The Hidden Cost of Intelligence:

AI,

Data Centers,

And The Climate

February 2026

Nathaniel Burola

Agenda

- Introduction
- Setting The Stage
  - What is artificial intelligence (AI)?
  - What is a data center?
  - Climate attitudes towards AI
- The Environmental Reality
  - Environmental impacts of AI and data centers
- The Path Forward
  - The role of AI in the climate transition
  - What is missing?

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Introduction

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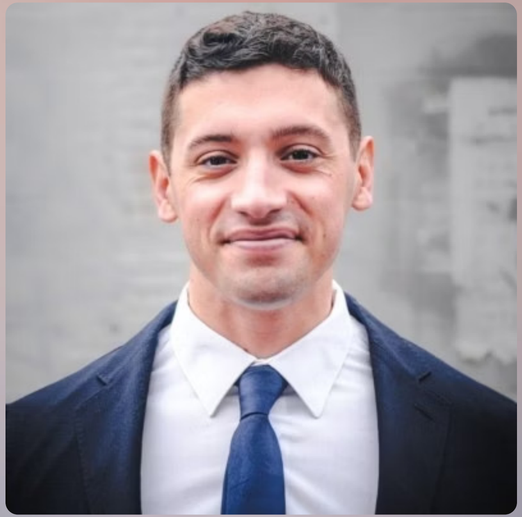
New York Times Bestseller
Empire of AI
Dreams and Nightmares in Sam Altman's OpenAI
Karen Hao
FOREWORD BY BRAD SMITH
VICE CHAIR AND PRESIDENT OF MICROSOFT
AI FOR GOOD
APPLICATIONS IN SUSTAINABILITY, HUMANITARIAN ACTION, AND HEALTH
JUAN M. LAVISTA FERRES, PHD, MS
WILLIAM B. WEEKS, MD, PHD, MBA



Nathaniel Burola - Background

AI & Environment Research Consultant

- Founder, **AI & Environment Resource Hub**
  - Catalogued 2,000+ resources across AI and environmental domains in an open-access database
- Fellow, The Digital Economist
  - Member group with the Sustainability in Tech workgroup
  - Member group with the Regenerative Digital Infrastructure workgroup
- Fellow, E2 1 Hotels Fellowship
- Speaker and educator
  - Speaker on AI and environment issues for Davos, The Carbonauts, The Digital Economist, Climatebase, and Greenplaces
  - Course on **environmental impacts of data centers** on Udemy
- Master's of Environmental Science and Management (MESM) graduate, University of California Santa Barbara (UCSB)
- Master of Technology Policy (MTP) future graduate, RAND School of Public Policy

What is artificial intelligence (AI)?
What is a data center?

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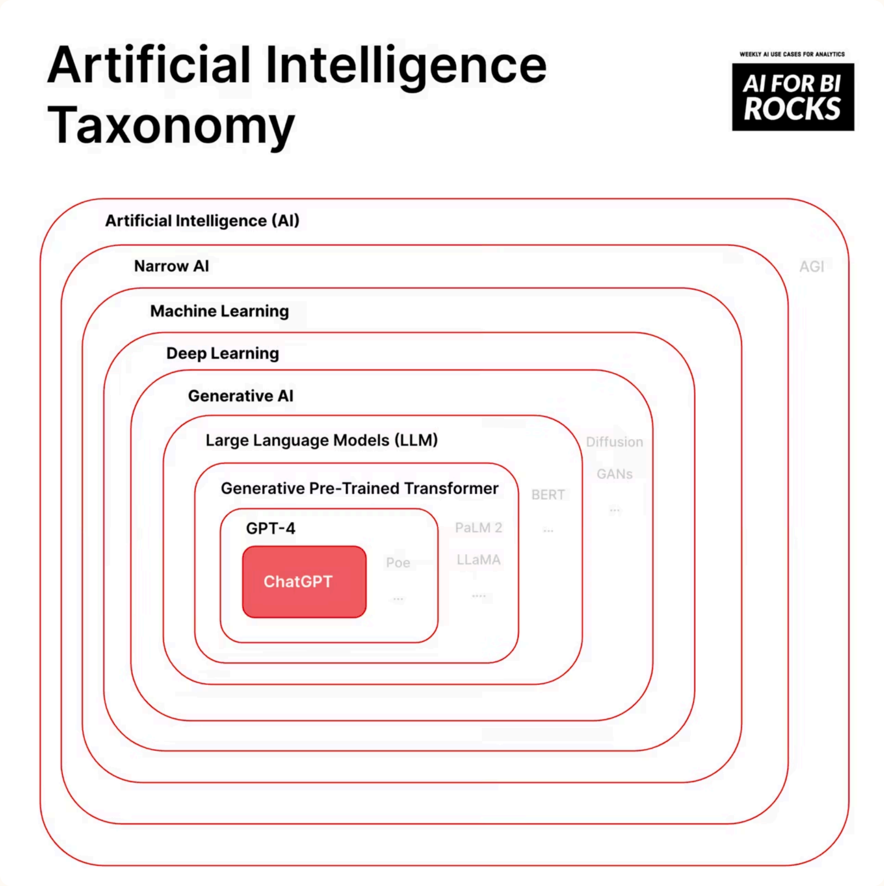
AI is an umbrella term and comes in many different forms

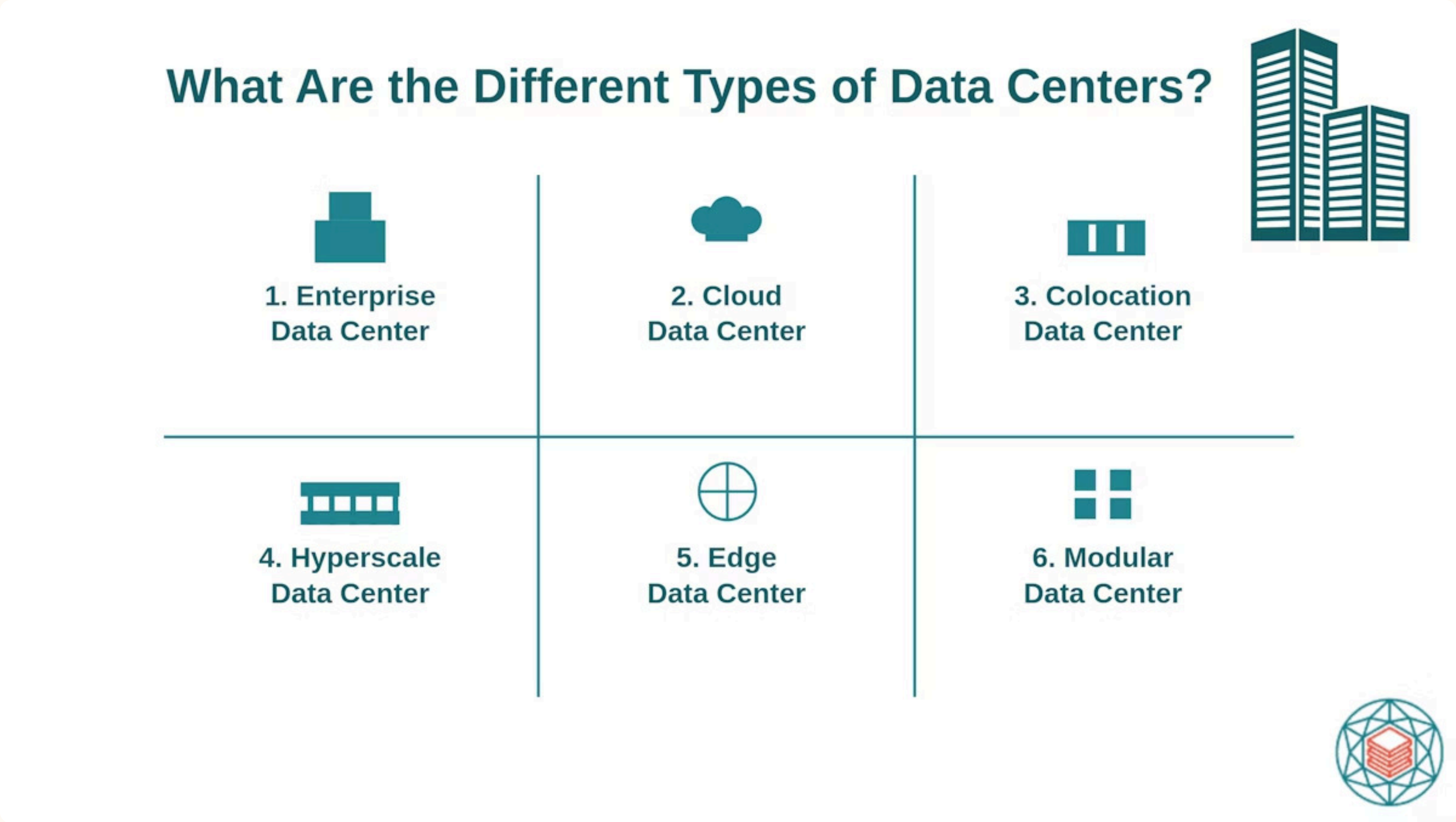
Systems (machines) that behave as if they were intelligent?



Source: **Artificial Intelligence Taxonomy by Tobias Zwingmann**. Originally published with **AI For BI Rocks**

Data center: Physical facility that houses computing infrastructure

The most prevalent type right now: hyperscale data center



Source: [Data Centers: Definitions and Types, Bitcatcha, 2025]

What are the different types of climate attitudes with AI?

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Which type of AI climate person are you?

Note: These are three generalized categories, you can be any or none

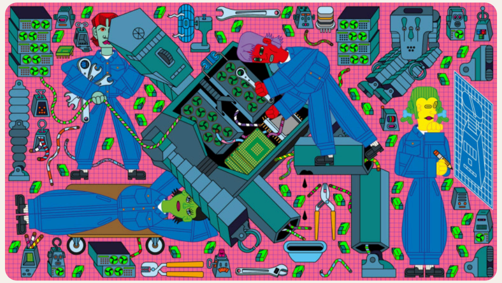
AI Climate Doomer

Source: [The Washington Post, 2023]

AI Climate Skeptic

Source: [Can AI Help Solve the Climate Crisis?, Sims Witherspoon,TED, 2023]

AI Climate Optimist



Source: [MIT Technology Review, 2025]

Are there any environmental impacts?

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Do AI or data centers have an environmental impact?

Spoiler alert: yes, they do

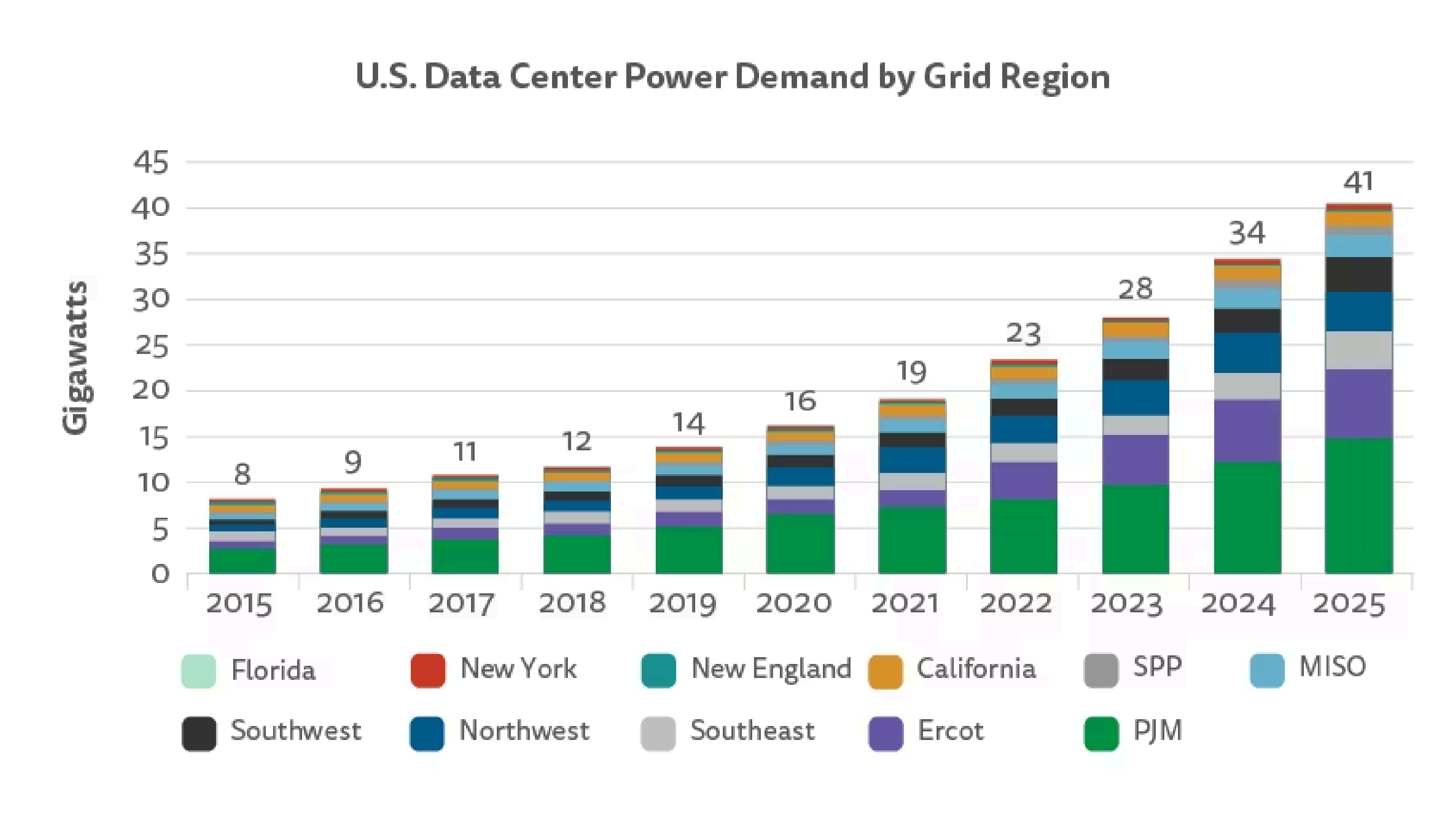
Mistral AI's Large 2 Model
Lifecycle Analysis

		Step	GHG Emissions	Water Consumption	Materials Consumption
	1	**Model conception** Download and storage of training data, developers' laptops embodied impacts and power consumption	<1%	<1%	<1%
INFRASTRUCTURE	2	**Datacenter construction** Building and support equipment manufacturing	<1%	<1%	1.5%
INFRASTRUCTURE	3	**Hardware embodied impacts** Server manufacturing transportation and end-of-life	11%	5%	61%
COMPUTING	4	**Model training & inference** Power and water use of servers and support equipment	85.5%	91%	29%
COMPUTING	5	**Network traffic of tokens** Transfer of requests to inference clusters and responses back to users	<1%	<1%	<1%
USAGE	6	**End-user equipment** Embodied impacts and power consumption	3%	2%	7%
USAGE	7	**Downstream 'enabled' impacts** Indirect impacts that result from the product's use	N/A	N/A	N/A

Source: [Our Contribution to a Global Standard for AI, Mistral AI, July 2025]

Data centers are reshaping U.S. electricity demand

Data center electricity demand has 5x in the past 10 years (quintupled)



Source: Sustainable Energy in America: 2026 Factbook by BloombergNEF and Business Council for Sustainable Energy

Energy consumption: Generative AI > Traditional AI

Across all scenarios, GenAI consumes 6-14x more energy in terawatt hours (twh)

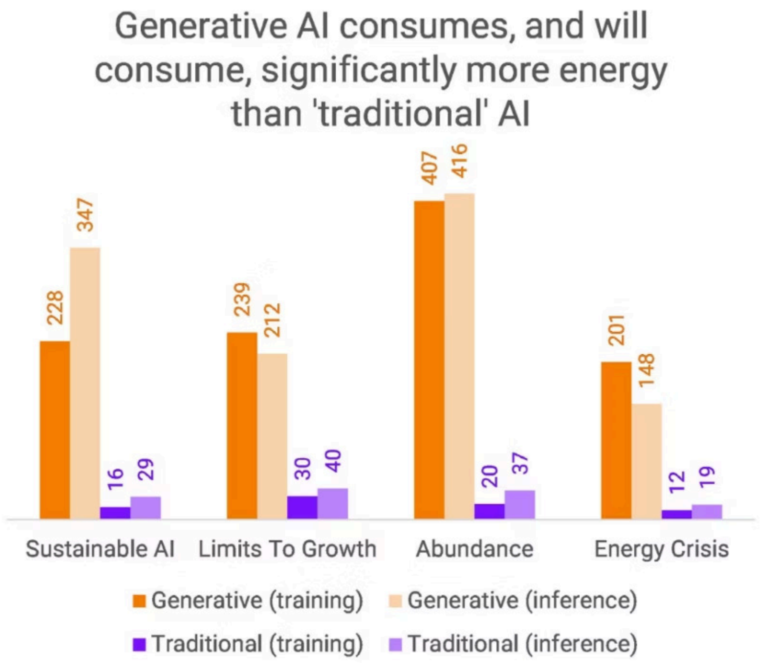


FIGURE 5 - ENERGY CONSUMPTION BY AI TYPE

This chart shows the estimated global energy consumption of AI by application type in 2030. Across the scenarios, generative AI consumes between six to fourteen times more than traditional AI. Values are expressed in terawatt hours.

Source: [The AI Climate Hoax, Ketan Joshi, February 2026]

Water consumption: Scope 1 + Scope 2…

But don't forget Scope 3 (supply chain water for server manufacturing)

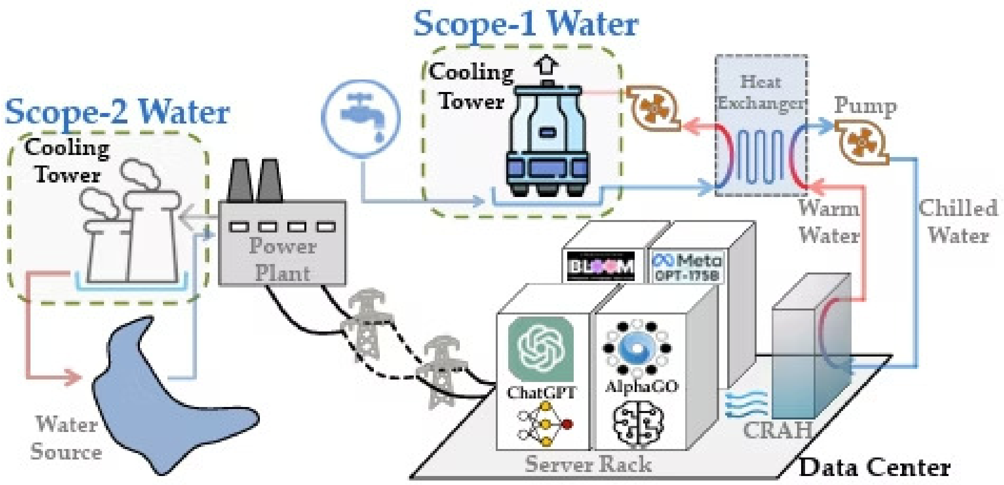


Figure 1: *An example of data center's operational water usage: on-site scope-1 water usage for data center cooling (via cooling towers in the example), and off-site scope-2 water usage for electricity generation. The icons for AI models are only for illustration purposes.*

Source: **Making AI Less "Thirsty": Uncovering and Addressing the Secret Water Footprint of AI Models, Li et al., 2025**

Carbon emissions: 24-44 million metric tons of CO2 between 2024-2030

Enabled emissions are also a thing (AI being used for oil/gas operations)

Abstract

The rapidly increasing demand for generative artificial intelligence (AI) models requires extensive server installation with sustainability implications in terms of the compound energy–water–climate impacts. Here we show that the deployment of AI servers across the United States could generate an annual water footprint ranging from 731 to 1,125 million m^3 and additional annual carbon emissions from 24 to 44 Mt CO_2-equivalent between 2024 and 2030, depending on the scale of expansion. Other factors, such as industry efficiency initiatives, grid decarbonization rates and the spatial distribution of server locations within the United States, drive deep uncertainties in the estimated water and carbon footprints. We show that the AI server industry is unlikely to meet its net-zero aspirations by 2030 without substantial reliance on highly uncertain carbon offset and water restoration mechanisms. Although best practices may reduce emissions and water footprints by up to 73% and 86%, respectively, their effectiveness is constrained by current energy infrastructure limitations. These findings underscore the urgency of accelerating the energy transition and point to the need for AI companies to harness the clean energy potential of Midwestern states. Coordinating efforts of private actors and regulatory interventions would ensure the competitive and sustainable development of the AI sector.

Source: **Environmental Impact and Net-Zero Pathways for Sustainable Artificial Intelligence Servers in the USA, Xiao et al., 2025.** Q

A majority oppose building AI data centers near their home

At least 2,714 out of 5,428 (50%+) respondents say they do not support...

Which of the following comes closest to your view regarding AI data centers being built close to where people live?

Response	Overall	Liberal	Moderate	Conservative
I support the construction of AI data centers close to where people live, including near my own community.	16%	14%	15%	20%
I support the construction of AI data centers close to where people live, but not near my own community.	8%	7%	7%	8%
I do not support the construction of AI data centers close to where people live.	52%	58%	50%	50%
Not sure	24%	20%	28%	23%

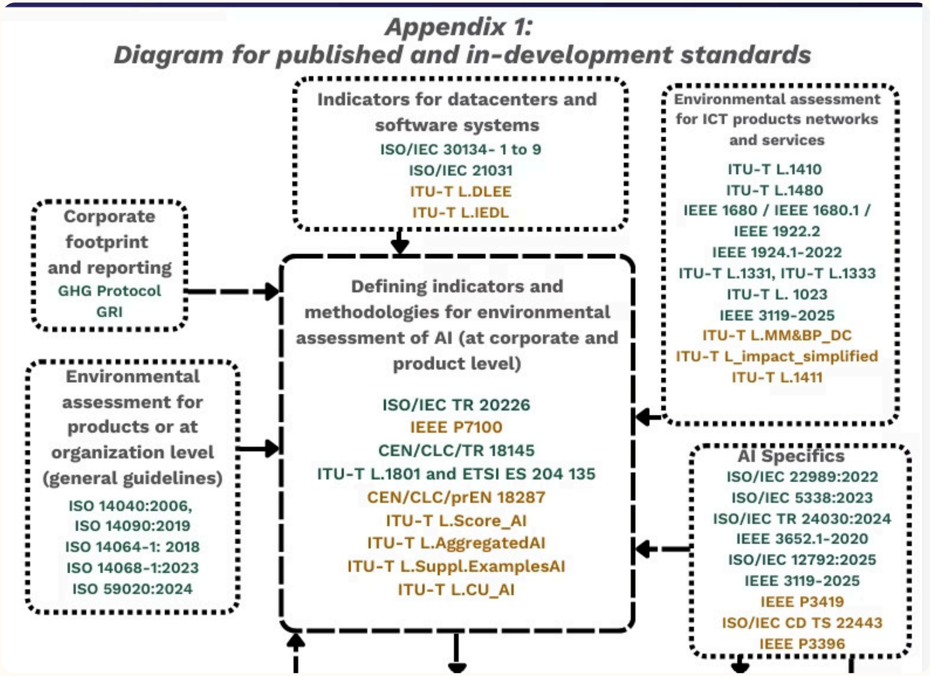
Regardless of your own personal opinion, how much do you think your community and your neighbors would support building data centers near where you live?

Response	Overall	Liberal	Moderate	Conservative
Support	27%	25%	26%	30%
Oppose	50%	55%	49%	48%
Net support	-23%	-31%	-24%	-18%

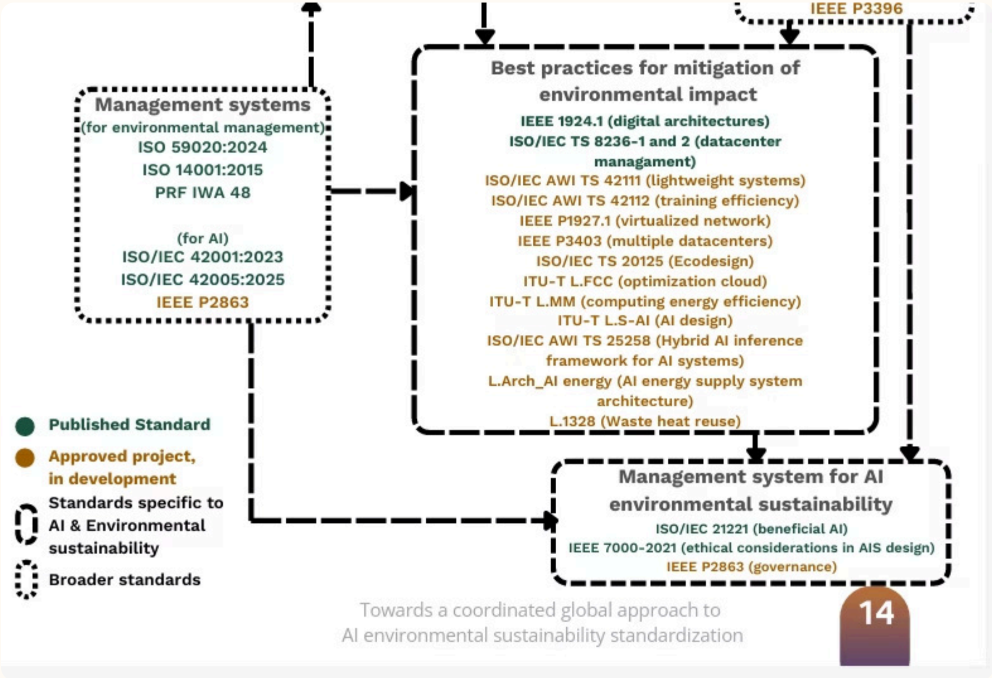
Source: Research on AI Data Centers, Costs, & Pollution, Climate Power, February 2026

How do we track the environmental impacts of AI at scale?

Here's a hint: standards are going to be important



Source: **Standardization for AI Environmental Sustainability, February 2026**



Source: **Standardization for AI Environmental Sustainability, February 2026**

What is the role of AI in the climate transition?

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ML and AI can solve *some* climate change challenges

We have monitoring, forecasting, and optiziming across different sectors

Figure 1.4b **Monitoring, Forecasting, and Optimizing across Sectors**

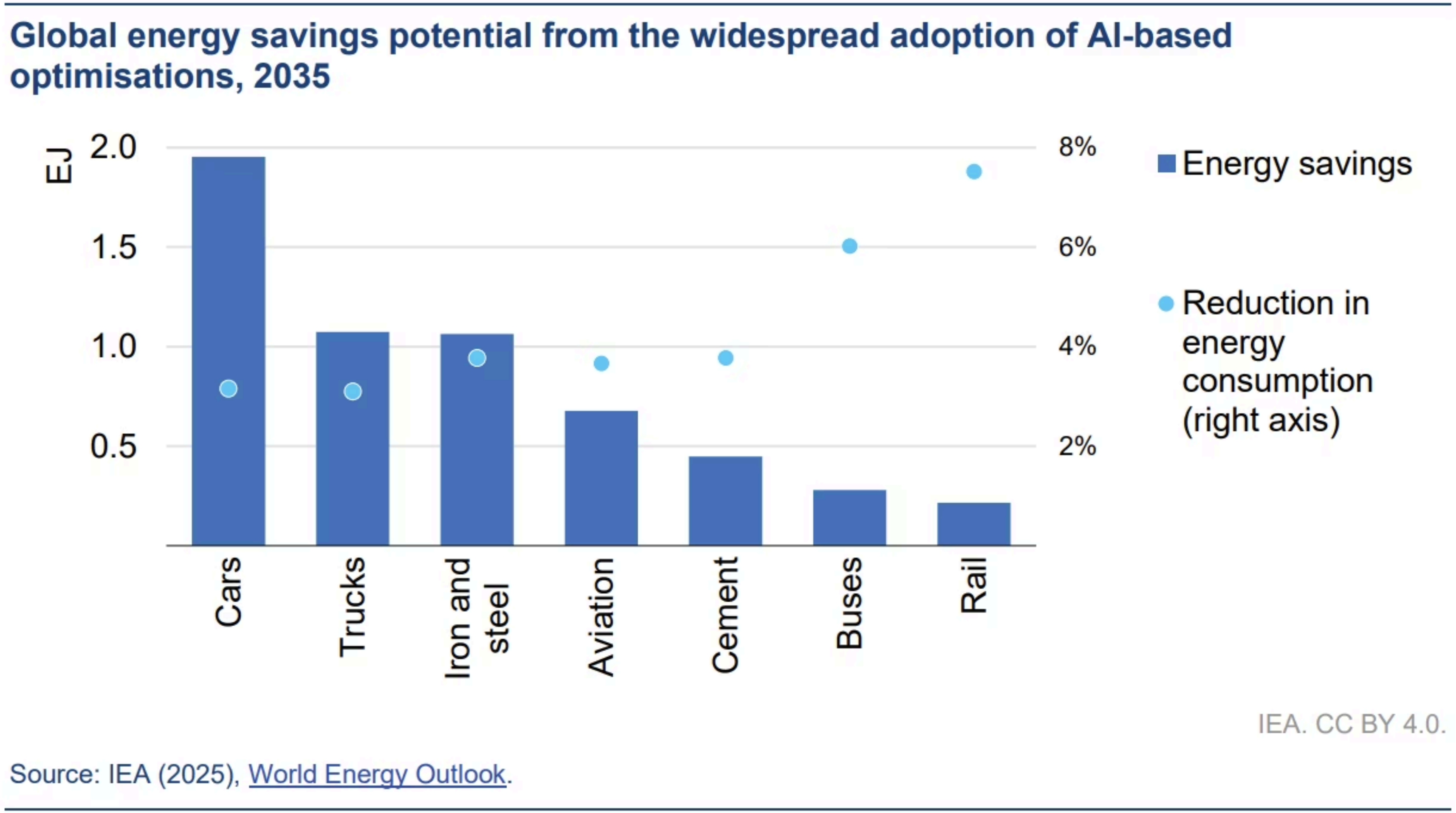
Source: WeCarbon Analysis

	Monitoring	Forecasting	Optimizing
Energy	• Real-time grid asset health monitoring • Smart meter anomaly detection	• Renewable generation prediction • Grid load and peak demand forecasting	• Dynamic grid balancing and frequency regulation • Battery energy storage system charge/discharge scheduling
Transport	• Real-time vehicle emissions tracking • Traffic flow and congestion pattern recognition	• Public transit ridership volume forecasting • EV charging station demand prediction	• Autonomous driving maximize energy efficiency • Eco-routing for logistics
Industry	• Detecting defect of production lines • Monitoring energy consumption	• Demand forecasting to prevent overproduction • Predicting supply chain disruptions	• Generative design for material efficiency • Real-time tuning of furnaces/ HVAC

Source: **ClimateTech In Focus 2025 Artificial Intelligence for Sustainability, 2025**

What are some short-term wins?

Energy: Saving > 13 exajoules (EJ) of energy globally in different sectors by 2035



Source: India AI Impact Summit, Real-World Impact of AI in Energy Casebook, February 2026

What are some short-term wins?

Agriculture: 12 million farmers saved through state-scale agri-digital infrastructure

Case Study 11

Advisory - Digital Public Infrastructure

fieldWISE: Transforming Indian Agriculture Through Digital Public Infrastructure

Author: Nikhilesh Kumar

Organisation: fieldWISE

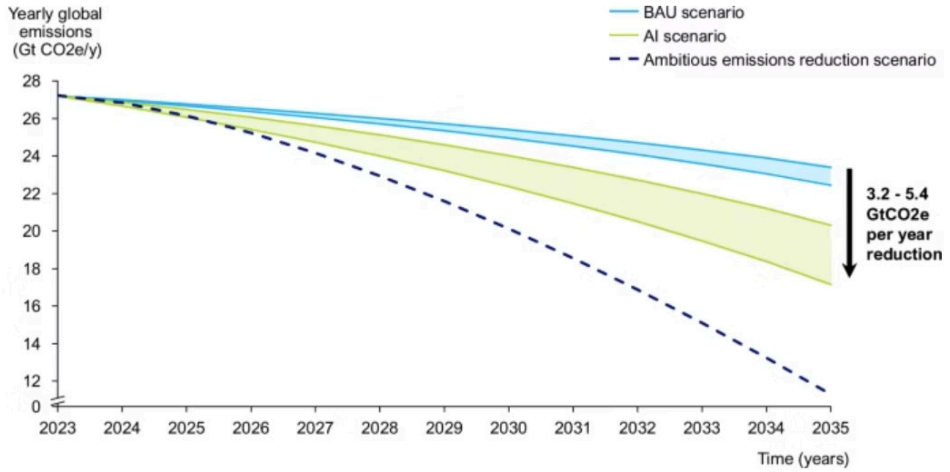
Location: Telangana, India

Source: **India AI Impact Summit, Real-World Impact of AI in Agriculture Casebook, February 2026**

What are some long-term wins?

We could reduce emissions by 3.2–5.4 $GtCO_2e$ by 2035 in 3 sectors with AI

Fig. 2: Projected annual global emissions in AI scenario vs. BAU and ambitious emissions reduction scenario by 2035 for the sectors in scope (Power, Meat and Dairy, Light Road Vehicles).



Note, the ambitious emissions reduction scenario is calculated using the IEA's net zero emissions scenario[42] for Power and Light Road Vehicles and UNEP's 2050 Paris-aligned target[3] for Meat and Dairy.

Note: Stern et al., acknowledge that they do not account for rebound effects, inter-sectoral spillovers, or dynamic macroeconomic impacts in their paper. They also assume grid emissions intensities remain constant through 2035, which is a significant simplification.

Source: **Green and Intelligent: The Role of AI in the Climate Transition, Stern et al., 2025**

So, what's missing?

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Most of the world is flying blind on AI's environmental impact

We need model-level transparency, standards, and policy guardrails

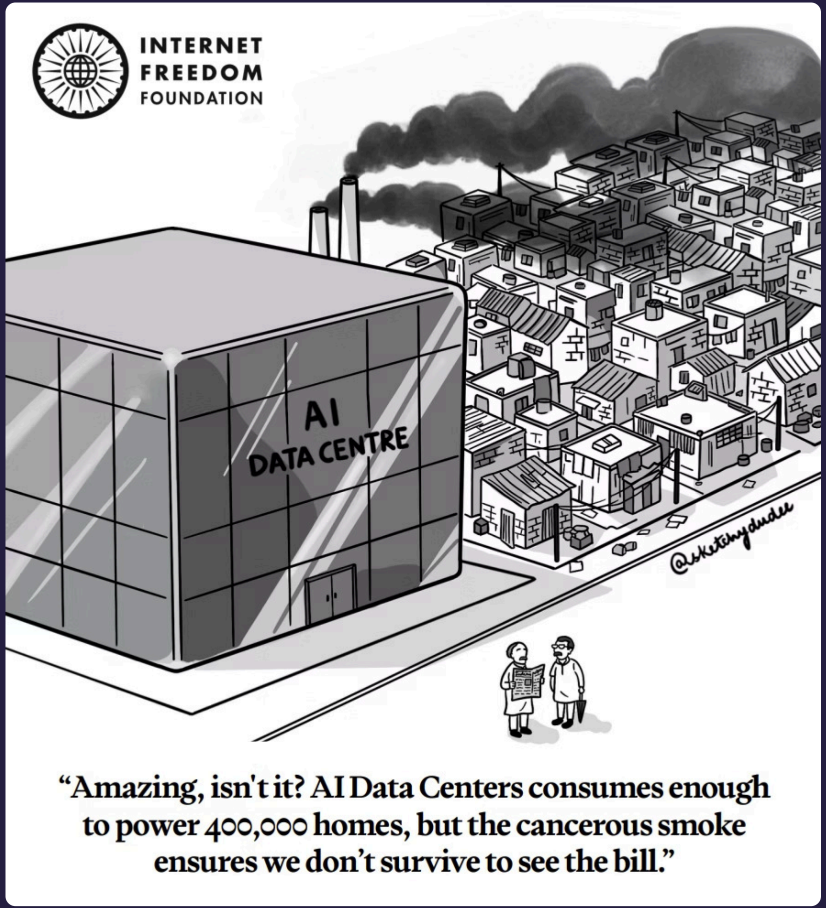
A Appendix: Additional Comparative Analysis

Table 1. Regulatory transparency and climate policy comparison

	EU	USA	CHN	GBR	JPN	CAN	IND	BRA	UAE	SGP
GHG emissions reporting for specific industries (varying scope and threshold)	**yes**	not en-forced	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**
ICT-sector-specific mandatory transparency	**yes**	**no**	**no**	**no**	**yes**	**no**	**no**	**no,** but pro-posed	**no**	**no**
Model-level transparency	**yes**	**no**	**no**	**no**	**no**	**no**	**no**	**no**	**no**	**no**
Share of renewable electricity generation in 2024 [56]	48%	23%	34%	52%	23%	65%	22%	87%	11%	5%
Carbon zero commitments [15]	2050	no target	2060	2050	2050	2050	2070	2050	2050	2050

Source: The Global Landscape of Environmental AI Regulation: From the Cost of Reasoning to a Right to Green AI, Ebert et al., 2026

One last point: it's not too late to get it right



Source: Internet Freedom Foundation, February 2026

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Appendix A: Cited Sources & Further Reading

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Artificial Intelligence Taxonomy by Tobias Zwingmann. Originally published with AI For BI Rocks

Data Centers: Definitions and Types, Bitcatcha, 2025

Can AI Help Solve the Climate Crisis?, Sims Witherspoon,TED, 2023

Our Contribution to a Global Standard for AI, Mistral AI, July 2025

Sustainable Energy in America: 2026 Factbook by BloombergNEF and Business Council for Sustainable Energy

The AI Climate Hoax, Ketan Joshi, February 2026

Making AI Less "Thirsty": Uncovering and Addressing the Secret Water Footprint of AI Models, Li et al., 2025

Quantifying Data Center Scope 3 GHG Emissions to Prioritize Reduction Efforts, Schneider Electric, May 2023

Standardization for AI Environmental Sustainability, February 2026

Research on AI Data Centers, Costs, & Pollution, Climate Power, February 2026

ClimateTech In Focus 2025 Artificial Intelligence for Sustainability, 2025

India AI Impact Summit, Real-World Impact of AI in Energy Casebook, February 2026

India AI Impact Summit, Real-World Impact of AI in Agriculture Casebook, February 2026

Green and Intelligent: The Role of AI in the Climate Transition, Stern et al., 2025

The Global Landscape of Environmental AI Regulation: From the Cost of Reasoning to a Right to Green AI, Ebert et al., 2026

Internet Freedom Foundation, February 2026

Environmental Impact and Net-Zero Pathways for Sustainable Artificial Intelligence Servers in the USA, Xiao et al., 2025.

Appendix B: Key Terms & Definitions

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Artificial Intelligence (AI): High-level umbrella term that generally refers to systems (machines) that behave as if they were intelligent. "Intelligence" in this sense generally refers to the ability to perform more or less cognitively complex tasks such as learning, problem solving, and decision making

Narrow AI: Task-specific systems, that are designed for particular jobs like language translation or image recognition. Narrow AI is designed to perform narrowly defined tasks efficiently

Machine Learning: A technology that lets systems iteratively learn from large amounts of data, identify patterns, and make decisions with minimal human intervention. TLDR, it is a statistical approach to automated pattern recognition in data

Source: **Artificial Intelligence Taxonomy by Tobias Zwingmann**.

Deep Learning: A subset of machine learning, that uses a certain type of machine learning models called artificial neural networks (ANNs) that typically contain many layers (hence "deep")

Generative AI: A branch of deep learning that aims to create or modify original content. It doesn't inherently have a creative mind; it uses statistical patterns in data to generate similar content without "understanding" the content the way humans do. This field spans multiple domains and approaches, from text generation to music generation to image generation to video generation

Large Language Models (LLMs): Advanced AI systems designed to understand, generate, and process human-like text by analyzing vast datasets using deep learning, specifically transformer architectures that was introduced by Google in 2017

Source: Artificial Intelligence Taxonomy by Tobias Zwingmann.

Generative Pre-trained Transformers (GPT): A special type of LLM that use a transformer architecture to generate original content.Despite its impressive capabilities, it's crucial to note that even the most advanced GPT does not "understand" the content it generates in the way humans do

GPT-4: GPT-based large language model developed by OpenAI that has many potential applications in various domains, including natural language processing, chatbots, content creation, language translation, and more

ChatGPT: Web application by OpenAI that lets users interact with their latest GPT models

Source: **Artificial Intelligence Taxonomy by Tobias Zwingmann**.

Enterprise Data Center: A privately owned facility built and managed by a single organization to support its internal IT operations. It provides dedicated resources, full control over security, and compliance with specific business requirements

Cloud Data Center: A remote facility operated by cloud service providers. Well-known cloud service providers include AWS (Amazon Web Services), Google Cloud, and Microsoft Azure. It offers scalable computing resources on demand, which eliminates the need for businesses to maintain physical server infrastructure

Colocation Data Center: A shared facility where businesses rent space for their servers and IT equipment. The provider supplies power, cooling, and network connectivity, while customers retain control over their hardware. Colocation reduces costs and improves reliability without requiring a company to build its own data center

Source: Data Centers: Definitions and Types, Bitcatcha, 2025

Hyperscale Data Center: A massive facility designed for cloud computing, big data processing, and large-scale applications. Companies like Amazon, Google, and Meta operate hyperscale data centers to handle millions of users and high-performance workloads

Edge Data Center: A small facility located near end users to reduce latency. End-user devices, IoT sensors, and applications generate data that the edge centers filter, analyze, and optimize locally. These centers handle real-time tasks before transmitting only essential information to larger centralized data centers like enterprise or hyperscale facilities

Modular Data Center: A preassembled, self-contained facility that is able to be quickly deployed and scaled as needed. It consists of standardized, prefabricated modules (often housed in shipping container-like structures) that come with built-in power, cooling, and IT infrastructure

Source: **Data Centers: Definitions and Types, Bitcatcha, 2025**