IARCO - Hrishitaa.pdf

by Mr Adnan

Submission date: 14-Oct-2025 01:22PM (UTC+0300)
Submission ID: 2780775094
File name: IARCO_-_Hrishitaa.pdf (130.71K)
Word count: 710
Character count: 4061

Assessing the impact of the growing use of Artificial Intelligence (AI) on the environment

Hrishitaa Punjabi

Scholar name	Hrishitaa Punjabi
Scholar's affiliation	Christ junior college
Scholar email	hrishitaap@gmail.com
Date of submission	30-09-2025

Introduction:

The use of AI in our life is undeniably habitual. We all use chatbots for studying, learning, working and even venting. However, what we don't realise the amount of energy going to these systems is almost triple the amount of what regular computers needed. The supercomputers are more interconnected than ever, producing a large amount of heat and hence massive amounts of water is needed to cool them. Gaining clarity over how to minimise its effect and spreading awareness is crucial in the growing age of AI.

Research Question:

How does the growing global usage of Artificial Intelligence affect energy consumption and the environment especially in the smart cities of the world such as New York, Tokyo, etc and what measures can be taken to reduce this?

Literature Review:

Researchers have extensively examined the impact of AI on our environment focusing on the energy consumption in developing areas of the world. Key findings include an analysis of 237 scientific publications from 2010 to 2024, which highlights significant advancements and obstacles to AI adoption across sectors, such as construction, transportation, industry, energy and households. The review showed that interest in the use of AI and ML in energy efficiency has grown significantly: over 60% of the documents have been published in the last two years, with the topics of sustainable construction and climate change forecasting attracting the most interest. [1]

Gaps in previous research: Researchers have focused more on the benefits of AI without equally comparing its consequences. Additionally, the water footprint of AI centres is understudied as compared to carbon emissions and energy consumption. Moreover, transparency from tech companies is extremely low which gives biased or incomplete data.

Methodology:

Dataset: Primary data will be collected directly from tech companies' surveys such as Google, Microsoft, etc and make a comparative analysis on how much their energy consumption and carbon emission has increased in MW/hr and water usage after the introduction of LLMs. Secondary data will be collected from already existing research material cited correctly. The dataset will focus on energy metrics before and after large-scale adoption of LLMs, with additional consideration of renewable energy usage and cooling technologies.

Data Collection: Data will be collected through online company reports, independent watchdog datasets, and, if possible, direct quantitative submissions from companies. Supplementary secondary data will be extracted from peer-reviewed journals, government publications, and industry white papers to validate findings.

Data Analysis:

a) **Quantitative Analysis:** Statistical analysis will be conducted using software such as Excel or SPSS. Descriptive statistics will summarize trends in energy consumption, carbon emissions, and water usage, while inferential statistics (e.g., paired t-tests or ANOVA) will evaluate differences before and after LLM adoption across companies and cities.

b) **Qualitative Analysis:** A brief comparative analysis of policies and strategies adopted by companies will be conducted to contextualize the quantitative results, identifying recurring strategies for energy efficiency and renewable energy adoption.

Expected Outcomes:

This study aims to uncover specific patterns in the environmental impact of AI adoption across diverse companies and cities. It is expected that the findings will highlight both the significant energy and water costs of AI systems as well as examples of effective mitigation strategies. These insights can guide the development of more sustainable AI infrastructure and policies for global tech companies, while also contributing to further understanding of environmentally responsible AI deployment in other developing and densely populated regions.

Conclusion: This research paves the way to develop a more sustainable way of AI by reducing carbon emissions, environment impact and water footprint. It strongly indicates the necessity of the policies that companies whether well established or new, must adopt for the betterment of our environment so that we as a community can seamlessly gain the advantages AI has to offer without pushing out and ignoring its downfall.

References: [1] S. Pimenow, O. Pimenowa, and P. Prus, "Challenges of artificial intelligence development in the context of energy consumption and impact on climate change," *Energies*, vol. 17, no. 23, p. 5965, 2024. Nov 27: 10.3390/en17235965.

IARCO - Hrishitaa.pdf

ORIGINALITY REPORT

16%	14%	12%	13%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.mdpi.com Internet Source	11%
2	Submitted to National College of Ireland Student Paper	2%
3	www.irejournals.com Internet Source	2%
4	iimsambalpur.ac.in Internet Source	1%

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	Off		