There is no artificial intelligence on a dead planet.

– a version of saying by David Bower

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Or how software is eating the Earth alive.

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About Myself

Janne Kalliola, Chief Growth Officer and founder of Exove

Have been coding since 1983

Now focusing on growth of Exove

Working with green coding and carbon neutrality for a few years now

Chairman of Board of Code from Finland and initiator of Carbon Neutral Software Company label

linkedin.com/in/jannekalliola/

Defrustrating the Digital

Exove is a design and software development company that combines analytical and technological expertise with understanding of humans. We focus on creating digital solutions that fight against digital frustration.

EXOVE. a REBL company

110
Experts

Revenue
9m€

Founded
2006

100+
Clients

Offices
6

Helsinki + Oulu + Tampere + Lahti + Jyväskylä + Tallinn

Climate crisis costs the world **12% in GDP for every 1°C** temperature rise.[1)]

[1)] The Macroeconomic Impact of Climate Change: Global vs. Local Temperature

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The ICT sector accounts for **4–10%** of the world's energy consumption[1)] and **2.1–3.9%** of greenhouse emissions[2)].

The numbers are growing.

[1)] Ministry of Transport and Communications: Climate and environmental strategy for the ICT sector.

[2)] The real climate and transformative impact of ICT: A critique of estimates, trends, and regulations

3.0% of global carbon emissions[1)] =

1,580,000,000 tons

Every year.

[1)] Global emissions 58.2Gt from UN Emissions Gap Report 2022

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For the sake of perspective, this is about the mass of **all land mammals and people**.[1)]

[1)] https://energyeducation.ca/encyclopedia/Gigatonne

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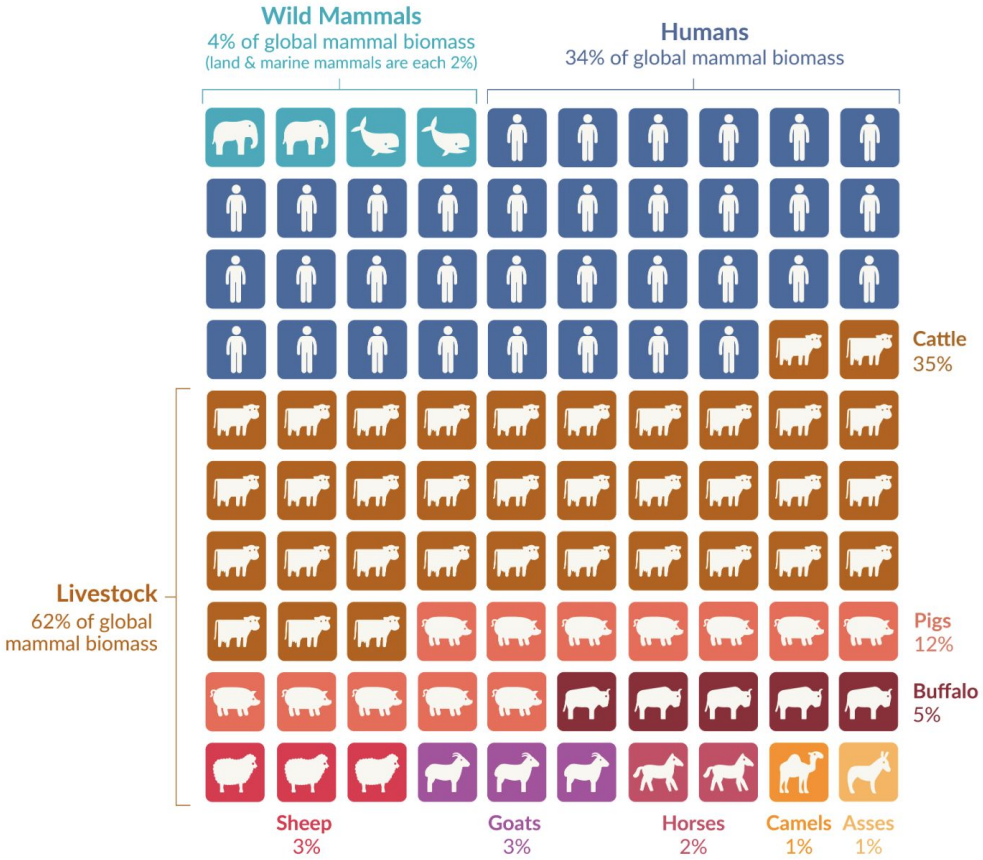
Also, do note this.[1)]



[1)] https://ourworldindata.org/wild-mammals-birds-biomass

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And worst of all, these numbers are before the AI boom.

We need to do better!

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The issue is how we see our software environment.

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Cornucopian (horn of plenty) paradigm[1)]

[1)] Understanding and Mitigating the Effects of Device and Cloud Service Design Decisions on the Environmental Footprint of Digital Infrastructure,

1. The Moore’s law will be valid forever.

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2. The cloud provides infinite scalability.

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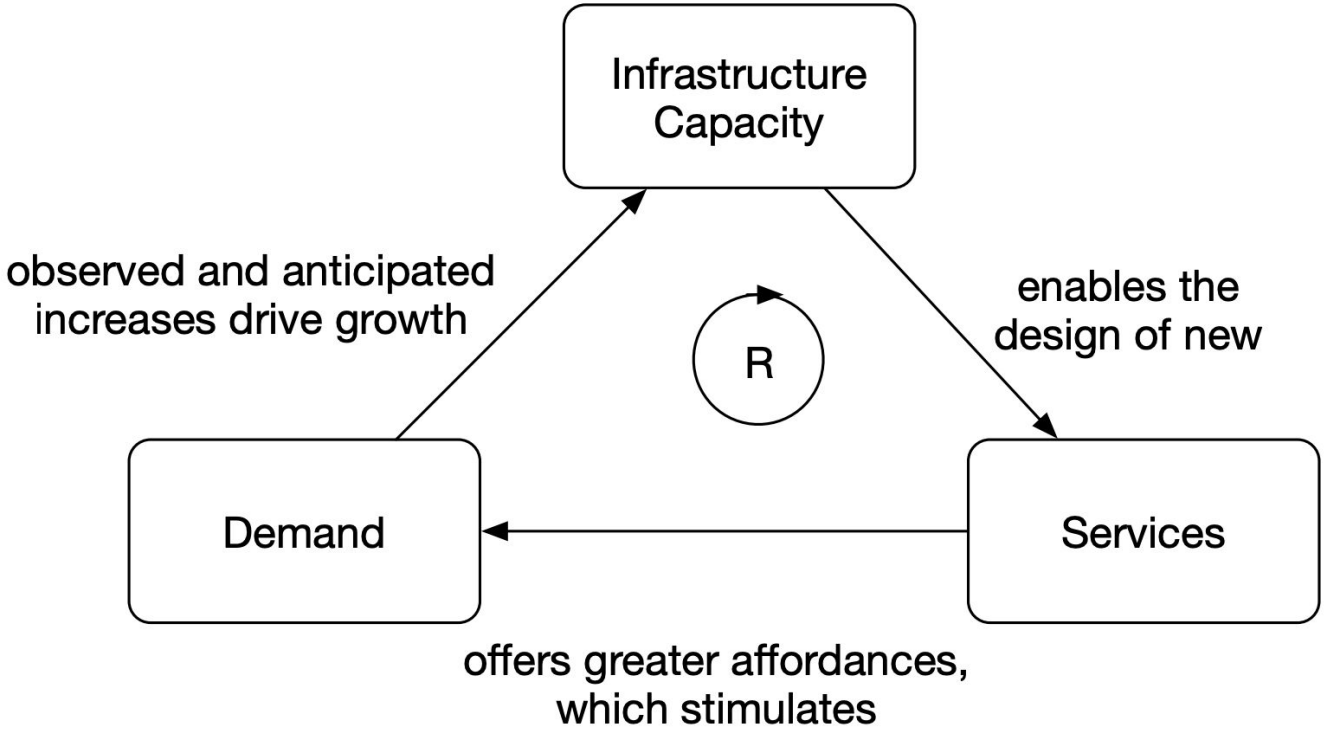

[1)] Understanding and Mitigating the Effects of Device and Cloud Service Design Decisions on the Environmental Footprint of Digital Infrastructure,

We must break free of this vicious cycle. **Or it will suck our planet dry.**

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The Role of Artificial Intelligence

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AI + Energy

The energy consumed by AI is huge, but nobody knows how huge.

Be awake when using AI.

Read more here: *technologyreview.com/2025/05/20/1116327/ai-energy-usage-climate-footprint-big-tech/*

Microsoft's emissions soar by 30%: Why is it building more data centres and what is their impact?

Copyright Canva

By Angela Symons

Published on 16/05/2024 - 17:00 GMT+2

AI has helped increase Microsoft's emissions almost a third since 2020.

Microsoft's total carbon emissions have risen by almost 30 per cent since 2020, according to the company's annual Environmental Sustainability Report released on Wednesday.

CLIMATE / ENVIRONMENT / SCIENCE

Microsoft's AI obsession is jeopardizing its climate ambitions

Microsoft CEO Satya Nadella delivers a speech during an event called Microsoft Build: AI Day in Kuala Lumpur, Malaysia, on May 2nd, 2024. Photo by MOHD RASFAN / AFP via Getty Images

/ After pledging to slash its greenhouse gas emissions, Microsoft's climate pollution grown by 30 percent as the company prioritizes AI.

By Justine Calma, a senior science reporter covering energy and with more than a decade of experience. She is also the host of **When Disaster Hits Home**, a podcast from Vox Media and Audib

May 15, 2024, 11:29 PM GMT+3

Microsoft's producing a lot more planet-heating pollution now than it did when it made a bold climate pledge back in 2020. Its greenhouse gas emissions were actually around 30 percent higher in fiscal year 2023, showing how hard it could be for the company to meet climate goals as it simultaneously races to be a leader in AI.

Training and running AI models is an increasingly energy-hungry endeavor, and the impact that's having on the climate is just starting to come into view. Microsoft's latest sustainability report is a good case study in the conundrum facing big tech companies that made a slew of climate pledges in recent years but could wind up polluting more as they turn their focus to AI.

"In many ways the

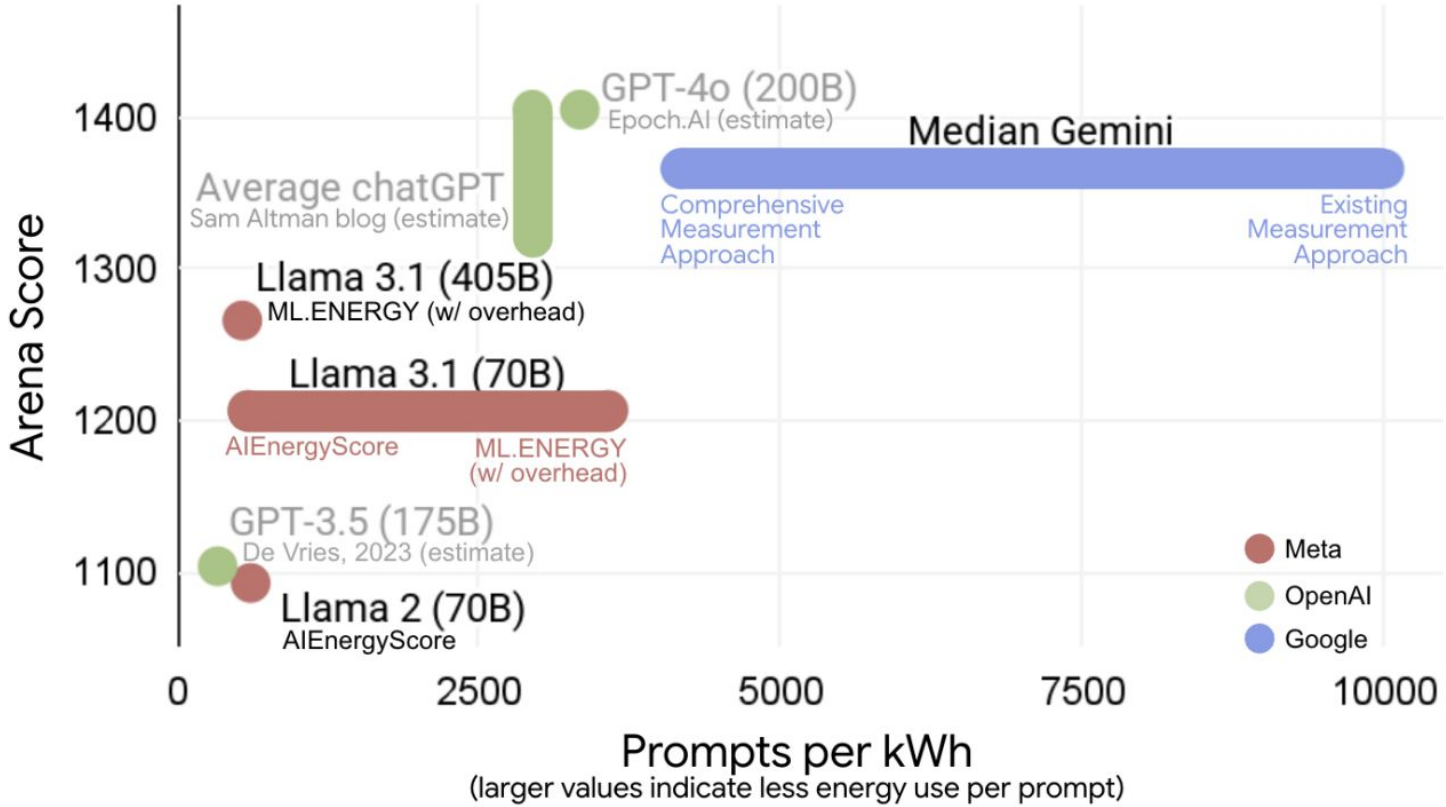
Back in 2020, Microsoft set a target of becoming carbon negative by the end of

Energy Consumption of AI

Recent scientific articles have estimated AI energy consumption:

- GPT-3.5 prompt consumes around 3Wh (De Vries, 2023)
- ChatGPT prompt consumes approx. 0.3 Wh (Epoch.AI, 2025)
- Small prompt consumes between 1.83 Wh and 6.95 Wh (EcoLogits calculator)
- ChatGPT prompt consumes around 0.34 Wh (Altman, 2025)
- Mistral prompt emits ~1.14 gCO_2e (Mistral AI, 2025)
- BLOOM prompt consumes ~4Wh (Luccioni et al., 2022)
- LLaMA-65B prompt consumes ~0.3Wh (Samsi et al., 2023)
- Gemini prompt consumes ~0.24Wh (Elsworth et al., 2025)

Measuring the environmental impact of delivering AI at Google Scale



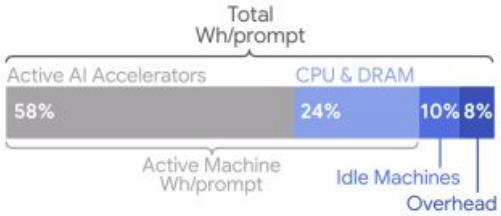
https://arxiv.org/pdf/2508.15734

Do Note!

That was only for the inference (i.e. using the AI). Training costs have not been estimated or measured.

Further, the methodologies and included scopes differ.

	Active AI Accelerators		CPU & RAM	Idle Machines	Overhead
	Chip Power	Utilization			
Luccioni et al., 2022	Measured chip power across multiple A100s	Limit batch size to 1 for reduced latency	Including host CPU & DRAM power	Not included	Not included
Samsi et al., 2023	Measured chip power across multiple A100s	Highly utilized of bench serving system	Not included	Not included	Not included
AIEnergyScore	Measured chip power across multiple H100s	Limit batch size to 1 for reduced latency	Not included (suggest +30% addition to GPU energy)	Not included	Not included (suggest PUE of 1.2)
ML.Energy	Measured chip power across multiple A100s -or- H100s	Variable batch size, influencing utilization	Estimated		
	Existing Approach				
Proposed Approach	Measured power supply power across multiple TPU/GPUs	Actual TPU/GPU utilization in production fleet	Including host CPU & DRAM power	Including provisioned machines for latency/uptime	Including actual campus PUE (~1.1)
	Comprehensive Approach				



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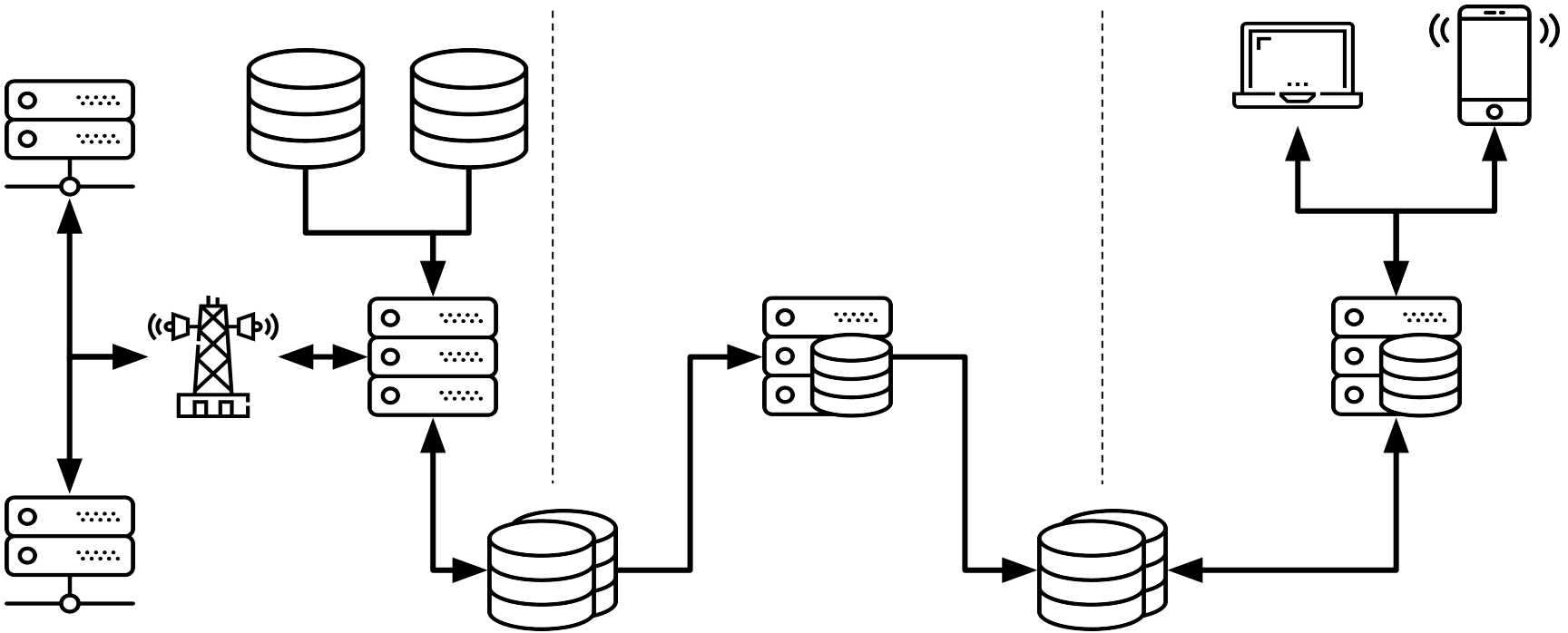
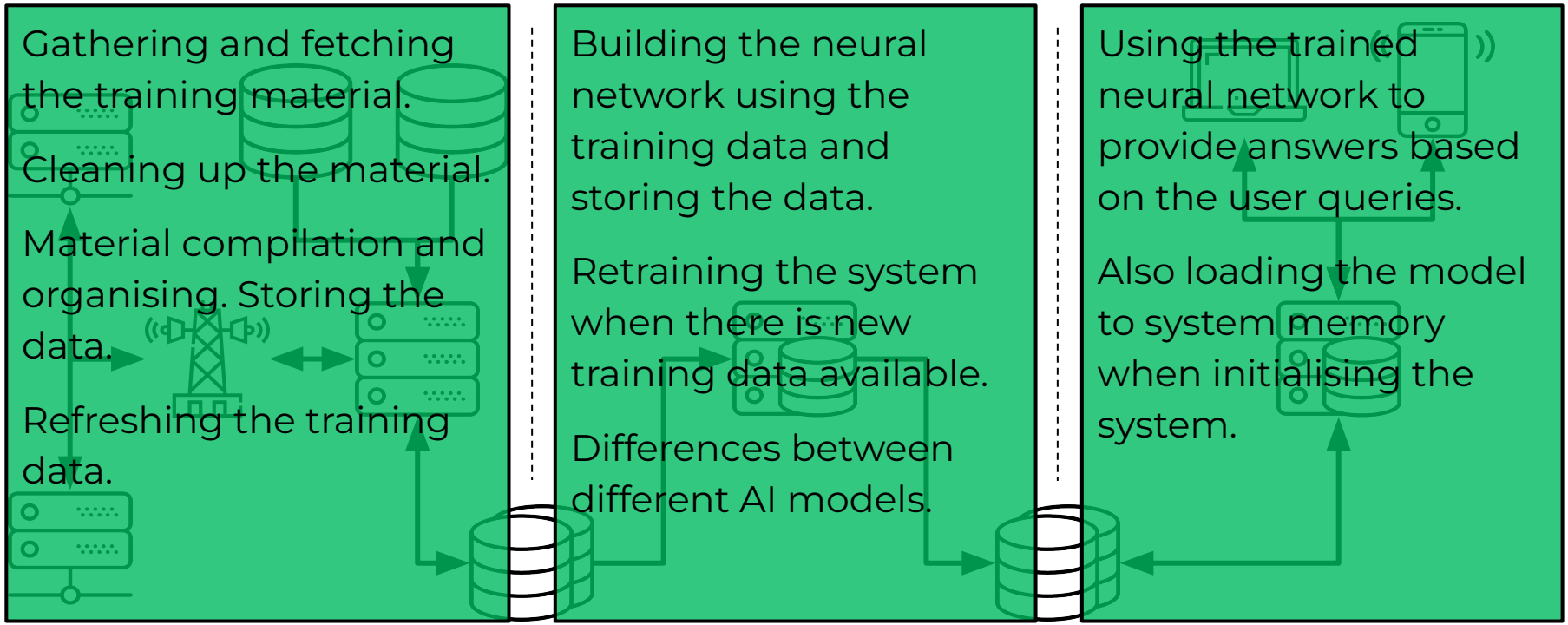
Energy Consumption of AI Systems



Energy Consumption of AI Systems



Energy Consumption of AI

The ratio between different parts depends on the use case.
For example, single ChatGPT query is estimated to consume 0.34 Wh. Daily queries are estimated to be around 1B[2], thus energy consumption is 340 MWh per day.

Training a large language model is estimated to use around 310 GWh.[3]

These are not insignificant numbers, especially when multiplied with the number of AI platforms and/or users.

[1] https://blog.samaltman.com/the-gentle-singularity

[2] https://www.demandsage.com/chatgpt-statistics/

[3] https://epoch.ai/data-insights/grok-4-training-resources

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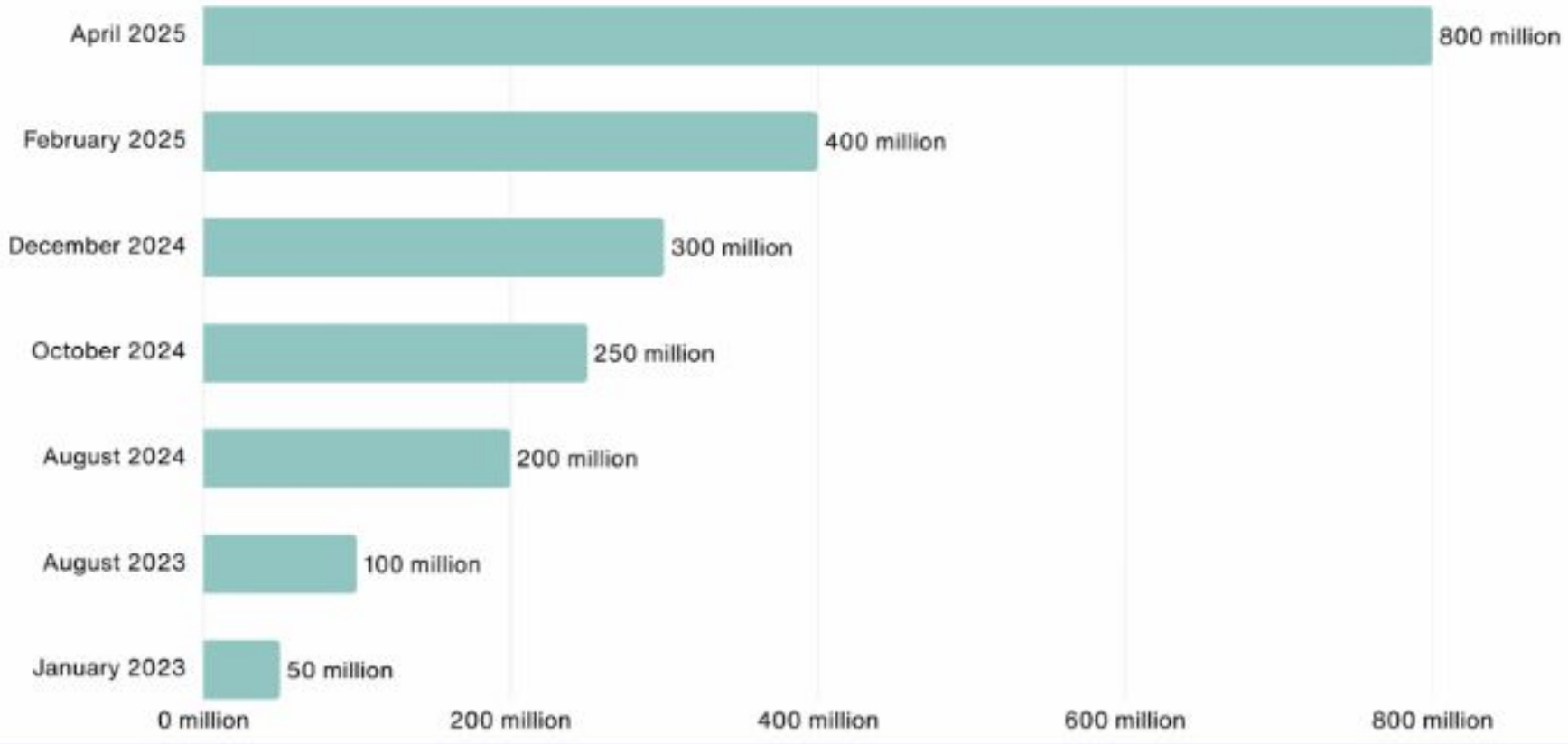

ChatGPT's Weekly Active Users

demandsage

Other formats

Do note that text generation is way lighter than generating images or video.

Single image generation is estimated to consume 10–290 Wh[1)].

There is no good data about energy consumption of video generation.

There are also ten-fold differences between generic and specific AI models.

[1)] mcengkuru.medium.com/the-hidden-cost-of-ai-images-how-generating-one-could-power-your-fridge-for-hours-174c95c43db8

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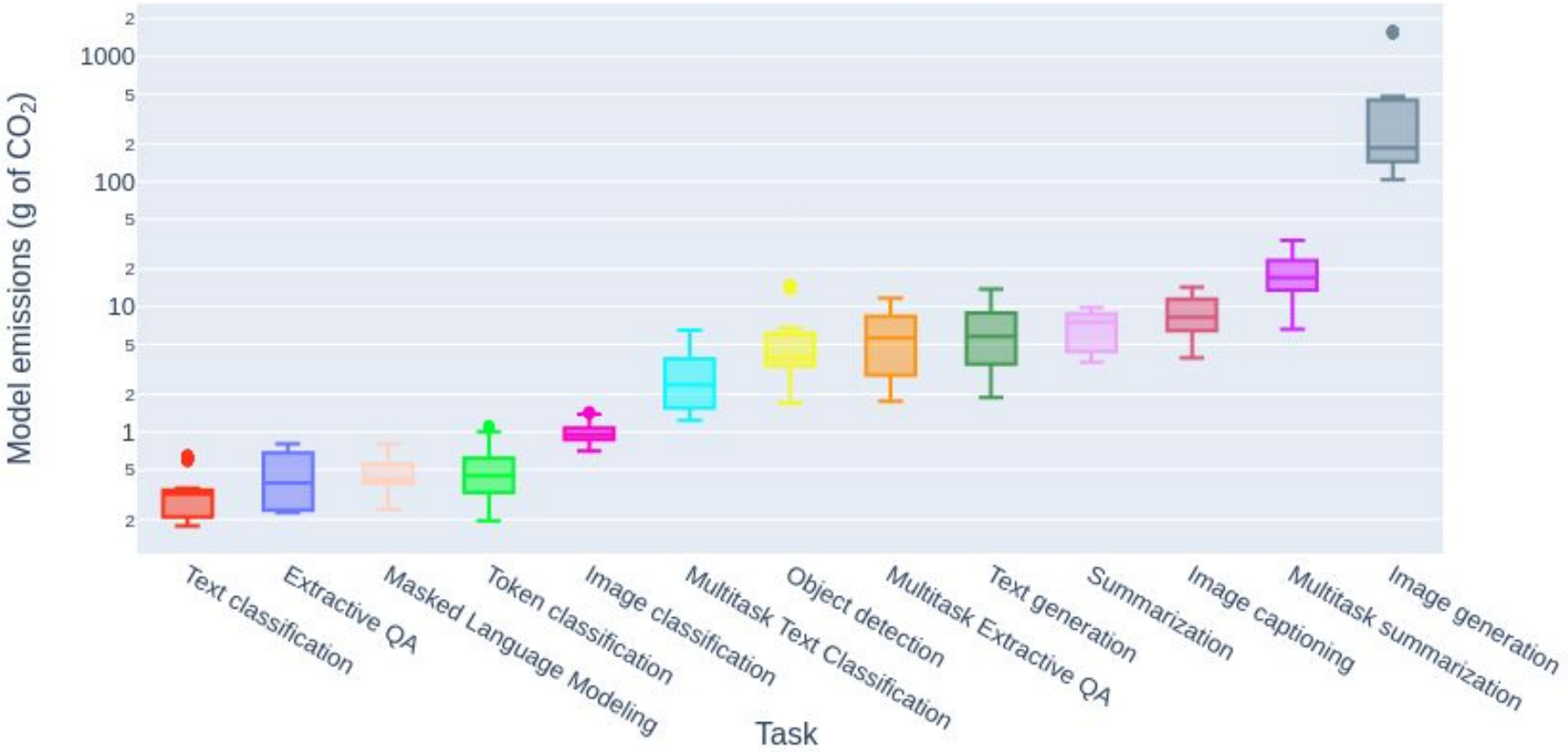

[1] Sasha Luccioni, Yacine Jernite, Emma Strubell: Power Hungry Processing: Watts Driving the Cost of AI Deployment?, http://dx.doi.org/10.1145/3630106.3658542

Future Development

AI energy consumption per prompt or inference is decreasing.

Google reports[1)] 44x reduction in total emissions per Gemini text prompts from May 2024 to May 2025:

- 33x reduction in energy consumption
- 1.4x reduction through electricity carbon intensity

The reasons behind the changes are smarter architectures, more efficient algorithms, optimised inference, custom hardware, optimised idling, data center efficiency and clean energy procurement.

https://arxiv.org/pdf/2508.15734

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On the Other Hand

"You're talking about AI electricity consumption potentially being half a percent of global electricity consumption by 2027," de Vries tells *The Verge*. "I think that's a pretty significant number."

A recent report by the International Energy Agency offered similar estimates, suggesting that electricity usage by data centers will increase significantly in the near future thanks to the demands of AI and cryptocurrency. The agency says current data center energy usage stands at around 460 terawatt hours in 2022 and could increase to between 620 and 1,050 TWh in 2026 — equivalent to the energy demands of Sweden or Germany, respectively.

theverge.com/24066646/ai-electricity-energy-watts-generative-consumption

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Our contribution to a global environmental standard for AI

Company

Jul 22, 2025 | Mistral AI

At Mistral AI, our mission is to bring artificial intelligence in everyone's hands. For this purpose, we have consistently advocated for openness in AI, with a unique focus on empowering organizations that want to own their AI future.

Today, as AI becomes increasingly integrated into every layer of our economy, it is crucial for developers, policymakers, enterprises, governments and citizens to better understand the environmental footprint of this transformative technology. At Mistral AI, we believe that we share a collective responsibility with each actor of the value chain to address and mitigate the environmental impacts of our innovations.

Even though some recent initiatives have been taken, such as the Coalition for Sustainable AI, launched during the Paris AI Action Summit in February 2025, the work to achieve here remains important. Without more transparency, it will be impossible for public institutions, enterprises and even users to compare models, take informed purchasing decisions, fill enterprises' extra-financial obligations or reduce the impacts associated with their use of AI.

In this context, we have conducted a first-of-its-kind comprehensive study to quantify the environmental impacts of our LLMs. This report aims to provide a clear analysis of the environmental footprint of AI, contributing to set a new standard for our industry

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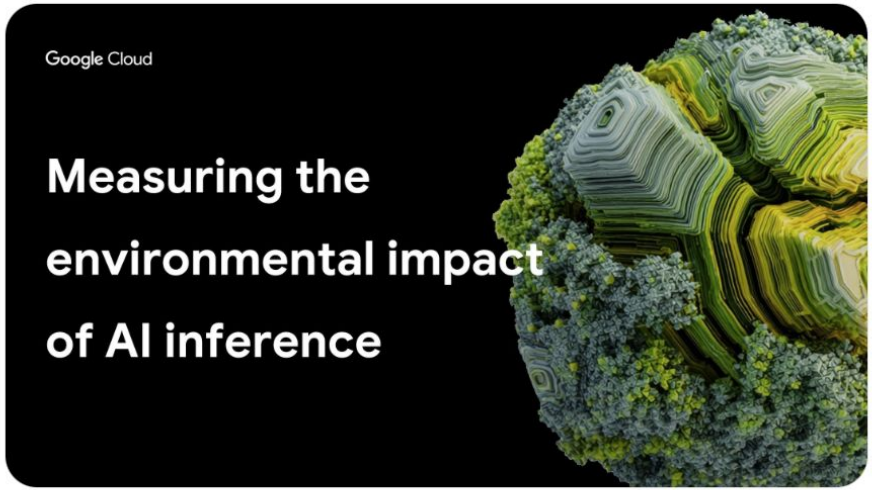
How much energy does Google's AI use? We did the math

August 21, 2025



Amin Vahdat
VP/GM, AI & Infrastructure, Google Cloud

Jeff Dean
Chief Scientist, Google DeepMind and Google Research

AI is unlocking scientific breakthroughs, improving healthcare and education, and could add trillions to the global economy. Understanding AI's footprint is crucial, yet thorough data on the energy and environmental impact of AI inference — the use of a trained AI model to make predictions or generate text or images — has been limited. As more users use AI systems, the importance of

Display a menu

Recommendations

1. **Check** whether AI is truly necessary.
2. **Define** how AI usage is constrained – maximise value, minimise environmental impact.
3. **Find** the most suitable AI model for the task. Procure it from a carbon-efficient source.
4. **Define** how the model is trained. Figure out good ways to collect and prepare the training data. Take energy consumption into account.
5. **Define** the model configuration. Measure the energy consumption.
6. **Share** experiences of using AI and have discussion with other parties.

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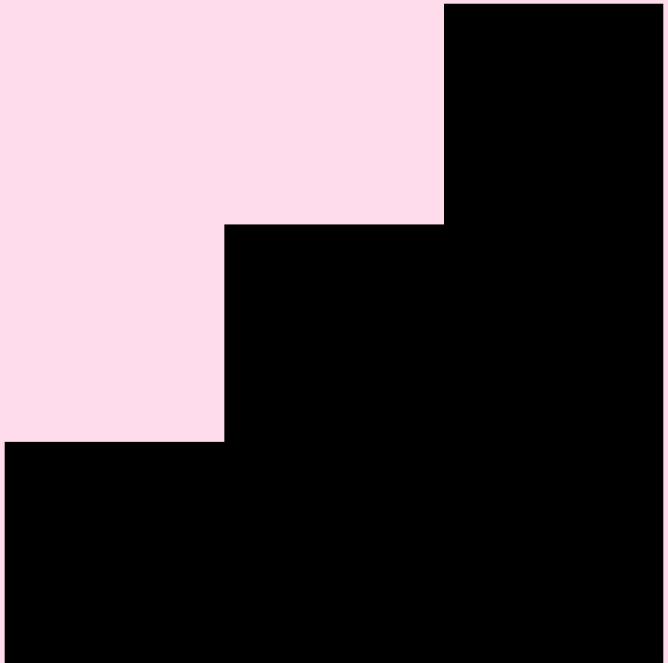

Final Words

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This is a journey.
Do not expect everything to be fixed immediately.


The most important thing in starting a journey is to take the first step.

exove.com/fi/vihrea-koodi

exove.com/green-code

Questions? Comments?

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