's Guide to Air Pollution and Pollution Sources

(This quick reference guide has been provided to give a short introduction to the basic processes of air pollution and some of the common terms used in APIS. However, APIS has provided individual pollutant (and pollutant issue) **overviews** where more detailed information can be obtained. In addition, each overview lists references of up to date research. Overviews are listed on the home page.)

The processes of emissions, chemical transformation, and deposition are illustrated below (figure 1). Primary pollutants SO_2 , NO and NO_2 are oxidised in the atmosphere to form SO_4^{2-} and NO_3^- respectively, while NH_3 reacts with these oxidised components to form NH_4^+ (ammonium). These pollutants known as aerosols can travel long distances, and together with primary pollutants can be deposited in the form of wet or dry deposition.

Wet Deposition: Process whereby pollutants are removed from the atmosphere by precipitation. Wet deposition removes most of the aerosols containing SO_4^{2-} , NO_3^- and NH_4^+ , but some can be captured directly (dry deposition) at the terrestrial surface by aerodynamically rough surfaces (e.g. forests). Since rainfall efficiently removes these aerosols, parts of the country with the largest wet deposition tend to be areas of high rainfall.

Dry Deposition: Deposition of gases and aerosols directly to the Earth's surface. Includes most of the primary pollutants (SO_2 , NO_2 , NH_3 and O_3), and to a lesser extent aerosols.

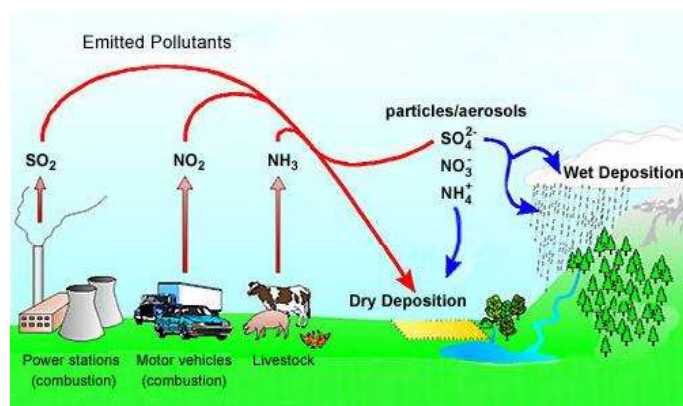


Figure 1: Pollutant emission and deposition processes

Environmental Assessment

Concentrations and deposition of air pollutants are assessed against a range of criteria to protect both human health and the environment. Environmental criteria include critical loads (http://www.apis.ac.uk/overview/issues/overview_Cloadslevels.htm) for nitrogen deposition ($\text{kg Nitrogen ha}^{-1} \text{ year}^{-1}$) and acid deposition and critical levels (http://www.apis.ac.uk/overview/issues/overview_Cloadslevels.htm) for ammonia

($\mu\text{g m}^{-3}$), sulphur dioxide ($\mu\text{g m}^{-3}$), nitrogen dioxide ($\mu\text{g m}^{-3}$), ozone (ppb hours). There are some critical loads for heavy metals but these are not currently used to assess impacts. There are no critical levels or loads for other pollutants but in some cases there are other assessment criteria such as environmental quality standards (EQS) and environmental assessment levels (EAL).

Pollutant sources

Many processes produce a variety of aerial pollutants. These processes are often tightly controlled and regulated resulting in emissions that are small and not significant. The table below illustrates the main air pollutant releases associated with a range of industrial and non-industrial sources. Please note, the purpose of the table is to show the most significant pollutant releases from each sector, in a national context. There are likely to be releases of other pollutants from installations in each sector, in addition to those marked "x", which may lead to a risk of local impacts. The main air pollutants in terms of impacts on vegetation and ecosystems are nitrogen oxides (NO_x), sulphur dioxide (SO₂) and ammonia (NH₃).

Pollutant	Power generation	Refineries and fuel production	Chemical industry	Metals industry	Cement, lime and minerals	Energy from Waste *	Agriculture / intensive farming	Road transport	Domestic combustion
Nitrogen oxides (NO _x)	X	X		X	X	X		X	X
Sulphur dioxide (SO ₂)	X	X		X					X
Ammonia (NH ₃)			X				X	X	
Particulates (PM)	X	X		X	X	X	X	X	
Heavy metals	X	X	X	X	X	X		X	X
Halogens (HCl, HF)	X			X					X
Volatile Organic Compounds (VOC)		X	X			X		X	
Persistent Organic Pollutants (POP)	X		X	X		X			
Polycyclic Aromatic Hydrocarbons (PAH)				X				X	X

* Dependent on waste type



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(<http://jncc.defra.gov.uk/>)



(<http://www.environment-agency.gov.uk/>)



(<http://www.doeni.gov.uk/niea/index.htm>)



(<http://www.snh.gov.uk/>)



(<http://www.sniffer.org.uk/>)



(<http://www.naturalengland.org.uk/>)



(<http://www.ccw.gov.uk>)



(<http://www.sepa.org.uk/>)



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