India - Largest Emitter of Sulphur Dioxide

According to a report by Greenpeace (an environmental Non-Governmental Organization), **India is the largest emitter of Sulphur Dioxide (SO_2) in the world,** contributing more than 15% of global anthropogenic emissions.

- The **primary reason** for India's high emission output is the **expansion of coal-based electricity generation** over the past decade.
- According to the Report, five of the top ten SO_2 emission hotspots from coal/power generation industry across the world are in India.
    - The **major SO_2 emission hotspots in India** are Singrauli in Madhya Pradesh, Neyveli and Chennai in Tamil Nadu, Talcher and Jharsuguda in Odisha, Korba in Chhattisgarh, Kutch in Gujarat, Ramagundam in Telangana and Chandrapur and Koradi in Maharashtra - as detected by the **NASA** OMI (Ozone Monitoring Instrument) satellite.
- The vast majority of coal-based power plants in India **lack Flue-Gas Desulfurization (FGD) technology** to reduce air pollution.
    - Sulfur dioxide in flue gas from fossil-fuel power plants can be **controlled by means of an absorption process** called Flue Gas Desulfurization (FGD).
    - FGD systems may involve **wet scrubbing or dry scrubbing.**
    - **In wet FGD systems,** flue gases are brought in contact with an absorbent, which can be either a liquid or a slurry of solid material. The sulfur dioxide dissolves in or reacts with the absorbent and becomes trapped in it.
    - **In dry FGD systems,** the absorbent is dry pulverized lime or limestone; once absorption occurs, the solid particles are removed by means of baghouse filters.
- **Hotspots Across the World:** The largest sulphur dioxide emission hotspots have been found in Russia, South Africa, Iran, Saudi Arabia, India, Mexico, United Arab Emirates, Turkey and Serbia.
    - Air pollutant emissions from power plants and other industries continue to increase in India, Saudi Arabia and Iran.
    - In Russia, South Africa, Mexico and Turkey, emissions are currently not increasing — however, there is not a lot of progress in tackling them either.
    - Of the world's major emitters, **China and the United States have been able to reduce emissions rapidly** by switching to clean energy sources. China, in particular, has achieved success by dramatically improving emission standards and enforcement for sulphur dioxide control.
- **Individual Hotspots across the World:** The **Norilsk smelter site in Russia** continues to be the **largest anthropogenic SO_2 emission** hotspot in the world. **Singrauli in Madhya Pradesh** is at number **five.**

Sulphur Dioxide (SO2) and Air Pollution

- SO_2 emissions are a significant **contributor to air pollution.** High concentrations of SO_2 in the air generally lead to the formation of other Sulfur Oxides (SOx).
    - SOx can react with other compounds in the atmosphere to form small particles. These particles contribute to **Particulate Matter (PM) pollution.**
    - Small particles may penetrate deeply into the lungs and in sufficient quantity can

contribute to health problems.
    - **Air Pollution is a huge public health concern,** with 91% of the world's population living in areas where outdoor air pollution exceeds guideline limits by the **World Health Organization (WHO)** and as a result, 4.2 million people die prematurely every year.
- The **greatest source of SO2 in the atmosphere is the burning of fossil** fuels in power plants and other industrial facilities.
- Other sources include industrial processes such as extracting metal from ore, natural sources such as volcanoes, and locomotives, ships and other vehicles and heavy equipment that burn fuel with high sulphur content.
- **Situation in India:** As per the report, in India, there has been an increase of SO_2 emissions at already existing hotspots and new sites generating emissions are emerging across the country.
    - The Union Ministry of Environment, Forest and Climate Change had, for the first time, introduced SO_2 emission limits for coal-fired power plants in December 2015.
    - However, a Supreme Court order changed the deadline for installation of FGD technology in power plants from 2017 to December 2019 in Delhi-NCR and till 2022 for other parts of the country.
    - Environment experts have called for strict action on coal power plants as it is not clear whether power plants will meet even the extended deadlines to comply with pollution limits, both in Delhi and around the country.

Source: IE