Contents list available at CBIORE journal website

International Journal of Renewable Energy Development

Journal homepage: https://ijred.cbiore.id

Research Article

Do the various sources of energy consumption affect the environmental degradation in India?

Abdul Hayy Haziq Bin Mohamad[a,b,c] and Rossazana Ab-Rahim[a*]

[a] *Faculty of Economics and Business, Universiti Malaysia Sarawak, Malaysia*

[b] *School of Business and Management, University of Technology Sarawak, Malaysia*

[c] *Centre on Technological Readiness and Innovation in Business Technopreneurship, Malaysia*

Abstract. India possesses ample opportunities for economic growth, resulting in a surge in electricity demand. As per the Environmental Performance Index (EPI), India's rank on environmental health and ecosystem viability stands at a lowly 168th out of 180 countries. Historically, India relied on fossil fuels for electricity generation, leading to substantial environmental degradation that have harmed the environment. In recent times, India has diversified its electricity generation sources, incorporating not only fossil fuels but also nuclear power and renewable resources. However, despite these changes, India still struggles with high CO_2 emissions which indicates the level of environmental degradation. Hence, this study aims to investigate the sources of energy consumption in India: fossil fuels, renewable energy, and nuclear energy. By utilising the ARDL and NARDL methodologies, this study enriches the empirical studies by examining energy consumption trends in India from 1985 to 2021. The findings of this study shed light on whether the adoption of renewable energy and nuclear energy significantly aids in reducing carbon emissions in India, thereby facilitating the attainment of the Sustainable Development Goal (SDG), Therefore, it is of the utmost necessity for India to emphasize the formation of clean energy in their energy policy to achieve the SDG7 by the year 2030. This study found a positive correlation between GDP per capita and CO_2 emissions, highlighting the urgent need to reduce India's dependency on fossil fuels. The ARDL analysis further confirms that fossil fuel-generated energy contributes to CO_2 emissions, whereas nuclear-generated energy reduces them.

Keywords: Electricity, Energy, CO_2 Emissions, Sustainable Development Goal, India.

Received: 6th June 2023; Revised: 26th Nov 2023; Accepted: 17th Dec 2023; Available online: 3rd Jan 2024

1. Introduction

Due to its vast population, India has a significant electricity consumption annually. India's demand for power has sharply increased in recent years as a result of the country's economic growth and rising urbanization. But India has a lot of problems trying to meet its need for electricity. The nation's electricity industry is characterized by a high level of inefficiency, subpar infrastructure, and excessive reliance on fossil fuels such as coal (Wang & Song 2019). As a result, India frequently has inconsistent electricity supplies, including frequent power outages and blackouts (Rehman & Hussain 2017). According to report by India energy outlook 2021, India is the nation that will have the greatest growth in energy consumption in 2024 due to its rapidly growing economy, population, urbanization, and industrialization (IEA 2023).

Consequently, it becomes imperative for a nation of this magnitude to shift its energy production from fossil fuels to renewable and clean sources (Qayyum *et al.* 2022, Ortega-Ruiz *et al.* 2022). Several countries still depend on fossil fuels as their main electricity source due to their ability to offer more reliable power (Chen *et al.* 2022, Martins *et al.* 2018). Nonetheless, it is not justifiable to compromise the value of the environment for the sake of electricity generation (Covert *et al.* 2016).

Ahmed *et al.* (2022) and Sasmaz *et al.* (2020) suggest fossil fuel is the significant contributors to the emissions of CO2 and greenhouse gases, thereby playing a major role in the occurrence of severe climate change. Martins *et al.* (2019) offer evidence of substantial climate change, including global warming and the subsequent rise in temperatures worldwide. This phenomenon has led to the melting of arctic glaciers and the resulting increase in sea levels (Stokes *et al.* 2022, Yarzábal *et al.* 2021). Other past studies such as Gussmann & Hinkel (2021), Shah *et al.* (2020), and Piecuch (2020) recommend countries such as the Maldives and Pakistan, as well as coastal areas of the United States (Florida and Louisiana), are already experiencing coastal erosion due to rising sea levels.

The escalation of fossil fuel prices is often triggered by geopolitical conflicts in oil-exporting nations, which can include warfare. According to Estrada *et al.* (2020), conflicts in Middle Eastern countries disrupt the oil supply, leading to a significant increase in prices. A similar situation arose during the recent Russia-Ukraine conflict, due to the fact that Russia is one of the primary exporters of oil and natural gas in the world (Adekoya *et al.* 2022). Furthermore, the sanctions on Russia have also impacted global oil supply, resulting in price hikes (Mbah & Wasum 2022). As the results, the fluctuations of electricity tariff during political crises in oil-exporting nations exacerbates the

* Corresponding author
Email: arrossazana@unimas.my (R. Ab-Rahim)

https://doi.org/10.61435/ijred.2024.55836
ISSN: 2252-4940/© 2024.The Author(s). Published by CBIORE