



# The Climate and Environmental Benefits of Controlling SLCPs in P.R. China

A UNEP/PRCEE Synthesis Report



UNEP



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# Glossary

This glossary has been compiled from definitions in other UNEP reports including the UNEP/WMO Assessment (UNEP/WMO, 2011); the UNEP near-term climate protection and clean air benefit report (UNEP, 2011a); the UNEP report on hydrofluorocarbons (UNEP, 2011b); and the UNEP report on nitrous oxide (UNEP, 2013).

**Aerosols:** are collections of airborne solid or liquid particles (excluding pure water), with a typical size of between 0.01 and 10 micrometers and residing in the atmosphere for at least several hours. Aerosols may be of either natural or anthropogenic origin. They may influence the climate directly by scattering and absorbing radiation, and indirectly by acting as cloud condensation nuclei or modifying the optical properties and lifetime of clouds.

**Albedo:** a measure of the reflectivity of the earth's surface. It is the fraction of solar energy (shortwave radiation) reflected from the Earth back into space. Snow covered surfaces have a high albedo. The Earth's albedo varies mainly through varying cloudiness, snow, ice, leaf area and land cover changes.

**Anaerobic digestion:** a series of processes in which microorganisms break down biodegradable material in the absence of oxygen, used for industrial or domestic purposes to manage waste and/or to release energy.

**Anthropogenic:** resulting from human activities.

**Atmospheric brown clouds (ABCs):** are regional scale plumes of air pollution that consist of copious amounts of tiny particles of soot, sulphates, nitrates, fly ash, and many other pollutants. The brownish colour of ABCs is due to the absorption and scattering of solar radiation by anthropogenic black carbon, fly ash, soil dust particles, and nitrogen dioxide gas.

**Atmospheric lifetime:** the time it takes for 67% of a molecule to be removed from the atmosphere in the absence of new emissions of the same molecule.

**Baseline or reference scenario:** is the state against which change is measured. It might be a 'current baseline', in which case it represents observable, present-day conditions. It might also be a 'future baseline', which is a projected future set of conditions excluding the driving factor of interest. Alternative interpretations of the reference conditions can give rise to multiple baselines. The scenario used in UNEP/WMO (2011) for comparison with the scenarios where black carbon and methane measures have been implemented is that of the International Energy Agency (IEA) World Energy Outlook 2009 with incorporation of all presently agreed policies affecting emissions.

**Biogas:** typically refers to a gas produced by the biological breakdown of organic matter in the absence of oxygen. Biogas originates from biogenic material and is a type of biofuel. Biogas is produced by anaerobic digestion or fermentation of

biodegradable materials such as biomass, manure, sewage, municipal waste, green waste, plant material and energy crops.

**Biomass:** in the context of energy, the term biomass is often used to refer to organic materials, such as wood, animal dung and other agricultural wastes that can be burned to produce energy or converted into a gas and used for fuel.

**Black carbon (BC):** is formed through the incomplete combustion of fossil fuels, biofuel and biomass and is emitted as part of anthropogenic and naturally occurring soot. It consists of pure carbon in several linked forms. Black carbon warms the Earth by absorbing sunlight and re-emitting heat to the atmosphere and by reducing albedo (the ability to reflect sunlight) when deposited on snow and ice.

**Carbon dioxide equivalent (CO<sub>2</sub>e):** a simple way to place emissions of various climate change agents on a common footing to account for their effect on climate. A quantity that describes, for a given mixture and amount of greenhouse gas, the amount of carbon dioxide that would have the same global warming ability, when measured over a specified timescale.

**Cardiovascular disease:** the class of diseases that involve the heart or blood vessels.

**Climate change:** the long-term fluctuations in temperature, precipitation, wind, and all other aspects of the Earth's climate. It is also defined by the United Nations Convention on Climate Change as "change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition leads to natural climate variability observed over comparable time periods".

**Coal bed methane (CBM):** is a kind of hydrocarbon gases contained in coal bed with methane as the main component, adsorbed on the surface of coal matrix particle, and part of which is dissociated in the pores of the coal or dissolved in the coalbed water.

**Coal mine methane:** mine gas consisting of a mixture of methane, other hydrocarbons and water vapour. It is often diluted with air and associated oxidation products.

**Crop residue:** there are two types of agricultural crop residues. Field residues are materials left in an agricultural field or orchard after the crop has been harvested. These residues include stalks and stubble (stems), leaves, and seed

Pods. Process residues are those materials left after the processing of the crop into a usable resource. These residues include husks, seeds, bagasse, and roots.

**Diesel particle filter:** a device designed to remove diesel particulate matter or soot from the exhaust gas of a diesel engine.

**Dimming:** the observed widespread reduction in sunlight at the surface of the Earth. Dimming shows significant regional variations.

**Drainage efficiency:** usually expressed in percentage, it is the proportion of methane (by volume) captured in a methane drainage system relative to the total quantity of gas liberated.

**End-of-pipe technologies:** methods used to remove already formed contaminants from a stream of air, water, waste, product or similar. These techniques are called 'end-of-pipe' as they are normally implemented as a last stage of a process before the stream is disposed of.

**Enteric fermentation:** a digestive process by which carbohydrates are broken down by microorganisms into simple molecules for absorption into the bloodstream of an animal. Methane is a byproduct of this process.

**Global warming potential (GWP):** the global warming potential of a gas or particle refers to an estimate of the total contribution to global warming over a particular time that results from the emission of one unit of that gas or particle relative to one unit of the reference gas, carbon dioxide, which is assigned a value of 1.

**Global warming:** an average increase in the temperature of the atmosphere near the Earth's surface and in the troposphere, which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human induced. In common usage, "global warming" often refers to the warming that occurs as a result of increased emissions of greenhouse gases from human activities.

**Greenhouse gases:** gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds. This property causes the greenhouse

**Ozone (O<sub>3</sub>):** the triatomic form of oxygen and a gaseous atmospheric constituent. In the troposphere, it is created both naturally and by photochemical reactions involving gases resulting from human activities. It is a primary component of photochemical smog. In high concentrations, tropospheric ozone can be harmful to a wide range of living organisms. Tropospheric ozone acts as a greenhouse gas. In the stratosphere, ozone is created by the interaction between solar ultraviolet radiation and molecular oxygen (O<sub>2</sub>). Stratospheric ozone plays an important role in the stratospheric radiative balance. Depletion of stratospheric ozone results in an increased ground-level flux of ultraviolet (UV-) B radiation.

**Ozone precursors:** chemical compounds, such as carbon monoxide (CO), methane, non-methane volatile organic compounds (NMVOCs), and nitrogen oxide (NO<sub>x</sub>), which in the presence of solar radiation react with other chemical compounds to form ozone, mainly in the troposphere.

**Particulate matter (PM):** very small particles of solid or liquid matter such as soot, dust, fumes, mists or aerosols. The physical characteristics of PM, and how they combine with other particles, are part of the feedback mechanisms of the atmosphere. Particulate matter that is less than 2.5 μm in aerodynamic diameter is referred to as PM<sub>2.5</sub> and those less than 10 μm including PM<sub>2.5</sub> are referred to as PM<sub>10</sub>.

**Premature deaths:** the number of deaths occurring earlier due to a risk factor than would occur in the absence of that risk factor.

**Short-lived climate pollutants (SLCPs):** are agents that have relatively short lifetime in the atmosphere - a few days to a few decades - and a warming influence on climate. The main short lived climate pollutants are black carbon, methane and tropospheric ozone. These SLCPs are also dangerous air pollutants, with various detrimental impacts on human health, agriculture and ecosystems. Some hydrofluorocarbons (HFCs) are also short-lived and have substantial climate impacts but are not air pollutant and therefore do not have direct harmful effects on human health, agriculture and ecosystems.

**Tropospheric ozone:** ozone in the portion of the atmosphere from the Earth's surface to the lowest 10-20 km of the atmosphere.

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