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THE PARIS AGREEMENT CONNECTION

Community Action ⇋ Global Solidarity

OZONE & SUMMER HEAT

How does it affect my summer?

The heat of the summer sun turns our vehicle interior into an oven, causes us to sweat even after showering, and increases our electric bills due to higher AC usage. These seasonal annoyances sneak up on us each year, but there is a far sneakier, invisible culprit that is created due to the summer warmth. Ozone (O_3) is a compound found naturally in the stratosphere, approximately 12-50 km above the Earth's surface. This gaseous molecule is a necessity in the stratosphere since it blocks harmful UV radiation. Ozone located in the troposphere, the ground level of the atmosphere 0-12 km from the Earth's surface, is an air pollutant and toxic for human health. At this lower atmospheric level, O_3 is formed through a chemical reaction between oxides of nitrogen (NO_x), volatile organic compounds (VOCs), heat, and sunlight. In the summer months, the chemical reaction takes place at a higher rate. The release of NO_x and VOCs comes from anthropogenic activities including combustion of fossil fuels for transportation, electricity, and industrial processes. Additionally, VOCs can be emitted by household products such as paints, varnishes, and cleaning products. [Photo by Levi Jones on Unsplash]

OZONE & ITS IMPACTS ON HEALTH

Newly formed ozone has a lifespan of a few hours to a few weeks. When combined with other pollutants in the air, it creates smog, which can be an irritant to the eyes and lungs. Increasing physical activity in the summer months is a common goal for many, but as you increase activity, your respirations increase as well. This leaves an individual at a higher risk for inhaling smog. Breathing in air that contains ozone is particularly problematic for individuals with chronic breathing conditions such as bronchitis or asthma. Children should be monitored while at

play when ozone levels peak because their lungs are not fully developed. Individuals who are lacking in vitamins C and E are also at a higher risk of ozone related problems. Such health problems include coughing, sore throat, difficulty breathing, wheezing, and inflamed airways. Ozone exposure has also been linked to an increased risk of premature death in certain vulnerable populations, including people over 65, pregnant women, children and teens, individuals who work outside, and people of lower socio-economic status. [Photo by Jacquelyn Downing in the Pālolo Valley]

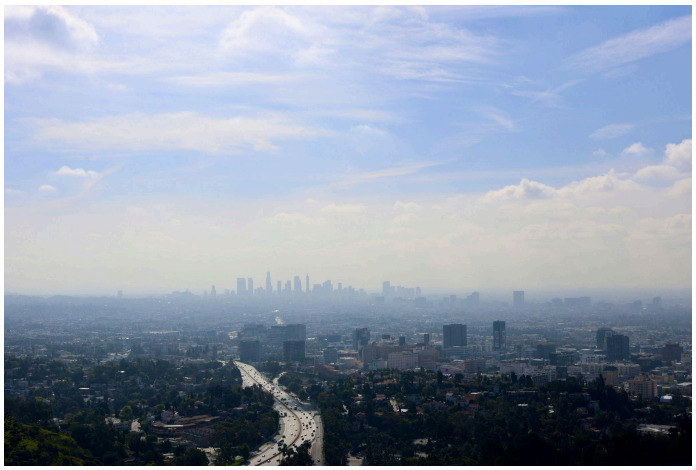
Air Quality Index		
AQI Category and Color	**Index Value**	**Description of Air Quality**
Good Green	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Moderate Yellow	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups Orange	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Unhealthy Red	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy Purple	201 to 300	Health alert: The risk of health effects is increased for everyone.
Hazardous Maroon	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

AIR QUALITY INDEX (AQI)

AQI is a scale of air quality used to assess the amount of pollution present and whether it is a health risk.1 Any number below 100 is an acceptable level for most people. Individuals with high risk factors or chronic breathing conditions may experience health effects with an AQI above 100. Harmful levels of O_3 in your city can be tracked on AirNow.gov and international locations on the AirNow Department of State website. Summer heat waves can be a good indicator that ozone levels may be at a dangerous level in urban and nearby rural areas. Be aware of the air quality in your area!

The State of the Air 2024 report was issued by the American Lung Association after analyzing 25 years of data on air quality in the US. The report evaluates two of the most dangerous air pollutants: fine particles and ozone. According to the report, 131.2 million Americans are living with increased levels of ozone pollution that have received a failing grade by the Environmental Protection Agency (EPA). Cities polluted the most by ozone are located in the West and Southwest. One measure cities can implement to achieve a lower AQI is transitioning from fossil fuels to renewable energy sources for their primary energy needs. The Eastern states have experienced a significant improvement in air quality by switching from coal-fired power plants to renewable energy sources. The EPA offers various renewable energy and energy efficiency programs aimed at assisting energy consumers, state policymakers, and energy providers in making the transition.

AIR QUALITY BELOW EPA STANDARDS



In 2021, the National Renewable Energy Laboratory (NREL) partnered with Los Angeles city officials to design the Los Angeles 100% Renewable Energy Study (LA100), in an aggressive plan to lead the city in 100% renewable energy by 2045. For the past 25 years, Los Angeles has topped the nation with the worst ozone pollution and consistently receives a failing grade, for pollutant levels set by the EPA. Los Angeles experiences the worst smog in the nation during the summer months of June, July, and August. This is due to higher temperatures, less rainfall, and an increase in carbon dioxide emissions from traffic congestion, ships, planes, and industrial sites. Wildfires also continue to be problematic for air quality, emitting hazardous pollutants such as nitrogen dioxide (NO_2) and ozone. The climate change factors thought to be the cause of the increased number of wildfires in California are higher temperatures and increased dryness. [Photo by Scott Greer on Unsplash]

US CITIES WITH CLEAN AIR QUALITY

Fortunately, there are many cities across the US with healthy air quality which has been approved by the American Lung Association. These locations include Bangor, Maine, Wilmington, North Carolina, and Honolulu, Hawai'i. The superior air quality in Hawai'i is not only unmatched in the nation, but also one of the best internationally, having 99.40% good air quality days. The average AQI for Hawai'i in 2024 to date is 21.2, making it the cleanest in the US. Hawai'i possesses several attributes that contribute to its leadership in air quality. Its remote location in the Pacific Ocean shields it from extensive industrial activities and transportation emissions. Additionally, the Hawaiian Islands benefit from consistent tradewinds that disperse pollution away from the region. The largest threats to Hawai'i's air quality are volcanic activity which produces vog, a word derived by the locals combining the

words ``volcano" and "smog." Vog is an air pollutant that causes the sky to look hazy after an eruption from the Kīlauea Volcano. [Photo by Jacquelyn Downing in the Pālolo Valley]

SUSTAINABLE PRACTICES

We can all do our part by committing to reduce ozone pollution in our city.

- Commute to work with a friend or use public transportation such as the Skyline Rail on Oahu.
- Reduce travel time throughout town during the week by combining errands into 1 trip.
- Turn off your vehicle if it needs to idle longer than 10 seconds.
- Use fans to help conserve electricity while setting air conditioners no lower than 78 degrees.
- Choose electric lawn equipment rather than gasoline-powered, or mow your lawn after 7pm. This provides an opportunity for ozone-forming chemicals to disperse overnight rather than undergoing reactions with sunlight to create the air pollutant. [Photo by Christian Lue on Unsplash]

Footnotes

1. "Wildfire Smoke and Your Patients' Health," United States Environmental Protection Agency, June 26, 2023, https://www.epa.gov/wildfire-smoke-course/wildfire-smoke-and-your-patients-health-air-quality-index