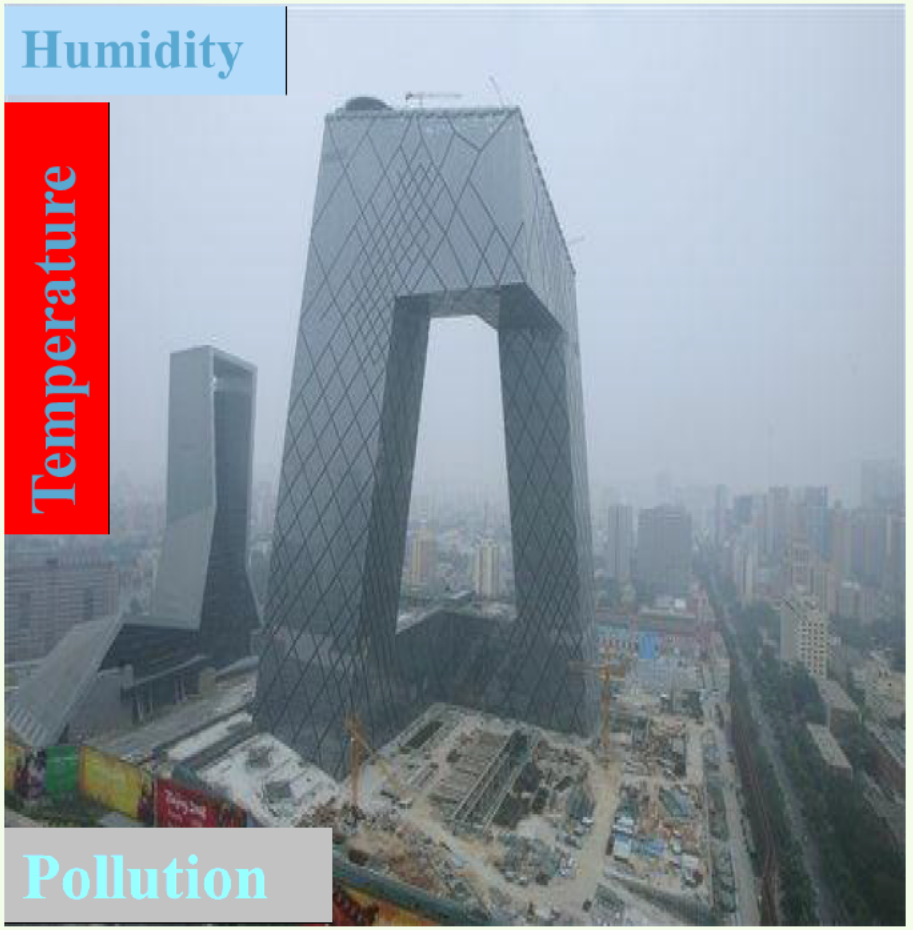
Mitigate
Urban Air Pollutants

Today's Air Pollution Problem

Urban outdoor air pollution is estimated to cause 1.3 million deaths worldwide per year. Those living in middle-income countries disproportionately experience this burden.

2011



What is Air Pollution?

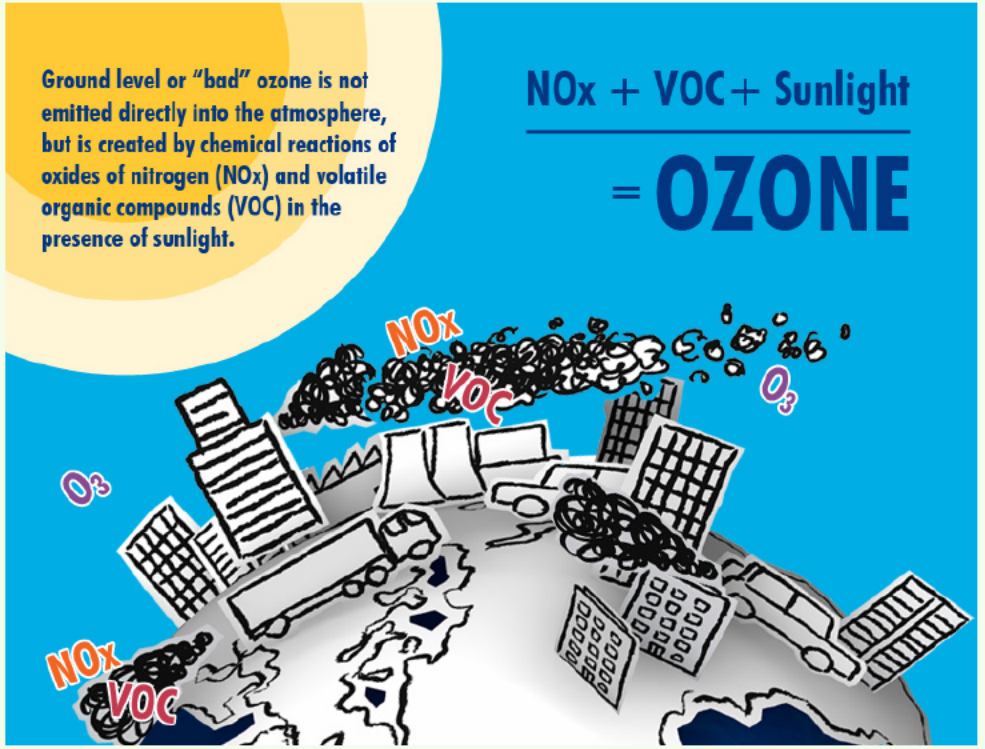
There are several major air pollutants

Major air pollutants include Particulate Matter (PM), Oxides of Nitrogen (NOx) and Sulfur (SOx), Volatile Organics (VOCs) and Ozone (O_3).

Ozone, which occurs at ground level, is generated from a photochemical reaction between NOx (NO and NO_2) and VOCs.

Today, PM, NOx, and Ozone are the most persisting and hazardous pollutants in our major urban areas.

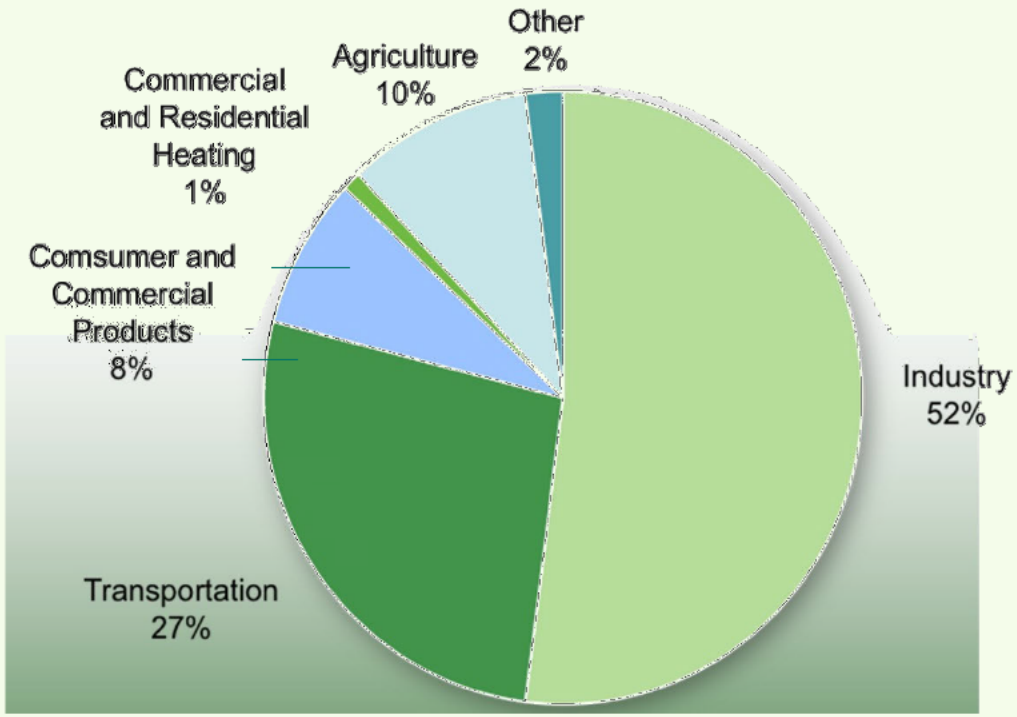
The most visible effect of these pollutants is smog.



http://go3project.com

Air Pollution Comes From Multiple Sources

Sources of Emissions of Air Pollutants



- Industry, including power generation, and transportation represent more than 75% of the pollutant emissions
- The relative importance of sources can vary from country to country

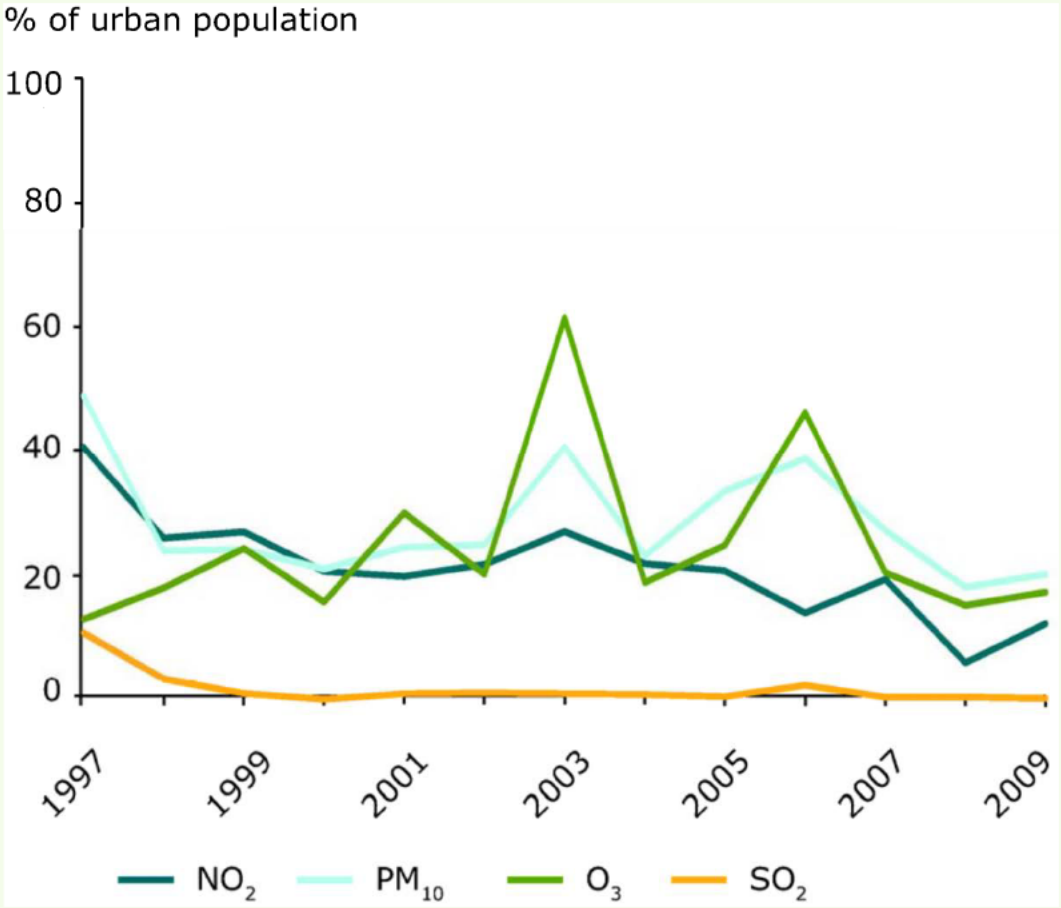
But the problem affects all regions

Control of emissions at their source has showed significant reduction, but with some limitations

The European Union case:

- EU infringement procedures have been opened against 20 of the EU's 27 member states over air quality
- The infringement actions follow the entry into force of a new EU air quality directive in June 2008
- EU rules aimed at lowering vehicle emissions through technical changes have not brought targeted reductions
- The level of pollutants such as NOx or O_3 remain above ceiling targets in many urban areas (EEA - Sept 2012 report)

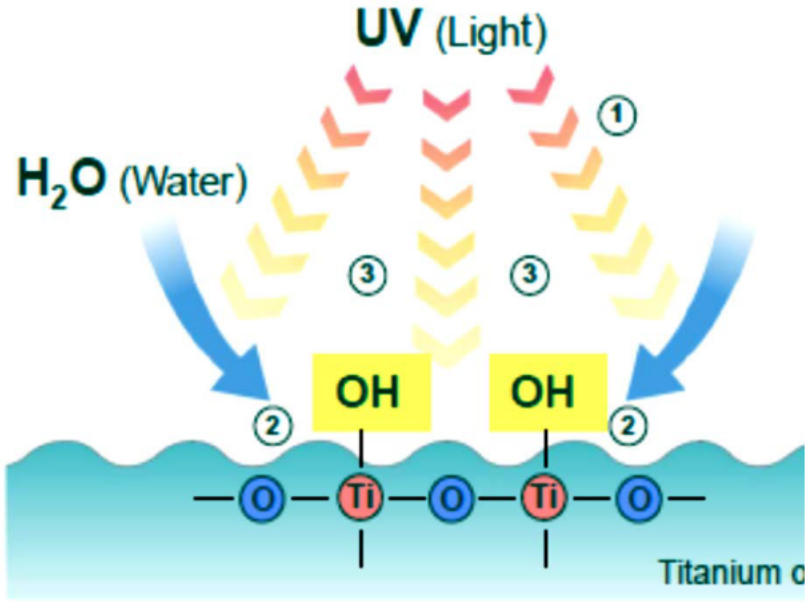
A large portion of the EU population is still exposed to pollutants limits exceeding the ceilings



Percentage of urban population resident in areas where pollutant concentrations are higher than selected limit/target values, 1997-2009 (EU-27)

Photocatalysis is a Natural Process

Instant reaction with organic matter at the molecular level



Peroxy and hydroxy radicals are created

These reactive species are then available to drive redox reactions to break down organic species

- UV light source can be the sun, a fluorescent light or even indoor light
- Water + Light = Chemical Reaction

- Photocatalysis is the acceleration of a photoreaction in the presence of a catalyst
- Photo = light (*Greek*): energy source for the reaction

What is heterogeneous photocatalysis?

- Catalyst (*TiO_2*): a substance which **accelerates** a chemical reaction, but which itself is **not consumed** by the overall reaction.
- In the case of TiO_2 (*semi-conductor*) **radicals** are formed due to the energy absorption of the light. These **radicals** will **provoke** the chemical reaction with the pollutants.
- Heterogeneous: reaction between pollutants in **gas** form and radicals formed **at the surface** of the material, due to the presence of TiO_2 at the surface.

Photocatalysis Technology offers a range of environmental solutions

A properly designed photocatalytic surface can:

- Degrade atmospheric pollutants such as NOx, SOx, and VOCs
- Self-cleaning
- Anti-algae
- Bacteriological
- Water purification
- Soil purification

Results

	Lab Test EN ISO 22197 -1 NOχ ppm	Bacteria Test	Bacteria Test	VOCs	PM 10
Product: Concrete P Specimen 10 mm x 50 mm x 10 mm.	Reduction 48%				
Product Active Cool Real Scale App.*		Area: Walls Reduction 100%	Area: Indoor Air Reduction 33-42%	Area: Indoor Air Reduction 40%	Area: Indoor Air Reduction 25 %

Real Scale App.* Eugenideio Hospital

Where to apply?

Inside

- Increased quality of air
- Minimized pollutants

- Hospitals, restaurant kitchens, schools…

Outside

- purification of the air
- Self cleaning properties in terms of Pollution reduction

- Houses: self-cleaning and air-purification before the air enters the house

Walls, Pedestrians, Car Parks, Concrete Structures, Pavements, Roads…

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