

Exploring Global Electricity Dynamics

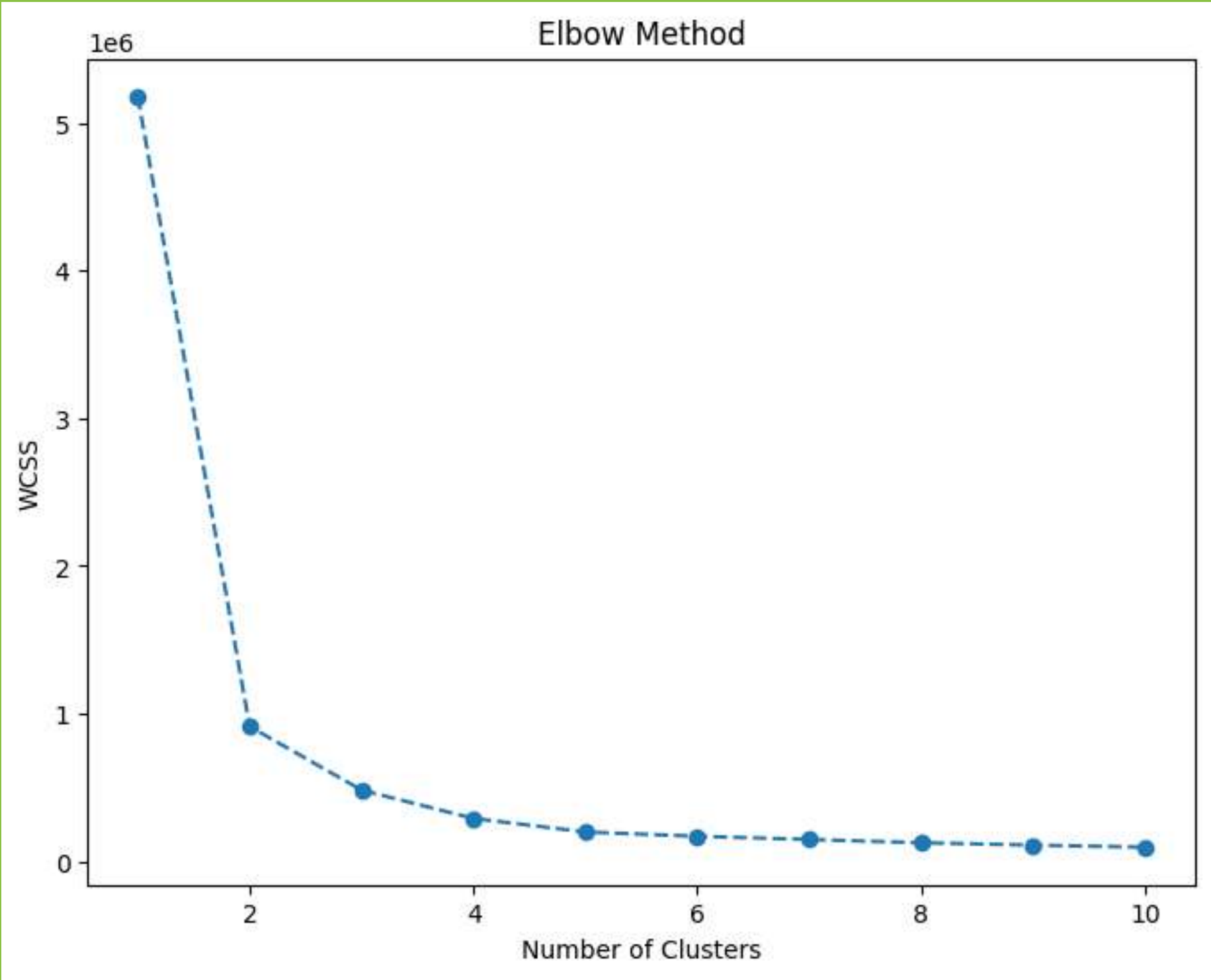
Impact, Trends, and Significance

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Introduction

Global access to electricity is a fundamental driver of progress, impacting economies and livelihoods worldwide. Our study scrutinizes electricity access across key nations, employing KMeans clustering to discern distinct patterns. With electricity serving as a linchpin for societal development, our focus zeroes in on understanding disparities and trends among the top 10 contributing countries. By unraveling these intricacies, we aim to uncover insights crucial for shaping equitable policies and fostering sustainable global development.

Finding Number of Clusters

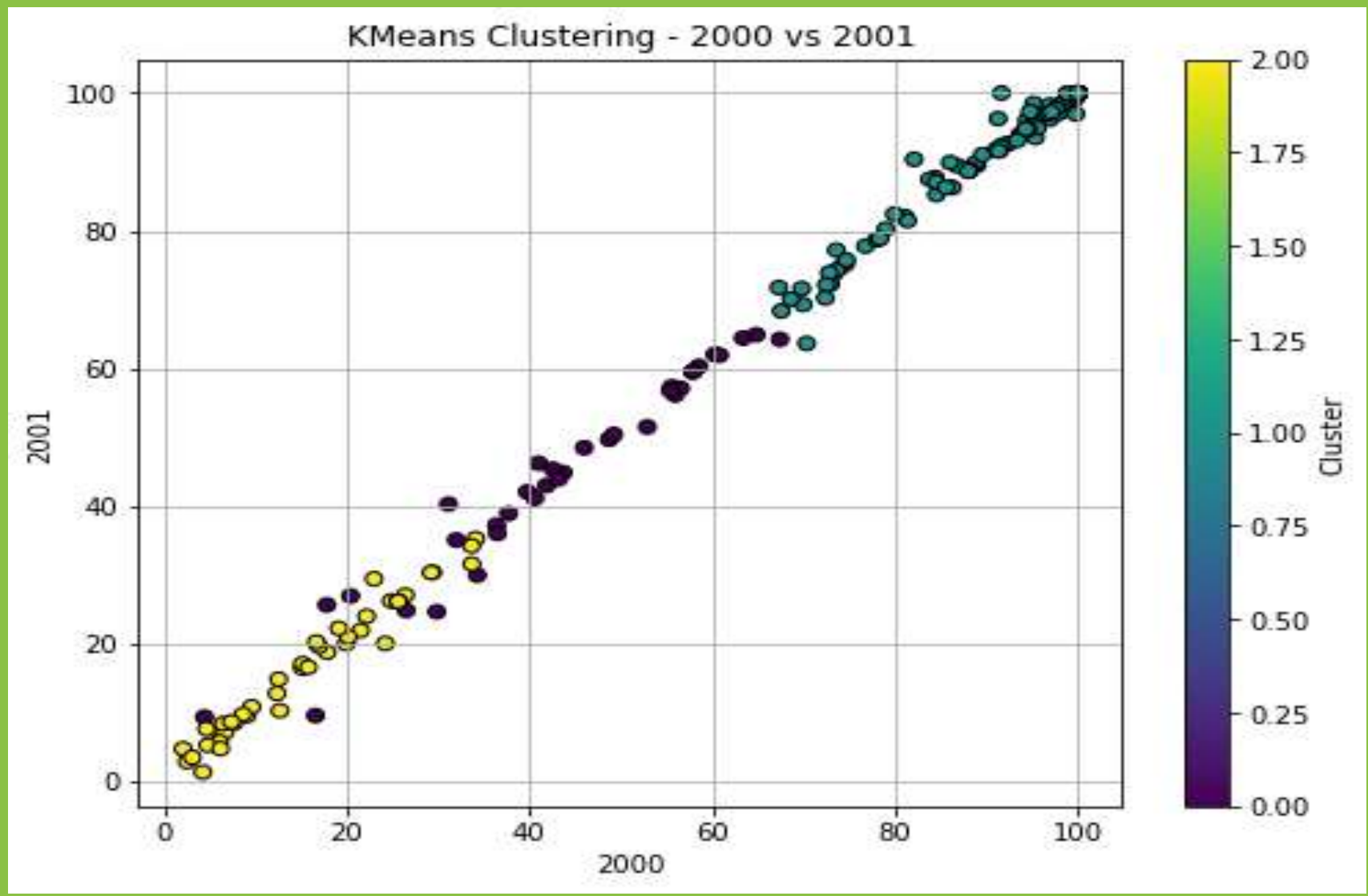


Identifying the optimal number of clusters is pivotal in uncovering meaningful patterns within the dataset. Employing methodologies such as the 'Elbow Method' or 'Silhouette Score' aids in determining the ideal cluster count. By exploring these techniques, we aim to discern the most suitable number of clusters that effectively capture the underlying structure of the data, providing invaluable insights into distinct groupings within the electricity access landscape across diverse regions.

Further Developments

Looking ahead, our exploration opens doors to crucial future prospects. Understanding the evolving trends in electricity access among nations lays the groundwork for targeted interventions and policy implementations. Leveraging this knowledge can pave the way for strategic investments, innovative technologies, and inclusive initiatives aimed at enhancing global electricity accessibility, thereby fostering sustainable development and equitable growth worldwide.

Projections

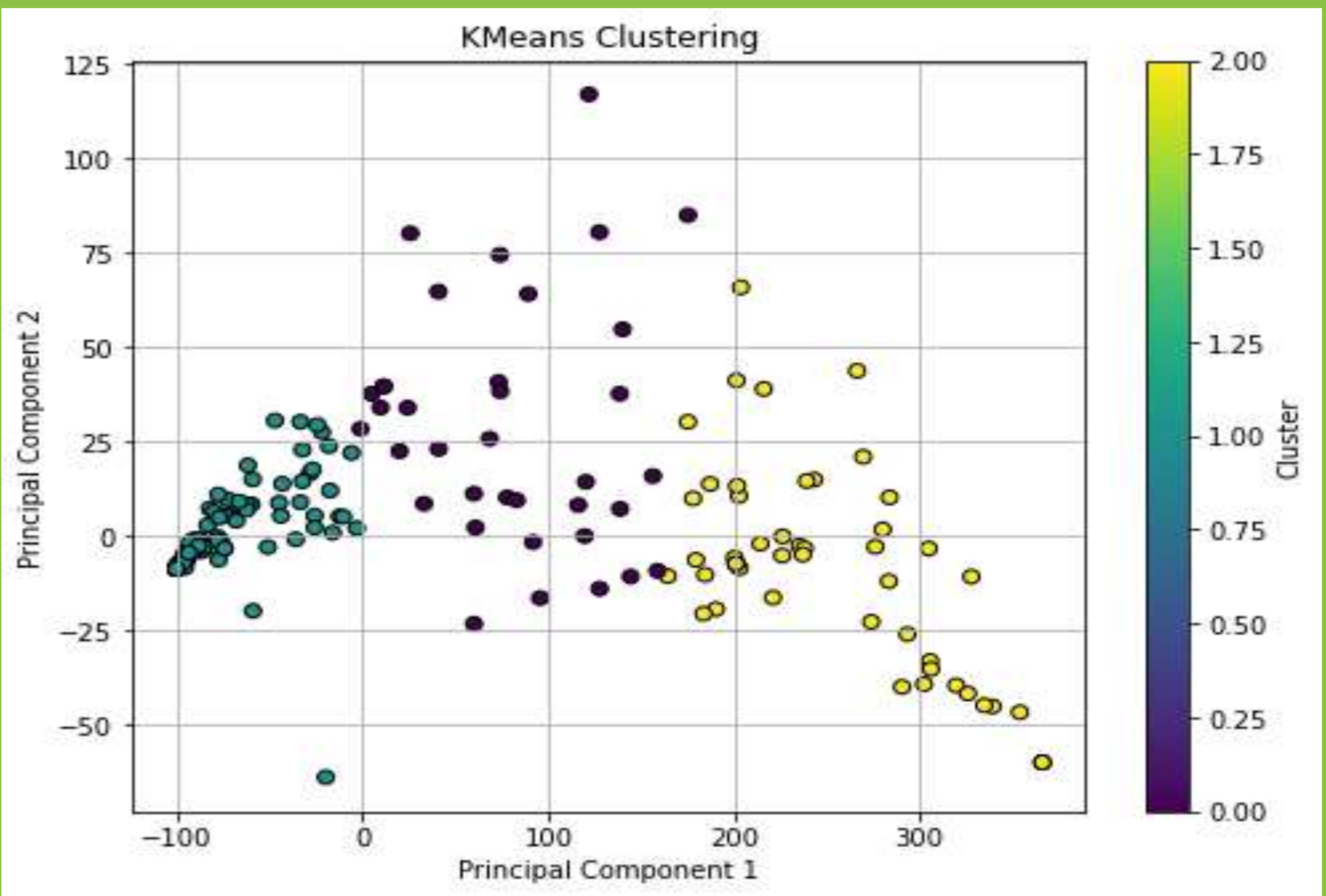


Projects foster innovation, creativity, and growth. They serve as catalysts, translating ideas into tangible outcomes. Through structured planning and execution, projects unlock potential, drive change, and shape the world we envision.

Dataset

The dataset at hand encapsulates crucial metrics regarding electricity access across various nations, spanning from 2000 to 2021. It comprises indicators of access to electricity (% of population) and corresponding yearly values. This comprehensive dataset allows us to delve into the nuanced dynamics of electricity access, enabling in-depth analysis and insightful interpretations crucial for understanding global disparities and trends.

K-Means Clustering



K-means clustering partitions data into 'k' clusters, minimizing intra-cluster variance. It aids in pattern recognition, segmentation, and understanding distinct groups within a dataset for insightful analysis and decision-making.

References

- [1] Elshkaki, A., & Graedel, T. E. (2013). Dynamic analysis of the global metals flows and stocks in electricity generation technologies. *Journal of Cleaner Production*, 59, 260-273.
- [2] Data from: <https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?view=chart>
- [3] Keenan, R. J., Reams, G. A., Achard, F., de Freitas, J. V., Grainger, A., & Lindquist, E. (2015). Dynamics of global forest area: Results from the FAO Global Forest Resources Assessment 2015. *Forest Ecology and Management*, 352, 9-20.
- [4] Shahbaz, M., Sarwar, S., Chen, W., & Malik, M. N. (2017). Dynamics of electricity consumption, oil price and economic growth: Global perspective. *Energy Policy*, 108, 256-270.
- [5] Sovacool, B. K., Hook, A., Sareen, S., & Geels, F. W. (2021). Global sustainability, innovation and governance dynamics of national smart electricity meter transitions. *Global Environmental Change*, 68, 102272.
- [6] Tinsley, B. A. (2000). Influence of solar wind on the global electric circuit, and inferred effects on cloud microphysics, temperature, and dynamics in the troposphere. *Space Science Reviews*, 94(1-2), 231-258.