

NOVA RESONANCE / ENVIRONMENTAL STEWARDSHIP

Can AI-Assisted Creativity Justify Its Environmental Costs?

Electricity, water, meaningful participation, and a conditional case for responsible human-AI collaboration

Research-informed position paper | 9 October 2026 | Prepared for Alicia and Ian Payson, co-founders, Nova Resonance

Core position: AI collaboration can be worth its environmental burden in particular circumstances, but its value does not erase that burden. The right test is whether the collaboration serves a meaningful human purpose, avoids preventable harm, uses proportionate resources, protects affected communities, and remains open to refusal and revision.

Abstract

Creative and educational AI systems may expand access to expression, experimentation, and collaboration. They also consume electricity and water, depend on resource-intensive hardware, and may increase demand through new uses. This paper reviews recent International Energy Agency (IEA), Lawrence Berkeley National Laboratory (LBNL), and peer-reviewed evidence on these environmental costs; distinguishes them from unproven claims about Nova Resonance itself; and proposes a defensible position for prospective collaborators. The strongest case is conditional and comparative: use AI where participants judge its contribution to be meaningful, alternatives are considered, local environmental burdens are addressed, transparent measurements are pursued, and meaningful no-AI choices remain available. The paper supplies a research protocol, a collaborator-facing account of uncertainty, and operational commitments. No Nova Resonance-specific lifecycle assessment has yet been conducted. [1-13]

Research question and scope

Question: Under what ecological, technical, and participatory conditions can AI-assisted creative collaboration provide meaningful benefits without imposing preventable or disproportionate environmental costs?

Public working edition | Founder-approved | AI-assisted | Not peer-reviewed

Scope: This paper concerns Nova Resonance projects such as Core Resonance, JamBot, Bot University, creative services, and the proposed Commons. It evaluates research on data centers and AI, not a measured footprint of these specific products. It distinguishes organizational values, external findings, and proposed future commitments. It does not offer a universal claim that creative value outweighs ecological harm.

Method: Narrative synthesis of identified government/laboratory, intergovernmental, standards-body, and peer-reviewed sources available as of 9 October 2026. This is not a systematic review, original impact assessment, third-party audit, or peer-reviewed publication. Numbers from different inventories or scenarios should not be combined as though they have identical scope.

1. Environmental impacts: what the evidence establishes

1.1 Electricity demand is substantial and accelerating

The IEA estimates that global data center electricity demand was approximately 485 TWh in 2025, having increased 17% from the preceding year; consumption by AI-focused data centers grew around 50%. Its central projection reaches approximately 950 TWh by 2030. These figures describe data centers and AI-focused subgroups, not the electricity demand of all AI interactions individually. [1]

LBNL's June 2026 update places its U.S. reference estimate at 649 TWh of data center electricity in 2030, with compound-uncertainty scenarios from 521 to 843 TWh, equivalent to approximately 9.5%-15.3% of projected U.S. electricity consumption. These are projections, not observed 2030 outcomes; data centers host many kinds of workloads. [2]

Declining electricity per simple task does not guarantee declining total demand. The IEA warns that reasoning-intensive, video, and agentic workloads can use far more energy than a simple text interaction, while demand for such services grows. Consequently, there is no scientifically defensible single figure for the energy cost of "an AI prompt" across applications, vendors, hardware, times, and locations. [1]

1.2 Water depends on geography and infrastructure

Water is implicated in onsite cooling, electricity generation, and upstream equipment production. Consumption (water not returned to the local source) must not be confused with withdrawal (water removed and sometimes returned). A peer-reviewed 2025 review by Lei and colleagues found workload-level water consumption can vary by more than 10,000-fold across studied conditions, driven by server efficiency, electricity supply, utilization, cooling design, climate, and related factors. This is a variability finding, not a typical "liters per chat" estimate. [3]

A 2026 study in Environmental Science & Technology identified water-supply gaps affecting about a quarter of its mapped global data centers in historical hydrologic conditions and projected wider exposure under future scenarios. Such spatial findings highlight local concerns rather than establishing the impact of a particular provider or Nova Resonance workload. [4]

The environmental significance of a liter of water differs by place and time. A cooling strategy that lowers onsite freshwater use may increase electricity demand; an electricity source may reduce carbon intensity without necessarily reducing water demand. Site, watershed, season, cooling design, water quality, and local access are relevant to any responsible claim. Water stress should be assessed using location-specific tools such as WRI Aqueduct where facility location is known. [3, 4, 12]

1.3 Hardware, carbon and cost-shifting also matter

GPU and server production, replacement, distribution, and disposal create embodied emissions and material demands. Counting only electricity consumed during an inference task omits part of the lifecycle. The ISO lifecycle-assessment framework and Software Carbon Intensity standard offer established methods for defining boundaries and including operational and hardware impacts. [8, 9]

Power grids and local communities may face new investment costs, capacity constraints, emissions, or competition for water. A global average is not a substitute for local inquiry. The IEA emphasizes that electricity-price outcomes depend on grid conditions and policy choices, and that the sector faces real public concern around affordability and the environment. [1]

2. Why potential benefits deserve consideration

Nova Resonance's declared purpose is to help people create, connect, learn, explore, and make meaningful work. Core Resonance envisions an interactive musical ecosystem; JamBot is intended to respond to musicians rather than replace them; the wider organization proposes educational and creative spaces that support participant autonomy. These are documented purposes and designs, not independently established environmental or social outcomes. [NR1, NR2]

There is credible evidence that AI can change creative experiences. In a randomized writing study published in Science Advances, access to AI ideas improved independent assessments of some individual stories, while AI-assisted stories became more similar to each other. This supports a nuanced potential for assistance, alongside a risk of homogenization; it does not demonstrate equivalent effects in games, music, accessibility, or Nova Resonance. [6]

Certain AI applications can also help optimize energy systems: IEA analyses discuss grid operations, electricity-system integration, and industrial energy savings. Such prospective savings depend on actual deployment and rebound effects; they cannot be credited to a creative AI project that does not perform those functions. It would be misleading for Nova Resonance to invoke global AI-enabled decarbonization scenarios as a direct offset for its own computing. [7, 1]

Quality is not a productivity score

Nova Resonance deliberately rejects equating the value of creative work or participants with output volume, speed, ranking, or throughput. Meaningful quality should be interpreted through creators' and collaborators' accounts, contextual critiques, agency, originality, relationships, and the work itself. Meanwhile, electricity, greenhouse gases, water, and hardware use must be accounted for quantitatively where possible. Measuring resource use is not the same thing as quantifying the worth of art or people.

The possible benefits include access to exploration that some collaborators could not otherwise afford, new modes of musical response, more varied avenues for participation, and sustained creative relationships. For Nova Resonance, these are hypotheses and aspirations pending direct evidence, best explored through case studies and consented participant accounts rather than confident promotional claims.

3. Why the benefits cannot simply be added up against the risks

No common unit converts creative meaning into liters of freshwater, carbon emissions, or the loss of a neighboring community's access to energy. The phrase "benefits outweigh risks" is therefore a judgment requiring explicit values, comparisons, and limits, not a scientific formula. In particular, a benefit to a distant user cannot automatically justify an avoidable burden imposed on people living near a data center.

A credible determination requires four independent tests

- Purpose and counterfactual: What does the participant seek to create or understand? Could the desired experience be supported without generative AI, with less AI, or with a lighter technical system?
- Environmental sufficiency: Are electricity, water and hardware impacts reasonably understood, proportionate to the use, and minimized where choices exist? Are location-sensitive harms excluded?
- Consent and quality: Does the participant find the collaboration worthwhile on their own terms? Are authorship, accessibility, critical disagreement, privacy, and the right not to use AI preserved?
- Revisability: What information would cause Nova Resonance to reduce, replace, pause, or end the AI component? Have affected people been heard, not merely informed?

An enthusiastic participant account does not prove environmental harmlessness. Likewise, an environmental impact inventory alone cannot determine whether art is meaningful. Both forms of evidence are necessary and answer different questions.

4. A concrete environmental stewardship commitment for Nova Resonance

The following is a proposed policy for founder review, not a claim about practices already deployed, vendors already audited, or energy/water footprints already measured.

1. Default to intention, not automation

For each proposed AI feature, explain what human creative purpose it serves. Offer a no-AI or reduced-AI path when feasible. Avoid AI additions that merely create spectacle or engagement without participant value.

2. Use proportionate computation

Favor deterministic code, existing audio/MIDI processing, rules, and smaller or task-specific models when adequate. Avoid unnecessary re-generation, endless loops, duplicate agents, always-on background calls, and needless high-cost media generation. [5]

3. Distinguish verified facts from estimates

Keep records of model/provider, workload type, call count where known, runtime, hardware if available, provenance of resource estimates, and unknowns. Do not assert gallons per chat or provider-specific carbon neutrality without a traceable method.

4. Consider locality and water

Where provider disclosure permits, consider water risk, electricity mix, cooling method, and regional timing. Record when site-level data is unavailable rather than filling the gap with reassuring global averages. [3, 12]

5. Assess lifecycle and procurement

Include operational energy and reasonable allocation of embodied hardware effects. Seek provider evidence rather than accepting marketing labels; consider lifecycle principles from ISO 14040 and ISO/IEC 21031. [8, 9]

6. Preserve creator control and agency

Disclose AI participation, preserve authorship and creative intent, obtain consent for materials and training uses, and permit collaborators to decline AI features without being penalized or excluded.

7. Review and correct

Let contributors and impacted communities raise objections. Record uncertainties and changes. Pause harmful designs and publish revisions when the evidence changes.

5. A feasible Nova Resonance case-study protocol

A credible environmental claim requires a bounded, representative example from Nova Resonance, not only industry-wide averages. A first study could follow one opt-in creative session involving a musician, a participant-chosen goal, and a small Core Resonance or JamBot interaction. The session can remain exploratory and respectful without evaluating its participants as productivity units.

Qualitative creative inquiry

Compare three approaches to the same participant-defined aim: (A) human-only or conventional creative tool; (B) lightweight or narrowly specified assistance; (C) interactive general-purpose AI collaboration. Creators should not be required to prefer any pathway. Collect original sketches, process notes, participant reflection, criticism, observations of disagreement or surprise, and whether their intended meaning survived. Preserve the full conversation where consented. Avoid ranking artistic worth or forcing an output target.

Environmental accounting, separately reported

Document which resources are actually consumed or reasonably attributable in each path, using functional boundaries agreed in advance. Track available energy (kWh), greenhouse gas emissions (kg CO₂e), direct and indirect water consumption (liters, clearly distinguished from withdrawal), hardware assumptions, workload types, location/time uncertainty, and provider disclosure gaps. Use location- and market-based emissions reporting as appropriate to the reporting boundary; do not double-count reductions. [8-11]

Interpretation

Present creative accounts alongside environmental findings rather than converting them into a single benefit-to-harm score. Ask: Did AI enable a valued experience that the alternatives did not? Were the environmental differences material and avoidable? Which harms were invisible, and to whom? Did AI reduce the artist's independence or amplify sameness? What would a reasonable dissenting collaborator say about the result?

This study would not establish a general AI footprint or universal superiority. It would offer an honest, reproducible account of one Nova Resonance decision, plus grounds for choosing differently next time.

6. How to speak with an environmentally concerned collaborator

Lead with recognition and a choice

Suggested opening: "Your concern about electricity and water use is legitimate. We do not think every AI application is justified. We want people to create and participate, not to transfer environmental costs onto someone else. If you collaborate with us, we can talk openly about where AI is used, when we can avoid it, and what information we still need. You should be free to say no."

Questions and evidence-based answers

Doesn't every prompt waste water?

Computing has an environmental footprint, but a single universal water-per-prompt claim is unreliable. Research shows very large differences by task, location, grid and cooling design. That does not mean the water use is zero. [3]

Aren't data centers a growing climate problem?

Yes. Their total electricity demand is rising rapidly, including from AI-specific workloads. That is a reason to limit unnecessary use and demand transparent accounting, not an argument for pretending the impact is negligible. [1, 2]

Can't you just use renewable electricity?

Cleaner generation helps with some emissions; claims still depend on timing, accounting and grid effects, and they do not automatically solve water stress or embodied hardware impacts. [8, 10, 11]

Does AI genuinely improve the art?

Sometimes it may change or expand an artist's creative options, but that cannot be promised for everyone. Some research also finds more uniform creative outputs. The participant decides what matters. [6]

How will you prove you are responsible?

By making the environmental boundaries and uncertainties visible, testing smaller alternatives, documenting why AI is necessary for a given experience, and allowing affected participants to challenge the decision.

Can I take part without AI?

That should be a real option wherever practical. If a particular experience necessarily uses AI, disclose that up front and support a genuine refusal without pressure.

7. Limits, objections, and stopping conditions

This paper does not establish: (1) that all AI is net environmentally beneficial; (2) a per-prompt water cost for any Nova Resonance vendor; (3) that Nova Resonance's benefits have already exceeded its ecological costs; (4) that IEA energy-saving scenarios directly offset artistic AI workloads; or (5) that recycling, offsets, or renewable-energy contracts eliminate local water impacts.

Reasonable objections remain. Hosting-site information may be proprietary; an AI alternative may be more energy-intensive; rising use can erase efficiency gains; a project may transfer costs to communities not represented in the collaboration; creator benefits may be confounded by novelty or prompt effort; and conversational attachment may reduce critical distance. An honest position paper should welcome these objections as design inputs.

Proposed pause conditions: credible evidence of avoidable harm to local water or energy access; unexplained resource growth without added participant value; an inability to meaningfully describe crucial environmental assumptions for an expanded deployment; coercion to use AI; or a cheaper and lower-impact alternative that satisfies the creator's intended experience just as well.

Conclusion

The responsible case for AI is not "the benefits always outweigh the risks." It is: "We will use AI deliberately where it opens possibilities people genuinely value, investigate the full environmental costs, prefer lower-impact alternatives, and change course when the burden is not justified."

Nova Resonance's principle, Create More. Consume Less., can be a demanding design standard rather than a slogan. To earn trust from a skeptical collaborator, the company must give them reliable facts, real decision-making power, and permission to disagree. The quality of a creative experience matters; so does the condition of the world in which it becomes possible.

References and source notes

- [1] International Energy Agency (IEA). 2026. Key Questions on Energy and AI, executive summary. Global 2025 electricity, scenario projections, query energy variation, grid and affordability. [Source ↗](#)
- [2] Smith, S. J., et al. 2026. United States Data Center Energy Usage Report: 2025 Update. Lawrence Berkeley National Laboratory. U.S. projections, uncertainty ranges. [Source ↗](#)
- [3] Lei, N., Lu, J., Shehabi, A., & Masanet, E. R. 2025. "The water use of data center workloads: A review and assessment of key determinants." *Resources, Conservation & Recycling* 219, 108310. doi:10.1016/j.resconrec.2025.108310. [Source ↗](#)
- [4] "One Quarter of Global Data Centers are Located in Water-Stressed Areas." 2026. *Environmental Science & Technology* 60(39), 27780-27791. doi:10.1021/acs.est.6c08088. Site exposure analysis. [Source ↗](#)
- [5] Luccioni, A. S., Jernite, Y., & Strubell, E. 2024. "Power Hungry Processing: Watts Driving the Cost of AI Deployment?" *ACM FAccT*, 85-99. doi:10.1145/3630106.3658542. [Source ↗](#)
- [6] Doshi, A. R., & Hauser, O. P. 2024. "Generative AI enhances individual creativity but reduces the collective diversity of novel content." *Science Advances* 10(28), eadn5290. doi:10.1126/sciadv.adn5290. [Source ↗](#)
- [7] IEA. 2025. Energy and AI, especially "AI and climate change" and energy optimization chapters. Exploratory benefits, adoption barriers, rebound effects. [Source ↗](#)
- [8] International Organization for Standardization. ISO 14040:2006. Environmental management - Life cycle assessment - Principles and framework. [Source ↗](#)
- [9] ISO/IEC 21031:2024. Software Carbon Intensity (SCI) specification. Methodological standard for software carbon intensity, including hardware allocation. [Source ↗](#)
- [10] GHG Protocol. Scope 2 Guidance. Location-based and market-based accounting and disclosure. [Source ↗](#)
- [11] Green Software Foundation. Software Carbon Intensity Specification. Public technical specification and implementation concepts. [Source ↗](#)

[12] World Resources Institute. Aqueduct Water Risk Atlas. Methods and location-sensitive water stress screening. [Source ↗](#)

[13] Shehabi, A., et al. 2024. United States Data Center Energy Usage Report. Lawrence Berkeley National Laboratory. Historical baseline and methodology. doi:10.71468/P1WC7Q. [Source ↗](#)

Internal Nova Resonance source documents

[NR1] Nova Resonance - Current Framework Pack.md (accessible private project record, October 2026). Covers Creative Studio, Core Resonance, JamBot, company identity and participant-centered values. Internal design intent, not proof of deployment.

[NR2] Nova_Resonance_WorkBot_Master_Direction_Brief_2026-10-07.md (accessible private project record). Documents "Create More. Consume Less.", Adaptive Resonance, creative aims and environmental/participant risk sensitivity. Internal direction, not a verified environmental audit.

[NR3] 02 Decisions & Handoff in the Nova Resonance Continuity Archive (updated 9 October 2026). Documents a founder instruction not to reduce creative work or collaborators to quantified performance; this does not preclude physical environmental measurements.

Publication status: Public working paper, approved for release by the Nova Resonance founders.

AI assistance was used in drafting and research synthesis. Not peer-reviewed; independent full-source verification is not certified. Proposed policies and environmental assessments are not implemented.