

NextGen Tech Solutions

<u>Team Member Name</u>	<u>Year</u>	<u>Major</u>
Member 1: Ella Call	Senior	Finance
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Member 3: Patrick Phelan	Junior	Finance

Advisor(s): Christine Cahill

Topic Title: Cooling AI: The Hidden Cost of Water

Audience: Board of Directors of Microsoft

Sustainable Development Goal

SDG #6: Clean water and sanitation: Ensure availability and sustainable management of water and sanitation for all

SDG #12: Responsible Consumption and Production: Ensure sustainable consumption and production patterns.

Executive Summary

In recent years, artificial intelligence (AI) technologies have been rapidly expanding. This has brought to light a significant ethical concern: the substantial demand for freshwater required to cool large AI data centers. On average, AI data centers consume approximately 300,000 gallons of water a day for cooling purposes, which is equivalent to the daily water consumption of around 100,000 households. It is projected that AI's water usage will hit 6.6 billion m³ by 2027. This issue is particularly urgent given that roughly two-thirds of the world's population faces severe water shortages for at least one month a year. By 2030, this gap is projected to worsen significantly, with nearly half of the world's population facing severe water stress, a challenge that has been amplified due to AI.

The urgency of addressing this issue is undeniable. Microsoft is a world leader in AI technology, owning over 300 data centers in over 34 countries. Microsoft must prioritize the responsible development of AI systems, as outlined in its mission statement. To address this challenge, we recommend the use of a glycol-water mixture which reduces water consumption without compromising performance. A propylene glycol-water mixture will help maintain stable temperatures in data centers while minimizing water usage. This process typically operates in a closed-loop system, which includes a 30-50% propylene glycol concentration. The mixture circulates through the water block absorbing heat, and is then dissipated into the environment, cooling the system. By implementing this solution, Microsoft can ease pressure on local water resources, reduce its carbon footprint, and enhance its overall environmental impact. With Microsoft's goal of becoming "water positive" by 2030- aiming to replenish more water than it consumes-this solution helps make that goal achievable.

