Oxygenated and hydrocarbon solvents do not play a part in the stratospheric ozone problem. Under certain conditions, solvent emissions may contribute to create groundlevel ozone. However, the solvents industry has substantially reduced its emissions and continues to contribute to the improved air quality in Europe.

Ozone can be found near the ground level (the tropospheric ozone commonly referred to as "smog") or high up in the stratosphere. Stratospheric ozone protects humans from excessive ultraviolet rays and helps stabilise the earth's temperature. Oxygenated and hydrocarbon solvents do not play a part in the stratospheric ozone problem. This is because solvents, like natural VOC emissions, are rapidly cleaned from the lower atmosphere by photochemistry. This means that they never reach the stratosphere.

Ground level ozone is formed when NOx and VOCs react with sunlight and heat. It also occurs naturally all around us. Under certain weather conditions, too much ozone is produced and results in reduced air quality. Ozone peaks, which are temporary, primarily occur in summer and are pertinent to certain regions in Europe.

The extent to which NOx and VOCs participate in ozone formation varies. In order to develop efficient strategies to improve air quality, the EU industry is working on reducing emissions as well as understanding what contributes most to ozone formation. Reducing NOx would appear to be the most effective way to continue to reduce ozone levels in the EU.

THE SOLVENTS INDUSTRY PLAYING ITS PART TO REDUCE OZONE PEAKS

- **Helping to develop** new means of deterring solvents with negligible photochemical reactivity.
- **Helping to create** new formulas for coatings and other products with low ozone forming potential whilst maintaining high quality standards.
- **Researching** ozone formation and targeting efficient solutions such as promoting abatement techniques.
- **Working** with EU and national regulators to encourage development of products that meet environmental needs without compromising performance.

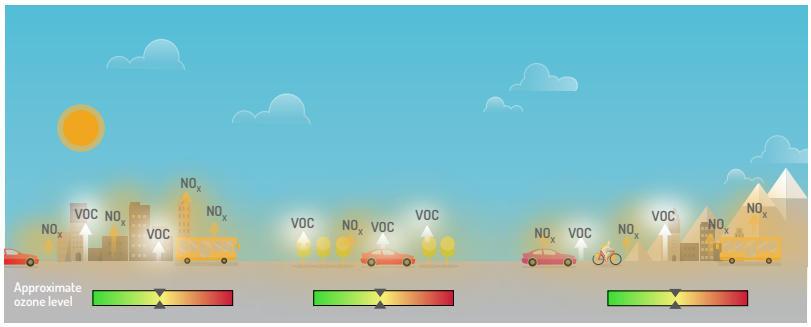
WHAT ARE VOCs AND NOX?

Volatile Organic Compounds or VOCs are organic chemicals which evaporate easily. Whereas the biggest share of the total VOC emission results from natural emissions from trees and plants, they also come from human activities (such as transport and industrial operations).

NOx (nitrogen oxide and nitrogen dioxide) are inorganic chemicals which are reactive gases. Their emissions result mainly from human activities such as the combustion of fuels (vehicles, power stations, industrial boilers). In most of Europe, the quantity or concentration of ground-level ozone primarily depends on the quantity of NOx (NOx-limited conditions).

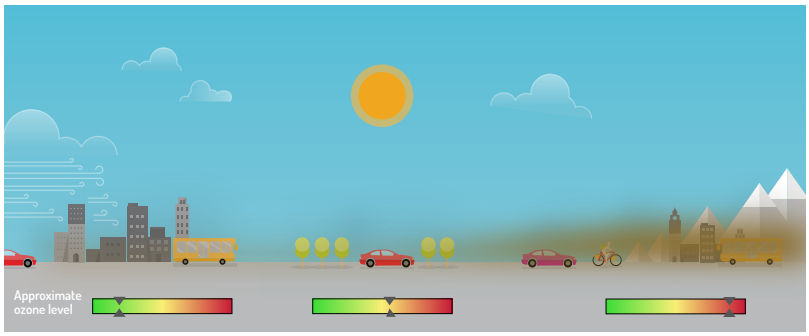
The extent to which NOx and VOCs participate in ozone formation varies. In order to develop efficient strategies to improve air quality, the EU industry is working on reducing emissions as well as understanding what contributes most to ozone formation. In the last 40 years, industrial VOC emissions have already been reduced by more than half.

OZONE LIFECYCLE



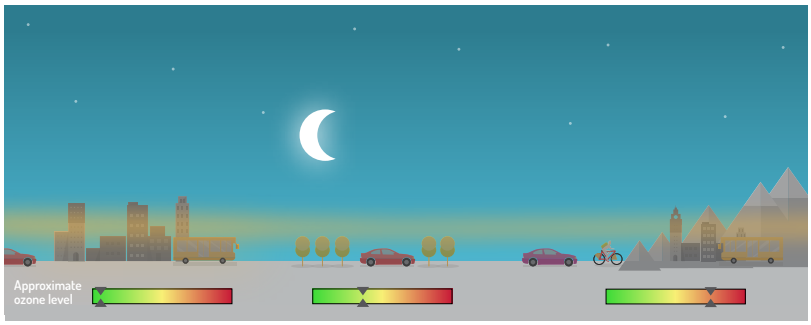
THE CHEMISTRY OF TROPOSPHERIC OZONE (TROPOSPHERIC OZONE PHOTOCHEMICAL SMOG / YELLOWISH HAZE)

Tropospheric ozone forms in the low atmosphere, ground level, when NOx and VOCs react with sunlight and heat. Stratospheric ozone keeps the earth warm and protected from excessive UVs.



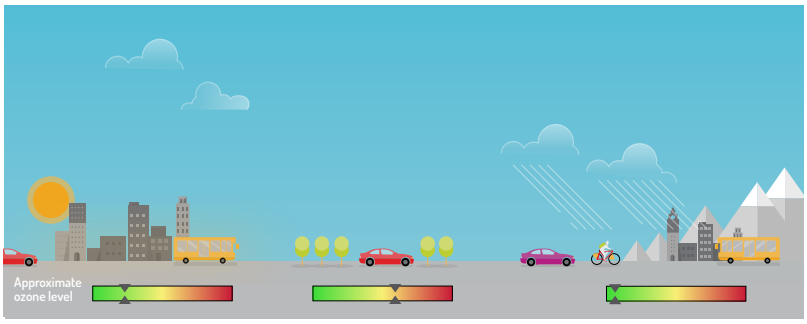
OZONE DRIFTS WITH THE WIND AND BUILDS UP AGAINST NATURAL BOUNDARIES

Forests and agriculture emit large amounts of natural VOCs that cannot be reduced. The highest ozone levels are often reached in rural areas down-wind of cities. Even if the man-made VOCs were absent, you would still have ozone pollution in the presence of NOx and sunshine.



OZONE STOPS FORMING WITHOUT UVS, AT NIGHT,WHEN CLOUDY OR WHEN COLD

Tropospheric ozone reaches its peak in the afternoon and its lowest level at night. If the next day is also sunny the build up will include the ozone left after the night and thus the second day may have a higher level of ozone.



DAY 2: OZONE BUILDS UP FROM NIGHT OZONE LEVEL AND INCREASES WITH SUNSHINE AND HEAT

Tropospheric ozone can only accumulate over a few days. However as soon as it rains or there is wind, ozone disappears or is dispersed.

CONCLUSION

Reducing man-made VOCs only marginally reduces ozone because of the large quantities of natural VOCs. Thus, to reduce tropospheric ozone, it is more efficient to reduce NOx with temporary and geographically targeted measures.

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