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The Sustainable AI Guide

How to Use AI Smarter Without Ignoring Its Impact

✓ Understand the Impact ✓ Use AI Smarter ✓ Reduce Digital Waste ✓ Build Better Habits

A comprehensive educational guide for students, educators, and everyday AI users

AI is not automatically sustainable or unsustainable. Its impact depends on how it is built, powered, cooled, deployed, and used.

Important Disclaimer

This guide is for educational purposes only. AI sustainability data changes quickly. Energy, water, and carbon estimates vary by model, hardware, location, cooling system, electricity source, task type, output length, methodology, and year.

This guide should not be treated as engineering, financial, legal, academic-integrity, or environmental compliance advice. Readers should verify current numbers and policies from original sources before citing or making decisions based on this material.

Education2Success created this resource to help students and communities understand the hidden infrastructure behind AI and use technology more responsibly.

ED2S NOTE

Numbers cited in this guide reflect data available as of publication. Data center electricity use, AI energy benchmarks, and corporate sustainability disclosures change frequently. Always consult original sources.

Welcome from Education2Success

AI is changing how we learn, work, research, create, and communicate. But AI is not magic, and it is not weightless. Behind every prompt is a physical system: data centers, servers, chips, electricity, cooling systems, water systems, materials, and people.

This guide is not about guilt. It is about awareness and smarter choices. We believe that understanding the systems behind our tools empowers us to use them more wisely and to hold companies accountable for how those systems are built.

Whether you are a student, educator, parent, advocate, or everyday user, this guide gives you the knowledge and practical tools to engage with AI more intentionally.

> ***"Sustainable AI is not about avoiding technology. It is about using powerful tools with awareness, purpose, and responsibility."***
> — Education2Success

We hope this guide helps you ask better questions, make more intentional choices, and find ways to use AI as a tool for positive change.

Warmly,

The Education2Success Team

Ed2S.org

How to Use This Guide

This guide is organized into seven parts. You can read it from cover to cover, or navigate directly to the sections most relevant to you.

Guide Structure

1. Learn what AI actually is, plain-language explanations without hype.
2. Understand data centers, the physical backbone of all AI.
3. Explore energy, water, carbon, and hardware impacts, real numbers, real context.
4. Learn why per-prompt estimates vary, and why total scale matters.
5. Build responsible AI habits, checklists, prompting tools, and decision frameworks.
6. Use AI for sustainability projects, when AI can genuinely help.
7. Use the included templates and worksheets, practical tools you can use today.

BEST WAY TO USE THIS GUIDE

✓ Read pages 1-16 for the big picture and key concepts.

✓ Use the checklists, templates, and worksheets for action.

✓ Reference the source pages for classroom use or research reports.

✓ Revisit this guide as AI technology and sustainability data evolves.

✓ Share it with a friend, student, or colleague.

Quick Summary: What You Need to Know

Six key ideas to keep in mind as you read this guide:

#	Key Point	Why It Matters
1	AI runs on real infrastructure.	Data centers, servers, chips, cables, power systems, and cooling equipment are all physical realities.
2	Data centers use electricity, cooling systems, hardware, and sometimes water.	These are measurable, manageable, and improving, but they are not zero.
3	One text prompt may be small, but global scale matters.	Billions of prompts across many models and data centers add up to significant totals.
4	Image, video, and reasoning-heavy AI can use more compute than simple text.	Not all AI tasks are equal. The type and length of output matters.
5	AI can also help sustainability.	When used intentionally, AI can optimize buildings, grids, water systems, routes, and more.
6	The goal is smarter use, not panic.	Both individual and systemic habits matter. Awareness leads to better choices.

"AI is not automatically good or bad for sustainability. The impact depends on how it is built, powered, cooled, deployed, and used."

The Sustainable AI Checklist

Before you prompt, pause and work through this checklist.

PURPOSE & TASK

☐ I know what I need before prompting.

☐ I am using AI for a task where it adds real value.

☐ I considered whether search, notes, a calculator, or a template would work better.

TOOL & PROMPT

☐ I chose the simplest AI tool that gets the job done.

☐ I asked clearly to avoid repeated regenerations.

☐ I requested the right output length, not longer than I need.

☐ I avoided unnecessary image or video generation.

QUALITY & SAFETY

☐ I fact-checked important claims before sharing or acting on them.

☐ I avoided pasting private or sensitive information into AI tools.

☐ I followed school or workplace AI rules.

☐ I used AI to improve my thinking, not replace it.

ED2S ACTION STEP

"Before your next AI prompt, pause for 10 seconds and ask: What exactly do I need, and is AI the right tool to help me get it?"

PART 1

What AI Actually Is

Before we talk about sustainability, we need to understand what AI is doing.

AI in Plain English

Artificial intelligence is software designed to identify patterns, make predictions, classify information, generate content, or assist with decisions. AI systems can help write text, answer questions, generate images, analyze data, summarize information, recommend products, recognize speech, detect fraud, and support scientific research.

How AI Processes a Request

INPUT	You type a prompt, a question, instruction, or request, into an AI interface.
MODEL	The AI system processes your input using patterns learned from large amounts of training data.
OUTPUT	The model generates a response: text, code, an image, a summary, or another format.

Example:

Input: "Summarize this article about renewable energy."

Process: AI model analyzes the text and generates a shorter version.

Output: A concise summary highlighting the key points.

REALISTIC NOTE

AI does not "think" exactly like a human. It generates outputs based on statistical patterns learned from data and specific instructions. This means it can be confident-sounding even when wrong. Always verify important claims.

Generative AI vs. Traditional AI

Not all AI is the same. Understanding the differences helps you choose the right tool and understand why some AI uses more computation than others.

Type	What It Does	Examples	Typical Compute Demand
Traditional AI	Classifies, predicts, recommends, and detects patterns.	Spam filters, route prediction, credit fraud detection, recommendation engines	Generally lower
Generative AI	Creates new text, images, code, audio, video, or summaries.	Chatbots, image generators, code assistants, video generators	Moderate to higher depending on output type
Multimodal AI	Works across text, images, audio, video, and files simultaneously.	Upload an image and ask questions, summarize a PDF, generate text from audio	Often higher, depending on the modalities, model, and task.

KEY TAKEAWAY

Generative AI often requires more computation than simpler, task-specific tools, especially for long outputs, image generation, video creation, and reasoning-heavy tasks. Choosing the right type of AI for a task is part of sustainable AI use.

What Happens When You Send a Prompt?

What looks like a simple text exchange actually involves a chain of physical infrastructure working together in milliseconds.

Step	What Happens	Infrastructure Involved
1	You type a prompt into an app or browser.	Your device: phone, laptop, tablet
2	The request travels through internet networks.	Cables, routers, data transmission infrastructure
3	It reaches servers inside a data center.	Physical buildings: power systems, cooling, security
4	AI chips process the request at high speed.	GPUs, TPUs, or AI accelerators drawing electricity
5	The model generates your output token by token.	Computation, memory systems, networking
6	The response travels back to your device.	Return network transmission
7	Heat from computation must be removed.	Cooling systems: air, liquid, or evaporative cooling

DID YOU KNOW?

The "cloud" is not weightless. It is a global network of real buildings filled with servers, machines, cables, power systems, cooling equipment, and people. Every AI response depends on physical infrastructure to process, deliver, and cool the computing involved.

What Is a Data Center?

A data center is a specialized facility that houses the physical equipment needed to run cloud computing, websites, streaming services, banking, apps, social media, research systems, and AI. Data centers are the backbone of the digital world.

Core Data Center Components

Servers	Physical computers that process requests and run applications, including AI models.
Storage systems	Drives and arrays that store data, model weights, and user information.
Networking equipment	Switches, routers, and cables that move data within and between data centers.
Cooling systems	Air handlers, chillers, cooling towers, and liquid cooling to remove heat from equipment.
Power distribution	Transformers, UPS systems, and power distribution units delivering reliable electricity.
Backup generators	Diesel or gas generators providing power during grid outages.
Security systems	Physical access controls, surveillance, and cybersecurity infrastructure.
Monitoring systems	Software and sensors tracking temperature, power, humidity, and equipment status.

ANALOGY

"Cloud computing is someone else's computer, usually thousands of computers inside specialized buildings, managed by engineers, running 24 hours a day, 7 days a week."

AI Hardware: CPUs, GPUs, TPUs, and Accelerators

AI runs on specialized hardware. Understanding the basic types helps explain why AI workloads can be energy-intensive, and why hardware efficiency matters for sustainability.

CPU (Central Processing Unit)	General-purpose processor found in all computers. Good for sequential tasks. Less efficient for parallel AI computations.
GPU (Graphics Processing Unit)	Designed to run many calculations simultaneously. Originally for graphics, now essential for AI training and inference at scale.
TPU (Tensor Processing Unit)	Google's custom AI chip, designed specifically for machine-learning workloads. Other companies build similar AI accelerators.
AI Accelerators	Specialized chips from NVIDIA, AMD, Intel, and others built to maximize AI performance per watt of electricity.
Memory & Storage	High-bandwidth memory is critical for loading large AI models. Faster memory means faster, potentially more efficient inference.
Networking Equipment	High-speed interconnects move data between chips and servers at low latency for large distributed AI systems.

SCIENCE / ENGINEERING NOTE

AI sustainability is partly an engineering challenge: faster chips, more efficient software, better cooling technologies, cleaner electricity sources, and smarter data center design can all reduce impacts without sacrificing capability. Efficiency and sustainability often go together.

PART 2

The Environmental Footprint of AI

Electricity, water, carbon, hardware, and local impacts.

The 4-Part AI Footprint

AI's environmental impact is not just one number. It is a system with four interconnected dimensions. Understanding all four gives you the full picture.

Footprint Area	What It Includes	Why It Matters
⚡ ELECTRICITY	Power for computation, servers, networking, storage, lighting, and cooling systems	Largest operational impact; depends heavily on electricity source and efficiency
💧 WATER	Direct use for cooling/humidification; indirect use through electricity generation	Increasingly important as AI data centers expand, especially in water-stressed regions
🌍 CARBON EMISSIONS	CO_2 from electricity generation; embodied carbon in hardware manufacturing	Depends on grid mix, energy contracts, and full life-cycle accounting
🖥 HARDWARE / MATERIALS	Chips, servers, cables, concrete, steel, copper, rare materials, and e-waste at end of life	Often overlooked; production and disposal of hardware carries significant footprint

"AI's impact is not just one number. It is a system. Sustainable AI requires thinking about electricity, water, carbon, hardware, and local community impacts together."

Electricity: The Big Picture

Data centers, which power AI and all digital services, are a significant and growing part of global electricity use. Here is what the numbers look like:

Year / Projection	Global Data Center Electricity	Context
2024 (reported)	About 415 TWh	Approximately 1.5% of global electricity use (IEA)
2030 (projected)	About 945 TWh	IEA projects data center use could more than double
Comparison	945 TWh	Roughly comparable to the electricity use of a large industrialized country

The IEA projects that AI is one of the major drivers of this growth, alongside broader demand for cloud computing, digital services, and other high-performance computing workloads.

REALISTIC NOTE

These are projected ranges, not certainties. Actual outcomes depend on efficiency improvements, the pace of AI adoption, the energy mix of the grid, and policy decisions. Always use careful wording: "projected," "could," "around," and "about" when citing these figures.

SOURCE NOTE

International Energy Agency, Energy and AI report. Available at: https://www.iea.org/reports/energy-and-ai

U.S. Data Center Electricity Growth

The United States is home to a significant share of global data center capacity. U.S. data center electricity use has grown substantially and is projected to continue growing.

Year	U.S. Data Center Electricity Use	Share of U.S. Electricity
2014	About 58 TWh	Smaller portion of total U.S. electricity
2023	About 176 TWh	About 4.4% of total U.S. electricity
2028 (projected low)	About 325 TWh	About 6.7% of total U.S. electricity
2028 (projected high)	About 580 TWh	Up to about 12% of total U.S. electricity

These numbers represent all U.S. data center activity, not just AI. However, AI is a significant accelerant of high-performance computing demand, which drives data center growth.

REALISTIC NOTE

AI is not the only reason data centers are growing. Cloud computing, video streaming, business applications, and other digital services all contribute. But AI workloads, especially large-scale model training and inference, are accelerating demand for the highest-performance, most energy-intensive server configurations.

SOURCE NOTE

U.S. Department of Energy, December 2024

https://www.energy.gov/articles/doe-releases-new-report-evaluating-increase-electricity-demand-data-centers

Lawrence Berkeley National Laboratory, January 2025.

https://newscenter.lbl.gov/2025/01/15/berkeley-lab-report-evaluates-increase-in-electricity-demand-from-data-centers/

Why Local Impact Matters

Global percentages can look small, but data centers are often geographically concentrated. A large data center campus can place significant pressure on local electricity grids, water systems, land, and communities.

Local Impact Area	What Can Happen
Grid capacity	Large data centers can require new substations, transmission lines, and grid upgrades.
Electricity demand	Large data center campuses can require electricity loads comparable to major industrial facilities or large numbers of homes, depending on facility size.
Backup generation	Diesel generators used during outages can affect local air quality.
Water availability	Cooling towers or evaporative systems can compete with agriculture and drinking water.
Land use	Large campuses change land use, affect ecosystems, and alter local character.
Noise	Cooling equipment and backup generators create noise in previously quiet areas.
Tax incentives	Data centers often receive significant local tax breaks that affect community budgets.
Community trust	Rapid, large-scale development without community engagement can create conflict.
Local electricity prices	High electricity demand can affect utility rates for residents and businesses.

"Global percentages tell one story. Local infrastructure tells another."

What Is PUE? (Power Usage Effectiveness)

PUE is the most common metric for measuring data center energy efficiency. It tells you how much of a facility's total energy actually goes to the IT equipment, versus overhead like cooling, lighting, and power distribution.

PUE = Total Facility Energy ÷ IT Equipment Energy

Example: If a data center uses 120 units of total energy and 100 units go to IT equipment, PUE = 1.2

PUE of 1.0	Theoretical perfect efficiency, all energy goes to IT. Not achievable in practice.
PUE of 1.2	Very efficient, found in modern, well-optimized data centers.
PUE of 1.5	Average. Less optimized or older facility; historically common, but averages vary by year and region.
PUE of 2.0+	Less efficient, older facilities or those in hot climates without advanced cooling.

REALISTIC NOTE

PUE does not tell the whole sustainability story. A highly efficient data center (low PUE) powered entirely by coal still has high carbon emissions. PUE also does not directly capture water use, hardware impacts, or what the computing is actually used for.

SOURCE NOTE

Microsoft, Measuring Energy and Water Efficiency for Microsoft Datacenters: https://datacenters.microsoft.com/sustainability/efficiency/

What Is WUE? (Water Usage Effectiveness)

WUE measures how much water a data center uses for cooling and humidification per unit of IT electricity consumed.

WUE = Annual Water Used (liters) ÷ Annual IT Electricity (kWh)

Example: If a facility uses 0.3 liters of water per kWh of IT energy, WUE = 0.3 L/kWh

A lower WUE indicates less water used per unit of computing power, generally better for water conservation. However, the meaning of a WUE number depends heavily on context.

REALISTIC NOTE

A low WUE is good, but water impact also depends on WHERE the data center is located. One liter of water used in a water-stressed desert region can matter far more than one liter used in a water-abundant northern region. Location context is essential when interpreting water metrics.

WUE typically captures only direct water use on-site. It may not include the indirect water used by power plants to generate the electricity the data center consumes. Full water footprint analysis requires both direct and indirect water accounting.

Why Data Centers Need Cooling

Servers and AI chips convert electricity into computation, and into heat. If that heat is not removed quickly and efficiently, equipment can overheat, fail, or run less efficiently. AI workloads are especially heat-intensive because many AI accelerators operate closely together at high utilization.

Common Cooling Methods

Air cooling	Cold air circulates through server rooms using precision air conditioning units. Widely used but less efficient at very high densities.
Chilled water systems	Cold water pumped through the data center removes heat from air handlers. Can be more efficient than air-only cooling in some large or high-density facilities, depending on design and climate.
Evaporative cooling	Water evaporates to remove heat. Effective in dry climates but consumes water directly.
Liquid cooling / Direct-to-chip	Liquid coolant flows directly to hot chips. Very efficient for high-density AI hardware.
Free-air cooling	Ambient outside air used for cooling in cooler climates. Reduces energy and water use when conditions allow.
Closed-loop cooling	Sealed coolant loops that do not evaporate water. Lower water use than open evaporative systems.
Reclaimed or non-potable water	Some facilities use recycled water for cooling instead of drinking water.

SCIENCE / ENGINEERING NOTE

This is heat transfer engineering at industrial scale. Sustainable AI data centers depend on how efficiently heat can be moved away from electronics while minimizing energy and water use. New cooling technologies, like direct liquid cooling and immersion cooling, can improve cooling efficiency for dense AI hardware, though results depend on system design and operating conditions.

Water: Direct vs. Indirect Use

AI's water footprint has two components: water used directly at the data center, and water used indirectly through electricity generation. Both matter for a complete picture.

DIRECT WATER USE	INDIRECT WATER USE
Cooling towers that evaporate water to remove heat	Water used by power plants to generate the electricity data centers consume
Evaporative cooling systems	Energy supply chain water use (mining, fuel processing, etc.)
Humidification systems that add moisture to server rooms	Regional grid water footprint, depends on the electricity mix
On-site water-based cooling infrastructure	Water embedded in hardware manufacturing (chips, servers)

Some data centers may use little or no on-site water but still carry an indirect water footprint through the electricity they purchase. A data center powered by coal or natural gas plants that use water for cooling is drawing on water even without on-site evaporation.

REALISTIC NOTE

AI water estimates vary widely depending on cooling technology, climate zone, grid electricity mix, and whether the analysis includes only direct water or also indirect water. Published per-prompt estimates should be interpreted with this context in mind.

SOURCE NOTE

Li, Yang, Islam, and Ren. "Making AI Less Thirsty: Uncovering and Addressing the Secret Water Footprint of AI Models." https://arxiv.org/abs/2304.03271

Carbon Emissions: Why the Grid Matters

The carbon footprint of AI depends heavily on electricity. The same AI task can have a very different carbon footprint depending on where the data center is located and what energy sources power it.

Consider two hypothetical data centers with identical efficiency (same PUE, same servers, same AI model). One is in a region powered mostly by coal. The other is in a region powered mostly by hydro and wind. The carbon emissions for the same AI task can differ dramatically depending on grid carbon intensity, sometimes by large multiples. Simply due to the electricity source.

Key Carbon Concepts

Carbon intensity	Grams of CO_2 emitted per kilowatt-hour of electricity. Varies by region, grid mix, and time of day.
Time of day	Renewable energy output varies. Running AI at times of high renewable availability can lower emissions.
Location-based vs. market-based	Two different accounting methods for reporting emissions (see next page).
Clean energy procurement	Companies can purchase renewable energy certificates or sign power purchase agreements for clean energy.
24/7 carbon-free energy	A stricter standard: matching actual electricity use with clean energy in the same hour and location.
Backup generation	Diesel generators for outages can create short-term high-emissions events not captured in averages.

KEY MESSAGE

"Where and when computing happens can matter significantly for carbon emissions. Geography and grid mix are not just footnotes, they are central to understanding AI's real-world carbon impact."

Location-Based vs. Market-Based Emissions

When companies report their carbon emissions, they can choose different accounting methods. Understanding the difference is essential for evaluating AI sustainability claims.

Method	What It Measures	Strengths	Limitations
Location-Based	Emissions based on the actual electricity grid in the region where energy is consumed.	Shows physical grid reality; harder to manipulate.	Does not reflect clean energy contracts or procurement.
Market-Based	Emissions based on energy contracts, renewable energy certificates (RECs), or PPAs.	Shows procurement choices and clean energy investments.	May look cleaner than local grid reality; REC quality varies.
24/7 Carbon-Free Energy	Matches electricity use with clean energy by hour and grid location.	Stronger: reflects actual moment-by-moment grid reality.	Much harder and more expensive to achieve at scale.
Carbon Offsets / Removals	Pay for emissions reductions or removals elsewhere to compensate for emissions.	Can support climate projects; flexible.	Quality and permanence vary widely; does not reduce local grid impacts.

KEY TEACHING POINT

A company can make a technically accurate clean-energy claim while still having real local grid impacts, water impacts, hardware impacts, and community impacts. Evaluating AI sustainability claims requires asking which accounting method was used and what is not being counted.

Hardware and Embodied Carbon

When people think about AI's environmental impact, they usually focus on electricity. But there is another important dimension: the carbon and resources embedded in building the physical infrastructure itself.

OPERATIONAL CARBON	EMBODIED CARBON
Carbon from electricity used during operation	Carbon from manufacturing chips, servers, and equipment
Ongoing, occurs every hour the system runs	Upfront, occurs during production, before operation begins
Can be reduced with clean energy	Can be reduced with longer hardware life cycles, reuse, and recycling
Relatively well-measured by most companies	Often underreported or excluded from AI sustainability disclosures

Modern AI chips require advanced semiconductor manufacturing, which can be energy- and water-intensive. This means AI hardware can carry an environmental footprint before it processes a single prompt. Each new generation of AI hardware carries its own embodied footprint.

Server hardware has limited operational lifespans. When servers are replaced, what happens to them? The answer matters enormously for the full life-cycle footprint of AI infrastructure.

> ***"Sustainable AI is not only about electricity. It is also about the physical life cycle of the machines, from design and manufacturing through operation, repair, reuse, and responsible disposal."***

E-Waste and Circular Hardware

As AI drives rapid expansion of data center infrastructure, hardware turnover and e-waste become important sustainability considerations. AI infrastructure can contribute to e-waste if hardware is replaced quickly without responsible end-of-life management.

Circular Hardware Strategies

Repair	Fixing failed components to extend server life rather than replacing entire systems.
Reuse	Repurposing servers for lower-intensity workloads before retiring them.
Component harvesting	Recovering usable parts from retired systems for use in repairs or refurbished builds.
Refurbishment	Restoring servers to working condition for resale or redeployment.
Recycling	Recovering metals and materials from servers that cannot be reused.
Design for longevity	Engineering hardware to last longer, be repaired more easily, and transition between use cases.

Some major AI infrastructure operators report high server reuse and recycling rates in their sustainability disclosures. These company-level initiatives are meaningful, but they vary across the industry and should not be assumed to be universal standards.

ED2S ACTION STEP

"When you hear a company talk about sustainable AI, ask a specific question: What happens to your servers and AI hardware after they are replaced? A company committed to circular hardware can answer this with specifics."

PART 3

How Much Does One AI Prompt Use?

Why the honest answer is: it depends.

Why There Is No Single Answer

One of the most common questions about AI sustainability is: "How much energy does one AI prompt use?" The honest answer is that there is no single universal number, and understanding why reveals a lot about how AI actually works.

The energy and water footprint of an AI request depends on all of the following:

Factor	How It Affects Impact
Model size	Larger models with more parameters require more computation per request.
Prompt length	Longer input context requires more processing.
Output length	More generated tokens = more computation. A one-sentence answer uses less than a 10-page report.
Task type	Text summarization vs. image generation vs. video creation vary enormously in compute demand.
Reasoning depth	Reasoning-heavy tasks may use more compute because they can involve longer processing, longer outputs, or additional model steps.
Number of regenerations	Each time you regenerate, the request runs again.
Hardware efficiency	Newer, more efficient AI chips do more per watt.
Data center PUE	How much extra energy the facility uses beyond the servers themselves.
Data center WUE	How much water the facility uses per kWh of IT energy.
Electricity source	Coal vs. nuclear vs. wind vs. solar changes the carbon picture significantly.
Cooling system type	Air vs. liquid vs. evaporative cooling affects water use.
Measurement boundaries	Does the estimate include idle infrastructure? Hardware manufacturing? Network transmission?

"There is no single universal footprint for one AI prompt. The exact number matters less than understanding why AI impact varies, and why total scale matters."

Comparing Published Estimates

Several organizations have published estimates of AI energy use per prompt. These numbers come from different systems, different methodologies, and different accounting boundaries. They should not be treated as directly interchangeable.

Source / System	Energy	Carbon	Water	Important Context
Google Gemini median text prompt (Google methodology)	0.24 Wh	0.03 gCO_2e	0.26 mL	Google's own methodology for median Gemini Apps text prompt; Google also reports large efficiency improvements over recent 12-month periods.
EPRI ChatGPT request estimate	About 2.9 Wh	Varies by grid	Not specified	An industry estimate; not a universal value for all AI prompts or models.
BLOOM inference study (research conditions)	About 4 Wh	About 1.5 gCO_2e	Varies	Open-model research study; different system, methodology, and conditions than commercial AI services.

These values illustrate the wide range of estimates, not a definitive measurement of "one AI prompt." A 2025 Google research paper on delivering AI at Google scale described specific methodology and found efficiency improvements over time. The BLOOM paper studied an open model in research conditions. Comparing them requires understanding each system's boundaries.

This estimate should be interpreted as Google’s reported result for a median Gemini Apps text prompt under Google’s methodology. It should not be generalized to all AI systems, all models, image/video generation, or reasoning-heavy tasks.

REALISTIC NOTE

The exact per-prompt number is less important than understanding (1) why AI impact varies so widely, (2) why total global scale and growth trajectory matter more than individual prompt estimates, and (3) why transparency about methodology is essential for evaluating any sustainability claim.

SOURCE NOTE

Google Cloud blog and Elsworth et al. (2025): https://cloud.google.com/blog/products/infrastructure/measuring-the-environmental-impact-of-ai-inference/ | Luccioni et al. (2023): https://arxiv.org/abs/2311.16863

EPRI, Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption, 2024.

Estimating the Carbon Footprint of BLOOM, for BLOOM training and inference context.

Setting the Record Straight: Common Myths

AI's environmental impact has generated some viral claims that oversimplify or misrepresent the real picture. Here is a balanced look at the most common ones.

MYTH VS. FACT

⚠ MYTH: Every AI prompt uses a bottle of water.

✓ FACT: Per-prompt water estimates vary enormously by model, task, data center, cooling system, and methodology. Some company estimates for simple text prompts are far smaller. Total data center expansion and cooling system design are the larger concerns. This is not including the water use to train each model.

⚠ MYTH: AI has no environmental impact.

✓ FACT: AI runs on physical infrastructure, data centers, servers, chips, electricity, cooling systems, and hardware, that has real, measurable impacts. These impacts are manageable, but they are not zero.

⚠ MYTH: Individual users are the main cause of AI's environmental impact.

✓ FACT: Individual habits matter, but corporate deployment decisions, data center siting, grid planning, cooling design, and transparency matter much more. Individual users are not off the hook, but they are not carrying the whole load.

⚠ MYTH: Clean energy makes AI's footprint disappear.

✓ FACT: Clean energy helps reduce carbon emissions significantly. But water use, hardware manufacturing, land use, grid stress, and local community impacts still exist. Renewable energy is necessary but not sufficient for fully sustainable AI.

Text vs. Image vs. Video AI

Not all AI outputs are created equal. Different types of outputs require different amounts of computation, and therefore different amounts of energy and other resources.

Output Type	Typical Compute Demand	Examples
Short text completion / simple Q&A	Generally lower	"What is photosynthesis?" "Summarize this in 3 bullets."
Simple summary / short brainstorming	Generally lower	"List 5 ideas for..." "Summarize this article..."
Long report / detailed analysis	Moderate	Multi-page document drafts, complex explanations
Code generation	Moderate to higher	Writing, reviewing, and debugging code
Image generation	Higher	Creating realistic images, illustrations, graphics
Repeated regenerations	Cumulative	Each generation = another full inference run
Long reasoning chains	Higher	Multi-step problem solving, long reasoning tasks, or agent-style workflows.
Video generation	Likely highest	Many frames + motion + visual consistency required
Large-scale training	Much higher	Building new AI models from scratch

REALISTIC NOTE

This ladder is directional, not a universal measurement. Exact impacts depend on specific models, hardware, data centers, and tasks. The key insight is that output type and length matter, and that "simpler text" is generally less compute-intensive than "image or video generation."

Output Length Matters

Longer AI outputs generally require more generated tokens, and more computation. A habit of asking for output only as long as you actually need it is one simple way to be a more efficient AI user.

LESS EFFICIENT PROMPT	MORE EFFICIENT PROMPT
"Explain climate change."	"Explain climate change in 5 bullet points for a high school student."
"Give me everything about AI."	"Give me a 300-word beginner explanation of AI's water and energy impacts."
"Make a guide."	"Create a 10-section outline with bullet points and key sources."
"Tell me about solar energy."	"Summarize 3 key advantages of solar energy in 2 sentences each."

Efficient prompting is not a substitute for corporate efficiency, clean energy, or transparent data center planning. It is a personal digital habit that supports intentional use.

ED2S ACTION STEP

"Ask for the output size you actually need. A clearer, more specific prompt reduces unnecessary back-and-forth, saves your time, and reduces unnecessary computation."

Digital Overconsumption

Digital overconsumption happens when digital tools are used excessively, automatically, or wastefully, simply because they are convenient. AI can amplify this pattern if people generate endless drafts, images, summaries, and answers without clear purpose.

Examples of Digital Overconsumption with AI

- Regenerating the same answer 20 times without changing the prompt.
- Generating dozens of images for one low-stakes social post.
- Asking AI for basic calculations a calculator could solve instantly.
- Using AI to summarize an article that takes 3 minutes to read directly.
- Requesting long reports when a short answer or outline would serve the purpose.
- Using AI as a replacement for search engines when a quick search would be more accurate.
- Running repetitive AI tasks that could be done with a simple spreadsheet or template.

> ***"Convenience can create invisible waste. The ease of generating AI output does not mean that generating it is always the best choice."***

KEY MESSAGE

Sustainable AI habits are not about never using AI. They are about using AI with intention, asking for what you actually need, verifying what matters, and choosing the simplest tool that gets the job done.

PART 4

Responsible AI Use for Students and Communities

Better habits, smarter tools, stronger thinking.

The Responsible AI Decision Tree

Before using AI, work through this decision tree to find the right tool for your task.

Question	If YES	If NO
Is this a simple math calculation?	Use a calculator, faster and more accurate.	Continue to next question.
Is this about current news, prices, laws, or facts that may have changed recently?	Use search + official sources first. AI may be outdated or hallucinate.	Continue to next question.
Is this brainstorming, drafting, summarizing, or organizing ideas?	AI may be genuinely useful here. Proceed carefully.	Continue to next question.
Is this a high-stakes medical, legal, financial, or safety decision?	Use official sources or consult an expert. AI can explain, not replace verification.	Continue to next question.
Do I need an image or video, or would text or a sketch work?	If image/video is unnecessary, choose the lower-compute option.	Proceed with text-based AI if the task is appropriate.
Am I about to regenerate because the output is imperfect?	Try improving the prompt first before regenerating.	You may be ready to use the output.

END GOAL: Use the simplest tool that gets the job done. AI is powerful, but it is not always the right tool for every task.

AI vs. Search vs. Calculator vs. Human

Choosing the right tool is one of the most important sustainable AI habits. Here is a practical reference guide.

Task Type	Best First Tool	Why
Basic arithmetic / math	Calculator	Fast, exact, and avoids unnecessary cloud AI compute.
Current news, prices, or recent events	Search + credible sources	Some AI tools may not have current information, and even tools with web access can misunderstand or misrepresent sources.
Brainstorming and idea generation	AI (with verification)	Useful for expanding thinking; output needs human judgment.
Summarizing your own notes or materials	AI (if privacy-safe and allowed)	Can be efficient; check privacy policies and school rules.
Medical / legal / financial decisions	Expert + official sources	High stakes; AI can explain concepts but cannot replace expertise.
Creative draft (essay, script, post)	AI + human editing	AI helps start; humans must refine, verify, and own the result.
Scientific or data claim	Official or peer-reviewed source	AI can summarize; original sources are needed for accuracy.
Quick definition or explanation	Search or AI, then verify	Low risk; still check for accuracy on important topics.
School or work assignment	Follow institution policy first	Academic integrity and professional standards come before convenience.

KEY MESSAGE

AI is a powerful tool. But it is not always the fastest, most accurate, or most resource-efficient option. Matching the right tool to the task is a core skill for responsible technology use.

The Efficient Prompting Template

A clear, well-structured prompt reduces unnecessary back-and-forth, produces better outputs, and reduces wasted computation. Use this template to build effective prompts.

ROLE: ____

(Who should AI act as? e.g., "a sustainability educator," "a student writing coach")

TASK: ____

CONTEXT: ____

AUDIENCE: ____

OUTPUT FORMAT: ______________________________________

LENGTH: ____

TONE: ____

SOURCES NEEDED? _____________________________________

WHAT TO AVOID: ______________________________________

VERIFICATION NEEDED: _______________________________

Example prompt using this template:

"Act as a sustainability educator. Explain how AI data centers use water in 200 words for high school students. Include direct vs. indirect water use, avoid fearmongering, and list 3 facts I should verify before citing."

ED2S ACTION STEP

"A clear prompt is not just more efficient, it produces better results. Before submitting a prompt, ask: Did I give AI a role, task, audience, format, length, and constraints?"

The One-Shot Prompt Method

The best sustainable AI habit is asking well the first time. Every regeneration is another inference run. Improving your prompt before submitting reduces waste and saves time.

How to Ask Well the First Time

1. State the goal clearly and specifically.
2. Identify the audience for the output.
3. Specify the format (list, paragraph, table, script, outline, etc.).
4. Give the length (number of words, bullet points, sections, etc.).
5. Set the tone (professional, friendly, academic, conversational, etc.).
6. State what to avoid (jargon, fearmongering, partisan framing, excessive length, etc.).
7. Ask for sources or express uncertainty flags when the topic requires verification.

BEFORE (Vague)	AFTER (Clear and Efficient)
"Make this better."	"Rewrite this 30-second Ed2S TikTok script for college students. Keep it factual, high-retention, non-fearmongering, and end with a question that encourages comments."
"Write a summary."	"Summarize this article in 5 bullet points for a general audience. Highlight 2 facts that should be verified."
"Give me ideas."	"Give me 10 creative sustainability campaign ideas for a college campus. Focus on low-cost, high-visibility actions."

ED2S ACTION STEP

"Before you hit regenerate, improve the prompt. Ask: What did my prompt not tell AI that would help it do better?"

How to Ask for Sources and Uncertainty

AI can produce confident-sounding outputs that contain errors, outdated information, or invented citations. Users who know how to ask for uncertainty and source guidance get better, safer results.

Useful Prompts for Verification

- "List what you are confident about and what needs verification from current sources."
- "Give me source types I should check, such as EPA, DOE, IEA, peer-reviewed studies, or company sustainability reports."
- "Do not invent citations. If you are unsure, say so clearly."
- "Separate what is established fact from what is your inference or estimation."
- "Tell me what could have changed recently that would affect this answer."
- "What parts of this topic are actively debated among experts?"

WARNING

For current statistics, laws, prices, health guidance, scientific claims, regulatory requirements, and information where being wrong has real consequences, always verify with current, credible, primary sources. AI can help you understand topics and identify where to look, but it cannot replace verification.

DID YOU KNOW?

AI can "hallucinate", generate plausible-sounding but factually incorrect information, including invented citations to research papers that do not exist. Developing a habit of verification is essential for responsible AI use.

When Not to Use AI

Sustainable AI use is not about using AI for everything. It is about using AI where it genuinely helps and recognizing the many situations where other tools are faster, more accurate, or simply better.

Cases Where AI May Be Unnecessary

Simple math	A calculator is faster, more accurate, and avoids unnecessary AI/data-center compute for simple arithmetic.
Looking up current information	Search engines access real-time information that AI may not have.
Reading a short source yourself	A 5-minute read may be faster, more accurate, and better for comprehension than asking AI to summarize.
Generating images for throwaway posts	Consider whether the visual is truly needed or whether text or a simple graphic serves better.
Asking for very long answers to simple questions	Requesting a 1,000-word response to a question that needs 50 words creates unnecessary output.
Replacing thinking with AI output	Using AI to generate opinions, decisions, or judgments without applying your own reasoning.
Tasks with established templates or formulas	If a spreadsheet, template, or standard form already exists, use it directly.

"AI should increase your effectiveness and awareness, not replace them. The best AI users are the ones who know when NOT to use AI."

Academic Integrity and AI

AI tools are changing how students research, write, and learn. Schools and universities are actively developing policies about appropriate AI use. Here is how to navigate this responsibly.

Appropriate and Inappropriate Uses (Varies by School Policy)

Often Appropriate (Check Your Policy)	Often Not Appropriate
Brainstorming and generating initial ideas	Submitting AI-generated text as your own original work without disclosure
Getting feedback on your own draft	Using AI to complete a test or exam designed to assess your knowledge
Practicing with tutoring-style explanations	Bypassing the learning process by having AI do all the thinking
Summarizing sources you have read	Fabricating AI-generated citations or research that does not exist
Improving grammar and style on your own writing	Uploading private class materials to AI tools if prohibited by your institution

Academic Integrity Checklist

- ☐ I checked my class, school, or institution's AI policy before using AI.
- ☐ I used AI in a way allowed by my instructor or institution.
- ☐ I understand the material, I did not use AI to avoid learning.
- ☐ I fact-checked any AI-generated content I am relying on.
- ☐ I cited AI use where required by my institution.
- ☐ I did not upload private class materials, exam questions, or confidential documents to AI tools.

REALISTIC NOTE

This guide does not provide legal advice on academic integrity. Every school, university, and employer has different policies. When in doubt, ask your instructor or consult your institution's AI use guidelines directly.

Privacy and Data Awareness

Responsible AI use is not only about the environment. It is also about privacy, consent, security, and trust. What you type into an AI tool may be stored, used to improve models, seen by company employees, or exposed in a security incident. Be thoughtful about what you share.

Information to Avoid Sharing with AI Tools

PRIVACY CAUTION

Unless you fully understand the tool's privacy policy, do not paste:

- Passwords or security credentials of any kind
- Social Security numbers or government IDs
- Private medical records or health information
- Confidential workplace or school documents
- Financial account numbers or bank information
- Personal addresses, phone numbers, or contact details of others
- Unreleased business plans or proprietary company information
- Private conversations or messages from others without their consent

Before using any AI tool for work, school, or sensitive personal tasks, review the tool's privacy policy, terms of service, and data retention practices. Institutional and enterprise versions of AI tools often have stronger privacy protections than consumer versions.

REALISTIC NOTE

"Responsible AI is not only about the environment. It is about privacy, consent, security, and trust. These dimensions of AI impact matter as much as energy and water, and they affect real people directly."

PART 5

AI for Sustainability

When AI can help reduce waste, improve efficiency, and solve real problems.

When AI Can Help Reduce Waste

AI is not inherently a sustainability problem. When deployed intentionally for problems where data analysis, pattern recognition, and optimization add genuine value, AI can help reduce waste, improve efficiency, and support sustainability goals.

Application Area	How AI Can Help	Real Example
Delivery and logistics	Optimize routes to reduce fuel use and vehicle miles traveled.	Route optimization reduces unnecessary driving.
Building energy	Control HVAC and lighting based on occupancy, weather, and demand.	Smart building systems can reduce energy use when properly installed, maintained, and operated.
Predictive maintenance	Predict equipment failure before it happens, reducing waste and downtime.	Industrial systems avoid unnecessary replacement.
Food and agriculture	Monitor crops, predict yield, optimize irrigation, reduce spoilage.	Precision agriculture reduces water and chemical use.
Waste sorting	Image recognition identifies recyclable materials on sorting lines.	Reduces contamination in recycling streams.
Leak detection	Analyze sensor data to find water or gas leaks quickly.	Reduces waste and environmental exposure.
Climate communication	Simplify complex climate science for diverse audiences.	Help students and communities understand sustainability.
Environmental data analysis	Process large datasets from satellites, sensors, and surveys.	Track deforestation, air quality, or species populations.

"AI becomes more sustainable when it helps solve real problems with measurable outcomes, not when it generates unnecessary digital output."

AI in Buildings and Energy Systems

Buildings account for a significant portion of global energy use. AI-assisted building optimization is one of the most well-developed applications of AI for sustainability, and one of the most promising for real-world impact at scale.

How AI Can Help Buildings Use Less Energy

Smart HVAC control	AI can learn occupancy patterns and adjust heating and cooling automatically, avoiding conditioning empty spaces.
Occupancy prediction	Predict when rooms and areas will be used based on schedules, sensors, and patterns.
Demand response	Shift energy-intensive operations to times when electricity is cheaper or cleaner.
Fault detection	Identify when equipment is running inefficiently or about to fail before it causes a larger problem.
Lighting control	Daylight harvesting and occupancy-based lighting control reduce unnecessary electricity use.
Predictive maintenance	Extend the life of equipment and prevent waste from unexpected failures.

The IEA has discussed AI's potential to improve energy efficiency in buildings and industry. Real-world impact depends on deployment, data quality, building system design, integration quality, and ongoing human operation.

SCIENCE / ENGINEERING NOTE

Energy efficiency is not just software. Sensors, control systems, building equipment, maintenance practices, and human behavior all shape how much energy a building actually uses. AI is most effective when it integrates with well-maintained physical systems and skilled operators.

AI in Water and Agriculture

Water scarcity and agricultural efficiency are among the most pressing sustainability challenges of the coming decades. AI can support better decision-making in both areas, when deployed with appropriate data, infrastructure, and local expertise.

WATER MANAGEMENT	AGRICULTURAL OPTIMIZATION
Leak detection in water distribution systems	Precision irrigation based on soil moisture, weather, and crop data
Water quality monitoring and anomaly detection	Crop monitoring using satellite or drone imagery
Drought risk mapping and early warning	Yield prediction to reduce waste and improve planning
Water consumption pattern analysis	Weather forecasting for planting and harvest decisions
Infrastructure maintenance prediction	Pest and disease detection before widespread damage occurs
Resource planning and allocation modeling	Supply chain optimization to reduce food waste after harvest

These applications are most effective when paired with appropriate physical infrastructure, community knowledge, and supportive policy. AI systems are tools for decision support, not replacements for local expertise or investment in physical water and agricultural infrastructure.

REALISTIC NOTE

"AI does not replace infrastructure, local knowledge, or policy. It helps people make better decisions when appropriate data, systems, and governance structures are already in place."

AI in Waste and the Circular Economy

The circular economy aims to keep materials in use longer and reduce waste sent to landfill. AI can support circular economy principles across multiple stages, from design through end of life.

Waste sorting	Image recognition and machine learning help identify and separate recyclable materials on sorting lines.
Contamination detection	AI can flag heavily contaminated loads that would otherwise compromise entire batches of recyclables.
Product life-cycle analysis	AI can help designers analyze the environmental footprint of materials and product decisions.
Inventory and demand optimization	Better demand forecasting reduces overproduction and excess waste.
Repair and reuse prediction	AI can predict when products or components should be repaired rather than replaced.
Reuse marketplace matching	AI can match supply and demand in secondary markets for used goods and materials.
Packaging redesign	Data analysis helps identify packaging improvements that reduce material use.
Material tracking	AI-assisted tracking keeps materials visible through supply chains and end-of-life systems.

ED2S ACTION STEP

"Think about your own campus or community. What waste streams could benefit from better sorting, labeling, or collection? AI can help analyze data, but observation and community action are the starting point."

AI in Climate and Sustainability Communication

Effective sustainability communication is one of the most impactful uses of AI for organizations like Education2Success. AI can help translate complex data and research into accessible, engaging content, when used carefully and with verification.

How Ed2S Can Use AI Responsibly

Simplifying complex topics	Turn technical research into accessible explanations for students and community members.
Drafting video scripts	Create first drafts of TikTok, YouTube, or Instagram scripts that humans then refine and verify.
Discussion questions	Generate classroom or community discussion prompts for sustainability topics.
Report to social post	Convert long sustainability reports into shorter, shareable social media content.
Quiz creation	Build educational quizzes and interactive learning materials from factual source materials.
Translation	Help translate sustainability education materials for multilingual audiences.
Campaign brainstorming	Generate ideas for sustainability campaigns, events, and community initiatives.
Research summarization	Summarize research papers to identify key findings before deep-reading the source.

WARNING

AI can help communicate science, but humans must verify the facts. Always check AI-generated sustainability content against primary sources before publishing or presenting it. Inaccurate sustainability claims, even well-intentioned ones, can undermine trust and cause harm.

ED2S ACTION STEP

"Use AI to make sustainability easier to understand, not easier to misinform. Every piece of Ed2S content created with AI assistance should be fact-checked by a human before it is published or shared."

PART 6

Greenwashing and AI Sustainability Claims

How to evaluate what companies say about sustainable AI.

How to Read AI Sustainability Claims

AI companies regularly publish sustainability reports, blog posts, and announcements. Learning to read them critically is an essential skill for students, advocates, and citizens.

10 Questions to Ask When Evaluating AI Sustainability Claims

#	Question to Ask	Why It Matters
1	Does the company disclose total electricity use and data center energy separately?	Aggregated numbers can obscure AI-specific growth.
2	Does it disclose water withdrawals and water consumption separately?	Withdrawn water is not the same as consumed water.
3	Does it explain direct and indirect water use?	Indirect water from electricity is often excluded.
4	Does it report both location-based and market-based emissions?	Market-based can look much cleaner than physical grid reality.
5	Does it disclose model-level or task-level energy impact?	Aggregate numbers hide per-model efficiency differences.
6	Does it include training and inference in its footprint?	Early reports focused on training; inference now matters at scale.
7	Does it include hardware manufacturing and e-waste?	Embodied carbon is often excluded from AI sustainability claims.
8	Does it discuss local community and grid impacts?	Global percentages hide local infrastructure pressures.
9	Are claims specific with numbers, or vague with language like "committed" or "working toward"?	Vague language is a red flag.
10	Are claims independently verified or audited?	Self-reported data without third-party review is harder to evaluate.

"If a claim sounds impressive but gives no numbers, boundaries, or methodology, be cautious. Good sustainability communication explains tradeoffs. Greenwashing hides them."

The AI Sustainability Scorecard

Use this scorecard to evaluate how transparently an AI company reports its environmental impacts. Score each category from 1 (minimal disclosure) to 5 (comprehensive, verified disclosure).

Category	Evaluation Question	Score (1–5)	Notes
Energy Transparency	Does the company disclose total and data center electricity use?		
Water Transparency	Does it disclose direct and indirect water withdrawals and consumption?		
Carbon Accounting	Does it report both location-based and market-based emissions?		
Model Efficiency	Does it measure or discuss per-task or per-model energy efficiency?		
Hardware Circularity	Does it address server reuse, repair, refurbishment, and responsible disposal?		
Local Impact	Does it discuss grid, water, and community impacts near its data centers?		
User Guidance	Does it help users understand and use AI more efficiently?		
Independent Verification	Are its sustainability claims audited or verified by credible third parties?		

32-40 points	Strong transparency, meaningful disclosure across most dimensions.
24-31 points	Moderate transparency, reporting in key areas with some gaps.
16-23 points	Limited transparency, significant gaps in reporting.
Below 16 points	Major information gaps, claims should be treated with caution.

Good reporting includes clear boundaries, year-over-year data, location-based and market-based emissions, water withdrawal and consumption, direct and indirect impacts, third-party verification, and discussion of local grid/water/community effects.

Green AI Red Flags

Use this checklist to identify potentially misleading sustainability claims. If you are seeing several of these red flags in a company's sustainability communication, approach their claims with critical scrutiny.

- ☐ "100% green AI" with no specific data, boundaries, or methodology cited.
- ☐ "Carbon neutral" claim without explaining accounting boundary, method, or scope.
- ☐ Only discusses offsets, no mention of efficiency, water, or hardware.
- ☐ No water reporting of any kind in sustainability disclosures.
- ☐ Only market-based emissions reported; no location-based figures.
- ☐ No mention of hardware life cycle, server reuse, or e-waste strategy.
- ☐ No explanation of where data centers are located or what grids they use.
- ☐ Per-prompt energy or water claim with no methodology or boundary disclosure.
- ☐ Major capacity expansion paired only with vague sustainability promises.
- ☐ No third-party verification, external audit, or independent review.
- ☐ No discussion of local grid, water, or community impacts.
- ☐ Sustainability page not updated in over a year despite continued growth.

"Good sustainability communication explains tradeoffs, acknowledges limitations, and gives readers the information they need to evaluate claims. Greenwashing hides tradeoffs behind vague language and impressive-sounding numbers without context."

PART 7

Templates and Worksheets

Practical tools for smarter AI use.

Responsible AI Use Checklist

Print this checklist or use it digitally before and after significant AI sessions.

PURPOSE

☐ I know what I am trying to accomplish before I start.

☐ AI is genuinely useful for this specific task.

TOOL CHOICE

☐ I considered whether search, a calculator, notes, or a human expert would serve better.

☐ I chose the simplest AI tool that meets my needs.

PROMPT QUALITY

☐ My prompt includes context, audience, format, length, and constraints.

☐ I tried to ask well the first time instead of planning to regenerate.

OUTPUT SIZE

☐ I requested the shortest output that will actually be useful.

☐ I am not generating images or video when text would serve the purpose.

VERIFICATION

☐ I fact-checked important claims, statistics, and citations.

☐ I know which parts of the output need verification before I share or act on them.

PRIVACY

☐ I did not paste sensitive, private, or confidential information.

RULES

☐ I followed my school's, employer's, or institution's AI guidelines.

Efficient Prompt Builder Worksheet

Use this worksheet to plan prompts before submitting them. A few minutes of planning can save significant back-and-forth.

I am using AI to help with:

____

My audience is:

____

The output should be: ☐ List ☐ Paragraph ☐ Table ☐ Script ☐ Outline ☐ Other: ______

Length (words, bullets, pages, etc.):

____

Tone: ☐ Professional ☐ Friendly ☐ Academic ☐ Conversational ☐ Other: ______

Context I need to give AI:

____

Sources I need (if any):

____

Things to avoid:

____

What I will verify after receiving the output:

____

AI vs. Search vs. Other Tools: Decision Guide

Use this guide before choosing a tool for any research, writing, or learning task.

Task Situation	Best First Tool	Why
Need current information (news, prices, laws, events)	Search + credible sources	AI may be outdated or incorrect on time-sensitive information.
Simple math or calculation	Calculator or spreadsheet	Faster, exact, no compute overhead from AI.
High-stakes decision (medical, legal, financial, safety)	Expert or official source	High stakes require verified expertise, not AI output.
Brainstorming and generating ideas	AI (then filter with human judgment)	AI excels at generating diverse options quickly.
Writing or drafting creative content	AI + human editing and verification	AI can draft; human must refine and own the output.
Need a citation or specific source	Search credible databases, not AI	AI can hallucinate or misattribute sources.
Learning a concept or topic	AI for explanation, then primary sources for verification	Combine AI explanation with source-based confirmation.
Personal judgment or ethical decision	Human decision first; AI as support only	AI should not make values-based decisions for you.
Quick definition or simple fact	Search or AI, verify if important	Low risk for casual use; verify if it matters.
Analyzing your own data or notes	AI (if privacy-safe and allowed)	Can be efficient; check data privacy policies first.

AI Impact Reflection Worksheet

Take 10 minutes to reflect on your current AI use patterns. Honest answers help you identify where small habit changes could make a real difference.

1. What AI tools do I use regularly (at least once a week)?

2. What do I primarily use AI for?

3. Which of my AI uses are genuinely valuable to me?

4. Which uses are unnecessary, repetitive, or out of habit?

5. Do I often regenerate outputs? When and why?

6. Do I ask for longer outputs than I actually need?

7. Do I verify important AI-generated claims before sharing or acting on them?

8. How could I use AI for one sustainability project this month?

This week, I will use AI more intentionally by:

Classroom Discussion Worksheet

For educators, students, and community groups. Use these questions to spark meaningful dialogue about AI, sustainability, and responsibility.

DISCUSSION QUESTIONS

1. Should schools and universities teach sustainable AI use as a standard part of digital literacy?
2. Should AI companies be legally required to disclose energy and water use per product or model?
3. Is per-prompt impact the best way to measure AI sustainability, or are there better approaches?
4. Can AI reduce more emissions globally than it creates? What would need to be true for that to happen?
5. Should data centers be prohibited from being built in water-stressed regions?
6. Who has the greatest responsibility for sustainable AI: users, companies, governments, or engineers?
7. How can students use AI as a learning tool without losing critical thinking skills?
8. What would responsible AI use look like on your campus or in your community?

GROUP ACTIVITY: THE BALANCED AI POLICY EXERCISE

Divide into three groups. Each group takes one position and prepares a 3-minute argument:

Group A: "AI can significantly help sustainability efforts when used intentionally."

Group B: "AI creates new sustainability challenges that outweigh its benefits."

Group C: Creates a balanced AI sustainability policy using evidence from both sides.

Campus Sustainable AI Challenge

Put your learning into practice. Use AI to design a real sustainability improvement for your school, club, workplace, or community.

STEP	WHAT TO DO
1. Pick a real problem	Choose a sustainability issue you observe in your community, campus, or organization.
2. Observe and collect data	Take notes, count, measure, photograph, or survey. Start with what you can observe.
3. Ask AI for possible solutions	Use AI to brainstorm approaches, research precedents, and identify relevant data.
4. Verify claims with sources	Check any AI-generated facts against credible sources before including them in your proposal.
5. Estimate potential impact	How much waste could be reduced? How much energy or water could be saved?
6. Identify stakeholders	Who is affected? Who needs to approve or support the change?
7. Create a proposal	Use the project proposal template on the next page.
8. Present your idea	Share with your class, club, school administration, or community group.

Example Project Ideas

- Design a campus battery recycling and rechargeables awareness campaign.
- Analyze cafeteria food waste and propose reduction strategies.
- Improve recycling bin labeling and placement based on contamination data.
- Create a classroom energy audit and reduction plan.
- Build a low-waste event checklist for student organizations.
- Develop a sustainability social media content calendar for your school.
- Analyze water use habits on campus and propose conservation steps.

Sustainable AI Project Proposal Template

PROJECT TITLE: ____

PROBLEM (What issue are you addressing?):

WHY IT MATTERS:

WHO IS AFFECTED:

CURRENT BEHAVIOR OR SYSTEM (What is happening now?):

HOW AI CAN HELP:

NON-AI ALTERNATIVE (What would we do without AI?):

EXPECTED SUSTAINABILITY BENEFIT:

HOW SUCCESS WILL BE MEASURED:

SOURCES TO VERIFY:

7-Day Smarter AI Habit Challenge

Small habits practiced consistently create lasting change. Try this 7-day challenge to build more intentional AI habits.

Day	Challenge	Done?	Reflection
Day 1	Track every AI prompt you send today. Write down what you used AI for and whether it was necessary.	☐	______________________
Day 2	Use the decision tree before every prompt. Ask: Is AI the right tool here?	☐	______________________
Day 3	Rewrite one vague prompt you would normally send into a clear, specific one using the template.	☐	______________________
Day 4	Ask for a shorter output than you normally would. Notice whether it was sufficient.	☐	______________________
Day 5	Fact-check one AI-generated claim using a primary source or credible website.	☐	______________________
Day 6	Avoid all unnecessary image or video AI generation today. Use text alternatives.	☐	______________________
Day 7	Use AI to brainstorm or research one idea for a sustainability project in your community.	☐	______________________

"Smarter AI use is a habit. Like any habit, it starts with small, consistent choices repeated over time."

Your Final Action Plan

You have completed The Sustainable AI Guide. Now choose your commitments. Select at least three to start with.

- ☐ I will use AI intentionally, with a clear purpose for each session.
- ☐ I will ask clearer, more specific prompts before submitting.
- ☐ I will avoid unnecessary regenerations by improving my prompts.
- ☐ I will request shorter outputs when a brief answer is sufficient.
- ☐ I will avoid unnecessary image or video generation when text serves the purpose.
- ☐ I will fact-check important claims before sharing or acting on AI outputs.
- ☐ I will protect private and sensitive information in all AI interactions.
- ☐ I will follow my school's, employer's, or institution's AI guidelines.
- ☐ I will learn more about how data centers work and why they matter.
- ☐ I will use AI for at least one real sustainability project this year.
- ☐ I will share one thing I learned from this guide with someone else.
- ☐ I will evaluate AI sustainability claims critically before accepting them.

"Technology should help us build a better future. The more we understand the systems behind our tools, the better choices we can make."

- Education2Success

Source Notes and Data Transparency

AI sustainability data changes quickly. Many figures cited in this guide are estimates drawn from company reports, government publications, and peer-reviewed research. Readers should understand these important caveats before citing or acting on any specific number.

IMPORTANT NOTE ON DATA QUALITY

Different studies use different measurement boundaries. Some include only active chip power; others include servers, idle capacity, facility energy, cooling, water, carbon accounting, and hardware manufacturing. Numbers from different sources may appear to conflict because they measure different things. Do not compare estimates without understanding their methodology.

Education2Success recommends updating this guide regularly as new AI sustainability research, regulatory disclosures, and company sustainability reports become available.

The 5 Questions of Sustainable AI, our core educational framework in this guide:

1. PURPOSE: Do I actually need AI for this task?
2. TOOL FIT: Am I using the simplest tool that gets the job done?
3. PROMPT QUALITY: Can I ask clearly once instead of regenerating repeatedly?
4. OUTPUT SIZE: Do I need a long answer, image, video, or heavy reasoning?
5. IMPACT AWARENESS: Do I understand that AI runs on energy, water, hardware, and data centers?

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