ENVIRONMENTAL OUTLOOK TO 2050:
The consequences of Inaction

Key Findings on Health and Environment

Air pollution, unsafe water supply, poor sanitation and hazardous chemicals exert significant pressures on human health, particularly the elderly and the young. While some global trends (*e.g.* access to improved water sources) are getting better, others – such as urban air pollution and lack of access to basic sanitation – continue to pose a serious risk to human health. In addition, the incremental effects of climate change are contributing to the global burden of disease. The OECD and its partner the PBL Netherlands Environmental Assessment Agency, have examined past trend data and projected future trends if new policies are not introduced to reduce these risks.

Trends and projections

Air pollution

RED: If no new policies are implemented, the *OECD Environmental Outlook Baseline* scenario projects that **urban air quality** will continue to deteriorate globally. By 2050, outdoor air pollution (particulate matter and ground-level ozone) is projected to become the top cause of environmentally related deaths worldwide (see figure below).

Global premature deaths from selected environmental risks: *Baseline*, 2010 to 2050
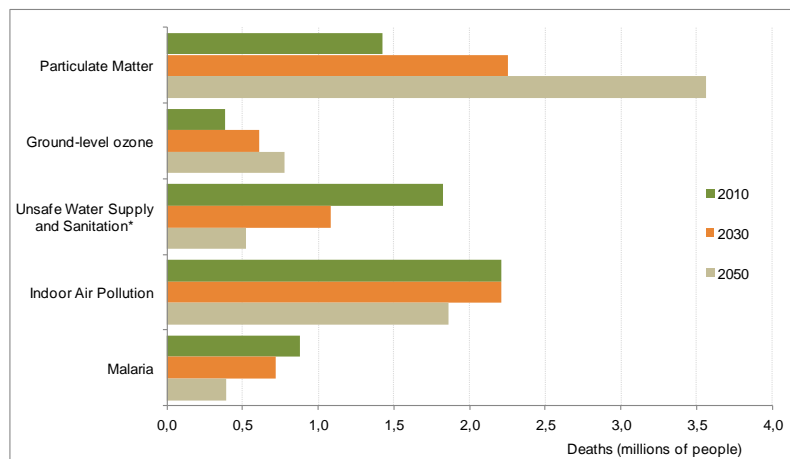

Note: * Child mortality only.
Source: *OECD Environmental Outlook Baseline*; output from IMAGE.

RED: **Air pollution concentrations** in some cities, particularly in Asia, are already far above acceptable health standards (e.g., the World Health Organization's Air Quality Guideline). This situation is likely to continue and significant reduction efforts will be needed to reduce their effects on health.

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**PM$_{10}$ concentrations for major cities: *Baseline*, 2010-2050**
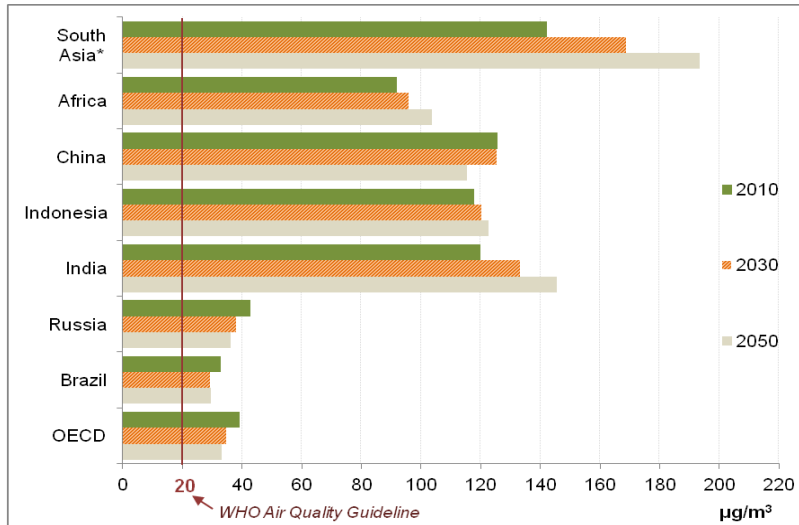
Note: * The region South Asia excludes India.
Source: *OECD Environmental Outlook Baseline*; output from IMAGE.

RED: The **number of premature deaths from exposure to particulate matter** (PM) worldwide is likely to more than double to 3.6 million in 2050 under the Baseline, mostly in China and India, with increasing urbanisation and population ageing (leading to more susceptible people) likely to outstrip the benefits of any emission reductions. The absolute number of **premature deaths linked to ground-level ozone** in 2050 is also likely to be highest in China and India. However, OECD countries are likely to have one of the highest ozone-related mortality rates in terms of number of deaths per million inhabitants – second only after India – due to the much greater ageing of the population in the region.

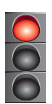**Number of deaths linked to ground-level ozone per million inhabitants**
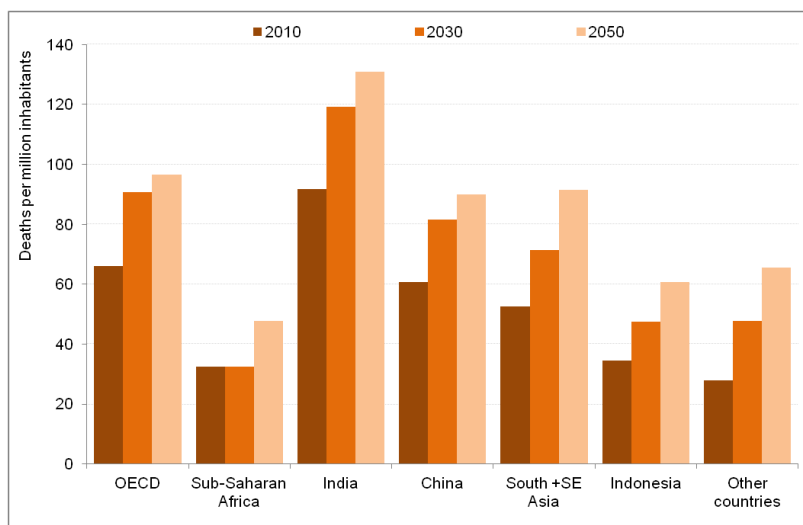
Note: The region South+SE Asia excludes India and Indonesia.
Source: *OECD Environmental Outlook Baseline*; output from IMAGE.

RED: Substantial increases **in sulphur dioxide (SO_2) and nitrogen oxides (NO_x) emissions** are likely to occur **in the key emerging economies** in the coming decades. Compared to the year 2000, emission levels of SO_2 are projected to be 90% higher and NO_x 50% higher in 2050.

YELLOW: With rising income and living standards, the number of people using traditional (and more polluting) solid fuels for cooking and heating is projected to decline after 2020, implying a reduction in **premature deaths from indoor air pollution**. However, it might become more difficult for poor households to move away from these polluting traditional energy sources, (*e.g.* firewood) if climate change policies increase energy prices. Targeted measures to provide alternative clean energy (*e.g.* efficient cook stoves) for poor households will therefore be needed.

GREEN: **OECD air emissions of SO_2, NO_x and black carbon** (precursors to PM and ozone pollution) are expected to continue to fall in the coming decades.

Unsafe water supply and poor sanitation

YELLOW: **Child mortality from diarrhoea – caused by unsafe water supply and poor sanitation** – is projected to decrease to 2050, although by then 240 million people will still not have access to an improved water source, and 1.4 billion people are projected to be without access to basic sanitation. Sub-Saharan Africa will lag behind most other regions, particularly due to lack of access to adequate sanitation.

Hazardous chemicals

RED: The **global burden of disease attributable to exposure to hazardous chemicals** is already significant and is likely to be more serious than the available data indicate. This burden falls more heavily on non-OECD countries, where people are at greater risk of exposure to hazardous chemicals and waste and where the *OECD Environmental Outlook Baseline* projects a six fold increase in chemical production by 2050.

Projected chemicals production by region (in sales): *Baseline,* **2010-2050**
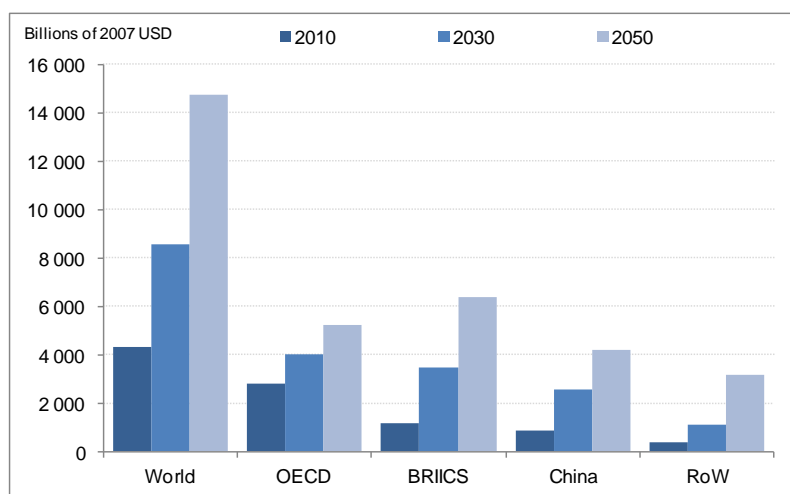
Note: China is included in the BRIICS data, but has also been singled out to show its share in the BRIICS production.

Source: *OECD Environmental Outlook Baseline*, output from ENV-Linkages.

YELLOW: While OECD governments continue to make good progress collecting and assessing **information on human exposure to individual chemicals** throughout their lifecycle, knowledge gaps still exist concerning the health effects from thousands of chemicals present in the environment. More information on potential exposures to chemicals in products and in the environment, as well as the adverse effects of combined human exposure to multiple chemicals is needed.

YELLOW: Many OECD governments have changed, or are in the process of changing, national legislation to expand their **regulatory coverage of chemicals**, but enforcement is still incomplete.

Incidence of malaria from climate change

YELLOW: Climate change will mean that a greater number of people will be living in malaria risk areas in 2050. Despite this, **global premature mortality from malaria** is projected to decrease to 2050 under the *Baseline* scenario, due to greater urbanisation and increased per-capita income (for adaptation and disease treatment) as well as the aging of the population (children are the most vulnerable to malaria). Even so, these projections do not take into account health risks due to flooding, diarrhoea, changes in food production and heat stress, and it is projected that Africa will suffer around 400 000 premature deaths in 2050 from malaria.

2. Policy options and needs

- **Curb the growing health impacts of air pollution** through more ambitious and targeted regulatory standards and economic instruments, such as taxes on polluting activities. An urgent policy priority is to reduce the sources of particulate air pollutants in non-OECD countries, especially emissions from transportation.

- **Reduce motor vehicle emissions** through policy mixes which include taxes and regulations, and promoting cleaner public transport. Encourage behavioural changes in business models and lifestyle (*e.g.* car sharing, teleconferencing, teleworking).

- **Maximise synergies between local air pollution abatement and climate change mitigation policies.**

What if…air pollution emissions were reduced by up to 25%?

A policy simulation was run of a hypothetical air pollution abatement approach which would reduce emissions of NO_x, SO_2 and black carbon by up to 25%. This scenario suggests that CO_2 emissions would also be reduced by 5% in 2030 compared to the *Baseline.* Air pollution abatement through structural measures (*e.g.* shifts in energy sources and demand) will have more co-benefits for climate-related emissions than end-of-pipe measures.

The health benefits, in terms of avoided deaths, are projected to be greatest in the BRIICS in both 2030 and 2050 compared to the *Baseline.* However, despite relatively significant reductions in emissions projected under this simulation, the number of avoided deaths when compared to the *Baseline* would be relatively modest. This may be due to the fact that in some cities, especially in Asia, concentration levels projected in the *Baseline* are far above the maximum threshold level and thus huge reduction efforts would be needed before positive health impacts are seen. In addition, greater urbanisation expected during the next 40 years, and the large increase in the number of elderly people (the most susceptible group) is likely to lead to more premature deaths, all else being equal. Overall, this suggests that even greater reductions would be needed to have any significant impact on the growing number of premature deaths.

- **Scale up investment in water supply and sanitation.** The benefit-to-cost ratios can be as high as 7 to 1 in developing countries.

- **Improve the knowledge base.** This includes doing more to harmonise data; improving methodologies for determining environmental burdens of disease and the cost and benefits of policies to address risks to human health; improving our understanding of chemical hazards; collecting more data on exposures to chemicals from production to use and final disposal; and keeping the public informed by making chemical information widely available through the Internet and other sources.

- **Intensify international co-operation in the management of chemicals.** This includes work sharing on the assessment of chemicals and development of methodologies for assessing existing, emerging or poorly-understood issues (*e.g.* endocrine disrupters, nanomaterials and chemical mixtures); increasing the sustainable use of chemicals and green chemistry; and implementing policies to protect the most vulnerable human life stages (*i.e.* early life).

Addressing certain chemical assessment challenges, the example of Endocrine disrupters

A recent priority area for governments is to investigate chemicals or mixtures of chemicals which may have endocrine-disrupting properties. These substances alter the function(s) of the endocrine system and consequently cause adverse health effects in an intact organism, or its progeny, or (sub) populations. A number of observations of health effects have been made in which endocrine disrupters (ED) could play a role, including: declining sperm counts, congenital malformations in children, cancer, retarded sexual development, retarded neurobehavioural development, impaired immune functions and effects on metabolism. However, certain lifestyle factors are also known to be important elements of these problems, and the part attributable to ED needs to be better evaluated. New OECD validated and standardised screens or assays have been developed to test chemicals for their possible endocrine-disrupting effects. Many OECD member countries are actively involved in gathering information on endocrine disrupters to help support regulatory actions.

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The *OECD Environmental Outlook to 2050* (OECD, 2012) was prepared by a joint team from the OECD and the PBL Netherlands Environmental Assessment Agency. The *Outlook* includes chapters on: socioeconomic developments, climate change, biodiversity, water and health and environment.

http://www.oecd.org/environment/outlookto2050