

Terra Consulting

<u>Team Member Name</u>	<u>Year</u>	<u>Major</u>
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Topic Title: Microsoft's Sustainability Goals Amid Rapid Growth and AI Expansion

Audience: Microsoft Sustainability Science Team and the Microsoft Board of Directors

Sustainable Development Goal

SDG #7 Affordable and Clean Energy: Push for energy efficiency optimizations in AI model training and building renewable energy infrastructure to reduce greenhouse gas emissions.

SDG #12 Responsible Consumption and Production: Ensure cooling systems in data centers become water efficient, minimizing freshwater consumption.

Executive Summary

By 2030, Microsoft has pledged to match 100% of its electricity usage with carbon-free energy. However, its rapid growth in AI and cloud computing demands increasing energy. With over 300 data centers and ongoing expansion, including the planned five-gigawatt Stargate facility, its clean energy goals struggle to keep pace. Additionally, Microsoft produces various indirect carbon emissions from activities like upstream and downstream transportation and business travel. These carbon emissions contribute to the greenhouse effect, worsening anthropogenic climate change. Microsoft's rapid increase in energy consumption not only challenges their carbon-free energy commitment but also raises concerns about long-term environmental impact. Without additional mitigation efforts, Microsoft's sustainability commitments risk becoming more aspirational than achievable.

Beyond energy, Microsoft's AI expansion presents an ethical dilemma regarding water usage. AI server cooling systems require substantial amounts of water, with some estimates indicating up to 16 ounces per AI query. Microsoft has pledged to become water-positive by 2030, yet its data centers consumed over 6.3 million cubic meters of water in 2023—a 32% increase from 2022—raising concerns about strain on local water supplies. The ethical challenge lies in balancing technological advancement with responsible resource management, particularly in water-scarce regions.

To address these challenges, Terra Consulting recommends expanding on-site renewable energy production, such as solar and wind installations at data centers, to reduce reliance on external power grids. Additionally, Microsoft must implement a standardized water efficiency framework across all data centers, prioritizing closed-loop cooling, water recycling, and strategic partnerships with municipalities for local water replenishment. These measures will help Microsoft meet its 2030 sustainability commitments while mitigating ethical concerns. Failure to act decisively could lead to increased regulatory scrutiny and potential reputational damage, undermining Microsoft's position as a sustainability leader. By implementing these solutions, Microsoft can position itself as a leader in sustainable AI development while maintaining public trust and regulatory compliance.