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The impact of the thermal power plants on child health and pregnant women in Madhya Pradesh

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Abstract - The fact that coal is the most widely used fossil fuel for power generation is true, but still it is also true that the coal that is available in India is of very poor quality and has a very low calorific value. Thermal power plants that burn this coal release a significant amount of heat energy and pollutants that are exceedingly dangerous to the environment and human health. They have a number of detrimental effects, such as acid rain, greenhouse effects, and global climate change. The health of pregnant women and children, in particular, is greatly impacted by the pollution of fossil fuel combustion from thermal power plants, which is of great concern to the developing country's health care system. Due to the use of coal, oil, gasoline, diesel, and natural gas, they endure a disproportionately large burden of disease and developmental disability from both environmental pollution and climate change. The poor health of children and women is the disproportionately heavy financial and health burden placed on certain minorities, the young, and the poor, especially those who live in developing nations where they are most at risk from the effects of toxic air pollutants and the Carbon dioxide-driven climate change brought on by the burning of fossil fuels. The Indian government has passed the National Clean Air Program (NCAP) (MOEF(GOI), 2019) in response to the country's rising pollution levels and its consecutive effect on the health care system in India. This program outlines the long-term strategy or graded response action plan intended to lower air pollution in more than 100 non-attainment cities.

Keywords: Power generation, Environmental Pollution, Fossil Fuels, Health care system

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INTRODUCTION

India is one of the nations that is developing the quickest overall. With a population of 1.38 billion or 17.7% of the world's population, it is also the second most populous nation in the world. With an average growth rate of roughly 1.344 percent, it is anticipated to reach a population of 1.72 billion around 2060[1]. People's demand rises in direct proportion to population expansion, which in turn drives a dramatic uptick in industrialization and urbanization. Any country's welfare and economic prosperity depend heavily on the growth and development of the power sector. Over time, electricity has come to be seen as both one of the greatest benefits for modern living and the most essential requirement for the growth of every other sector. India is currently the third-largest producer and consumer of electricity in the world. Electricity consumption per person in the nation increased gradually from 15 kWh in 1950 to approximately 1,181 kWh in 2018–19. Similar to this, the total amount of electricity produced increased significantly from 1390.467 billion units in 2019–20 to roughly 5.1 billion units in 1950[2]. The majority of India's thermal power plants that use coal to generate electricity are known as TPPs. India is fifth in the world for installed thermal power capacity.

India's primary source of electricity is generated from thermal power plants. In a nation like India, thermal power is generated by coal to the tune of 88%, with the remaining 20% coming from gas and diesel[3]. Despite the fact that coal is the most widely used fossil fuel for power generation, it is also true that the coal that is available in India is of very poor quality and has a very low calorific value. Some of the main causes of the particulate matter emissions in India include the high ash content of the accessible coal and the usage of inefficient technologies. Thermal power plants that burn this coal release a significant amount of heat energy and pollutants that are exceedingly dangerous to the environment and human health. They have a number of detrimental effects, such as acid rain, greenhouse effects, and global climate change. The harmful gases carbon, sulfur, and nitrogen oxides, CFCs (greenhouse

[1] Murty, M.N., Kumar, S. and Dhavala, K.K., 2007. Measuring environmental efficiency of industry: a case study of thermal power generation in India. *Environmental and Resource Economics*, *38*(1), pp.31-50.

[2] Ibid

[3] Ibid

gases), various trace gases, and airborne organic matter including fly ash and suspended particle matter are among the contaminants that are released. Our administration and the residents of the area are extremely concerned about these numerous and growing environmental effects caused by the thermal power facilities. They not only have a negative impact on our environment and the habitats around us, but they also cause a number of really serious health problems in people. Sadly, until alternate renewable and nuclear power sources are developed, India's dependence on coal and the effects of its excessive use will continue to rise.

The health of pregnant women and children, in particular, is greatly impacted by the pollution of fossil fuel combustion from thermal power plants, which is of great concern to the developing country's health care system. Due to the use of coal, oil, gasoline, diesel, and natural gas, they endure a disproportionately large burden of disease and developmental disability from both environmental pollution and climate change. The poor health of children and women is a major theme of this study, as is the disproportionately heavy financial and health burden placed on certain minorities, the young, and the poor, especially those who live in developing nations where they are most at risk from the effects of toxic air pollutants and the Carbon dioxide-driven climate change brought on by the burning of fossil fuels. Children and their descendants in the future would be contaminated greatly in the long run if this burden were not lifted. Millions more children suffer from chronic illnesses that have an impact on their physical and cognitive development, such as respiratory conditions other than pneumonia. The Lancet Commission on Health and Climate Change's report reached the following conclusion: The biggest opportunity of our century to improve the public health system, address inequality, and boost the resilience of individuals, communities, and the larger society is provided by government policies and other strategies to lessen reliance on fossil fuels and create sustainable communities.

The impact

A variety of dangerous compounds discovered in the waste material generated by the thermal power plant offer considerable health hazards, especially to children and expectant mothers. The emitted ingredient from the thermal power plants comprises mercury, sulfuric acid, and several others that are estimated to be very dangerous for the mother during pregnancy. This is thought to be substantially more important when there are thermal power plants in operation. Furthermore, Coal-fired power plants are a substantial source of harmful air pollution, such as SO2, NOx, particulate matter smaller than 10 microns (PM10), and particulate matter smaller than 2.5 microns (PM2.5), which may have a negative influence on the health of the local population. In addition to the pollutants that are discharged from power plants' stacks, communities may also be exposed to coal ash, a waste product created during the combustion of coal. The coal ash is made up of fly ash, bottom ash, boiler slag, and flue gas desulfurization material.

Coal-fired power emissions are a significant contributor to human mortality and morbidity, according to a study titled "Coal Kills — An Assessment of Death and Disease caused by India's Dirtiest Energy Source" that was conducted by Urban Emissions.info and Greenpeace India with assistance from Conservation Action Trust (CAT).

Govt efforts and policies

The Indian government has passed the National Clean Air Program (NCAP) (MOEF(GOI), 2019) in response to the country's rising pollution levels and its consecutive effect on the health care system in India. This program outlines the long-term strategy or graded response action plan intended to lower air pollution in more than 100 non-attainment cities[4]. A solid understanding of the number of emissions to be lowered and its related impacts can help authorities in formulating an action for the present as well as the future. Regulating power plant emissions is one of the ways. Controlling the power industry is a top concern because it is the largest contributor to SIA and the third highest contributor to total PM2.5 concentrations in north India. Thorough understanding of the existing contributions as well as the results of control policy implementation on pollutants produced from power plants and their related health hazards, however, is still lacking.

In recent years, numerous nations have worked to minimize emissions of dangerous pollutants produced by thermal power plants, including some trace elements. Mercury is thought to be the most significant of these due to its high toxicity, persistence, and extended atmospheric lifetime. The presence of mercury can be extremely dangerous and may have detrimental effects on human health in both aquatic and terrestrial ecosystems, depending on the type and concentration of mercury, the routes of exposure, the levels of exposure, and the toxicokinetic mechanisms.

As mercury is released into the atmosphere, it is transported, cycled, and diluted in both terrestrial and aquatic habitats before being dumped nearby. High mercury concentrations have been discovered in both the Arctic and Antarctica, both of which are

[4] Etchie, T.O., Sivanesan, S., Etchie, A.T., Krishnamurthi, K., Adewuyi, G.O. and George, K.V., 2022. Can the Indian national ambient air quality standard protect against the hazardous constituents of PM2. 5?. *Chemosphere*, p.135047.

remote from the places that originally emitted mercury and are essentially unpopulated.

It is admirable that India is making an attempt to create sustainable solar energy. The goal of the Jawaharlal Nehru Solar Mission (JNNSM), a significant project of the Indian government, is to produce 20 GW of solar power by 2022[5]. However, there are several restrictions on the practical implication. High capital and financing costs, competition from China and Taiwan, poor demand in India, a lack of technological innovation, and reliance on imported wafers for cell production are the main obstacles in the solar industry. In India, there is also a shortage of land per person because it takes a lot of lands to harness solar energy. India has a large potential for the wind industry thanks to the country's 220 sites with wind densities of at least 220 W/m2. However, these locations are not effectively used. The problem is that outdated, worn-out turbines are inefficient. The overall lack of financial motivation to replace the older WTGs, which Henriksen discussed for wind turbine generators, is one of the main obstacles to solving this issue. Grants should be given to cover additional medical expenses.

Additionally, the government has done away with the requirement to wash the coal, a process that gets rid of impurities and lessens the quantity of fly ash produced as a by-product of combustion. The June coal block auction followed that.

The Union Environment Ministry published a memorandum in November that permits thermal power plants to switch their coal supplies without having to revise their environmental clearance applications. This is the most recent adjustment. The calorific value, ash content, and moisture levels of the coal purchased by thermal plants are no longer relevant factors. Most plants previously used imported coal, or a mix of imported and domestic coal, which has less fly ash and is more expensive. While essential coal may have 10% or less ash, coal that is mined in India can have between 30 and 50 percent ash[6].

The Union Power Ministry unveiled a program in April 2020 to promote the use of indigenous coal in thermal power plants by establishing a system to assist plant owners in making the move from imported coal. The United Progressive Alliance (UPA) government, led by Congress, imposed the requirement for thermal power stations to use coal with an ash concentration below 34%, but the new government administration eliminated it in May. This restriction was put in place to limit the production of fly ash[7].

All thermal power plants must also comply with the new emission regulations by December 2022 at the latest, per Supreme Court directions and a CPCB ruling. Flue-gas desulphurization (FGD) systems must be installed at the plants in order to control sulfurous emissions. However, according to a different CEA report, out of 448 thermal power units nationwide, only four have successfully launched FGD programs. This amounts to just 1,740 MW, or barely more than 1%, of the nation's total installed 1,69,722 MW thermal power capacity.

Other analysts claim that the emission regulations for thermal power plants that were notified in December 2015 have also been weakened. The Center raised the cap on nitrogen oxide emissions from thermal power plants in May 2019 from 300 to 450 milligrams per cubic meter. However,

Fly ash and sulfur emissions have had a significant negative influence on the local ecosystem in areas where thermal power stations are located in India.

Fly-ash Pond overflows and dyke breaches that cause casualties and reduced agricultural output frequently make the news. The majority of plants have fallen short of the UPA government's timetable of December 2017 for using fly ash exclusively.

In the first half of 2019-2020, thermal power plants used 78.19 percent of their fly ash, according to a recent study by the Central Electricity Authority (CEA). Following a directive from the National Green Tribunal, the Central Pollution Control (CPCB) has also served penalty notices to these facilities for missing their deadlines to use fly ash. However, 102 out of 112 power plants have so far declined to pay the fines for a variety of reasons, including pending appeals against the tribunal's judgment.

The use of domestically generated coal in thermal power plants rather than imported coal has been promoted by the government because doing so will ease India's import load. India imported 197.84 million tonnes of coal in 2019, a 12.6 percent increase from the previous year, according to government figures.

[5] Khare, V., Nema, S. and Baredar, P., 2013. Status of solar wind renewable energy in India. *Renewable and Sustainable Energy Reviews*, *27*, pp.1-10.
[6] Ibid
[7] Ibid

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