Air quality in Jeddah: A local problem we can actually fix by Nachiketh Velekkat Suraj

Competition theme: Air quality Improvement

Air pollution in Jeddah comes from the rapid economic and social growth associated with over-consumption of fuel, which increases the risk of diseases such as cancer, cardiovascular and respiratory diseases. Jeddah's air often looks clear, but the city regularly deals with unhealthy levels of fine particulate matter or PM, especially PM2.5, which is a fine tiny inhalable particle in the air, and are 2.5 micrometres or smaller in diameter making them extremely small. These microscopic particles and released from sources like smoke and industrial emissions. PM 2.5 are dangerous because they can penetrate deep into our lungs and enter the bloodstream, causing serious health issues like respiratory & heart diseases, stroke, and cancer. In Jeddah the PM2.5 concentration is currently about 4 times the recommended World Health Organization annual PM2.5 value.

Jeddah experiences a high concentration of PM2.5 due to a combination of natural, urban, and industrial factors that reinforce one another. As a coastal city located in an arid region, Jeddah is frequently affected by sand and dust storms originating from surrounding deserts, which release large quantities of fine particulate matter small enough to remain suspended in the air for long periods, which significantly increase PM 2.5 concentrations. The concentration of these particles are further increased by intense vehicle emissions, as the city relies heavily on private vehicles, this leads to continuous emissions from fuel combustion, brake wear, and tire friction, all major sources of PM2.5. Not only that but the ongoing construction and urban expansion also contribute to increasing the concentration of these fine particulate matter from the emissions of construction vehicles, they also contribute to many fine dust particles becoming airborne, especially when combined with strong winds and limited vegetation to trap these particles, this leads to an increase in the PM 2.5 concentration. Furthermore, Industrial activities, port operations, and power generation around the city release pollutants that chemically react in

the atmosphere to form secondary PM2.5 which are fine particulate matter that form in the atmosphere through chemical reactions of precursor gases like sulfur dioxide, nitrogen oxides and ammonia. Together, these factors lead to a high concentration of PM2.5 levels in Jeddah, causing a serious concern for air quality and public health. One of the ways in which the high PM2.5 concentrations in Jeddah can be tackled, is by expanding reliable public transport and encouraging carpooling, as well as promoting the use of electric cars.

To reduce the high concentration of PM 2.5 caused by dust and sandstorms, we can increase green spaces such as parks, plant more wind-breaking vegetation like trees, and stabilize exposed soil at construction sites to prevent dust from becoming airborne. Furthermore, we can start spraying water on construction sites to reduce dust, as by making the particles wet it makes them heavier, making them less likely to be airborne. They should also require proper covering of materials so that dust and other particles can’t escape and become airborne. Finally, we can also invest in renewable and clean energy like wind or solar energy which will help reduce the PM 2.5 and the concentration of other air pollutants. All of this can lead to massive improvements in the air quality and public health in Jeddah.