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Assessment of Socio Economic Impacts of Thermal Power Plant: A Review

Mukesh Kumar
Department of Environmental Science and Engineering GJU S&T Hisar:
Mukesh.goel77@gmail.com

Abstract
Humans have overexploited natural resources to ensure energy supply. If current trends continue, fossil fuels will run out in decades. Even if all fossil fuels are used for energy, an increasing population and urbanization will strain them. Hydrocarbons—oil, coal, and natural gas—have been humanity's main energy source for a century. However, climate change and its effects on human health and well-being have greatly raised the demand for alternate energy sources. Over 80% of global energy comes from hydrocarbons. Fossil fuel production and consumption account for 89% of worldwide greenhouse gas emissions, including carbon dioxide. Power plant emissions, including primary and secondary pollutants, are detrimental to human health. PM 2.5 and PM 10 are major causes of early respiratory illness mortality, chronic bronchitis, upper and lower respiratory tract infections, and cardiovascular disease. Other thermal power plant fuel combustion byproducts such sulphur dioxide, nitrogen oxides, and volatile organic compounds cause more sickness. Thermal power plant emissions deplete ozone, causing respiratory illness, lung function, and recently, fatality. The most important factor in early air pollution deaths is fine particulate matter.

Introduction
The availability of energy is crucial to the development of any economy. It's used in construction, farming, and manufacturing, to name a few industries. In India, the electricity sector is now dominated by coal. Recent studies estimate that India's total installed thermal capacity stands at 231.45 GW as of July 2020. India's overall capacity to generate electricity from coal in 2022 was more than 200 GW. From 1,026 billion units (BU) in FY2021 to a projected 1,057 billion units (BU) in FY2022, coal-fired power generation rose. India is the second largest producer and consumer of coal-based electricity in the world, after China (Ghosh, S. 2002). Even with INDCs, emissions will remain 25 billion tonnes of CO2 over the 2016–2030 stabilization target, according to the report. The UNFCC received India's responsible coal use report(Liu et al., 2022). Even with INDCs, emissions will remain 25 billion tonnes of CO2 over the 2016–2030 stabilization target, according to the report. The UNFCC received India's responsible coal use report. Read recent life cycle assessments (LCAs) for coal-based thermal power plants before commencing a relevant LCA for coal-fired power plants. LCA study aimed to create regulations that would help developing nations produce greener coal power. Specific CO2 emissions in India were 938 g/kWh (Malode et al., 2022).

Adaptable environmental impact assessment methods have been debated for decades at the state, national, and international levels. Holling, 1978, encouraged impact assessment techniques and instruments to limit everlasting uncertainty in threat and protection estimates and modelling. The purpose of environment impact assessment is to generate scrupulous data

on apparent impacts that a proposal may cause on environment. Impact of this may consist of several fields with the environment, social life and economy (Tenny et al., 2006). It shows details of potential impacts to make sure that the study of all has been taken into contemplation through the estimation of a key activity.

India's thermal power plant situation

Currently, India produces 133 MTs of coal fly ash (half anmully) from about approx. 200 coal / lignite based TPPs. According to official data from the half-year period of 2021-2022, no new TPPs will be commissioned for the purpose generating energy beyond 2027. These plants produce (70-75%) of the nation's electricity. In India, there are now proposals to build 50,025 MW of coal-based thermal power stations (Montrone et al 2021). This information is reassuring since it implies that India would grow stronger as a superpower in terms of energy and economics. As a result continuous and reliable energy production by TPP depends on a source of coal that can be delivered to coal based thermal power plants. By 2031 - 2032, the coal fly ash generation total could approach 1000 MT. Land, water, and air pollution are all results of the continued disposal of residual coal fly ash. The issue has become intolerable after a thorough review of official data on coal based thermal power plant content yearly growth.

How Far Along Are "Coal to Gas" and "Coal to Electricity" Projects?

Burning coal creates a lot of pollution in the north. To improve environmental conditions, the "coal to gas and electricity" business should be phased out in favour of a cleaner alternative. It is challenging to monitor and control loose coal usage, restrict emissions, and maximise utilisation because so many people rely on it for their daily lives and economic activities (Chen et al., 2019). Burning coal creates a lot of pollution in the north. To improve environmental conditions, the "coal to gas and electricity" business should be phased out in favour of a cleaner alternative. It is challenging to monitor and control loose coal usage, restrict emissions, and maximise utilisation because so many people rely on it for their daily lives and economic activities (Gasparotto et al., 2021). In terms of energy consumption policy implementation, "coal to gas and electricity" will decrease coal use while increasing demand for natural gas and electricity. Because of severe shortages in natural gas and electricity, the "coal to gas and electricity" policy will encounter significant resistance. The strategy of "changing coal to gas and electricity" must address how to make up for the decrease in energy consumption induced by replacing coal with natural gas and electricity, even though the structure of China's energy consumption is unlikely to change drastically in the near future. Simultaneously, problems like rapid growth in emissions are brought on by inadequate environmental oversight processes. It can also be used to transform steam boilers and gas turbines in coal-fired power plants. No significant negative effect on the population of artificial gas and natural gas can be attributed to the "changing coal to gas and electricity" programme. It is possible that non-resident energy domains, such as the industrial sector, will be given higher priority by the "changing coal to gas and electricity" programme in urban regions. Due to inefficient implementation or high prices relative to

coal-fired heating, the strategy of "changing coal to electricity" may have resulted in a drop in power consumption in rural areas. Some cities have supported the "coal to gas, electricity" project as a means of reducing air pollution. Reducing pollutants and making the northern masses more comfortable in the winter are both tied to better heating infrastructure in the region. This is a major step towards a more sustainable energy future and a better rural way of life. Companies, government promotion, and resident affordability should take precedence. Clean energy must be a top priority, and more clean heating must be installed ((Zhang et al., 2022)).

Impact of "coal to gas" and "coal to electricity" schemes

- **Air Quality**

The research demonstrates that coal burning emits 148 times more ash powder, 700 times more carbon dioxide, and 29 times more nitrogen oxide than natural gas under the same energy consumption. Natural gas will solve China's smog problem if it replaces coal. China's energy resources are mostly coal and natural gas is scarce. Due to development technology restrictions, natural gas and heating costs are considerable. In the north, winter heating is necessary, and protecting the atmosphere is crucial for providing residents' living needs(Wang et al., 2019).

Many coal-fired boilers have not been desulfurized, and some have been miniaturised. These boilers fail the national standard. Air pollution during heating period has also increased. Burning coal for heating emits pollutants like Particulate matter, SO2, and CO2, worsening atmospheric pollution.

- **Quality of groundwater**

Study revealed that heavy metals are present in power plant groundwater. Zinc 0.13 mg/l, Cu 0.20 mg/l, Ni 0.16 mg/l, Fe 0.13 mg/l, Cr 0.02 mg/l, Cd 0.16 mg/l, and Co 0.07 mg/l were heavy metals The site's Cd danger exceeds adjacent homes' safe limits (Yadav 2013). Blume and Brummer (1987) explained heavy metal-soil organic matter bonding. Organic matter in soil highly binds Cr, Fe, Pb, Cd, Ni, Co, and Hg but poorly binds Mn and Zn, which may increase plant bioavailability.

- **Soil quality**

Petrogenic and mixed pyrogenic activities including coal combustion, wood burning, and diesel engine emissions induced PAHs in soil samples. Kumar et al. (2014) analyzed soil samples near the Korba power plant for PAHs. The analysis of 16 PAHs revealed a range of 7-2100 µg/kg, with an average of 385 ± 120 µg/kg. In this investigation, the main PAHs detected were ANy (466 ± 150 µg/kg), Npt (150 ± 70 µg/kg), Flt (26 ± 8 µg/kg), ANe (65 ± 5 µg/kg), Pyr (34 ± 10 µg/kg), and DBA (26 ± 1 µg/kg), accounting for over 85% of the 16 key PAHs.

- **Socio economic effect**

Socioeconomic studies mostly measure the Human Development Index (HDI), which estimates human development by measuring life expectancy, education, per capita income, etc. Accounting for inequality, it represents development potential (UNDP, 2010).

Developmental initiatives are developed after objectively assessing public needs, native area baseline data, and potential repercussions on people and the environment. Thus, socioeconomic surveys can help evaluate the environmental and social effects of development (Grausz, 2011).

China and India are among the few coal-dependent nations. China gets almost 70% of its electricity from coal-fired power facilities (Wang, 2018). The two countries' significant economic and social progress in the previous 2-3 decades has led to the growth of coal-fired energy. IEA (2007) and Jiang and Hu (2006) predict that coal-generated electricity will dominate this region for next 2-3 decades. Coal-fired power facilities emit pollutants and consume coal and water (State Power Economic Research Institute, 2009).

Conclusion

Water is a unique and essential resource found on earth which is unparalleled in its characteristics and properties. The persistent increase in carbon dioxide emissions over the past three decades has resulted in elevated air temperatures at now. The environment is experiencing escalating levels of pollution as a consequence of the rapid process of industrialization and the extensive reliance on fossil fuels for energy generation. The present study has attempted to review the EIA studies done in various coal thermal power plant. In this review article parameter like air water soil agriculture land etc were studied. The result indicated that the air was the most severely affected by coal thermal power plant followed by water soil and other. So this article focuses on how coal thermal power plant effects the groundwater, soil and atmosphere which are not good for health. That is why; sustainable energy can lead to a green future and also a better environment to livelihood.

References

Ghosh, S. (2002). Electricity consumption and economic growth in India. *Energy policy*, *30*(2), 125-129).

Liu, Z., Deng, Z., Davis, S. J., Giron, C., & Ciais, P. (2022). Monitoring global carbon emissions in 2021. *Nature Reviews Earth & Environment*, *3*(4), 217-219.

Malode, S., Mohanta, J. C., & Prakash, R. (2022). A review on life cycle assessment approach on thermal power generation. *Materials Today: Proceedings*, *56*, 791-798.

Holling, C. S., & Walters, C. (1978). Adaptive environmental assessment and management.

Tenney, A., Kværner, J., & Gjerstad, K. I. (2006). Uncertainty in environmental impact assessment predictions: the need for better communication and more transparency. *Impact Assessment and Project Appraisal*, *24*(1), 45-56.

Montrone, L., Ohlendorf, N., & Chandra, R. (2021). The political economy of coal in India–Evidence from expert interviews. *Energy for Sustainable Development*, *61*, 230-240.

Chen, H., & Chen, W. (2019). Potential impact of shifting coal to gas and electricity for building sectors in 28 major northern cities of China. *Applied Energy*, *236*, 1049-1061.

Gasparotto, J., & Martinello, K. D. B. (2021). Coal as an energy source and its impacts on human health. *Energy Geoscience*, *2*(2), 113-120..

.Zhang, J., Wang, W., Gao, L., Deng, Z., & Tian, Y. (2022). Can the Coal-to-Gas/Electricity policy improve air quality in the Beijing–Tianjin–Hebei region?—Empirical analysis based on the PSM-DID. *Atmosphere*, *13*(6), 879.

Wang, S., Li, Y., & Haque, M. (2019). Evidence on the impact of winter heating policy on air pollution and its dynamic changes in North China. *Sustainability*, *11*(10), 2728.

Yadav, P., Singh, B., Mor, S., Garg, V. K. (2013).Quantification and health risk assessment due to heavy metals in potable water to the population living in the vicinity of a proposed nuclear power project site in Haryana, India. Desalin Water Treat. 1-12

Blume, H.P., Brummer, G. (1987). Prognose des Verhaltens von Schwermetallen in Boden mit einfachen Feldmethoden. Mitt Dtsh Bodenkundl Ges. 53, 111 - 117.

Kumar, B.,Verma, V. K., Kumar, S., Sharma, C. S. (2014). Polycyclic Aromatic Hydrocarbons in Residential Soils from an Indian City near Power Plants Area and Assessment of Health Risk for Human Population. Polycyclic Aromatic Compounds. 34 (3).

United Nations Development Programme (UNDP) (2010). Human Development Report (2010): The Real Wealth of Nations: Pathways to Human Development: Human Development Report 201020th Anniversary Edition Sustain ability and Equity: A Better Future For all. New York: UNDP, Palgrave Macmillan.

Grausz, S. (2011). The social cost of coal: implications for the World Bank. Washington, DC: Climate Advisors.

Wang, L., Li, P., Yu, S., Mehmood, K., Li, Z., Chang, S., Liu, W., Rosenfeld, D., Flagan, R. C., Seinfeld, J. H. (2018). Predicted impact of thermal power generation emission control measures in the Beijing-Tianjin Hebei region on air pollution over Beijing, China. Scientific Reports. 8:934

IEA (International Energy Agency).(2008 . World Energy Outlook (2007): China and India Insight. Available from: /http://www.iea.org/weo/2007.aspS.

Jiang, K., Hu, X., (2006).Energy demand and emissions in 2030 in China: scenarios and policy options. Environmental Economics and Policy Studies 7, 233–250.

State Power Economic Research Institute. (2009). Annual Report of Power Energy. Supply-demand and Power Resource Development 2008. China Electric Power Press, Beijing, China.